MUA Submission:

Inquiry into the Long-term productivity of Australia's maritime logistics system

22 February 2022

Productivity Commission

Submitted by email: maritime@pc.gov.au

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Executive Summary

There is widespread recognition that Australia and the world currently face significant supply chain problems, particularly global container shipping being much more expensive, slower, and less reliable. Fewer than 1 in 5 container vessels on the critical high-volume Asia to Australia and New Zealand routes arrived on time for their container terminal time slots for large parts of 2021. Within a year freight rates from China to Australia and New Zealand more than doubled, and to Europe they have more than quadrupled. Significant levels of global and domestic inflation are linked to these increased costs.

Underlying these issues is a rapid consolidation of container shipping lining companies through mergers, takeovers, and new forms of Alliances between companies. 90-95% of vessel cargo capacity in Melbourne, Adelaide and Fremantle is controlled by the three major global container shipping Alliances, and 70-80% in Sydney and Brisbane. In Melbourne the top 4 container liner companies, in only two Alliances, control 76% of vessel cargo capacity in Q4 2021 - up from 54% in Q2 2017 (TOR 5).

Neither Australian government policy nor regulation has not kept up with these developments – either in the direct regulation of the international container shipping companies, or in how these supply chains are integrated into planning and management of Australian ports and logistics. The companies operating across these supply chains have been left to pursue their own self-interest - little wonder the public has lost out.

The ACCC Container Stevedoring Monitoring Report 2020-21 sought to blame container terminal workers and their Enterprise Agreements for these global and structural problems. In this submission we show that this analysis is simply not correct, and based on a misunderstanding of the Waterline productivity data, the nature of the investments made into new container terminal technology, and how global benchmarks are designed and whether they are suitable for benchmarking purposes.

If the PC focusses the attention of this inquiry on industrial relations it will miss other more significant issues in maritime logistics that do require attention.

This Inquiry is an opportunity to properly grapple with a real challenge facing Australian supply chains – our reliance on international shipping, which is not regulated and is exempted from the normal competition laws that applies to other businesses in Australia. Consolidation and new kinds of commercial Alliances have resulted in a sharp decline in the registration of liner shipping conference agreements which triggers the exemption from the anti-cartel provisions of the *Competition and Consumer Act 2010* provided by Part X, and means that the conditions attached to those exemptions to protect Australia's national interest are no longer effective.

Other countries, particularly the USA, have responded to these challenges by reforming their regulation of international container liner shipping. Australia has still not properly examined or addressed this issue. While the ACCC issued a 2019 discussion paper on its proposal to replace the Part X exemption with an Ocean Liner Shipping Class Exemption, it was only 13 pages long and asked industry to provide 'industry background'. Submissions were only received from government departments and bodies with direct commercial

interests in aspects of container liner shipping – there was no robust independent analysis of the situation or of policy options available to government. This is a reform the OECD called for in 2002, and it appears to still be stalled in Australia.

In this submission we:

- Analyse productivity measures used in Australia, and provide recommendations for improvement
- Examine the productivity of Australian ports, including the relationship between investment in new technologies and productivity
- Analyse productivity measures used for international benchmarking, and provide recommendations for improvement
- Provide background on the stevedoring workforce in Australia, the unique employment arrangements in the industry, and measures in place to ensure good labour supply, a flexible and productive workforce, and safety of the workforce
- Analyse and refute the criticisms made by the ACCC of particular clauses in MUA Enterprise Agreements
- Analyse the problems with international shipping services to Australia, including trends in consolidation, lack of reliability, and the challenges for productivity and shipping users caused by increasing throughput compared to flat or declining total vessel cargo capacity
- Examine international initiatives to better regulate international container shipping to ensure it meets domestic needs
- Examine the powers of the Australian government to better regulate international container shipping, an provide recommendations on how this should be carried out;
- Provide recommendations on improving planning, management and regulation of ports
- Examine the cross-sectoral challenge of managing empty containers.

Recommendations are collated in a section that follows, and also appear near the relevant text in the body of the report.

The next section provides a summary of our analysis of Australian port productivity, before proceeding to deal with each to of the Inquiry Terms of Reference.

Australian port productivity in brief

Waterline data shows that the labour contribution to quay line container terminal productivity has improved considerably over time, but that capital productivity has not kept up:

- Container terminal productivity as measured by the ship rate (a combination of capital and labour productivity) has dramatically improved over the last 22 years (when the ACCC commenced monitoring container terminal productivity performance) rising from under 30 container moves per hour to over 60 containers moves per hour, notwithstanding a slight dip over the last two financial years due to factors outside the control of the terminal operators.

- Capital productivity (measured by the crane rate) has flatlined, pretty much from 2000-01, but definitely since 2009-10, rising from around 26 containers per hour to just 30 per hour over the past 20 years.

- Labour productivity (measured by the labour rate) has steadily risen since 1998-99, with a slight dip in 2018-19 to 2020-21, rising from around 22 containers per hour to around 50 per hour. The slight dip in labour productivity over the last three financial years is explained firstly, by the increase in the size of ships, particularly the extended beam of larger ships, without any corresponding change in the performance capability of cranes allocated to those larger ships; second the increase in congestion on the apron due to the larger exchanges taking place from those larger ships and the inability of automated stacking cranes (ASCs) to keep up with quay cranes; and third, over 2020 and 2021, COVID related factors which, in relation to the rapid spread of the Omicron strain, means that COVID 19 factors will continue to impact port performance over 2022 and possibly longer.

- The revenue received by terminal operators per container has fallen by 27.6 per cent over the past 10 years, and by over 33 per cent over the past 20 years. That is, the cost of container terminal operations (based on the crane rate) has fallen dramatically, and cost efficiency has improved dramatically over the past 20 years. Improved labour productivity performance from quay crane operations has been a significant contributory factor in that cost efficiency improvement.

The reason quay crane productivity has decreased after yard automation in ports is due to automated stacking cranes (ASCs) not having the speed or capacity to keep up with manually operated quay cranes. Manual quay cranes are still used in all but the VICT terminal in Melbourne, which uses semi-automated quay cranes where the operator is not in a cab on the crane but operates the crane from an onsite remote-control room.

The ACCC conclusions on port productivity are in part founded on a fatal misunderstanding of the application of new crane technology in Australian ports.

We highlight a number of flaws and gaps in the ACCC analysis which suggests that little, if any, weight should be placed on its conclusions about productivity performance and labour relations at Australian ports. The ACCC Container Stevedoring Monitoring Report of 2020-21 analysis of productivity contains two serious flaws which need to be understood in considering the legitimacy of its conclusions about trends in productivity and labour relations issues at Australian container stevedoring ports:

- Firstly, the ACCC appears to have assumed that the large investments in automated terminal equipment by terminal operators includes investment in automated quay cranes. That is not the case. The only terminal which has invested in automated quay crane technology is Victoria International Container Terminal (VICT), and those are semi-automated quay cranes which still require a human operator.
- Second, the ACCC, in using measures based on a gross crane rate to assert Australia has poor terminal productivity performance, has then erroneously conflated performance based on measures using a gross crane rate with poor labour relations practices. But the workforce and the labour relations arrangements that are relevant to functions that can affect the gross crane rate, such as availability of tugs, mooring services and marine pilotage, are not associated with port workers. The fact is that terminal operator workers and the enterprise bargaining agreements that they work under which the ACCC claims are a significant causal factor in explaining its erroneous conclusions about terminal productivity performance have no role in many of the port operations that impact on the crane rate using gross crane productivity measures, such as average on-berth hours and average idle hours.

We have undertaken a detailed analysis of the ACCC observations on the alleged better productivity performance of New Zealand ports. That in-depth analysis reveal that the apparent better productivity performance of New Zealand ports was achieved on the back of exceptionally poor safety practices leading to fatalities and serious injuries, along with poor labour relations practices. We encourage you to consider the submission from the Maritime Union of New Zealand on this point.

Port congestion, and failure to meet berthing windows, was already occurring prior to the COVID 19 exacerbations to supply chain performance, essentially commencing from the time of shipping line consolidations and formation of new container line alliances.

We urge a rejection of the arguments advanced by the US Cato Institute and the ACCC which essentially says that port workers are not entitled to their human right to a good salary and a secure job that includes a fair work-life balance, and because the workforce, represented by their labour unions have negotiated such an outcome, they are a therefore a primary cause of port congestion. We urge the Productivity Commission to demonstrate more objectivity and sophistication, and ensure that whatever proposals it may advance in developing a productivity framework that is capable of benchmarking and which may advance proposals to improve productivity at Australian ports that those proposals are compatible with Australia's and company obligations to conform with a range of human rights and labour standards conventions to which Australia is a signatory.
The MUA has identified a range of variables that impact on container terminal productivity, which need to be considered in designing a like-with-like comparison of port productivity. These include:

- The nature of the service contract between the shipping line and the terminal operator i.e. what stevedoring service or service performance is the shipping line paying for
- The quality and timeliness of information flows from ship to shore e.g. the vessel stowage plan, and whether there is late notification of a ship route that could result in containers needing to be picked up for loading in a different sequence to that specified in an original stowage plan
- The prevalence of multi-port calls which increases the complexity of the container storage task, because of the need to reposition containers between port calls (known as restows). This requires more crane movements to load and unload containers than if the entire cargo were to be loaded or unloaded at a single port
- The number of cranes a stevedoring company allocates (per berth) to a ship, noting that physical maximisation of cranes may not lead to linear improvements in productivity due to under/behind the crane or apron congestion
- The performance capability/limitations of the landside equipment supplied by the container terminal operator
- The availability of landside equipment, which could be out of service due to repairs and maintenance being performed
- The allocation of labour by the terminal operator. Australian terminal operators invariably under allocate labour to the lashing function which results in lost time at the end of the vessel loading where the crane rate is zero because the containers have all been loaded but there is still lashing to be done so work is not technically complete. Additionally due to safety requirements, lashing cannot occur under a working crane which means at least the entire final ship's bay needs to be lashed after the last container is loaded
- The skills, qualifications and experience of the labour supplied to operate the landslide equipment
- The safe operating standards applied by the employer/workforce in accordance with WHS law, regulation, codes of practice and collective bargaining agreement (CBA) provisions
- The extent of automation of the landslide equipment provided by the terminal operator, noting the international consensus that automated equipment cannot perform to the same levels as manually operated equipment
- The size and configuration of the ship – larger ships with wider beams and higher stacks require a longer time over the ship for cranes to pick containers; larger ships also result in larger exchanges creating more congestion inside a terminal, which slows down container movement (see for example the discussion at section 4.3. Quay-crane deployment in The case study of an Australian container terminal operator)86. Smaller ships on the other hand result in more lateral movement of quay cranes, thus slowing down lifts per hour. See also a 2017 analysis by JOC showing that crane productivity peaks at the 7,000-10,000 TEU vessel size
- The age of the ship and quality of lashing bars – the data shows that container ships visiting Australia are older ships – with an average age of 13 years
- Whether the unloaded containers are for transhipment or local landside distribution, noting that most containers unloaded in Australia are for local landside distribution, meaning they are positioned in the yard at a longer distance from the berth, requiring longer intra-terminal transportation time;

- The ratio of 20-foot containers to 40-foot containers, noting that the carrying capacity (payload) of a 40-foot container is not twice that of a 20-foot container. Accordingly, a move to 40-foot containers over time will result in a larger increase in TEUs than would otherwise be expected by the volume increase in tonnes. The rising share of 40-foot containers in overall container trade explains some, but not all, of the decline in tonnes per TEU of trade across recent history;
- Terminal configuration and layout which can affect container handling rates. Loading and unloading operations and the land transport interface for the receival and dispatch of containers can become congested, if the physical layout of the terminal and the type of container handling machinery being used is inadequate. Further, yard space determines how far containers must be moved between stack and ship. The stack height determines how many containers must be moved to gain access to a container at the bottom of the stack, for example;
- The yard space and stacking methodology applied;
- The terminal operators' access to closely located container parks (and the capacity/productivity of those container parks);
- Government mandates or policies which impact on terminal operations, such as targets for the transfer of containers by rail from terminals, impacted by rail access and capacity constraints; and
- The labour relations standards provided in enterprise bargaining agreements settled between the terminal operator companies and the labour union representing the workforce, where provisions such as additional rest where temperature exceeds a specified level, quay crane drivers hot-seat changeovers mid-run, performance benchmarks, workers' toolbox meetings that run beyond allocated time for work breaks, bi-annual union meetings, and unsafe work, all of which may impact on working time.

We support the Productivity Commission undertaking an international productivity benchmarking study so the findings can be included in its draft report, provided it first convenes a meeting of stakeholders to settle on the methodological framework for undertaking the study, with one critical condition. That condition is that the Productivity Commission convene a second meeting of stakeholders aimed at reaching understandings on how the results of the study are interpreted and to enable the Productivity Commission to outline to stakeholders how it intends to use the results of the study in terms of any remedial action it might propose in responding to the results or findings.

If the Productivity Commission intends undertaking a new benchmarking study, we suggest the following principles and criteria be incorporated into the methodology to be applied to ensure a like-with-like comparison:

- The ports are gateway ports and not predominantly transhipment or hub ports;
- The ports handle a similar number of containers/TEUs annually;
- The port handles a similar full to empty ratio; and 20 foot to 40-foot, ratio;
- That the yard area/configurations are similar;
- That the ship size ranges serviced by the port are similar i.e. the ship size (by TEU, LOA and beam) that are serviced by the port, are similar;

- The ports have a similar level of terminal operators i.e. 3, and if not, explain the number of terminal operators (and the terminal operators are the direct employers of the container terminal workforce).

We propose there be seven international benchmarking indicators:

- The crane rate, using Australian definitions on the time divisor shown as both containers and TEUs per hour. Crane time being the time allocated by the stevedoring company to work on a container ship, assuming the container ship is ready for loading or unloading, which is calculated as the sum of hours that each quay crane is allocated to a ship, less operational and non-operational delays, so it does not include delays due to the following: no labour allocated; closed-port holiday; port-wide industrial stoppage; total crane time spent handling break-bulk cargo and containers that require manual intervention, e.g. use of wires, chains, non-rigid spreaders or other handling gear; Award or enterprise agreement breaks as applicable; adverse weather; delays caused by the ship or its agent; all breakdowns, including spreader changes; other equipment breakdowns which stop crane operations; booming up for passing ships; handling hatch covers; cage work and lashing/unlashing where crane operations are affected; crane long-travelling between hatches and crossing accommodation; labour withdrawn without operator's agreement including enterprise agreement related industrial stoppages; over-dimensional containers requiring additional (rigid) spreader; spreader changes; waiting for export cargo; or defective ship's gear (e.g. jammed twist-locks, broken cell guides, ballast pumps unable to maintain list/trim)
- The elapsed labour rate, using Australian definitions on labour hours (i.e. the elapsed labour time = the time elapsed between labour first boarding a container ship and labour last leaving the ship, less any time when the labour has not worked for whatever reasons including non-operational delays such as: no labour allocated to ship; closed-port holiday; industrial stoppages; and containers that require manual interventions, e.g. use of wires, chains, non-rigid spreaders or other handling gear, but also allowing for reasonable delays such as meal breaks; machinery breakdowns shift changes; weather events) — shown as both containers and TEUs per hour:
- The ship rate, again using Australian definitions on input data – shown as both containers and TEUs per hour:
- Proportion of ships waiting at anchorage for more than 2 hours (subject to consensus that the 2-hour time divisor is appropriate) and or the proportion of ships arriving on time to meet their allocated berthing window slot; and
- Average lifts per hour of container terminal operations.
- Quay crane density, being the number of cranes available on the berth accounting for minimum crane spacing, and target crane utilisation; and
- Cost (in US$ and Aus$, using an agreed Australian labour cost benchmark standard) of quay crane operations per elapsed labour hour.

About us

This submission has been prepared by Maritime Union of Australia (MUA). The MUA is a Division of the 120,000-member Construction, Forestry, Maritime, Mining and Energy Union and an affiliate of the 20-million-member International Transport Workers' Federation (ITF).

The MUA represents approximately 13,000 workers in the shipping, offshore oil and gas, stevedoring, port services and commercial diving sectors of the Australian maritime industry.

Recommendations

Recommendation 1: That the Productivity Commission undertake an examination of the quay crane rate, the elapsed labour rate and the ships rate (by containers [crane lift cycles]), not TEUs) of the different container terminal technological applications being utilised by different terminal operators in Australia, and to consider recommending such a data series be incorporated in future volumes of Waterline.

Recommendation 2: That the Productivity Commission obtain from terminal operator companies and publish in its Inquiry report, data on quay crane and yard capacity improvements arising from terminal operator investment in landside equipment and technologies, and that the Productivity Commission recommend that the ACCC publish such information in its annual Container Stevedoring Monitoring Report.

Recommendation 3: That the Productivity Commission propose that BITRE enhance its Waterline data series by inclusion of additional data sets as proposed, namely: new indicators that capture landside technological applications and the impact of that technology; aggregations of terminal equipment such as straddle carriers, yard trucks, reach stackers, stacking cranes, empty container handlers and forklifts per terminal operator and per port; container exchange data; data on empty containers to enable monitoring; and cost data.

Recommendation 4: That the Productivity Commission adopt the MUA proposal of seven indicators for international benchmarking in development of 'a framework of performance measures to determine port performance and benchmarking Australian ports internationally', namely: the crane rate; the elapsed labour rate; the ship rate; the proportion of ships waiting at anchorage for more than 2 hours; average lifts per hour of container terminal operations; quay crane density; and cost.

Recommendation 5: That the Productivity Commission should support, or should not undermine, efforts to increase security of employment and access to sick leave in the maritime industry.

Recommendation 6: That the Productivity Commission recommend that domestic and international seafarers must be given status as key workers with priority access to vaccines and the ability to cross state and international borders and have shore leave. The Australian government and agencies must participate in international efforts to address the lack of vaccination of seafarers, the crew change crisis, and access to shore leave for seafarers.

Recommendation 7: That the Productivity Commission recommend that maritime workplaces have access to free rapid antigen testing for Covid and that broader covid safety measures protect not only the workforce but the supply chain itself.

Recommendation 8: That the Productivity Commission recommend improvements to maritime logistics VET Qualifications and Skill Sets to improve workers' career advancement and labour mobility. The Skills Council (Australian Industry Standards) has made efforts in the stevedoring area which have been largely ignored by employers. At a minimum, licences

should be developed to operate ship's cranes, auto-stacking cranes, straddle carriers, all rail track gantry cranes and other container handling equipment.

Recommendation 9: That the Productivity Commission remind employers that the right to collectively bargain and to take strike action is protected by human rights agreements signed by the Australian government. Government agencies should not be writing reports that undermine these agreements. ACCC employees must receive training in the human rights protected by ILO agreements, as well as the functioning of Australia's industrial relations system.

Recommendation 10: That the Productivity Commission recommend that if the ACCC or other agencies of the Australian government wish to make comment about the particular provisions of enterprise agreements, they should first seek comment from the parties to the agreement.

Recommendation 11: That the Productivity Commission consider that the content of Enterprise Agreements are already highly restricted by the Fair Work Act. We are aware that some organisations are seeking further restrictions on allowable content for maritime Enterprise Agreements. This must not be supported, as a one-size fits all solution will impede the ability to make agreements suitable to the circumstances of each workplace and employer, and we believe this to be a smokescreen for further attacks on workers' rights and conditions of employment.

Recommendation 12: That the Productivity Commission recommend a review of the National Freight and Supply Chain Strategy and the National Ports Strategy to ensure that they properly incorporate and plan for Australia's international and domestic shipping needs.

Recommendation 13: That the Productivity Commission solicit an independent analysis of international shipping lines and services to Australia over the past 10 years including:

- For each international container port:
    - Total available vessel cargo capacity
    - Port calls
    - TEU handled
    - Reliability of service
- For each port – what are the key needs of importers and exporters, and how well do the shipping services on offer match these needs?
- Container services to Australia – a complete list, and analysis of how they are controlled, how they have changed over time, what companies are involved, what Alliances are involved, and how the Alliances are organised (commercially and practically).
- How the three Alliances relate to the services in Australian ports
- How different freight rates on different global routes have affected trades to Australia, including whether containers and container vessels have been redeployed from servicing Australia to the China-Europe route.

Provision must also be made to ensure ongoing high-quality research on these issues is produced and made public.

Recommendation 14: That the Productivity Commission recommend improvements in long term strategic planning for port infrastructure, and the regulation of ports in the public interest. This must involve robust consultation and planning, strong economic regulation, coordination between levels of government, licensing of port services, and port-level plans for future port development objectives and safety and environmental management.

Recommendation 15: That the Productivity Commission recommend that the provision of a coastal container shipping service be investigated, particularly to connect Fremantle and Adelaide and potentially other ports in Victoria, South Australia and West Australia to larger international container hub ports in other states.

Recommendation 16: That the Productivity Commission recommend the establishment of a fleet of internationally-operating container ships as part of a national Strategic Fleet, with services planned to facilitate critical exports, imports and availability of containers. Fuller recommendations are available in the MUA document The need for a Strategic Fleet, June 2021.

Recommendation 17: That the Productivity Commission support the reform of the *Coastal Trading (Revitalising Australian Shipping) Act 2012* to ensure a better balance of domestically and internationally controlled shipping across all shipping trades. A suite of recommendations is available in the MUA document Reform of coastal trading regulation – creating a better ship licencing system for a balanced system of maritime cabotage , March 2021.

Recommendation 18: That the Productivity Commission recommend that legislation be introduced to require all container liner shipping services operating to Australia to register their service, regardless of their corporate structure and the number of companies involved. Registration should include minimum service requirements and obligations to require 30-day notification of schedule and fee changes, minimum reliability standards, maximum ship size (length, beam and draught (keel and air)), and ongoing monitoring.

Recommendation 19: That the Productivity Commission recommend that the Australian government establish a Regulator of International Shipping, a new independent statutory body with strong functions and powers aimed at ensuring that international shipping operating to Australia is compliant with all human rights and legal obligations and serves the needs of the Australian public in the short and long term. Responsibilities would include:

- Registering, monitoring, and publishing details on all container shipping services to Australia, and ensuring they meet tests and obligations for reliability, notification of schedule and fee changes, ship size, and are developed with the participation of industry stakeholders
- Receiving and mediating complaints about international shipping services to Australia
- Undertaking investigation and evidence gathering on the cartel or anti-competitive behaviour of international shipping lines
- Planning future shipping needs to Australia, and ensuring services and infrastructure are available to meet those needs, under a coordinated arrangement involving the state and NT governments, and state/NT maritime and economic regulators

- Mechanisms to address non-compliance with international human rights, labour standards, WHS standards and corporate governance norms, declarations and conventions to which Australia is a signatory.

Recommendation 20: That the Productivity Commission support the repeal of Part X of the *Competition and Consumer Act 2010* and its replacement with a limited class exemption for a single purpose - to collude and reach agreement between shipping lines for the exchange, selling, hiring, or leasing (or subleasing) spaces (slots) on vessels.

- If there is sound evidence to suggest that such an approach could impede or inhibit Australia's access to frequent and reliable liner cargo shipping services to meet the demand by importers and exporters of containers at internationally competitive freight rates, that for shipping lines with 25% or less market share (by TEUs exchanged in Australian ports) that a class exemption be extended to permit:
    - Coordination and/or jointly fix sailing timetables and the determination of port calls in Australia;
    - Pooling of vessels to operate a network; and
    - Adjusting capacity in response to fluctuations in supply and demand for international liner shipping services.

Recommendation 21: That the Productivity Commission ensure that improvements it recommends to liner conference agreement processes enable stakeholder organisations other than the designated shipper body (currently the Australian Peak Shippers Association) to provide inputs to the liner ship conference service provision arrangements.

Recommendation 22: That the Productivity Commission recommend that obligations on shipowners and masters (as the agent of the owner) regarding payment of seafarer employment entitlements be strengthened, along with the provisions for vessel detention arising from non-compliance with payment of seafarer employment entitlements, as well as conditions of re-entry for vessels that have previously been detained.

Recommendation 23: That the Productivity Commission recommend that a holistic strategy to deal with the management and repositioning of empty containers be developed, and mechanisms to monitor it built into existing Waterline data.

The challenge we face in Australia's maritime logistics (TOR 1a)

TOR 1 a) Examine the long-term trends, structural changes, and impediments that impact the efficiency and dependability of the maritime logistics system

The maritime logistics system and its associated supply chains are struggling.

Why?

Australia has a disproportionate reliance on foreign-registered ships due to the decimation of our domestically-controlled international trading fleet, and our domestic fleet. Few checks were put on the market power of shipping lines when the Australian National Line was sold in 1998. The recent consolidation of container shipping lines and formation of Alliances has had a major effect in Australia.

The three new container Alliances control up to 90-95% of vessel cargo capacity in Melbourne, Adelaide and Fremantle, and 70-80% in Sydney and Brisbane. In Melbourne the top 4 container liner companies, in only two Alliances, control 76% of vessel cargo capacity in Q4 2021 - up from 54% in Q2 2017 (TOR 5).

But the real test is what level of service is offered, and do these services meet the needs of the Australian public. Across all ports, reliability is down and capacity has been squeezed. With much higher freight rates to be obtained in other parts of the world, vessels and containers are being shifted out of Australian trades, even as Australian container throughput continues to grow. Total vessel cargo capacity and port calls are down 30-40% in Adelaide and Fremantle. In Sydney and Melbourne, throughput has significantly increased while vessel cargo capacity has remained flat. Fuller ships mean more complicated loading and discharge, and challenges in maintaining productivity (TOR 5).

International shipping lines also have a disproportionate political influence in Australia. They continue to be exempted from normal competition laws. While obsessing about competition between container terminal operators, Australian governments have ignored the waves of reform of the regulation of international shipping around the world, beginning in 2002 when the OECD recommended that exemptions for rate-fixing container liner agreements be removed from national legislation (TOR 5). Current efforts to reform by repeal of Part X of the Competition and Consumer Act and replace it with more appropriate regulation appear to be stalled (TOR 5).

These same international shipping lines have had an excessive influence on how productivity is measured for international benchmarking purposes, (TOR 1b), and on port policy and port investment (TOR 5).

Recommendations in this submission call for more balanced measurements of productivity, and the creation of a Regulator of International Shipping to ensure that shipping services meet domestic requirements, without violating the human rights of workers on board.

In ports and on shore, there has been a lack of integrated long-term strategic planning for freight infrastructure and the workforce. Freight planning has been highly fragmented between levels of government and modes of transport, and not adequately included ports and shipping. The result has been:

- Very small portions of container freight on rail
- Congestion on the landside interface of stevedores and fraught relations between stevedores and landside logistics
- Abandonment of a domestically controlled and crewed shipping fleet across all sectors
- New port infrastructure constructed on the basis of servicing demands of international shipping lines rather than efficiently servicing Australian needs
- Workforce skills shortages, for the management of ports (which relies on shipping qualifications) and on vessels

State governments, encouraged by national incentives for 'asset recycling', sought long term leases of port infrastructure on the basis of highest revenue rather than planning for future infrastructure needs. The result has been:

- Insufficient regulation of privatised ports, particularly of land-rent charged by the newly privatised entities to stevedores and other port service providers.
- Unnecessary constraints on the construction of new port infrastructure eg. at the Port of Newcastle.

Competition policy made the introduction of a third container terminal operator a key goal in ports policy, resulting in:

- Duplication of services in relatively small ports such as Brisbane, meaning high levels of investment was not targeted to areas of need but instead created overcapacity. Hutchison continues to have very small throughput.
- Increase of the unconstrained market power of international shipping lines to extract lower prices from stevedores, requiring terminal operators to increase other fees and charges to maintain a revenue stream to meet their investment requirements as port throughput increases.
- Disjointed implementation of this policy meant the third terminals were split between two different companies (Hutchison and VICT), creating further inefficiencies.

Investment by container terminal operators has not necessarily been directed to productivity improvements as measured by government agencies, but according to the commercial priorities of the individual terminal operator companies. This can include reducing labour costs, dealing with particular issues around the layout of individual terminals, and choices about managing landside logistics.

The destruction of domestic manufacturing capacity has significantly increased our reliance on imports. Hence events like Chinese New Year, the Beijing Olympics, and the periodic closure of ports and factories in China and in other countries due to covid has a disproportionate effect in Australia.

The government's aggressive stance towards China has inflamed tensions with our largest trading partner, with multiple imports from Australia slowed or banned.

Many international vessels visiting Australian ports are in a poor state of repair, with container securing equipment also in a poor state of repair and in non-compliance with Marine Order 32 and other WHS legislation. Losing containers overboard is becoming a more frequent occurrence and the Australian Maritime Safety Authority is undertaking a multifaceted project to address this.[1] Where safety problems are identified on ships, work is required to take place, and this can cause delays.

The global seafaring workforce has suffered terribly from border closures and travel restrictions. Despite Australia's reliance on sea transport there has not been a coherent Commonwealth response to address these impacts. International seafarers have been subjected to forced labour and unable to leave ships at the end of their contract, and have insufficient access to COVID vaccines. UNCTAD has drawn attention to these problem in its most recent *Review of Maritime Transport*.[2]

Understanding port productivity measures (TOR 1b)

1. *b) developing a **framework of performance measures** to determine port performance and benchmarking Australian ports internationally.*

We have raised concerns that the ACCC's diagnosis of poor port productivity in Australia is flawed, and those significant portions of the analysis presented in the *Container Stevedoring Monitoring Report 2020-21* are not supported by the data the ACCC presents.
Port productivity is a deceptively complex area, and it is critical to understand the underlying assumptions behind any measure, what information the measure actually provides, and what conclusions can be drawn. This applies to both domestic data, and particularly to international data where there may be even more variability in port structure, data collection and assumptions made.

In the following sections we present:

- An analysis of existing Australian port productivity data: what it tells us and what it does not tell us
- How container terminal automation has impacted port productivity
- Key interests and assumptions behind different ways of measuring port productivity
- An analysis of the World Bank/IHS Markit port productivity data used by the ACCC, and the key interests and assumptions behind it
- Recommendations for how Australian container port productivity data can be improved
- How accurate international benchmarking could be undertaken.

[1] For example, AMSA launches campaign targeting container ships | AMSA Media Hub.
[2] UNCTAD, Review of Maritime Transport 2021, p. xxiv

Waterline's current Australian measures of port productivity

The principal source of port productivity information for Australia is the Waterline series produced bi-annually by the Bureau of Infrastructure and Transport Research Economics (BITRE).[3]

The BITRE Waterline series provides measures of:

- Container terminal throughput, disaggregated to:
  - Wharf-side throughput
  - Landside throughput
  - Whole of container terminal throughput
  - Whole of port throughput.

- Container terminal productivity, disaggregated to:
  - Wharfside productivity measures
  - Landside productivity measures
  - Whole of container terminal productivity measures.

Measures of container terminal throughput

Wharf-side throughput measures

- **Indicator 1.1 UCC ships handled** - Only fully cellular ships, or Unitised Cellular Container (UCC) ships, are included in this indicator.
- **Indicator 1.2 Total containers handled** - This is the total number of containers lifted on/off UCC ships at specialised container berths. These counts are not standardised to account for different container sizes. Thus, one 20-foot container and one 40-foot container are counted as two containers.
- **Indicator 1.3 Total TEUs handled** - This indicator is similar to total containers handled (Indicator 1.2), but measured in 'twenty-foot equivalent units' (TEUs). It accounts for containers of different sizes.
- **Indicator 1.4 40-foot containers as proportion of all containers handled** - This is the number of 40-foot containers as a proportion of all containers handled.

Landside throughput measures

- **Indicator 1.5 Number of trucks used in VBS/TAS operations** - This is the count of trucks processed through either the vehicle booking system (VBS) or the truck appointments system (TAS). This count excludes trucks that perform bulk runs of empty containers between the container parks and container terminals. This indicator counts trucks on a round trip. That is, a truck entering a container terminal and the same truck exiting the container terminal is counted as one truck.
- **Indicator 1.6 Total number of containers transported by trucks and rail** - This indicator includes the total number of containers transported in all modes on the landside, either by trucks or by rail. Counts of containers in this indicator are further

[3] Bureau of Infrastructure and Transport Research Economics (BITRE), *Waterline*, https://www.bitre.gov.au/taxonomy/term/82

broken down into Indicator 1.7 (containers moved by trucks) and Indicator 1.8 (containers moved by rail).

- **Indicator 1.7 Total number of containers transported by trucks** - This indicator includes the total number of containers transported by VBS/TAS trucks. This indicator is computed using data provided by stevedores. Up to Waterline 55, this indicator included the trucks undertaking bulk runs; this has been discontinued due to inconsistent data.
- **Indicator 1.8 Number of containers by rail** - The total number of containers carried by rail in or out of container terminals, using data supplied by container port operators. This indicator includes containers handled through 'on-dock' and 'near-dock' rail sidings. 'Ondock' refers to rail sidings accessible by yard container handling equipment, whereas 'neardock' sidings are those within the port precinct, but accessed via the public road network. Only on-dock rail data is reported for Sydney, as port precinct rail data is not available.
- **Indicator 1.9 Total number of TEUs transported by trucks and rail** - This indicator includes the total number of TEUs transported in all modes on the landside, either by trucks or by rail. Counts of TEUs in this indicator are further broken down into Indicator 1.10 (TEUs moved by trucks) and Indicator 1.11 (TEUs moved by rail).
- **Indicator 1.10 Total number of TEUs transported by trucks** - This indicator includes the total number of TEUs transported by VBS/TAS trucks. Up to Waterline 55, this indicator included the number of TEUs transported by trucks undertaking bulk runs; this has been discontinued due to inconsistent data.
- **Indicator 1.11 Number of TEUs by rail** - The total number of TEUs carried by rail in or out of container terminals, using data supplied by container port operators. This indicator includes containers handled through 'on-dock' and 'near-dock' rail sidings. 'Ondock' refers to rail sidings accessible by yard container handling equipment, whereas 'neardock' sidings are those within the port precinct, but accessed via the public road network. Only on-dock rail data is reported for Sydney, as port precinct rail data is not available.

Whole of container terminal throughput measures

- **Indicator 1.12 Total number of container ship visits** - This is a count of all port calls by UCC ships where the vessel visited and exchanged containers at the container terminal.
- **Indicator 1.13 Total number of containers (lifts) exchanged** - This indicator is estimated using Indicator 1.4 (proportion of 40-foot containers) and the total number of TEUs exchanged with container vessels, as reported by ports.

Whole of port throughput measures

- **Indicator 1.14 Total cargo throughput** - This is the weight, measured in tonnes, of all container and non-container general cargoes that passed through the port.
- **Indicator 1.15 Non-containerised general cargo throughput** - This is the weight of non-container general cargoes processed through a port. Non-container general cargo refers to break bulk commodities including machinery, iron and steel products, timber, paper and timber products and other general cargoes. It does not include bulk cargoes.

- **Indicator 1.16 Total number of TEUs exchanged** - This is a count of TEUs, exchanged through the port. This count is further broken down into Indicators 1.17 to 1.20.
- **Indicator 1.17 Full import TEUs** - This is a count of full containers in TEUs imported (unloaded) at the port.
- **Indicator 1.18 Empty import TEUs** - This is a count of empty containers in TEUs imported (unloaded) at the port.
- **Indicator 1.19 Full export TEUs** - This is a count of full containers in TEUs exported (loaded) at the port.
- **Indicator 1.20 Empty export TEUs** - This is a count of empty containers in TEUs exported (loaded) at the port.

Measures of container terminal productivity

Wharfside productivity measures (Measures of productivity on the wharf-side of a container terminal relate only to containers moved by stevedoring companies from/to UCC ships at that container terminal)

- **Indicator 2.1 Crane rate—containers per hour -** This is computed as the total number of containers handled divided by the total crane time. The crane time is the time allocated by the stevedoring company to work on a container ship, assuming the container ship is ready for loading or unloading.[4] It is the sum of hours that each quay crane is allocated to a ship[5], less operational and non-operational delays, so it does not include delays due to the following (an exhaustive list):
  - No labour allocated;
  - Closed-port holiday;
  - Port-wide industrial stoppage;
  - Total crane time spent handling break-bulk cargo and containers that require manual intervention, e.g. use of wires, chains, non-rigid spreaders or other handling gear;
  - Award or enterprise agreement breaks as applicable;
  - Adverse weather;
  - Delays caused by the ship or its agent;
  - All breakdowns, including spreader changes;
  - Other equipment breakdowns which stop crane operations;
  - Booming up for passing ships;
  - Handling hatch covers;
  - Cage work and lashing/unlashing where crane operations are affected;
  - Crane long-travelling between hatches and crossing accommodation;
  - Labour withdrawn without operator's agreement including enterprise agreement related industrial stoppages;

[4] BIRTE has advised MUA that this means "unlashing is complete, crane is in position, boom down, ready for first lift".

[5] BITRE has advised MUA that this means "the crane is assigned to perform work on a ship. This would not be as straightforward as the (elapsed) labour time as a crane could conceivably be de- or re-allocated during a port call. For example, if three cranes are assigned initially, but work is complete on all but two bays; or a vessel departure makes additional cranes available to work the remaining vessels." Also "the crane time should be a "practical" measure, i.e. it is the time each crane is actively working vessels, summed up over all cranes and all ship calls for the quarter."

- Over-dimensional containers requiring additional (rigid) spreader;
- Spreader changes;
- Waiting for export cargo; or
- Defective ship's gear (e.g. jammed twist-locks, broken cell guides, ballast pumps unable to maintain list/trim):
  - Note that the ACCC says the crane rate is an indicator of **capital productivity** that reflects the intensity to which quayside cranes are worked.

- **Indicator 2.2 Elapsed labour rate—containers per hour** - This indicator is computed as the number of containers handled divided by the total elapsed labour time. Sometimes this measure is reported as the ''ship working rate''. The elapsed labour time is the time elapsed between labour first boarding a container ship and labour last leaving the ship[6], less any time when the labour has not worked for whatever reasons including non-operational delays such as:
  - No labour allocated to ship;
  - Closed-port holiday';
  - Industrial stoppages; and
  - Break bulk and containers that require manual interventions, e.g. use of wires, chains, non-rigid spreaders or other handling gear:
    - In contrast to 'crane time', 'elapsed labour time' is not equivalent to the total labour-hours worked:
      - ✓ The ACCC says this is an indicator of **labour productivity** (The 'elapsed labour rate' is computed as the 'number of containers handled' divided by the 'elapsed labour time').

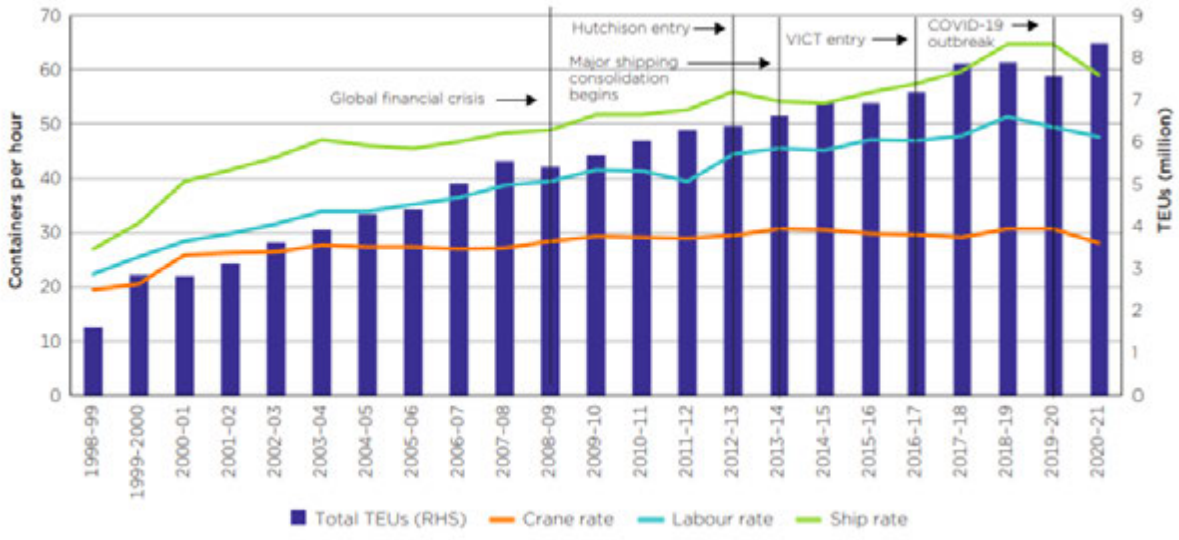
- **Indicator 2.3 Ship rate—containers per hour -** This is the average number of containers moved on or off a ship in an hour:
  - The ACCC says the ship rate is a measure of **overall labour and capital productivity combined**.
- **Indicator 2.4 Crane rate—TEUs per hour** - This is similar to Indicator 2.1 after converting containers to TEUs.
- **Indicator 2.5 Elapsed labour rate—TEUs per hour** - This is similar to Indicator 2.2 after converting containers to TEUs.
- **Indicator 2.6 Ship rate—TEUs per hour** - This is similar to Indicator 2.3 after converting containers to TEUs.
- **Indicator 2.7 Throughput pbm (containers per berth metre)** - This is the number of containers through a container terminal divided by the length (in metres) of berths.[7] At a container terminal it measures the intensity of use of the terminal container

[6] BITRE has advised MUA that "the 'elapsed labour time' is a descendant of the early-Waterline 'net time'; an 'elapsed time' with deductions for various stoppages. The original phrasing of the 'elapsed time' was 'the total time the ship is alongside the berth offering for work, whether worked or not, measured from labour first ordered to last labour ashore'. 'Labour first ordered' should be interpreted as closest to 'about to step onto the gangway' or earlier."

[7] BITRE has advised MUA that "Total berth length is as published by port authorities and/or port operators (i.e. not stevedores), for only those berths with dedicated container-handling equipment. Depending how they are published by the port, these may be a sum of individual berth lengths, or an entire quay line. For Melbourne, the Toll/SeaRoad berths (Webb Dock 1 & 2 East) are included as they each handle more than 2% of total port TEUs. This approach is specific to Melbourne."

handling facility. The six-month figure is a weighted average of the corresponding quarterly throughput.

Figure 1: Container terminal productivity in Australia – 1998-99 to 2020-21



Source: ACCC, *Container stevedoring monitoring report – 2020–21,* October 2021, Figure 6.1, variables derived from Waterline 66 (not 68 as incorrectly recorded by ACCC), P58,

Landside productivity measures

- **Indicator 2.8 Containers per truck** - Count of containers processed through the VBS/TAS systems divided by the total number of VBS/TAS trucks used.
- **Indicator 2.9 TEUs per truck** - Count of TEUs through the VBS/TAS systems divided by the total number of VBS/TAS trucks used. In contrast to Indicator 2.8, this indicator measures the truck efficiency in a standard unit, a TEU, and thus takes into account the different sizes of containers.
- **Indicator 2.10 Proportion of trucks backloaded** - This indicator shows the number of backloaded trucks as a proportion of the total VBS/TAS trucks. It was published for the first time in Waterline 57. 'Backloaded operations' refers to trucks which haul containers on both the inbound and outbound legs of a single trip. Such operations make more effective use of trucks and landside infrastructure.
- **Indicator 2.11 Average truck turnaround time** - The indicator measures the time elapsed from when the truck enters the gate of a container terminal to the time when the last container is loaded. It does not include the time the truck waits outside the gate of a container terminal. This is a measure of stevedoring efficiency and shows how quickly a stevedoring company processes trucks at a container terminal.
- **Indicator 2.12 Average container turnaround time** - This indicator is calculated as the 'average truck turnaround time' (Indicator 2.11) divided by 'average containers per truck' (Indicator 2.8). It is a measure of the stevedoring efficiency in handling containers at a container terminal. Container turnaround time improves (that is, it goes down) if either the truck utilisation rates improve, implying that the number of

containers per truck increases, or the container terminal is faster in processing each truck.

Whole of container terminal measures

- **Indicator 2.13 Median of ship turnaround time** - This is the median of the time (in hours) a containership is in a port. It is the time that elapses from the time a ship enters a port to the time a ship leaves the port.
- **Indicator 2.14 95th percentile of ship turnaround time** - The 95th percentile indicates that for 95 per cent of the ships, the turnaround time is below the value of the indicator. Conversely, for 5 per cent of the ships, the turnaround time is above the value of the indicator.
- **Indicator 2.15 Number of ships waiting at anchorage for more than 2 hours** - This indicator provides the number of container ships, as reported by port authorities, that waited for longer than 2 hours for port entry clearance at the time of the ship's first entry. Delay before entering a port usually results from the geography-specific situation of a port and may also be caused by operational reasons, either at the terminal, the ship, or both.
- **Indicator 2.16 Proportion of ships waiting at anchorage for more than 2 hours** - This is the number of container ships in Indicator 2.15 as a proportion of the total number of container ships that visited the container terminal in the period.
- **Indicator 2.17 Average waiting time at anchorage** - This is the average time (hours) ships have waited in anchorage. Only ships that waited for port entry clearance for two hours or more are included in the calculation.
- **Indicator 2.18 Median waiting time at anchorage** - This is the median of time (hours) ships have waited in anchorage. Only ships that waited for port entry clearance for two hours or more are included in the calculation.
- **Indicator 2.19 Total time ships spent at berth** - This is the total hours spent in berth by all dedicated container ships (UCC) that exchanged containers at that port. The time a ship spends in berth is the elapsed time between the time a ship arrives at berth and the time of its departure from berth. Port authorities report the berth time as a 'gross value' including all times spent by a ship at berth such as time for loading/unloading containers, for maintenance and supply operations, or waiting for labour or suitable weather.
- **Indicator 2.20 Average TEUs per ship-hour at berth** - This is the total TEUs lifted on/off dedicated container ships (UCC) divided by the total time ship spent in berth (Indicator 2.19). The indicator is strongly influenced by changes in average number of TEUs exchanged per visiting ships and by the mix of ship sizes during the period. The average number of TEUs exchanged also varies seasonally and cyclically.
- **Indicator 2.21 Average lifts per ship-hour at berth** - This indicator is similar to Indicator 2.20 whereas the total crane lifts (containers handled) are used in calculating the indicator rather than the number of TEUs.
- **Indicator 2.22 Total time ships are available to stevedores** - This is the total time (in hours) when ships can be loaded or unloaded.
- **Indicator 2.23 Average lifts per hour of stevedoring operation** - This is the total number of crane lifts (containers handled) divided by the total (gross) time available to stevedores for loading and unloading containers.

