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Foreword

Waterline is published by the Bureau of Infrastructure, Transport and Regional Economics (BITRE) and provides information on container movements on both the wharf-side and the landside of five Australian major port terminals: Brisbane, Sydney, Melbourne, Adelaide and Fremantle. This Waterline covers port terminal activity up to the June quarter 2015.

Waterline reports on trends in container handling productivity on the waterfront in Australia as well as the cost of importing and exporting containers. It covers both the unloading of container ships and the transport of containers from container terminals. This Waterline provides the latest data available on stevedoring productivity and landside performance.

New landside indicators are introduced in this issue of Waterline. Two indicators examine truck movements outside formal booking systems, for containers and TEUs. A third quantifies backloaded operations, whereby trucks carry containers on both inbound and outbound legs of their trip.

This issue of Waterline was prepared in the Infrastructure and Surface Transport Statistics Section by Adam Malarz and Thomas Rutherford with contributions from Peter Kain. For further information on this report please phone Adam Malarz on (02) 6274 7168, Thomas Rutherford on (02) 6274 6818 or email maritime_stats@infrastructure.gov.au.

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December 2015

At a glance

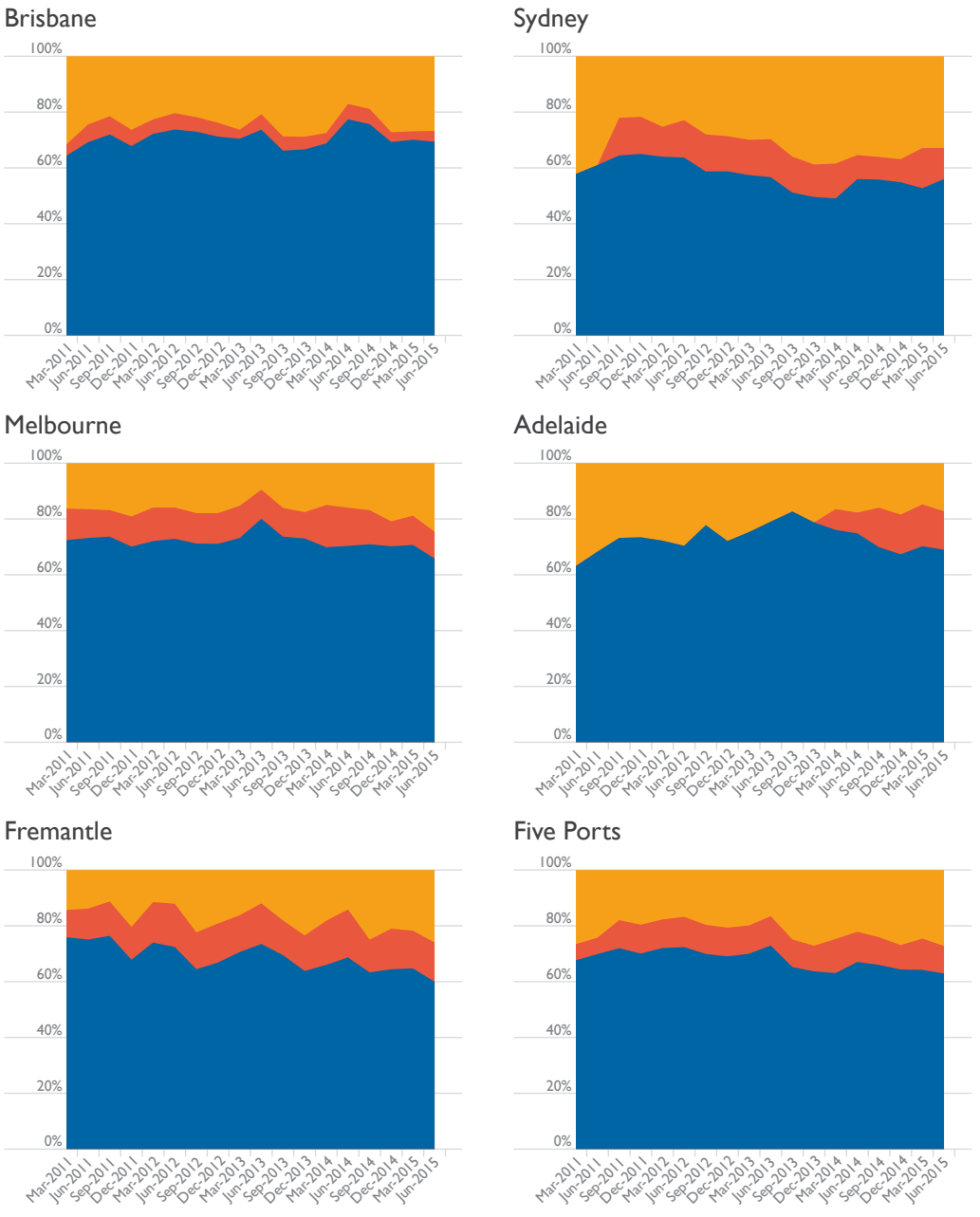
Throughput

- Waterline 57 introduces two new throughput indicators—*balance of containers handled landside* (Indicator 1.9) and *balance of TEUs handled landside* (Indicator 1.13). These indicators illustrate the variability and size of the container handling task outside of VBS (vehicle booking system), TAS (truck appointment system) and railway operations. Previous issues of Waterline did not quantify movements occurring outside these systems.

  During the period January–June 2015, the largest percentage of containers handled outside VBS and rail operations was in Sydney (30.6 per cent) and the smallest in Adelaide (17.5 per cent).

- Figure A.1 illustrates the proportions of TEUs handled by VBS/TAS trucks, by rail, and the balance, for each port and for Five ports (the total of the five major capital city container terminals). Of particular note is the seasonal variation in the use of informal booking systems.
- "Whole of port" *Twenty-foot equivalent units (TEUs) exchanged* at Australia's five major container ports increased to a total of 3.4 million TEUs for the period January–June 2015, an increase of 2.5 per cent compared to the same period in 2014. The percentage increase varied by container port: Brisbane increased by 5.8 per cent, Sydney by 4.0 per cent, Melbourne by 2.0 per cent. Fremantle was stable, while Adelaide declined by 6.2 per cent.
- The "whole of container terminal" measure of the *number of ship visits* to the five ports declined to 1934 ship calls to berth in the period January–June 2015, a decrease of 4.8 per cent compared to the corresponding period in the previous year.
- The total number of ship calls to the major container ports declined by 4.1 per cent compared to July–December 2014.
- The "wharf-side of port" measure of the *total number of containers handled* increased by an average of 1.3 per cent across the five ports. Just over half of these containers were larger, 40-foot containers. This measure counts only containers transported in specialised container ships as reported by the three main stevedoring companies.
- Throughput growth (in TEUs) at Australia's container ports has declined slightly to 2.8 per cent, still exceeding non-farm GDP growth (at 2.5 per cent). Figure A.2 illustrates historical growth in these series. Over the period from 1994 to 2015, GDP increased by more than 90 per cent while container throughput grew by more than 280 per cent.

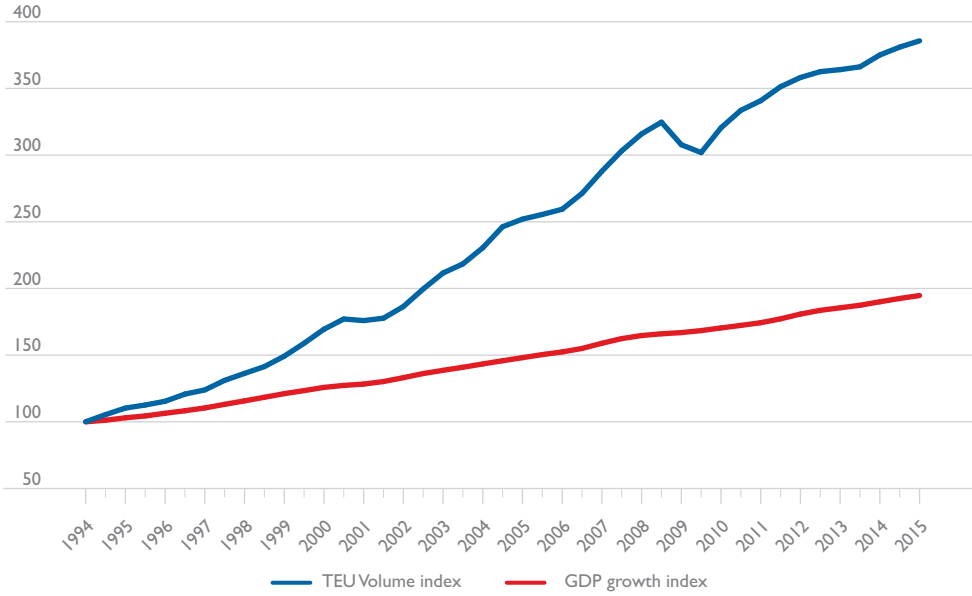
Figure A.1 Landside: Proportion of containers handled by VBS trucks, rail and other



Note: Balance of TEUs handled may include some or all of: empty container operations, bulk runs and containers handled at the port by importers/exporters. The balance is computed against the total containers handled wharfside; landside-only operations are additional to the totals.

Sources: BITRE estimates (2015).

Figure A.2 Growth in container traffic compared to GDP growth (Jan–Jun 1994=100)



Sources: BITRE estimates (2015), ABS (2015).

Aerial view of Port Botany. Photo courtesy of NSW Ports.

Productivity

Waterline 57 introduces a new productivity indicator—*per cent of trucks backloaded* (Indicator 2.10). 'Backloaded operations', also known as 'triangular operations', refer to trucks which haul containers on both the inbound and outbound legs of a single trip. Operations of this type make more efficient use of both the landside infrastructure and available trucks. Indicator 2.10 shows the number of backloaded operations as a percentage of total VBS trucks in Brisbane, Sydney, Melbourne and Fremantle. During the period January–June 2015, the largest percentage of backloaded operations was in Melbourne (16.4 per cent) and the smallest in Sydney (8.2 per cent).

Average measures of "Wharf-side of port" *elapsed labour rate* declined by 1.9 per cent across the five ports in the period January–June 2015 (compared to the same period in 2014). Similarly, *crane rate* and *ship rate* declined by 3.5 per cent and 2.9 per cent respectively.

Of note was a decline in wharf-side productivity (containers per hour) at Sydney. The *crane rate, elapsed labour rate* and *ship rate* declined by 13.0 per cent, 12.3 per cent and 11.5 per cent, respectively, for January–June 2015 compared to the same period in 2014. A slight decline was also noted in Melbourne. A notable improvement was at the Port of Brisbane, with *crane rate, elapsed labour rate* and *ship rate* improving by 0.7 per cent, 16.4 and 10.8 per cent respectively.

"Land-side of port" productivity declined on average across the five ports. Average *truck* and *container turnaround times* increased by 3.5 per cent and 3.7 per cent respectively in the period January–June 2015 compared to the same period in 2014. Port of Brisbane experienced an improvement in these measures, where *truck* and *container turnaround times* declined by 21.1 per cent and 21.0 per cent respectively.

The *median ship turnaround time* worsened in Sydney and Melbourne but improved in Brisbane, Adelaide and Fremantle. The largest improvement was in Adelaide where the *median ship turnaround time* declined by 14.5 per cent, followed by Fremantle where it declined by 11.3 per cent in January–June 2015 compared to the same period in 2014.

Whole of Container Terminal productivity indicators

Between January and June 2015:

- *Average lifts per ship-hour at berth* declined from 39.2 in March quarter to 37.2 in June quarter 2015;
- *Average lifts per stevedore's hour* declined from 43.2 in March quarter to 41.1 in June quarter 2015.

Waiting times for entering container terminals increased on average across the five ports, decreasing only in Fremantle. The measure of the *per cent of ships waiting at anchorage for more than 2 hours* increased from 9.8 per cent in March quarter to 14.0 per cent in June quarter of 2015. The average waiting time also increased from 22.1 hours in March quarter, to 27.0 hours in June quarter 2015 for ships that waited for entry to the five ports.

Daily and weekly truck movements at container terminals

The total number of used truck timeslots in five ports declined by 0.3 per cent in the March quarter and increased by 0.5 per cent in the June quarter, as compared with the corresponding periods of 2014. The number of truck slots available in the March quarter of 2015 declined by 1.5 per cent, and the June quarter declined by 2.5 per cent, relative to the corresponding quarters in 2014. Usage of weekday off-peak truck timeslots increased by 3.7 per cent across the five ports to 42.0 per cent in the March quarter of 2015, and by 0.5 per cent to 41.6 per cent in the June quarter of 2015, as compared with the corresponding periods of 2014.

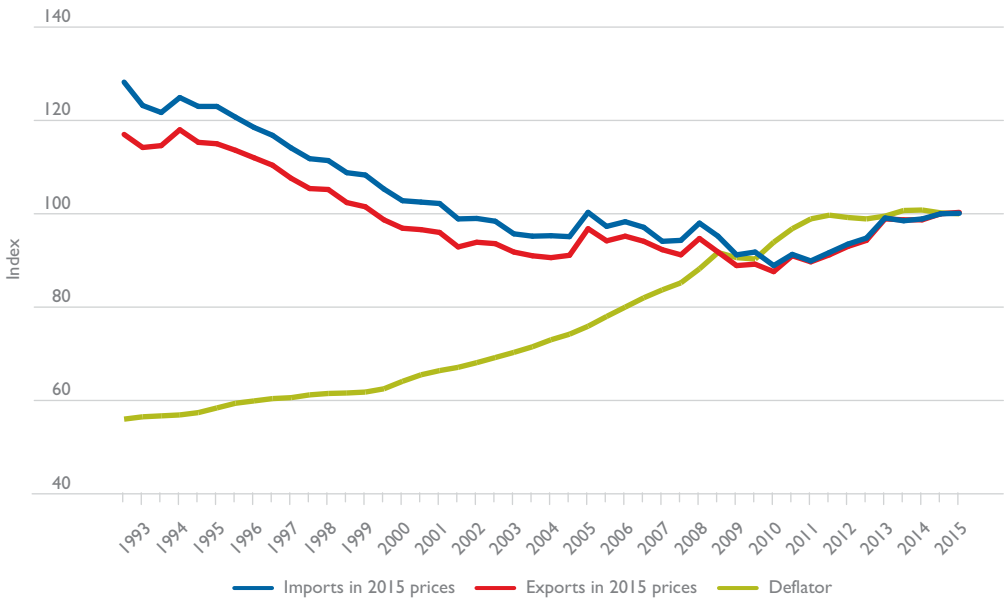
Port-interface cost

The port interface cost index increased for larger ship categories during the period January–June 2015, and declined for smallest size category, as compared with that of July–December 2014. Figure A.3 provides a long-term comparison between port interface costs for the 35 000–40 000 GT size category and the general price level across the economy (as measured by the GDP deflator).

The movement in costs in constant 2015 prices varied by ship size:

- For small ships (5 000 to 20 000 GT) port interface costs declined by $31/TEU for imports and by $30/TEU for exports;
- For medium size ships (35 000 to 40 000 GT) port interface costs increased by $1/TEU for imports and $3/TEU for exports;
- For large size ships (50 000 to 55 000 GT) port interface costs were steady for imports and increased by $2/TEU for exports.

Figure A.3 Port interface cost indices compared to the GDP deflator



Note 1: PICI data presented in this figure are for 35 000 to 40 000 GT ship category.

Note 2: Data plotted in this figure are constant 2015 prices; January–June 2015 is the base period for both the GDP deflator and PICI.

Sources: BITRE estimates (2015).

Abbreviations and terms

ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
BITRE	Bureau of Infrastructure, Transport and Regional Economics
DP World	Dubai Ports World
FACT	Flinders Adelaide Container Terminal
Five ports	Refers to the aggregation of the following major container terminals at the five mainland capital city ports: • Fisherman Islands (Brisbane), • Brotherson Dock, at Port Botany (Sydney), • Swanson Dock (Melbourne), • Flinders Adelaide Container Terminal at Outer Harbor/Pelican Point (Adelaide), and • North Quay in the "Inner Harbour" on the Swan River (Fremantle)
GT	Gross Tonnage
Infrastructure	Department of Infrastructure and Regional Development
n.a.	Not applicable
Mins	minutes
Pbm	Per berth metre
PICI	Port Interface Cost Index
Qtr	Quarter
TAS	Truck Appointment System (used by Hutchison Ports Australia to schedule trucks at a container terminal). See also VBS
TEU	Twenty-foot equivalent unit
TTT	Truck turnaround time
UCC	Unitised Cellular Container ship; a type of specialised container ship
VBS	Vehicle Booking System, used to schedule trucks at a container terminal. DP World and Patrick use a shared system developed by 1-Stop Connections Pty Ltd; FACT operates a similar system

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BITRE is particularly grateful for the assistance of the following organisations in the provision of data used to prepare Waterline:

- stevedoring companies: DP World, Flinders Adelaide Container Terminal, Hutchison Ports Australia, and Patrick
- individual port authorities and corporations: Port of Brisbane Pty Ltd, Port Authority of New South Wales, NSW Ports, Port of Melbourne Corporation, Flinders Ports, and Fremantle Ports
- Ports Australia
- shipping lines
- customs brokers
- road transport operators
- pilot, tug and mooring operators.

Contents

Foreword iii

At a glance v

Abbreviations and terms xi

Acknowledgements xii

Chapter 1 Measures of container terminal throughput 1

Chapter 2 Measures of container terminal productivity 19

Chapter 3 Timeslots for trucks at container terminals 41

Chapter 4 Port interface cost index 54

Appendix A Maps of five major Australian container ports 71

References 87

List of tables

Table 1.1 Container terminal throughput: Brisbane 12
Table 1.2 Container terminal throughput: Sydney 13
Table 1.3 Container terminal throughput: Melbourne 14
Table 1.4 Container terminal throughput: Adelaide 15
Table 1.5 Container terminal throughput: Fremantle 16
Table 1.6 Container terminal throughput: Five ports 17
Table 1.7 Container terminal throughput: Container Ship Visits by Port, January–June 2015 18
Table 1.8 Container terminal throughput: Container Ship Visits by Port, July–December 2014 18
Table 2.1 Container terminal productivity: Brisbane 34
Table 2.2 Container terminal productivity: Sydney 35
Table 2.3 Container terminal productivity: Melbourne 36
Table 2.4 Container terminal productivity: Adelaide 37
Table 2.5 Container terminal productivity: Fremantle 38
Table 2.6 Container terminal productivity: Five ports 39
Table 3.1 Timeslots available and actually used by trucks: Brisbane 48
Table 3.2 Timeslots available and actually used by trucks: Sydney 49
Table 3.3 Timeslots available and actually used by trucks: Melbourne 50
Table 3.4 Timeslots available and actually used by trucks: Adelaide 51
Table 3.5 Timeslots available and actually used by trucks: Fremantle 52
Table 3.6 Timeslots available and actually used by trucks: Five ports 53
Table 4.1 Port interface costs by ship type – parameters and estimates: Brisbane 60
Table 4.2 Port interface costs by ship type – parameters and estimates: Sydney 62
Table 4.3 Port interface costs by ship type – parameters and estimates: Melbourne 64
Table 4.4 Port interface costs by ship type – parameters and estimates: Adelaide 66
Table 4.5 Port interface costs by ship type – parameters and estimates: Fremantle .. 68
Table 4.6 The national port interface cost indices, by size of ship 70

List of figures

Figure A.1 Landside: Proportion of containers handled by VBS trucks, rail and other ... vi

Figure A.2 Growth in container traffic compared to GDP growth (Jan–Jun 1994=100) ... vii

Figure A.3 Port interface cost indices compared to the GDP deflator ... x

Figure 1.1 TEU throughput by container port: Wharf-side of port ... 6

Figure 1.2 TEU throughput by container port: Landside of port ... 7

Figure 1.3 TEU throughput by container port: Whole of port ... 8

Figure 1.4 Container terminal traffic: Number of UCC ships handled ... 9

Figure 1.5 Container terminal traffic: Number of trucks used in VBS/TAS operations ... 10

Figure 1.6 Containers by rail as per cent of containers on the landside ... 11

Figure 2.1 Wharf-side crane rate ... 25

Figure 2.2 Wharf-side elapsed labour rate ... 26

Figure 2.3 Wharf-side ship rate ... 27

Figure 2.4 Productivity in five ports: Comparison of wharf-side rates ... 28

Figure 2.5 Average TEUs per truck on landside of container terminals ... 29

Figure 2.6 Average container turnaround time on landside of container terminals ... 30

Figure 2.7 Longest and shortest truck turnaround time in five ports ... 31

Figure 2.8 Longest and shortest container turnaround time in five ports ... 31

Figure 2.9 Average number of lifts per hour a ship spent at berth ... 32

Figure 2.10 Average number of lifts per berth visit ... 33

Figure 3.1 Timeslots used by trucks in all off-peak periods ... 44

Figure 3.2 Timeslots used by trucks in off-peak periods Monday to Friday ... 45

Figure 3.3 Timeslots used by trucks on Saturday and Sunday ... 46

Figure 3.4 TEUs processed per VBS truck at container terminals ... 47

Figure 4.1 Port Interface Cost Index for container imports and exports, by ship size ... 59

CHAPTER 1
Measures of container terminal throughput

Overview

Chapter 1 of Waterline presents in a consolidated format all container port throughput indicators. The indicators are in four groups—wharf-side, landside, whole of container terminal and whole of port.

There are four wharf-side quarterly throughput indicators (previously reported in Chapter 2 of Waterline):

1.1 UCC ships handled, as reported by stevedores

1.2 Total containers handled by stevedores

1.3 Total TEUs handled by stevedores

1.4 40-foot containers as per cent of all containers handled.

There are nine landside quarterly throughput indicators (previously reported in Chapter 1 of Waterline):

1.5 Number of trucks used in VBS/TAS operations

1.6 Total number of containers transported by trucks and rail

1.7 Total number of containers transported by trucks

1.8 Number of containers by rail

1.9 Balance of containers handled landside

1.10 Total number of TEUs transported by trucks and rail

1.11 Total number of TEUs transported by trucks

1.12 Number of TEUs by rail.

1.13 Balance of TEUs handled landside

At the whole of container terminal level, using data from port authorities, there are two quarterly throughput indicators:

1.14 Total number of container ship visits, as reported by Port Authorities

1.15 Total number of containers (lifts) exchanged

At the whole of port level, using data from port authorities, there are seven six-monthly throughput indicators:

1.16 Total cargo throughput

1.17 Non-containerised general cargo throughput

1.18 Total number of TEUs exchanged

1.19 Number of TEUs: Full import

1.20 Number of TEUs: Empty import

1.21 Number of TEUs: Full export

1.22 Number of TEUs: Empty export.

Indicators of these three groups are presented separately for Brisbane, Sydney, Melbourne, Adelaide and Fremantle, as well as for the five ports as a whole.

Container terminal

The movement of containers from/to the container ship takes place on a wharf or pier known as a container terminal. Unlike a traditional wharf, a container terminal needs a large area adjoining the wharf for storing containers. The containers are placed in stacks of two or more and are kept there until they are moved away by truck or train for unloaded containers, or loaded onto a ship, from the container terminal. While in the terminal, the containers are at the disposal of a stevedoring company.

Stevedoring

The term stevedore can refer to a company which manages the operation of loading or unloading a ship. In Australia the people who work on the waterfront are referred to as waterside workers or stevedores. A stevedoring company typically owns equipment used in the loading or discharging operation and hires labour for that purpose. A stevedoring company also may contract with a terminal owner to manage all terminal operations. In Australia, there are three major stevedoring companies which handle containers: Patrick, Dubai Ports World and Hutchison Ports Australia.

Wharf-side throughput measures

Measures of throughput at the wharf-side relate only to containers moved by stevedoring companies from/to UCC ships at the container terminals.

Indicator 1.1 UCC ships handled, as reported by stevedores

Only fully cellular ships, or Unitized Cellular Container (UCC) ships, are included in this indicator. Normally these purpose built container ships are equipped with 40-foot cell guides below deck as a minimum requirement.

Indicator 1.2 Total containers handled

This is the total number of containers lifted on/off UCC ships. 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 derived from the total containers handled, taking into account different sizes of containers.

TEU stands for "Twenty-foot equivalent unit", a universally recognised measure of containers which converts containers of different sizes into standardised twenty-foot units. For example, a 20-foot container equals one TEU, and a 40-foot container is converted to two TEUs.

Indicator 1.4 40-foot containers as per cent of all containers handled

This is the number of 40-foot containers as a percentage 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 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. In previous editions of Waterline, this indicator included the trucks undertaking bulk runs; this has been discontinued due to inconsistent data.

Indicator 1.8 Number of containers by rail

This indicator counts the total number of containers carried by rail in or out of a container terminal is based on data provided by each container port authority. This indicator includes containers processed at "on dock" and those handled through "near dock" rail sidings. "On dock" refers to situations where the rail siding is on dock in a container terminal. In contrast, "near dock" rail sidings are in the neighbourhood of the container terminal but not on the dock. Only "on dock" rail data is reported for Sydney as port precinct rail data is not available.

Indicator 1.9 Balance of containers handled landside

This indicator shows the difference between the throughput of containers on the wharfside (Indicator 1.2) and the total containers transported by VBS/TAS trucks and rail (Indicator 1.6). It illustrates the scale and variability of the container handling task outside of VBS/TAS and railway operations. This indicator includes containers handled by consignees' own transport, but excludes landside-only operations.

To avoid double counting of containers, this indicator is calculated differently in Melbourne and Adelaide, where it is the difference between throughput of containers on the wharfside (Indicator 1.2) and the number of containers transported by VBS/TAS trucks (Indicator 1.5).

Indicator 1.10 Total number of TEUs transported by trucks and rail

This indicator includes the total number of TEUs transported by VBS/TAS trucks, bulk run trucks, and by rail. Counts of TEUs in this indicator are further broken down into Indicator 1.11 (TEUs moved by trucks) and Indicator 1.12 (TEUs moved by rail).

Indicator 1.11 Total number of TEUs transported by trucks

This indicator includes the total number of TEUs transported by VBS/TAS trucks. In previous editions of Waterline, this indicator included the number of TEUs transported by trucks undertaking bulk runs; this has been discontinued due to inconsistent data.

Indicator 1.12 Number of TEUs by rail

This is a count of the total number of TEUs carried by rail in or out of a container terminal based on data provided by each container port authority. This indicator includes TEUs processed at "on dock" and those handled through "near dock" rail sidings. "On dock" refers to situations where the rail siding is on dock in a container terminal. In contrast, "near dock" rail sidings are in the neighbourhood of the container terminal but not on the dock. Only "on dock" rail data is reported for Sydney as port precinct rail data is not available.

Indicator 1.13 Balance of TEUs handled landside

This indicator is similar to Indicator 1.9, but calculated in TEUs. It shows the difference between the throughput of TEUs on the wharfside (Indicator 1.3) and the total TEUs transported by VBS/TAS trucks and rail (Indicator 1.10).

To avoid double counting of TEUs, this indicator is calculated differently in Melbourne and Adelaide, where it is the difference between throughput of TEUs on the wharfside (Indicator 1.3) and the number of TEUs transported by VBS/TAS trucks (Indicator 1.11).

Whole of container terminal throughput

Indicator 1.14 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. Table 1.7 summarises ship visits by size of ship and by container port.

Indicator 1.15 Total number of containers (lifts) exchanged

This indicator is estimated using Indicator 1.4 (percentage of 40-foot containers) and total number of TEUs exchanged reported by ports.

Whole of port throughput

Indicator 1.16 Total cargo throughput

This is the weight, measured in tonnes, of all container and non-container general cargoes that passed through the port.

Indicator 1.17 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 1.18 Total number of TEUs exchanged

This is a count of TEUs, exchanged through the port. This count is further broken down into Indicators 1.19 to 1.22.

Indicator 1.19 Full import TEUs

This is a count of full containers in TEUs imported (unloaded) at the port.

Indicator 1.20 Empty import TEUs

This is a count of empty containers in TEUs imported (unloaded) at the port.

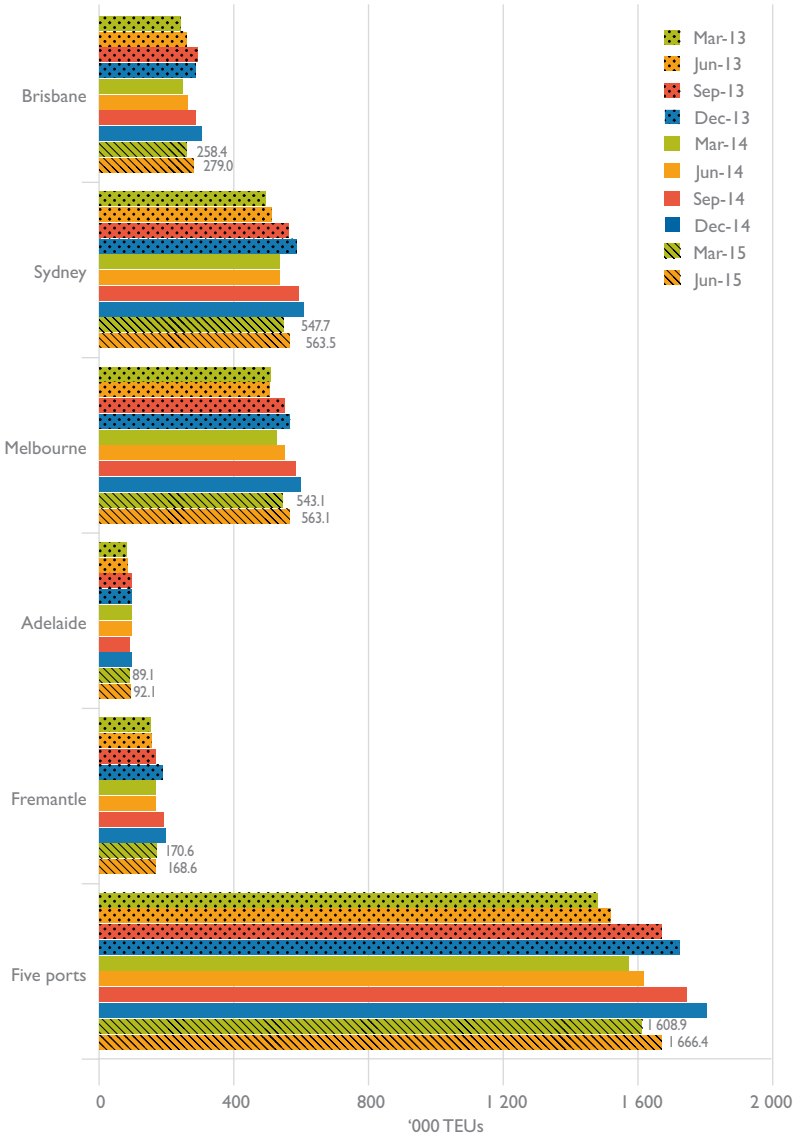
Indicator 1.21 Full export TEUs

This is a count of full containers in TEUs exported (loaded) at the port.