- **Indicator 2.24 Average lifts per berth visit** - This is the number of crane lifts (containers handled) divided by the number of berth visits of dedicated container ships (UCC).

Understanding the Waterline data

Firstly, the Waterline productivity measures only relate to ship to shore or quay crane operations. Waterline does not measure other terminal crane operations, such as yard stacking cranes.

Secondly, Waterline does not provide any cost indicators. Cost indicators are crucially important in measuring the actual and relative performance of new landside technologies, such as use of Automated Stacking Cranes (ASCs). The literature on automated crane technology invariably emphasises that the key driver or rationale for introduction of automated crane technology, be it associated with quay cranes or stacking cranes, is the reduction in labour required or improved labour productivity measured by the unit labour cost as a ratio of the output e.g. cost per container move.[8]

The introduction of automated crane technology is generally not motivated by improved crane cycle times. In fact, the evidence indicates that because terminals face many potential disturbances and disruptive factors (see examples below) that are not readily managed by automated equipment, the result is that automated crane equipment is not as efficient as manually operated equipment, requiring highly sophisticated exception management, which is still evolving. Some of those disturbances and disruptive factors are:

- The quality of arriving containers and/or twist locks;
- The difficulty in automatically identifying containers due to illegible ID numbers;
- Automated truck identification may suffer from low hit rates for similar reasons;
- A truck/chassis appears to be different than expected;
- Loading sequence is disrupted – due to vehicle break-down, wrong container weights etc;
- Stowing groups are filled differently than planned due to new information;
- Truck drivers and or operators may not behave as expected and disrupt the automated process; and
- Equipment breakdowns.

We note that efficiency can be measured as a time factor and or a cost factor. We know for example that VICTs Webb Dock terminal at the Port of Melbourne is not as efficient (measured by the crane rate i.e. containers moved per time unit) compared to the manually operated terminals operated by DPW and Patrick Terminals at Swanson Dock at Port of Melbourne, but we do not know if the VICT terminal is less, more or similar in terms of cost efficiency. What we need to know is whether the handling rates are being achieved using the most economically efficient mix of capital and labour resources, given their relative costs.

[8] See for example, Port Equipment Manufacturers Association (PEMA), Information Paper, *Container Terminal Automation*, https://www.pema.org/wp-content/uploads/downloads/2016/06/PEMA-IP12-Container-Terminal-Automation.pdf

What can we say about Waterline quay crane productivity measures?

National conclusions

The key Waterline container terminal productivity measures (or quay crane/berth measures, as distinct from overall port productivity) use a methodology that is broadly consistent with internationally recognised container terminal productivity measures.

The Waterline productivity measures are therefore an adequate set of measures to examine each Australian port's productivity performance, having regard to international methodological practice, and to compare Australian inter-port productivity given the data inputs for each of the port specific data sets, aggregated to a five-port average, are the same.

The publicly available data does not permit an analysis or comparison of intra-port performance i.e. specific container terminal operator performance. This is a significant disadvantage because it impedes the ability to determine the impact of different container terminal technologies adopted by Australian container terminal operators. We strongly urge the Productivity Commission to recommend a body, or to undertake itself, an examination of the quay crane rate, the elapsed labour rate and the ships rate (by containers [crane lift cycles]), not TEUs) of the different container terminal technologies being utilised by particular terminal operators in Australia, and to consider recommending such a data series be incorporated in future volumes of Waterline.

> **Recommendation 1:** That the Productivity Commission undertake an examination of the quay crane rate, the elapsed labour rate and the ships rate (by containers [crane lift cycles]), not TEUs) of the different container terminal technological applications being utilised by different terminal operators in Australia, and to consider recommending such a data series be incorporated in future volumes of Waterline.

Subject to two critically important qualifications the Waterline 'ship rate' measure (Indicator 2.3) may also be adequate for comparing Australia ports (separately or as a 5 port or Australian average) with ports outside Australia.

We also believe it would be useful to have measures of cost efficiency.

The most important qualifications (factors that must be known to make a truly accurate international comparison) are:

- Is the crane move data based on containers or TEUs moved per hour?
  - A crane moving only 40-foot containers each move will move double the number of containers [if measured as TEUs] each hour relative to a crane moving only 20-foot containers):
    - Furthermore, are the cranes capable of, and lifting, two containers per lift, or for a proportion of lifts or only one container per lift (irrespective of container size) i.e. are all cranes in the comparison twin lift cranes; and

- How are the hours that are used as the divisor defined i.e. from what point in the unloading cycle does the time factor to calculate hours to be used, commence, and once loading is underway from that commencement point, what disruptions are included or excluded?
  - Commencement may be from the time of the first/last mooring line tie up (berthing), the time when the stevedoring gang begins climbing the gangway to start unlashing, the start of unlashing, the time the quay crane moves to position, the time its boom is finished lowering for the first lift, or the time at which the crane's spreader locks onto the first box, etc; and
  - In terms of inclusions and exclusions are disruptions to quay crane lifts (cycles) such as hatch cover removal, crane operator changeovers, non-operator induced factors such as container repositioning.

It is this second qualification which determines in part if the measure is a gross or net measure. For a net measure, it needs to be known what is netted out from the gross berthing time to ensure the comparison is accurate i.e. is it comparing like-with-like. The quite different methodology for calculating hours in the Waterline wharfside productivity measures and in the World Bank-IHS Markit Container Port Performance Index 2020 (CPPI) report[9] (World Bank-IHS Markit CPPI report) guarantees that this is not a like-with-like comparison, which confirms the caution the World Bank has suggested in drawing conclusions from its CPPI report.

There are nevertheless several key observations that can be made about Australian container terminal (berth or quay crane) productivity from a review of Waterline time series data:

- First, that container terminal productivity as measured by the ship rate (a combination of capital and labour productivity) has dramatically improved over the last 22 years (1998-99 [regarded as a watershed moment in Australian port operations, hence the start of ACCC container terminal monitoring] to 2020-21), rising from under 30 container moves per hour to over 60 containers moves per hour notwithstanding a slight dip over the last two financial years due to factors outside the control of the terminal operators. This is shown in Figure 1 above:
  - Note however, that had the ACCC used the ship rate based on TEU moves per hour the 2019-20 ship rate would have shown TEU moves per hour had increased to 96.5 per hour by end 2019-20 (an average of the Jan-Jun and Jul-Dec 2019-20 data).[10]
- Second, that capital productivity (measured by the crane rate) has flatlined, pretty much from 2000-01, but definitely since 2009-10, rising from around 26 containers per hour to just 30 per hour over the past 20 years.
- Third, that labour productivity (measured by the labour rate) has steadily risen since 1998-99, with a slight dip in 2018-19 to 2020-21, rising from around 22 containers

[9] The World Bank, 2021, *The Container Port Performance Index 2020: A Comparable Assessment of Container Port Performance,* World Bank, Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO, produced in conjunction with IHS Markit, https://www.maritimes.gr/images/PORTS/Container-Port-Performance_Index-WB-2021.pdf?_t=1620669079

[10] BITRE, *Waterline 67*, December 2021, Table 2.6, P39, https://www.bitre.gov.au/sites/default/files/documents/water_067.pdf

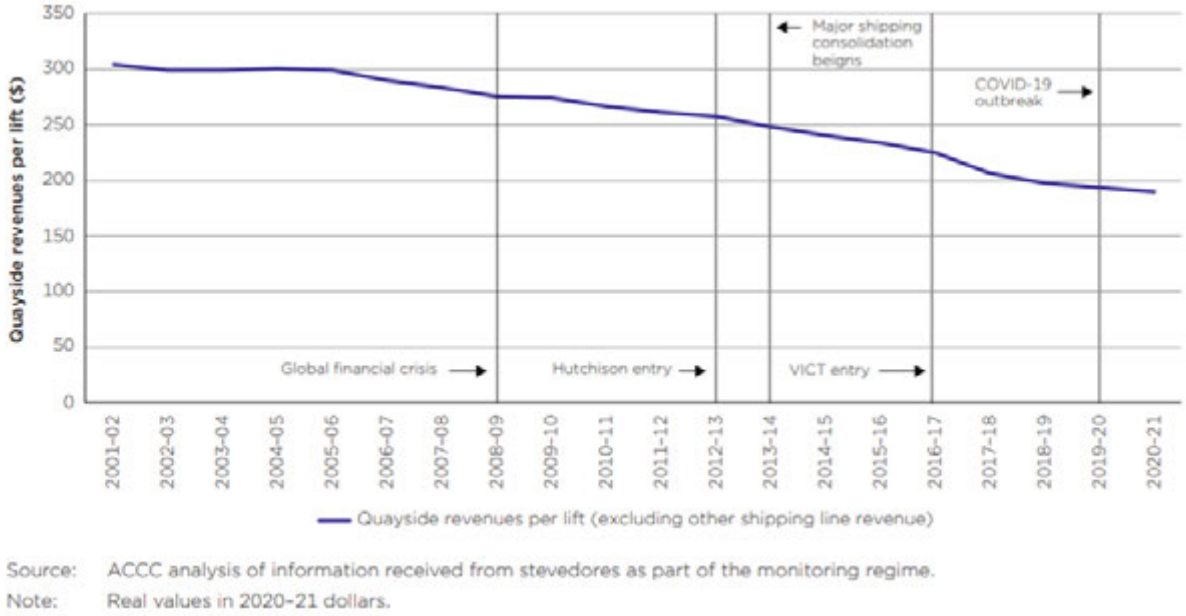
per hour to around 50 per hour. The slight dip in labour productivity over the last three financial years is explained firstly, by the increase in the size of ships, particularly the extended beam of larger ships, without any corresponding change in the performance capability of cranes allocated to those larger ships; second the increase in congestion on the apron due to the larger exchanges taking place from those larger ships and the inability of automated staking cranes (ASCs) to keep up with quay cranes; and third, over 2020 and 2021, COVID related factors which, in relation to the rapid spread of the Omicron strain, means that COVID 19 factors will continue to impact port performance over 2022 and possibly longer. The ACCC reported in 2021 that terminal operators had advised it that the risks associated with the pandemic had driven up their operating costs and impacted productivity, and that "*One stevedore noted they had implemented various initiatives to comply with health directives from governments and supply chain partners. These all impacted on productivity and resulted in common activities taking longer to complete. Stevedores also faced increased labour allocation requirements and administrative costs.*"[11]:

  - Clearly however, the significant improvement in labour productivity has been the main contributor to overall container terminal productivity improvement over the last 22 years. In fact, the overall improvement in container terminal productivity appears to be almost entirely due to the increase in labour productivity. Conversely, the largest contributor to the decline in quay crane productivity in 2020-21 of 8.7 per cent relative to 2019-20 was the decline in capital productivity, down 8.5 per cent whereas labour productivity was only down by 3.5 per cent.[12]

- Fourth, as shown by data presented in Figure 2 in the ACCC Container Stevedoring monitoring report 2020-21 the aggregate revenue received by terminal operators (per container) associated with the operation of quay cranes from which the crane rate is derived has fallen by 27.6 per cent over the past 10 years, and by over 33.0 per cent over the past 20 years.[13] That is, the cost of container terminal operations has fallen dramatically, and cost efficiency has improved dramatically over the past 20 years. Improved labour productivity performance from quay crane operations has been a significant contributory factor in that cost efficiency improvement.

[11] ACCC, *Container stevedoring monitoring report – 2020-21*, P20, https://www.accc.gov.au/system/files/Container%20stevedoring%20monitoring%20report%202020-21.pdf
[12] Ibid, Pxxiv, graphic showing container terminal productivity
[13] ACCC, *Container stevedoring monitoring report, 2020-21*, P48 https://www.accc.gov.au/system/files/1465_Container%20stevedoring%20monitoring%20report%202017-18_D08.pdf

Figure 2: Aggregated quayside revenue per lift for Patrick, DP World and FACT: 2001–02 to 2020–21



Source: ACCC analysis of information received from stevedores as part of the monitoring regime.
Note: Real values in 2020-21 dollars.

Source: ACCC, Container stevedoring monitoring report – 2020–21, No 23, October 2021, Figure 5.2 P48, https://www.accc.gov.au/system/files/Container%20stevedoring%20monitoring%20report%202020-21.pdf

This is acknowledged by the ACCC which reported in its 2020-21 report that:

> "Labour cost per lift in 2018–19, at 51.5 per cent, is the lowest observed throughout the 21 years of the ACCC's monitoring of the waterfront. A study found that in East Asian ports the proportion of labour cost to total cost is around 35 per cent, while it is around 50 per cent in Northwest Europe, and around 65 per cent on the west coast of the United States."[14]

Given that both revenue per container lift is decreasing as container volumes and throughput increase, and as labour costs per lift are decreasing in relative terms, cost efficiency is at an all-time high in Australian container terminals.

International conclusions

Drawing from the Waterline data and available international port productivity data that uses similar data inputs and similar measures, Australia's port performance compares very favourably, notwithstanding there are contextual factors relevant to Australian ports that inherently mitigate against achievement of the best international performance. Perhaps the main contextual factor that must be taken into consideration is that Australian ports are not transhipment ports but are gateway ports, which impacts on yard logistics, and second, Australian ports have notoriously challenging yard layouts which also impacts on yard logistics.

[14] ACCC, *Container stevedoring monitoring report*, 2018-2019–20, P72, https://www.accc.gov.au/system/files/Container%20stevedoring%20monitoring%20report%202019-20.pdf

The Journal of Commerce (JOC)[15] port productivity data for 2012 relating to vessels of less than 8,000 TEUs, published in 2013 – see Table 1 – shows quay crane (or container terminal) productivity ranging from 80 to 69 container moves per hour in the globe's top 10 performing terminals.

Waterline No. 53 shows that in 2012, the Australian ship rate was 56 containers per hour, just 13 containers per hour less than the 10th top ranked port in the globe at that time.[16]

Table 1: Port productivity based on JOC research - global ports - vessels less than 8,000 TEUs - 2012

PORT	COUNTRY	BERTH PRODUCTIVITY*
Qingdao	China	80
Shanghai	China	79
Nhava Sheva (Jawaharlal Nehru)	India	79
Ningbo	China	77
Busan	South Korea	77
Jebel Ali	United Arab Emirates	77
Taipei	Taiwan	73
Tianjin	China	70
Salalah	Oman	70
Elizabeth	U.S.	69

Source: JOC Port Productivity Research

Source: JOC Group, *Key Findings on Terminal Productivity Performance Across Ports, Countries and Regions*, Whitepaper, July 2013,
Note: JOC defines berth productivity as the number of total container moves (on-load, off-load, and re-positioning) divided by the number of hours during which the vessel is at berth (time between berth arrival, or "lines down" and berth departure, or "lines up"), without adjustments for equipment and labour down time. The productivity metrics contained in these rankings are the average berth productivity for all validated and standardised vessel calls in the database for each port or terminal during calendar year 2012.

Similarly, JOC port productivity data published by Loadstar.com just three years later in 2015 reveals berth (container terminal) productivity in the globe's top 25 ports – see Table 2 – which we understand was also derived from JOC data.[17] It shows container terminal productivity by containers per hour, ranging from 180 containers per hour in the top ranked terminal down to 99 containers per hour in the 25th ranked terminal. This data shows the dramatic range in productivity performance, even across the top 25 performing terminals.

[15] JOC merged with IHS Markit whose data provided the inputs to the World Bank report entitled *The Container Port Performance Index 2020*, quoted in the ACCC Container Stevedoring Monitoring Report 2020-21. Data published by JOC is therefore regarded as authoritative.
[16] BITRE, *Waterline 53*, Table 2.6 Container terminal productivity: Five ports, P41 https://www.bitre.gov.au/sites/default/files/water_053.pdf
[17] Loadstar.com, The LongRead Vol. 1, June 2015, *Measuring port performance*, https://theloadstar.com/wp-content/uploads/The-Loadstar-LongRead-Port-productivity1.pdf

Table 2: Top global terminals – TEUs per hour - 2015

TOP TERMINALS WORLDWIDE

TERMINAL NAME	PORT NAME	COUNTRY	BERTH PRODUCTIVITY
APM Terminals Yokohama	Yokohama	Japan	180
Tianjin Port Pacific International	Tianjin	China	144
DP World-Jebel Ali Terminal	Jebel Ali	United Arab Emirates	138
Qingdao Qianwan	Qingdao	China	136
Tianjin Port Alliance International	Tianjin	China	132
Ningbo Beilun (Second)	Ningbo	China	127
Guangzhou South China Oceangate	Nansha	China	122
Busan Newport Co Ltd	Busan	Republic of Korea	119
Yantian International	Yantian	China	117
Nansha Phase I	Nansha	China	117
Xiamen Songyu	Xiamen	China	116
South Asia Gateway	Colombo	Sri Lanka	111
Ningbo Gangji Yining	Ningbo	China	110
Dalian Port	Dalian	China	109
Khorfakkan	Khor al Fakkan	United Arab Emirates	108
Yangshan Deepwater Port Phases 3/4	Shanghai	China	107
Hyundai Busan Newport	Busan	Republic of Korea	104
Red Sea Gateway	Jeddah	Saudi Arabia	103
Yangshan Deepwater Port Phases 1/2	Shanghai	China	103
Tianjin Port	Tianjin	China	102
APM Terminals Rotterdam	Rotterdam	Netherlands	102
Meishan Island International	Ningbo	China	102
Salalah Container Terminal	Salalah	Oman	99
Busan New Port	Busan	Republic of Korea	99
Kao Ming	Kaohsiung	Taiwan	99

Source: Loadstar.com, The LongRead Vol. 1, June 2015, *Measuring port performance*.

If in fact the data sets in Tables 1 and 2 are drawn from the same (JOC) source and use the same definition of port productivity as referenced in the 2012 data set, then the data in Table 3 raises several important questions. First, how did some ports dramatically lift their productivity performance in just three years. For example, Qingdao China improved from 80 to 136 moves per hour, Shanghai from 79 to 107 moves per hour etc. If the data is not comparing like-with-like data it demonstrates just how fraught are international comparative data sets.

Perhaps one explanation for the improvement is a massive investment by the major international transshipment ports in handling the larger ships that were rapidly entering the container shipping market at that time, by increasing both the number and capability of the cranes to service those larger ships, while Australia had not at the time felt the full cascading impact of larger ships and had at that stage not responded by an investment in more and better quay cranes.

In 2019 the ACCC reported that:

> Ports and stevedores have been making investments to accommodate larger ships, but these investments are irregular because the visits by the larger ships are infrequent. As a result, larger ships sometimes contribute to congestion at Australian container terminals, as 2 berths may be taken up by one vessel. In addition, the capital costs incurred by ports and stevedores are passed on to Australian cargo owners. Consolidation and alliances have also led to shipping lines having greater bargaining power in negotiations with stevedores, container parks and cargo

> owners. Shipping lines have used this bargaining power to negotiate lower charges from both stevedores and empty container parks.[18]

In Australia however, the ACCC observed in 2012 that in previous monitoring reports:

> the five-port net crane rate generally remained within a band of 26 to 28 containers per hour between mid-2001 and mid-2009. This led the ACCC to question the efficiency gains from investment in new equipment. Since 2009–10 however, the five-port average net crane rate has risen and remained largely stable at around 29 containers per hour in year average terms. The increase in capital productivity observed in the last two years after a long period of comparatively stable productivity rates has coincided with the impending entry of a third stevedore. The move away from the current stevedoring duopoly at several ports over the next few years is significant as new entry raises the prospect of heightened competition in the supply of stevedoring services. More competitive pressure would be expected to increase the incentives for the stevedores to use existing terminal capacity, including labour and capital inputs, more productively. The near completion of third terminal works at Sydney has coincided with Patrick announcing a major investment to install automated stacking cranes (similar to its approach at its Fisherman Islands terminal in Brisbane), which it claims will boost productivity and improve performance at its Port Botany terminal.[19]

A review of major capital investment by stevedores in container terminal facilities reported in the ACCC Container Stevedoring Monitoring Reports from 2012 to 2021 (extracted and reproduced in **Appendix C**) shows that Australian terminal operators have been steadily investing in terminal equipment and technologies, but very little is in automated quay crane technology.

What is not clear is what quay crane and yard capacity improvements that investment has achieved. For example, what number of quay cranes with what performance characteristics can each of the terminal operators allocate to each berth they service. What we need to know is:

- Whether the additional/replacement equipment facilitated quay crane productivity improvement;
- Whether there has there been adequate investment in landside equipment and yard stacking configurations to meet and match additional quayside investment; and
- Whether there has there been sufficient additional/replacement equipment to outpace volume increase or has the investment fallen behind or just kept pace with volume increases thereby maintaining capital constraints on productivity.

This is information the Productivity Commission should obtain and publish from each of the container terminal operators, and that it recommends that the ACCC publish such information in its annual Container Stevedoring Monitoring Report.

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[18] ACCC, *Container stevedoring monitoring report No. 21*, October 2019,
[19] ACCC, *Container stevedoring monitoring report No. 14*, October 2012, PP61-62,

Recommendation 2: That the Productivity Commission obtain from terminal operator companies and publish in its Inquiry report, data on quay crane and yard capacity improvements arising from terminal operator investment in landside equipment and technologies, and that the Productivity Commission recommend that the ACCC publish such information in its annual Container Stevedoring Monitoring Report.

Another source of data on international comparisons was published in a report prepared by Westport[20] in 2018, as shown in Table 3. It shows the crane rates (containers per hour) for five international ports (Los Angeles USA; Southampton UK; Antwerp Belgium; Capetown South Africa; and Tauranga NZ) ranging from 28 to 35 containers per hour. In 2018 the Australian five port average crane rate was 31 containers per hour[21], which is within the range of the international ports assessed by Westport.

Table 3: Westport WA summary of international ports 2018

Criteria	Los Angeles, USA	Southampton, UK	Antwerp, Belgium	Prince Rupert, Canada	Vancouver, Canada	Cape Town, South Africa	Tauranga, NZ
Crane rates (container per hour)	Average 28 * * *Le-Griffin, Murphy 'Container Terminal Productivity, Los Angeles and Long Beach', 2007*	Average 28 - 35	Average 28 * * *Interser, (Belgian logistics company) website*			Average 33.	Average 35

Source: WA Government, Westport, *Supply Chain Work Package [Draft] August 2018*, Table 3, Summary International Ports, P18

Importantly for the purposes if this submission, the international berth productivity data sets serve to highlight just how important is a deep dive into the circumstances and context of each port's operational arrangements to be able to make clear and objective judgments about Australia's actual and relative productivity performance and more importantly, in identifying solutions that could be attempted to improve performance.

Analysing Australian port productivity measures

The impact of automation on container terminal productivity

We have previously noted the difficulty in obtaining productivity data disaggregated to the terminal operator level.

However, the MUA has been able to source data from particular terminal operators at particular ports. What the data demonstrates is that as shown in Table 4 for Fremantle (DPW) and in the text below for Melbourne (VICT V Patrick Terminals and DPW) is that

[20] Westport is a research, data and feedback-gathering project to deliver the Westport Strategy - an integrated plan to meet the freight and logistics needs for Perth and the South West of WA for the next 50 to 100 years.
[21] BITRE, Waterline 67, Table 2.6, P39

terminal operators which have introduced automated landside equipment, mainly automated stacking cranes (ASCs) cannot match the productivity levels as determined by the crane rate of the terminal operators that have maintained manually operated landside equipment.

Table 4: DP World Brisbane – Gross Moves per berth hour (GMPH) from 2011 (pre-automation of yard operations) to 2021 (8th year of automated operations).

Year	Stage of yard automation	GMPH (Gross quay crane moves per hour)	BMPH (Gross berth moves per hour)
2011	Pre automation	27.00	
2012	During introduction of automated equipment	25.32	
2013	Commissioning of automated equipment (May 2013)	24.80	
2017	Automated operations (December)	26.00	
2018	Ongoing automated operations (January)	26.59	
2019	Automated operations (February) Automated operations (May)	25.85 26.70	
2020	Automated operations (May)	24.90	40.30
2021	Automated operations (April)	26.20	38.80

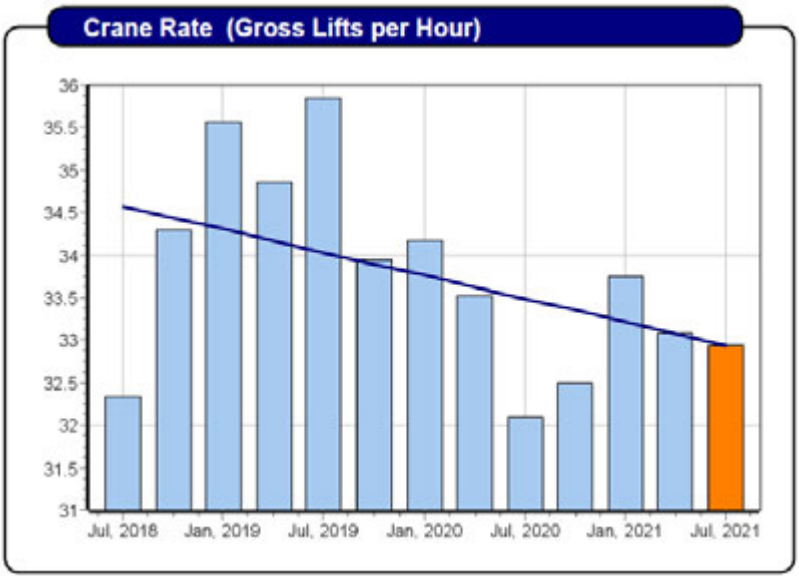
Source: MUA based on DPW data**.**

Note: We understand that DPWs GMPH is calculated on the basis that 'hours' are defined as the time from when labour first sets foot on the vessel (the first task being unlashing) until the last labour comes off the ship which means it includes time spent on meal breaks, change of shift, breakdowns, moving hatch lids, weather events etc and where the ship is finished loading. Where DPW fails to allocate enough lashers, the time can include up to another 4-5 hours lashing with no crane moves occurring. This will clearly provide a lower crane rate than the crane rate figure produced by Waterline, which is a net rate, and relied on by the ACCC. The GMPH is an average per crane figure irrespective of whether one, two, three or more cranes are allocated for each ship. DPWs BMPH is defined as the total number of containers moved per hour while the ship was alongside, with the same definition of hours alongside as used in the GMPH measure. By contrast the Fremantle BMPH was 31.16 in June 2020, and 32.84 in June 2021, as DPW Fremantle allocates less cranes per ship than DPW Brisbane.

The VICT semi-automated terminal at Webb Dock at the Port of Melbourne delivers a much lower crane rate than the DPW and Patrick manually operated terminals at Swanson Dock (18-20 lifts per hour at Webb Dock compared to 26-30 lifts per hour at Swanson Dock). That means DPW and Patrick's deliver a 32 per cent higher quay crane rate or productivity rate than VICT. As explained above we do not know if the reduced labour required by VICT compensates in efficiency terms for the 32% crane rate differential.

By contrast the FACT terminal in Adelaide, which has not introduced any automated equipment, reported a gross crane rate of around 33-34 containers per hour over the period January to July 2021, as shown in Figure 3. This is over 20% higher than the DPW Brisbane crane rates at April 2021.

Figure 3: FACT gross quay crane rate - July 2018 to July 2021



Source: FACT, CTMP Report, KPI Trend Analysis, 2021

On an MUA analysis, the reason quay crane productivity has decreased post automation in ports where automated or semi-automated crane technology has been introduced is due to the automated stacking cranes (ASCs) not having the speed or capacity to keep up with manually operated quay cranes, still used in all but the VICT terminal in Melbourne which uses semi-automated quay cranes (the operator is not in a cab on the crane but operates the crane from an onsite control room).

Whilst ship turnaround time in some circumstances may have increased slightly for some vessels that is generally due to three factors:

- Extra quay cranes being deployed;
- Improved planning of ship stows; and
- Initiatives such as continuous operations and toolbox meetings being conducted prior to shift start time.

Experience since the introduction of ASCs demonstrates that the ASC's are unable to keep up with quay cranes due to the limited area available in the water transfer zone (the apron) to store containers awaiting transfer to the stack. Additionally, within the stacking areas there is a significant increase in the number of times a container is moved due to the increased need for consoling[22] which can inhibit the delivery of containers to ships or trucks/trains. In some instances, containers are moved over 15 times in terminals using ASCs, a significant increase on the pre-ASC period where containers were only moved 3-4 times. The reason why terminals using ASCs result in consoling is that due to capacity limits when stacks are 3 or 4 high the container required to go out to either a truck/train or a ship could be on the bottom of that stack, however the containers to be moved (shuffled) will likely be placed elsewhere on top of other containers that need to be dispatched and the cycle continues whereby containers are inefficiently moved over and over again. In well run

[22] Consoling is the term used in circumstances where a container is moved within the terminal, not including transportation to/from the ship or out to a truck or train.

manually operated yards, prior to automation, typically a container was unloaded from the ship, block stacked and then broken down and laid out in timeslots for trucks to collect them. That meant only one move from the ship to the block stack, one to the layout area and then one to the truck, a total of three moves. At times, due to containers being out of order or other issues there was a need for consoling but again this may only be one or two extra moves.

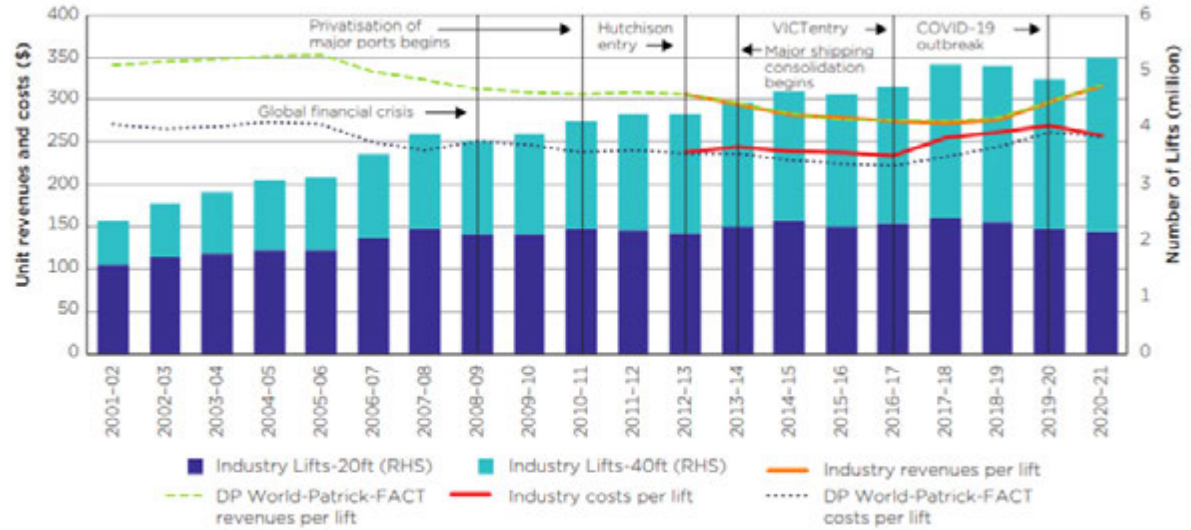
At Port of Brisbane, it is a regular occurrence for DPW to only operate 3 quay cranes over a ship despite the availability of a fourth crane and there being ships bays that could be simultaneously unloaded/loaded. Regularly, 3 quay cranes can attain superior berth moves per hour than 4. For example, 3 quay cranes averaging 220 lifts per shift (660 moves per shift) compared to 4 cranes moving 150 lifts per shift (600 moves per shift), due to the inability of the ASCs to keep up with 4 quay cranes.

Additionally, internet, computer server issues and outages can stop the terminal operations because the ASCs are inoperable during these times. The outsourcing of information technology 'help' assistance to overseas call centres can also impact the time in rectifying any issues encountered.

The lower GMPH at DPWs Brisbane terminal following the introduction of ASCs is not unexpected and is consistent with numerous reports and studies that identify the main driver for the introduction of automation as being a reduction in labour and therefore a reduced cost per handled container (cost per move).[23] The Australian terminal operator's initial expectations for reduced labour, and reduced labour costs, have not been achieved. This is demonstrated in Figure 4, where industry costs per lift (see red line) have not shown any reduction since the introduction of automated yard equipment. MUA analysis shows that at DPWs Brisbane terminal, labour is around 40 per cent higher than initial DPW stated expectations from introduction of its automated yard equipment.

[23] Rintanen, K., & Thomas, A., *Container Terminal Automation*, 2016, https://www.pema.org/wp-content/uploads/downloads/2016/06/PEMA-IP12-Container-Terminal-Automation.pdf

Figure 4: Unit revenues, unit costs and number of lifts: 2001–02 to 2020–21

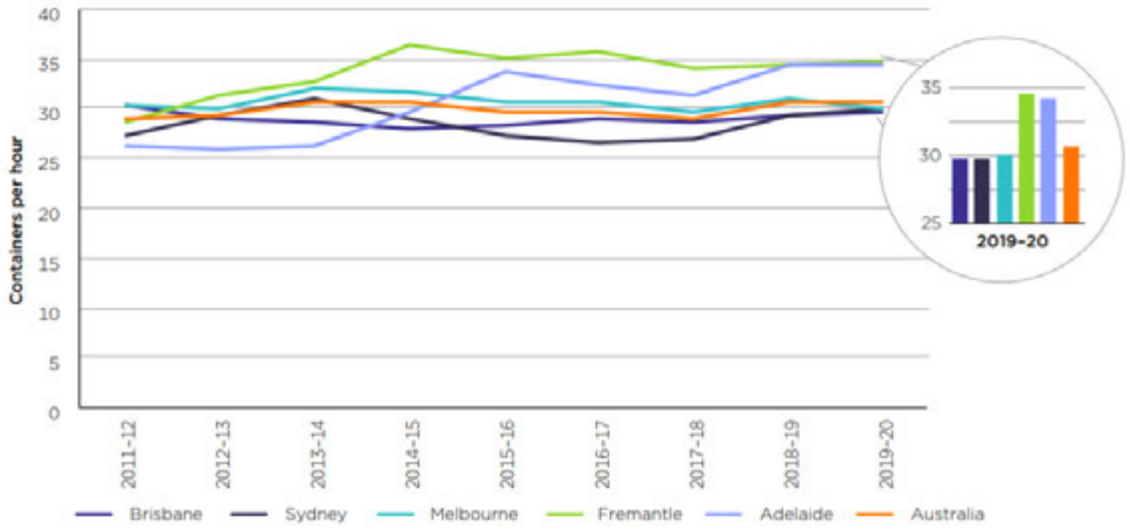


Source: ACCC analysis of information received from stevedores as part of the monitoring regime.
Note: Real values in 2020-21 dollars.

Source: ACCC, Container stevedoring monitoring report – 2020–21, No 23, October 2021, Figure 4.2, P37.

The data from the ACCC Container Stevedoring Monitoring Report 2019-20 presented in Figure 5 confirms that automation has not increased productivity. The two terminals with the largest increase in crane rates are Adelaide and Fremantle, both terminals that have not adopted any automated equipment. The three other major terminals where there has been significant investment in yard automation have varied slightly over the period but are still about the same as pre-automation. Sydney has shown slight improvement, while Brisbane is slightly down.

Figure 5: Net crane rates, 2011–12 to 2019–20



Source: ACCC analysis of data from BITRE's forthcoming *Waterline 66*.

Source: ACCC, Container Stevedoring Monitoring Report—2019-20

Flaws in the ACCC analysis of productivity performance - is labour relations a causal factor?

The ACCC Container Stevedoring Monitoring Report of 2020-21 analysis of productivity contains two serious flaws which need to be understood in considering the legitimacy of its conclusions about trends in productivity and labour relations issues at Australian container stevedoring ports.

Firstly, the ACCC appears to have assumed that the large investments in automated terminal equipment by terminal operators includes investment in automated quay cranes. That is not the case. The only terminal which has invested in automated quay crane technology is Victoria International Container Terminal (VICT), and those are semi-automated quay cranes which still require a human operator. The operator does not operate physically in the quay crane over the ship but from a control room. The one advantage this brings is that operator fatigue is reduced, allowing longer periods in control of the quay crane when operated from a control room. This avoids delays in operator changeover during a shift that is required where the operator is located in the crane. In a fully manually operated crane, the crane drivers rotate about every 2-3 hours over the course of a shift, which can range from 8 hours up to 12 hours in certain circumstances.

The fact that there has been negligible investment in automated quay cranes is important because all the productivity measures the ACCC has relied on to reach conclusions about productivity performance and trends are measure of quay crane productivity, not the productivity of any of the other crane operations in terminals, such as ASCs and automated straddles (Autostrads).

It is this confusion about where the investment in automated crane technology has taken place that led the ACCC to erroneously conclude that: 'For each crane in operation, the hourly number of containers being loaded or unloaded has not improved significantly since 2000–01'[24] (and to include a heading to the section asserting that 'After initial improvement through advancements in technology, quayside productivity and efficiency have stagnated in the past 10 years'[25]) having previously said that 'The widening gap between the ship rate and the crane rate is fully attributable to the increase in the measured crane intensity'.[26] ACCC then went on to say that:

> This shows that the key drivers for quayside productivity were stevedores increasing investment in technology and automation. Automated machines increase reliability and efficiency of operations and reduce human error. By having access to additional and more powerful and automated equipment, the stevedores manage to handle the fast-increasing volume with limited improvement in equipment operating hours.[27]

[24] ACCC, *Container stevedoring monitoring report – 2020–21*, No 23, October 2021, P59,
[25] Ibid, P57
[26] Ibid, P9
[27] Ibid

The ACCC could not know that because Waterline produces no data or measures of crane productivity other than quay cranes of which, at January 2022, there are only 5 semi-automated such cranes in Australia from a total of 61 quay cranes in the 5 ports analysed by Waterline and the ACCC. That is, automated quay cranes (and noting they are not fully automated) make up just 8.2 per cent of Australia's container quay cranes.[28]

As there has been negligible investment in automated quay cranes in Australia, and as we have explained, the ASCs, where the largest investment in automated cranes has taken place, are a barrier to improved quay crane productivity performance, the ACCC conclusions are founded on a fatal misunderstanding of the application of new crane technology in Australian ports.

We have explained that, in fact, quay crane productivity, using predominantly manually operated quay cranes, has improved significantly, and this has arisen primarily due to improvements in labour productivity, notwithstanding the many contextual factors we explain that place limitations on meeting best international practice.

The ACCC correctly makes the distinction between net and gross crane rate productivity measures, where Waterline crane productivity data is based on net crane rates.[29] We also consider those distinctions because they are critical in understanding international comparisons which invariably use a gross crane rate.

Secondly, the ACCC, in using measures based on a gross crane rate to assert Australia has poor terminal productivity performance, has then erroneously conflated performance based on measures using a gross crane rate with poor labour relations practices.

The fact is that terminal operator workers and the enterprise bargaining agreements that they work under which the ACCC claims are a significant causal factor in explaining its erroneous conclusions about terminal productivity performance have no role in many of the port operations that impact on the crane rate using gross crane productivity measures, such as average on-berth hours and average idle hours.

The workers that are involved in port operations that impact on ship on-berth hours and ship idle hours are pilotage workers, mooring line workers, towage workers and other ship service provider workers such as those crewing ships providing bunkers, ship's provisions etc (and of course the senior onboard ship managers and their local agents who are responsible for coordination of all the services required for the ship from arrival to departure), as well as regulators like harbourmasters.

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[28] The majority of quay cranes operating in Australia are ZPMC Cranes (manufactured by Shanghai Zhenhua Heavy Industries Co. Ltd, which has about 70 per cent of the global quay crane market) which can service ships up to 18 containers wide and on extremities 19 containers wide. A ship of 18 wide containers would have a beam of approximately 44 metres. Some terminals still have older cranes (Noell/Pacific) which historically serviced 13 container wide ships (panamax) or 32 metres (which create good marketing photo ops). These cranes are nevertheless being phased out as they cannot service the larger (post panamax) ships which can have a beam up to 49 metres.

[29] Ibid

The non-terminal operator workers who can impact on ship on-berth time and ship idle time operate under completely different enterprise bargaining agreements from quay crane operators and are not employed by any of the companies analysed in ACCC reports. Furthermore, they have not engaged in any industrial action as described by the ACCC over recent years, with the exception of protected industrial action involving one towage operator (Svitzer Australia) on certain dates over the period October 2020 to October 2021 at most of Australia's ports, the majority of which are not container terminal ports.

While some of the protected industrial action involved work stoppages of 4, 12 or 24 hour duration, most of the protected industrial action involved bans on overtime, maintenance and use of casuals. Some of the protected action involved 24 hour bans on servicing Maersk ships on selected days in November 2020 to January 2021 and in September 2021, some of which may have been container ships. It is not known however, if any Maersk container ships entered Australian container ports on the days protected industrial action was scheduled.

On the issue of comparisons and trends in ship on-berth hours and ship idle time shown in Figures 6.1 and 6.2 in the ACCCs Container stevedoring monitoring report – 2020-21, we do not consider these should be regarded as 'performance indicators'. They are simply data presentations. While we agree with the ACCCs explanation of the factors that may explain the increases in on-berth hours, the particular circumstances at each port relating to ship size, container exchanges, non-quayside terminal congestion and operating arrangements, safe unloading issues etc would need a more in-depth analysis before reaching conclusions about the reasons for trends and the differing data presented for different ports.

Similarly, in relation to the data presented on ship idle time, there are an even greater number of factors, mostly outside the control of the terminal operator and therefore their stevedoring workforces, that impact on ship idle time. For example, Again, no conclusive observations can be drawn from the raw data without an in-depth analysis of the circumstances of each port, and each terminal within each port (including processes for maintaining safe work e.g. 10-15 minute toolbox meetings at shift commencement).

It is well known that ships are regularly delayed in port by the availability of ship's pilotage, towage and mooring services. In many instances these services are unavailable because they were servicing other ships around the port. Unavailability is recorded as a 'service failure' and such data should be available to the Productivity Commission from the port operators. Although lack of service availability is recorded as a service failure against the service provider, it could either be a short-term capacity issue such as the services being used completing jobs in other parts of the port at the time required, or longer-term capacity issues - not enough pilot or towage vessels or workers delivering these services to meet peak needs.

In addition, health and safety representatives (HSRs) from the terminal operators, in performing their statutory responsibilities under state/NT work health and safety legislation, regularly inspect ships upon berthing to ensure compliance with important safety requirements, such as those provided by Marine Order 32 (Cargo handling equipment) 2016 made under the *Navigation Act 2012*. Marine Order 32 gives effect to ILO Convention No.

152, Occupational Safety and Health (Dock Work), 1979 and Recommendation No.160, Occupational Safety and Health (Dock Work), 1979.

HSR on-board inspections before unloading commences frequently identify unsafe equipment and or ship structural deficiencies that impact on safe unloading/loading and refer these to AMSA for its attention before unloading or loading can commence. Some examples of safety issues identified by HSRs are shown in Table 5.

Table 5: Examples of ship delays arising from safety issue reported by HSRs (2019 and 2022).

Date	Name of ship	Port	Nature Of Non Compliance	Length of Delay	Was AMSA involved Y/N
16-April-2019	*CPO Jacksonville*	Botany	Numerous see deficincy notice	Approx 7-10 days	Y
16-April-2019	*Emora*	Botany	Numerous see deficincy notice	Approx 14 days	Y
25-November-2022	*Toronto Trader*	Botany	Numerous see deficincy notice	Ongoing small delays	Y
01-February-2022	*Trinidad Trader*	Botany	Hatches not compliant,walkways not compliant	Ongoing small delays	Y*
04-February-2022	*Delos Wave*	Botany	Auxillary engine not working	Ongoing	Y^
* AMSA contacted not inspected yet					
^ AMSA have directed not to sail until rectified					

Source: Port Botany port workers

Port congestion, and failure to meet berthing windows, was already occurring prior to the COVID 19 exacerbations to supply chain performance, essentially commencing from the time of shipping line consolidations and formation of new container line alliances. One consequence is that bigger ships have been required to wait alongside for loading of the at-berth ship to be completed. Smaller ships are in and out of berths quicker and terminal operators now often leave ships idle while completing the loading of the ship on-berth whereas in the past they would put at least one crane on each ship. In addition, some terminal operators have moved away from a past practice of working continuity (hotseat changeover so the quay crane does not stop for meal breaks due to cost of additional labour for continuous operations). Now, the terminal operators only apply this practice sparingly which means cranes generally stop for meal breaks (typically of 45 minutes duration).

It is instructive that the CEO of DP World, one of the major terminal operators in Australia, which also operates approximately 70 container terminals globally, advised meetings of the Commonwealth Government's National Coordination Mechanism (NCM) in late 2021 that it regarded productivity at its Australian terminals as meeting appropriate productivity performance levels based on benchmarking with its terminals elsewhere around the globe. The ACCC participated in those meetings and would have heard those presentations first hand.

These flaws and gaps in the ACCC analysis suggest that little, if any weight should be placed on its conclusions about productivity performance and labour relations at Australian ports.

Comparison with NZ ports

In the ACCC Container stevedoring monitoring report – 2020-21 it presented data (see Figures 6.2, 6.3 and 6.4) to try to demonstrate that New Zealand (NZ) ports have generally performed better than Australian ports over the past decade. The ACCC asserted that "*across all 3 quayside productivity measures, Australia's best-performing port, Port of Melbourne, has consistently under-performed against the top performer in New Zealand, Tauranga*."[30]

The ACCC used that assertion, and its unqualified interpretation of the World Bank IHS Report, to conclude that "*Overall, although there has been productivity improvement at Australian ports, the various benchmarks show that productivity improvement has stagnated in the past decade and Australian ports are lagging behind its international counterparts*."[31]

It is true that based on the data presented (and noting that the NZ data is reported to be based on the same inputs and assumptions used by Waterline), two of the three NZ ports benchmarked (Auckland and Tauranga) exhibit slightly better productivity performance than Australian container ports.

However, what is revealed by a more in-depth analysis is that the apparent better productivity performance of NZ ports was achieved on the back of exceptionally poor safety practices leading to fatalities and serious injuries, along with poor labour relations practices.

At the Port of Auckland (POAL), there have been two fatalities since 2017. The Port of Auckland has a workforce of only 270 (stevedoring workers) and handled 818,238 TEU in 2021, similar to Fremantle.

These fatalities occurred following significant changes in labour relations and safety practices at the port. Over the period from 2012 to 2020 significant focus was placed by POAL on productivity, and increasing the productivity of the port. These increases were significant. They involved more flexible rostering arrangements, longer shifts; and the introduction of bonuses whereby the fastest operators were incentivized (rewarding the top five per cent of straddle drivers).

Following the investigation into the first fatality, POAL pleaded guilty to offences under the *Health and Safety at Work Act 2015* (NZ), and the second (in August 2020) POAL has been charged by Maritime New Zealand in relation to this incident. In addition, the Chief Executive of POAL has also been charged as an officer of POAL. This is the first time in NZ that an executive of a major corporate has been charged personally for breaches of the *Health and Safety at Work Act 2015*.

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[30] ACCC, *Container stevedoring monitoring report – 2020–21*, No 23, October 2021, P64, https://www.accc.gov.au/system/files/Container%20stevedoring%20monitoring%20report%202020-21.pdf

[31] Ibid P64

In contrast there have been no fatalities at an Australian container port since 2014, notwithstanding Australian container throughput is around three times greater than NZ.

The deterioration in safety at POAL resulted in establishment by the port owner, the Auckland Council, of the Ports of Auckland Independent Health and Safety Review conducted by Construction Health and Safety New Zealand (CHASNZ) which reported in March 2021. A few of the key findings from the review are that:

- There are systemic problems at POAL in relation to critical health and safety risk management and organisational culture that relate to health and safety;
- The role of the CEO in regard to health and safety leadership should be reviewed, redefined and measured;
- POAL needs, inter alia, to engage human factors expertise to review operating environments and work processes for straddle carriers and cranes;
- Overall incident reporting including near miss reporting may not adequately capture the volume of incidents that are potentially occurring at POAL. This view is based on worker feedback to the Reviewer and from review of the past year's incidents. This may in part be due to factors such as the difficulty workers have in using the Portsafe system and partly due to a perception that line management do not follow up on health and safety issues and see those raising them as troublemakers.
- Requirements for the POAL chief executive to prioritise safety over productivity and profitability, improve communication and engagement with staff on health and safety, help change risk behaviours, and resource corrective actions.
- An increased focus on safety for port leaders and management.
- Improving the relationship with the Maritime Union of NZ.
- Improving trust and engagement between executive management and the frontline workforce about health and safety expectations.
- Appointing a health and safety leader at POAL, reporting to the chief executive, to reset POALs approach to health and safety.
- The Auckland Council board requires more insight into health and safety issues raised by workers to ensure these are being adequately addressed.

We are advised that since the report was released, the POAL CEO has resigned and that there have been significant changes on the Auckland Council board.

We have also been advised by NZ port workers that labour supply companies operating terminal equipment at NZ ports and who are responsible for data recording and collection for the inputs for the NZ Freight Information Gathering System (FIGS) port performance data base[32], have consistently manipulated the container lift data and data that is used to provide a net crane rate, for both commercial reasons and to inflate crane lift data on which payment of worker's performance bonuses are based.

The bonus system was referenced in the sentencing notes of Judge E.M. Thomas of the District Court of Auckland in the case of Worksafe NZ V POAL on 20 December 2020 regarding the investigation into the death of a straddle driver where the Judge reported on

[32] NZ Ministry of Transport, *Freight Information Gathering System* (FIGS), https://www.transport.govt.nz/statistics-and-insights/freight-and-logistics/trade-trends/

gaps in training of straddle drivers identified by WorkSafe NZ, one of which was "*Operating a bonus system based on productivity which would cause drivers to feel that they had to work as fast as possible. Mr Dyer had a high tip alarm activation record. Despite that record he consistently received his bonuses."*[33]

In that case, POAL accepted that it had failed in its duty of care to ensure "*that the bonus scheme incorporated parameters that promoted safe driving, to counter any incentive to achieve greater productivity at the expense of safety*."[34]

Additionally, the Judge found that "*The failures represent a systemic failure to instil and maintain a culture of safety and to monitor compliance*."[35]

The adoption of a new safety culture at POAL as a result of reviews and legal proceedings has resulted in a significant ratchetting back of crane rates because the port is now operating at a more acceptable safety standard. These lower crane productivity figures will be revealed in the 2021 (and subsequent) crane rate data presented in the NZ FIGS reports.

We note that the MUNZ submission to this Inquiry states that:

> It is therefore fair to say: (a) that the increases in productivity at Ports of Auckland resulted in large part from work practices that have been found to be unsafe by the regulator and for which the company has been convicted for breaches of the Health and Safety at Work Act; (b) these work practices while best identified at POAL have also arisen in other ports around New Zealand; and (c) addressing the work practices has resulted in significant reductions in productivity.

At the Tauranga port, we are advised that due to the absence of approved trade unions, there are no enterprise bargaining agreements covering the majority of the workforce that are approved by the Employment Court of NZ, the result being that work practices are entirely determined by managerial prerogative, resulting in practices such as long shifts, shift extensions leading to fatigue and high levels of casualisation leading to high workforce turnover, a poorly trained and poorly disciplined workforce leading to reckless work practices such as regularly exceeding straddle crane speed limitations.

Workers at this port have acquired serious back injuries, with the Port refusing to properly maintain pavement surfaces to prevent injury, with long work hours exacerbating injury prevalence. Workers also say that their employer has dodged responsibility for these injuries, simply terminating workers once they are too injured to work.[36] Workers in Australian ports suffered these precise injuries from driving straddle carriers, until a safety

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[33] District Court of Auckland, Worksafe NZ V POAL, *Sentencing Notes of Judge E.M. Thomas*, 20 December 2020, Clause 5(7)
[34] Ibid Clause 6(4)
[35] Ibid Clause 11
[36] Newshub NZ, *Port of Tauranga contractors 'broken' after suffering serious back injuries from driving heavy machinery*, 30 June 2021 https://www.newshub.co.nz/home/new-zealand/2021/06/port-of-tauranga-contractors-broken-after-suffering-serious-back-injuries-from-driving-heavy-machinery.html.

campaign by workers and a legal case by the MUA on behalf of injured workers[37] resulted in better maintenance of terminal pavement surfaces and strict time limits being placed on the time that each worker can drive a straddle carrier.

Another factor to note at the Port of Tauranga is that it has significantly more yard space which can be used for storing containers. This means here is a larger amount of space close to the ship so containers can be delivered to the wharf prior to a ship arriving, and also left on the wharf when they are discharged. This is very different for example to the Ports of Auckland operation where it is necessary to move containers further when they are discharged or to bring containers a longer distance when the ship is loading. The additional yard space at Tauranga enables containers to be block stacked on the berth. Therefore, when comparing productivity, it may be that productivity is higher when the ship is in port. However, commonly in the Port of Tauranga, containers are then moved once the ship leaves port, or prior to the next ship arriving. This double handling of containers, impacting on overall port productivity will not be measured in the statistics, based only on quay crane rates, used to compare the ports.

In other words, the higher productivity levels recorded for Tauranga port are achieved on the back of a disregard for fundamental labour rights, a disregard for good safety practice and a misconceived view of overall port productivity.

This more in-depth analysis of NZ port productivity performance demonstrates that reliance on raw data to make so called objective assessments about comparative port productivity and to identify certain ports as benchmarks against which to assess Australian port productivity performance is a dangerous and ultimately ineffective exercise that will not achieve consensus among stakeholders unless developed with the input and support of all stakeholders, based on agreed and best practice port operating standards, including for safety and labour rights.

Robust and in-depth analysis of ports and terminals for benchmarking purposes that is underpinned by understandings and criteria about safety and labour rights standards along with other agreed like-with-like criteria that we address in the section of this submission headed 'Additional observations on the World Bank-IHS Markit CPPI report's port rankings' will be necessary for development of a 'framework of performance measures to determine port performance and benchmarking Australian ports internationally' if it is intended that those performance measures and benchmarks are to be used as the basis for proposing policy, regulatory, legislative and or operational reform.

We address productivity performance issues and methodology in the following sections.

What is an acceptable quay crane rate?

There remains a robust international debate in the container terminal industry about what is an acceptable crane lift rate per operational quay crane hour.

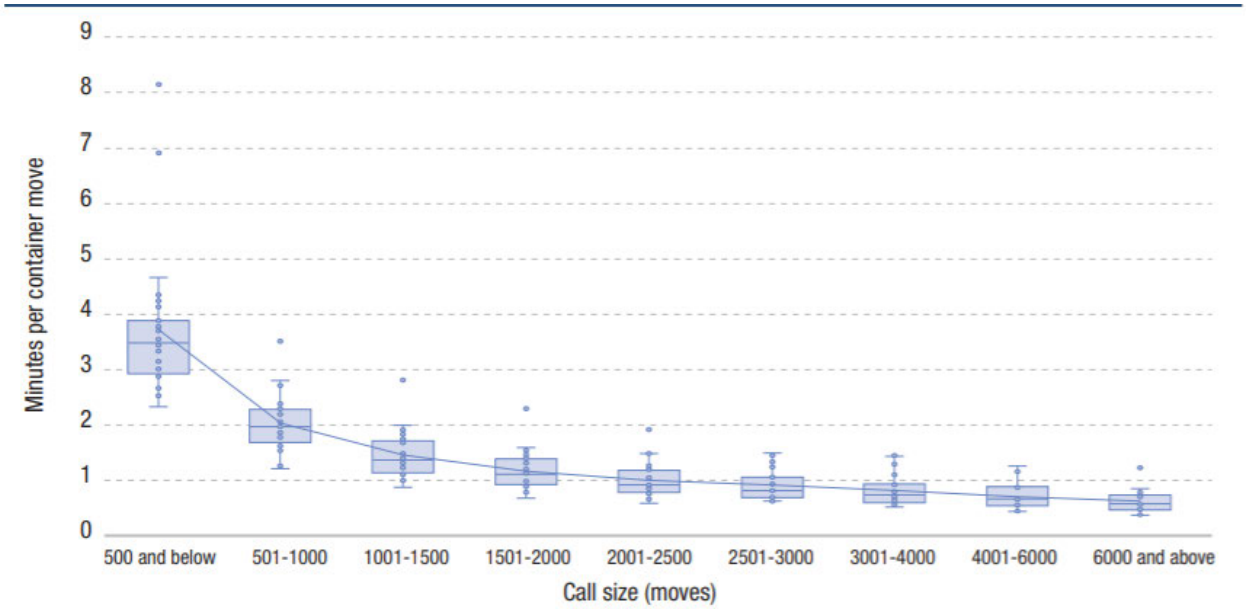
[37] Quinlan, Michael, Philip Bohle and Felicity Lamm. 2010. *Managing Occupational Health and Safety: A Multidisciplinary Approach*, 3rd ed. South Yarra, Australia: Palgrave Macmillan, p. 493-494. The case was *Coombs v Patrick Stevedores Holdings Pty Ltd [2005].*

In the World Bank's *Port Reform Toolkit* Second Edition published in 2017 it noted that a crane productivity of 25–30 gross moves per quay crane hour (or one container move every 2 minutes or 120 seconds) was typical at that time i.e. 4-5 years ago. The *Port Reform Toolkit* report also foreshadowed that to accommodate the mega containerships coming into service, new terminals will require crane productivity of 200 moves per ship-hour at berth, necessitating increasingly larger cranes to accommodate ships with a deck stack of up to 23 rows across.[38] (Note of course the confused language - 25–30 gross moves per gantry-crane hour (and we think that means quay crane) V 200 moves per ship-hour at berth - which are two different measures).

GHD reported in 2017 that the world record for a single lift crane is 75 container moves in an hour for a single crane and 793 moves in one hour for a set of cranes working on a large ship. However, GHD stated that these records are set under artificial conditions and are not applicable as part of a benchmarking system. GHD said that the typical upper-end productivity for a single lift crane is recognised as 35 moves per hour. It noted that at that time BITRE statistics for Melbourne indicate a current average rate of 30.9 moves per hour.[39] That is just below the GHD assessment of globally recognised standard for moves per hour.

A ship's crane has a physical cycle limitation, and the call size/ship size has an impact on the time in which a cycle can be completed, as shown in Figure 6.

Figure 6: Minutes per container move for container ships, by range of port call size



Source: UNCTAD, based on data provided by IHS Markit Port Performance Program.

[38] The World Bank, *Port Reform Toolkit*, Second Edition, Module 2: The Evolution of Ports in a Competitive World 2017.
[39] GHD, *Infrastructure Victoria: Second Container Port Advice: Estimated Capacity of the Port of Melbourne*, May 2017, P20,

Source: UNCTAD, *Review of Maritime Transport 2021*, November 2021.

The Yokohama-Kawasaki International Port Corporation (YKIP) was ranked the most efficient (productive) port in the world in the World Bank-IHS Markit CPPI report using the gross crane moves per port hour (GCMPH) measure. Similarly, it was the top ranked global port in the Loadstar 2015 rankings shown in Table 2. In a promotional article by CargoNow (undated, but produced since May 2021), it reported that it takes just 1.1 minutes (or 60.6 seconds) on average to load or unload a container in a standard port call at Yokohama. That equates to 59 containers moves an hour or double the World Bank's typical terminal moves figure it reported in 2017 and nearly double the GHD global standard it reported in 2017.

Based on Waterline data, the comparable Australian crane moves per hour is 47.4 in 2019-20, using the 'Average lifts per hour of stevedoring operation' data from Waterline 67, or one lift every 1.3 minutes or every 78 seconds.

We know from published data for the ports of Botany[40] and Melbourne[41] that 55 per cent (FY2022) and 58 per cent (FY2020) of container ship visits are of 5,000 TEU or less, respectively in Port Botany and Melbourne, with ships in the TEU range 4,000-6,000 being the most prevalent size ship calling at Port of Melbourne and Port Botany. There is an obvious relationship between ship size and call size. For Melbourne, the average containers per vessel visit that are exchanged is 1,964.[42] We could expect a similar figure for Port Botany, and lower exchanges per ship in other container ports. Based on the Melbourne vessel exchange data, by reference to Figure 6, the expected time for a lift for ship that is exchanging just under 2,000 containers is about 1.2 minutes or one lift every 72 seconds. That means the Australian moves per hour compares very favourably with international practice.

It is our analysis that across all the ship sizes and container exchanges per ship for ships visiting Australian ports that the Australian crane lift rates are very respectable, in fact at the upper end of global high-end performance.

As can be seen, these small marginal differences in container terminal productivity performance come down to just a matter of seconds for each lift. If Australian cranes were to improve their lift cycle by around 17 seconds per lift for example, that would put its terminal crane performance on par with the productivity performance at Yokohama, indicating that the ACCC revelations about the alleged poor comparative performance of Australian container terminals based on the World Bank-IHS Markit CPPI report of 2021 were alarmist, based on poor analysis and misconceived.

Even a small delay, such as a crane not operating at peak performance, a faulty twist lock, the incorrect positioning of a container within the onboard stack or a human error can impact these fine margins and therefore impact productivity performance.

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[40] See Table 5 in this submission, derived from NSW Ports Trade Data

[41] See The composition of PoM vessel visits in PoM, *Tariff rebalancing application to the Essential Services Commission*, September 2020,

[42] Port of Melbourne, Quarterly Trade Report – Q1 2021-22,

MUA analysis of on-board container stowage patterns on the ship types that typically visit Australian ports shows that the smaller hatches require a significant number of lateral movements of quay cranes for positioning over hatches, as well as repositioning of containers to access the containers for exchange, which considerably reduces cane moves per hour. This does not occur at large transhipment ports where the quay cranes do not require the same lateral movement and no container repositioning where all containers are to be unloaded.[43]

This is the contextual information that must be understood in using international comparative data sets like the World Bank-IHS Markit CPPI report, and in designing a framework of acceptable performance measures.

The reason that 2012 and 2015 data are used in the above analysis is because it is notoriously difficult to obtain reliable and comprehensive data on terminal productivity, and those were the only data sets we could readily obtain (notwithstanding some terminal operator data is presented in Table 4). The terminal service providers regard productivity data as proprietary, and do not generally publish it or share it.

That is the primary reason why the World Bank collaborated with IHS Markit to design and publish the *Container Port Performance Index 2020* (CPPI), as can be seen from the following quote from the Foreword: "*While modern ports collect data for performance purposes, the quality, consistency, and availability of data, the definitions employed, and the capacity and willingness of the organizations to collect and transmit data to a collating body, have all precluded the development of a comparable measure (or measures) to assess performance across ports, and time*."[44]

It should be noted that the data for the World Bank-IHS Markit CPPI report was obtained from just ten shipping companies, not from terminal or port operators.

The differing interests of port stakeholders in productivity performance

There are essentially four sets of stakeholders that have a commercial interest in port performance and in various measures of port productivity performance (see Figures 7 and 8):

- The container shipping lines, which are interested in the productivity of ships of which total time in port is the critical measure, including unloading and loading, but in addition, all other aspects of ship operations in port such as pilotage, biosecurity including human biosecurity, customs and immigration clearances, berthing, requiring towage and mooring (tie up and let go), provisioning (fuel, water, food etc), repairs, preparation for unloading and departure i.e. container lashing;
- The terminal operator companies, which provide the landside equipment and labour for unloading/loading, and are interested in the productivity of the stevedoring operation, noting that terminal operator interests may coincide with the interests of

[43] Advice obtained from interview with a DP World port worker at the Port of Brisbane
[44] The World Bank and IHS Markit, 2021, *The Container Port Performance Index 2020: A Comparable Assessment of Container Port Performance*, P8, https://www.maritimes.gr/images/PORTS/Container-Port-Performance_Index-WB-2021.pdf?_t=1620669079

shipping lines, depending on the contract terms between the terminal operator and the shipping lines it services. There nevertheless remains a tension between terminal operators and landside stakeholders in terms of dwell time of containers in the yard, because a terminal operator has a commercial incentive to optimise time in the yard because it contributes a revenue stream, only impacted by the ability of the yard to ensure yard container volumes do not impede quay crane productivity (one factor in terminal operators winning shipping line contracts);

- The landside stakeholders, which range from the trucking and rail operators who transport the cargo to and from ports, which are interested in turnaround times within a port, to the freight forwarders and other logistic chain service providers who provide intermediary services, whose reputations and profitability is based on keeping freight flowing; and
- The end users, such as retailers, wholesalers, producers and manufacturers, which are interested in getting products in and out of the country. Their interest is not so much about the productivity of each phase of the flow of a container from ship to shore, from shore to yard, from yard to truck or train and to the gate, but of the overall time (and cost) from the ship to the gate.

Figure 7: Import supply chain interests

Source: Port of Melbourne, Port of Melbourne's Supply Chain.

Figure 8: Export supply chain interests

Source: Port of Melbourne, Port of Melbourne's Supply Chain

Overarching all those interest groups are governments and regulators.

These differing interests are important to understand because any attempt to develop a framework of performance measures to determine port performance and for benchmarking Australian ports internationally will need to first determine the port stakeholders and users whose commercial and strategic interests will be served or not served by such a framework, and importantly, will the framework be useful for governments, policy makers and regulators.

Even more fundamentally, will the framework be designed with an ulterior or shadow motive in mind, such as undermining human rights, which is essentially what the US Cato

Institute argued in an opinion piece in September 2021 entitled *America's Ports Problem Is Decades in the Making*, including a subheading addressing root causes entitled *Start with the unions*.[45] It essentially argued that US port workers are not entitled to their human right to a good salary and a secure job that includes a fair work-life balance, and because the workforce, represented by their labour unions have negotiated such an outcome, they are a therefore a primary cause of US port congestion. The ACCC in Australia has advanced the same arguments. We urge the Productivity Commission to demonstrate more objectivity and sophistication, and ensure that whatever proposals it may advance in developing a productivity framework that is capable of benchmarking and which may advance proposals to improve productivity at Australian ports that those proposals are compatible with Australia's and company obligations to conform with a range of human rights and labour standards conventions to which Australia is a signatory.

Analysing international port productivity measures

In designing measures of port productivity, it is important to understand what it being measured and for what purpose. The question to be asked is which interest group will benefit from having the measures of productivity, and even more importantly, to what extent do Australian interests have control or influence over the factors that could improve that productivity performance if shown to be less than what is considered optimal – having regard to benchmarks (which itself is fraught given the many variables at play) - noting too that Australian ports are interconnected to global supply chains responding to national and global consumption and production patterns.

On the question of which stakeholder has control over what factors, GHD provided an analysis in its report for Infrastructure Victoria in 2017 when Infrastructure Victoria was preparing its *Advice On Securing Victoria's Ports Capacity*.[46] The GHD report identified external factors that are outside the control of either the port landlord or the terminal operator, factors within the control of the port manager and factors that are within control of the terminal operator, as follows:

- External factors that are outside the control of either the port landlord or the terminal operator, being:
  - Adequacy of landside transport infrastructure;
  - Peaking, referring to demand for both import and export containers which varies over the week primarily due to work-day practices and supply chains, and throughout the year due to consumer patterns and agricultural production;
  - Fleet spectrum, being the number and dimensions of the vessels that call at the port;
  - Vessel stowage patterns:

[45] Cato Institute, *America's Ports Problem Is Decades in the Making*, 22 September 2021

[46] GHD, *Infrastructure Victoria: Second Container Port Advice: Estimated Capacity of the Port of Melbourne*, May 2017, https://www.infrastructurevictoria.com.au/wp-content/uploads/2019/04/GHD_Infrastructure_Victoria_second_container_port_advice_-_Estimated_capacity_of_the_Port_of_Melbourne_FINAL.pdf

        - ❖ On these last two factors, the Productivity Commission noted that the prevalence of multi-port calls in Australia increases the complexity of the container stowage task, because of the need to reposition containers between port calls (known as restows). This requires more crane movements to load and unload containers than if the entire cargo were to be loaded or unloaded at a single port, and that larger, newer and better equipped ships are easier to load and offload. Among other things, they can be more readily worked by more than one crane, resulting in faster ship turnaround.[47]
    - ➢ TEU exchange per vessel;
    - ➢ TEU factor, i.e. the ratio of 20-foot to 40-foot containers; and
    - ➢ Truck utilisation and fleet mix.
- Factors within the control of the port manager (landlord):
    - ➢ Quay length;
    - ➢ Wharf structural capacity; and
    - ➢ Shipping channel configuration e.g. 1-way/2-way channel configuration.
- Factors that are within control of the terminal operator:
    - ➢ Number of shifts;
    - ➢ Crane rates;
    - ➢ Available cranes; and
    - ➢ Container dwell times i.e. within the yard.

The Productivity Commission has identified the following factors influencing container handling rates:

- Thin trade volumes
- Scale economies
- Multi-port calls
- Ship size and type
- Terminal configuration
- Labour intensity
- Yard utilisation
- Berth utilisation
- Crane and straddle carrier utilisation
- The logistics chain.[48]

Those considerations need to be balanced against other considerations:

- Data input availability, standardisation and collation needed to produce, publish and analyse productivity measures;
- Cost-benefit considerations (for producing, collating and publishing the inputs to measure and to respond to the outputs from reporting against measures) – including who is responsible for investing in reforms that may be identified from an analysis showing a need to improve an area of performance;

[47] Productivity Commission, *International Benchmarking of Container Stevedoring, Commission Research Paper*, July 2003, P40, https://www.pc.gov.au/research/completed/international-stevedoring/stevedoring.pdf

[48] Ibid, Section 4.2, P38

- Human rights considerations – given that all productivity improvement will impact on the port workforce and the workforce along the supply chains that service ports; and
- What role do governments (national, state and local) and regulators play in this mix – what policy objectives and regulatory requirements overlay port operations.

These challenges have been considered by governments, regulators, industry stakeholders including the workforce and their trade unions, academics and the media since containerisation began, and at present there remains a lack of consensus on root causes to port performance issues and solutions. This was openly revealed by the widely differing views of stakeholders who participated the National Coordination Mechanism (NCM) consultation on supply chain performance in late 2021.

Most designers of container terminal and port productivity measures have commenced with two principal approaches in mind:

- One is a production flow approach (also known as stock and flow analysis), breaking down the flow of containers through a port into its logical components and seeking to identify measures that capture productivity in each of those components – this is essentially the Waterline approach; and
- A second is a factor approach, which seeks to identify what factors affect productivity and identify measures that capture the performance of those factors – this is essentially the World Bank-IHS Markit CPPI report approach.

The result has been a convergence of measures, though with subtle variations that are critical to understand, especially for comparative purposes, benchmarking and for advocating solutions.

BITRE for example[49], identified seven factors that affect productivity at a container port terminal based on the work of Le-Griffin and Murphy (2006)[50]. These seven factors are:

- Capital resources invested—approximated by crane intensity;
- Labour input—measured as elapsed labour time;
- Terminal configuration and lay-out:
  - BITRE noted that these three measures are broadly within the control of a container terminal operator, noting that terminal configuration and layout are constrained by the landside dimensions and characteristics specified in the terminal operator's lease;
- Trade volume—measured as throughput per vessel visiting a container port terminal;

[49] Lubulwa, Godfrey, Lightfoot, Anatoli and Malarz, Adam, Bureau of Infrastructure, Transport and Regional Economics, *Analyses of stevedoring productivity in Australia's five major container ports*, Australasian Transport Research Forum 2010 Proceedings, 29 September-1 October 2010, https://www.australasiantransportresearchforum.org.au/sites/default/files/2010_Lubulwa_Lightfoot_Malarz.pdf

[50] Le-Griffin, Hanh Dam and Murphy, Melissa, *Container Terminal Productivity: Experiences at the Ports of Los Angeles and Long Beach,* University of Southern California, 2006, https://accessaintlaurentbeauport.org/wp-content/uploads/2019/06/Le-Griffin-2006-Container-terminal-productivity-Experiences-of-ports-of-Los-Angeles-and-Long-Beach.pdf

- Trade mix— approximated by the percentage of containers handled that are 40-foot containers;
- Average size of vessel; and
- The ratio of import to export containers:
  - These four measures are outside the control of the terminal operator and are mainly determined by domestic consumption and production factors, though shipping lines and liner conference alliances have a large degree of control over vessel sizes (and their scheduling) allocated to particular trade routes.

Le-Griffin and Murphy themselves identified common productivity measures of container terminals, set out in Table 6.

Table 6: Common Productivity Measures of Container Terminals

Element of Terminal	Measure of Productivity	Measure
Crane	Crane Utilization Crane Productivity	TEUs/year per Crane Moves per Crane-Hour
Berth	Berth Utilization Service Time	Vessels/year per Berth Vessel Service Time (hrs.)
Yard	Land Utilization Storage Productivity	TEUs/year per Gross Acre TEUs/Storage Acre
Gate	Gate Througput Truck Turnaround Time	Containers/hour/lane Truck Time in Terminal
Gang	Labor Productivity	Number of Moves/man-hour

Source: Le-Griffin, Hanh Dam and Murphy, Melissa, *Container Terminal Productivity: Experiences at the Ports of Los Angeles and Long Beach*

In a paper entitled Performance Measurements of Container Terminal Operations[51] Esmer provided an overview of the different approaches to measuring port performance. He referred to the work of Fourgeaud (2000) who noted that that container terminals' performance depends on, inter alia:

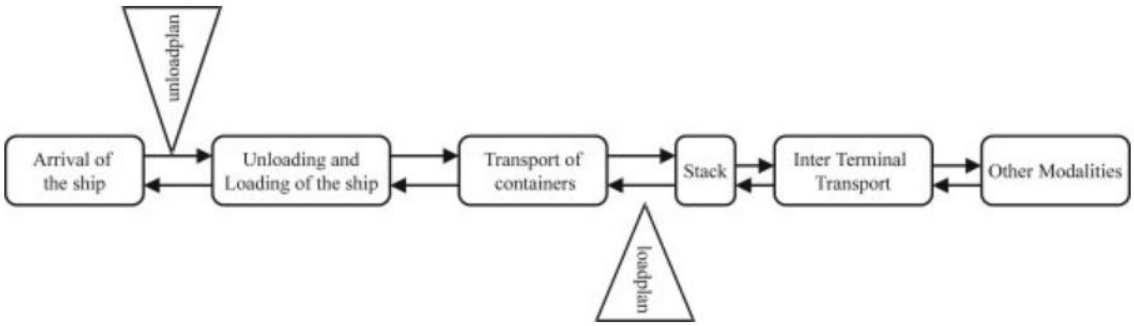
- The ratio of loaded V empty containers, noting that depending on the type of port, empty containers are not always included in the port statistics yet they still have to be handled;
- Unproductive moves, i.e. the handling of all the containers that do not have to be unloaded but have to be moved: mostly empty and light containers and those containing hazardous materials, loaded on top or on the stack;
- The level of automation of the quay cranes (and yard cranes); one of the limiting phases of the handling cycle is the time spent positioning accurately the spreader on a container (loading), or the container on a trailer, a MAFI trailer 244 (specialized equipment used to shift containers within port limits) or a chassis manoeuvring on the apron (unloading). With advances in crane technology e.g. cranes equipped with anti-sway devices, the problem is more the capacity to deliver or remove containers from the apron without delaying ship-to-shore operations;

[51] Esmer, Soner, *Performance Measurements of Container Terminal Operations*, Maritime Business and Administration School, Dokuz Eylul University, Turkey, 2008, http://acikerisim.deu.edu.tr:8080/xmlui/bitstream/handle/20.500.12397/5405/10.1%2520esmer.pdf?sequence=1&isAllowed=y

- Average weight of containers and the proportion of containers requiring special attention: flats, liquid bulks, reefers etc.; and the mix of containers of various sizes: 20'/40'/45' which will require manoeuvring or a change to spreaders; and
- Commercial constraints at play; noting that most of the shipping lines calling at a port may have commercial constraints, leading to unevenly distributed port calls.

Esmer concluded that the most useful measures can be divided into four categories. These are production, productivity, utilisation and service measures. These derive from the port processes represented in Figure 9.

Figure 9: Process of unloading/loading a ship at a container terminal



Source: Processes at a container terminal, http://www.irisvis.nl/container/processes.html

The key indicators Esmer developed under each of these categories are:

- Production measures:
  - Ship throughput: Measures the entire activity involved in loading and discharging vessels in a given time period (a shift, day, month or year);
  - Quay transfer throughput: Measure of the number of tonnes or containers moved between the quay and the storage areas;
  - Container yard throughput: This is the sum of the movements that take place in the storage areas; and
  - Receipt/delivery throughput: Measure of the activity relating to the delivery of outbound cargo or containers the port or terminal and collection of inbound cargo.
- Productivity measures:
  - Ship productivity: The broadest measures of ship productivity relate container handling rates for a ship's call to the time taken to service the vessel;
  - Crane productivity: Crane productivity is calculated per crane and can be expressed in gross and net values;
  - Quay productivity: Defines the relation between production and quay resources. The latter can be measured by defining, for a given unit time, the length of a typical berth (which will then produce a ' berth productivity ' figure) or by working on the basis of a particular length of quay or per meter of quay;
  - Terminal area productivity: Similar to the quay productivity indicator is the measure of 'terminal area productivity' which applies to the entire terminal and

expresses the ratio between terminal production and total terminal area for a given unit time;
  - Equipment productivity: The value that is of interest is the number of container moves made per working hour, either for an individual machine or for the stock of a particular type of machine.
  - Labour productivity: Even with a high level of mechanisation, labour costs still form a large part of total terminal costs and it is important to monitor labour well and know what the productivity per person-hour is over a measured period; and
  - Cost effectiveness: This brings the all-important element of cost into the equation. Perhaps the simplest and most revealing measure of a terminal's efficiency is the cost of handling its container traffic or throughput over a specified period (typically a month or a year).
- Utilisation measures:
  - Quay utilisation: This measure reflects the amount of time that the berth was occupied out of the total time available;
  - Storage utilisation: It is calculated by comparing the number of storage slots occupied with the total number of available slots according to the yard's design capacity;
  - Gate utilisation: The smooth and rapid processing of incoming and outgoing road vehicles at the gate is an important factor in efficient terminal operations. Thus, gate utilisation is a valuable measure for container terminal operators; and
  - Equipment utilisation: Because the terminal's investment in cargo-handling equipment is very costly, equipment utilisation is an extremely important performance measure. The utilisation of any item or type of equipment is defined as the proportion of time that it was effectively deployed over a specified period.
- Services measures:
  - Ship turnaround time: One of the most significant indicators of service to ship operators is ship turnaround time. This is the total time, spent by the vessel in port, during a given call. It is the sum of waiting time, plus berthing time, plus service time (i.e. ship's time at berth), plus sailing delay. Ideally, ship turnaround should be only marginally longer than ship' s time at berth and thus waiting time in particular should be as near to zero as possible;
  - Road vehicle turnaround time: For shippers/receivers (and trucking companies) the most important measure of a terminal's service quality is the time required to collect a container from the terminal or deliver one; and
  - Rail service measures: Train turnaround time would not be a useful measure for the service performance of a container terminal to the rail line.

Esmer concluded that:

> There is little agreement between ports, international organizations concerned with ports, and experts in the field over what these performance measures (often referred to as performance indicators) should be. In the literature, many alternative

measures have been reviewed and described for different purposes, but there is little consistency over how the terms should be defined and calculated.[52]

In its 2017 report to Infrastructure Victoria, GHD also considered port performance measures. It analysed a number of performance measures including berth utilisation. On berth utilisation, GHD noted that a commonly quoted benchmark for berth utilisation for major container terminals with multiple berths is 60-65%, and that while a 65% utilisation at first sight may appear to be relatively low it is necessary to maintain spare capacity to provide the conditions for competition between terminal operators in cases where a shipping line may wish to switch its terminal service provider.

GHD also analysed ship to shore transfers. It analysed:

- Berth capacity, defined as the maximum annual container throughput that can be handled over the berth without the vessel service level (measured by the wait time/service time ratio) falling below an acceptable level; and
- Berth throughput defined as TEU throughput per berth metre per year. GHD noted that berth throughput can be improved through improved stevedoring productivity; however, it is limited by the following factors:
  - Crane intensity, being the number of cranes that can be applied to each vessel depending on the vessel's length and stowage pattern;
  - Crane density, being the number of cranes available on the berth accounting for minimum crane spacing, and target crane utilisation;
  - Crane capacity, noting that twin lift and tandem lift cranes can handle more containers per lift than conventional ship to shore cranes (STSCs);
  - The ratio of 20-foot to 40-foot containers, which in turn impacts the number of lifts required per TEU;
  - Typical TEU exchange rates and stowage patterns, which in turn impacts on crane intensity; and
  - The ability of the yard handling system to keep up with the STSCs. GHD noted that as STSCs are the most expensive equipment within the port, and they have a direct impact on the ship service time it is important to ensure they are never delayed by the unavailability of transfer equipment between the stacks and the berth.[53]

Around 2012 the editorial team at the now defunct ports industry magazine *Cargo Systems*, attempted to produce metrics which objectively measured port performance. The methodology that was eventually devised by *Cargo Systems* centred on four metrics:

- The capital cost of the berth;
- The number of cranes deployed per berth;
- The average crane moves per hour; and

[52] Ibid, P251

[53] GHD, *Infrastructure Victoria: Second Container Port Advice: Estimated Capacity of the Port of Melbourne*, May 2017, P18-21, https://www.infrastructurevictoria.com.au/wp-content/uploads/2019/04/GHD_Infrastructure_Victoria_second_container_port_advice_-_Estimated_capacity_of_the_Port_of_Melbourne_FINAL.pdf

- Berth utilisation.[54]

This occurred alongside similar work undertaken by a rival industry journal, *The Journal of Commerce* (JOC). Having reviewed the work undertaken by JOC the *Cargo System* team abandoned its work because it concluded they were trying to produce something that allows terminal operators to measure themselves against their peers; while the JOC work was aimed at enabling terminals to be judged by their customers i.e. the shipping lines.

The *Cargo Systems* team noted that the buy-in that the JOC had received from the shipping lines has been crucial, because the shipping lines believed the JOC measure it developed was a relatively simple metric that participating shipping lines could measure terminals by. While it is acknowledged its metric might ignore certain value-adds that some terminals can bring to supply chains it claimed its measure allows the shipping lines to examine container terminal productivity within a common frame of reference.

The JOC metric is a single productivity measure that uses a 'time' denominator, where time commences when the first mooring line has been tied to the quay when a vessel berths to the time that the last line is cast as the vessel departs, divided by the number of containers handled in the intervening period to give a gross berth productivity figure.

In its White Paper of July 2013 JOC described its berth productivity measure (from which it ranked ports, and was the culmination of a five-year collaboration effort) as the number of total container moves (on-load, off-load, and re-positioning) divided by the number of hours during which the vessel is at berth (time between berth arrival, or 'lines down' and berth departure, or 'lines up'), without adjustments for equipment and labour down time.[55]

In a 2018 report prepared by a consulting firm for USAID, the US international development assistance agency which had committed to invest in a developing nation port, entitled *Principles of Monitoring Port Performance*, it proposed the adoption of two primary measures of port productivity – moves per berth-hour and moves per crane-hour.[56]

The USAID report noted however that the berth is only one component of the marine terminal and not necessarily the one which determines the terminal's overall capacity. It proposed a detailed capacity assessment that requires depicting the terminal as a stock and flow network, calculating the capacity of each component and identifying the terminal's 'weak link', meaning the component with the most constraining capacity which, in turn, determines the terminal's entire capacity. It suggested that a related analysis could identify the various measures available to increase the specific capacities of this component and

[54] The Loadstar, The LongRead Vol 1, June 2015, *Measuring port performance* https://theloadstar.com/wp-content/uploads/The-Loadstar-LongRead-Port-productivity1.pdf

[55] JOC, Port Productivity White Paper, *Key Findings on Terminal Productivity Performance across Ports, Countries and Regions*, July 2013, https://kentico.portoflosangeles.org/getmedia/30f7acdc-f7a1-45b5-b9c9-ad71a818cfc0/091913_Agenda_Audit_Committee_Item_3

[56] Nathan Associates Inc., *Principles of Monitoring Port Performance*, February 2018, USAID Office, Office of Infrastructure, https://pdf.usaid.gov/pdf_docs/PA00THBM.pdf

that of the entire terminal. For example, a comprehensive 2010 study of US container terminal capacity identified the container yard as the weak link in most US terminals.[57]

Accordingly, that study suggested that increasing terminal storage capacity could considerably add to the overall capacity of US terminals which, in turn, may delay the need for constructing new terminals. Increasing the storage capacity of the yards can be done either by increasing the storage density of existing yard areas (TEUs/ha), transferring secondary yard storage components (e.g., chassis) to off terminal locations, or providing additional storage area. Another way of increasing storage capacity is by reducing the demand for storage space and the related inventory of in-terminal containers by reducing dwell time, using tariff incentives (or disincentives) to encourage quicker evacuation of containers from the terminal.[58]

A useful analysis of the different yard or landside crane technologies and the associated stacking methodologies is provided in PEMA Information Papers on *Container Terminal Automation* and *Automatic Stacking Crane Performance*.[59]

The JOC work has now culminated in release of the first version of the World Bank and IHS Markit report, *Container Port Performance Index 2020: A Comparable Assessment of Container Port Performance* in May 2021.[60] A useful summary of the development of port productivity metrics is set out in Chapter 2.3 (Measures of Efficiency) in the World Bank and IHS Markit report.

The Container Port Performance Index (CPPI) 2020 measures gross crane productivity or gross crane moves per port hour (GCMPH), defined as call size or total moves divided by total gross crane hours, where call size is the number of container moves per call (discharge + load = ordered restows), and moves are the total container moves (discharge + ordered restowage moves + load, but excluding time on moving hatch covers, gear-boxes, etc).

It measures the performance of all cranes at a berth allocated to a ship so perhaps it is more accurately described as a berth performance measure, not a crane performance measure. It is noted that Waterline seems to agree, as its measure which most closely aligns with the World Bank-IHS Markit CPPI report measure is 'average lifts per hour of stevedoring operation' which Waterline does not include as a wharf productivity measure but a 'whole of container terminal' measure.

We say most closely aligns with the World Bank-IHS Markit CPPI report measure because it is not an exact alignment. This is because Waterline defines the total (gross) time as being

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[57] Ibid P26

[58] Ibid P26

[59] Port Equipment Manufacturers Association (PEMA), Information Papers on *Container Terminal Automation* and *Automatic Stacking Crane Performance*, https://www.pema.org/wp-content/uploads/downloads/2016/06/PEMA-IP12-Container-Terminal-Automation.pdf and https://www.pema.org/downloads/

[60] The World Bank and IHS Markit, 2021, *The Container Port Performance Index 2020: A Comparable Assessment of Container Port Performance*, P8, https://www.maritimes.gr/images/PORTS/Container-Port-Performance_Index-WB-2021.pdf?_t=1620669079

the time available to stevedores for loading and unloading containers, which is a more limited time than that used by the World Bank-IHS Markit CPPI report where the time commences from berthing (tie up) which is not when the first container move occurs. Time in the World Bank-IHS Markit CPPI report measure includes breakdowns, inclement weather, vessel inspired delays, un/lashing, boom down/up plus hatch cover and gear-box handling and all terminal inspired delays including meal-breaks.

This again demonstrates the importance of understanding the beneficiary of a measure. The World Bank-IHS Markit CPPI report measure is clearly useful to a shipping line but is not particularly useful for a terminal operator.

The World Bank-IHS Markit CPPI report methodology

The construction of the CPPI has employed two different approaches, a statistical approach (measuring efficiency and finances), and an administrative approach (reflecting expert knowledge and judgment), to ensure the resulting ranking of container port performance reflects as closely as possible actual port performance, while also being statistically robust.

Two sub-approaches have been developed to estimate the technical efficiency frontier using linear programming techniques, mainly (i) data envelopment analysis (DEA); and (ii) econometric (stochastic) approaches. DEA is a mathematical method used to convert inputs to outputs with the purpose of evaluating the performance of comparable organisations.

The World Bank-IHS Markit CPPI report used Factor Analysis (FA) in constructing its statistical approach, saying the advantage of FA is its ability to examine a large dataset and ascertain the impact of a series of measured variables on an unseen latent variable (for example, in this case, of efficiency), which cannot be measured directly with a single variable. Instead, the impact is seen through relationships with a series of visible and measurable variables, each of which contains information about the "efficiency" of the port. The latent variable, efficiency, is a function of each of the measured variables and an error term for each. FA then determines the relative weight attached to each of the measured variables, vis-à-vis the efficiency of the port, together with some uncertainty, which is captured by the error terms. It says the reason FA can be helpful is these variables are in fact determined by a small number of unobserved factors, which might include quality of infrastructure, expertise of staff, and so on. [61]

The USAID report also identified methods used to cope with multiple variables that can also be applied for marine terminals' performance: factor analysis (FA) and the principal components analysis (PCA), both of which are based on sophisticated analysis of the variances of the variables under study and are expressed as functions of a number of possible causes in order to find which are the most important. PCA is a dimensionality-reduction method that is often used to reduce the dimensionality of large data sets, by transforming a large set of variables into a smaller one that still contains most of the information in the large set.

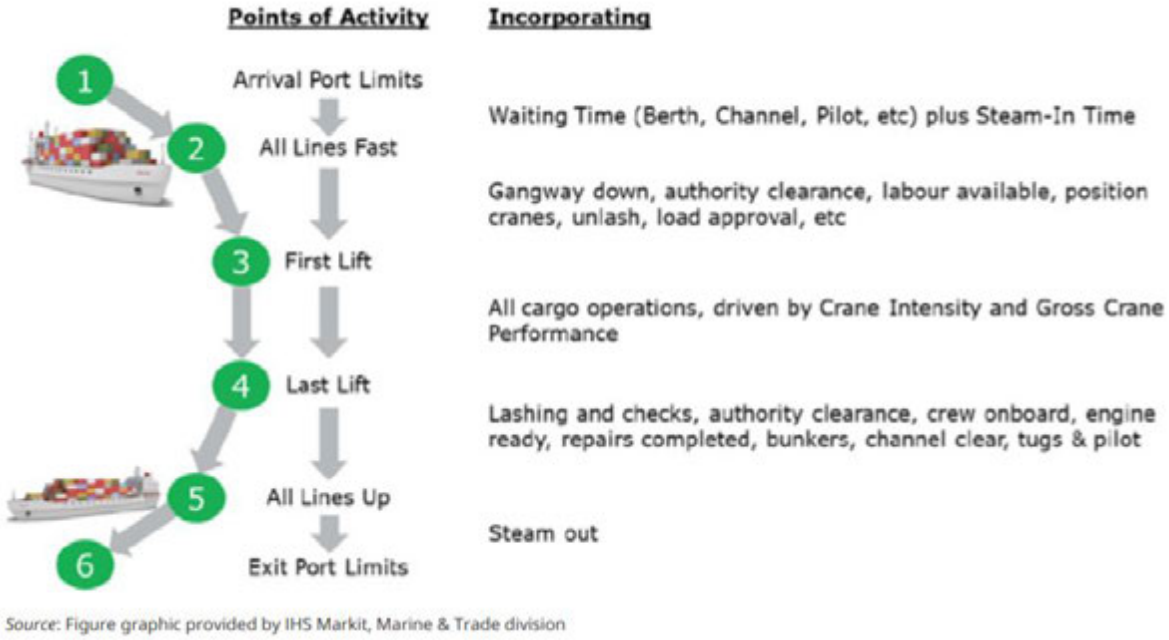
[61] Ibid P66 and P109

The components of the ship/port visit cycle, which are the source for the variables mentioned, are diagrammatically represented in Figure 10.

USAID noted from its experience that the results of DEA, FA and PCA analyses are difficult to interpret as the "scores" do not provide insight as to the constraining or facilitating factors that affect performance. Moreover, the multi-variable index is not tangible and not intuitive. Hence, it suggested adhering to using simple indicators that are far easier to explain.[62]

The index points used to construct the ranking in the administrative approach is an aggregate of the performance of the port, weighted relative to the average, across call and vessel size. Accordingly, the score can be negative, where a port compares poorly to the average in one call size and vessel size category, particularly if they do not have an offsetting positive score(s) in other cell(s) e.g. for a different vessel size category.