Indicator 1.22 Empty export TEUs

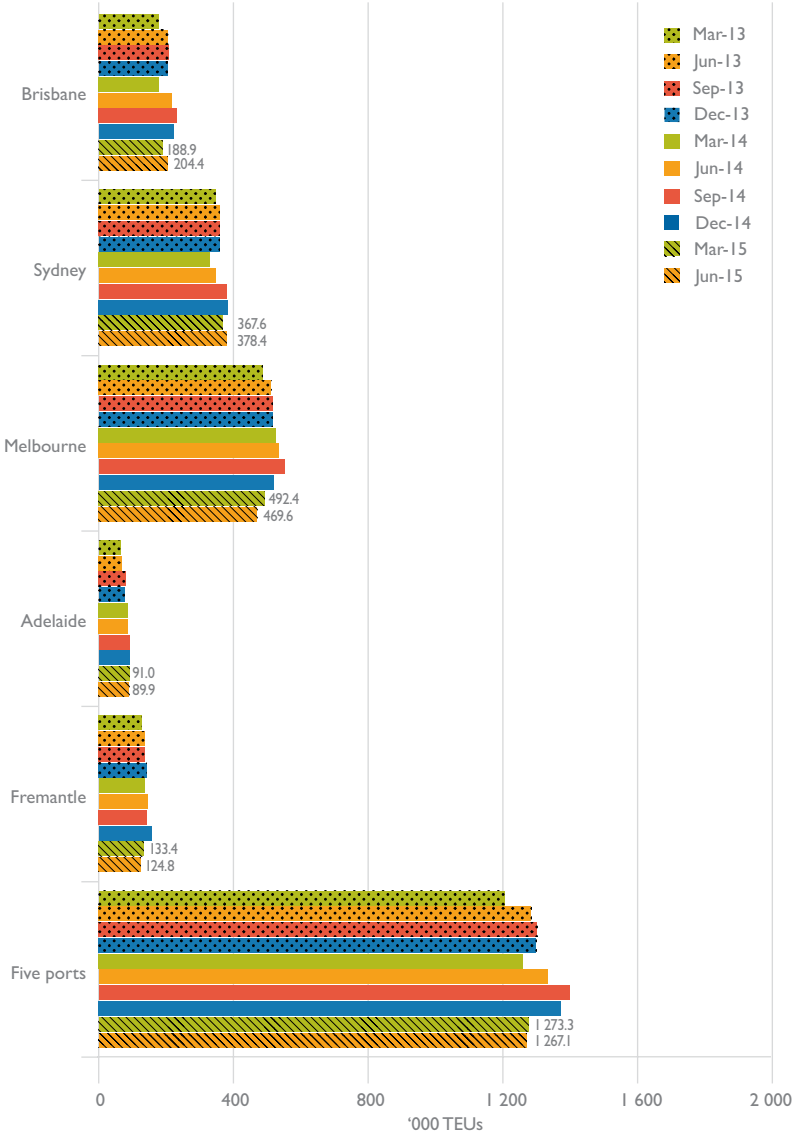
This is a count of empty containers in TEUs exported (loaded) at the port.

Figure 1.1 TEU throughput by container port: Wharf-side of port



Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

Figure 1.2 TEU throughput by container port: Landside of port



Notes: The data in this figure shows the total TEUs moved on the landside by rail and by VBS/TAS trucks where data are available.

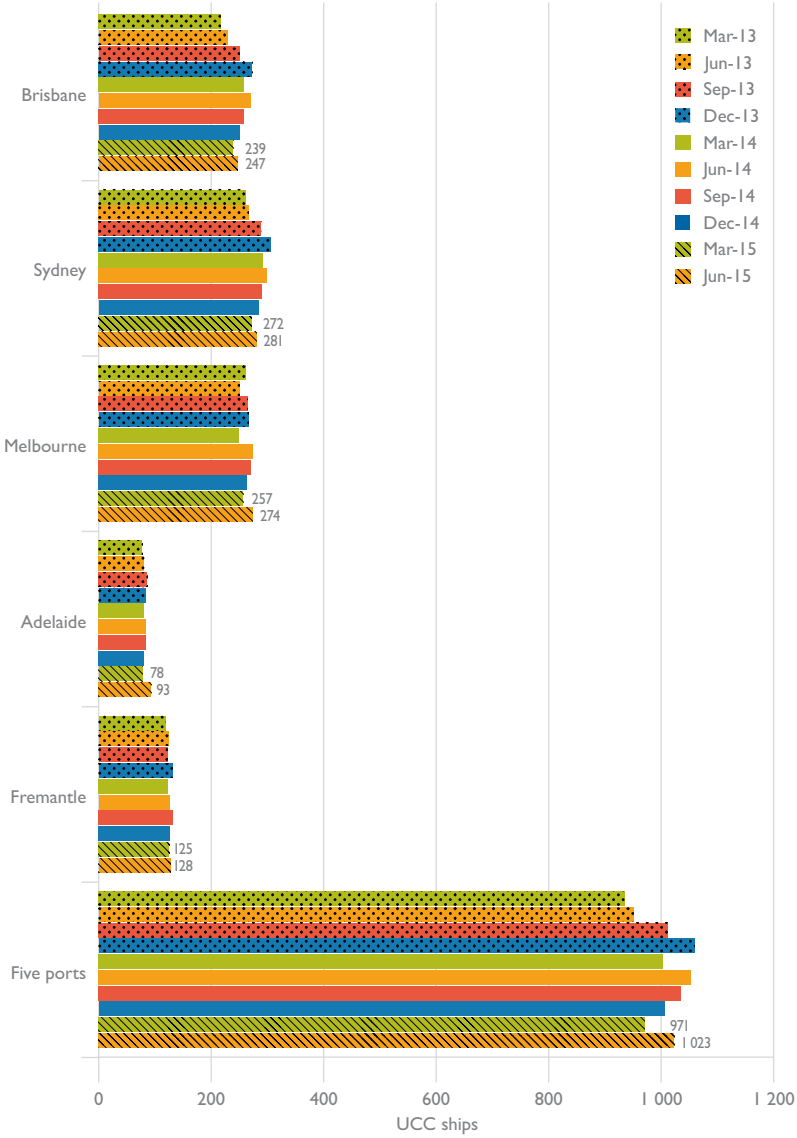
Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015), Patrick (2015), Flinders Ports (2015), Port of Brisbane Pty Ltd (2015), Port of Melbourne Corporation (2015) and Fremantle Ports (2015).

Figure 1.3 TEU throughput by container port: Whole of port

Notes: The data relate to terminals at Fisherman Islands (Brisbane), Brotherson Dock at Port Botany (Sydney), Swanson Dock (Melbourne), Flinders Adelaide Terminal at Outer Harbor/Pelican Point (Adelaide), and North Quay in the Inner Harbour (Fremantle).

Sources: Port of Brisbane Pty Ltd (2015), Port Authority New South Wales (2015), Port of Melbourne Corporation (2015), Flinders Ports (2015) and Fremantle Ports (2015).

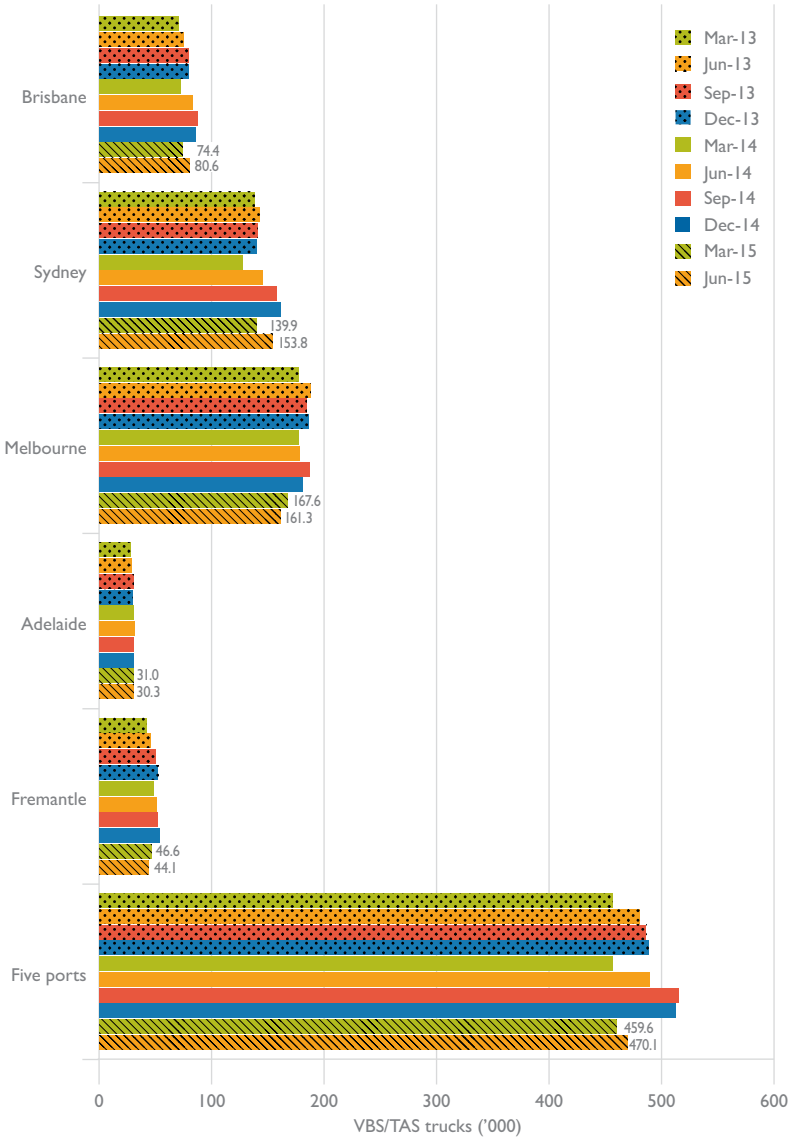
Figure 1.4 Container terminal traffic: Number of UCC ships handled



Notes: The data contained in this figure relates to Indicator 1.1 as defined in the explanatory notes and Table 1.1 to 1.6.

Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

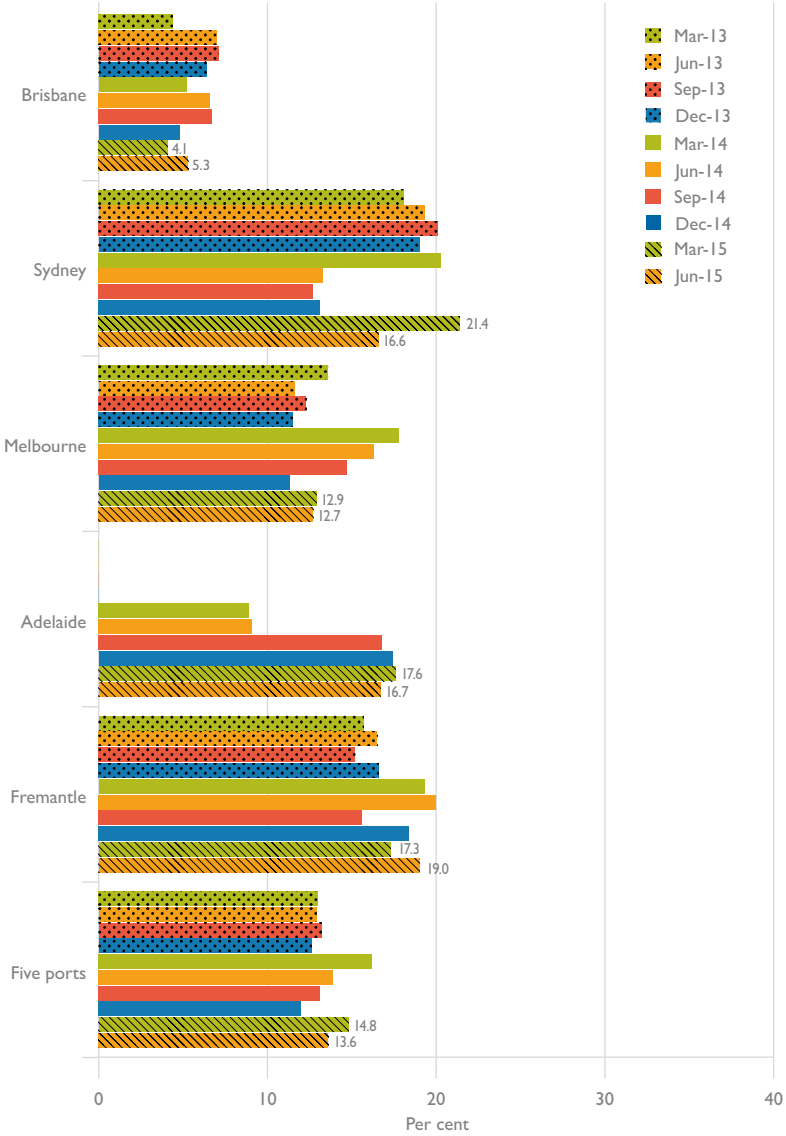
Figure 1.5 Container terminal traffic: Number of trucks used in VBS/TAS operations



Notes: Data on number of trucks used in bulk runs are not available.

Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

Figure 1.6 Containers by rail as per cent of containers on the landside



Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015), Patrick (2015), Flinders Ports (2015), Port of Brisbane Pty Ltd (2015), Port of Melbourne Corporation (2015) and Fremantle Ports (2015).

Table 1.1 Container terminal throughput: Brisbane

	2013						2014						2015		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
Wharfside															
UCC ships handled, as reported by stevedores	217	229	**446**	250	273	**523**	258	270	**528**	258	250	**508**	239	247	**486**
Total containers handled *('000)*	159.5	175.1	**334.6**	197.2	190.7	**387.9**	167.3	179.5	**346.8**	191.0	203.3	**394.2**	172.9	191.0	**363.9**
Total TEUs handled *('000)*	240.4	259.6	**500.0**	292.3	286.2	**578.5**	245.9	262.6	**508.6**	285.3	305.2	**590.5**	258.4	279.0	**537.4**
40-foot containers as per cent of all containers handled *(%)*	50.7	48.3	**49.4**	48.2	50.1	**49.2**	47.0	46.3	**46.6**	49.4	50.1	**49.8**	49.4	46.1	**47.7**
Landside															
Number of trucks used in VBS/TAS operations *('000)*	70.6	75.0	**145.6**	79.9	79.7	**159.6**	72.1	83.2	**155.3**	87.7	85.7	**173.4**	74.4	80.6	**155.0**
Total containers transported by VBS/TAS trucks and rail *('000)*	123.5	143.9	**267.4**	144.8	142.3	**287.1**	125.1	149.3	**274.4**	157.8	153.2	**311.1**	128.7	142.4	**271.2**
Containers by VBS/TAS trucks *('000)*	117.0	132.6	**249.7**	133.4	131.9	**265.3**	117.2	137.9	**255.1**	145.5	143.7	**289.3**	121.6	132.4	**254.0**
Containers by rail *('000)*	6.5	11.3	**17.8**	11.3	10.5	**21.8**	7.9	11.4	**19.3**	12.3	9.5	**21.8**	7.2	10.0	**17.2**
Balance of containers handled landside *('000)*	36.0	31.2	**67.1**	52.4	48.4	**100.8**	42.2	30.2	**72.4**	33.2	50.0	**83.2**	44.2	48.6	**92.7**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	177.1	205.7	**382.8**	208.3	203.7	**412.0**	178.3	217.7	**396.0**	231.5	222.1	**453.5**	188.9	204.4	**393.3**
TEUs by VBS/TAS trucks *('000)*	169.4	191.3	**360.6**	193.4	190.7	**384.1**	169.1	203.3	**372.4**	215.9	211.4	**427.3**	181.1	193.5	**374.6**
TEUs by rail *('000)*	7.7	14.4	**22.1**	14.9	13.0	**27.8**	9.2	14.4	**23.6**	15.6	10.7	**26.2**	7.8	10.9	**18.7**
Balance of TEUs handled landside *('000)*	63.3	53.9	**117.2**	84.0	82.5	**166.5**	67.6	45.0	**112.5**	53.8	83.1	**136.9**	69.5	74.6	**144.1**
Whole of container terminal															
Total number of container ship visits	220	223	**443**	253	266	**519**	248	263	**511**	252	234	**486**	236	236	**472**
Total containers (lifts) exchanged *('000)*	157.1	166.2	**323.4**	196.8	186.5	**383.3**	167.5	174.2	**341.7**	190.6	196.8	**387.3**	170.7	186.0	**356.7**
Whole of port															
Total cargo throughput *(million tonnes)*			**17.7**			**18.8**			**19.9**			**33.6**	8.8	7.9	**16.7**
Non-containerised general cargo throughput *(million tonnes)*			**0.6**			**0.5**			**0.5**			**0.4**	0.2	0.2	**0.4**
Total TEUs exchanged *('000)*			**502.3**			**583.7**			**513.6**			**595.2**	262.9	280.6	**543.5**
Full import ('000)			**224.3**			**259.5**			**228.0**			**264.9**	118.3	118.9	**237.2**
Empty import ('000)			**29.1**			**36.4**			**31.0**			**35.0**	13.2	23.5	**36.8**
Full export ('000)			**147.8**			**178.0**			**145.4**			**167.3**	64.7	87.4	**152.0**
Empty export ('000)			**101.1**			**109.8**			**109.2**			**128.1**	66.7	50.8	**117.5**

Note: Blank cells mean no data was reported in that period. Prior to March 2015, Whole of Port statistics were reported at six-monthly intervals only. Balance of TEUs handled may include some or all of: empty container operations, bulk runs and containers handled at the port by importers/exporters. The balance is computed against the total containers handled wharfside; landside-only operations are additional to the totals.