Figure 10: The World Bank's anatomy of a port call



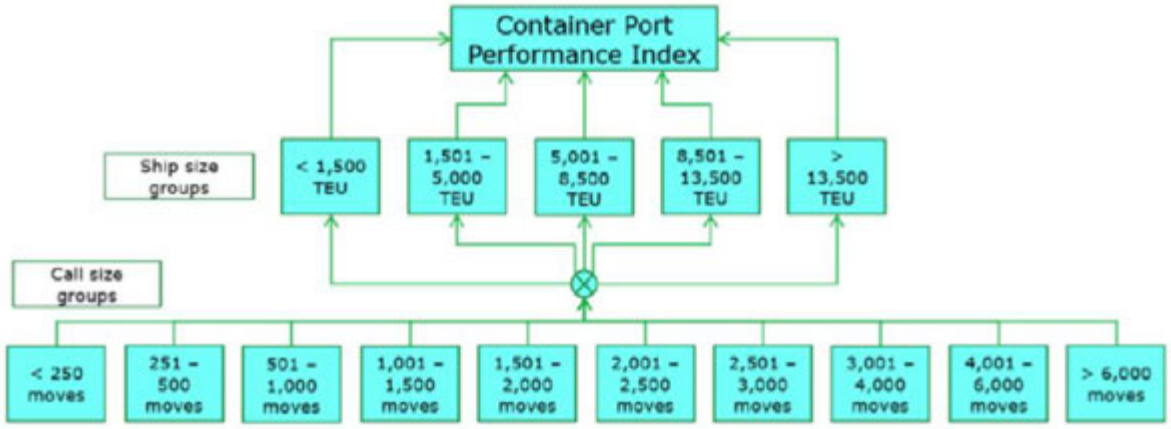
Source: The World Bank and IHS Markit, 2021, *The Container Port Performance Index 2020,* P45

The data for the World Bank-IHS Markit CPPI report is provided by 10 of the world's largest liner shipping companies, which collectively operate 76 percent of global fleet capacity covering 502 ports and 1,014 terminals in 137 countries, with calls by 3,860 individual vessels making 180,000 port calls annually.

However, to account for significant differences in ship calls, determined by: (i) greater or lesser workloads; and (ii) smaller or larger capacity ships, ship calls are analysed in ten call size groups and five ship size groups that generally reflect the types of ships deployed on specific trades and services (Figure 11).

[62] Nathan Associates Inc., *Principles of Monitoring Port Performance*, February 2018, USAID Office, Office of Infrastructure, P25, https://pdf.usaid.gov/pdf_docs/PA00THBM.pdf

Figure 11: The Structure of the World Bank-IHS Markit CPPI



Source: Original calculations for this publication, based on CPPI 2020 data.
Note: TEU = twenty-foot equivalent unit

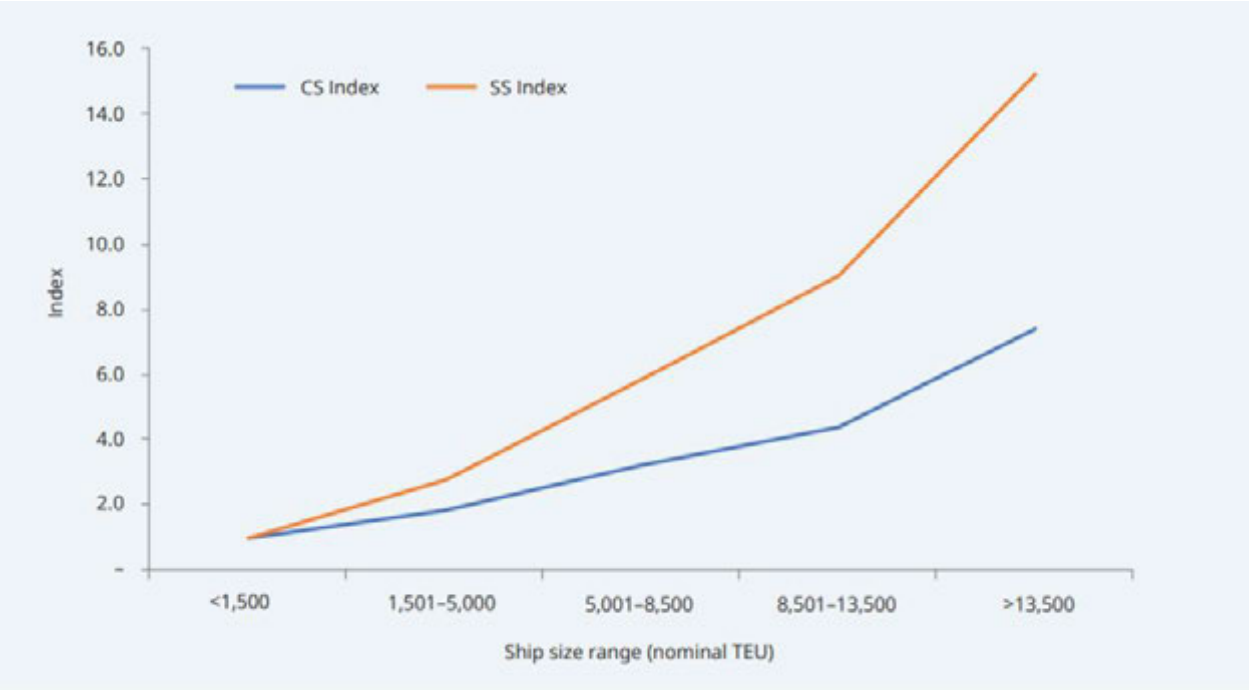
Source: The World Bank and IHS Markit, 2021, *The Container Port Performance Index 2020,* P51

The World Bank-IHS Markit CPPI report says that a correlation of close to 60 percent is observed between call size and crane intensity using a logarithmic trend line. Crane intensity increases rapidly through smaller call sizes and starts to peak and flatten when call sizes reach 4,000 to 6,000 moves per call (as shown in Figure 2). The World Bank notes that with a maximum observed crane intensity of around nine cranes per ship, it is interesting to note that for calls exceeding 11,000 moves, crane intensity is always below 6.0. This consistent result reflects a global representation; most of the call sizes in excess of 11,000 moves occur on North America's west coast where ports have multiple terminals, each with a limited quantity of cranes (crane density), and where the deployment of additional cranes is generally considered to be cost prohibitive. Above and beyond crane density lie factors relating to how close together adjacent cranes can operate. Additional constraints from the stowage plan can also have an impact if an excessively intense area of loading/unloading work is concentrated in one part of the ship.[63]

Average call size increases as ship size increases, but not proportionately with ship size (see Figure 12). This result is partially influenced by the deployment trends and dynamics of the liner shipping networks, and the capacity and volume of a particular port. For example, a ship of 20,000 TEU capacity will likely be deployed on the Asia–North Europe trade lane and make more than 12 port calls per rotation. On the other hand, a ship of 14,000 TEU deployed on the transpacific route would likely serve just eight ports in a full rotation. If all rotations had an equal quantity of port calls, then call size and ship size would trend proportionately, assuming that (i) a port can physically handle vessels of an increased size; and (ii) the availability of sufficient containers to be loaded and unloaded to justify a stop by a larger-scale vessel.[64]

[63] The World Bank and IHS Markit, *The Container Port Performance Index 2020*, 2021, P54
[64] Ibid P54

Figure 12: Relationship between Global Ship Size Index and Call Size Index



Source: Original calculations for this publication, based on CPPI 2020 data.

Source: The World Bank and IHS Markit, 2021, *The Container Port Performance Index 2020,* P54

Caution when comparing the World Bank-IHS Markit CPPI report to Australian ports

The World Bank-IHS Markit CPPI report reviewed attempts to produce comparable port performance data and methodologies over the last 40 years and noted that the issue remains a contested space.

The World Bank, in presenting the CPPI has warned that:

> Some of the results, however, should be interpreted with a note of caution. Despite the apparent sophistication of the statistical and econometric approaches, the studies share many of the same challenges as previous attempts. These include differences in the definition and reliability of the input statistics (among the questions to address: Does the container handling space include, or exclude container depots outside or adjacent to the port area? Does it include the general cargo berths where overspill containers are handled?), temporal consistency in the data available from different ports and terminals, public sector mandates to allow more or less storage time, and similar limitations in trust and transparency between terminal operators and port authorities.[65]

It also noted that:

[65] Ibid, P37

> Even if the data are comparable, reliable, and complete, interpretations will differ within each context. As in one example, a port or terminal under stress might appear an exemplar in terms of the comparison, as the pressure forces an improvement in the utilisation of space, and improvement in operational practices. By contrast, a port under less stress might not face the same pressures, and in some cases encourage higher dwell time for revenue maximization. The picture is obviously nuanced, **and the key message is that the various metrics should not be considered alone without carefully considering other indicators within a given context.**[66] (MUA emphasis).

The World Bank has foreshadowed that the CPPI 2021 to be produced in 2022 will seek to investigate and explain divergences between the two approaches revealed in its port rankings, while also gaining a further understanding of key determinants or influences on container port performance. It also noted that the factor analysis result could be seriously distorted in the presence of large outliers and that this is an area necessitating further investigation in future iterations of the CPPI.[67]

The report noted that:

> Poorly performing ports are characterized by limitations in spatial and operating efficiency, limitations in maritime and landside access, inadequate oversight, and poor coordination between the public agencies involved, resulting in a lack of predictability and reliability.[68]

Some of those characteristics are visible in Australian ports. The question arises, as we previously emphasised, is which stakeholder or partner in the port supply chain has the responsibility for coordinating a response to these limitations and for investing in remediation. The market failures identified will not be resolved by individual supply chain participants responding in isolation to their preferred market signals that suit their particular interests. Some form of overarching coordination and intervention will be required.

In a report prepared by a consulting firm for USAID, the US international development assistance agency which had committed to invest in a developing nation port, entitled Principles of Monitoring Port Performance, the author's cautioned that:

> a meaningful comparison of berth productivity among terminals should include terminals with similar crane availability and ship and call sizes, as we discussed earlier, as loading/discharge volume and vessel size can influence shoreside productivity. Another factor to consider is crane technology, especially the availability of twin lifting cranes.[69]

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[66] Ibid, P39
[67] Ibid, P110
[68] Ibid, P11
[69] Nathan Associates Inc., *Principles of Monitoring Port Performance*, February 2018, USAID Office, Office of Infrastructure, P22, https://pdf.usaid.gov/pdf_docs/PA00THBM.pdf

The author's identified another problem in comparative assessments of terminals as being the lack of uniformity in the terminology used and the system for reporting or collecting data. For example, the event "starting ship handling" can be defined either as the time when the gang begins climbing the gangway, the gantry moves to position, its boom is finished lowering, the crane's spreader locks into the first box, etc.[70]

This is a problem with the World Bank-IHS Markit CPPI, which has adopted the GCMPH measure, defined as call size or total moves divided by total gross crane hours, where call size is the number of container moves per call (discharge + load = ordered restows), and moves are the total container moves (discharge + ordered restowage moves + load, but excluding time on moving hatch covers, gear-boxes, etc). It is unclear from the report when 'gross moves' commences.

The USAID report authors also identified that the commercial sensitivity of performance data as problem, because container terminal operators tend to treat performance information as proprietary.[71]

In fact, it was this problem that led the World Bank to opt for a measure that did not require inputs from terminal operators but rather from shipping lines. The shipping lines' motives for requiring the productivity comparison results and therefore their willingness to provide data inputs was predominantly to place policy and commercial pressure on port managers and container terminal operators who they regarded as not falling into line with their use of unregulated monopoly power to drive changes in the logistics chain - principally company consolidation, new shipping line alliances and use of larger ships. The shipping lines believed other parties in the logistics change were too slow to respond to their strategies, notwithstanding the costs, which the shipping lines do not wish to contribute to.

Australian port rankings in the World Bank-IHS Markit CPPI report

It is impossible to make any accurate assessment of why Australian container ports have achieved the ranking given in the World Bank-IHS Markit CPPI report in the absence of knowing what data inputs were provided and without an assessment of the quality of that data. In fact, we do not even know which shipping lines provided the data for Australia, nor their source for the raw data.

Furthermore, the World Bank has provided many qualifications on the data presented and therefore the rankings and cautioned against considering the data and results in isolation, without carefully considering other indicators within a given context.

Other global comparative productivity indicators (rather than the gross moves per hour (GMPH) indicator used by the World Bank) such as net berth moves (by TEU) per hour (BMPH), that focuses on the total number of TEUs that (all) cranes moved on/off a particular vessel each hour, or labour hours per move (LHPM) may have produced an entirely different ranking.

[70] Ibid P24
[71] Ibid P24

The literature (see for example Mili and Sadraoui (2015)[72]) identifies a number of factors that influence the working time that will show up in the GMPH measure used by the World Bank, the main factors being:

- The time spent waiting for the vessel to prepare for unloading;
- The time taken for unlashing/lashing of containers; and
- Crane breakdowns.

On the time taken to prepare for unloading, tying up can typically involves 20-25 minutes on the sizes of vessels servicing Australian ports, but for the larger vessels now entering Australian ports tie ups can take another 40 or 45 minutes of longer, due to larger and heavier lines and the requirement for additional lines.

In regard to lashing, in Australia no worker is permitted to board the ship until the gangway is fully down and the gangway net is secure. This can take anywhere from 15-30 minutes depending on the crew and style of gangway net. This task cannot be commenced until all the mooring lines are secure. Therefore, from vessel arriving until the lashing gang walk up the gangway can be a significant amount of time, anywhere from 35 minutes best case to over an hour.

Another significant factor affecting the time lashing takes is whether 20-foot containers are butted up are a have a gap. If they are separated by a gap, it means the centres have to be unlashed/lashed which takes a lot of time whereby all the gear has to be passed down and back up, which is labour intensive. A ship that is 20 containers wide and double lashed in the centre would mean 80 lashing bars and 40 turnbuckles would need to be handled. Therefore the time taken for lashing can range on a small well-maintained vessel from around 2 hours through to it taking a full shift.

We previously referred to MUA analysis of on-board container stowage patterns on the ship types that typically visit Australian ports which shows that the smaller hatches requires a significant number of lateral movements of quay cranes for positioning over hatches, as well as repositioning of containers to access the containers for exchange, which considerably reduces cane moves per hour. Additionally, with multiple points of work and not going below deck there is more unlashing and lashing to be completed.

Other factors can also come into play, such as the changes of destination or schedule of vessels that the shipping line may decide once the containers for loading have already been stored in the yard based on a previous stowage plan provided by the shipping line. That can result in additional time retrieving containers, thus slowing down the movement of containers for loading, with a consequential impact on productivity.

This problem has frequently arisen during the last two years when shipping lines have altered schedules and not met berthing windows. This has also resulted in the sequence of ship loading being altered, with the same impact. Australia, with up to five port calls within

[72] Mili, Khaled and Sadraoui, Tarek, *Optimizing the Operational Process at Container Terminal*, International Journal of Econometrics and Financial Management, 2015, Vol. 3, No. 2, https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.917.7687&rep=rep1&type=pdf

the nation and at the end of the vessel round trip cycle, poses particular problems for stowage planning.

An analysis of the World Bank-IHS Markit CPPI report by Peter van Duyn, a maritime logistics expert at the Centre for Supply Chain and Logistics at Deakin University published in June 2021 was prefaced by the comment that "*I find it hard to believe that ports in our region like Bell Bay (ranked 163), Port Moresby (ranked 211), Noumea (ranked 124) and Wellington (ranked 141) are considered better performers than Australia's capital city ports. It also surprises me to find that respectable ports such as Southampton (ranked 317), Felixstowe (ranked 322) and Valencia (ranked 308) find themselves at the bottom end of the table.*"[73]

Van Duyn suggests that a more accurate analysis of the report's findings for Australia, drawing on the ranking of ports according to categories of vessel sizes those ports service shows that rather than being in the bottom 25%, most Australian ports sit around the 150 to 175 ranking (out of 351 ports) i.e. in the top 50%.

Port Botany, which was ranked the lowest of Australia's 4 largest ports (337/351 on the statistical approach, and 327/351 on the administrative approach) was actually ranked 189th (of 351, just outside the top 50% using the administrative approach) when its ranking is identified based on the ships it most frequently services as shown in Table 7, being ships in the 5,000-6,000 TEU range as shown in Table 8 (Port Botany) and Figure 13 (Port of Melbourne) (coinciding most closely with the World Bank's 5,001-8,500 TEU range).

Brisbane (156/351), Freemantle (171/351) and Melbourne (159/351) are also ranked much higher based on their servicing of ships in the 5,000-6,000 TEU range. Data in Table 9 identifying the number of container ships visiting Fremantle Port shows the marked reduction in the number of container ship visits, a proxy for the increased size of ships (given overall TEU volumes actually increased), commenced in the 2020-21 financial year i.e. from June 2020 onwards.

[73] Van Duyn, Peter, *Australian port performance not as 'Dreadful' as it may seem*, Daily Cargo News (DCN), 10 June 2021, https://www.thedcn.com.au/news/containers-and-container-shipping/letter-to-the-editor-australian-port-performance-not-as-dreadful-as-it-may-seem/

Table 7: The CPPI 2020: Administrative Approach

			Weight	0.46		1.00		1.54		1.97		2.57
			<1,500 TEU		1,501–5,000 TEU		5,001–8,500 TEU		8,501–13,500 TEU		>13,500 TEU	
Port name	Rank	Total points	Rank	Points	Rank	Points	Rank	Points	Rank	Points	Rank	Points
ADELAIDE	333	(78.35)		—	242	(3.6)	205	(22.4)	150	(20.4)		—
BRISBANE	234	(7.78)	140	(1.1)	178	1.6	156	(4.6)	112	(0.9)		—
FREMANTLE	319	(49.22)		—	210	(0.9)	171	(7.5)	146	(18.7)		—
MELBOURNE	313	(40.21)		—	238	(3.4)	159	(5.0)	143	(14.7)		—
PORT BOTANY	327	(62.93)	185	(5.0)	235	(3.1)	189	(13.1)	147	(19.0)		—

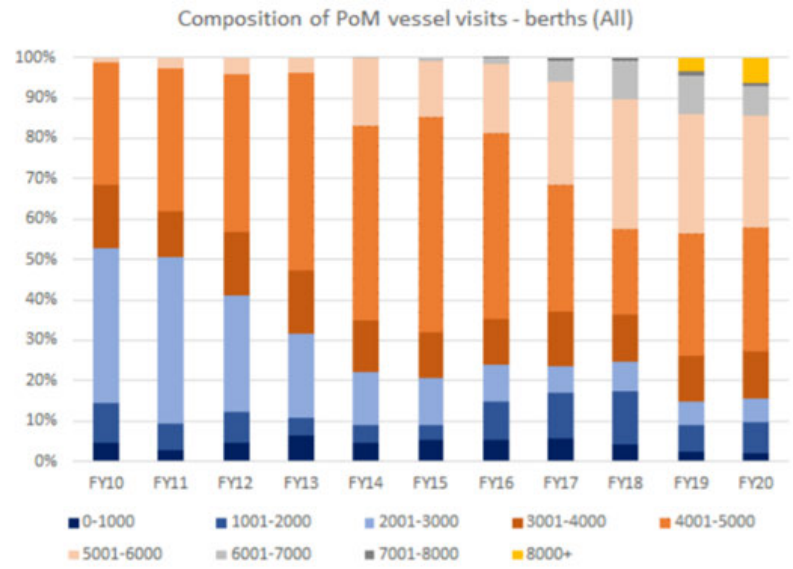
Source: Extracted from Table A.1. The CPPI 2020: Administrative Approach, The World Bank and IHS Markit, 2021, *The Container Port Performance Index 202,* P85

Table 8: Port Botany YTD container vessel visits for November FY2022

TEU BAND (VESSEL CAPACITY)	NOV FY22	NOV FY21	FY 22 YTD	FY 21 YTD
0 - 1,000	1	1	2	8
1,001 - 2,000	11	8	72	52
2,001 - 3,000	14	11	65	27
3,001 - 4,000	6	5	26	28
4,001 - 5,000	15	12	65	74
5,001 - 6,000	23	19	110	105
6,001 - 7,000	4	7	26	31
7,001 - 8,000		1		3
8,001 - 9,000	5	10	32	38
9,001 - 10,000	4	2	21	15
10,001 or more		1	1	2
GRAND TOTAL	**83**	**77**	**420**	**383**

Source: NSW Ports, *Trade Report*, November 2021, https://www.nswports.com.au/resources

Figure 13: Composition of Port of Melbourne vessel visits by TEU size across all Port of Melbourne berths



Source: PoM shipping data.
Note: FY20 data is extrapolated based on 6-months of actuals.

Source: PoM, *Tariff rebalancing application to the Essential Services Commission*, September 2020,

Table 9: Container ship visits – Fremantle Port – 2018-19 to 2020-21 (YTD)

Container Ship Visits	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2018/19	43	43	37	43	44	41	45	39	41	41	46	40
2019/20	45	42	40	42	34	27	33	28	30	30	30	30
2020/21	34	31	26	29	30	28	29	28				

Source: MUA based on data obtained from the WA Port Operations Taskforce, March 2021

Van Duyn suggests two other factors that could have contributed to the ranking of Australian ports:

- Australia does not have the volume of containers that warrants container terminal investment to the depth that is efficient for large global transshipment or hub ports:
  - Noting that the Victorian port economic regulator, the Victorian Essential Services Commission (ESC), has established a methodology to determine the levels of investment that is prudent and efficient for the Port of Melbourne (PoM), and is currently conducting an inquiry into the prudency and efficiency of investment by the PoM over its first 5 years as a leased port; and
  - Noting also that PoM is Australia's largest port handling just 3 million TEUs pa, relative to ports such as Guangzhou (ranked 4th by the CPPI - 22 million TEUs pa), Hong Kong (ranked 7th - 19.6 million TEUs pa), Kaohsiung (ranked 5th - 10.45 million TEUs pa) which have different investment imperatives; and
- Most of the World Bank-IHS Markit CPPI report's high-ranking ports are transshipment ports rather than gateway ports such as Australia's capital city ports:

- This impacts dramatically on container yard logistics, which in turn impacts on the speed with which cranes can be utilised at gateway ports, handling smaller vessels with smaller exchanges.

Additional observations on the World Bank-IHS Markit CPPI report's port rankings

Of the top 50 CPPI ranked ports only 5 (or 10%) are regarded by the MUA as having labour and human rights standards that meet the ILO Core Labour Convention, Dock Work Convention and WHS Convention standards. This is shown in Table 10. Similarly, of the 21 countries in which the top 50 CPPI ranked ports are located, only 5 countries (or 23.8%) are ranked by the Human Freedom Index as having a high standard of human freedom.

Table 10: Global top 50 ports (World Bank CPPI Rankings - statistical approach) and Australian ports. The table shows the extent to which they meet ILO labour and WHS standards (as assessed by the MUA), and their Human Freedom Index (country ranking). The table also shows whether the port is on the JOC top 50 global container ports list, ranked by 2018 throughput.

Port	Country	CPPI rank	CPPI score	Meets ILO labour & WHS standards? (Y/N or P=partially)	Human Freedom Index High (H) /Low (L)	JOC Top 50 Global Container Ports (Y/N)
Yokohama	Japan	1	-5.995	P	L	N
King Abdullah Port	Saudi Arabia	2	-5.684	N	L	N
Chiwan	China	3	-5.202	N	L	N
Guangzhou	China	4	-5.162	N	L	Y
Kaohsiung	China	5	-4.669	N	L	Y
Salalah	Oman	6	-4.531	N	L	Y
Hong Kong	China	7	-4.276	N	L	Y
Qingdao	China	8	-3.860	N	L	Y
Shekou	China	9	-3.726	N	L	N
Algeciras	Spain	10	-3.597	Y	H	Y
Beirut	Lebanon	11	-3.378	N	L	N
Shimizu	Japan	12	-3.361	P	L	N
Tanjung Pelepas	Malaysia	13	-3.342	N	L	Y
Port Klang	Malaysia	14	-3.334	N	L	Y
Singapore	Singapore	15	-3.279	P	L	Y
Nagoya	Japan	16	-3.251	P	L	N
Colombo	Sri Lanka	17	-3.209	N	L	Y
Sines	Portugal	18	−3.183	Y	H	N
Kobe	Japan	19	−3.127	P	L	N
Zhoushan	China	20	−2.963	N	L	N

Jubail	Saudi Arabia	21	−2.898	N	L	N
Yeosu	South Korea	22	−2.831	P	L	N
Fuzhou	China	23	−2.829	N	L	Y
Ningbo	China	24	−2.805	N	L	Y
Lazaro Cardenas	Mexico	25	−2.798	N	L	N
Khalifa Port	Abu Dhabi	26	−2.795	N	L	N
Tanger Mediterranean	Morocco	27	−2.769	N	L	N
Yangshan	China	28	−2.733	N	L	N
Yantian	China	29	−2.724	N	L	N
Taipei, Taiwan	China	30	−2.681	P	L	N
Da Chan Bay Terminal one	China	31	−2.588	N	L	N
Mawan	China	32	−2.557	N	L	N
Dalian	China	33	−2.506	N	L	Y
Incheon	South Korea	34	−2.422	N	L	N
Tokyo	Japan	35	−2.418	P	L	N
Hamad port	Qatar	36	−2.411	N	L	N
Lianyungang	China	37	−2.375	N	L	Y
Pipavav	India	38	−2.371	N	L	N
Halifax	Canada	39	−2.365	Y	H	N
Caucedo	Dominican Republic	40	−2.355	N	L	N
Bremerhaven	Germany	41	−2.265	Y	H	Y
Cartagena	Colombia	42	−2.185	N	L	N
Salvador	Brazil	43	−2.051	N	L	N
Aarhus	Denmark	44	−2.036	Y	H	N
Aguadulce	Columbia	45	−2.035	N	L	N
Cai lan	Vietnam	46	−1.991	N	L	Y
Haiphong	Vietnam	47	−1.953	N	L	Y
Magdalla	India	48	−1.943	N	L	N
Cai Mep	Vietnam	49	−1.932	N	L	N
Mundra	India	50	−1.902	N	L	Y
Total		**50**		**5/21**	**5/21**	**18/50**
Australian ports						
Brisbane	Australia	246	0.569	Y	H	N
Melbourne	Australia	302	1.676	Y	H	N
Fremantle	Australia	326	2.716	Y	H	N
Port Botany	Australia	337	3.907	Y	H	N
Adelaide	Australia	339	4.546	Y	H	N

Source: MUA, derived from CPPI rankings, Table 11, the Global Human Freedom Index [co-published by the Cato Institute, the Fraser Institute, and the Liberales Institut at the Friedrich Naumann Foundation, and MUA assessment.

Similarly, of the top 50 World Bank-IHS Markit CPPI report's ranked ports (Administrative approach) only 3 (or 6%) are regarded by the MUA as having labour and human rights standards that meet the ILO Core Labour Convention, Dock Work and WHS Convention standards.

Table 11: The JOC Top 50 Global Container Ports 2018

Container cargo throughput, 2018 versus 2017, in millions of TEU

RANK	PORT	COUNTRY	2018	2017	PERCENT VOLUME CHANGE
1	Shanghai	China	42.01	40.23	4.4%
2	Singapore	Singapore	36.60	33.67	8.7%
3	Ningbo-Zhoushan	China	26.35	24.61	7.1%
4	Shenzhen	China	25.73	25.21	2.1%
5	Guangzhou	China	21.92	20.37	7.6%
6	Busan	South Korea	21.66	20.47	5.8%
7	Hong Kong	China	19.60	20.76	-5.6%
8	Qingdao	China	19.31	18.30	5.5%
9	Tianjin	China	16.00	15.07	6.2%
10	Jebel Ali	UAE	14.95	15.37	-2.7%
11	Rotterdam	Netherlands	14.50	13.73	5.6%
12	Port Klang	Malaysia	12.32	11.98	2.8%
13	Antwerp	Belgium	11.10	10.45	6.2%
14	Xiamen	China	10.70	10.38	3.1%
15	Kaohsiung	Taiwan	10.45	10.27	1.7%
16	Dalian	China	9.77	9.70	0.7%
17	Los Angeles	US	9.46	9.34	1.3%
18	Tanjung Pelepas	Malaysia	8.96	8.38	6.9%
19	Hamburg	Germany	8.77	8.86	-1.0%
20	Keihin ports	Japan	8.14	7.98	2.0%
21	Long Beach	US	8.09	7.54	7.3%
22	Laem Chabang	Thailand	8.07	7.78	3.7%
23	Tanjung Priok	Indonesia	7.80	6.92	12.7%
24	New York and New Jersey	US	7.18	6.71	7.0%
25	Colombo	Sri Lanka	7.05	6.21	13.5%
26	Yingkou	China	6.50	6.28	3.5%
27	Suzhou	China	6.36	5.88	8.1%
28	Ho Chi Minh City/Cai Mep	Vietnam	6.33	5.94	6.6%
29	Bremen/Bremerhaven	Germany	5.48	5.51	-0.5%
30	Valencia	Spain	5.18	4.83	7.2%
31	Manila	Philippines	5.05	4.82	4.8%
32	Jawaharlal Nehru Port Trust	India	5.05	4.71	7.2%
33	Piraeus	Greece	4.91	4.15	18.3%
34	Algeciras	Spain	4.77	4.39	8.7%
35	Hai Phong	Vietnam	4.76	4.45	7.0%
36	Lianyungang	China	4.75	4.72	0.6%
37	Mundra	India	4.44	3.98	11.6%
38	Savannah	US	4.35	4.05	7.4%
39	Colon	Panama	4.32	3.89	11.1%
40	Jeddah	Saudi Arabia	4.12	4.15	-0.7%
41	Santos	Brazil	4.12	3.85	7.0%
42	Rizhao	China	4.00	3.22	24.2%
43	Felixstowe	UK	3.85	4.30	-10.5%
44	Northwest Seaport Alliance	US	3.79	3.70	2.4%
45	Tanger Med	Morocco	3.47	3.31	4.8%
46	Barcelona	Spain	3.42	2.97	15.1%
47	Vancouver	Canada	3.40	3.25	4.6%
48	Salalah	Oman	3.39	3.95	-14.2%
49	Fuzhou	China	3.34	3.01	11.0%
50	Marsaxlokk	Malta	3.31	3.15	5.1%

Sources: Port authorities, IHS Markit: Ports & Terminals, Alphaliner

Source: Journal of Commerce (JOC) Online, *Top 50 global port rankings 2018*, 9 August 2019,

Only 18 (or 36%) of the top 50 ports by throughput listed in Table 11 are among the top 50 better performing ports based on the World Bank CPPI rankings (statistical approach) and of that 18, only five are located in a nation that is regarded by the ITF as having labour and

human rights standards that meet the ILO Core Labour Convention and WHS Convention standards.

This seems to suggest that the vast majority of the World Bank's top ranked performing ports are located in nations that do not adhere to acceptable human rights and labour standards or nations that do not adhere to human rights and labour standards to the same extent as expected by Australia where a higher value is placed on the rule of law and on compliance with international standards and norms.

The nations of Abu Dhabi, China, Columbia, Dominican Republic, India, Japan, Lebanon, Malaysia, Mexico, Morocco, Oman, Qatar, Saudi Arabia, Singapore, Sri Lanka and Vietnam where the majority of the World Bank top ranked ports are located, are not regarded internationally as model nations in upholding human rights and complying with labour standards expected under international norms and standards such as the ILO Core Labour Conventions.

In fact, the 2021 ITUC Global Rights Index, which lists the world's worst countries for workers, and rates nations on a scale of 1 to 5 and 5+ with the worst being level 5+, ranks China, Colombia, India, Malaysia and South Korea as level 5 (where workers have no guarantee of rights); Lebanon Oman, Qatar, Sri Lanka and Vietnam as level 4 (where workers face systematic violations of rights); Mexico and
Morocco as level 3 (where workers face regular violations of rights); and Japan and Singapore as level 2 (where workers face repeated violations of rights).[74]

It will be important that the Productivity Commission specify the standards of human and labour rights which should accompany any proposals it makes for improving port productivity, aimed at ensuring that the workforce contribution to improved productivity is accompanied by policies and practices that conform with best practice adoption of international human rights obligations to which Australia has committed to uphold, derived from for example, the OECD Guidelines for Multinational Enterprises which reference the Core ILO Labour Conventions[75]; the UN Guiding Principles on Business and Human Rights[76], and the Universal Declaration of Human Rights, particularly Articles 23 and 25.[77]

Factors to be considered in analysing port productivity

Just about every study of port performance and every organisation that has sought to design port performance metrics has been challenged by the large number of variables that affect and influence port performance, including container terminal productivity performance.

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[74] International Trade Union Confederation (ITUC), *Global Rights Index 2021*, https://files.mutualcdn.com/ituc/files/ITUC_GlobalRightsIndex_2021_EN_Final.pdf
[75] OECD, *Guidelines for Multinational Enterprises*, https://www.oecd.org/daf/inv/mne/48004323.pdf
[76] United Nations (UN), *Guiding Principles on Business and Human Rights*, https://www.ohchr.org/documents/publications/guidingprinciplesbusinesshr_en.pdf
[77] UN, *Universal Declaration of Human Rights*, https://www.un.org/en/about-us/universal-declaration-of-human-rights

The Productivity Commission noted this challenge in its 2003 research report on *International Benchmarking of Container Stevedoring* where it observed that container handling rates are influenced by a range of factors that are within and outside the control of the terminal operator. Internal factors include terminal layout and the capital resources employed at the terminal, as well as labour productivity. External factors include trade volumes and associated shipping patterns that influence the extent of any scale economies. Ship size and type are other factors that interact with terminal throughput to influence scale economies and capital utilisation.[78]

The most important variables that impact on container terminal productivity, are:

- The nature of the service contract between the shipping line and the terminal operator i.e. what stevedoring service or service performance is the shipping line paying for;
- The quality and timeliness of information flows from ship to shore e.g. the vessel stowage plan, and whether there is late notification of a ship route that could result in containers needing to be picked up for loading in a different sequence to that specified in an original stowage plan;
- The prevalence of multi-port calls which increases the complexity of the container stowage task, because of the need to reposition containers between port calls (known as restows). This requires more crane movements to load and unload containers than if the entire cargo were to be loaded or unloaded at a single port[79];
- The number of cranes a stevedoring company allocates (per berth) to a ship, noting that physical maximisation of cranes may not lead to linear improvements in productivity due to under/behind the crane or apron congestion[80];
- The performance capability/limitations of the landside equipment supplied by the container terminal operator;
- The availability of landside equipment, which could be out of service due to repairs and maintenance being performed;
- The allocation of labour by the terminal operator. Australian terminal operates invariably under allocate labour to the lashing function which results in lost time at the end of the vessel loading where the crane rate is zero because the containers have all been loaded but there is still lashing to be done so work is not technically complete. Additionally due to safety requirements, lashing cannot occur under a

[78] Productivity Commission, *International Benchmarking of Container Stevedoring*, July 2003,
[79] Ibid P39
[80] Because vessels have become wider rather than longer, terminal operators have been unable to do what they did previously when faced with bigger ships - deploy more cranes. An example: the 2009-built *Gerda Maersk* is 366 metres long, 43 metres wide and has a capacity of 9,000 TEU; by comparison, the *Maersk-McKinney Møller* is just 10% longer at 399 metres, but 37% wider at 59 metres and carries twice as many containers. The consensus is that eight, perhaps nine for some ships, is the maximum number of cranes that can be set to work on the largest ship, while most terminals deploy a maximum of six. Another option is to increase crane moves per hour and there are limitations, mainly the critical space on the dockside under the cranes, coupled with the way containers are moved between yard stacks and quays. The problem is congestion under the crane - getting the boxes to and away from the crane is the fundamental issue. The more boxes lifted on and off a ship per crane per hour, the more trailers, tractors, straddle carriers and the like are arriving in the lanes between the crane's legs, and apron congestion becomes the problem, not the crane speed.

working crane which means at least the entire final ship's bay needs to be lashed after the last container is loaded;

- The skills, qualifications and experience of the labour supplied to operate the landside equipment;
- The safe operating standards applied by the employer/workforce in accordance with WHS law, regulation, codes of practice and collective bargaining agreement (CBA) provisions;
- The extent of automation of the landside equipment provided by the terminal operator, noting the international consensus that automated equipment cannot perform to the same levels as manually operated equipment[81];
- The size and configuration of the ship – larger ships with wider beams and higher stacks require a longer time over the ship for cranes to pick containers; larger ships also result in larger exchanges creating more congestion inside a terminal, which slows down container movement (see for example the discussion at section 4.3. Quay-crane deployment in *The case study of an Australian container terminal operator*)[82]. Smaller ships on the other hand result in more lateral movement of quay cranes this slowing down lifts per hour. See also a 2017 analysis by JOC showing that crane productivity peaks at the 7,000-10,000 TEU vessel size;[83]
- The age of the ship and quality of lashing bars – the data shows that container ships visiting Australia are older ships – with an average age of 13 years[84];
- Whether the unloaded containers are for transhipment or local landside distribution, noting that most containers unloaded in Australia are for local landside distribution, meaning they are positioned in the yard at a longer distance from the berth, requiring longer intra-terminal transportation time;
- The ratio of 20-foot containers to 40-foot containers, noting that the carrying capacity (payload) of a 40-foot container is not twice that of a 20-foot container. Accordingly, a move to 40-foot containers over time will result in a larger increase in TEUs than would otherwise be expected by the volume increase in tonnes. The rising share of 40-foot containers in overall container trade explains some, but not all, of the decline in tonnes per TEU of trade across recent history;[85]
- Terminal configuration and layout which can affect container handling rates. Loading and unloading operations and the land transport interface for the receival and dispatch of containers can become congested, if the physical layout of the terminal and the type of container handling machinery being used is inadequate. Further, yard space determines how far containers must be moved between stack and ship. The stack height determines how many containers must be moved to gain access to a container at the bottom of the stack, for example[86]

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[81] See for example, International Transport Forum, *Container Port Automation: Impacts and Implications*, International Transport Forum Policy Papers, No. 96, OECD Publishing, Paris, October 2021,

[82] Vrakasa, George, Chan Caroline, Thai, Vinh V., *The effects of evolving port technology and process optimisation on operational performance: The case study of an Australian container terminal operator,* The Asian Journal of Shipping and Logistics, Volume 37, Issue 4, December 2021, PP 281-290

[83] JOC.com, *Midsize vessels outpace mega-ships in berth productivity*, 30 November 2017

[84] UNCTAD, *Port calls, time spent in ports, vessel age and size in 2020*, Maritime Profile: Australia,

[85] Deloitte, *Infrastructure Victoria Second Container Port Advice: Container trade forecasts for Victoria*, February 2017, P12,

[86] Productivity Commission, *International Benchmarking of Container Stevedoring*, July 2003, P40

- The yard space and stacking methodology applied;[87]
- The terminal operators' access to closely located container parks (and the capacity/productivity of those container parks);
- Government mandates or policies which impact on terminal operations, such as targets for the transfer of containers by rail from terminals, impacted by rail access and capacity constraints; and
- The labour relations standards provided in enterprise bargaining agreements settled between the terminal operator companies and the labour union representing the workforce, where provisions such as additional rest where temperature exceeds a specified level, quay crane drivers hot-seat changeovers mid-run, performance benchmarks, workers' toolbox meetings that run beyond allocated time for work breaks, bi-annual union meetings, and unsafe work, all of which may impact on working time.

We note that the National Freight Data Hub (NFDH) is developing a project on container data to help stakeholders better understand, inter alia:

- What and where are the physical and regulatory bottlenecks and barriers for the efficient and safe movement of freight;
- How well are Australia's freight transport networks performing; and
- What and where are the opportunities for freight movements to be more efficient and safer.[88]

It draws on Waterline data but notes the following limitations:

- Waterline data is provided every six months at quarterly resolution;
- Waterline data has been collected since 1994, however, data fields have changed over time.
- The data is aggregated so individual container movements cannot be isolated.
- Container counts are aggregated from different points in the supply chain, sourced from different data providers with differing operational requirements. As such, aggregate container counts vary between indicators.
- Road throughput refers to containers booked through the Vehicle Booking System (VBS) or Truck Appointment System (TAS). Containers not captured in this measure may include:
  - Transhipped containers;
  - Containers transported outside of VBS/TAS, including bulk/stack runs; and
  - Containers shipped other than through the dedicated container terminals, such as through multi-user facilities.

We are advised by BITRE that:

> The NFDH is being led by BITRE in close consultation with other areas of the Department and industry. The NFDH is prioritising 13 key data projects, including a

[87] See for example, Port Equipment Manufacturers Association (PEMA), Information Paper, *Container Terminal Automation*, https://www.pema.org/wp-content/uploads/downloads/2016/06/PEMA-IP12-Container-Terminal-Automation.pdf and *Automatic Stacking Crane Performance* https://www.pema.org/downloads/

[88] Australian Government, National Freight and Supply Chain Strategy, *National Freight Data Hub*, https://datahub.freightaustralia.gov.au/projects/container/

project to Publish better quality performance data for ports. The NFDH prototype website currently hosts the 'Container counts' visualisation, which uses Waterline data and includes metrics on throughput, ship rate and landside measures. BITRE is working with stakeholders to gather more and timelier data about container ports. To date, the NFDH has published Australian Bureau of Statistics International Merchandise Trade data in two visualisations, Imports and exports and Volume versus value. Under a related NFDH project, BITRE is working to increase the accessibility of Australian import and export data from the Customs Integrated Cargo System, to enhance understanding of freight flows.[89]

We note that neither BITRE nor the NFDH has consulted the MUA on its data projects.

Consistent with the World Bank-IHS Markit CPPI report, which proposed that other indicators within a given context be considered alongside its CPPI the Productivity Commission is urged to also consider the World Bank's Logistics Performance Indicators (LPI) when developing a framework of performance measures to determine port performance and benchmarking Australian ports internationally. The World Bank's CPI shows that Australia ranks highly on its overall logistics performance on a global scale.[90]

The LPI is the weighted average of the country scores on the six key dimensions. In the 2018 LPI, Australia is ranked 18th of 160 nations, up one position since 2016.[91]

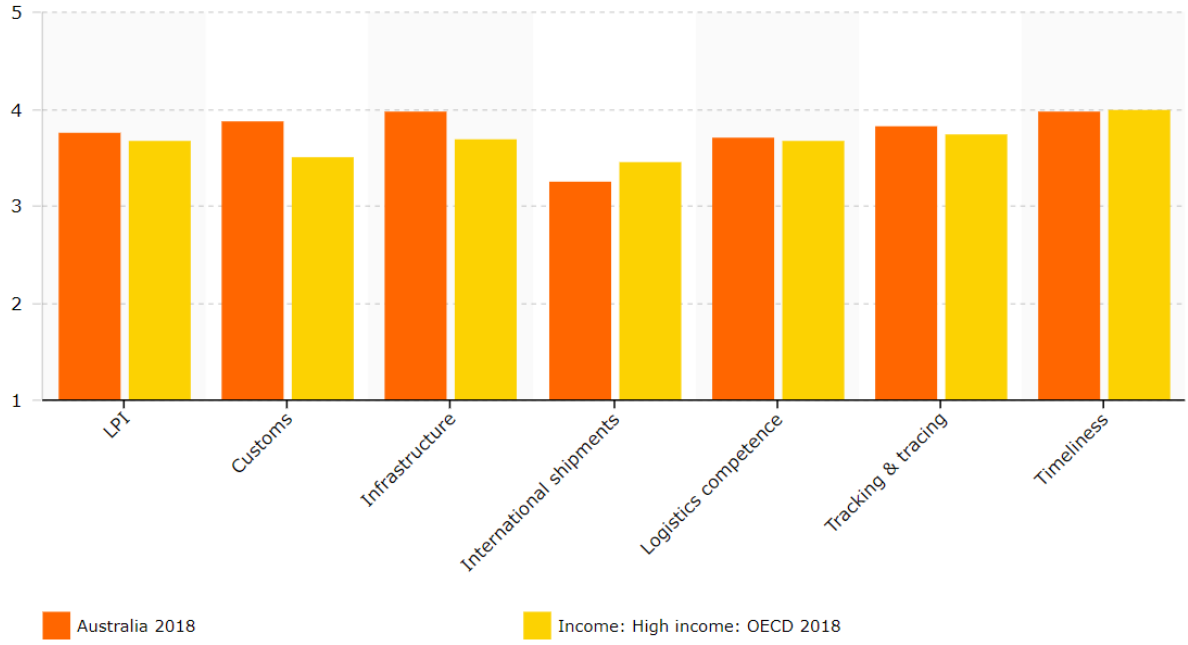
The six dimensions are (including Australia's ranking at 2018):

- Customs: Efficiency of the clearance process (i.e., speed, simplicity and predictability of formalities) by border control agencies, including customs (Australia ranked 7th);
- Infrastructure: Quality of trade and transport related infrastructure (e.g., ports, railroads, roads, information technology) (Australia ranked 16th);
- International shipments: Ease of arranging competitively priced shipments (Australia ranked 40th);
- Logistics competence: Competence and quality of logistics services (e.g., transport operators, customs brokers) (Australia ranked 21st);
- Tracking and tracing: Ability to track and trace consignments (Australia ranked 20th);
- Timeliness: Timeliness of shipments in reaching destination within the scheduled or expected delivery time (Australia ranked 21st).

Figure 14 shows how Australia compared with other high income OECD countries on the LPI. On all measures except international shipments, Australia either equals or outperforms the other high income OECD countries.

[89] BITRE email to MUA of 9 February 2022
[90] World Bank, *Logistics Performance Indicators (LPI)*, 2018 https://lpi.worldbank.org/
[91] Ibid

Figure 14: Australian LPI compared to other high income OECD countries



Source: World Bank, *Logistics Performance Indicators*

Another World Bank index that is relevant is the Liner Shipping Connectivity Index (LSCI).[92] The LSCI was initially generated on the country level, and since 2018 has also been developed on the port level in collaboration with MDS Transmodal.