Sources: DP World (2015), Hutchison Ports Australia (2015), Patrick (2015) and Port of Brisbane Pty Ltd (2015).

Table 1.2 Container terminal throughput: Sydney

	2013						2014						2015		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
Wharfside															
UCC ships handled, as reported by stevedores	261	267	**528**	289	306	**595**	292	299	**591**	290	284	**574**	272	281	**553**
Total containers handled *('000)*	325.6	340.8	**666.4**	366.7	387.0	**753.7**	352.6	355.2	**707.9**	387.6	393.5	**781.2**	354.9	367.0	**721.8**
Total TEUs handled *('000)*	493.6	511.2	**1 004.7**	561.0	584.5	**1 145.5**	535.9	536.2	**1 072.1**	592.4	606.8	**1 199.2**	547.7	563.5	**1 111.3**
40-foot containers as per cent of all containers handled *(%)*	51.6	50.0	**50.8**	53.0	51.1	**52.0**	52.0	50.9	**51.5**	52.8	54.2	**53.5**	54.4	53.6	**54.0**
Landside															
Number of trucks used in VBS/TAS operations *('000)*	138.5	143.1	**281.7**	141.1	140.3	**281.4**	127.8	145.3	**273.1**	157.9	161.0	**318.9**	139.9	153.8	**293.7**
Total containers transported by VBS/TAS trucks and rail *('000)*	236.9	244.7	**481.6**	243.4	241.6	**485.0**	223.0	229.7	**452.7**	249.3	252.4	**501.7**	243.6	257.7	**501.2**
Containers by VBS/TAS trucks *('000)*	189.3	193.8	**383.0**	191.4	192.6	**383.9**	174.1	197.8	**371.9**	217.0	218.2	**435.2**	189.0	214.7	**403.7**
Containers by rail *('000)*	47.7	51.0	**98.6**	52.0	49.1	**101.1**	48.8	31.9	**80.8**	32.3	34.2	**66.5**	54.5	43.0	**97.5**
Balance of containers handled landside *('000)*	88.7	96.1	**184.7**	123.3	145.3	**268.7**	129.7	125.5	**255.2**	138.3	141.1	**279.4**	111.3	109.3	**220.6**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	345.9	359.3	**705.2**	359.1	357.7	**716.8**	329.9	346.3	**676.2**	378.7	382.9	**761.6**	367.6	378.4	**745.9**
TEUs by VBS/TAS trucks *('000)*	283.4	289.8	**573.2**	286.8	289.8	**576.6**	262.9	300.1	**563.1**	330.6	332.8	**663.4**	288.8	315.5	**604.3**
TEUs by rail *('000)*	62.5	69.5	**132.0**	72.3	68.0	**140.2**	66.9	46.2	**113.1**	48.1	50.1	**98.2**	78.7	62.9	**141.6**
Balance of TEUs handled landside *('000)*	147.7	151.9	**299.6**	201.9	226.8	**428.7**	206.0	189.9	**395.9**	213.7	223.9	**437.6**	180.2	185.2	**365.3**
Whole of container terminal															
Total number of container ship visits	262	270	**532**	286	297	**583**	284	293	**577**	288	275	**563**	260	264	**524**
Total containers (lifts) exchanged *('000)*	301.5	308.7	**610.3**	337.0	358.3	**695.3**	319.4	322.1	**641.5**	361.5	362.9	**724.4**	350.1	358.4	**708.5**
Whole of port															
Total cargo throughput *(million tonnes)*			**14.3**			**9.8**			**9.3**			**10.3**	4.4	5.8	**10.3**
Non-containerised general cargo throughput *(million tonnes)*			**0.0**			**0.0**			**0.0**			**1.7**	0.8	0.9	**1.7**
Total TEUs exchanged *('000)*			**1 007.8**			**1 145.3**			**1 061.1**			**1 185.9**	542.4	561.3	**1 103.7**
Full import ('000)			**499.9**			**576.6**			**524.6**			**597.8**	265.3	282.0	**547.4**
Empty import ('000)			**7.4**			**3.4**			**5.5**			**6.3**	3.1	2.3	**5.5**
Full export ('000)			**208.5**			**227.5**			**208.5**			**233.8**	112.1	122.8	**234.9**
Empty export ('000)			**292.0**			**337.8**			**322.6**			**348.0**	161.8	154.2	**316.0**

Note: Blank cells mean no data was reported in that period. Prior to March 2015, Whole of Port statistics were reported at six-monthly intervals only.
Cells with an entry of "0.0" mean that data were reported but rounded to zero.
Balance of TEUs handled may include some or all of: empty container operations, bulk runs and containers handled at the port by importers/exporters. The balance is computed against the total containers handled wharfside; landside-only operations are additional to the totals.

Sources: DP World (2015), Patrick (2015) and NSW Ports (2015).

Table 1.3 Container terminal throughput: Melbourne

	2013						2014						2015		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
Wharfside															
UCC ships handled, as reported by stevedores	262	250	**512**	265	266	**531**	249	274	**523**	271	264	**535**	257	274	**531**
Total containers handled *('000)*	340.0	337.3	**677.3**	364.6	377.4	**742.1**	355.3	370.8	**726.2**	388.6	395.5	**784.2**	363.6	376.8	**740.4**
Total TEUs handled *('000)*	508.0	505.7	**1 013.6**	550.1	565.9	**1 116.0**	525.2	548.4	**1 073.6**	581.9	595.7	**1 177.7**	543.1	563.1	**1 106.2**
40-foot containers as per cent of all containers handled *(%)*	49.4	49.9	**49.7**	50.9	49.9	**50.4**	47.8	47.9	**47.9**	49.7	50.6	**50.2**	49.4	49.4	**49.4**
Landside															
Number of trucks used in VBS/TAS operations *('000)*	177.2	188.2	**365.5**	184.2	185.8	**370.0**	177.3	178.4	**355.7**	186.9	180.6	**367.6**	167.6	161.3	**328.9**
Total containers transported by VBS/TAS trucks and rail *('000)*	329.1	343.6	**672.7**	344.3	348.7	**693.0**	362.1	362.2	**724.4**	371.3	349.8	**721.0**	332.1	319.1	**651.1**
Containers by VBS/TAS trucks *('000)*	284.8	304.2	**589.0**	302.4	309.3	**611.7**	298.7	303.4	**602.1**	317.3	311.0	**628.3**	289.5	279.2	**568.7**
Containers by rail *('000)*	44.4	39.4	**83.7**	41.9	39.4	**81.2**	63.5	58.8	**122.2**	54.0	38.8	**92.8**	42.5	39.9	**82.4**
Balance of containers handled landside *('000)*	55.2	33.1	**88.3**	62.2	68.1	**130.3**	56.6	67.4	**124.1**	71.4	84.5	**155.9**	74.0	97.7	**171.7**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	486.5	510.9	**997.5**	514.7	515.2	**1 029.9**	526.1	533.8	**1 059.9**	550.9	517.5	**1 068.4**	492.4	469.6	**962.0**
TEUs by VBS/TAS trucks *('000)*	420.2	451.9	**872.1**	451.6	456.2	**907.7**	432.3	446.9	**879.2**	470.1	459.2	**929.2**	428.8	410.0	**838.8**
TEUs by rail *('000)*	66.3	59.0	**125.3**	63.2	59.0	**122.2**	93.8	86.9	**180.7**	80.9	58.4	**139.2**	63.5	59.7	**123.2**
Balance of TEUs handled landside *('000)*	87.7	53.8	**141.5**	98.5	109.7	**208.3**	92.9	101.5	**194.5**	111.9	136.6	**248.4**	114.3	153.1	**267.4**
Whole of container terminal															
Total number of container ship visits	284	270	**554**	281	284	**565**	261	266	**527**	266	259	**525**	249	266	**515**
Total containers (lifts) exchanged *('000)*	346.2	344.3	**690.5**	368.9	380.0	**748.9**	359.2	361.6	**720.9**	384.4	389.2	**773.6**	359.0	371.3	**730.3**
Whole of port															
Total cargo throughput *(million tonnes)*			**17.2**			**17.6**			**17.4**			**17.2**	8.4	9.0	**17.5**
Non-containerised general cargo throughput *(million tonnes)*			**1.1**			**1.1**			**1.0**			**1.1**	0.5	0.6	**1.1**
Total TEUs exchanged *('000)*			**1 190.6**			**1 302.2**			**1 230.5**			**1 323.8**	616.6	638.5	**1 255.1**
Full import ('000)			**529.2**			**593.6**			**538.7**			**608.8**	278.9	284.0	**562.9**
Empty import ('000)			**68.9**			**59.4**			**75.6**			**57.6**	29.5	36.1	**65.7**
Full export ('000)			**428.5**			**438.3**			**441.0**			**429.3**	204.8	218.1	**422.8**
Empty export ('000)			**164.0**			**210.9**			**175.2**			**228.0**	103.4	100.3	**203.7**

Note: Blank cells mean no data was reported in that period. Prior to March 2015, Whole of Port statistics were reported at six-monthly intervals only.

Balance of TEUs handled may include some or all of: empty container operations, bulk runs and containers handled at the port by importers/exporters. The balance is computed against the total containers handled wharfside; landside-only operations are additional to the totals.

The counts of containers by rail include those handled by Qube Logisitics.

Sources: DP World (2015), Patrick (2015) and Port of Melbourne Corporation (2015).

Table 1.4 Container terminal throughput: Adelaide

	2013						2014						2015		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
Wharfside															
UCC ships handled, as reported by stevedores	77	81	**158**	86	83	**169**	81	84	**165**	84	81	**165**	78	93	**171**
Total containers handled *('000)*	58.5	61.1	**119.6**	68.1	69.4	**137.5**	69.6	70.8	**140.4**	65.1	67.7	**132.9**	63.0	64.3	**127.4**
Total TEUs handled *('000)*	81.6	84.4	**166.0**	96.5	96.2	**192.7**	95.3	97.3	**192.6**	91.5	95.3	**186.8**	89.1	92.1	**181.3**
40-foot containers as per cent of all containers handled *(%)*	39.4	38.1	**38.7**	41.7	38.6	**40.2**	37.0	37.5	**37.2**	40.5	40.7	**40.6**	41.4	43.2	**42.3**
Landside															
Number of trucks used in VBS/TAS operations *('000)*	28.0	28.6	**56.6**	30.7	29.8	**60.5**	31.0	31.9	**62.9**	30.4	31.0	**61.5**	31.0	30.3	**61.3**
Total containers transported by VBS/TAS trucks and rail *('000)*	45.8	48.8	**94.7**	55.2	53.6	**108.8**	62.3	62.2	**124.5**	64.5	64.4	**128.8**	64.6	62.6	**127.2**
Containers by VBS/TAS trucks *('000)*	45.8	48.8	**94.7**	55.2	53.6	**108.8**	56.7	56.4	**113.1**	53.3	52.9	**106.3**	53.2	51.9	**105.0**
Containers by rail *('000)*	0.0	0.0	**0.0**	0.0	0.0	**0.0**	5.6	5.8	**11.4**	11.1	11.4	**22.6**	11.4	10.7	**22.1**
Balance of containers handled landside *('000)*	12.7	12.3	**25.0**	12.9	15.8	**28.7**	12.9	14.4	**27.3**	11.8	14.8	**26.6**	9.9	12.5	**22.3**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	64.4	68.9	**133.3**	80.3	76.3	**156.6**	86.7	87.0	**173.7**	91.0	91.5	**182.5**	91.0	89.9	**180.9**
TEUs by VBS/TAS trucks *('000)*	64.4	68.9	**133.3**	80.3	76.3	**156.6**	79.0	79.1	**158.1**	75.7	75.5	**151.2**	75.0	74.9	**149.9**
TEUs by rail *('000)*	0.0	0.0	**0.0**	0.0	0.0	**0.0**	7.7	7.9	**15.6**	15.3	15.9	**31.3**	16.0	15.0	**31.0**
Balance of TEUs handled landside *('000)*	17.2	15.4	**32.7**	16.3	19.8	**36.1**	16.3	18.2	**34.5**	15.8	19.7	**35.6**	14.1	17.2	**31.3**
Whole of container terminal															
Total number of container ship visits	77	82	**159**	86	86	**172**	81	82	**163**	85	81	**166**	77	92	**169**
Total containers (lifts) exchanged *('000)*	59.0	61.6	**120.6**	67.1	69.7	**136.7**	69.2	69.7	**139.0**	65.5	67.5	**133.0**	61.8	63.9	**125.6**
Whole of port															
Total cargo throughput *(million tonnes)*			**7.9**			**8.0**			**8.1**			**7.0**	3.9	3.7	**7.6**
Non-containerised general cargo throughput *(million tonnes)*			**0.1**			**0.2**			**0.2**			**0.1**	0.1	0.1	**0.2**
Total TEUs exchanged *('000)*			**165.5**			**191.9**			**190.8**			**187.0**	87.3	91.6	**178.9**
Full import ('000)			**60.5**			**72.9**			**67.0**			**70.6**	33.6	33.1	**66.7**
Empty import ('000)			**22.2**			**24.3**			**27.4**			**22.6**	10.8	13.4	**24.2**
Full export ('000)			**72.3**			**76.9**			**81.1**			**77.6**	36.9	39.0	**75.9**
Empty export ('000)			**10.4**			**17.8**			**15.3**			**16.2**	6.0	6.1	**12.1**

Note: Blank cells mean no data was reported in that period. Prior to March 2015, Whole of Port statistics were reported at six-monthly intervals only.

Cells with an entry of "0.0" mean that data were reported but rounded to zero.

Balance of TEUs handled may include some or all of: empty container operations, bulk runs and containers handled at the port by importers/exporters. The balance is computed against the total containers handled wharfside; landside-only operations are additional to the totals.

Sources: Flinders Adelaide Container Terminal (2015) and Flinders Ports (2015).