LSCI can be considered a proxy for accessibility to global trade through the shipping network. The higher the index, the easier it is to access a high capacity and frequency global maritime freight transport system and effectively participate in international trade. Therefore, LSCI can be jointly considered as a measure of connectivity to maritime shipping and as a measure of trade facilitation. It reflects the strategies of container shipping lines seeking to maximize revenue through market coverage.

The index is generated from data on container ship deployment with six components:

- The number of weekly calls;
- The number of competing carriers;
- The number of services;
- The size of the largest ship that calls in port;
- The total deployed container carrying capacity, and
- The number of other ports connected through direct services.

While not directly measuring performance, the World Bank says that the LSCI has been shown to be highly correlated with performance and low trade costs. Figure 15 shows that Australia's liner shipping connectivity has continued to improve over the period 2006 to 2020. However, that connectivity could be considerably enhanced by establishment of a national strategic fleet, incorporating a fleet of container ships in the 4,000 to 8,000 TEU

[92] UNCTAD, *Liner Shipping Connectivity Index*, Data Centre,

range, who would be supported by Australian exporters and importers to deliver a service model tailored to meet Australia's container shipping needs.

Figure 15: Liner shipping connectivity - Australia

Source: UNCTAD, *Maritime Profile: Australia*. The data is derived from the LSCI for which data is provided by MDS Transmodal (https://www.mdst.co.uk) .

Improving the measurements of Australia's port productivity

The MUA regards the Waterline indicators as a strong foundation for an Australian framework of performance measures to determine port performance, and we suggest that all current indicators be maintained. We address benchmarking Australian ports internationally separately in the next section.

We nevertheless propose the following improvements/additions to the Waterline indicators:

- Inclusion of new indicators that captures landside technological applications and the impact of that technology, including:
  - Total number of quay cranes per terminal operator and per port specifying:
    - Whether manual or automated;
    - Crane type and manufacturers' specifications on cycle rates, capacity, reach, maximum lift capacity, twin or single lift etc;
  - Quay cranes per metre of useable berth length;
  - Quay cranes per total containers/TEUs moved (for each specified time divisor);
  - Average number of quay cranes allocated to ships by:
    - TEU ranges of ship;
    - LOA of ship; and
    - Beam of ship; and
  - Yard dwell times;

  - Total number of straddle carriers, yard trucks, reach stackers, stacking cranes, empty container handlers and forklifts per terminal operator and per port, with each sub aggregated to specify:
    - Whether manual or automated;
    - Type and manufacturers specifications on cycle rates; capacity, reach, maximum lift etc; and
    - The ratio of each type of equipment to yard area and to maximum TEUs that can be stored in the yard;
  - Average containers exchanged for each specified ship TEU range;
  - Empty container data, focussing on empty container park (ECP) performance and their relationship with ports; and
  - Cost (in Aus$s using an agreed Australian benchmark standard) of quay crane operations per elapsed labour hour.
- The inclusion of new indicators on terminal operator charges per container and per TEU to indicate the actual costs and cost trends impacting on end users/consumers. These measures should show the components of revenue that contributes to terminal operators' profitability and could be expressed as a return on capital employed (ROCE) to better understand profit margins and any tendencies towards price gouging
- The inclusion of new indicators that identify the quay crane rate, the elapsed labour rate and the ships rate (by containers [crane lift cycles]), not TEUs) of the different container terminal technologies being utilised by particular terminal operators in Australia.

Recommendation 3: That the Productivity Commission propose that BITRE enhance its Waterline data series by inclusion of additional data sets as proposed, namely: new indicators that capture landside technological applications and the impact of that technology; aggregations of terminal equipment such as straddle carriers, yard trucks, reach stackers, stacking cranes, empty container handlers and forklifts per terminal operator and per port; container exchange data; data on empty containers to enable monitoring; and cost data.

What is important about the Waterline indicators is that they seek to capture performance across all components of a container port's operation – the berth, the yard, the gate, so each group of stakeholders we refer to in the section of this submission on stakeholder interests is a beneficiary of the Waterline indicators.

Importantly, we propose that there be a standardised analysis of the data derived from the inputs that give rise to the indicators on an annual basis so there can a high level of stakeholder acceptance of the analysis aimed at also reaching understandings on what improvements might be considered to address less than adequate performance.

We acknowledge that the ACCC has taken on that analytical task as part of its compliance with the Ministerial Direction issued to it by the Treasurer in January 1999 to monitor "*prices, costs and profits relating to the supply of services by a container terminal operator*"

in specified ports, but there is no consensus on what the framework of that analysis should look like or what it should focus on.

The ACCC attempts to undertake an analysis, understandably, through a competition policy lens, and while that is required and is helpful, it is insufficient. We have an open mind on whether the annual analysis we refer to should be undertaken by the ACCC or BITRE/Department of Infrastructure, Transport, Regional Development and Communications or National Transport Commission or some new body, but an objective analysis that is undertaken with the involvement of stakeholders is urgently needed.

Accurate international benchmarking of Australian ports

As far as we can ascertain, there is only one global benchmark data set currently available – the World Bank and IHS Markit Container Port Performance Index. It is still in its formative stages and as we have addressed in some detail in this submission, it is not only inadequate as a benchmark for Australian ports because of the characteristics of Australian ports vis a vis the methodological construction of the CPPI, but it is a measure designed with only one stakeholder group in mind – the international liner shipping service providers.

So even if consensus could be reached that the World Bank-IHS Markit CPPI is to be a benchmark that Australia will rely on in future to assess performance relative to international ports, it needs to be supplemented by other data sets which include indicators that are meaningful for a wider group of stakeholder interests, particularly for container terminal operators and port operators (who, along with governments, are the investors in ports and can therefore make important improvements in performance, unlike the international shipping lines which make no direct investments in ports [other than as in some cases where the parent company of the shipping line is also a terminal operator due to vertical integration]).

Unless the Productivity Commission reaches a conclusion that Australia is sufficiently influential to have the World Bank or some UN agencies develop additional indicators, then the only alternative is for an Australian agency to resource the development and production of additional indicators, and even that will be challenging as it will require the cooperation of governments and port stakeholders, particularly terminal operators and shipping lines, and ideally governments in other nations to provide inputs to indicators.

We nevertheless think that would be a worthwhile initiative, provided agreement can be reached among Australian stakeholders on what those additional indicators might be, and that definitions are agreed on data inputs, and which ports in which nations might be selected for providing a sufficiently robust like-with-like comparison as to be useful for benchmarking purposes.

We note that the Productivity Commission undertook such benchmarking studies in 1998 and in 2002, but has not replicated that work since.[93]

[93] Productivity Commission, *International Benchmarking of Container Stevedoring, Commission Research Paper*, July 2003, https://www.pc.gov.au/research/completed/international-stevedoring/stevedoring.pdf

We also note that the Productivity Commission, in its 2003 report, warned that:

> The basic challenge in all benchmarking studies is to ensure like-with-like comparisons. As a rule, performance comparisons over time for a particular business are likely to be more robust than comparisons across businesses. This is for two main reasons. First, the features of the operating environment are more likely to differ across businesses, especially internationally. Second, the data are less likely to be collected in a consistent way.[94]

We concur with those important qualifications.

We would nevertheless support the Productivity Commission again undertaking a benchmarking study so the findings can be included in its draft report, provided it first convenes a meeting of stakeholders to settle on the methodological framework for undertaking the study, with one critical condition.

That condition is that the Productivity Commission convene a second meeting of stakeholders aimed at reaching understandings on how the results of the study are interpreted and to enable the Productivity Commission to outline to stakeholders how it intends to use the results of the study in terms of any remedial action it might propose in responding to the results or findings.

We suggest this approach because for example, both the Productivity Commission's 2002 International Benchmarking of Container Stevedoring research report and the ACCC 2020-21 Container Stevedoring Monitoring Reports highlighted the apparent strong relative productivity performance of the NZ port of Tauranga compared to Australian ports, yet neither report analysed the factors that might explain that performance gap nor point to lessons that could be learnt from the so called performance gap that could suggest actions to be taken by Australian stakeholders (or NZ stakeholders) to close the performance gap, if indeed that is an objective i.e. who benefits and who does not benefit.

The MUA and its counterpart union in NZ, the Maritime Union of NZ (MUNZ) have noted for example that the labour relations and work health and safety practices at Tauranga are unacceptable because they do not meet industry best practice. We have addressed those issues in the section entitled Comparison with NZ ports. If for example the Productivity Commission wanted to include NZ Ports, and Tauranga in particular in a future benchmarking study, we need to know if corner cutting on WHS and labour rights is a feature of the Tauranga culture that has enabled it to extract higher crane rates.

We are confident that no Australian stakeholder would accept that fatalities and workplace injuries and unfettered managerial prerogative that disregards international labour conventions are a necessary collateral to achieve higher crane rates. We also need to know if management culture and practices differ among ports and whether the nature and quality

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of management and workforce engagement are factors that could explain performance gaps.

Unless there is some consensus among stakeholder on the factors that might explain performance gaps, if found, and understandings on lessons learnt that could be translated into positive actions to improve performance, then the typical cycle of blame gaming and 'megaphone' policy debate is likely to continue, to the detriment of all interest groups. That will simply entrench existing positions and impede the ability to find consensus on a way forward.

If the Productivity Commission intends undertaking a new benchmarking study, we suggest the following principles and criteria be incorporated into the methodology to be applied:

Key principle

- That the key principle of ensuring a like-with-like comparison is maintained. In our view this means at a minimum that:
  - The ports are gateway ports and not predominantly transhipment or hub ports;
  - The ports handle a similar number of containers/TEUs annually;
  - The port handles a similar full to empty ratio; and 20 foot to 40-foot, ratio;
  - That the yard area/configurations are similar;
  - That the ship size ranges serviced by the port are similar i.e. the ship size (by TEU, LOA and beam) that are serviced by the port, are similar;
  - The ports have a similar level of terminal operators i.e. 3, and if not, explain the number of terminal operators (and the terminal operators are the direct employers of the container terminal workforce).

Sample size

- We suggest using a larger sample size than the 2002 study which used ships operating on 5 trades, calling at 16 ports in 6 markets (US east coast and US west coast, SE Asia, E Asia, UK and Europe).
  - We suggest the inclusion of ports in South Asia, more ports in Europe and UK.
- We suggest the sample be large enough to cover 80 per cent of the of all containers into and out of Australia, rather than the 70 per cent covered in the 2002 report.

Automation

- While we do not suggest that only ports with similar levels of automation be included in the sample, as we want to know how Australian ports stand against ports with different automation models, we propose that the extent of and type of automation be identified for all ports used in the sample, denoted by:
  - Fully automated; semi-automated or non-automated;
  - That it be made clear if the quay cranes used in the measure of the crane rate are fully automated; semi-automated or non-automated; and
  - That the number of straddle carriers per quay crane be specified and that the level of automation of straddle carriers be identified i.e. fully automated; semi-automated or non-automated.

Ranking of ports

- We also suggest that as in the 2002 Report, the ports selected for the study be identified by their world ranking based on a reliable and accepted data source such as the Containerization International Yearbook.

On the question of indicators for international benchmarking, we propose there be seven:

- The crane rate, using Australian definitions on the time divisor (i.e. the crane time = the time allocated by the stevedoring company to work on a container ship, assuming the container ship is ready for loading or unloading, which is calculated as the sum of hours that each quay crane is allocated to a ship, less operational and non-operational delays, so it does not include delays due to the following: no labour allocated; closed-port holiday; port-wide industrial stoppage; total crane time spent handling break-bulk cargo and containers that require manual intervention, e.g. use of wires, chains, non-rigid spreaders or other handling gear; Award or enterprise agreement breaks as applicable; adverse weather; delays caused by the ship or its agent; all breakdowns, including spreader changes; other equipment breakdowns which stop crane operations; booming up for passing ships; handling hatch covers; cage work and lashing/unlashing where crane operations are affected; crane long-travelling between hatches and crossing accommodation; labour withdrawn without operator's agreement including enterprise agreement related industrial stoppages; over-dimensional containers requiring additional (rigid) spreader; spreader changes; waiting for export cargo; or defective ship's gear (e.g. jammed twist-locks, broken cell guides, ballast pumps unable to maintain list/trim) — shown as both containers and TEUs per hour;
- The elapsed labour rate, using Australian definitions on labour hours (i.e. the elapsed labour time = the time elapsed between labour first boarding a container ship and labour last leaving the ship, less any time when the labour has not worked for whatever reasons including non-operational delays such as: no labour allocated to ship; closed-port holiday; industrial stoppages; and containers that require manual interventions, e.g. use of wires, chains, non-rigid spreaders or other handling gear, but also allowing for reasonable delays such as meal breaks; machinery breakdowns shift changes; weather events) — shown as both containers and TEUs per hour:
  - We suggest that the Productivity Commission explain what it means by the 'efficiency of labour' if it still holds the view expressed in the 2002 report that stated that "increasing the efficiency of labour will also increase the output of cranes and other terminal capital and vice versa."[95]
- The ship rate, again using Australian definitions on input data – shown as both containers and TEUs per hour:
  - These 3 indicators are helpful for a number of stakeholders, including container terminal operators, and they provide a BMPH indicator (berth moves per hour) to supplement the GMPH (gross moves per hour) indicator used by the World Bank-IHS Markit in its CPPI;
  - We nevertheless caution the Productivity Commission from relying on quay crane performance indicators as a proxy for the efficiency of operations within the terminal as a whole. We believe that technological applications, or more correctly, a poor integration of technological applications across all facets of

[95] Ibid, P35

terminal operations no longer permit quay crane performance to be used as a proxy for the performance of the entire terminal. That is aper of the reason why we propose additional performance measures are required.

- Proportion of ships waiting at anchorage for more than 2 hours (subject to consensus that the 2-hour time divisor is appropriate) and or the proportion of ships arriving on time to meet their allocated berthing window slot; and
- Average lifts per hour of container terminal operations.
- Quay crane density, being the number of cranes available on the berth accounting for minimum crane spacing, and target crane utilisation; and
- Cost (in US$ and Aus$, using an agreed Australian labour cost benchmark standard[96]) of quay crane operations per elapsed labour hour.

We remain unsure of the benefit of producing container handling charges comparisons as included in the 2002 Productivity Commission report.

We propose that the following factors, inter alia, be taken into consideration when analysing the findings or result of any new study:

- In the selected ports, the safe operating standards and practices applied by the employer/workforce in accordance with WHS law, regulation, codes of practice and collective bargaining agreement (CBA) provisions and how those measure up to Australian standards, including data on fatalities and serious injury for the previous 3 years at the port; and
- For the nation in which each port is located, the nation's adoption of internationally recognised human rights and labour standards relative to Australia, assessed by:
  - Whether a collective agreement is in place for the workforce of the terminal operators operating in the selected port, negotiated by a recognised trade union and the employer;
  - The level of unionisation in the port.
- The extent to which any proposals for productivity improvement are to be borne by either labour or capital so it is clear where the Productivity Commission believes the focus for resolution of barriers to productivity improvement lie. We refer to the RIRDC report which concluded that technological innovation at the time at Australian terminals, which led to improvements in net crane rates were due both to labour reforms and the influence of new technology, but it was not possible to determine how much of the improvement was due to one or the other factor.[97] That must be a foundation before proposals for design of reforms are advocated.

[96] To take account of differing local labour costs across international ports, the idea would be to establish an elapsed labour hourly cost based on an Australian terminal operator collective agreement quay crane operator classification and apply that in calculating the labour cost to international ports.

[97] Rural Industries Research and Development Corporation (RIRDC), *Benchmarking Technology on the Australian Waterfront: Implications for Agricultural Exports*, 2002 http://www.rirdc.gov.au cited in the Productivity Commission, *International Benchmarking of Container Stevedoring, Commission Research Paper*, July 2003

Recommendation 4: That the Productivity Commission adopt the MUA proposal of seven indicators for international benchmarking in development of 'a framework of performance measures to determine port performance and benchmarking Australian ports internationally', namely: the crane rate; the elapsed labour rate; the ship rate; the proportion of ships waiting at anchorage for more than 2 hours; average lifts per hour of container terminal operations; quay crane density; and cost.

Maritime logistics in context (TOR 2)

2. *Determine the **broader economic impact of the maritime logistics sector**, and assess the sectors' operating model and any structural impediments, on consumers, business, and industry. This should include examining costs of curfews imposed at some ports, impacts of urban encroachment on ports and connections to ports, and adequacy of development planning and land protection. It should also look at the **economic impact of delays**; uncertainty and the capacity for logistics chains to respond; and increased freight costs (including fees and charges in the sector) and cancellations of sailings, including on importers, exporters, and supply chains.*

Maritime logistics has a very broad impact in Australia, which is why comprehensive planning in the broader public interest is necessary, and why recent narrowly-conceived policy interventions to prioritise asset sales and container terminal competition have not served the broader public interest. Efforts to fix the problem by catering to one modal sector only (eg. the ACCC's suggestion that liner shipping be carefully 'enticed' to Australia) will also not serve this public interest.

The impact of COVID-19 on maritime logistics includes significant increases in global imports of consumer goods, insufficient ship and port capacity globally, and rapid escalation of freight rates on particular routes in high demand. Shipowners have shifted their ships and containers to trades with highest profits, particularly imports to large cities from Asia and Europe, which has resulted in less profitable trades losing capacity, including exports, and exports of empty containers (TOR 5). [98]

Inflation is taking place globally. In Australia, the ABS has said that inflation in the price of goods is partly caused by 'supply disruptions leading to price rises', and that the increasing price of petrol is also a major contributor.[99] Fuel prices have increased 45 per from their low in 2020 to December 2021.[100] Fuel prices in Australia are driven by global prices and the status of fuel as an internationally traded commodity. Shipping routes for clean petroleum from Singapore to the east coast of Australia and from crude from SE Asia to Australia are in the top 10 in the world,[101] and Australia is heavily reliant on imports of both.

The pandemic increased pressures on the maritime workforce, and on their families and the community in general. Workers continued 24/7 operations despite the pandemic and the risk it posed to them and their families. Initially many employers were reluctant to introduce effective covid safety measures until they came under pressure from their own workforces and their representatives. Work during the pandemic remains challenging and stressful.

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[99] Australian Bureau of Statistics, Consumer Price Index, Australia, 25 January 2022.

[100] Australian Bureau of Statistics, Automotive fuel in the CPI, 2021.

[101] N Nektarios A. Michail, Konstantinos D. Melas, Covid-19 and the energy trade: Evidence from tanker trade routes, The Asian Journal of Shipping and Logistics, December 2021.

Covid safety measures in terminals have marginally impacted productivity, but have also allowed terminals to continue operating in challenging circumstances.

Training of key skills has been impacted by COVID-19 due to restrictions around working in close confines with others which has impacted the ability to allocate workers to the optimum crane intensity.

The pandemic has also demonstrated the importance of permanent work, adequate sick leave, decent work-life balance, and a well organised workforce to ensure the safety of workers and the community. Employers should not be encouraged to undermine these measures by cutting permanent work and removing measures that encourage permanency and give workers access to sick leave.

The crew change and Modern Slavery crisis for global seafarers

The seafaring workforce has suffered terribly from border closures and travel restrictions. Despite Australia's reliance on sea transport there has not been a coherent Commonwealth response to address these impacts. International seafarers have been subjected to forced labour and unable to leave ships at the end of their contract. Domestic seafarers have had to quarantine for 14 days up to 6 times per year, leading to burnout and workers seeking other jobs.

At its peak in 2020 and early 2021 some 400,000 seafarers were impacted by the seafarer crew change crisis, unable to be repatriated to their home nation on completion of their legally binding contract term. There remain around 250,000 seafarers still affected.[102] Some seafarers were working for as long as 18 months over their initial contracts.

The International Labour Organisation (ILO) Maritime Labour Convention (MLC) states that the maximum continuous period that a seafarer should serve on board a vessel without leave (and being repatriated to their home country) is 11 months. On any given day, nearly one million seafarers are working on some 60,000 large cargo vessels worldwide, so around 20-25 per cent of global seafarers remain impacted and are unable to be repatriated in accordance with the legal obligation of the shipowner in compliance with the Seafarers' Employment Agreement.

UNCTAD lists the need to end the crew change crisis and facilitate crew changes in their top five priorities for action.[103]

In December 2021, shipowners, seafarers' unions and maritime employer groups announced they are establishing their own approved international network of quarantine facilities to ensure seafarers can safely join ships, despite unpredictable changes to government border policies in light of the Omicron variant which is again causing governments to close their borders to seafarers needing to leave and join ships. The Crew

[102] International Maritime Organisation, Frequently asked questions about how COVID-19 is impacting seafarers, accessed February 2022.
[103] UNCTAD, Review of Maritime Transport 2021, p. xxiv

Enhanced Quarantine International Programme (#CrewEQUIP) is a partnership between the International Maritime Employers' Council (IMEC); the International Chamber of Shipping (ICS); and the International Transport Workers' Federation (ITF). The program is designed to overcome frequent changes in government border policies affecting international crew by having the highest standards and industry-best protocols in place, ensuring the scheme will continue to safely get crew to vessels even if governments increase their quarantine requirements.

In Australia the MUA and ITF have made regular representations to Ministers in the Commonwealth and state/NT governments recommending that there be a nationally coordinated plan for seafarers, involving:

- Establishment of a dedicated task force to coordinate across state and federal government agencies (the MUA and ITF have not been satisfied with the performance of the Maritime Response Group managed by the Department of Infrastructure, Transport, Regional Development and Communications)
- Engaging with key seafarer labour supply countries (for example Philippines, India) to better coordinate country to country repatriation procedures for seafarers
- Protecting seafarers and the community through Australia's adherence to International Maritime Organisation (IMO) COVID protocols along with ILO Labour and WHS Conventions, including the Maritime Labour Convention (MLC)
- Establish "green lanes" for maritime crew repatriation as some specific ports have established
- Rationalise visa, permit, and exemption processes, to support crew changes.

Neither the Commonwealth, nor the states/NT have responded positively to these proposals for nationally coordinated action, though some states have initiated their own crew change and vaccination programs. Currently, Queensland is the only state which has adopted specific procedures to facilitate crew changes from ships while berthed in Qld ports, under the guidance of the Minister for Transport Mark Bailey and facilitated by Maritime Safety Qld (MSQ) and Qld Health. The procedures involve dedicated transportation from ships to and from the relevant airport for changeover crews, and dedicated seafarer quarantine hotels in Brisbane and Gladstone.

It is concerning that no state Public Health Order has declared seafarers as 'key workers.' One option that could be considered to overcome this weakness in national coordination of COVID health support for seafarers would be to establish a *Freight industry Protocol* and *Freight Industry Code* tailored for the maritime sector (covering seafarers and dockworkers) as was put in place in early 2020 (and updated in August 2021) for road and rail sector supply chain workers.[104]

[104] Australian Government, Protocol for Domestic Border Controls – Freight Movements, August 2021; Freight Movement Code for the Domestic Border Controls – Freight Movement Protocol, August 2021.

Additionally, the ACTU and MUA have been communicating with ASX100 companies, a large number of whose business operations involve shipping in their supply chains, regarding ways those companies could strengthen modern slavery risk due diligence and for remediating modern slavery in their supply chains. That work will continue.

To date there has been a lack of active response from international container shipping line companies in addressing these issues, which are critical initiatives needed as part of a package of measures needed to help remedy supply chain congestion.

Vaccination of global seafarers

The lack of a global vaccination effort, and lack of an effort to vaccinate international seafarers is not only unconscionable but has had a severe impact on maritime supply chains. The UNCTAD 2021 *Review of Maritime Transport* lists 'Vaccinate the world' as its number one priority for action, with 'vaccinate seafarers' at number 4.

Queensland and NSW are the only two states which have implemented specific measures to facilitate the vaccination of international seafarers while in key ports in those states. The Queensland program, which commenced as a trial in September 2021, is considered the superior model as it integrates vaccination with its crew change process. The NSW model, supported by NSW Health and a close working relationship between the MUA and the NSW Nurses and Midwives' Association (NSWNMA) has also worked well. In NSW approximately 800 seafarers have been vaccinated up to 31 December 2021.

There are two key national issues that remain unresolved that would help facilitate State and Territory governments vaccinate seafarers in their ports:

- A cost sharing arrangement to help offset the costs to state health agencies to administer seafarer vaccination programs, noting of course that international seafarers cannot access Medicare, and so far, ship owners/ship operators/ship charters have not been willing to contribute to the cost. In some other countries such as Belgium, the ship must apply in advance of entering key Belgium ports to have seafarers on the ship vaccinated and pay a cost-based fee calculated on the number of seafarers requiring vaccination. The Queensland Government position is that shipowners should meet the cost.
- A nationally consistent and internationally accepted vaccination passport for seafarers who are vaccinated. Australia's International COVID-19 Vaccination Certificate is only available to Australian citizens. The MUA and ITF are pressing Australian governments to adopt the WHO 'yellow card' as a standard vaccination certificate for seafarers.

Recommendation 5: That the Productivity Commission should support, or should not undermine, efforts to increase security of employment and access to sick leave in the maritime industry.

Recommendation 6: That the Productivity Commission recommend that domestic and international seafarers must be given status as key workers with priority access to

vaccines and the ability to cross state and international borders and have shore leave. The Australian government and agencies must participate in international efforts to address the lack of vaccination of seafarers, the crew change crisis, and access to shore leave for seafarers.

Recommendation 7: That the Productivity Commission recommend that maritime workplaces have access to free rapid antigen testing for Covid and that broader Covid safety measures protect not only the workforce but the supply chain itself.

The maritime workforce: Productive, flexible and safe (TOR 3)

*3. Examine **workforce** issues, including industrial relations, labour supply and skills, and any structural shifts in the nature and type of work in the maritime logistics sector.*

The vast majority of workers in Australian ports are members of the MUA. These include:

- Workers handling containers in container terminals
- Workers handling cargo in bulk and general terminals, including
    - Bulk loaders handling coal and grain
    - Breakbulk such as aluminium ingots
    - Ro-ro cargo such as cars and other vehicles
    - Large items of project cargo such as wind turbine blades and towers and large pieces of machinery and part of oil and gas facilities
- Workers carrying out port services, including as crew on tugboats, pilot boats, lines vessels
- Workers carrying out port maintenance and administration, including berth maintenance and connecting ships to wharf services.

MUA members also work as seafarers on vessels:

- Carrying cargo between Tasmania and Melbourne
- Carrying cargo to communities in northern Queensland and the NT
- Carrying cargo on a number of coastal trades including cement and bauxite
- Carrying bunker fuel to refuel larger ships
- Exporting LNG to Japan and China
- Transhipment vessels for exports of mining products eg. iron ore
- Servicing offshore oil and gas facilities, and on vessels carrying out exploration and construction of any new offshore oil and gas facilities, and offshore renewable energy facilities
- Maritime crew for Floating Production, Storage and Offtake vessels
- Civilian crew of a number of Navy vessels, including a training ship.
- Crew of vessels contracted to a number of government departments, including to the Australian Maritime and Safety Authority for the protection of the Great Barrier Reef (to assist any ships that become disabled before they damage the Reef), the government's Antarctic research vessel, and some Customs and Border Force vessels.
- Ferries and harbour tourism vessels

Commercial divers are also MUA members, their work ranges from offshore oil and gas facilities to port construction projects.

These workers are covered by multiple Enterprise Agreements reached between the MUA and the many employers in these industries, and underpinned by Awards including the:

Seagoing Industry Award
Stevedoring Industry Award
Coal Export Terminals Award
Dredging Industry Award
Marine Towage Award
Ports, Harbours and Enclosed Water Vessels Award
Port Authorities Award
Professional Diving Industry (Industrial) Award
Viterra Bulk Handling and Storage of Grains, Pulses and Minerals Award

The maritime workforce is productive, flexible, safe, with a skilled long-term workforce and very limited damage to cargo. Despite widespread labour shortages in multiple industries, there remains a good supply of labour in most sections of the maritime industry.

Good labour supply

There is a good supply of labour and labour shortages in the maritime workforce are rare. These jobs are perceived as good jobs by the Australia workforce so there are generally multiple suitable applicants for vacancies and employers rarely have difficulty filling positions.

In January 2022 it was reported that 'staff shortages that are now crippling economic activity' in Australia. Bjorn Jarvis, head of the Australian Bureau of Statistics' labour statistics unit, commented that 'ongoing labour shortages' were 'particularly in lower-paying industries.[105] Table 11 below shows the extraordinary increase in job vacancies across blue-collar industries that might compete with the maritime industry for labour.

Table 11: Increase in job vacancies from February 2020 to November 2021

Industry	Per cent increase
Manufacturing	141%
Construction	80%
Transport, postal, warehousing	77%
Electricity, gas, water and waste	65%
Mining	48%

Source: Australian Bureau of Statistics, Job Vacancies, Australia, 12 January 2022.

[105] Peter Hannam and Ben Butler, Job vacancies surge in Australia as Covid labour shortages choke supply chains, Wed 12 Jan 2022

Despite these shortages, in 2022 there is no issue with unfilled vacancies for workers in stevedoring and in areas of MUA coverage in ports, allowing those workplaces and supply chains to function much more effectively than many others.[106]

A productive workforce

Section x outlined the high labour productivity in Australian container terminals.

Australia also has the fastest dry bulk loading in the world – at 48 tons per minute it is almost double the speed of the nearest competitors Columbia (28 tons per minute) and Brazil (25 tons per minute).[107]

Over the past few decades, the size of the stevedoring workforce has remained about steady, while volumes and value of cargo has steadily increased. Unfortunately, the government does not keep statistics on the total size of the stevedoring workforce, but we have estimated the total number of workers based on MUA membership numbers and our industry knowledge of stevedoring workplaces.

In 2007 the MUA had 6,556 stevedoring members, and we estimate that the total number of stevedoring workers in 2021 is about the same at 6,526 (Table 12). The value of Australian sea freight increased from about $400 billion to close to $600 billion in 2018-19 (Figure 16), and is likely well beyond $600 billion now.

Table 12: Estimated number of workers in the Australian stevedoring industry.

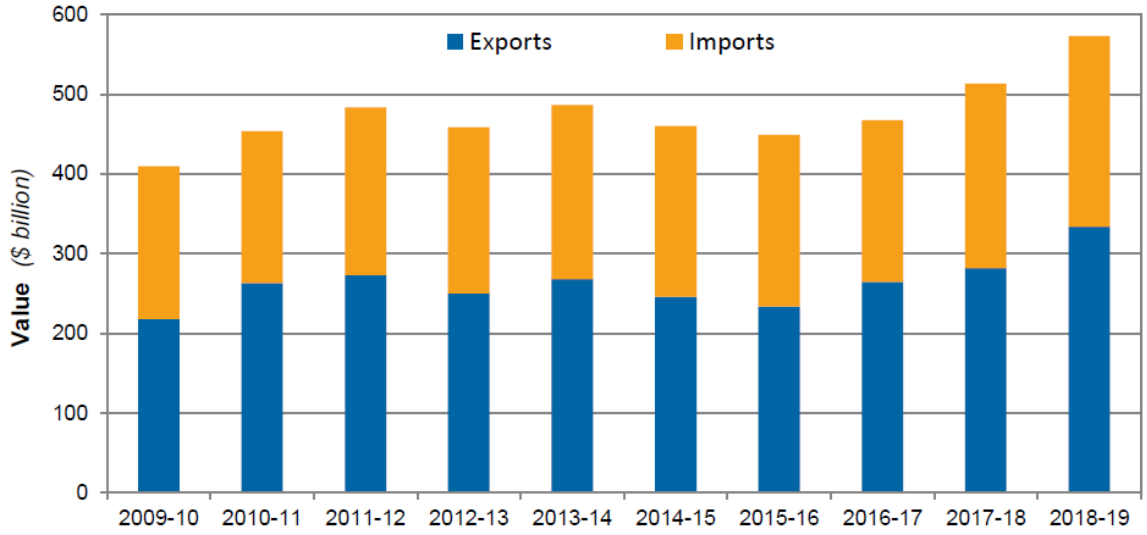
	Workers	
	2015	**2021**
Container terminal stevedoring workers including outsourced maintenance workers	3,267	3,555
Bulk & General stevedoring workers	3,380	2,971
TOTAL	**6,547**	**6,526**

Source: MUA membership figures and industry knowledge. An allowance has been made for workers who are not union members. 2015 numbers were included in submissions to the Fair Work Commission review of the Stevedoring Award, and were not disputed by employers or government.

[106] There is more of a labour supply issues for seafarers given the severe impact of border closures on this national workforce and the recent increase in oil and gas project work. There is also a skills supply issue in higher level port jobs due to the decimation of the Australian shipping industry which historically provided highly qualified port management roles.

[107] UNCTAD, Review of Maritime Transport 2021, p. 103

Figure 16: Value of Australian sea freight in 2019-2020 prices.



Sources: ABS (2021a), ABS (2021b).

Source: BITRE, Australian Sea Freight 2018-19, July 2021, p. 2.

Work on the waterfront has intensified significantly since 1998. There were 3,000 directly-employed workers in container terminals in 1998, and today the number is not much higher at 3,555 workers. However, the volume of containers handled by these workers has almost tripled: from 2.9 million TEU in 1999-2000 to 8.5 million TEU in 2020-21, leading to a large increase in the number of containers handled per worker per year (Table 13).

Table 13: Productivity increases in Australian container terminals from 1998 to 2021.

	1998	2015	2021
Containers handled in Australian container terminals (million TEU)	2.9	7.2	8.5
Container terminal workers	3,000	3,267	3,555
TEU per worker per year	**966**	**2,204**	**2,391**

Sources: 1998 statistics from Steve O'Neill, 1998, Outline of the Waterfront Dispute, Current Issues Brief 15 1997-98. Canberra: Parliamentary Library, 12 May 1998. TEU from ACCC, Container Stevedore Monitoring Reports.

The recent increase in the container terminal workforce is largely due to new 3rd terminals being established in east coast ports in accordance with government competition policy. Hutchison Brisbane and Sydney terminals opened in 2013 and now have approximately 350 workers. VICT opened in 2017 and currently employs 190 workers. There have been reductions in the size of the workforce at other terminals over the same period.

A highly flexible workforce

Stevedoring is a 24-hour industry scheduled around the arrival and departure times of multi-million-dollar cargo ships. There is a great deal of pressure to load and discharge these ships as quickly as possible in order to maintain their efficiency and utilization. Of critical importance in the stevedoring industry is to have the right number of workers, with the right skills available precisely when a ship arriving from a lengthy voyage is ready to be loaded or discharged, and for the length of time necessary to load or discharge the ship. Receival and delivery work also must be carefully organised in relation to ship schedules, loading and unloading. The precision that employers seek in this regard is further complicated by the fact that unexpected and last-minute delays are common.

The efforts by employers of finding ways to ensure that workers are available to be allocated when they want them to work, but to avoid paying them when the need for labour changes at the last minute has given rise to quite unusual and complex systems for allocating workers to shifts and calculating the payment of workers. This has been a significant focus of enterprise bargaining since it began. Unlike other industries, rosters are not calculated to ensure 24-hour operation (or some other period). Instead, work is organised so workers can be picked up to work at the time that employers want them to work.

For workers, 24-hour shift work 7 days a week is almost always required. Whether permanent or casual, nearly all workers in the industry must call in with 12- to 16-hour's notice find out when they are due to work, or not – generally at 2-4pm for the next day's allocation. Less than 2,000 of the total 6,500 stevedoring workforce workers have a permanent, predictable roster. Even these rosters have considerable flexibility built in:

- A significant number of shifts may be designated as 'Irregular' in the roster, meaning the company can allocate the worker to any shift.
- Cancellations and a system of 'debits and credits' mean that workers may need to make themselves available to work, but the company can cancel their shift at short notice and require them to pay it back on another designated 'off' shift

The close to 3,000 workers in bulk and general stevedoring do not have rosters and can be called to start at any hour of the day with shift lengths varying from 4 hours to 12 hours, which can be cancelled at short notice.

This frequently unpredictable 24-hour shift work has gruelling health effects over the long term (particularly in relation to musculoskeletal disorders and gastrointestinal problems) and is exceedingly challenging for workers' family lives.

Enterprise Agreements negotiated over the past years seek to find some stability and permanency for workers to meet life and family commitments in the midst of uncertain shipping schedules, and compensate workers for working significant numbers of nights and weekends.

The amount of work in each port also varies over the year. For example, there are typically more imports of consumer goods to container terminals in the lead up to Christmas. Exports of fresh foods will also vary seasonally. Cargo volumes fluctuate significantly with economic

activity. The value of the Australian dollar, the price of commodities, and the level of activity in the manufacturing industry, the construction industry, and the offshore oil and gas industry all have an impact on the demand for stevedoring services. Clauses have been agreed to across the industry that allow for such peaks and troughs to ensure labour profile and flexibility adapts to the workload and level of predictability of vessel arrivals and contracted hours.

In bulk and general stevedoring, a key aspect of flexibility introduced by employers after the 1998 Patrick dispute was a wage based on working 1,820 annual accumulated hours per year (including annual leave). In this system, a worker may work between 0 hours and 78 hours per week, without any payment of overtime until they meet the annual cap of 1820 hours. There is no cap on the weekly hours of work, it is only limited by the provisions for rest between shifts. This gives employers a great deal of flexibility in allocating labour. This system of annual accumulated hours is in place at most bulk and general operators, including Qube, Linx, and ANS, and with slight variations in total hours at NSS and Newcastle Stevedores (but not generally at container terminals). As this system was tied to the introduction of a salary based on the average (not actual) number of shifts worked in a past year, it considerably reduced the administrative challenge of calculating workers' wages for each shift they worked. It also eliminated what employers refer to as 'idle time'.

In large container terminals, work is more regular than in bulk and general terminals as ships operate on tighter schedules with a greater degree of predictability. However, employers still require a considerable amount of flexibility from workers. Instead of a system of annual accumulated hours, employers tried to achieve greater flexibility by introducing more casual workers in addition to the permanent workers. Through the process of enterprise negotiations from 1998 to the present, a proportion of casual workers have been converted to workers who have many of the entitlements of permanent workers, but who are not on fixed rosters or salaries and are instead paid on the hours they work and whose labour is allocated in a very flexible way.

At different container terminal companies, these categories of semi-permanent workers are described as PGEs (Patrick – Permanent Guaranteed Employees), and VSEs (DP World, Flinders Adelaide - Variable Salary Employees). Since 1998 a significant proportion of the container terminal workers are classified as PGEs, and VSEs - workers who have some benefits of permanency but no roster. Table 14 shows that in 2014, we estimated that approximately 40% of container terminal workers in Australia are workers in these categories (1,233 workers).

Table 14: Estimated numbers and categories of container terminal workers in 2014 (not including outsourced maintenance workers). Includes DP World (Sydney, Melbourne, Brisbane and Fremantle), Patrick (Sydney, Melbourne, Brisbane and Fremantle), Hutchison (Sydney and Brisbane), and Flinders Adelaide Container Terminals.

	Number of workers	Percentage of total workforce	On a roster?
Rostered Permanent	1,904	60%	Yes but with significant irregularities discussed in paras 0, 0, 0, 0, 0 and 0 herein.
Irregularly engaged (PIR / PGE / VSE)	1,233	39%	None for PGEs and VSEs. PIRs have a 100% irregular roster.
Supplementaries (Casual)	58	5%	No
TOTAL	**3,195**		

Source: MUA membership figures, mapping of the stevedoring industry, industry knowledge.

Some of these semi-permanent categories of workers were also created in bulk and general stevedoring workplaces. For example, Qube employs VSEs (Variable Salary Employees) and GWEs (Guaranteed Wage Employees). Linx also employs PGEs (Permanent Guaranteed Employees) and GWEs. Both companies employ Supplementary and B-Supplementary workers, who are entirely casual and many have other jobs to survive. In 2015 we estimated that there were only 860 permanent workers in bulk general nationally (working under the annual accumulated hours system), 710 in these semi-permanent categories, and with the remaining 1,810 bulk and general stevedoring workers being either casuals or working in small companies and ports where they are likely to be casual.[108]

The other significant change in the industry which allowed employers greater power to allocate workers flexibly was the introduction of computerised shift allocation. Between approximately 2003 and 2013, the PeopleSoft and Microster software packages were introduced into most stevedoring workplaces, and the person known as the 'Allocator' was made redundant. Since the introduction of these software programs, it is much more difficult for workers to organise informal shift swapping to accommodate personal needs, for example, if a worker is ill, has child-care issues, or has a medical appointment.

Work in the stevedoring industry is allocated on a daily basis. Stevedoring workers are required to ring a telephone number (as at Qube and DPW) or they receive a text message (as at Patrick, Linx, and Hutchison) each day at between 1400 and 1700, telling them if they will be required to work the next day, and if so, at what time.[109] In the case of Patrick's Port

[108] Full details in submissions to the Stevedoring Award review in the Fair Work Commission.
[109] Details are specified in each enterprise agreement.

Botany terminal, the workers' text message tells them what job they will be performing. In other cases, workers are told what job they will be performing when they arrive at work. This applies to permanent workers and workers on a roster in many instances, due to labour being allocated in work gangs. A workers' specific role would only be known upon viewing the work allocation orders, always displayed on the job, or through the allocation to task by the charge foreman.

In the case of Qube in Port Kembla, stevedoring workers are required to ring the company by 1600 to be notified of their allocation for the next day. It is possible that a worker could be required to work at 0500 the following morning (in 13 hour's time), or they could be required to work as late as 0100 the day after (in 33 hour's time) or any hour in between and the allocated shift length varies from 4 hours to 12 hours. Or they may not be required to work at all. Workers weekend shifts are allocated on Friday – although this can also be changed.

I reproduce below clauses on shift time and shift notification from the *Qube Ports Pty Ltd Port of Port Kembla Enterprise Agreement 2021* (Part B) to demonstrate the flexibility Qube requires of its stevedoring workers:

1.2.2 Shift times and extensions will be determined by management in accordance with the following table:

Start time	Shift	Maximum shift length hours (including extensions)
0500 hours	Day	12
0600 hours	Day	12
0700 hours	Day	12
0800 hours	Day	12
0900 hours	Day	12
1000 hours	Day	12
1100 hours	Day	12
1200 hours	Evening	12
1300 hours	Evening	12
1400 hours	Evening	12
1500 hours	Evening	12
1600 hours	Evening	12
1700 hours	Evening	12
1800 hours	Evening	12
1900 hours	Evening	12
2000 hours	Night	10
2100 hours	Night	10
2200 hours	Night	10
2300 hours	Night	10
2400 hours	Night	9
0100 hours	Night	7
0200 hours	N/A	N/A
0300 hours	N/A	N/A
0400 hours	N/A	N/A

1.6 Notification

1.6.1 Employees will be notified of their work requirements on the job on the previous day or by telephone service by 1600 hours on that day, other than where specified in this clause.

1.6.2 Notification will contain details of the work location, commencement time and indicative duration of the work period.

1.6.3 The indicative shift length is to be worked/ paid unless a reduced time is notified at the commencement of the shift toolbox meeting.

1.6.4 A shift can be extended beyond the indicative shift length to a maximum of 12 hours as per clause 31 of Part A of this Agreement.

1.6.5 Should the indicative shift length be reduced at the toolbox meeting, it cannot be extended except in extenuating circumstances, as agreed.

1.6.6 Notification to work on weekends will be notified Friday at the normal notification time. Sunday Day Shift, Evening Shift and Night Shifts (first shift Monday) may be confirmed, varied or cancelled (i.e. change to shift start time or cancelled) by 1400 hours. Saturday.

1.6.7 Notification to work on Monday public holidays will be notified on Friday at the normal notification time. Monday public holidays Day Shift, Evening Shift and Night Shift (first Shift Tuesday) may be confirmed, varied (i.e. change to shift start time) or cancelled by 1500 hours Sunday.

1.6.8 Where a shift is cancelled in accordance with clauses 1.6.6 and 1.6.7, no payment will apply.

1.6.9 Whilst on shift, an Employee may be “ordered back” to a subsequent shift.

1.6.10 Employees are responsible for ascertaining when they are required to work.

1.6.11 The Company may contact Employees after the usual notification time and procedures above, except between 0100 hours and 0430 hours, to provide additional resources due to late changes in operational requirements. In these circumstances, no Employee is compelled to work at short notice. It is essential that the Employee has had adequate rest and is able to meet all Company requirements in relation to working safely, prior to accepting any such engagements at short notice.

All Other Qube agreements provide for a vast array of start times and flexibilities to meet operational requirements.

With this many possible start times, the concept of a ‘shift’ is rather blurry. The flexibility of possible start times at Qube in Port Kembla is characteristic of many bulk and general stevedoring workplaces and enterprise agreements.

Shift start times are also flexible in container terminals (although to a lesser degree). For example, at Patrick’s large Port Botany container terminal, possible start times specified in the *Patrick Terminals Enterprise Agreement 2016* (Part B: Schedule 4 – Port Botany, s.1.6) are:

- Day shift: may start at 0500, 0600, 0700, 0800
- Evening shift: may start at 1200, 1300, 1400, 1500, 1600
- Night shift: may start at 2100, 2200, 2300

Along with flexible start times, shifts do not have a standard length in the bulk and general side of the stevedoring industry. Therefore, when workers leave home to go to work, they are frequently unsure as to when they will be able to return home again. This uncertainty is particularly difficult for workers with family obligations. Workers may be given an indicative length of shift when they telephone for their work allocation, but this can be changed at the toolbox meeting when they arrive (see s.1.6.3 from the Qube Port Kembla Agreement above).

Indicative shift lengths can vary from 4 hours to 12 hours (longer in some regional areas and outports). Shift length can be extended during the actual shift, provided that workers are notified by the last shift break. The national section of the Qube Enterprise Agreement provides as follows (Part A s31.2):

> c. Shift extensions may be extend for one, two, three or four hours and once notified the duration of the extension may not be altered. It is intended that a confirmed shift extension will only be altered in extenuating circumstances by agreement. For avoidance of doubt, the full shift length, including any extension, will not exceed 12 hours.
>
> d. Shift extensions will be notified at the commencement of the last break, or earlier and may be cancelled by notification up to one hour before the shift extension is to occur.
>
> e. In the case of a four hour shift, notification will be provided no later than one hour prior to the end of the shift and any shift extension will result in a seven hour minimum engagement.
>
> f. If an Employee is not available to extend, they will notify the shift manager and where there is no shift manager, the Team Leader at the tool box meeting. If the Employee does not notify the Company in accordance with this subclause of his or her inability to extend, the Employee will be required to extend. [110]

Container terminal employers have established a notional shift length of 8 hours, so that three 8-hour shifts can fit neatly into a 24-hour period. However, these shifts can also be extended at short notice. For example, the *Patrick Terminals Enterprise Agreement 2016* (Part B: Schedule 4 – Port Botany, s.1.6) provides that day and evening shifts can be extended by four hours, and night shift extended by 2 hours. Extensions are notified at the last break of the shift, and confirmed 1 hour before the end of the shift (s.22.5). The flexibility and potential overlapping of shift times are further indicated by the provisions in Schedule 4 s1.6 that explain:

- Dayshift can start as early as 5am and finish as late as 8pm
- Evening shift can start as early noon and end as late as 2am

[110] Each Qube port has a separate union agreement, with Part A of the agreement being the same across all ports. Here we use *Qube Ports Pty Ltd Port of Port Kembla Enterprise Agreement 2021*(Part A s.31.2): but this provision is that same across all Qube union agreements.

- Night shift can start as early as 9pm and end as late as 7am

Further emphasising the unpredictable nature of the industry, the Qube Enterprise Agreement (Part A, national) also provides:

> 31.3 Shift extensions can be called in unforeseen circumstances. Unforeseen circumstances include vessel late arrival, equipment breakdown, weather delay, apparent stowage problems and genuine circumstances that are identified in consultation with employee representative and foremen. [111]

For the minority of workers in the stevedoring industry who do have a roster, this is not really a roster in the conventional sense in which workers know what shifts they will be working in the future. Where stevedoring workers have a roster, it is common for over 50% of the shifts on the roster to be not predictable. Typically, stevedoring rosters will use notation such as:

- 'I' (Irregular) to indicate that the worker can be allocated to work any shift on that day, or may not work at all

- D/E (Day/Evening) to indicate that the worker will be allocated to a day or evening shift

- D/I (Day/Irregular) to indicate that the worker will be assigned to a day shift if one is available, or to any other shift, or they may not work at all.

- Patrick Terminal has a system of debits and credits for hours. On days identified as 'Black off' (Patrick Port Botany) or 'A/O' (Patrick Melbourne), workers can be compelled to work if they are behind in their hours and there is a need for them to work. These days are treated differently than the normal 'Off' days in the roster.

The only stevedoring workers who have rosters where more than 50% of the shifts are predictable are permanent workers at the larger container terminals in Sydney, Melbourne and Adelaide. In 2015 we estimated that this is only 18% of the national stevedoring workforce. Table 15 shows that even within these rosters, a significant portion of shifts are not predictable.

[111] Part A (national) section of the *Qube Ports Pty Ltd Port of Port Kembla Enterprise Agreement 2021*(Part A s.31.3).

Table 15: Examples of stevedoring workers with moderately predictable rosters (more than 50% of possible shifts worked are predictable).

	Approximate number of permanent workers on a roster in 2021	Portion of possible shifts worked which are not predictable
DP World Melbourne	250	26 out of 70 shifts worked (37%) of the 16-week roster are not predictable (I or D/E or E/D).
DP World Sydney (36 hour roster)	250	32 out of 72 shifts worked (44%) of the 16-week roster are not predictable (I or D/E).and any shift may be cancelled the day prior to a maximum 6 per year.

Source: DP World Australia Enterprise Agreement.

The degree of flexibility built into many rosters means that many of the possible shifts designated in the roster can be cancelled at short notice between the allocation and commencement of work. There is also an assumption built into many rosters that not all irregular days marked I, D/I, E/D, E/I, E/D/I are worked. For example, if workers at Qube Brisbane workers all days marked as such for an estimated 8 hours, they would work 2,444 hours. However, workers are expected to accumulate 1820 worked hours throughout year, so there is a built-in expectation that approximately 33% of their shifts will be cancelled. Yet workers must still make themselves available for work on those days.

Hazardous work - with good safety practices

The rapid increase in productivity after 1998 initially resulted in a safety crisis on the Australian waterfront, with an average of one death of a stevedoring worker per year between 2007 and 2014. Across a workforce of only 6,000-7,000 workers, this meant a fatality rate 14 times higher than the average rate of workplace deaths in Australia at the time. After an MUA campaign, Safe Work Australia resolved to address this safety crisis through the tripartite development of the *Model Code of Practice: Managing Risks in Stevedoring* in 2009-2013.[112]

Due to MUA campaigning, there is now a high level of awareness of the Code and it is widely used to set the standard for safety practices in the stevedoring industry. The Code has been implemented through elected worker Health and Safety Representatives, and through Safety Committees at each workplace.

There have not been any stevedoring fatalities in MUA-organised stevedoring worksites since death of Anthony Attard in Melbourne in May 2014, and the widespread adoption of the Code of Practice across Australian stevedoring workplaces.

[112] Safe Work Australia, Model Code of Practice: Managing risks in stevedoring, December 2016.

The good safety outcomes of Australian stevedoring workplaces over the last 8 years are in sharp contrast to the New Zealand ports put forward as examples of ports that have 'performed better than Australian ports'[113] by the ACCC (Auckland, Lyttleton, and Tauranga). We encourage the Productivity Commission to consider the submission of the Maritime Union of New Zealand to this inquiry. They detail how a workplace culture that emphasised on productivity at all costs in the Port of Auckland led to two deaths of workers in two years (2018-2020), in a workforce of only 270 workers. After an independent inquiry, fines of over $500,000, and a complete change of management, the ship and vessel rate has declined by about 50% (see earlier section x).[114]

This demonstrates a considerable achievement and discipline of the Australian stevedoring workforce: safety has improved *at the same time* as productivity has continued to improve (see Table 13, showing improved productivity between 2015 and 2021).

If the Port of Auckland fatality rate in 2018-20 was replicated in the Australian stevedoring workforce of 6,500 people, we could expect 24 fatalities per year.[115]

No level of productivity is worth 24 deaths per year.

Skills and training

Stevedoring work has changed considerably, particularly with the wave of automation of terminals between 2012 and 2018.

Efforts by the union to update descriptions of industry technologies and skills in the 2015 Award review by the Fair Work Commission were rejected by employers. We believe this is because they want to limit union coverage of work involving new technologies. This is short sighted and to the detriment of the industry.

Stevedoring work is unusual in that there are no requirements for VET qualifications or licences (Skill Sets) for entry level employment. Most item of heavy machinery operated on the waterfront does not require licencing. This includes ship's cranes, Auto-stacking Cranes, straddles, and in some jurisdictions, Rubber Tyre Gantry's (RTGs). This is the case despite the extremely large size and power of modern container moving equipment regardless of how large and potentially lethal it is.

Skills training for Australian container terminals and bulk and general workplaces is carried out on the job by trainers from within the experienced workforce.

> **Recommendation 8:** That the Productivity Commission recommend improvements to maritime logistics VET Qualifications and Skill Sets to improve workers' career advancement and labour mobility. The Skills Council (Australian Industry Standards) has made efforts in the stevedoring area which have been largely ignored by

[113] ACCC, Container Stevedoring Monitoring Report 2020-21, October 2021, p.64
[114] Te Manatu Waka Ministry of Transport, FIGS: Port container handling, Ship and vessel rates.
[115] 1 death/270 workers per year in Auckland = 0.37 deaths per worker per year in Auckland x 6,500 workers in Australia = 24 deaths per year for a workforce of 6,500 people.

employers. At a minimum, licences should be developed to operate ship's cranes, auto-stacking cranes, straddle carriers, all rail track gantry cranes and other container handling equipment.

ACCC claims about MUA Enterprise Agreements

The ACCC claimed that 'restrictive work practices are preventing stevedores from maximising labour efficiency and effectively utilising technological enhancements.[116]

The first sections of this submission on productivity (TOR 1b) discussed the limitations of the actual data on productivity collected and measured by the ACCC.

There is no causal link between the productivity figures presented by the ACCC and the clauses in Enterprise Agreements which it highlighted.

The reasons underlying container terminal productivity are complex, and addressed extensively in our response to TOR 1b.

It must be noted that Enterprise Agreements are agreements reached between employers and workers, represented by their union. Any provision in the agreement has also been signed off by the employer. Each Agreement is unique, and customised to the particular situation at a particular company. The ACCC has cherry picked certain clauses as if they were universal, without understanding the particular situations they were addressing, and it appears without making inquiries into those situations. Making universalising claims about individual enterprise agreements betrays a fundamental misunderstanding of how enterprising bargaining works and the principles that underpin it.

There were 28 stevedoring enterprise agreements registered over the period of 12 months to October 2021. The clauses highlighted by the ACCC are from only a very few of these agreements.

Collective bargaining is a human right protected by international agreements which the Australian Government is a signatory to. We are aware that some organisations are seeking further restrictions on allowable content for maritime Enterprise Agreements. This must not be introduced, as a one-size fits all solution will impede the ability to make agreements suitable to the circumstances of each workplace and employer. We believe that the organisations advocating for further restrictions on the content of Enterprise Agreements are using it as a smokescreen to undermine workers' rights and conditions of employment, and that the content it could regulate has an insignificant impact on productivity.

Recommendation 9: That the Productivity Commission remind employers that the right to collectively bargain and to take strike action is protected by human rights agreements signed by the Australian government. Government agencies should not be writing reports that undermine these agreements. ACCC employees must receive

[116] ACCC, Container Stevedoring Monitoring Report 2020-21, October 2021, p.65-69

training in the human rights protected by ILO agreements, as well as the functioning of Australia's industrial relations system.

Recommendation 10: That the Productivity Commission recommend that if the ACCC or other agencies of the Australian government wish to make comment about the particular provisions of enterprise agreements, they should first seek comment from the parties to the agreement.

Recommendation 11: That the Productivity Commission consider that the content of Enterprise Agreements are already highly restricted by the Fair Work Act. We are aware that some organisations are seeking further restrictions on allowable content for maritime Enterprise Agreements. This must not be supported, as a one-size fits all solution will impede the ability to make agreements suitable to the circumstances of each workplace and employer, and we believe this to be a smokescreen for further attacks on workers' rights and conditions of employment.

The ACCC highlighted provisions in particular MUA agreements outlined below, which we will address in turn.

Employee allocation

The ACCC describes 'highly restrictive' shift start times, notification and cancellation times, and claim that these increase 'idle time'.

These claims are just not true. We have addressed these issues in section x, which demonstrated in detail the extremely flexible start times, notification processes and cancellation provisions across stevedoring workplaces.

While 'idle time' was a feature of stevedoring work organisation before 1998, work has been significantly re-organised and intensified since that time, to the point that idle time has been eliminated.

Order of engagement

The ACCC says that:

> Most EAs contain provisions (also known as the 'order of pick') that specify the order in which different types of employees are engaged for a shift. The order of engagement constrains management's ability to make the most effective use of the workforce, thereby reducing productivity and, in turn, timeliness and reliability.[117]

Generally, this means that agreements require that permanent workers are allocated work before casual workers. Permanent workers also need to meet their minimum number of rostered shifts and annual hours. These measures have been developed over many decades to secure permanency of work in an environment where workers are otherwise required to

[117] ACCC, Container Stevedoring Monitoring Report 2020-21, October 2021, p.65.

be extremely flexible. As such, they serve as an important mechanism to retain labour supply. This has served stevedoring companies well in the current labour shortages affecting virtually all other industries.

Permanent work also allows workers access to sick leave, which has been shown to be critically important to retain overall workplace health in the pandemic.

Given the absence of licensing and qualifications for stevedoring workers described above, these workforce retention measures are critically important to retaining a skilled workforce, and safe workplaces.

Without these measures, we are very confident work in stevedoring workplaces would become highly casualised, subject to labour and skills shortages, and much more unsafe.

Restrictions from flexibly rostering staff

The ACCC do not like the provision in the Patrick Enterprise Agreement which they say requires them to only employ permanent workers as crane operators. That say that 'even though Patrick has made considerable investment in enhancing crane capabilities, restrictive labour constraints limit Patrick's ability to effectively utilise its cranes to meet peak demand.'[118]

This provision in the Patrick agreement ensures that the most experienced operators are operating the most valuable piece of equipment in the terminal, which is critical to whole terminal workflow. This is a also a safety issue. We do not support this work being carried out by casual workers instead of the experienced permanent workforce.

We would welcome Patrick training and employing more permanent crane operators.

Removing these provisions in the agreement would also increase casualisation, and reduce workers' access to sick leave.

In relation to Port Botany, the union's observations of the reason why the company does not use more cranes on ships at the terminal is:

- the automated driverless straddle carriers take up more space as they require vacant 'nodes' in their lane of operation to be kept clear. Putting more cranes on a ship increases the number of obstacles around the ship and the number of automated straddles trying to operate in the relatively small wharf apron, which can slow all of the straddles down as they wait for each other to clear their 'node' or lane of operation.
- the footprint of the terminal is relatively small, or at least smaller than the optimal size for the automated straddle mode of operation Patrick has chosen.
- if an inexperienced crane driver is allocated to drive a quay crane, not only is that quay crane likely to be slower, but it means that 3-4 straddle carriers are allocated to service that slower crane instead of receiving containers from a crane operated by

[118] ACCC, Container Stevedoring Monitoring Report 2020-21, October 2021, p.66.

> an experienced operator who is likely to be faster. So the straddles may end up being less utilised if an additional crane is allocated than if there were fewer cranes operating more quickly, with more space around them on the apron for the straddles to operate in.

There are a number of issues with the new technologies, maintenance and investments made at the Patrick Port Botany terminal which are causing problems with current and recent operations. In the first quarter of the 2021, 25% of Patrick's Port Botany berth capacity was out of order due to maintenance. In addition, the new Automated Rail Mounted Gantry cranes for loading trains have also not operated to manufacturer's specifications and require manual interventions every 4th lift.

Recruitment

The ACCC complain that:

> Some stevedores must initially offer any promotional opportunities internally and are only allowed to make offers to external candidates in the absence of an adequate internal candidate. Some stevedores are required to consult with the Maritime Union of Australia (MUA) or apply criteria agreed with the MUA when conducting recruitment. These provisions can foster skill mismatches and reduce the ability of management to hire the most qualified person for the job.[119]

First, when any potential worker is nominated, the employer goes through all the normal employment assessment processes to make the final decision about hiring workers. Hiring remains at the discretion of the employer.

Second, several of these clauses were presented to the union from the employer. In the case of Patrick Port Botany, the clause has now been amended to ensure the company has final say over the hiring of permanent workers, and union agreement is not needed. The company has agreed to a limit on the number of casual workers they hire. In any case, the clause was originally proposed by the employer as they were seeking to hire a number of casual workers, while the union was seeking to make some of these positions permanent. The employer offered to recruit casual workers from among family and friends of employees, in order to secure support of the workforce to have casual rather than permanent positions.

At Hutchison, the 'family and friends' provision in the enterprise agreement highlighted by the ACCC, was also an offer from the employer. It arose from a recruitment dispute where the company had previously ignored its obligations under the agreement, and as a result of late changes the company wanted to make to the EA, which was close to finalisation. HPA offered this position to the union as part of a final settlement.

No industrial action was taken in pursuit of either claim.

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[119] ACCC, Container Stevedoring Monitoring Report 2020-21, October 2021, p.65.

Similarly, the ACCC complain about clause 10.1 which encourages consideration of internal candidates. These words were included in the greenfield agreement between Hutchison and the MUA in 2013. No industrial action has been taken in pursuit of these claims. The employer has not sought to change them since that time.

It should be noted that there is a lack of diversity in the stevedoring workforce, which the MUA has sought to address over many years. The Hutchison terminals presently have the most women employed as a percentage of the workforce of any Australian stevedore, as well as a considerable number of First Nations workers. This situation arose out of diversity provisions in recruitment clauses.

In relation to recruitment more generally, the MUA has also acted to ensure that the physical tests used by employers to assess new hires do not discriminate against women by requiring unrealistic lift tests that do not reflect the real challenges of the job.

It is the union's position that experienced workers should be considered for promotion from within the workforce first, indeed, given the lack of external skills training this has been an essential part of skills development on the waterfront.

These provisions have also ensured a good supply of labour in an economy now plagued by labour shortages.

Consultation with the workforce and union still leaves employers with the final say over recruitment decisions.

Outsourced labour

The ACCC complain about clauses in EA that restrict the outsourcing of labour, particularly for maintenance tasks. The Fair Work Act prevents Enterprise Agreements from containing restrictions on outsourcing labour. All MUA agreements are approved through the Fair Work Commission.

We object to the ACCC's claim that 'the restriction to [sic] contracting out decreases pressure on permanent employees to be competitive with contractors, thereby reducing workplace performance.'[120]

Statements such as these contradict the duty of care of employers under the WHS Act to provide a safe workplace, including a mentally healthy and safe workplace.

In general, it is the union's position that the maintenance of container stevedoring equipment is a critical safety issue, best carried out by workers who understand stevedoring equipment, which is only deployed in a very limited number of locations in Australia. Some employers do seek to delay maintenance on cranes in unsafe ways. For example, for a period of time DP World had a policy to not replace the wires on portainer cranes in accordance with the manufacturer's directions, but to work the wires until they failed. This

[120] ACCC, Container Stevedoring Monitoring Report 2020-21, October 2021, p.65.

means the wires would be kept on cranes until they snapped under load, and a container fell, often from a considerable height, damaging the cargo and endangering workers. Worker Health and Safety Representatives challenged this practice, Safe Work NSW got involved, and it has now been changed. In this case, company used more compliant outsourced maintenance companies to get around their obligations to provide a safe workplace.

New technologies

The ACCC make observations about 'onerous processes in relation to the adoption of new technologies,' involving employee consultation, involvement, and impact mitigation, particularly at Flinders Adelaide Container Terminal. The ACCC also say that EA clause 8.4 at Hutchison 'limit Hutchison's ability to automate…By definition, automation is a creation and application of technologies to produce goods or services with minimal human intervention. Yet, provision 8.4 prohibits Hutchison from automating in a way that would reduce the level of its employees.'[121]

In relation to Hutchison, both of its terminals were established with semi-automated yard operations, using auto-stacking cranes. The company has been very clear that further investment in automated equipment at the terminal is linked to expanding the footprint and capacity of the terminals, which have access to empty land they are not yet using. They have said that any such investment will increase the number of workers on site. This is the nature of enterprise agreements – they are adapted to the circumstances of the individual company and workforce. Hence the company has no fear of such a clause that gives the workers great comfort, job security and will provide enhanced levels of cooperation arising from that security of employment.

Only four of the 28 enterprise agreements registered in 2021 have dealt with the question of automation.

The process of automation is a fair and proper subject for consultation and EA negotiation. Automation introduces massive changes into a workplace. It changes roles and responsibilities, its changes the nature and structure of jobs and potentially eliminates huge numbers of jobs. There is not one single waterfront EBA that prevents a company automating. The agreed automation outcomes arrived at through bargaining seek to deal with how such a huge workplace change is introduced and provide job security provisions or introduce mitigating measures, in the face of mass redundancies.

It would be unreasonable to expect that the workforce has no consultation or ability to present a view if a company was for example to automate and potentially make 40% of the workforce redundant. That is not a barrier to productivity in any way. It a feature of a reasonable approach by a company in agreeing to include its workforce in changes to the business. If anything, enhanced consultation and involvement will always lead to more productive outcomes.

[121] ACCC, Container Stevedoring Monitoring Report 2020-21, October 2021, p.66.

Ongoing waterfront automation has been a feature of container terminal stevedoring in Australia since the initial Patrick Brisbane operation came into being in 2005. There is a high level of yard automation at the 12 container terminals in Australia (Table 14). Automation of quay cranes is much more limited: one relatively small terminal has semi-automated remote-controlled cranes in place (out of the 12 container terminals nationally).

Table 14: Status of yard automation and EA clauses about automation at Australian container terminals.

Company Port	Automated yard operations?	Mode	EA clause?	Requirement in clause
Patrick				
Brisbane	Auto	Auto straddle operation	Y	Consultation if 30% of workforce is affected.
Sydney	Auto	Auto straddle operation	Y	
Melbourne	Manual	Conventional straddle	Y	
Fremantle	Manual	Conventional Tug and forklift	Y	
DP World				
Brisbane	Auto	Auto Stacking cranes	Y	Negotiate between parties if automation is implemented.
Sydney	Manual	Conventional RTG	Y	
Melbourne	Manual	Conventional Straddle	Y	
Fremantle	Manual	Conventional RTG	Y	
Hutchison				
Brisbane	Auto	Auto Stacking cranes	Y	No loss of jobs due to the fact that with automation will involve and expansion of the terminal, increasing the size of the workforce.
Sydney	Auto	Auto Stacking cranes	Y	
Flinders Ports				
Adelaide	Manual	Conventional straddle	Y	Consultation and maintain roles
VICT				
Melbourne	Auto	Highly automated incl. remote control	N	N/A

Source: Enterprise Agreements, MUA industry knowledge.

For workers there will never be a bigger change introduced into their workplace than introduction of automation. Workers are concerned and want some guarantees over job security and their future. The community and government should also be concerned as it imposes a loss of employment and a loss of domestic revenue through workers' earnings being spent in the community, as opposed to that money going to company revenue or shareholders.

The agreements cater for a proposed introduction of any automation process and provide some guarantees around job security and how the automated technology would be

introduced. The nature of the clauses varies greatly in each agreement but they all act to the same end in providing some certainty amidst a huge change and providing basic levels of job security that every worker has a right to expect.

As discussed in section x, automation is not as reliable or productive as human labour. It cannot operate or adapt to complex or evolving situations, unknown environments, ambiguous data, capricious decision makers, or certain weather conditions. In both highly and semi-automated terminals, the introduction of new technology has led to a net loss of jobs and loss of productivity at container terminals. Its primary role has been to reduce labour costs for stevedoring operators.

To claim that the minimal barriers to automation in agreements is a barrier to productivity is false. Automation itself is a barrier to productivity and if governments were genuine about true waterfront productivity, they would themselves bring in measures to prevent port operators moving to automated technology at the expense of not only jobs and waterfront productivity but because of the negative impact across communities.

If governments wish to ensure that investment in new technologies by stevedoring companies is directed to improving productivity, measures should be introduced to this end.

MUA industrial action

The ACCC Container Stevedoring Monitoring report highlighted industrial action by the MUA,[122] which it claimed was in pursuit of the so-called 'restrictive work practices' discussed in the previous section.

First, it must be noted that Enterprise Agreements have now been agreed at all Australian container terminals.

Second, the number of days since the expiry of the agreement until a new agreement is signed does not mean days of industrial action. For the vast majority of days highlighted in the ACCC's Table 6.6, work continued as normal. Industrial action took place only on notified days, in accordance with workers' rights under the Fair Work Act.

Finally, the ACCC fails to mention that the pandemic very significantly interrupted the Enterprise Agreement negotiations at Hutchison, DP World, and Patrick. All three negotiations commenced before the pandemic took hold in March 2020. In the early stages of the pandemic there was a very significant drop in work of stevedoring employers, and increased costs as covid-safety measures were introduced. As a result, employers immediately began to seek cost-cutting measures, such as the removal of redundancy provisions when automation was being considered, and reductions in superannuation and long service leave provisions. Agreements on matters which had been reached before the pandemic were put back into doubt. Some employers also sought to remove some of the long-standing provisions of agreements that create permanent jobs and more predictable rostering for workers.

[122] ACCC, Container Stevedoring Monitoring Report 2020-21, October 2021, p.67

At the same time, workers were expected to come to work at risk themselves and their family, while managers stayed at home. Many employers were initially reluctant to implement covid-safe measures – for example they refused to collaborate with the MUA to bring in a uniform set of safety measures in stevedoring workplaces. These had to be fought for by worker Health and Safety Representatives and safety committees in each workplace.

Workers felt they had made personal sacrifices to ensure Australia's exports and imports continued through the very challenging period of the pandemic. They felt it was fundamentally unfair to be rewarded for these sacrifices by losing some of the conditions of work which make family life possible amidst the extreme flexibility requirements of stevedoring work (see section x). Industrial action taken during this period was in protection of existing provisions in Enterprise Agreements.

Towards the end of 2020 and in 2021, the massive boom in international container cargo became clear, and stevedores started to handle record numbers of boxes. Profitability was back up, and at new highs. In this environment, workers were even less inclined to accept the concessions that many of the employers were still seeking.

In 2021 and early 2022, all container stevedoring Enterprise Agreements were finally settled.

Maritime Logistics Infrastructure: Ships and ports (TOR 4)

4. *Assess **infrastructure needs and constraints**, including options to enhance the efficiency of ports and connected landside supply chains and the interactions between decisions of different levels of government. This should include reviewing rail access at container ports; any imbalance between the types of containers for imports versus exports; the suitability of container storage facilities; and costs and benefits of investing in new port and shipping infrastructure or enhancements to existing infrastructure to enable the use of larger ships. This should also identify the role of Governments and the private sector in meeting current and future infrastructure challenges in the sector.*

Crisis in international shipping to Australia

Ships are a critical yet overlooked aspect of maritime infrastructure – it is not unusual for freight planning in Australia to completely overlook the critical role of ships in domestic and international supply chains, taking their existence for granted and not treating them as an aspect of the supply chain which must also be including in planning.

With the decimation of the Australian shipping fleet and the sale of Australian National Line in 1998, Australia is entirely dependent on a relatively small number of international shipping companies for virtually all of its maritime imports and exports, and a very large

portion of its coastal trade.[123] There are no Australian-registered container ships serving the 5 key container ports – this trade between ports is now carried exclusively by international ships as a leg of an international voyage.

This makes Australian international and domestic trade quite vulnerable to global shocks, and to decision-making by these international shipping companies in their own interests.

Problematic practices by the container liner shipping companies identified in the ACCC's Container Stevedoring Monitoring Report 2020–21 include:

- Shipping line capacity constraints, including a diversion of services from Australia i.e. to higher value routes and volumes
- The surge in shipping line charges (excessive increase in freight rates and arbitrary imposition of congestion charges)
- Shipping line practices such as omitting ports, rolling over cargo (to a later voyage), cancelling bookings; failing to meet berthing slot windows and imposing move count restrictions on vessel exchanges
- Diversion of vessels to alternative ports, thus disrupting scheduling through a cascading effect (schedule sliding)
- The use of increasingly larger ships in the Australian trade.

In 2021 the number of container vessels arriving on time for their time slots at container terminals (schedule reliability) declined to historic lows on all trade routes servicing Australia (Table 15). Schedule reliability across routes calling at ports in Oceania historically ranges from 70% up to 95%.[124] In April-May 2021 reliability was only 17% on the Asia-Oceania route, with vessels on the Europe-Oceania route being the 'most' reliable with 41% arriving for their slots. The delays were substantial and the average delay of these late vessels ranged from 3.6 days to over 12 days across all ports on these routes (Table 15).

[123] Trade between Tasmania and Melbourne is undertaken by a small fleet of Australian ships, however these are not cellular container ships but carry a wide variety of cargo, mainly in a roll-on/roll off configuration.

[124] Source: Sea-Intelligence Maritime Analysis, Global Liner Performance Report, June 2021, p.51-62.

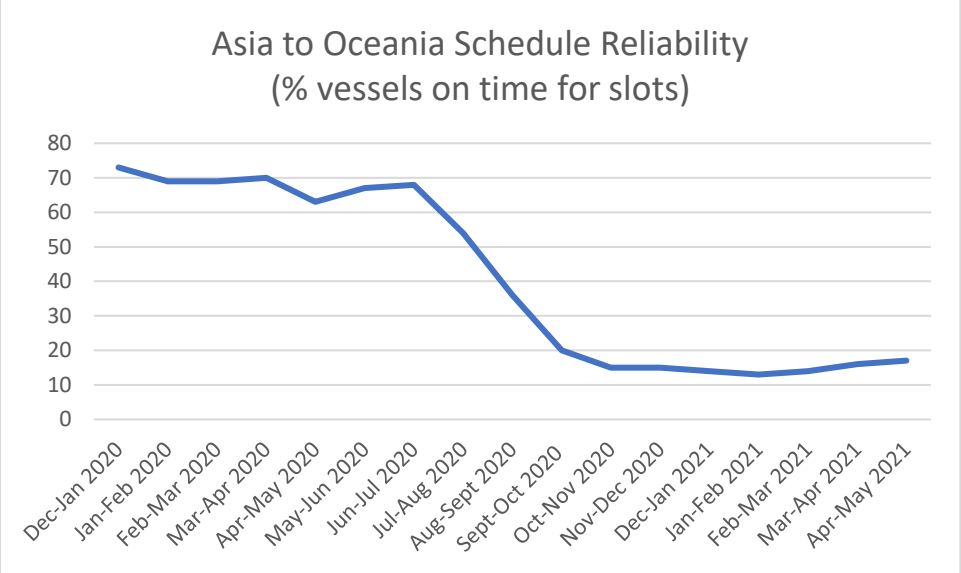
Table 15: Percent of vessels arriving on time for slots at container terminals, and the average number of days which late vessels were delayed in 2020 and 2021. Statistics include all ports on these routes.

	April-May 2020		April-May 2021	
	Schedule reliability (% of vessels arriving for slots)	Average delay of late vessels (days)	Schedule reliability (% of vessels arriving for slots)	Average delay of late vessels (days)
Asia to Oceania	63%	4.1	17%	7.6
Oceania to Asia	74%	3.8	22%	5.8
Europe to Oceania	69%	4.6	41%	3.6
North America to Oceania	87%	2.8	27%	6
Oceania to North America	91%	2.4	38%	12.8

Source: Sea-Intelligence Maritime Analysis, Global Liner Performance Report, June 202, p.51-62.

Fewer than 1 in 5 container vessels on the critical high-volume Asia to Oceania routes arrived on time for their container slot from November 2020 to April 2021 (Figure 17).

Figure 17: Percent of vessels on time for container terminal slots on the Asia-Oceania routes (schedule reliability). Data covers all ports and vessel arrivals for 28 container liner services.



Source: Sea-Intelligence Maritime Analysis, Global Liner Performance Report, June 2021, p.57.

We have already discussed the international crew change crisis, and the forced labour and Modern Slavery conditions this generated on ships around the world and in Australian ports (TOR 2).

The Productivity Commission report on Vulnerable Supply Chains in 2021 acknowledged that 'further investigation is required to ascertain whether the existing transport of essential goods is particularly vulnerable to disruption'. However, many in the maritime industry have expressed concern that this report did not adequately reflect how close these supply chains have come to failure, or the multiple human rights abuses that their operation depended upon.[125]

In the next section (TOR 5), we outline the powers the Australian government has, and the steps which we believe the government needs to take using those powers, to regulate the international shipping lines involved in trade to Australia, in order to make these supply chains more resilient and ensure minimum levels of service and supply.

In this section we outline the issues that have arisen in container liner shipping to Australia in recent years.

> **Recommendation 12:** That the Productivity Commission recommend a review of the National Freight and Supply Chain Strategy and the National Ports Strategy to ensure that they properly incorporate and plan for Australia's international and domestic shipping needs.

Regulation of international shipping

The vulnerability of Australian import and export supply chains predates the pandemic by decades, and the Australian government has been remarkably slow to act. In 2002, the OECD published a report on the anti-trust exemptions for liner shipping, recommending members countries 'should seriously consider removing anti-trust exemptions for price-fixing and rate discussions.'[126] The US government had already taken steps to remove these measures in the 1998 Ocean Shipping Reform Act, and the EU followed suit in in 2006 (with the measure taking effect in 2008).[127]

The ACCC identifies the long-standing exemptions from competition law available to container shipping companies in Australia in Part X of the *Competition and Consumer Act 2010* (and its predecessor legislation) as 'among the most permissive employed by a developed country'.[128] Yet despite the obsession of state and federal governments with competition policy as it applies to container terminals, we are not aware of any serious consideration by government of competition policy as it applies to the container liner shipping servicing these ports until the 2015 Harper Review, and then ACCC's discussion paper of 2019. When it was finally released this paper was only 13 pages long, and contained little robust or independent analysis about how competition was affecting

[125] For example, MIAL opinion piece in DCN.
[126] OECD, Competition Policy in Liner Shipping Final Report, 16 April 2002, p.78. See discussion of this report in Owen Tang and Po-wan Sun, Anti-competition of ocean shipping alliances: a legal perspective, Maritime Business Review, 2018: 3(1), p.12-13.
[127] Owen Tang and Po-wan Sun, Anti-competition of ocean shipping alliances: a legal perspective, Maritime Business Review, 2018: 3(1), p.12-13.
[128] ACCC, Proposed Class Exemption for Ocean Liner Shipping Discussion Paper, 3 December 2019, p.1.

container liner services to Australia – instead asking industry to provide 'industry background'. Submissions to the consultation were only received from bodies with direct commercial interests in container liner shipping (and one government department).

The key priority from our perspective, however, is not competition policy per-se, it is to ensure that shipping to and from Australia meets Australian needs, including minimum standards and service levels, and does so without violating the human rights of thousands of people around the world. Competition policy must be put in the context of clear policy objectives set by government to ensure adequate, reliable, cost effective and well-planned shipping services to Australia, and as international and historical experience shows, competition policy is only one tool that can be used.

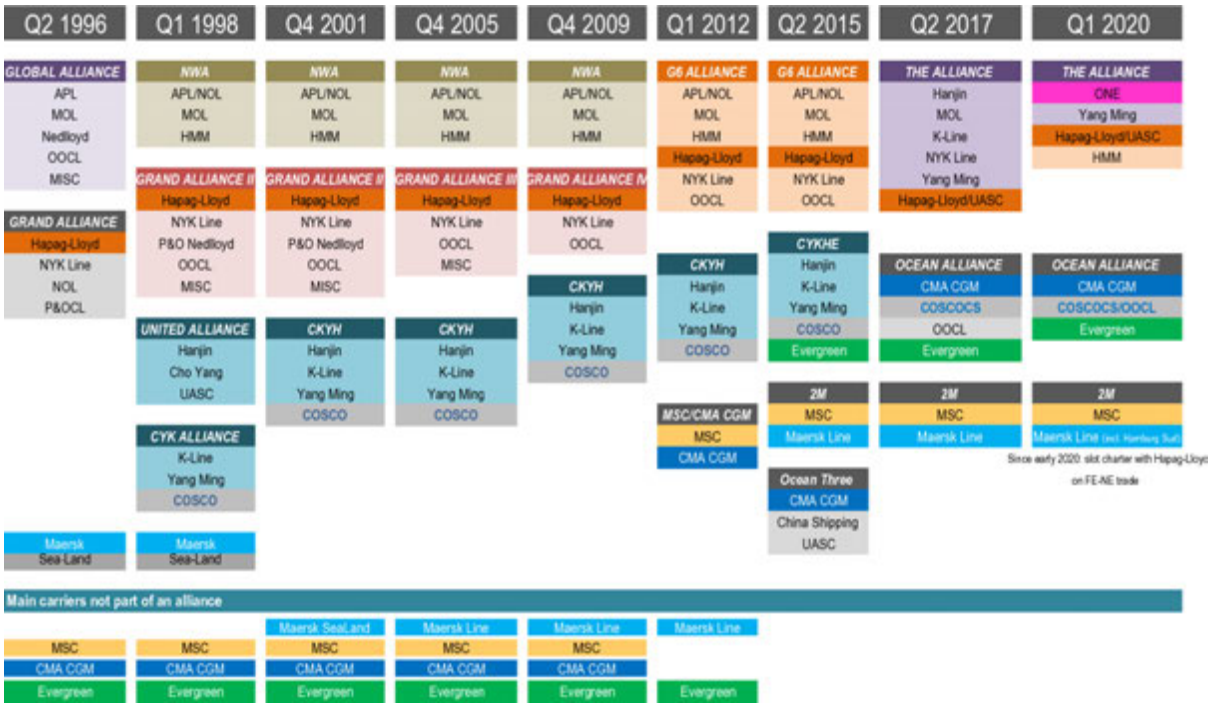
Previous Australian governments created and operated the Australian National Line to ensure services to Australia were effectively delivered, and in the US the Federal Maritime Commission (FMC) has for decades 'worked to ensure that neither the activities of liner shipping groups nor foreign government laws or regulations impose unfair costs on American exporters, or on American consumers of imported goods.'[129] Legislation passed the US House of Representatives in December 2021 to further strengthen the FMC's powers, and this is currently being debated in the US Senate.[130] Details of these initiatives will be discussed further under TOR 5.

Consolidation of container liner shipping

There has been an extraordinary consolidation of container liner shipping globally, involving mergers, acquisitions, and bankruptcies, as well as the formation and reorganisation of shipping Alliances using novel commercial arrangements. In the past six years even the major independent carriers also joined Alliances. Figure 18 and 19 show how 80% of global trade is now concentrated in three Alliances, and this figure appears to be higher in Australia.

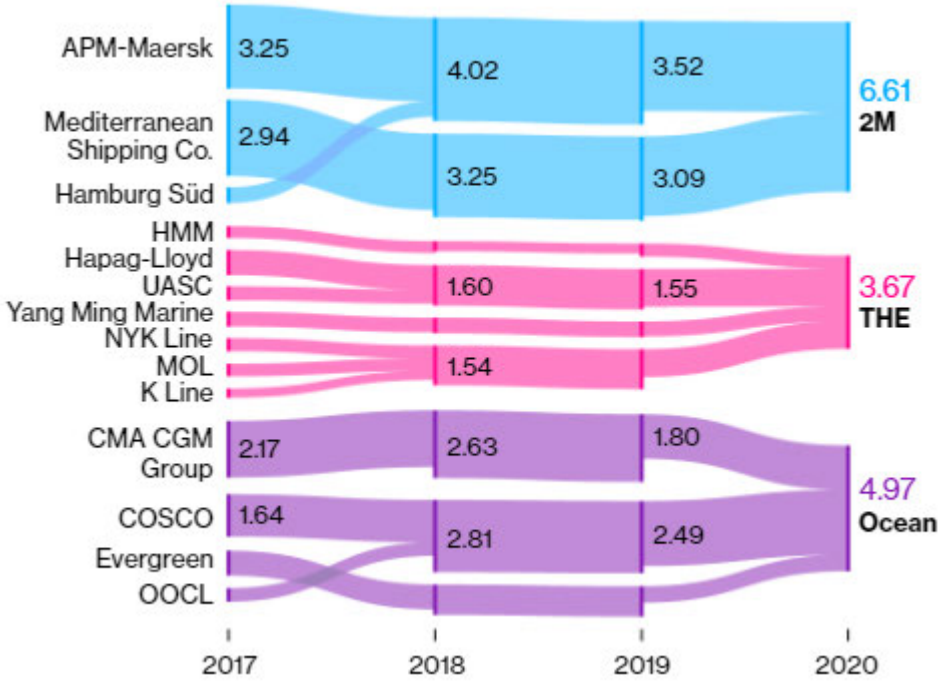
[129] Federal Maritime Commission, FMC History, Accessed February 2022.
[130] This is the Ocean Shipping Reform Act, further discussion below in TOR 5.

Figure 18: Consolidation of container liner shipping into three global alliances.



Source: Notteboom, T.E., Haralambides, H.E. Port management and governance in a post-COVID-19 era: quo vadis?. *Marit Econ Logist* **22,** 329–352 (2020). https://doi.org/10.1057/s41278-020-00162-7

Figure 19: Container shipping Alliances, and the freight they ship (millions of TEU).



Source: S&P Global Platts, reproduced in Charlotte Ryan, British Freight Lobby Slams 'Profiteering' in Container Shipping, Bloomberg, 6 January 2022.

The Australian Peak Shippers Association told a 2019 Senate inquiry about the 'increased market power' of container liner shipping, describing how 'unprecedented' consolidation of liner shipping companies, increased competition among container terminal operators, and a lack of effective regulation by Part X of the *Competition and Consumer Act,* or any other Australian legislation or agency, had led to a significant loss of shipping services for Australian exporters in the preceding 3-4 years.[131]

In Australia, the dominant Ocean Alliance operates between 39-51% of the cargo capacity of vessels in TEU through our five international container ports. Together the three Alliances cover between 78-95% of vessel capacity (Table 16).

Table 16: Percentage of cargo capacity of vessels (TEU) controlled by the three main container shipping alliances, calling at container terminals in the five Australian container ports. Data is for Q4 2021.

	Percentage of vessel cargo capacity in each port that is a part of each global alliance (TEU)				Other vessel capacity
	the Ocean Alliance CMA-CGM (ANL) COSCO (OOCL) Evergreen	**2M** MSC Maersk (Hamburg Sud)	**THE Alliance** ONE Yang Ming Hapag-Lloyd/UASC HMM	**Total vessel capacity in the three Alliances**	TS Lines Zim PIL and other smaller companies
Sydney	39%	31%	9%	**78%**	22%
Melbourne	45%	34%	11%	**89%**	11%
Brisbane	43%	20%	10%	**73%**	27%
Adelaide	51%	29%	16%	**95%**	5%
Fremantle	48%	30%	16%	**94%**	6%

Source: Compiled from Alphaliner data, accessed February 2022.

It appears from the figures in Table 16 that there may be more competition in Sydney and Brisbane. However, these ports also play a significant role in servicing the Pacific Islands and PNG. So, there may not be more competition on the higher volume routes, just a wider variety of routes that are serviced by smaller companies that are not part of the global alliances than call at Melbourne, Fremantle and Adelaide.

Reduced port calls and total vessel cargo capacity

It is clear that Adelaide and Fremantle have been particularly affected by the consolidation of container shipping lines, with the Ocean Alliance controlling about 50% of vessel cargo

[1] Australian Peak Shippers Association, Evidence to the Senate Rural and Regional Affairs and Transport References Committee, Inquiry into the Policy, regulatory, taxation, administrative and funding priorities for Australian shipping, transcript of hearing on 13 March 2019, p.35-44. See also their submission to the Inquiry.

capacity in those ports, and the three Alliances controlling close to 95% of vessel capacity servicing the ports (Table 16).

At the same time as this consolidation has taken place, the number of vessels calling in Adelaide and Fremantle and their total cargo capacity has sharply declined. Over 2 years to the end of 2021, the number of container ships calling at Adelaide declined 41% and to Fremantle by 33% (Table 17). This decline means not only less total capacity, but fewer schedule and destination options for shippers through those ports.

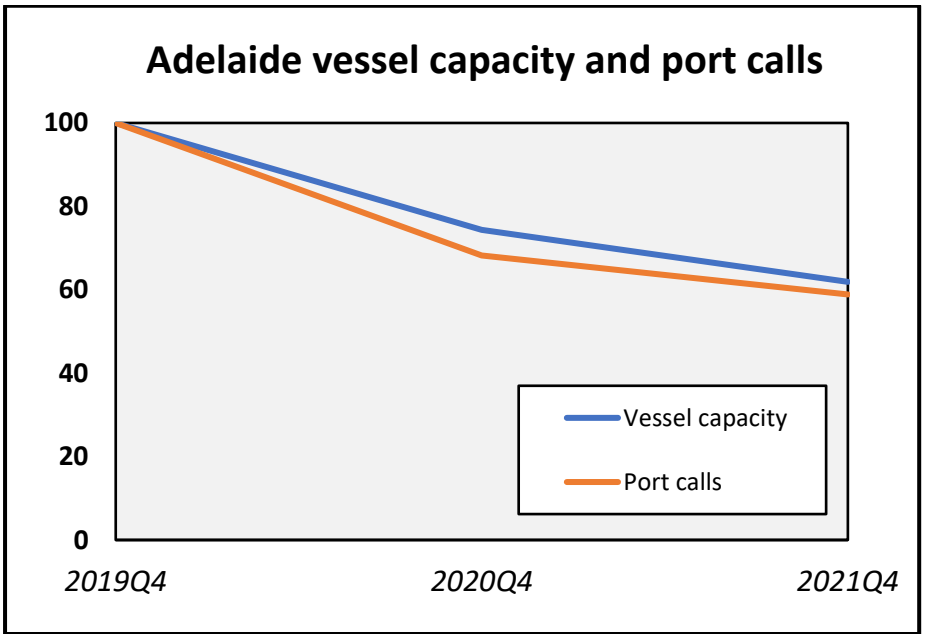
Over the same period, TEUs handled per year in Fremantle has increased by about 100,000 TEU, and has remained steady in Adelaide. This means that container terminals must deal with much fuller ships, which creates challenges to maintain productivity due to the number of complex container moves that may be required.

Table 17: Ports calls by container ships in Adelaide and Fremantle in Q4 2019 compared to Q4 2021.

	Port calls by container ships		Percentage change
	Q4 2019	Q4 2021	
Adelaide	107	63	41% decrease
Fremantle	139	93	33% decrease

Source: Compiled from Alphaliner data, accessed February 2022.

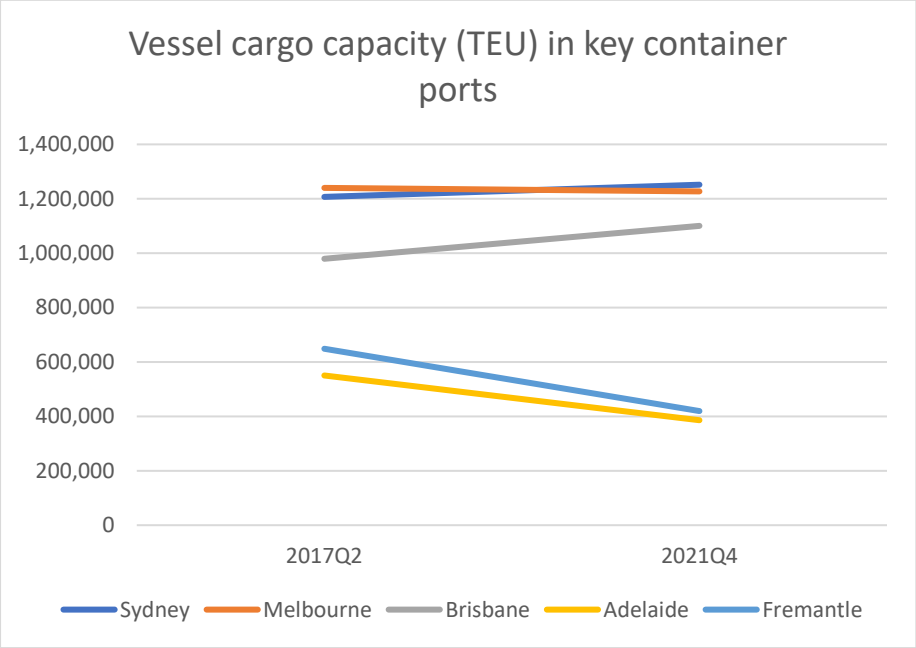
Figure 20: Vessel cargo capacity and ports calls to Adelaide, indexed to Q4 2019.