Table 1.5 Container terminal throughput: Fremantle

	2013						2014						2015		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
Wharfside															
UCC ships handled, as reported by stevedores	119	124	**243**	122	131	**253**	123	126	**249**	132	127	**259**	125	128	**253**
Total containers handled *('000)*	104.5	106.2	**210.7**	112.2	125.2	**237.4**	114.1	117.5	**231.6**	129.8	132.8	**262.7**	115.3	112.8	**228.1**
Total TEUs handled *('000)*	153.1	155.5	**308.6**	167.0	186.8	**353.8**	166.6	168.3	**334.8**	190.4	198.2	**388.7**	170.6	168.6	**339.2**
40-foot containers as per cent of all containers handled *(%)*	46.5	46.5	**46.5**	48.8	49.2	**49.0**	46.0	43.2	**44.6**	46.7	49.2	**48.0**	48.0	49.5	**48.7**
Landside															
Number of trucks used in VBS/TAS operations *('000)*	42.1	45.4	**87.5**	50.3	52.4	**102.7**	48.4	50.8	**99.2**	52.1	53.9	**106.0**	46.6	44.1	**90.8**
Total containers transported by VBS/TAS trucks and rail *('000)*	89.4	96.2	**185.6**	97.2	101.7	**198.9**	99.9	107.0	**206.8**	103.5	111.2	**214.7**	93.0	86.5	**179.4**
Containers by VBS/TAS trucks *('000)*	74.2	78.8	**153.0**	81.1	83.5	**164.6**	78.7	83.5	**162.2**	85.6	88.9	**174.6**	75.8	69.6	**145.4**
Containers by rail *('000)*	15.2	17.4	**32.6**	16.1	18.2	**34.3**	21.2	23.5	**44.6**	17.9	22.3	**40.2**	17.2	16.8	**34.0**
Balance of containers handled landside *('000)*	15.1	10.0	**25.1**	15.0	23.5	**38.5**	14.2	10.6	**24.8**	26.3	21.6	**47.9**	22.3	26.4	**48.6**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	128.3	136.8	**265.1**	136.8	143.0	**279.7**	136.3	144.4	**280.7**	142.9	156.6	**299.4**	133.4	124.8	**258.3**
TEUs by VBS/TAS trucks *('000)*	108.1	114.2	**222.3**	116.0	119.2	**235.2**	110.0	115.5	**225.5**	120.5	127.7	**248.3**	110.4	101.1	**211.5**
TEUs by rail *('000)*	20.2	22.6	**42.8**	20.8	23.8	**44.5**	26.3	28.9	**55.2**	22.3	28.8	**51.2**	23.0	23.7	**46.7**
Balance of TEUs handled landside *('000)*	24.8	18.6	**43.5**	30.2	43.8	**74.1**	30.3	23.8	**54.1**	47.6	41.7	**89.2**	37.1	43.8	**80.9**
Whole of container terminal															
Total number of container ship visits	120	123	**243**	123	129	**252**	129	125	**254**	132	126	**258**	126	128	**254**
Total containers (lifts) exchanged *('000)*	104.8	106.3	**211.1**	112.6	121.8	**234.4**	115.8	116.2	**232.0**	129.1	131.0	**260.1**	114.6	112.0	**226.6**
Whole of port															
Total cargo throughput *(million tonnes)*			**16.3**			**15.6**			**17.8**			**17.4**	9.2	9.3	**18.5**
Non-containerised general cargo throughput *(million tonnes)*			**0.5**			**0.5**			**0.5**			**0.5**	0.2	0.2	**0.4**
Total TEUs exchanged *('000)*			**311.1**			**357.7**			**345.4**			**398.1**	174.1	171.4	**345.5**
Full import ('000)			**153.7**			**176.5**			**164.1**			**189.8**	83.1	82.9	**166.1**
Empty import ('000)			**6.7**			**9.0**			**14.0**			**17.1**	4.6	5.4	**10.0**
Full export ('000)			**87.6**			**96.6**			**109.4**			**118.2**	52.4	51.9	**104.2**
Empty export ('000)			**63.0**			**75.6**			**57.9**			**72.9**	34.0	31.2	**65.2**

Note: Blank cells mean no data was reported in that period. Prior to March 2015, Whole of Port statistics were reported at six-monthly intervals only.

Balance of TEUs handled may include some or all of: empty container operations, bulk runs and containers handled at the port by importers/exporters. The balance is computed against the total containers handled wharfside; landside-only operations are additional to the totals.

Sources: DP World (2015), Patrick (2015) and Fremantle Ports (2015).

Table 1.6 Container terminal throughput: Five ports

	2013						2014						2015		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
Wharfside															
UCC ships handled, as reported by stevedores	936	951	**1 887**	1 012	1 059	**2 071**	1 003	1 053	**2 056**	1 035	1 006	**2 041**	971	1 023	**1 994**
Total containers handled *('000)*	988.2	1 020.4	**2 008.6**	1 108.9	1 149.6	**2 258.5**	1 059.0	1 093.9	**2 152.9**	1 162.2	1 192.9	**2 355.1**	1 069.6	1 112.0	**2 181.6**
Total TEUs handled *('000)*	1 476.6	1 516.3	**2 992.9**	1 666.9	1 719.6	**3 386.5**	1 568.9	1 612.8	**3 181.7**	1 741.6	1 801.2	**3 542.8**	1 608.9	1 666.4	**3 275.3**
40-foot containers as per cent of all containers handled *(%)*	49.4	48.6	**49.0**	50.3	49.6	**49.9**	48.2	47.4	**47.8**	49.9	51.0	**50.4**	50.4	49.9	**50.1**
Landside															
Number of trucks used in VBS/TAS operations *('000)*	456.6	480.2	**936.8**	486.2	488.1	**974.3**	456.6	489.6	**946.2**	515.1	512.2	**1 027.3**	459.6	470.1	**929.7**
Total containers transported by VBS/TAS trucks and rail *('000)*	824.8	877.2	**1 702.1**	884.9	887.9	**1 772.8**	872.4	910.4	**1 782.8**	946.4	931.0	**1 877.4**	861.9	868.2	**1 730.2**
Containers by VBS/TAS trucks *('000)*	711.1	758.3	**1 469.3**	763.5	770.8	**1 534.3**	725.4	779.1	**1 504.4**	818.7	814.9	**1 633.6**	729.1	747.8	**1 476.9**
Containers by rail *('000)*	113.8	119.0	**232.8**	121.4	117.1	**238.5**	147.0	131.3	**278.4**	127.6	116.1	**243.8**	132.8	120.5	**253.3**
Balance of containers handled landside *('000)*	163.4	143.2	**306.5**	224.0	261.7	**485.7**	186.5	183.6	**370.1**	215.8	261.9	**477.7**	207.7	243.8	**451.5**
Total TEUs transported by VBS/TAS trucks and rail *('000)*	1 202.2	1 281.6	**2 483.8**	1 299.2	1 295.9	**2 595.1**	1 257.3	1 329.3	**2 586.6**	1 395.0	1 370.6	**2 765.5**	1 273.3	1 267.1	**2 540.4**
TEUs by VBS/TAS trucks *('000)*	1 045.5	1 116.1	**2 161.6**	1 128.1	1 132.2	**2 260.3**	1 053.3	1 144.9	**2 198.2**	1 212.8	1 206.6	**2 419.4**	1 084.2	1 095.0	**2 179.2**
TEUs by rail *('000)*	156.7	165.5	**322.2**	171.1	163.7	**334.8**	204.0	184.3	**388.3**	182.2	163.9	**346.1**	189.1	172.1	**361.2**
Balance of TEUs handled landside *('000)*	274.5	234.6	**509.1**	367.7	423.7	**791.4**	311.6	283.6	**595.2**	346.6	430.7	**777.3**	335.6	399.3	**735.0**
Whole of container terminal															
Total number of container ship visits	963	968	**1 931**	1 029	1 062	**2 091**	1 003	1 029	**2 032**	1 023	975	**1 998**	948	986	**1 934**
Total containers (lifts) exchanged *('000)*	968.5	987.2	**1 955.9**	1 082.4	1 116.3	**2 198.6**	1 031.3	1 043.7	**2 075.1**	1 131.0	1 147.5	**2 278.5**	1 056.1	1 091.6	**2 147.7**
Whole of port															
Total cargo throughput *(million tonnes)*			**73.4**			**69.8**			**72.5**			**85.5**	34.7	35.7	**70.6**
Non-containerised general cargo throughput *(million tonnes)*			**2.3**			**2.3**			**2.2**			**3.8**	1.8	2.0	**3.8**
Total TEUs exchanged *('000)*			**3 177.3**			**3 580.8**			**3 341.4**			**3 690.0**	1 683.3	1 743.4	**3 426.7**
Full import ('000)			**1 467.6**			**1 679.1**			**1 522.4**			**1 731.9**	779.3	801.0	**1 580.2**
Empty import ('000)			**134.3**			**132.5**			**153.5**			**138.6**	61.2	80.9	**142.1**
Full export ('000)			**944.7**			**1 017.3**			**985.4**			**1 026.2**	470.8	519.1	**989.9**
Empty export ('000)			**630.5**			**751.9**			**680.2**			**1 027.0**	372.0	342.5	**714.5**

Note: Blank cells mean no data was reported in that period. Prior to March 2015, Whole of Port statistics were reported at six-monthly intervals only.

Balance of TEUs handled may include some or all of: empty container operations, bulk runs and containers handled at the port by importers/exporters. The balance is computed against the total containers handled wharfside; landside-only operations are additional to the totals.

Sources: As for Tables 1.1 to 1.5.

Table 1.7 Container terminal throughput: Container Ship Visits by Port, January–June 2015

	Brisbane	Sydney	Melbourne	Adelaide	Fremantle	Total
Gross Tonnage						
5 000–20 000 GT	48	60	55	0	24	187
20 001–35 000 GT	57	87	55	25	16	240
35 001–40 000 GT	57	78	80	38	39	292
40 001–50 000 GT	135	109	125	36	51	456
50 001 and above GT	172	174	198	70	123	737
All ship sizes	471	508	513	169	253	1 915

Sources: Port of Brisbane Pty Ltd (2015), NSW Ports (2015), Port of Melbourne Corporation (2015), Flinders Ports (2015) and Fremantle Ports (2015).

Table 1.8 Container terminal throughput: Container Ship Visits by Port, July–December 2014

	Brisbane	Sydney	Melbourne	Adelaide	Fremantle	Total
Gross Tonnage						
5 000–20 000 GT	63	50	29	0	26	168
20 001–35 000 GT	54	108	66	20	6	254
35 001–40 000 GT	65	89	89	41	43	327
40 001–50 000 GT	137	129	148	49	54	517
50 001 and above GT	167	187	191	56	129	730
All ship sizes	486	563	523	166	258	1 996

Sources: Port of Brisbane Pty Ltd (2014), NSW Ports (2014), Port of Melbourne Corporation (2014), Flinders Ports (2014) and Fremantle Ports (2014).

CHAPTER 2
Measures of container terminal productivity

Overview

Chapter 2 of Waterline presents in a consolidated format all container terminal productivity measures. The indicators are in three groups—wharf-side, landside and whole of container terminal.

Seven quarterly wharf-side productivity indicators are covered:

2.1 Crane rate – containers per hour

2.2 Elapsed labour rate – containers per hour

2.3 Ship rate – containers per hour

2.4 Crane rate – TEUs per hour

2.5 Elapsed labour rate – TEUs per hour

2.6 Ship rate – TEUs per hour

2.7 Throughput pbm (containers per berth metre).

The following five quarterly landside productivity indicators are reported for trucks involved in VBS/TAS operations. Bulk run trucks are not included in calculating these indicators:

2.8 Containers per truck

2.9 TEUs per truck

2.10 Per cent of trucks backloaded

2.11 Average truck turnaround time

2.12 Average container turnaround time.

Twelve indicators are reported for whole of container terminal productivity.

2.13 Median of ship turnaround time

2.14 95th percentile of ship turnaround time

2.15 Number of ships waiting at anchorage for more than 2 hours

2.16 Per cent of ships waiting at anchorage for more than 2 hours

2.17 Average waiting time at anchorage

2.18 Median waiting time at anchorage

2.19 Total time ships spent at berth

2.20 Average TEUs per ship-hour at berth

2.21 Average lifts per ship-hour at berth

2.22 Total time ships available to stevedores

2.23 Average lifts per hour of stevedoring operation

2.24 Average lifts per berth visit.

The chapter presents these indicators for Brisbane, Sydney, Melbourne, Adelaide, Fremantle and Five ports, where Five ports are aggregations of data for the five capital city container terminals.

Wharf-side 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 elapsed crane time (see details in Box 1). This indicator is interpreted as a proxy measure for the productivity of capital at a container terminal.

Box 1: Elapsed Crane Time

This is the crane time allocated by the stevedore to work on a container ship, assuming the container ship is ready for loading or unloading. It is computed as the total allocated crane hours, less operational and non-operational delays:

- 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
- Defective ship's gear (e.g. jammed twist-locks, broken cell guides, ballast pumps unable to maintain list/trim).

Indicator 2.2 Elapsed labour rate – containers per hour

This indicator measures labour productivity at a container terminal and is computed as the number of containers handled divided by the total elapsed labour time (see details in Box 2). Sometimes this measure is reported as the "ship working rate".

Indicator 2.3 Ship rate – containers per hour

This is the average number of containers moved on or off a ship in an hour. Generally, this indicator measures the combined stevedoring productivity of capital and labour.

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. At a container terminal it measures the intensity of use of the terminal container handling facility. The six month figure is a weighted average of the corresponding quarterly throughput.

Box 2: Elapsed Labour Time

This is 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
- Break bulk and containers that require manual interventions, e.g. use of wires, chains, non-rigid spreaders or other handling gear.

Landside productivity measures

These indicators relate to the performance in processing containers through the 1-Stop Connections Pty Ltd Vehicle Booking System (VBS) by Patrick and DP World, or through the Truck Appointment System (TAS) by Hutchison Ports Australia. They do not include the performance of bulk run trucks.

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 Per cent of trucks backloaded

'Backloaded operations' (also called 'triangular 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. This indicator shows the number of

backloaded trucks as a percentage of the total VBS/TAS trucks in Brisbane, Sydney, Melbourne and Fremantle. It is published for the first time in Waterline 57.

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 truck exits the gate. This measure 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 fast (expressed in minutes) a stevedoring company processes a truck at a container terminal.

Indicator 2.12 Average container turnaround time

This is 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 container ship 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 Per cent of ships waiting at anchorage for more than 2 hours

This is the number of container ships in Indicator 2.15 as a per cent 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) is 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.