Source: Compiled from Alphaliner data, accessed February 2022.

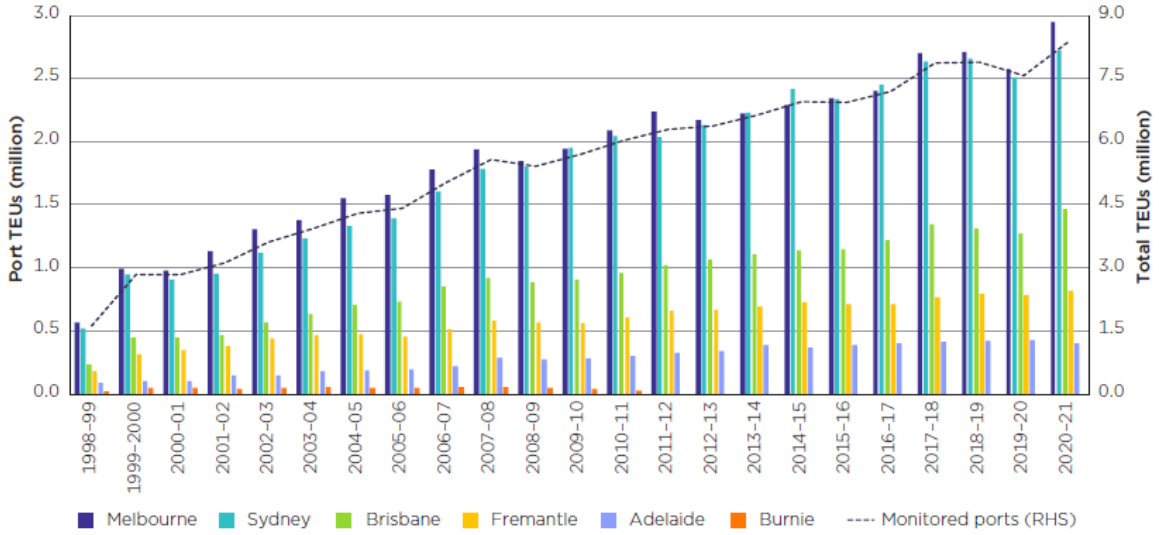
Looking at other Australian container ports, there is generally flat or falling cargo capacity of vessels across the past four years (Figure 21). This is particularly the case in the three ports in which the three container shipping Alliances cover 89%-95% of vessel capacity – Adelaide, Melbourne and Fremantle. It is despite a very substantial increase in container throughput in Melbourne in the same period (Figure 22). The only substantial increase in vessel capacity was in Brisbane, where only 73% of vessel capacity is controlled by the Alliances, the lowest of any Australian container port.

Figure 21: Cargo capacity of container vessels (TEU) calling in Australian container ports.



Source: Compiled from Alphaliner data, accessed February 2022. This time period was chosen as it provides the largest available spread of dates in the data.

Figure 22: Container stevedoring throughput at Australian container ports, 1998-2021.



Source: ACCC, Container Stevedoring Monitoring Report 2020-21, October 2021, p.67

Individual companies have also significantly increased their market share in recent years. In Melbourne the top 4 container liner companies, in only two Alliances, control 76% of vessel cargo capacity in Q4 2021 (Table 18). This is up from 54% in Q2 2017.

Table 18: Market share of container liner companies calling in Melbourne in 2017 and 2021, measured by vessel cargo capacity (TEU). Alliances are as follows, in 2021 Yellow: the Ocean Alliance, Blue: 2M, Green: THE Alliance.

	Percentage of Melbourne's vessel cargo capacity (TEU)	
	2017Q2	2021Q4
OOCL (acquired by COSCO)	10.7%	
Maersk	14.6%	21.8%
ANL/ CMA CGM	15.4%	12.5%
MSC	13.2%	19.1%
COSCO	9.8%	22.2%
Hapag Lloyd	7.0%	6.5%
TS Lines		5.0%
ONE	3.2%	4.1%
Evergreen		3.0%
Hamburg Sud (acquired by Maersk)	7.1%	
Yang Ming	4.2%	
Other	14.8%	5.8%
	100.0%	100.0%

Source: Compiled from Alphaliner data, accessed February 2022.

It must also be noted that many of the companies in these Alliances are large enough that they are able to offer entire international container liner services in-house, without the need for cooperation with another company. This does not reduce the need for these services to be regulated and monitored, or the effects of corporate decisions on the Australian public. We understand that CMA CGM/ANL, COSCO, Maersk, MSC, and ONE all offer wholly-owned services to Australia.

We are also concerned that shipping lines are seeking to dictate the timing and type of investment at ports, with the ultimate aim of benefiting their own commercial interests to the detriment of the price taking terminal operator companies with whom they negotiate contracts. This manipulation favours those terminal operators with a smaller presence in Australian container ports, seeking to place commercial pressure on the longer established terminal operator companies with a larger presence, to drive down their contract prices with terminal operator companies. While this may not lessen competition among shipping lines, it lessens competition among terminal operator companies, for which the shipping line behaviour is solely responsible.

A complete analysis of Australian container trades is beyond the scope of this submission, but the information presented here should be a good indication that much more work is needed in this area. The PC should commission further work to understand the trends presented here on how container shipping line consolidation is affecting Australian ports – how consolidated are services to Australia? how are they commercially and practically organised? and what is the data on cargo capacity and utilisation, size of ships, frequency of services, reliability of services? In particular, the effect of these trends on Adelaide, Fremantle and Melbourne needs to be examined.

The PC should not simply rely on information provided by Shipping Australia Ltd (SAL) or their peak body the World Shipping Council, who appear to be the main providers of industry information to the ACCC's consultation on a new class exemption. These organisations represent the liner shipping companies who have a direct commercial interest in preventing regulation of international shipping.

Recommendation 13: That the Productivity Commission solicit an independent analysis of international shipping lines and services to Australia over the past 10 years including:

- For each international container port:
    - Total available vessel cargo capacity
    - Port calls
    - TEU handled
    - Reliability of service
- For each port – what are the key needs of importers and exporters, and how well do the shipping services on offer match these needs?
- Container services to Australia – a complete list, and analysis of how they are controlled, how they have changed over time, what companies are involved, what Alliances are involved, and how the Alliances are organised (commercially and practically).
- How the three Alliances relate to the services in Australian ports

- How different freight rates on different global routes have affected trades to Australia, including whether containers and container vessels have been redeployed from servicing Australia to the China-Europe route.

Provision must also be made to ensure ongoing high-quality research on these issues is produced and made public.

Uneven profitability of shipping routes

Reduced shipping capacity to Australian ports, while TEU throughput volumes are rising, is a cause for concern. It means that ships are fuller with more complex stowage plans, increasing the number of complex moves that are needed to load and discharge containers at each port. This presents a challenge to maintaining quayside productivity levels.

The China Containerised Freight index gives us a clue as to why overall container vessel capacity serving Australia may be flat or declining.

A shipping line can charge double the freight rate shipping a container from China to Europe and the Mediterranean than they can to Australia and New Zealand (Table 19). Rates to Europe are rising, while rates to Australia are falling, so the gap is continuing to grow.

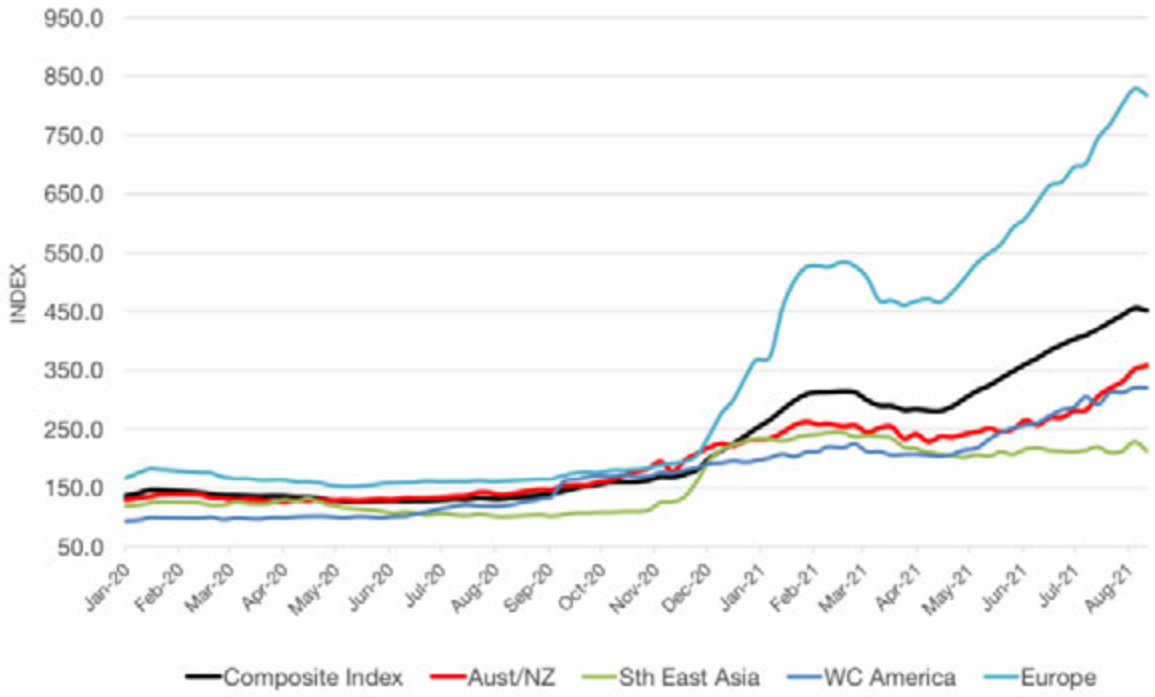
Table 19: China Containerised Freight Index – the price of exporting containers from China to the locations in the table.

China Containerized Freight Index			
Description	Previous Index 2022-01-28	Current Index 2022-02-11	Weekly Growth (%)
COMPOSITE INDEX	3565.33	3587.91	0.6%
JAPAN	1219.81	1227.87	0.7%
EUROPE	5639.26	5854.14	3.8%
W/C AMERICA	2628.62	2745.24	4.4%
E/C AMERICA	2770.26	2801.93	1.1%
KOREA	1369	1264.83	-7.6%
SOUTHEAST	2294.88	2213.51	-3.5%
MEDITERRANEAN	6577.1	6614.07	0.6%
AUSTRALIA/NEW ZEALAND	2917.77	2839.66	-2.7%
SOUTH AFRICA	3336.96	3257.02	-2.4%
SOUTH AMERICA	2834.44	2669.63	-5.8%
WEST EAST AFRICA	1952.07	1936.97	-0.8%
PERSIAN GULF/RED SEA	4232.14	3882.36	-8.3%
Issued by SSE			

Source: Shanghai Shipping Exchange, accessed February 2022.

Figure 23 shows that although the price of container exports from China to Europe has historically been somewhat higher than Australia (understandable given the different distances and costs involved), the vastly increased freight rates on the China to Europe route arose in about December 2020 and have generally continued to increase since then.

Figure 23: China containerised freight index, Jan 2020-August 2021.



Source: Shaghai Shipping Exchange, reproduced in MinterEllisonRuddWatts, Addressing New Zealand's sea freight challenges, 12 October 2021.

Not only are rates higher to take a container from China to Europe, they are also higher to bring it back from Europe to China, making for higher profits for the full return journey (Table 20).

Table 20: China Import Containerised Freight Index – the price of importing containers to China from the locations in the table.

China Import Containerized Freight Index (CICFI) 2022-02-09			
Description	Previous Index 2022-01-26	Current Index 2022-02-09	Weekly Growth (%)
Comprehensive Index	1444.67	1455.47	0.7%
EUROPE SERVICE	1185.16	1197.83	1.1%
MEDITERRANEAN SERVICE	2161.12	2213.78	2.4%
W/C AMERICA SERVICE	1442.16	1390.68	-3.6%
E/C AMERICA SERVICE	1173.4	1212.5	3.3%
AUSTRALIA/NEW ZEALAND SERVICE	1595.34	1745.81	9.4%
Issued by SSE			

Source: Shanghai Shipping Exchange, accessed February 2022.

Therefore, shipping lines are re-deploying their ships and containers to the areas where they can make the most profit, at the cost of services to Australian ports, and increasing the challenges to container terminal operators in managing much fuller and less frequent ships. While the ACCC mentions this issue in relation to Adelaide,[132] it is only in passing, and not fully investigated. In relation to freight rate increases, the ACCC only looks at the average global rate increase, and not at the distortions caused by the very different rates available on different routes.

Figure 21 and 22 above showed that container vessel capacity to Australia has been largely flat from 2017-2021, despite the total TEUs exchanged increasing significantly in this period. Global fleet capacity was 21.1 million TEU across 5,177 vessels at the end 2017, which had increased to 25 million TEU across 5,533 vessels by February 2022 (only counting fully cellular vessels).[133] New capacity was added to the global fleet, but this additional capacity was not directed to Australian ports despite our growing throughput.

It is understandable that shipping lines might move their ships out of the Australian trades, or prioritise placing new capacity in other trades – they are for-profit companies and there is nothing in Australian law preventing them from doing so.

The question is why would the Australian government leave the country so vulnerable to such decision making?

[132] ACCC, Container Stevedoring Monitoring Report 2020-21, October 2021, p. xiv and p.14.
[133] Mike Wackett, Global Fleet Capacity to Swell as More Containerships are Delivered in 2018, The Loadstar, 3 January 2018; Alphaliner TOP 100, Accessed 14 February 2022

In TOR 5 below we explore the powers the Australian government has to rectify this problem and make policy recommendations on steps that could be taken.

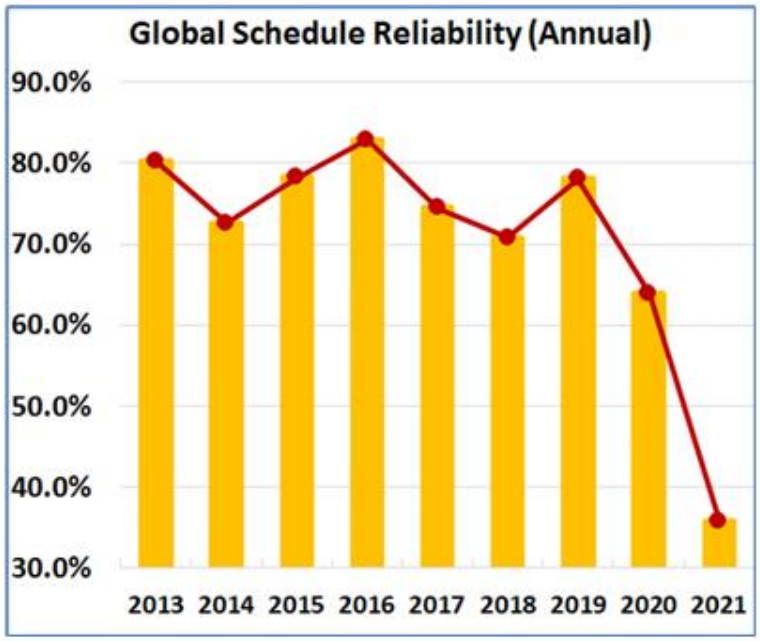
Global container shipping: poor reliability, record profits, shifting capacity

The challenges being experienced by Australian importers, exporters and in ports such as Adelaide and Fremantle are global problems.

Global schedule reliability plunged from 63.9% in 2020 to 35.8% last year, according to a recent analysis from Sea-Intelligence (Figure 24).[134]

At the same time the 10 leading publicly listed container shipping lines are on track to earn a record $115 billion to $120 billion in profit in 2021,[135] and as much as $200 billion in 2022.[136]

Figure 24: Global schedule reliability for international container liner shipping.



Source: Sea-intelligence, reproduced in: Abby Williams, Liner performance report reveals "staggering drop" in schedule reliability, DCN, 8 February 2022.

Globally, container shipping companies are deploying their vessels to the routes with the highest freight rates. In a single year (January 2021-January 2022) there was a 30% increase in total cellular TEU capacity on the Asia-North America routes, and a 10% increase in the

[134] Abby Williams, Liner performance report reveals "staggering drop" in schedule reliability, DCN, 8 February 2022.

[135] Greg Holt, Top 10 container shipping lines on track for $115-120 billion 2021 profit: Alphaliner, S&P Global Platts, 2 December 2021.

[136] Sam Chambers, Intra-Asia and Africa trades lose out in today's record-breaking box shipping era, Splash247.com, January 26, 2022

Asia-Europe routes. There were drops of 11% on Intra-Asia routes, 5% on intra-Europe routes and 6% on African routes.

Vessel capacity on routes in Oceania increased slightly by 1.3% from January 2020 to January 2021,[137] but this did not match the average 7.8% increase per year in TEU capacity through Australian ports.[138] The increase in throughput for that period is probably even higher but the numbers have not yet been published as far as we are aware.

Olaf Merk, project manager for ports and shipping at the International Transport Forum (ITF) of the Organisation for Economic Co-operation and Development (OECD), questioned whether regulators ought to be looking into this shift in global vessel coverage:

> This seems to have become the current reality of global liner shipping: alliances and consortia continuously shift capacities between tradelanes to adapt to changes in demand even if there are no real changes in demand…and so it can happen that shippers in one continent suddenly have less capacity to their disposal due to a capacity shift to other parts of the world, even if they need more capacity. This dynamic – often coordinated via alliances and consortia – obviously can have impacts on freight rates.
>
> One wonders to what extent competition authorities take this into account when providing their legal privileges to alliances?[139]

In particular the companies in the 2M Alliance (Maersk and MSC) have increased their capacity on the Asia to North America routes by 50% and 82% respectively. The Loadstar also comments that 'Redeploying ships to better-paying routes is a win-win for carriers, which after shifting vessels are able to command much higher rates for the capacity-crunched secondary trades.'[140]

Problems with international shipping to New Zealand

New Zealand is even more peripheral to global supply chains, and even more dependent on international shipping for internal trade and imports and exports. Australia should keep a close eye on the developing supply chain issues there, which could end up foreshadowing challenges being faced in Adelaide and Fremantle.

In a paper on the country's growing supply chain issues, New Zealand law firm MinterEllisonRuddWatts observed that only 6% of vessels are arriving on time and 'some services are skipping scheduled stops along New Zealand's coast to make up for lost time or chase higher paying business elsewhere. There is also mounting concern that some shipping

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[137] Global Maritime Hub, Carriers prioritize East-West routes,
[138] ACCC, Container Stevedoring Monitoring Report 2020-21, October 2021, p.2
[139] Sam Chambers, Intra-Asia and Africa trades lose out in today's record-breaking box shipping era, Splash247.com, January 26, 2022
[140] Mike Wackett, Forwarder angst as carriers switch vessels onto the best-paying tradelanes, 4 August 2021

lines may soon choose not to visit New Zealand at all, given the country's position on the fringes of global shipping routes.'[141]

New Zealand is also experiencing:

> a severe shortage of refrigerated containers (particularly at smaller and southern ports), which take the country's primary produce overseas. Once upon a time, the international shipping lines would have been keen to redistribute empty shipping containers around the country and take the surplus containers offshore. However, this business stream is not attractive at present given the record sea freight rates on offer elsewhere. With only one New Zealand flagged and crewed coastal container ship, Moana Chief, able to perform the domestic redistribution task, the country's current container surpluses and deficits are likely to continue to grow in the months ahead.[142]

Our colleagues in the Maritime Union of New Zealand report that this lack of refrigerated containers means that kiwifruit is being loaded onto pallets, and transferred to general cargo ships by ships' cranes. This is an extraordinary situation which will result in a significant damage to cargo and exports.

Problems with international shipping to the UK and Europe

Although the updated regulation of container liner shipping in Europe took effect in 2008, there are already strong indications that measures are insufficient and in need of review. There was strong opposition[143] to the renewal of the existing European Consortia Block Exemption, which took effect in 2020. Now many organisations are calling for an early review, including the European Shippers' Council, CLECAT (European Association for Forwarding, Transport, Logistics and Customs Services), FEPORT (the Federation of European Private Port Companies and Terminals), the European Tugowners Association, the European Barge Union, the European Transport Federation, the International Union for Road—Rail Combined Transport, the Global Shippers Alliance and the Global Shippers Forum.[144]

In in their letter to the European Commission, these organisations describe a 'fundamentally flawed' container shipping market, with a regulatory environment that has resulted in practices by the container shipping industry that have led to 'a lack of container capacity, poor reliability of schedules and ongoing surges in freight rates. This not only heavily

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[141] Sarah Salmond, Addressing New Zealand's sea freight challenges, MinterEllisonRuddWatt, 12 October 2021.
[142] Sarah Salmond, Addressing New Zealand's sea freight challenges, MinterEllisonRuddWatt, 12 October 2021.
[143] European Commission, Consultation on the evaluation of the Consortia Block Exemption Regulation, 2018.
[144] European Shippers' Council, CLECAT (European Association for Forwarding, Transport, Logistics and Customs Services), FEPORT (the Federation of European Private Port Companies and Terminals), the European Tugowners Association, the European Barge Union, the European Transport Federation, the International Union for Road—Rail Combined Transport, the Global Shippers Alliance and the Global Shippers Forum, letter to European Commission Director of Waterborne Transport and Director Antitrust, Transport, Postal and other services, 14 September 2021. Available on request. Greg Knowler, European shipper groups renew call for regulatory scrutiny of carriers, Journal of Commerce, Sep 17, 2021.

disrupts the maritime and hinterland logistics supply chains, it also negatively affects other parties down the supply chain, including retailers and consumers.'[145]

The letter attributes the blockage of the Suez Canal by the *Ever Given* to the persistence by container shipping lines in deploying vessels that are too large for the available infrastructure, and the lack of regulatory action to address this problem. They say the deployment of Ultra Large Container Vessels is also contributing to tightening windows for container delivery to terminal, increased demurrage costs, and 'a rat race to deliver containers, with artificial peaks and bottlenecks as a consequence and capacity being wasted'. The potential efficiencies of larger ships are not being shared with users, but the cost impact is.

The letter notes that the both the 2M Alliance and Ocean Alliance operate outside the scope of the Consortia Block Exemption. This issue must be carefully considered in any future Australian regulation to ensure that it captures the nature of the commercial arrangements within these Alliances.

In the UK, the British International Freight Association has called on the U.K. government to investigate the state of competition within the global container-shipping market.[146]

Port infrastructure and planning

Ports are critical pieces of infrastructure with multiple users with sometimes competing interests, which must be planned and operated in the public interest. Planning should be based on genuine Australian infrastructure needs, not efforts to 'entice' international shipping lines (as per the ACCC *Container Stevedoring Monitoring Report 2020-21*) who are already their abusing market power.

A very significant portion of recent new port investment has been to establish new container terminals in Brisbane, Sydney and Melbourne, as a result of competition policy. This investment has not necessarily targeted increased throughput or efficiency, but saw the establishment of a third container terminal as an end in itself, without thinking through interactions with other port users or the market effect. As the ACCC commented in 2018, 'It may be only the shipping lines that benefit from the additional competition between stevedores at the east coast ports.'[147]

Ports have also not been adequately included in freight planning, particularly their role in facilitating shipping services. Planning is fragmented across state and federal governments, and now private leaseholders. While stevedoring operations take place 24 hours a day and seven days a week, there remain significant areas of the landside supply chain that do not work these hours.

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[145] European Shippers' Council and others listed above, letter to European Commission Director of Waterborne Transport and Director Antitrust, Transport, Postal and other services, 14 September 2021.
[146] Charlotte Ryan, British Freight Lobby Slams 'Profiteering' in Container Shipping, Bloomberg, 6 January 2022.
[147] ACCC, *Container Stevedoring Monitoring Report 2017-18*, p.4.

There is a critical need to improve port planning. We suggest:

- That there be a transparent process in each state to enable port stakeholder Ministers, with input from port users and port stakeholders, to oversee the standards for the governance, management, development and sustainability of state port assets, be they state managed or leased/sold to private port operators, aimed at protecting the interests of domestic citizens and businesses and the facilitation of trade and supply chain functionality/efficiency given the strategic role of ports in state and national supply chains

- That an appropriate economic regulator in each state be required, in consultation with port users and port stakeholders, to:
  - Oversee port pricing and charging by port operators, port users and port service providers; and
  - Oversee operational standards and community service obligations (CSOs) that underpin procurement and contractual relationships of port users and port service providers; and
    - That the ACCC monitor competition issues associated with ports.

- That there be a transparent process in each state for development, review, modification and accountability for delivering on state freight and logistics priorities set out in state freight strategies, port strategies and coastal shipping strategies, consistent with city, regional, industrial policy and planning objectives, that includes a transparent process, with input from port users and port stakeholders, for periodic review of port capacity:
  - That state strategies be coordinated by the Commonwealth, and be consistent with a national freight and supply chain strategy and national ports strategy and having regard to national and state infrastructure priorities.

- That declared ports be required to prepare and implement annual Port Development Strategies (PDSs) in consultation with port users and port stakeholders, consistent with state freight strategies, port strategies, coastal shipping strategies and with city, regional, industrial policy and planning objectives; and that PDSs be developed in accordance with Port Development Strategy Ministerial Guidelines issued by the relevant Minister, who must also have a power to issue a Direction to a port operator.

- That declared ports be required to prepare an annual Safety and Environment Management Plan (SEMP) consistent with a Ministerially issued port safety licence. This ensures that there are clear lines of accountability from the Minister through to the port authority which in turn provides for the port authority to establish clear lines of accountability to each of the declared commercial trading ports. Such a mechanism also provides for the establishment of consistent performance standards, as well as an auditing regime and reporting (transparency) regime. The SEMP must include the execution of Memorandums of Understanding with state and Commonwealth safety and regulatory agencies such as those

responsible for work health and safety, ship safety, seafarer safety on ships interfacing with ports, human biosecurity, pratique and border security

- Licensing and licensing conditions (standards) of port service providers delivering port services regarded as prescribed services:
  - That those standards relate to: corporate governance standards, stakeholder consultation standards, human rights and labour standards, safety standards, environmental standards, emission reduction standards that should underpin all port operations and investment in ports.

Recommendation 14: That the Productivity Commission recommend improvements in long term strategic planning for port infrastructure, and the regulation of ports in the public interest. This must involve robust consultation and planning, strong economic regulation, coordination between levels of government, licensing of port services, and port-level plans for future port development objectives and safety and environmental management.

Improving resilience of maritime logistics (TOR 5)

5. *Research **mechanisms to help improve the sector's resilience and efficiency**. This should include examination of **technology uptake,** innovation, data capture and sharing across international freight networks compared to Australia; examples of areas where Australia does well; identification of technologies that offer the greatest productivity gains in the Australian circumstances; and identification of any barriers to greater uptake of technology and innovation.*

New technologies in container terminals

Under TOR 1 b) of this submission we discussed the importance of properly understanding the specific objectives and impacts of investments in new technologies, particularly in container terminal operations. We showed how investments in new technologies have not necessarily improved terminal productivity or throughput of containers. Container terminal operators have generally used these investments to reduce labour costs while increasing control of the workforce.

Container terminal handling at the quayside, in the yard, and at the landside interface all involve distinct machinery and associated work processes. Container terminal operators, shipping lines, and landside logistics operators all have different interests when it comes to investment in new technologies in these distinct areas.

If governments expect investments in new technologies by stevedoring companies to have specific objectives, mechanisms should be introduced to articulate and monitor these objectives.

Making shipping more resilient

Under TOR 4 we discussed the problems plaguing international shipping to Australia, and the effects this is having domestically.

In this section we discuss the actions being taken by other governments to address these problems, and the powers available to the Australian government.

Australia has faced the problem of insufficient shipping services and tonnage before. The government responded to these problems by establishing and operating its own national shipping line to ensure the necessary services were available. From 1914 to 1928 the Commonwealth Line operated up to 64 vessels domestically and internationally before the vessels and the company were sold off by the government.[148] A national fleet was re-established during World War Two, when the government purchased 20 vessels and ordered 30 more from Australian shipyards.[149] At the end of the War, the government passed the Shipping Act (No 6 of 1949)[150] which created the Australian Shipping Board, and in 1956 Menzies created the Australian National Line (ANL) to take over shipping operations. The ANL managed more than 100 vessels, and was the backbone of shipping services to Australia for decades before it was sold to French company CMA CGM in 1998.

From another perspective, it is only the past 24 years that Australia has been without a national shipping service. While trade has certainly increased in this period, significant problems have also emerged. Considering the long history of issues with shipping services to Australia, which is most surprising is that after selling the ANL service, government left itself with no recourse to ensure that adequate shipping services to Australia were maintained.

In addition to the thorough piece of research recommended in TOR 4, there are four key actions we believe government should take to increase resiliency in international container trades and ensure that all states remain properly connected to the international shipping services they need:

- Investigate the need to provide a coastal container shipping service, particularly to connect Fremantle and Adelaide to the major hub port of Melbourne
- Establish a fleet of international container ships, as part of a national Strategic Fleet
- Reform the *Coastal Trading Act 2012* to ensure a better balance of domestically and internationally controlled shipping across all trades
- Require all container liner shipping services to register their service and meet minimum service and notification requirements, regardless of their corporate structure
- Establish a Regulator of International Shipping to regulate international shipping, including registering, monitoring and publishing container shipping services, managing complaints about international shipping services, investigating cartel or anti-competitive behaviour, planning future shipping needs and infrastructure, and

[148] L. Fitzhardinge, W.M. Hughes and the Waterside Workers,' *Australian Journal of Political History*, May 1957, p.169-80. Also www.flotilla-australia.com/acl.htm, accessed February 2022.
[149] Robin Clark, Lindsay Rex and Doug Robertson, *The Australian National Line, 1956-1981, History and Fleet List* (Australian Shipping Commission, 1982), p. 8-9.
[150] Parliament of Australia, No.6 of 1949 An Act relating to Shipping. accessed February 2022.

ensuring human rights, WHS and corporate governance standards are upheld on ships trading to Australia
- Repeal of Part X, and replace with a limited class exemption.

USA: Federal Maritime Commission and 2021 Ocean Shipping Reform Act

Other Australian organisations have advocated for the establishment in Australia of a body like the Federal Maritime Commission in the USA.[151] We are broadly supportive of the establishment of such an agency, with some concerns about operation and implementation. We provide below an overview of how this agency has developed and what lessons this could provide for Australia. We note that the establishment of an agency like the FMC in Australia is strongly opposed by Shipping Australia,[152] but this should not surprise anyone given that their member companies would be regulated by such a body – a significant change from the very limited oversight and constraints on international shipping currently in place in Australia.

The USA does not rely on competition law to regulate international shipping. The Federal Maritime Commission (FMC) is an independent agency that has had oversight of international shipping to the USA for over 100 years. Under the 1916 Shipping Act, operators of shipping liner agreements applied to the FMC's predecessor Board for approval to operate to the USA, and the FMC assessed the agreement with a series of tests. In 1961 the powers and independence of the FMC were strengthened, and another test to approve the agreement was added: is the agreement contrary to the public interest? This power was also used to regulate rates that were unreasonably high or low. International shipping carriers challenged this provision, and the case eventually went to the US Supreme Court, which ruled in favour of the FMC.

The 'public interest standard' for US conference shipping agreements stood until 1984, and then in 1998 the requirements were further amended to provide for 'confidential service contracts' as an alternative to conference agreements.[153] Globally, the shipping industry has moved to away from liner conference agreements towards consortia and strategic alliances that do not involve rate fixing.

In 2017 legislation was brought in to increase the funding for the FMC, and to prevent container alliances from contracting directly with tug companies and other port services. There were concerns that this developing practice was leading to an abuse of market power that was undermining the provision of those port services.[154]

President Biden's Executive Order on Promoting Competition in the American Economy included the FMC in the new bodies it set up, and directed the FMC to 'vigorously enforce

[151] Ian Ackerman, Industry body reiterates call for a new federal regulator for shipping, DCN, 2 August 2021. See also September 2021 DCN print version, p.20.
[152] Shipping Australia response, p.22 November 2021 DCN print version.
[153] This short history draws on Owen Tang and Po-wan Sun, Anti-competition of ocean shipping alliances: a legal perspective, Maritime Business Review, 2018: 3(1), p.8-14
[154] Reynolds Hutchins, Legislation would give FMC more alliance muscle and money, Journal of Commerce, June 09, 2017.

the prohibition of unjust and unreasonable practices' in relation to detention and demurrage charges for containers, and to recommend further changes as necessary.[155]

The anti-trust laws of the United States of America[156] do not apply to Ocean Common Carrier Agreements that are filed with the FMC and accepted by it.[157] In the US, an Ocean Common Carrier Agreement must:

> (1) state its purpose
> (2) provide reasonable and equal terms for admission and readmission to conference membership for any ocean common carrier willing to serve the particular trade or route
> (3) permit any member to withdraw from conference membership on reasonable notice without penalty
> (4) at the request of any member, require an independent neutral body to police fully the obligations of the conference and its members
> (5) prohibit the conference from engaging in conduct prohibited by section 41105(1) or (3) of this title
> (6) provide for a consultation process
> (7) establish procedures for promptly and fairly considering requests and complaints of shippers; and
> (8) provide for independent action by members

The FMC imposes a regulatory regime as to the contents of these agreements before they can be accepted for filing. Applicants must complete the information form[158] and the FMC has the right to request any additional information or documents the FMC considers necessary.[159]

The FMC's current mission statement is:

> Ensure a competitive and reliable international ocean transportation supply system that supports the U.S. economy and protects the public from unfair and deceptive practices.[160]

The FMC says that it ensures competitive and efficient ocean transportation services for the shipping public by:

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[155] The White House, Executive Order on Promoting Competition in the American Economy, 9 July 2021, S. 5(o).
[156] The Act of July 2, 1890 (ch. 647, 26 Stat. 209), 15 U.S.C. 1, as amended; the Act of October 15, 1914 (ch. 323, 38 Stat. 730), 15 U.S.C. 12, as amended; the Federal Trade Commission Act (38 Stat. 717), 15 U.S.C. 41, as amended; sections 73 and 74 of the Act of August 27, 1894 (28 Stat. 570), 15 U.S.C. 8, 9, as amended; the Act of June 19, 1936 (ch. 592, 49 Stat. 1526), 15 U.S.C. 13, as amended; the Antitrust Civil Process Act (76 Stat. 548), 15 U.S.C. 1311, note as amended; and amendments and Acts supplementary thereto.
[157] 46 U.S. Code § 40307
[158] eCFR :: Appendix A to Part 535, Title 46 -- Information Form and Instructions
[159] 46 U.S. Code §40304(d).
[160] About the Federal Maritime Commission, accessed February 2022.

- Reviewing and monitoring agreements among ocean common carriers and marine terminal operators (MTOs) serving the U.S. foreign oceanborne trades to ensure that they do not cause substantial increases in transportation costs or decreases in transportation services
- Maintaining and reviewing confidentially filed service contracts to guard against detrimental effects to shipping.
- Providing a forum for exporters, importers, and other members of the shipping public to obtain relief from ocean shipping practices or disputes that impede the flow of commerce
- Ensuring common carriers' tariff rates and charges are published in automated tariff systems and electronically available to the public
- Monitoring rates, charges, and rules of government-owned or controlled carriers to ensure they are just and reasonableTaking action to address unfavourable conditions caused by foreign governments or business practices in U.S.-foreign shipping trades.

The FMC also says that it protects the public from financial harm and contributes to the integrity and security of the U.S. supply chain and transportation system by:

- Helping resolve disputes involving the shipment of cargo, personal or household goods, or disputes between cruise vessel operators and passengers
- Investigating and ruling on complaints regarding rates, charges, classifications, and practices of common carriers, MTOs, and Ocean Transportation Intermediaries (OTIs), that violate the Shipping Act of 1984
- Licensing OTIs with appropriate character and adequate financial responsibility
- Identifying and holding regulated entities accountable for mislabelling cargo shipped to or from the United States
- Ensuring that cruise lines maintain financial responsibility to pay claims for personal injury or death, and to reimburse passengers for failure to perform the cruise.[161]

The existence of the FMC meant that during the pandemic, the US government was able to take steps to understand and address the developing supply chain issues. In 2020 it took steps to increase the scrutiny of the global container alliances.[162] In 2021 it took initiatives to ensure that trucking companies could carry out 'double moves' to allow them to drop off an empty container and pick up a loaded container during the same visit.[163]

Concerns arose that after the liberalisation that took place in the 1980s and 1990s, the FMC's powers were not sufficient to deal with the developing problems. As a result, the Ocean Shipping Reform Act was introduced in August 2021 and was rapidly passed by the

[161] All from About the Federal Maritime Commission, accessed February 2022.
[162] Federal Maritime Commission, Federal Maritime Commission Increases Global Alliances' Information Monitoring Report Requirements, November 25, 2020
[163] Federal Maritime Commission, New Supply Chain Initiatives Announced at FMC Meeting, November 17, 2021.

US House of Representatives in December 2021.[164] Speaking in the debate on the Act, Congressman John Garamendi said the Act was needed because 'the pandemic highlighted the longstanding issues of the ocean shipping industry and the staggering vulnerabilities in the integral supply chain that drives global commerce.' [165] The Act had bi-partisan support and was endorsed by 360 different organisations.

Co-sponsor Congressman Dusty Johnson explained that key aspects of the Act include:

- Allows the FMC to set minimum standards for ocean shipping that makes sure that US shippers are protected from the actions of others which leave export cargoes stranded at US ports.
- Protects US shippers from retaliation if they file a complaint with the FMC
- Prohibits the foreign-flagged ocean carriers from unreasonably denying American export cargo on their vessels
- Requires foreign ocean carriers to certify the accuracy of the detention and demurrage fees…they have to certify that those fines are accurate
- Authorises the National Academy of Sciences to study how best to improve transparency in the supply chain.[166]

The Act re-introduces the term 'public interest' in relation to the information that must be filed with the FMC by ocean carriers (s. 4(b)).[167] The US Senate has also introduced a similar version of the Ocean Shipping Reform Act, with bi-partisan support.[168]

New Zealand: support for government investment in shipping

The growing supply chain issues in New Zealand are described under TOR4. Zealand law firm MinterEllisonRuddWatts recommend that the government take action to 'increase the number of international services calling here, whether by chartering ships in its own name or bringing businesses together to charter ships collectively'. They also recommend that the Government invest directly to encourage the reestablishment of New Zealand's coastal shipping fleet, which could play a critical role in transhipping import and export cargo from hub ports to ports around the country, and re-positioning empty containers to the ports where they are needed.[169]

Powers of the Australian government to regulate international shipping

In Australia, Part X of the *Competition and Consumer Act 2010* provides exemptions from competition law for container shipping lines, but also places obligations on them in return

[164] Ocean Shipping Reform Act
[165] Hon John Garamendi in the US House of Representatives, debate on the Ocean Shipping Reform Act of 2021, 8 December 2021.
[166] Hon Dusty Johnson in the US House of Representatives, debate on the Ocean Shipping Reform Act of 2021, 8 December 2021.
[167] US Senate, H. R. 4996, 9 December 2021.
[168] John Gallagher, Senate introduces ocean shipping reform bill, February 3, 2022
[169] Sarah Salmond, Addressing New Zealand's sea freight challenges, MinterEllisonRuddWatt, 12 October 2021.

for these exemptions. The problem is that the bar to require registration is quite high, and the reconfiguration of the kinds of alliances used in global container shipping mean that conferences that set rates are increasingly rare. In addition, the mergers between many of liner companies mean that the number of services registered under Part X has plunged from 55 in 2016-17 to less than 10 in 2019-20.[170]

The consequences of this change are described in evidence to a 2019 Senate Inquiry by the Australian Peak Shippers Association, who explains that the reduced number of registrations under Part X means that shippers have substantially less access to the provisions in Part X that were put in place to protect them.[171] APSA said that:

> we want to know at least 30 days in advance if you're going to cancel your sailing or if you're going to increase charges at any point or if you're going to invent a new charge. That is an absolute copycat of what already exists at the Federal Maritime Commission in the US. They say that if you're a shipper in the US or if you're in a US trade lane you can't introduce a new charge without giving shippers 30 days notice, because it affects, in particular, agri-exporters. It could be their margin, which they could lose in a day.[172]

The significant gap that has opened up in Australian regulation of international shipping is the general powers to monitor *all* container liner shipping to Australia, and ensure that it meets the needs of Australian importers, exporters and consumers. This, in a nutshell, is the role of the FMC in the USA. This goes beyond the question of regulation of anti-competitive practices, and more to the question of ensuring minimum service levels are in place.

If adequate container shipping services are not in place, steps must be taken to address those gaps, through the provision of shipping services by government, as the Australian government has done for many decades, for precisely this reason.

We have obtained advice that there is plenty of scope under Australian law for such an agency to be established, drawing on the heads of power in the Commonwealth of Australian Constitution Act, provided it is interpreted in a manner that is consistent with the United Nations Convention on the Law of the Sea (UNCLOS).

The key benefit in establishing a Regulator of International Shipping is oversight and co-ordination of agencies involved in the regulation of shipping. One of the functions of the proposed Regulator would be the administration of some of the provisions in Part X (International liner cargo shipping) of the C&C Act, such as those in Divisions 3 (Minimum standards for conference agreements), 6 (Registration of conference agreements), 7

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[170] Department of Infrastructure, Transport, Regional Development and Communication, Proposed Class Exemption for Ocean Liner Shipping Submission to the ACCC Discussion Paper.

[171] Australian Peak Shippers Association, Evidence to the Senate Rural and Regional Affairs and Transport References Committee, Inquiry into the Policy, regulatory, taxation, administrative and funding priorities for Australian shipping, transcript of hearing on 13 March 2019, p.36-40. See also the APSA submission to the Inquiry.

[172] Travis Brooks-Garrett, Australian Peak Shippers Association, Evidence to the Senate Rural and Regional Affairs and Transport References Committee, Inquiry into the Policy, regulatory, taxation, administrative and funding priorities for Australian shipping, transcript of hearing on 13 March 2019, p.38

(Obligations of ocean carriers in relation to registered conference agreements) and 8 (Powers of Minister in relation to registered conference agreements).

There are currently a multitude of State and Commonwealth agencies that have a role in the regulation of shipping. The establishment of a Regulator would enable uniform and seamless approach to matters throughout Australian ports.

We also propose that the Regulator be given powers to investigate and gather evidence on the cartel behaviour of international shipping lines and participate in the global coordination of regulators from the US, Canada, New Zealand and Britain that are sharing intelligence on shipping line cartel or anti-trust behaviour.[173] Separately, the US Federal Maritime Commission has periodic meetings with its equivalent bodies in Europe and China, and the Regulator could also represent Australia's interests in these discussions.

The establishment of the proposed new Regulator of International Shipping would require significant co-operation between the States, Northern Territory and the Commonwealth. This could be achieved through an intergovernmental agreement made between the Commonwealth and State the Northern Territory governments noting that such agreements are not legally binding and only express the commitment of governments arrange through the Infrastructure and Transport Ministers' Council to work together on certain objectives or goals.[174] Alternatively, the States could refer power to the Commonwealth.[175]

> **Recommendation 15:** That the Productivity Commission recommend that the provision of a coastal container shipping service be investigated, particularly to connect Fremantle and Adelaide and potentially other ports in Victoria, South Australia and West Australia to larger international container hub ports in other states.
>
> **Recommendation 16:** That the Productivity Commission recommend the establishment of a fleet of internationally-operating container ships as part of a national Strategic Fleet, with services planned to facilitate critical exports, imports and availability of containers. Fuller recommendations are available in the MUA document The need for a Strategic Fleet, June 2021.
>
> **Recommendation 17:** That the Productivity Commission support the reform of the *Coastal Trading (Revitalising Australian Shipping) Act 2012* to ensure a better balance of domestically and internationally controlled shipping across all shipping trades. A suite of recommendations is available in the MUA document Reform of

[173] Eli Greenblatt, ACCC joins 'five eyes' task force on soaring prices for shipping and freight, The Australian, 18 February 2022.

[174] For example model Work Health and Safety laws were development under the Inter-Governmental Agreement for Regulatory and Operational Reform in Occupational Health and Safety. Another example are the arrangements in place for fishing under the *Fisheries Act* 1952(Cth) and the corresponding *Fisheries Act* 1982(SA) that regulate rock lobster fishing in the waters off South Australia, including beyond the 3nm to 200nm.

[175] There is no need for the Northern Territory to refer power because of s 122 of the *Australia Constitution Act*.

coastal trading regulation – creating a better ship licencing system for a balanced system of maritime cabotage , March 2021.

Recommendation 18: That the Productivity Commission recommend that legislation be introduced to require all container liner shipping services operating to Australia to register their service, regardless of their corporate structure and the number of companies involved. Registration should include minimum service requirements and obligations to require 30-day notification of schedule and fee changes, minimum reliability standards, maximum ship size (length, beam and draught (keel and air)), and ongoing monitoring.

Recommendation 19: That the Productivity Commission recommend that the Australian government establish a Regulator of International Shipping, a new independent statutory body with strong functions and powers aimed at ensuring that international shipping operating to Australia is compliant with all human rights and legal obligations and serves the needs of the Australian public in the short and long term. Responsibilities would include:

- Registering, monitoring, and publishing details on all container shipping services to Australia, and ensuring they meet tests and obligations for reliability, notification of schedule and fee changes, ship size, and are developed with the participation of industry stakeholders
- Receiving and mediating complaints about international shipping services to Australia
- Undertaking investigation and evidence gathering on the cartel or anti-competitive behaviour of international shipping lines
- Planning future shipping needs to Australia, and ensuring services and infrastructure are available to meet those needs, under a coordinated arrangement involving the state and NT governments, and state/NT maritime and economic regulators
- Mechanisms to address non-compliance with international human rights, labour standards, WHS standards and corporate governance norms, declarations and conventions to which Australia is a signatory.