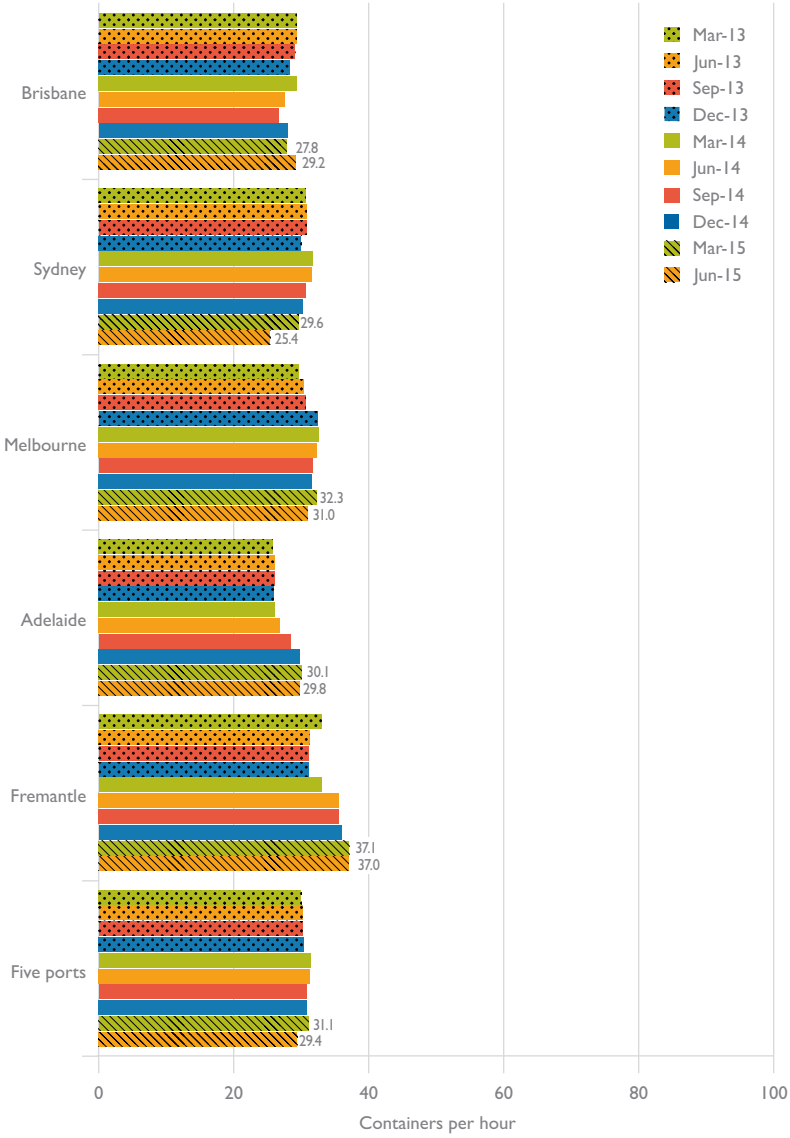
Indicator 2.23 Average lifts per hour of stevedoring operation

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

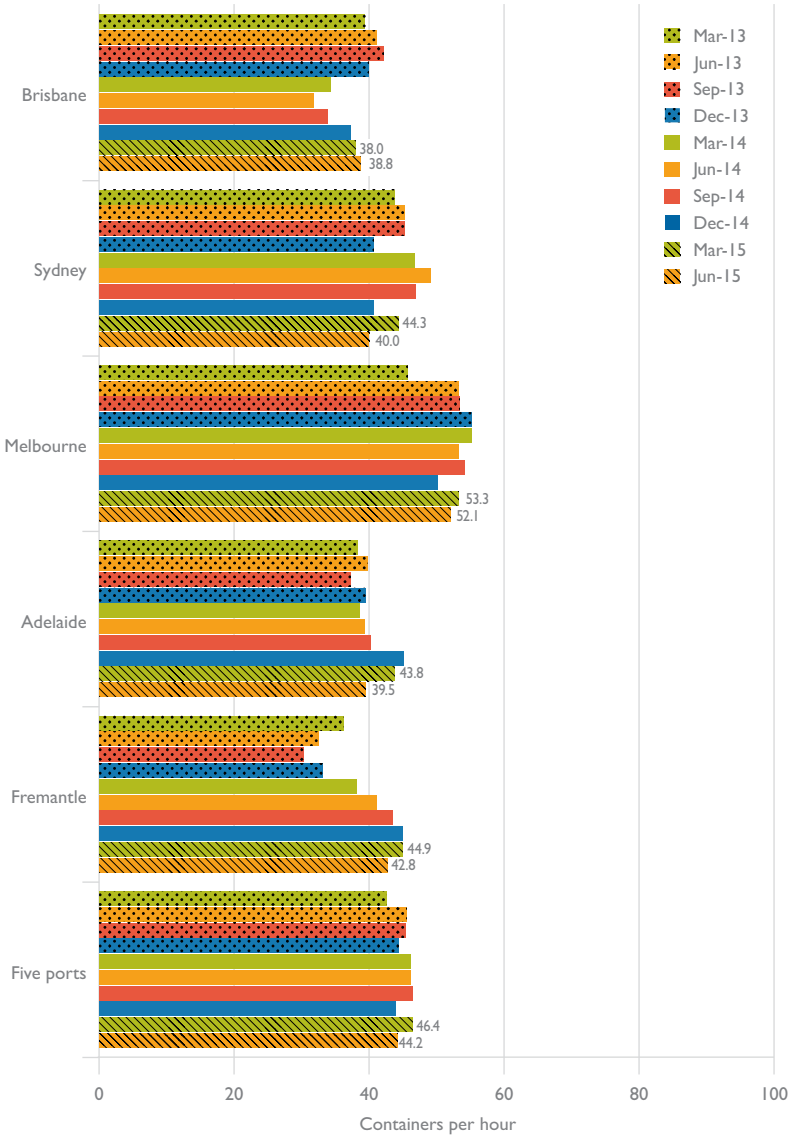
This is the number of crane lifts (containers handled) divided by the number of berth visits of dedicated container ships (UCC).

Figure 2.1 Wharf-side crane rate



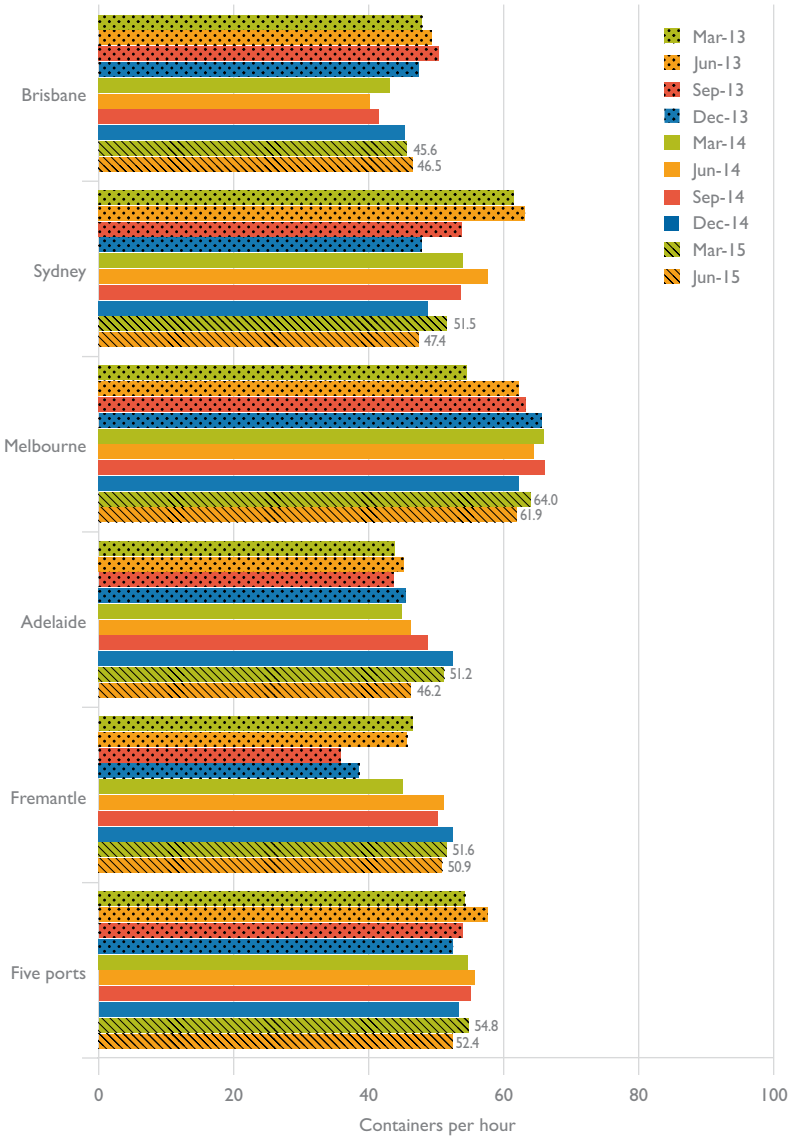
Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

Figure 2.2 Wharf-side elapsed labour rate



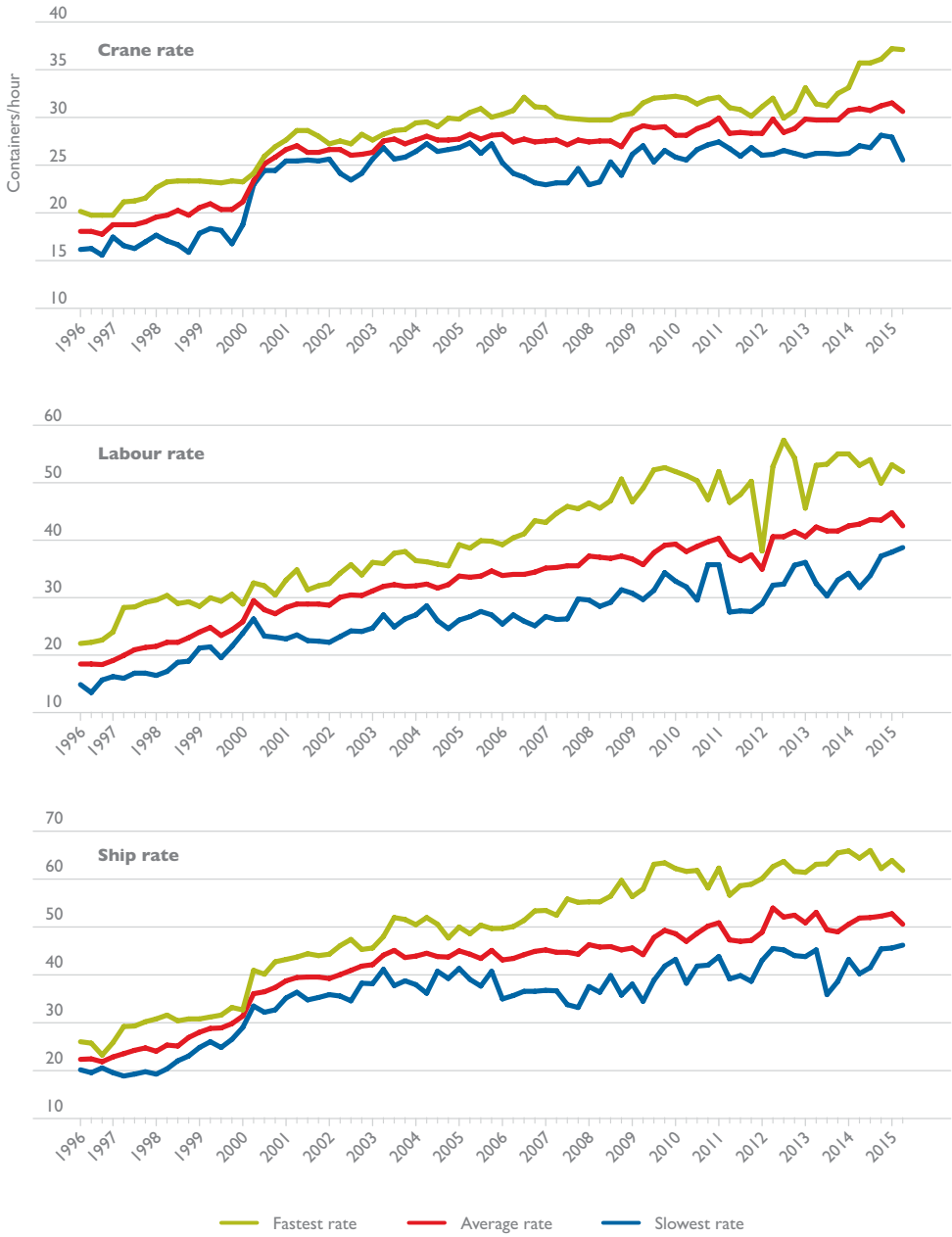
Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

Figure 2.3 Wharf-side ship rate



Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

Figure 2.4 Productivity in five ports: Comparison of wharf-side rates

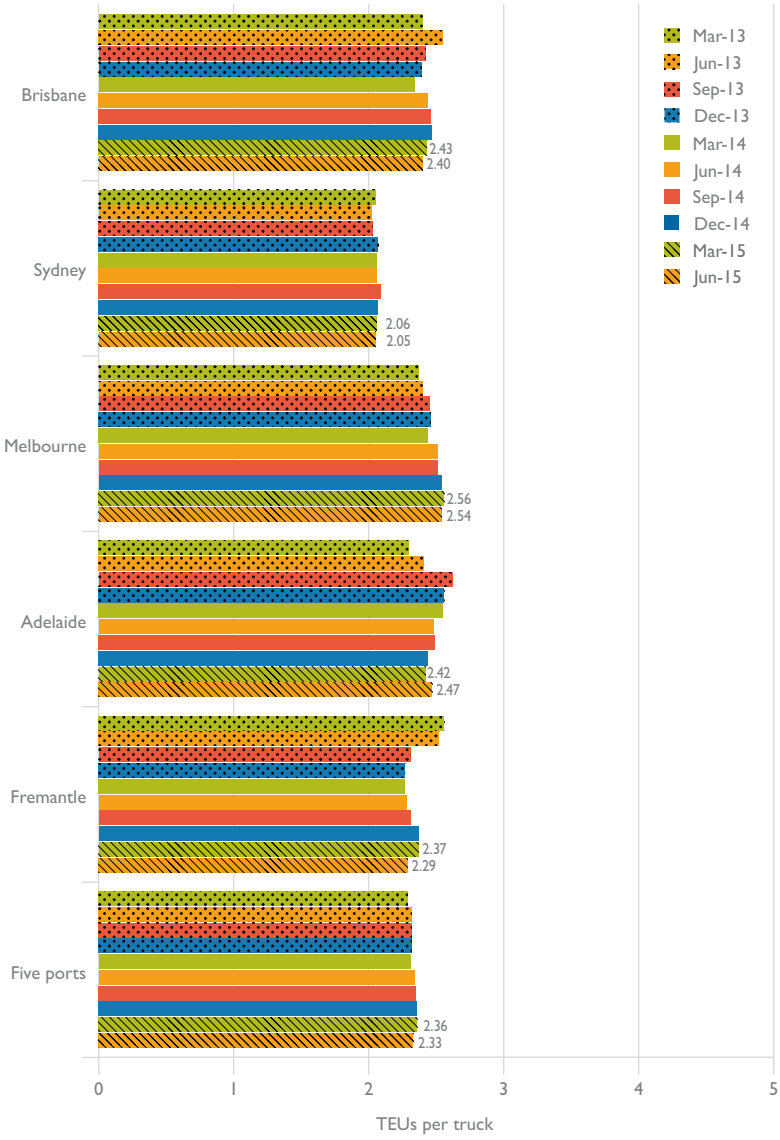


Notes: The wharf-side crane rate, labour rate and ship rate are compared among all five ports and the fastest, average and slowest rates are illustrated. The fastest and slowest rate may correspond to different ports in different periods.

Crane rate, labour rate and ship rate are measured in containers per crane hour, elapsed labour hour and berth hour respectively.

Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

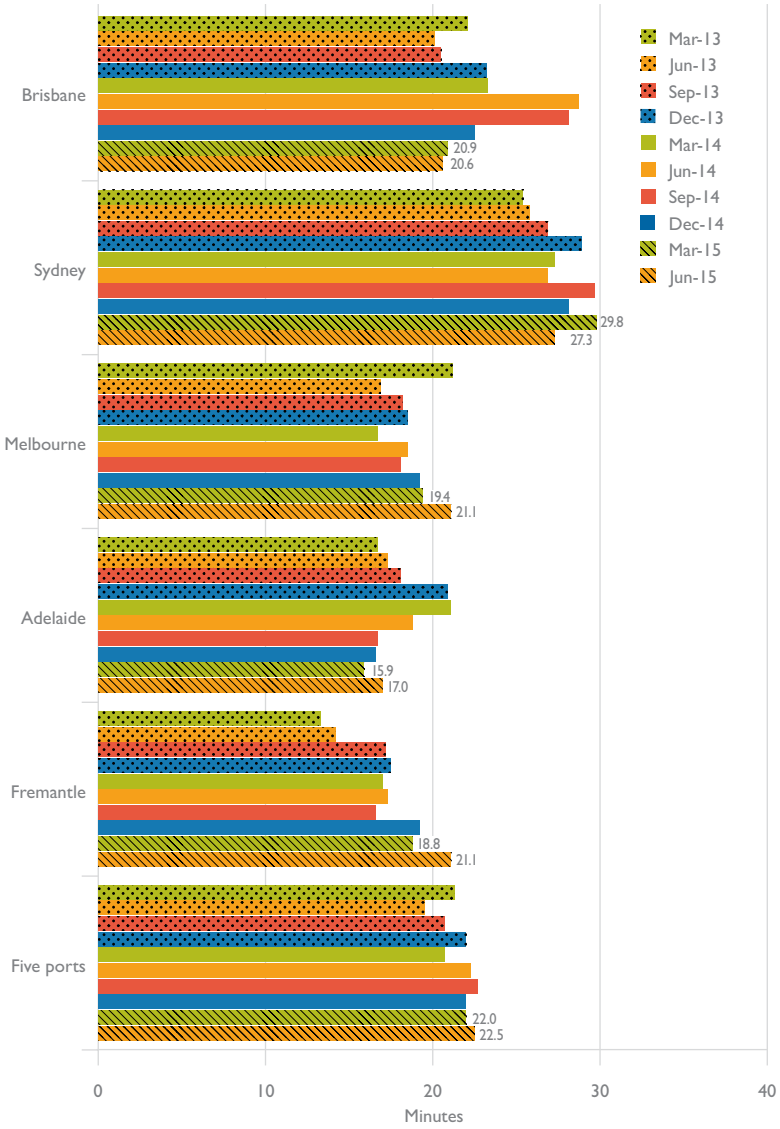
Figure 2.5 Average TEUs per truck on landside of container terminals



Notes: This indicator is based on only the trucks that are processed through the VBS/TAS system.

Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

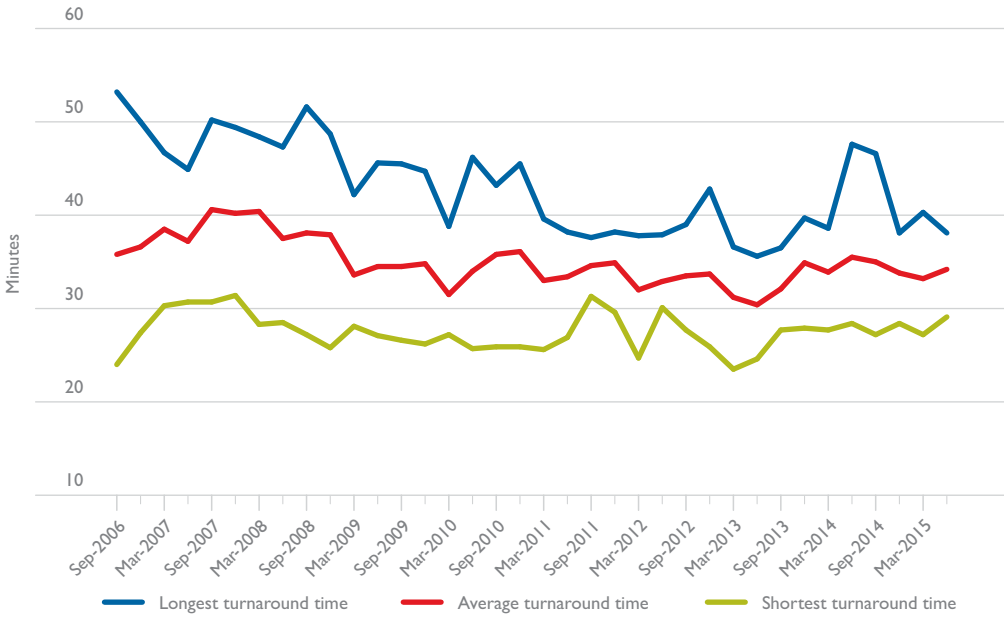
Figure 2.6 Average container turnaround time on landside of container terminals



Notes: This indicator is based on only the containers that are processed through the VBS/TAS system.

Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

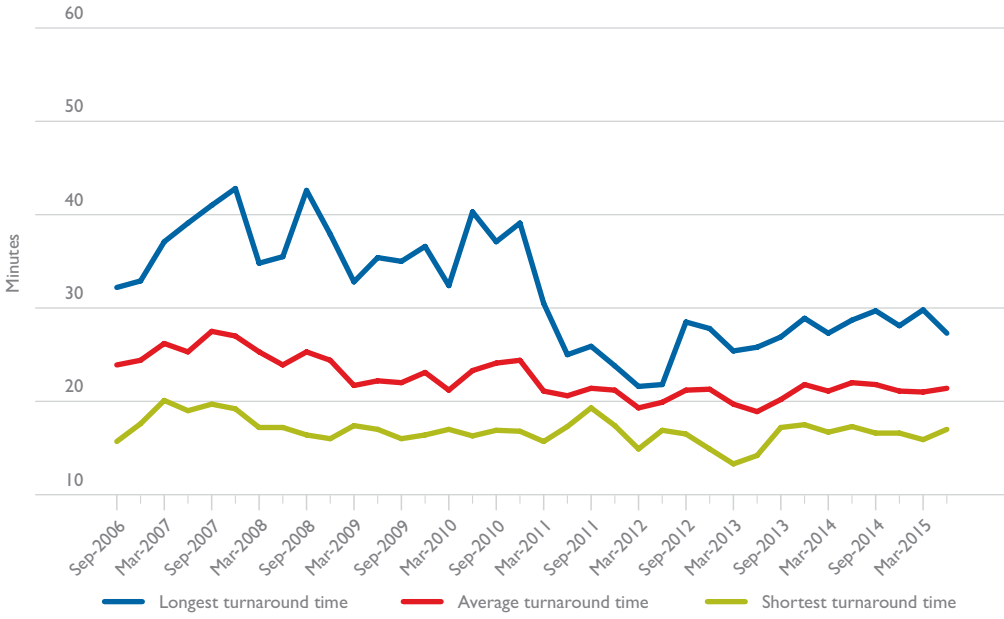
Figure 2.7 Longest and shortest truck turnaround time in five ports



Notes: The truck turnaround time is compared among all five ports in each quarter. The longest and shortest truck turnaround time may correspond to different ports in different periods.

Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015), Patrick (2015).

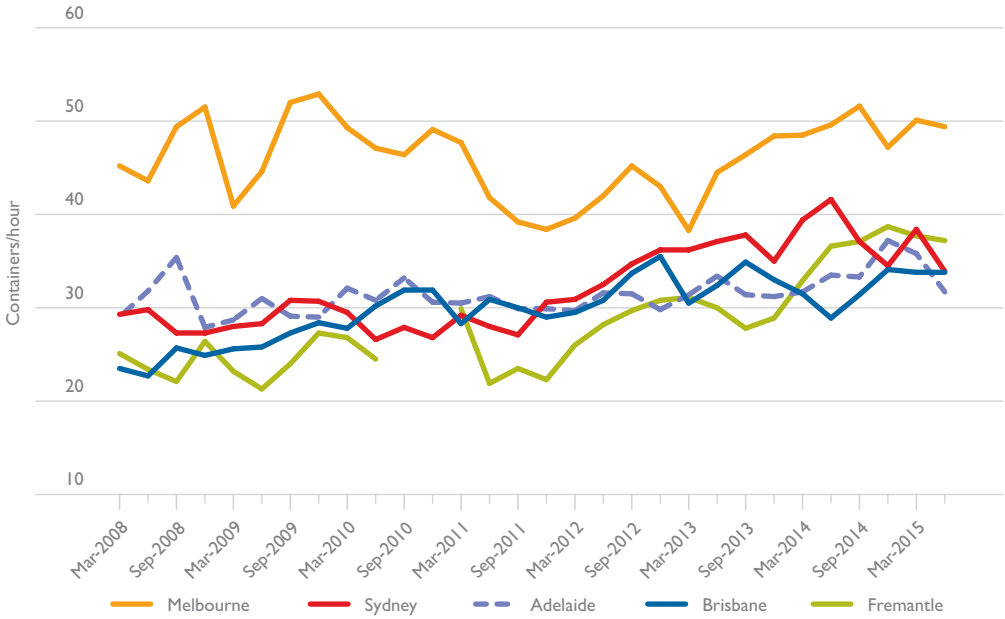
Figure 2.8 Longest and shortest container turnaround time in five ports



Notes: The container turnaround time is compared among all five ports in each quarter. The longest and shortest container turnaround time may correspond to different ports in different periods.

Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

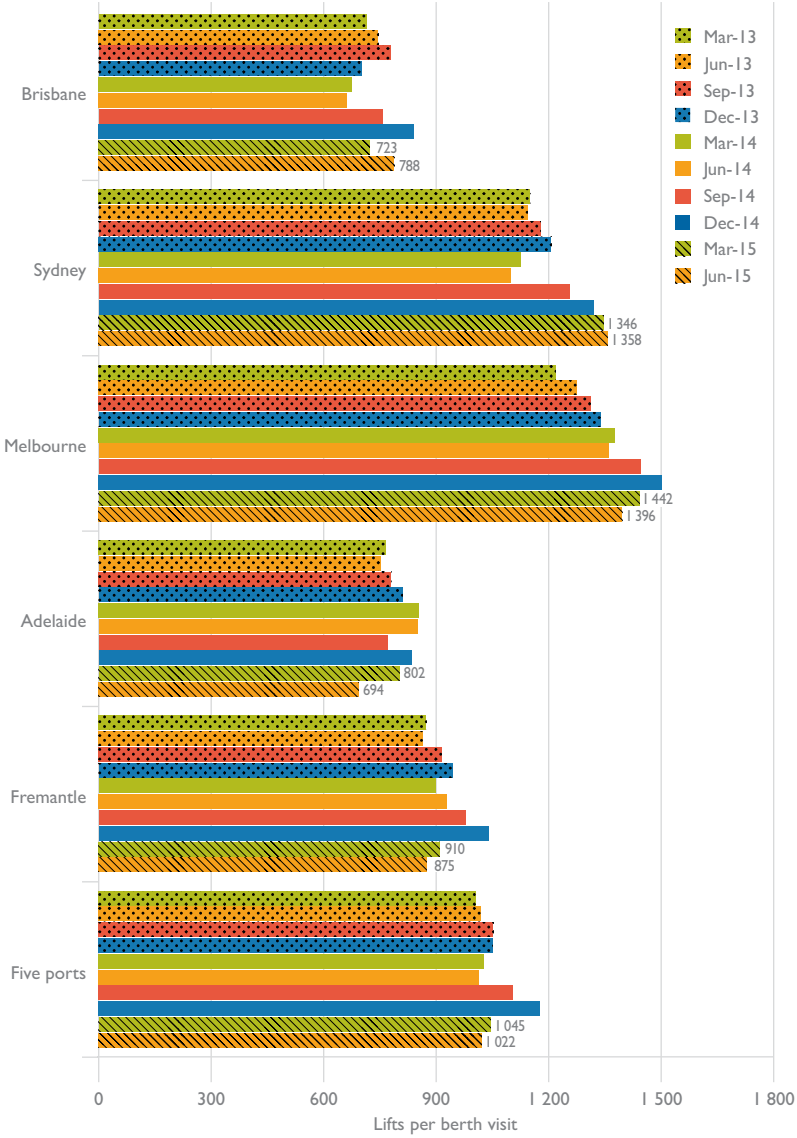
Figure 2.9 Average number of lifts per hour a ship spent at berth



Note: In September and December quarters of 2010 only part of ship movement statistics for Fremantle was available for analysis. These data points are not plotted.

Sources: BITRE estimates based on data from Port of Brisbane Pty Ltd (2015), NSW Ports (2015), Port of Melbourne Corporation (2015), Flinders Ports (2015) and Fremantle Ports (2015).

Figure 2.10 Average number of lifts per berth visit



Sources: BITRE estimates based on data from Port of Brisbane Pty Ltd (2015), NSW Ports (2015), Port of Melbourne Corporation (2015), Flinders Ports (2015) and Fremantle Ports (2015).

Table 2.1 Container terminal productivity: Brisbane

	2013						2014						2015		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
Wharfside															
Containers per hour															
Crane rate	29.3	29.3	**29.3**	29.1	28.3	**28.7**	29.4	27.5	**28.4**	26.7	28.0	**27.4**	27.8	29.2	**28.6**
Elapsed labour rate	39.4	41.1	**40.3**	42.1	39.9	**41.0**	34.3	31.8	**33.0**	33.9	37.3	**35.7**	38.0	38.8	**38.4**
Ship rate	47.9	49.3	**48.7**	50.4	47.4	**48.9**	43.2	40.2	**41.6**	41.5	45.4	**43.5**	45.6	46.5	**46.1**
TEUs per hour															
Crane rate	44.1	43.5	**43.7**	43.1	42.3	**42.7**	43.2	40.3	**41.7**	39.8	42.0	**40.9**	41.8	42.8	**42.3**
Elapsed labour rate	59.4	61.1	**60.3**	62.5	59.9	**61.2**	50.3	46.6	**48.4**	50.5	56.2	**53.4**	57.2	56.9	**57.0**
Ship rate	72.3	73.3	**72.8**	75.0	71.3	**73.2**	63.5	58.9	**61.1**	61.8	68.3	**65.2**	68.7	68.4	**68.5**
Throughput pbm	88.6	97.3	**92.9**	79.1	76.5	**77.8**	67.1	72.0	**69.6**	76.6	81.5	**79.1**	69.4	76.6	**73.0**
Landside															
Containers per truck	1.7	1.8	**1.7**	1.7	1.7	**1.7**	1.6	1.7	**1.6**	1.7	1.7	**1.7**	1.6	1.6	**1.6**
TEUs per truck	2.4	2.6	**2.5**	2.4	2.4	**2.4**	2.3	2.4	**2.4**	2.5	2.5	**2.5**	2.4	2.4	**2.4**
Per cent of trucks backloaded *(%)*										10.8	10.2	**10.5**	8.9	9.7	**9.3**
Truck turnaround time *(mins)*	36.6	35.6	**36.1**	34.1	38.4	**36.3**	37.9	47.6	**43.1**	46.6	37.7	**42.2**	34.2	33.8	**34.0**
Average container turnaround time *(mins)*	22.1	20.1	**21.1**	20.5	23.2	**21.8**	23.3	28.7	**26.2**	28.1	22.5	**25.3**	20.9	20.6	**20.7**
Whole of Container Terminal															
Ship turnaround time															
Median *(hours)*	30.0	30.7	**30.5**	30.1	28.7	**29.5**	29.2	29.4	**29.2**	30.6	30.7	**30.7**	28.2	28.9	**28.8**
95th percentile *(hours)*	97.3	51.5	**69.9**	51.0	49.3	**51.0**	51.1	52.0	**51.8**	51.8	51.6	**51.6**	44.5	45.8	**45.2**
Port congestion															
Number of ships waiting at anchorage for more than 2 hours	33	36	**69**	35	39	**74**	34	15	**49**	4	0	**4**	11	11	**22**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	15.0	16.1	**15.6**	13.8	14.7	**14.3**	13.7	5.7	**9.6**	1.6	0.0	**0.8**	4.7	4.7	**4.7**
Average waiting time at anchorage *(hours)*	30.6	13.4	**21.6**	13.1	12.6	**12.8**	12.1	10.7	**11.6**	10.8	-	**10.8**	10.0	20.0	**15.0**
Median of waiting time at anchorage *(hours)*	21.3	10.2	**13.6**	8.7	9.2	**9.1**	7.0	9.1	**7.0**	10.8	-	**10.8**	9.0	18.8	**10.1**
Total time ships spent at berth *('000 hours)*	5.1	5.1	**10.3**	5.6	5.7	**11.3**	5.3	6.0	**11.3**	6.1	5.8	**11.8**	5.1	5.5	**10.6**
Average TEUs per ship-hour at berth *(TEUs per hour)*	46.0	48.1	**47.1**	51.7	49.5	**50.6**	46.3	42.2	**44.1**	46.9	51.3	**49.0**	50.5	49.4	**49.9**
Average lifts per ship-hour at berth *(lifts per hour)*	30.5	32.4	**31.5**	34.9	33.0	**33.9**	31.5	28.9	**30.1**	31.4	34.1	**32.7**	33.8	33.8	**33.8**
Total time ships are available to stevedores *('000 hours)*	4.1	4.3	**8.4**	4.8	4.8	**9.6**	4.9	6.0	**10.9**	5.9	5.6	**11.4**	4.7	5.0	**9.7**
Average lifts per stevedores' hour *(lifts per hour)*	38.5	38.6	**38.5**	41.0	38.8	**39.9**	33.9	29.1	**31.3**	32.4	35.3	**33.8**	36.7	37.1	**36.9**
Average lifts per berth visit *(lifts)*	714.3	745.4	**730.1**	778.0	701.1	**738.6**	675.5	662.2	**668.7**	756.3	840.9	**797.0**	723.1	788.2	**755.7**

Note: Cells may not sum to totals due to rounding.
Throughput per berth metre (pbm) has been revised in Waterline 57. Coverage of container berths is more complete than in previous issues of Waterline.
Blank cells mean no data was reported for the categories. Backloaded trucks are reported for the first time in Waterline 57.