Recommendation 20: That the Productivity Commission support the repeal of Part X of the *Competition and Consumer Act 2010* and its replacement with a limited class exemption for a single purpose - to collude and reach agreement between shipping lines for the exchange, selling, hiring, or leasing (or subleasing) spaces (slots) on vessels.

- If there is sound evidence to suggest that such an approach could impede or inhibit Australia's access to frequent and reliable liner cargo shipping services to meet the demand by importers and exporters of containers at internationally competitive freight rates, that for shipping lines with 25% or less market share (by TEUs exchanged in Australian ports) that a class exemption be extended to permit:
    - Coordination and/or jointly fix sailing timetables and the determination of port calls in Australia;
    - Pooling of vessels to operate a network; and

- Adjusting capacity in response to fluctuations in supply and demand for international liner shipping services.

Recommendation 21: That the Productivity Commission ensure that improvements it recommends to liner conference agreement processes enable stakeholder organisations other than the designated shipper body (currently the Australian Peak Shippers Association) to provide inputs to the liner ship conference service provision arrangements.

Recommendation 22: That the Productivity Commission recommend that obligations on shipowners and masters (as the agent of the owner) regarding payment of seafarer employment entitlements be strengthened, along with the provisions for vessel detention arising from non-compliance with payment of seafarer employment entitlements, as well as conditions of re-entry for vessels that have previously been detained.

Links to land and sea (TOR 6)

6. *Have regard to the interlinkages and dependencies between the maritime logistics sector and other logistics systems, such as **airfreight and landside supply chains**. For example, the impact of the resumption of airfreight on ports, the preparedness of ports for disruptions in these supply chains and the role of ports for landside supply chains.*

The current fraught relationship between container terminals and landside logistics is unhelpful. Port workers see this on a daily basis through the lack of attention, amenities or communication with truck drivers in many container terminals.

The lack of holistic ports, shipping and freight planning has a particular impact where modes of transport intersect. Much more systematic planning and investment is needed, in the public interest.

One particular issue in need of attention that straddles landside and shipping is the role of empty containers. It is a critical issue that no one seems willing to address, as each commercial actor seeks to pass on the cost and responsibility for dealing with empty containers to others. The result is a lack of empty containers where they are needed.

Management of empty containers

There is a general lack of capacity of empty container parks (ECPs). For example, in NSW there has been no meaningful investment in ECP capacity since 2015 despite the growing containerised freight task. This raises questions about where that additional capacity should be built, and who should pay, given the Australian imbalance between empty and full containers. While significant new and expanded intermodal terminals are being developed in Western Sydney by several private companies, we are unsure whether empty container capacity is being included in these developments.

Dealing with the imbalance between empty and full containers in Australia relies on shipping lines to rectify the problem by carrying empty containers to locations and countries where full containers are packed. However, they are also keen to pass on these costs to other parties wherever possible. According to the Container Transport Alliance Australia (CTAA), shipping lines want empties returned to specific places, including to railhead facilities for export use and direct return to the wharf. This saves the shipping lines their own costs of repositioning the boxes and handling empties through traditional ECPs.[176]

CTAA have also commented on the low levels of flow of Electronic Data Exchange (EDI) between shipping lines and their ECP service providers means allocators must process container return electronic information manually, truck drivers must be supplied with paper or electronic versions of the delivery order (DO), and ECP gate staff must process trucks and drivers manually. All of these issues lead to delays and added costs. In addition, the Carrier Access Agreements for ECPs do not provide road transport operators with a means to recover costs associated with delays and performance issues at terminals.

The lack of mechanisms to properly deal with the handling of empty containers is problematic and is clearly on port efficiency and productivity and landside operations in ports.

More attention must also be paid to how empty container movements and productivity is monitored and improved.

> **Recommendation 23:** That the Productivity Commission recommend that a holistic strategy to deal with the management and repositioning of empty containers be developed, and mechanisms to monitor it built into existing Waterline data.

[176] Container Transport Alliance Australia, Direct Empty Container De-hire To Terminals – Costs Persist, 16 April 2018.

Appendix A: Stevedoring and stevedoring maintenance employers

Employers with more than 10 employees

ANS Southern
Aurizon Ports - ex Townsville Bulk Storage Handling
Australian Amalgamated Terminals
Australian Bulk Stevedoring
Cape Preston Port Company
DP World Australia Ltd
EC Stevedoring
Flinders Adelaide Container Terminal
Flinders Logistics
Fremantle Port Authority
Geelong Port Pty Ltd
GEMCO
Graincorp
Hutchison Ports Australia
Infraworks Rail
Inver Port Services
Kalmar
Linx Cargo Care
Melbourne International RoRo & Automatic Terminal
Multiple Employers
Newcastle Stevedores
Newcastle Coal Infrastructure Group
Northern Stevedoring Services Pty Ltd
Patrick Stevedores Operations Pty Ltd
Pentarch Stevedoring
Port Waratah Coal Stevedoring
Programmed Industrial Maintenance
QUANTEM
Qube
Queensland Bulk Terminals Pty Ltd (Wilmar Gavilon)
SeaRoad Shipping
Three Ocean Maritime
Toll Global Logistics - Energy and Marine
Toll Shipping
Transhipment Services Australia
Victoria International Container Terminal
Viterra

Appendix B: Investment in container terminal equipment – 2012-2021

Pasted below are extracts from ACCC Container Stevedoring Monitoring Reports - October 2012 to November 2021 – by ACCC report that report on the capital investment container terminal operators.

Major capital investment by stevedores in container terminal facilities, 2011–12[177]

Asciano (Patrick)
Asciano advised that five new ship-to-shore cranes were delivered to Port Botany, Port of Melbourne and Fremantle in the latter half of 2011–12. These are expected to be operational in the first quarter of 2012–13. Another four ship-to-shore cranes have been placed on order and are expected to be delivered and operational at the end of 2012–13.

Asciano also advised that 22 replacement straddles were ordered in December 2011. These are scheduled for delivery in 2012–13.

A large portion of terminal pavement was replaced at Port Botany in 2012.

DP World Australia
In 2011–12, DP World Australia invested in four new rubber-tyred gantries (RTGs) and reconfigured its rail sidings, to be served by two new reachstackers, to improve efficiency and capacity at Port Botany. Importantly, DP World Australia advised that these investments would contribute to an expansion of terminal capacity.

At the Port of Melbourne, DP World Australia undertook civil works on its container park at its intermodal terminal and invested in eight new straddles. DP World Australia advised that it has also placed an order for a further eight straddles for delivery in 2012. DP World Australia reported that some of new straddles would replace old equipment, while others would expand terminal capacity.

DP World Australia advised that it is progressing its modal change at its terminal at the Port of Brisbane, which is expected to be completed in December 2013. This project will involve a complete change in the yard mode of operation with investment in automatic stacking cranes and straddle carriers.

A new quay crane has been ordered for Melbourne for delivery in mid-2013. This is a replacement for an old crane recently demolished. A modern crane provides additional capacity as well as reliability. DP World Australia advised that older cranes are not able to handle the larger vessels now calling and therefore they have been progressively replacing or adding cranes as required.

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[177] ACCC, *Container stevedoring monitoring report No. 14*, October 2012, PP61-62, https://www.accc.gov.au/system/files/ACCC%20Container%20stevedoring%20monitoring%20report%202011-12.pdf

DP World Australia has continued to upgrade its terminal operating systems (IT systems) in 2011–12, with Fremantle upgraded during the reporting period. Sydney was upgraded last reporting period, while Melbourne and Brisbane are expected to be upgraded in 2013.

Flinders Adelaide Container Terminal (FACT)
In 2011–12, FACT invested in four additional straddle carriers for its Adelaide terminal.

Flinders Ports Holdings acquired 100% ownership of the Adelaide container terminal on 2 July 2012. It is currently preparing a capital plan and advised that it is considering some investments in new capital equipment for the future. For example, FACT is considering purchasing additional post-panamax cranes for delivery in 2014–15, to replace one or two of its existing cranes. It is also considering upgrading its current terminal operating system, including its vessel planning module and yard planning and operations. This project is currently in a scoping stage.

Major capital investment by stevedores in container terminal facilities, 2012–13[178]

Asciano (Patrick)
Capital expenditure during 2012–13 significantly increased, reflecting expenditure on 8 new cranes and other stevedoring equipment at all four of Patrick's container terminals. Of the 8 cranes ordered, all have been delivered, with only one remaining to be commissioned.

In July 2012, Asciano also announced plans to automate its Port Botany terminal. Some initial expenditure has already taken place on the $348m redevelopment of the Port Botany facility. Patrick will continue to invest in straddles and pavement work, and continue to progress the Port Botany redevelopment plan which includes the expansion of the existing terminal and automation of its operations.

Capital expenditure in FY 2014 is expected to be significant, with a large portion of the planned investment to be taken up with the Port Botany redevelopment.

Patrick is developing land adjacent to its Port Botany facility called 'the Knuckle' which will expand its quay line by 500m and footprint by 39 per cent including an extra berth at the Port Botany facility. A total of 44 new AutoStrads are currently being manufactured overseas and will be delivered to the Knuckle at Port Botany for testing once it is paved.

DP World Australia
The major investment program being implemented by DP World Australia involved its mode change in Brisbane which has been previously reported to the ACCC and is expected to be completed in the first quarter of 2014.

[178] ACCC, *Container stevedoring monitoring report No. 15*, October 2013, PP4-5 https://www.accc.gov.au/publications/container-stevedoring-monitoring-report/container-stevedoring-monitoring-report-no15

A new crane was handed over in Melbourne in August 2013 and is now in operation. Significant civil works were also undertaken in Melbourne. Expanding the terminal into the adjacent intermodal site has been identified by DP World Australia as a priority.

DP World Australia continued to roll out its standard terminal operating system with Melbourne changing from an in-house system to the systems in the other terminals. Once the Brisbane mode change is completed all sites will be on a common system.

New cranes are being procured for both Sydney and Fremantle and are scheduled to be delivered in 2014.

Flinders Adelaide Container Terminal Pty Ltd (FACT)

The ACCC understands that there have not been significant levels of new capital investment undertaken at the Adelaide terminal in 2012–13. However, the following initiatives have occurred:

- Introduction of in-house vessel planning which was previously co-ordinated in Sydney (DP World);
- Recruitment of additional stevedoring labour to ensure that the Terminal has the capability of providing up to 12 gangs has also been undertaken over the period;
- Terminal Operating System (TOS upgrades—a number of software improvements were implemented involving controlled random stacking, improve allocation and a new vehicle booking system.

FACT is conducting feasibility analysis to assess the ability to expand the existing quay line of 649 metres by a further 240 metres which would increase berth operating capacity from 630,000 TEUs per annum to around 1.24 million TEUs per annum.

Planned investments for 2013-14 and beyond include the acquisition of two new post-panamax cranes and 5 additional new straddles as well as development of additional hardstand areas.

Hutchison Ports Australia

The major investments undertaken by HPA during 2012–13 have involved the development of new terminals. As expected for a new business, considerable investment has been made in both civil construction and plant and equipment. Substantial investments in civil works and engineering have occurred at both the Brisbane Container Terminals (BCT) and Sydney International Container Terminals (SICT).

Building on reclaimed land has had costs attached, particularly at Port Botany where additional ground stabilisation works were necessary.

Quay crane and shuttle equipment has also been purchased for both sites. Investment in 2013–14 will consolidate the existing operations and further expand terminal capacity. By the end of 2013–14, BCT is expected to have capacity of 300,000 TEUs while SICT should reach capacity of 320,000 TEUs. By 2014–15, BCT is expected to reach capacity of around 600,000 TEUs and SICT capacity is planned to reach 1,000,000 TEUs in 2018–19.

Automation in Australian stevedoring

In recent years, the ACCC has observed a trend towards automating quayside stevedoring operations in Australia.

Two key types of automated equipment have been introduced by the stevedores – automated straddles (AutoStradsTM) and automated stacking cranes.

AutoStrad technology

AutoStrad technology has been in operation in Australia since it was successfully introduced by Patrick at its Brisbane terminal in 2005.

According to Asciano (Patrick's parent company), AutoStrads operate unmanned, using radar and laser guidance technology to navigate around the yard, moving and stacking containers from the quay line into the holding yards, onto vehicles and back to the quay cranes with accuracy better than 2cm.

AutoStrad technology used at the Patrick Brisbane Container Terminal has reportedly delivered noteworthy and sustained improvements in Patrick's productivity, safety and services reliability as well as reduced costs. Patrick has stated that it has achieved a 90 per cent reduction in safety incidents at its Brisbane terminal since automation. Asciano has stated that the system provides high levels of flexibility and reliability to its stevedoring operation.

In July 2012, Asciano announced its plan to develop and automate its Port Botany terminal. The project includes the use of 44 AutoStrads and associated infrastructure and systems. The redevelopment and automation is expected to be delivered by mid-2014.

Major capital investment by stevedores in container terminal facilities, 2013-14[179]

The value of the industry's asset base grew by 27.3 per cent in 2013–14, following an increase by 60.3 per cent last year38 (which represented the largest annual increase observed in over 10 years). The value of assets in the industry has more than doubled over the past two years.

As new terminals are rolled out at major east coast ports, and demand for stevedoring services continues to grow, Patrick and DP World have been undertaking a number of major investments to improve service levels, increase capacity and deliver efficiencies to their stevedoring operations.

HPA has continued to develop its newly opened Brisbane and Sydney terminal facilities, while on the south coast FACT has investments underway to improve its service levels and boost its capacity.

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[179] ACCC, *Container stevedoring monitoring report,* No16, October 2014, PP8-10, https://www.accc.gov.au/system/files/ACCC%20stevedoring%20report%202014.pdf

Patrick

Patrick reported the following key investments for 2013–14 and beyond:

- Capital expenditure for the period significantly increased, primarily reflecting expenditure on the redevelopment of the Port Botany terminal, which includes the expansion of the existing terminal and automation of its operation. On the landside, the Port Botany redevelopment also includes a new truck ramp entry point and new truck grids. The Port Botany redevelopment and automation is expected to be completed in 2014–15.
- Eight new cranes (ordered in late 2012–13) were delivered and fully commissioned across Patrick's four container terminals during 2013–14.

Patrick has been implementing optical character recognition at its Port Botany and Brisbane terminals, which is streamlining entry conditions for these terminals with the aim to reduce truck turn-around times.

DP World

DP World reported a number of significant investments in 2013–14:

- DP World completed its major capital investment program; the mode change of its terminal in Brisbane.
- A new quay crane was commissioned at its Melbourne terminal in late 2013, which, according to DP World, provides additional capacity and greater reliability at this terminal:
  - DP World noted that some of its older cranes can have operating restrictions on the largest vessels calling at its terminals today, so it is replacing or adding quay cranes as required to meet the needs of its customers.

DP World reported the following planned investments for 2014–15 and beyond:

- DP World continues to upgrade and standardise its IT systems, with all terminals now operating on the same terminal operating system. Melbourne was upgraded in 2013 and Brisbane in conjunction with the mode change in 2014. DP World reported that by replacing the legacy system nationally it has standardised its systems, and improved reporting and reliability.
- DP World has ordered two new super post-panamax quay cranes for its Sydney and Fremantle terminals. Delivery for this equipment is expected in the first half of 2015.

FACT

FACT reported the following investments in 2013–14:

- Partial payment of two new Liebherr post panamax cranes, with the balance of payment to take place in 2014–15 once the cranes have been delivered:
  - FACT noted that the commissioning of the two new cranes has been pushed back from late 2014 until the first quarter of 2015.
- Partial payment of five Terex straddle carriers, with the balance of payment to take place in 2014–15 once the straddles have been commissioned.
- New hardstand (.75ha) and hardstand maintenance.
- The purchase of three empty container movers.
- The purchase of ancillary type improvements such as safety cages, spreaders, platforms, fire suppression, vehicles and other safety related initiatives.

In addition to completing the acquisition of the new cranes and straddle carriers, FACT plans to complete the following investments for 2014–15:

- Additional hardstand development
- Purchase of a crane and equipment simulator for training purposes.

HPA

HPA undertook the following major investments in 2013–14:

- Phase one of HPA's Sydney terminal development works was completed and the terminal was opened for business. Automated Stacking Cranes (ASCs) were installed and a new rail siding and office and maintenance buildings were constructed.
- Phase one of HPA's Brisbane terminal was also completed in 2013–14, having been opened for business in the preceding year (2012–13). ASCs were also brought online in Brisbane in 2013–14.

HPA also reported a number of planned investments for 2014–15:

- Phase two works on its Sydney terminal will begin in 2014–15. This will include the installation and commissioning of another three container stacks using ASCs. The work is due to be completed mid-2015 and expected to almost double the capacity of HPA's Sydney terminal. Additional reach stackers and shuttles will also be acquired during phase two.
- Two additional quay cranes will come online at its Brisbane terminal in 2014–15, giving it a total of four quay cranes.
- Initial phase two works at its Brisbane terminal will commence with additional manual handing areas due to be competed in 2014–15. Additional ASCs at Brisbane are planned but as yet have not been scheduled.

Major capital investment by stevedores in container terminal facilities, 2014-15[180]

Patrick

Patrick reported the following major investments for 2014–15 and plans for the future:

- The four new cranes ordered in 2013–14 were delivered and will be commissioned over 2015-16.
- Completion of redevelopment of the Port Botany terminal which cutover to automation in April 2015. The Port Botany redevelopment includes a new truck ramp entry point and new semi-automated truck grids.
- Patrick has been implementing an optical camera recognition (OCR) system across some terminals with the aim of streamlining entry conditions and reducing truck turn-around times. Patrick is assessing its remaining terminals for suitability for installation of the OCR system.
- In 2015-16, Patrick plans to complete commissioning of cranes at the "knuckle" area of Port Botany and in Brisbane.

[180] ACCC, *Container stevedoring monitoring report* No17, October 2015, PP8-9, https://www.accc.gov.au/system/files/Container%20stevedoring%20monitoring%20report%202014-15%20-%20word%20version.pdf

DP World

DP World reported the following investments for 2014–15:

- Two new super post-panamax quay cranes were commissioned in Sydney and Fremantle in early 2015. These cranes provide terminals with additional capacity as well as reliability.

DP World reported the following planned investments for 2015–16 and beyond:

- Two new ASCs have been ordered for the semi-automated terminal in Brisbane. The new cranes will increase the fleet of ASCs to 16 bringing the number of module servicing container trade to eight (increasing yard capacity). The two new ASCs will be installed in 'Module One' at the terminal.
- The addition of Module One in Brisbane is expected to deliver improved quay crane productivity and vessel schedule integrity. Module One will also increase the number of waterside exchange lanes from 28 to 32, allowing additional freight to be transferred between ASCs and straddle carriers at any time. The two new ASCs are expected to be handed over for use in January 2017.
- In Melbourne, a project is underway to expand the yard capacity by developing an unused area in the existing terminal. This civil project is expected to be completed in the third quarter of 2016. DP World is also looking to replace a number of the straddle carriers in its Melbourne fleet as part of an on-going equipment replacement program.

FACT

FACT reported the following investments for 2014–15:

- An additional 2.4ha hardstand, providing additional container stacking area.
- Two post-panamax (Liebherr) cranes.
- Finalise payment of ZPMC quayside crane.
- Five straddle carriers.
- Crane training simulator to train drivers for new cranes.
- Replacement of terminal operational vehicles and additional plant and equipment.

FACT reported the following planned investments for 2015–16 and beyond:

- Increase the size of the straddle fleet with two straddle carriers.
- Additional hardstand.
- Replace damaged rail spur at the rail intermodal.
- Replacement or upgrade of terminal systems, additional weight detection system, operational vehicles and additional plant and equipment.
- With the capital investment made and improvements implemented since 2012 (particularly over 2014–15), FACT considers the terminal has considerable capacity to accommodate future volume growth.

Hutchison

Hutchison reported the following investments were undertaken in 2014–15:

- In Sydney, Hutchison has added as part of its Phase 2 expansion an additional three ASC blocks to increase its landside capacity to meet container slot demands to match

its quay-side capacity. This brings the number of ASC blocks at its Port Botany terminal to six. Hutchison has also added two more reach stackers to facilitate its rail and empty yard operations at Port Botany.
- In Brisbane, Hutchison commissioned two more quay cranes, in addition to its existing two quay cranes, and added a manual handling area to the terminal.

Hutchison reported the following planned investments for 2015–16 and beyond:
- In Sydney, further investment plans beyond Phase 2 will depend on market demand. Port Botany will, for the present, focus on building up its productivity and service offering after its first full start-up year of operations.
- In Brisbane, Phase 2 involving the completion of Berth 12 beyond the wharf strip will continue after the successful removal of a damaged quay crane. Phase 2 will add an additional three ASC blocks to the existing three blocks already at the terminal. The damaged quay crane is anticipated to delay Phase 2 expansion by at least 12 months.

Major capital investment by stevedores in container terminal facilities, 2015-16[181]

The stevedores provided the following information about their key investments to the ACCC.

DP World
DP World reported that its Melbourne terminal underwent an expansion project increasing the capacity of the terminal by 100,000 TEU per annum to 1.4 million TEU. The expansion will improve terminal performance and provides increased ability to handle peak volumes.

DP World's Sydney terminal extended its empty container handling capability with the completion of civil works at its Lot 13 site. The new area spans 17,100 sqm and provides an additional 371 twenty-foot ground slots.

Ten new straddle carriers have been ordered for DP World's terminal in Melbourne. These new straddle carriers will replace ten of the oldest carriers in the terminal, which is expected to reduce equipment running costs, improve straddle fleet performance and improve operational reliability.

Two new automated stacking cranes (ASCs) have been ordered and delivered to the semiautomated terminal in Brisbane. The new cranes will increase the size of the fleet of ASCs to 16, bringing the number of modules servicing container trade to eight (increasing yard capacity). The two new ASCs will be installed in 'Module One' at the terminal.

The addition of Module One in Brisbane is expected to deliver improved quay crane productivity and vessel schedule integrity. Module One will also increase the number of waterside exchange lanes from 28 to 32, allowing additional freight to be transferred

[181] ACCC, *Container stevedoring monitoring report No 18,* October 2016, PP20-22, https://www.accc.gov.au/system/files/Final%20Container%20Stevedoring%20Monitoring%20Report.pdf

between ASCs and straddle carriers at any time. The two new ASCs are expected to be handed over for use in December 2016.

Four new super post Panamax quay cranes are being ordered, one each for DP World's Brisbane and Sydney terminals and two for DP World's Melbourne terminal. The new cranes will improve terminal productivity, crane fleet reliability and give DP World the ability to handle the largest vessels currently servicing Australia. The cranes are expected to be ordered in 2016 with delivery and commissioning expected in mid-2017.

FACT

FACT reported the following investments for 2015–16 for its terminal in Adelaide:

- Replacement of a damaged rail spur at the rail intermodal
- Upgrade of terminal operating system including a new asset management system
- Replacement of terminal operational vehicles and additional plant and equipment
- Commissioned crane / straddle carrier training simulator
- Replacement of wireless network system and
- Upgrade of crane rails and anchor points.

It also reported the following planned investments for 2016–17 and beyond:

- Expansion and relocation of existing terminal depot operation
- Replacement of terminal operational vehicles and additional plant and equipment
- Additional hardstand
- Acquisition of five twin lift spreaders to increase operational flexibility of straddle carrier fleet
- Development of new straddle access platform and
- A rail intermodal upgrade

With the capital investment made and improvements implemented since 2012, FACT considers the terminal has considerable capacity to accommodate future volume growth.

Hutchison

Hutchison reported that there has been minimal expenditure in 2015-16 for both quayside and landside areas.

Hutchison reported that further investment plans in Sydney will depend on market demand. Port Botany will, for the present, focus on building up its productivity and service offering. In Brisbane, the commissioning and redeployment of a quay crane will occupy the second half of 2016, and there are plans for the continued development of Berth 12.

Patrick

Patrick reported that four new cranes ordered in 2013–14 were delivered and were commissioned in 2015-16. A new crane has also been ordered for Melbourne. Patrick has continued investment in truck entry systems across its terminals to streamline entry conditions and reduce truck turn-around times.

Major capital investment by stevedores in container terminal facilities, 2016-17[182]

VICT commences operations at the Port of Melbourne

The terminal currently has two 330 metre berths and a total of five 65-metre-tall neo-Panamax cranes. VICT estimates that its current capacity is one million standard containers per year. VICT estimates that when the terminal is fully developed it will have a total of eight Neo-Panamax cranes and be able to handle up to 1.8 million standard containers per year. It also predicts that, with optimal design and configuration, the terminal will be able to handle 8,000-12,000 TEU ships.

VICT's automation is designed for around the clock operation, with minimal labour costs. VICT has five neo-Panamax ship-to-shore cranes and ten stacking blocks, which enable single large vessels to be handled with four to five cranes.

VICT conducted its first service in April 2017, with the Mediterranean Shipping Company's E.R. Longbeach. VICT received 2,792 boxes, with the presence of 1,997 trucks. Average truck turnaround time was 28 minutes from in-gate to job completion.

Other developments
The major stevedoring investment that occurred in 2016-17 was associated with the establishment of VICT's fully automated container terminal at Webb Dock at the Port of Melbourne – see above.

DP World
DP World advised the ACCC that 10 straddle cranes were delivered to its Melbourne terminal in 2016 as part of its asset renewal plan. It also commissioned two additional automatic stacking cranes for Brisbane to complement the 14 existing machines. It expected that these stacking cranes will increase terminal handling capacity by 14 per cent and enable more efficient transfer of containers to transport companies.

Patrick
Patrick said that it undertook only minor investment, while Hutchison reported minor investments mainly associated with additions to its shuttle carrier and reach stacker fleet.

FACT
Flinders Adelaide also reported minor investment, as it considers that investments made since 2012 have provided the terminal with considerable capacity to accommodate future volume growth.

Future developments
Advice from the stevedores suggests that investment may pick up in 2017-18. DP World will be bringing in nine waterside quay cranes across all of its terminals. Three each will go to Sydney and Melbourne, two will go to Brisbane and one will go to Fremantle.

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[182] ACCC, *Container stevedoring monitoring report No 19,* October 2017, PP13-14, https://www.accc.gov.au/system/files/2016-17%20Container%20Stevedoring%20Monitoring%20Report.pdf

These cranes will be to both replace some cranes and to add to the current stock. The equipment is intended to meet the demand from the upsizing of vessels by shipping lines and to increase the productivity of its landside operations. DP World has also ordered 20 new straddle carriers for its Melbourne terminal and four rubber tyred gantries for its Sydney terminal.

These gantries are the yard equipment that receive and deliver containers from transport operators and transfers containers between the quay cranes and road/rail.

In 2017-18, Patrick plans to replace waterside quay cranes at Melbourne, Brisbane and Fremantle.

Major capital investment by stevedores in container terminal facilities, 2017-18[183]

Stevedore investments in 2017–18
DP World and Flinders Adelaide committed to substantial new investments in the year. A significant amount of these new investments are directed towards enabling these stevedores to more efficiently service the increasingly larger ships being deployed on Australian trade lanes.

DP World
DP World has committed to around $256 million worth of new investments in its terminal facilities in 2017–18 and attributed funding of these new investments from the infrastructure charges. DP World has ordered nine new ship-to-shore cranes, each worth around $14 million, to better service the growth in vessel sizes used by shipping lines and maintain competitiveness.

These new quay cranes are a mixture of replacement and additional cranes for DP World's terminals. In addition, DP World invested significantly in refreshing existing yard equipment that are used to facilitate efficient services in both quayside and landside areas. DP World received 20 replacement straddle carriers at its Melbourne terminal around March 2018, with more slated to arrive in the next financial year. DP World also received four new replacement Rubber-Tyred Gantries at its Sydney terminal, with more also scheduled to arrive in the next financial year. DP World also ordered and received 38 new forklifts and reachstackers. These will assist in improving productivity in handling empty, out of gauge, or special cargo and generally improve its terminals' ability to handle peak periods. This investment will also assist in handling the increased number of empty containers being directly returned to its terminals as part of its product offering to shipping lines.

DP World is now implementing a Weigh-in-Motion and Gate Optical Character Recognition in its Melbourne terminal to streamline entry conditions, reduce truck turnaround times, and assist truck operators in their compliance with Chain of Responsibility regulations.

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[183] ACCC, *Container stevedoring monitoring report 2017–18*. No 20
https://www.accc.gov.au/system/files/1465_Container%20stevedoring%20monitoring%20report%202017-18_D08.pdf

DP World is progressing works to integrate its Melbourne and Sydney container terminals with respective adjacent sites to improve efficiency and deliver wider service offerings to its customers.

In Melbourne, DP World worked with the Port of Melbourne to close Coode Road West, which has historically separated its stevedoring terminal from its adjacent intermodal terminal. This initiative is expected to reduce truck turnaround times, increase freight on rail and alleviate congestion in West Swanson Dock.

In Sydney, DP World is integrating its stevedoring terminal with its Botany Intermodal business. The integration will facilitate increased terminal capacity, increase freight on rail, as well as significantly widen the breadth of DP World's landside service offering to include repair and upgrade of containers, washing, out-of-gauge handling, etc. DP World is also conducting initiatives to better utilise existing space at its Brisbane terminal.

DP World expects its capital expenditure levels to remain relatively high in 2018–19 as it continues to execute residual parts of its investment program.

Patrick

Patrick's capital expenditure for the period was not substantial, especially relative to investment levels in previous years.

Capital expenditure in the period was spent on pavement repairs in its Sydney, Brisbane and Fremantle terminals while there have been quay crane replacements in Melbourne and Fremantle.

Patrick has also been replacing its straddle carrier and forklift fleets in Melbourne, Fremantle and Sydney. There has also been expenditure towards improving automated truck handling in its Brisbane and Sydney terminals.

Patrick made further progress on planning for the development of an automated rail terminal in Sydney to improve the stevedoring terminal's rail handling capacity and efficiency.

Patrick plans to replace two quay cranes in Melbourne, and one quay crane each in Fremantle and Brisbane in the next financial year. Patrick is working to replace its Terminal Operating System and undertake civil initiatives for its Fremantle and Sydney terminals. Patrick expects an uplift in capital expenditure levels in 2018–19 as it executes these initiatives.

Hutchison

Hutchison's capital expenditure for the period was also not substantial. However, a significant portion of its 2017–18 capital expenditure was spent towards expanding quayside container handling capacity and improving productivity and safety. Hutchison also made minor investments towards replacing existing landside assets and making

improvements to terminal IT infrastructure. Hutchison expects to maintain capital expenditure levels in 2018–19, but with a greater allocation towards landside infrastructure.

Major capital investment by stevedores in container terminal facilities, 2018-19[184]

Patrick

Patrick committed to significant new tangible assets in 2018–19, with partially-completed investment worth $35 million for new quay cranes, straddle carriers and significant undertakings to improve efficiency in their terminals' operating systems. These investment commitments will reflect in Patrick's tangible asset bases as soon as they are completed and employed. Patrick's expenditure on tangible assets reflects 0.2 per cent of the opening value of its asset base (excluding partially-completed investment).

Patrick is also committing around $150 million across 2019–20 and 2020–21 on various quayside and landside equipment and systems across its terminal portfolio. In particular, Patrick committed to investing $70 million in rail handling equipment and systems to support ongoing expansion and automation of its existing on-dock rail terminal at Port Botany. This investment is being done in partnership with NSW Ports which is contributing $120 million to the project. Once complete, the project is expected to lift rail handling capacity at Patrick's Sydney terminal to 1 million TEU and provide more rail windows for use by cargo owners in regional NSW. The project is intended to also allow Patrick to re-design its rail sidings, remove inefficiencies in rail handling operations and improve train turnaround times. Construction is expected to have commenced by September quarter 2019.

Patrick is also considering investments in rail handling equipment, systems, and infrastructure as part of the development of an on-dock rail terminal in its Melbourne terminal. Further investment to upgrade equipment, systems, and infrastructure at its Fremantle terminal will also be committed to as soon as Patrick is able to come to an agreement with Fremantle Ports on the terms of its terminal lease.

Patrick has invested significantly in equipment and new technology in the past to provide more efficient
quayside and landside services. Notable investments in the past decade include:

- Redevelopment, expansion and semi-automation of Port Botany terminal in 2013–14
- Eight new quay cranes purchased in 2012–13 and deployed from 2013–14 and 2014–15 across its four terminals. These include three new Port Botany 'goose-neck cranes' which enable Patrick to service large ship sizes at its Sydney terminal despite crane height restrictions from air traffic to neighbouring Sydney Airport.

DP World

[184] ACCC, *Container stevedoring monitoring report 2018–19*, No 21, October 2019, https://www.accc.gov.au/system/files/Container%20Stevedoring%20Monitoring%20Report%20-%202018-19.pdf

DP World's large-scale investment program continued in 2018–19 resulting in a substantial increase in its tangible asset base. DP World's new capitalised tangible assets for the period reflects 11.6 per cent of the opening value of its national tangible assets.

Five of the nine new Super-Post Panamax quay cranes DP World purchased arrived in 2018. The quay cranes are each worth around $14 million and are required to service the larger container ships increasingly being deployed on Australian container shipping routes. The purchase will either add to existing terminal crane profiles or be a replacement for older cranes.

DP World ordered nine replacement Internal Transfer Vehicles (ITV) for its Sydney terminal. According to DP World, the addition to the terminal's ITV fleet would assist in improving quayside and landside operational reliability.

DP World also purchased 11 replacement forklifts for its Brisbane and Melbourne terminals to replace similar equipment that have reached the end of their practical service lives.

DP World plans to make further investments in tangible equipment. In particular, DP World plans to
purchase new and/or replacement equipment such as:

- Rubber tyred gantry cranes for its Sydney terminal
- Straddles and shuttle carriers for Melbourne and Brisbane terminals respectively, and
- More forklifts and internal transfer vehicles for its Fremantle terminal.

DP World is also considering initiatives to develop additional non-automated stacking capacity at its
Brisbane terminal.

The ACCC observes that DP World's current investments continues the stevedore's trend of investing in
its terminals. Notable DP World investments in the past decade include:

- Semi-automation and redevelopment of its Brisbane terminal around 2012–13
- Significant expansion in yard capacity at its Melbourne terminal and development of on-dock rail handling capability in 2014–15
- Periodical procurement of larger and higher productivity quay cranes for all of its terminals, and
- Large scale civil expansion projects at Sydney and Melbourne terminals.

Hutchison

Hutchison has invested significantly in setting up its terminal operations in Brisbane and Sydney. Hutchison has phased its quayside and landside terminal expansions over the years and has deployed more quay cranes and automatic stacking crane modules as requirements dictate.

However, since 2014–15, Hutchison has not made meaningful tangible asset investments since completing Phase 2 of the respective sites' expansion. Hutchison's Sydney and

Brisbane terminals are both effectively operating well below their respective nameplate capacities, with Brisbane operating effectively as a one berth terminal.

FACT
Flinders Adelaide did not invest in significant new tangible assets in 2018–19. Flinders Adelaide's expenditure on tangible assets represented 1.7 per cent of the opening value of its asset base. The expenditure reflects the acquisition cost of weighbridges and works on its digital communications network.

Flinders Adelaide said that it would acquire an additional quay crane in the near term to accommodate projected increases in terminal demand and would continue to replace existing straddles and other yard handling equipment. Flinders Adelaide is also weighing options to redevelop existing equipment maintenance and administrative facilities.

Flinders Adelaide has made sizeable investments in the past decade. Very significant investment was capitalised in 2014–15 attributable to the procurement of several larger quay cranes, straddles and expansion of the terminal quayline by a further 240 metres

Major capital investment by stevedores in container terminal facilities, 2019-20[185]

Patrick
Patrick has maintained a significant capital investment program despite COVID-19, proceeding with various landside and quayside equipment valued at around $150 million. Patrick has reported that this has been done in an effort to improve efficiency and increase the capacity of all of its terminals.

In particular, the investment program will focus on new straddle cranes and rail capacity. Table 2.3 summarises these investments.

[185] ACCC, Container stevedoring monitoring report 2019–20, No 22, October 2020, https://www.accc.gov.au/system/files/Container%20stevedoring%20monitoring%20report%202019-20.pdf

Table 2.3: Summary of Patrick's capital investment program in 2020

Location	Infrastructure	Status
Brisbane	Two new straddles	Operational
	One new Liebherr crane	In progress
Fremantle	One ZPMC Post Panamax crane	Operational
Melbourne	Two ZPMC Post Panamax cranes	Operational
	Four new straddles	Operational
Sydney	Port Botany rail infrastructure project Phase 1 (in conjunction with NSW Ports)	In progress
	Six new straddles	Operational
	One new Liebherr crane	In progress
All	Terminal Operating System IT upgrade	In progress

Source: Daily Cargo News July 2020, pp. 47–48.

Of note is the $70 million investment as part of a $190 million rail infrastructure project in conjunction with NSW Ports. The project is Phase 1 of a broader investment program by NSW Ports. Phase 1 involves the construction of four 300-metre rail sidings that will be serviced by three automated rail mounted gantry cranes. This is expected to double rail capacity at Patrick's terminals at Port Botany, improve rail efficiencies and move trucks off the road. NSW Ports will deliver 'on dock' rail infrastructure with the remaining $120 million.

The Liebherr cranes that will be operational at both Brisbane and Port Botany will be the largest cranes operating in Australia. The ZMPC Post Panamax cranes at Fremantle and Melbourne both have a 19-container width capability, enabling the stevedores to service larger vessels.

Further investment in rail infrastructure will also be made by Patrick as part of its contribution to the recently announced Port of Melbourne Port Rail Transformation Project.

Major capital investment by stevedores in container terminal facilities, 2020-21[186]

In the period 2012–19, Australian stevedores made substantial investments in infrastructure and more efficient equipment. Between 2012–13 and 2014–15, Hutchison invested around $600 million to start its stevedoring operations in Brisbane and Sydney.

In the same period, Patrick invested almost $700 million, including purchasing new cranes and semi-automating its terminal in Port Botany. DP World also invested $300 million, including semi-automating its terminal in Brisbane. In 2017, VICT spent $550 million to start its fully-automated operation in Melbourne.

[186] ACCC, *Container stevedoring monitoring report – 2020–21*, No 23, November 2021, https://www.accc.gov.au/system/files/Container%20stevedoring%20monitoring%20report%202020-21.pdf

Figure 2 shows the aggregate investment made by the 2 incumbents (DP World and Patrick) and all 5 stevedores over the past 15 years. It is important to note that VICT made a $550 million investment in its new terminal in Melbourne in 2016–17, but this is not depicted in figure 2.

Figure 2 shows that Hutchison invested around $600 million in the first 3 years to start its stevedoring operations in Sydney and Brisbane. In the same period, Patrick invested nearly $700 million and DP World invested $300 million, including in automation and expansion of capacity.

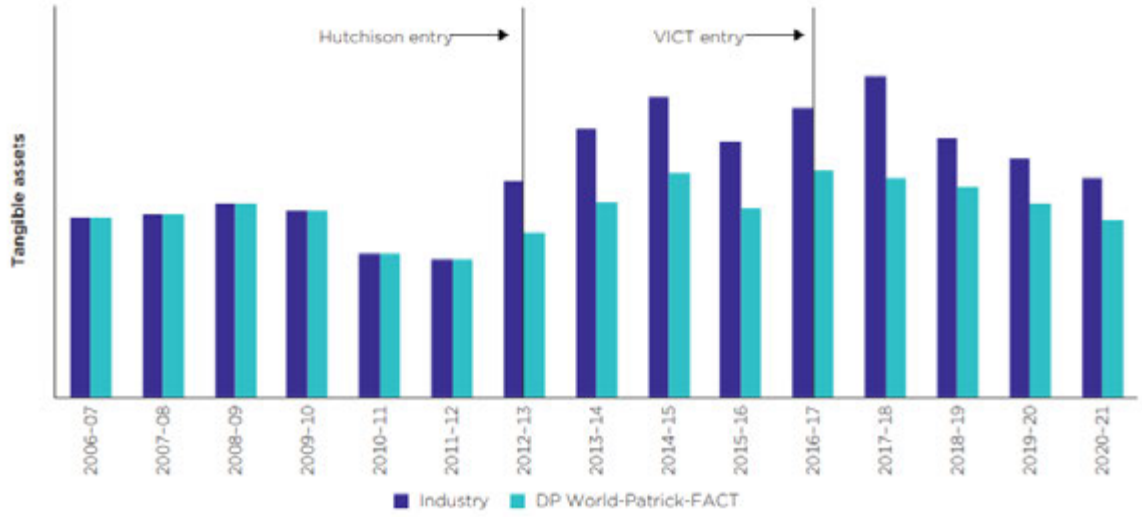
Figure 2: Aggregate investment (industry vs. incumbents): 2006-07 to 2020-21

Source: ACCC analysis of information received from stevedores as part of the monitoring regime.
Note: Real values in 2020-21 dollars.

Ports and stevedores have been making investments to accommodate larger ships, but these investments are irregular because the visits by the larger ships are infrequent. As a result, larger ships sometimes contribute to congestion at Australian container terminals, as 2 berths may be taken up by one vessel. In addition, the capital costs incurred by ports and stevedores are passed on to Australian cargo owners.

Figure 4.6 shows how the aggregate tangible asset base of the incumbents and all 5 stevedores changed over the past 15 years.

Figure 4.6: Aggregate tangible asset base (industry vs. 3 incumbents): 2006–07 to 2020–21



Source: ACCC analysis of information received from stevedores as part of the monitoring regime.

Note: The vertical axis of the chart is intentionally left blank to maintain confidentiality. Asset values were adjusted for write-down in the value of Hutchison's assets in 2015–16, 2018–19 and 2020–21.

Figures 2 and 4.6 show that, while there was a spike in investment in the period 2007–08 to 2008–09, this did not result in the growth of the aggregate tangible asset base. This indicates that the bulk of the investment made in that period was to upgrade or replace existing equipment.

Figure 2 shows that there was a large spike in investment in the period 2012–13 to 2014–15. Hutchison invested about $600 million to start its stevedoring operations in Sydney and Brisbane, Patrick invested around $700 million, and DP World invested $300 million.

Figure 4.6 shows that investments by incumbents led to a large expansion to their aggregate tangible asset base. This shows that DP World and Patrick increased capacity of their terminals in Brisbane and Sydney and invested in technological upgrades following entry of Hutchison. DP World informed the ACCC that, at the time, it invested heavily toward semi-automation at its Brisbane terminal, while Patrick informed the ACCC that it also invested in semi-automation at its Port Botany terminal.

Figures 2 and 4.6 also show that the incumbent stevedores made further investments that expanded their asset base following entry of VICT. DP World and Patrick informed the ACCC at the time that they invested heavily in infrastructure to handle larger ships and improve landside operations at their Melbourne terminals.

The entry of Hutchison and VICT has had a notable impact on the level of investment by stevedores in Melbourne, Sydney and Brisbane. There has not been the same level of investment at the other 2 monitored container ports in Australia, although at least in part this is due to their smaller throughput.

Investments being made by ports and stevedores to improve productivity and efficiency

As the container terminal industry continues to be affected by market volatility driven in part by COVID-19, the investment program across the 5 monitored stevedores varied

significantly. Table 7.1 lists the key investments that stevedores either commenced or completed in 2020–21.

Table 7.1: Selected key investment commenced and/or completed in 2020–21

Stevedore	Infrastructure	Location	Status
DP World	New rubber tyred gantries and internal transfer vehicles	Sydney	In progress
	High mast lighting upgrade	Sydney	In progress
	New straddle carriers	Melbourne	In progress
	New shuttle carriers	Brisbane	In progress
	Automated stacking cranes maintenance works	Brisbane	In progress
	IT infrastructure upgrade	Fremantle	In progress
	New quay crane and heavy forklifts	Fremantle	In progress
	Truck marshalling area	Fremantle	In progress
	Terminal pavement upgrades	All terminals	In progress
	New terminal vehicles	All terminals	Completed
	Quay crane works and upgrades	All terminals	Completed
	Upgrades in security infrastructure	All terminals	Completed
	Terminal pavement works	All terminals	Completed
FACT	Straddle carrier replacement	Adelaide	In progress
Patrick	12 new straddles	Brisbane, Sydney	Operational
	Terminal operating system upgrade	All terminals	Operational
	Port Botany rail project (with NSW Ports)	Sydney	Operational
	Redevelopment of Fremantle terminal	Fremantle	In progress
	2 Liebherr cranes	Brisbane, Sydney	In progress
	ESD rail project (with Port of Melbourne)	Melbourne	In progress
VICT	6 automated container carriers	Melbourne	In progress

Source: Information received from stevedores as part of the monitoring regime

Patrick has informed the ACCC that its investments, as set out in the table, total around $227 million.
The table does not include Hutchison, because due to the pandemic it has delayed its capital expenditure to 2021–22.

The stevedores have also indicated their future investments plans to the ACCC:

- Hutchison has indicated that its future investments will be for additional container storage in both Sydney and Brisbane.
- VICT has indicated that its further investment plans include civil works project, as well as purchases of new quay cranes, automated stacking cranes and automated container carriers.
- DP World has indicated that in the future, it will invest in additional yard equipment and infrastructure that ensures projected trade demands are met and service levels are maintained on both quayside and landside operations. Key planned investments in the near term include new shuttle carriers and pavement upgrades in Brisbane, new rubber tyred gantries and terminal vehicles in Sydney, replacement straddles and major pavement works in Melbourne and in Fremantle, a new quay crane, truck

marshalling area, additional yard equipment, and upgrade to the rail interface and IT systems.

- FACT has indicated that it will continue replacing its straddles into 2021–22 to provide additional capacity. FACT also has plans to purchase additional quay cranes as required by throughput and contractual service delivery obligations.
- Patrick plans to invest in excess of $50 million in Fremantle by enhancing truck and rail interfaces, enhancing crane capability and systems improvement. To increase capacity, Patrick will also undertake various civil, pavement and reefer work in the next 3 years across its 3 terminals on the east coast. To cater for volume growth, Patrick plans to replace existing, and purchase additional, straddles for its 3 east coast terminals. Patrick will also invest in Port's rail project at Port Botany and Port of Melbourne (these are discussed further below).