Sources: DP World (2015), Hutchison Ports Australia (2015), Patrick (2015) and Port of Brisbane Pty Ltd (2015).

Table 2.2 Container terminal productivity: Sydney

	2013						2014						2015		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
Wharfside															
Containers per hour															
Crane rate	30.7	30.8	**30.8**	30.8	30.0	**30.4**	31.7	31.5	**31.6**	30.7	30.3	**30.5**	29.6	25.4	**27.5**
Elapsed labour rate	43.8	45.3	**44.6**	45.3	40.7	**42.9**	46.8	49.1	**48.0**	46.9	40.7	**43.8**	44.3	40.0	**42.1**
Ship rate	61.5	63.2	**62.4**	53.8	47.8	**50.7**	53.9	57.6	**55.8**	53.6	48.8	**51.2**	51.5	47.4	**49.4**
TEUs per hour															
Crane rate	46.4	46.1	**46.3**	46.6	45.3	**45.9**	48.0	47.5	**47.7**	46.8	46.5	**46.6**	45.7	39.1	**42.4**
Elapsed labour rate	66.3	68.1	**67.2**	69.5	62.0	**65.6**	71.2	74.4	**72.8**	71.9	63.0	**67.4**	68.8	62.1	**65.4**
Ship rate	93.4	95.2	**94.3**	82.0	72.2	**77.0**	82.0	87.3	**84.7**	82.2	75.4	**78.8**	79.9	73.4	**76.6**
Throughput pbm	139.3	145.8	**142.6**	156.9	165.6	**161.3**	150.9	152.0	**151.4**	106.6	108.2	**107.4**	97.6	100.9	**99.2**
Landside															
Containers per truck	1.4	1.4	**1.4**	1.4	1.4	**1.4**	1.4	1.4	**1.4**	1.4	1.4	**1.4**	1.4	1.4	**1.4**
TEUs per truck	2.0	2.0	**2.0**	2.0	2.1	**2.0**	2.1	2.1	**2.1**	2.1	2.1	**2.1**	2.1	2.1	**2.1**
Per cent of trucks backloaded *(%)*										11.4	8.7	**10.1**	8.1	8.3	**8.2**
Truck turnaround time *(mins)*	34.7	34.9	**34.8**	36.5	39.7	**38.1**	37.2	36.6	**36.9**	40.9	38.1	**39.4**	40.3	38.1	**39.2**
Average container turnaround time *(mins)*	25.4	25.8	**25.6**	26.9	28.9	**27.9**	27.3	26.9	**27.1**	29.7	28.1	**28.9**	29.8	27.3	**28.5**
Whole of Container Terminal															
Ship turnaround time															
Median *(hours)*	30.3	29.8	**30.0**	30.0	33.7	**31.5**	28.1	25.6	**26.5**	30.4	34.2	**32.6**	32.5	34.2	**32.8**
95th percentile *(hours)*	53.1	50.5	**51.5**	53.8	58.7	**57.0**	46.9	44.9	**45.5**	60.6	68.8	**65.4**	60.6	84.5	**69.2**
Port congestion															
Number of ships waiting at anchorage for more than 2 hours	59	68	**127**	81	122	**203**	59	54	**113**	60	72	**132**	68	110	**178**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	22.7	25.0	**23.9**	27.8	40.0	**34.1**	20.8	18.4	**19.6**	20.8	26.2	**23.4**	26.2	41.7	**34.0**
Average waiting time at anchorage *(hours)*	17.3	14.3	**15.8**	15.3	16.1	**15.8**	10.1	10.4	**10.2**	10.3	15.1	**12.9**	24.7	28.0	**26.7**
Median of waiting time at anchorage *(hours)*	12.1	9.9	**11.0**	12.3	11.1	**11.4**	6.7	7.0	**6.7**	5.4	7.2	**6.3**	7.8	11.5	**9.8**
Total time ships spent at berth *('000 hours)*	8.3	8.3	**16.6**	8.9	10.2	**19.2**	8.1	7.7	**15.9**	9.7	10.5	**20.3**	9.1	10.6	**19.7**
Average TEUs per ship-hour at berth *(TEUs per hour)*	54.9	55.7	**55.3**	57.8	52.8	**55.1**	59.8	62.8	**61.2**	56.7	53.2	**54.9**	59.3	52.1	**55.4**
Average lifts per ship-hour at berth *(lifts per hour)*	36.2	37.1	**36.7**	37.8	35.0	**36.3**	39.4	41.6	**40.4**	37.1	34.5	**35.7**	38.4	33.9	**36.0**
Total time ships are available to stevedores *('000 hours)*	7.5	7.5	**15.0**	8.3	9.7	**18.0**	7.6	7.3	**14.8**	8.3	9.7	**18.0**	8.3	9.9	**18.2**
Average lifts per stevedores' hour *(lifts per hour)*	40.5	41.1	**40.8**	40.8	36.8	**38.6**	42.3	44.4	**43.3**	43.7	37.4	**40.3**	42.1	36.3	**39.0**
Average lifts per berth visit *(lifts)*	150.7	143.5	**147.1**	178.4	206.3	**192.6**	124.8	099.2	**111.8**	255.2	319.8	**286.7**	346.4	357.7	**352.1**

Note: Cells may not sum to totals due to rounding.

Throughput per berth metre (pbm) has been revised in Waterline 57. Coverage of container berths is more complete than in previous issues of Waterline.

Blank cells mean no data was reported for the categories. Backloaded trucks are reported for the first time in Waterline 57.

Sources: DP World (2015), Patrick (2015), NSW Ports (2015) and Port Authority New South Wales (2015).

Table 2.3 Container terminal productivity: Melbourne

	2013						2014						2015		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
Wharfside															
Containers per hour															
Crane rate	29.6	30.4	**30.0**	30.7	32.4	**31.5**	32.6	32.3	**32.4**	31.7	31.6	**31.6**	32.3	31.0	**31.6**
Elapsed labour rate	45.7	53.2	**49.4**	53.4	55.2	**54.3**	55.2	53.2	**54.2**	54.2	50.1	**52.1**	53.3	52.1	**52.7**
Ship rate	54.6	62.3	**58.4**	63.3	65.6	**64.5**	66.0	64.5	**65.2**	66.1	62.3	**64.2**	64.0	61.9	**62.9**
TEUs per hour															
Crane rate	44.1	45.6	**44.8**	46.2	48.3	**47.2**	48.0	47.6	**47.8**	47.2	47.3	**47.3**	48.0	46.2	**47.1**
Elapsed labour rate	68.3	66.9	**67.6**	80.5	82.7	**81.6**	81.6	79.0	**80.2**	81.4	75.3	**78.3**	80.1	78.1	**79.1**
Ship rate	81.7	93.6	**87.6**	95.5	98.5	**97.0**	97.7	96.2	**96.9**	99.5	94.1	**96.8**	96.6	93.1	**94.8**
Throughput pbm	173.0	171.7	**172.3**	185.6	192.1	**188.8**	162.4	169.5	**165.9**	177.6	180.8	**179.2**	166.2	172.2	**169.2**
Landside															
Containers per truck	1.6	1.6	**1.6**	1.6	1.7	**1.7**	1.7	1.7	**1.7**	1.7	1.7	**1.7**	1.7	1.7	**1.7**
TEUs per truck	2.4	2.4	**2.4**	2.5	2.5	**2.5**	2.4	2.5	**2.5**	2.5	2.5	**2.5**	2.6	2.5	**2.5**
Per cent of trucks backloaded *(%)*										16.4	16.2	**16.3**	16.7	16.1	**16.4**
Truck turnaround time *(mins)*	34.1	27.3	**30.6**	29.9	30.8	**30.3**	28.1	31.4	**29.8**	30.8	33.0	**31.9**	33.6	36.5	**35.0**
Average container turnaround time *(mins)*	21.2	16.9	**19.0**	18.2	18.5	**18.4**	16.7	18.5	**17.6**	18.1	19.2	**18.6**	19.4	21.1	**20.2**
Whole of Container Terminal															
Ship turnaround time															
Median *(hours)*	38.1	35.6	**36.6**	36.4	34.9	**35.7**	34.5	34.8	**34.6**	34.6	38.6	**36.3**	35.7	34.4	**35.0**
95th percentile *(hours)*	65.0	62.6	**65.0**	57.5	55.8	**56.7**	54.8	52.7	**53.8**	55.2	65.9	**62.6**	52.6	59.5	**55.6**
Port congestion															
Number of ships waiting at anchorage for more than 2 hours	21	10	**31**	18	10	**28**	3	10	**13**	9	4	**13**	10	9	**19**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	7.4	3.7	**5.6**	6.4	3.5	**5.0**	1.1	3.8	**2.5**	3.4	1.5	**2.5**	4.0	3.4	**3.7**
Average waiting time at anchorage *(hours)*	21.8	28.4	**23.9**	15.8	30.1	**20.9**	16.2	17.3	**17.1**	33.1	27.2	**31.3**	20.3	29.8	**24.8**
Median of waiting time at anchorage *(hours)*	18.2	23.3	**18.6**	15.5	24.7	**17.2**	21.8	16.2	**16.7**	36.6	27.7	**29.1**	21.3	24.5	**21.5**
Total time ships spent at berth *('000 hours)*	9.0	7.7	**16.8**	7.9	7.8	**15.8**	7.4	7.3	**14.7**	7.4	8.2	**15.7**	7.2	7.5	**14.7**
Average TEUs per ship-hour at berth *(TEUs per hour)*	57.2	66.7	**61.6**	70.1	72.6	**71.3**	71.7	73.4	**72.5**	77.3	71.1	**74.1**	74.8	73.9	**74.3**
Average lifts per ship-hour at berth *(lifts per hour)*	38.3	44.5	**41.1**	46.4	48.4	**47.4**	48.5	49.6	**49.1**	51.6	47.2	**49.3**	50.1	49.4	**49.8**
Total time ships are available to stevedores *('000 hours)*	7.4	6.3	**13.8**	6.9	6.8	**13.7**	6.4	7.0	**13.5**	7.2	7.9	**15.1**	6.9	7.3	**14.2**
Average lifts per stevedores' hour *(lifts per hour)*	46.6	54.3	**50.1**	53.8	55.5	**54.7**	55.8	51.4	**53.5**	53.6	49.2	**51.3**	52.0	51.2	**51.6**
Average lifts per berth visit *(lifts)*	1 218.9	1 275.3	**1 246.4**	1 312.8	1 338.2	**1 325.6**	1 376.4	1 359.5	**1 367.8**	1 445.0	1 502.8	**1 473.5**	1 441.8	1 395.9	**1 418.1**

Note: Cells may not sum to totals due to rounding.

Throughput per berth metre (pbm) has been revised in Waterline 57. Coverage of container berths is more complete than in previous issues of Waterline.

Blank cells mean no data was reported for the categories. Backloaded trucks are reported for the first time in Waterline 57.

Whole of container terminal refers to East and West Swanson Docks and Webb Dock East 3, 4 and 5.

Sources: DP World (2015), Patrick (2015) and Port of Melbourne Corporation (2015).

Table 2.4 Container terminal productivity: Adelaide

	2013						2014						2015		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
Wharfside															
Containers per hour															
Crane rate	25.8	26.1	**25.9**	26.1	26.0	**26.1**	26.1	26.9	**26.5**	28.4	29.8	**29.1**	30.1	29.8	**30.0**
Elapsed labour rate	38.3	39.8	**39.1**	37.2	39.5	**38.3**	38.6	39.4	**39.0**	40.2	45.1	**42.7**	43.8	39.5	**41.6**
Ship rate	43.8	45.2	**44.5**	43.7	45.5	**44.6**	44.9	46.2	**45.5**	48.7	52.5	**50.6**	51.2	46.2	**48.6**
TEUs per hour															
Crane rate	35.9	36.0	**36.0**	37.0	36.0	**36.5**	35.7	36.9	**36.3**	39.8	41.9	**40.9**	42.6	42.7	**42.6**
Elapsed labour rate	53.4	54.9	**54.2**	52.7	54.7	**53.7**	52.9	54.1	**53.5**	56.5	63.4	**60.0**	61.9	56.5	**59.2**
Ship rate	61.0	62.5	**61.8**	61.9	63.1	**62.5**	61.5	63.4	**62.5**	68.4	73.9	**71.2**	72.4	66.1	**69.2**
Throughput pbm	97.6	101.8	**99.7**	113.5	115.6	**114.6**	115.9	118.0	**117.0**	108.6	112.9	**110.7**	105.1	107.2	**106.1**
Landside															
Containers per truck	1.6	1.7	**1.7**	1.8	1.8	**1.8**	1.8	1.8	**1.8**	1.8	1.7	**1.7**	1.7	1.7	**1.7**
TEUs per truck	2.3	2.4	**2.4**	2.6	2.6	**2.6**	2.6	2.5	**2.5**	2.5	2.4	**2.5**	2.4	2.5	**2.4**
Per cent of trucks backloaded *(%)*															
Truck turnaround time *(mins)*	27.3	29.7	**28.5**	32.5	37.5	**35.0**	38.6	33.3	**35.9**	29.3	28.4	**28.9**	27.2	29.1	**28.1**
Average container turnaround time *(mins)*	16.7	17.3	**17.0**	18.1	20.9	**19.5**	21.1	18.8	**19.9**	16.7	16.6	**16.7**	15.9	17.0	**16.4**
Whole of Container Terminal															
Ship turnaround time															
Median *(hours)*	23.3	21.7	**22.2**	23.7	24.8	**24.2**	26.6	24.6	**25.5**	22.0	22.4	**22.1**	22.0	21.6	**21.8**
95th percentile *(hours)*	40.5	36.2	**39.6**	43.4	45.5	**45.5**	42.4	39.3	**39.9**	36.6	35.2	**35.8**	39.5	37.6	**38.0**
Port congestion															
Number of ships waiting at anchorage for more than 2 hours	9	10	**19**	9	16	**25**	8	9	**17**	5	6	**11**	2	4	**6**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	11.7	12.2	**11.9**	10.5	18.6	**14.5**	9.9	11.0	**10.4**	5.9	7.4	**6.6**	2.6	4.3	**3.6**
Average waiting time at anchorage *(hours)*	19.3	13.7	**16.5**	16.3	17.2	**16.9**	23.2	22.4	**22.8**	18.8	12.1	**15.1**	16.4	29.9	**25.4**
Median of waiting time at anchorage *(hours)*	17.5	11.5	**14.5**	19.0	16.8	**16.8**	17.8	13.1	**13.1**	13.3	6.2	**8.2**	16.4	28.0	**22.7**
Total time ships spent at berth *('000 hours)*	1.9	1.8	**3.7**	2.1	2.2	**4.4**	2.2	2.1	**4.3**	2.0	1.8	**3.8**	1.7	2.0	**3.7**
Average TEUs per ship-hour at berth *(TEUs per hour)*	43.7	46.2	**44.9**	44.5	43.2	**43.8**	43.4	46.1	**44.7**	46.7	52.3	**49.4**	50.6	45.4	**47.8**
Average lifts per ship-hour at berth *(lifts per hour)*	31.4	33.4	**32.4**	31.4	31.2	**31.3**	31.7	33.5	**32.6**	33.3	37.2	**35.2**	35.8	31.7	**33.6**
Total time ships are available to stevedores *('000 hours)*	1.5	1.5	**3.1**	1.8	1.8	**3.6**	1.8	1.8	**3.6**	1.6	1.5	**3.1**	1.4	1.6	**3.1**
Average lifts per stevedores' hour *(lifts per hour)*	38.6	40.1	**39.4**	36.6	39.6	**38.1**	38.5	38.8	**38.6**	40.4	45.0	**42.6**	42.9	39.2	**40.9**
Average lifts per berth visit *(lifts)*	765.8	751.6	**758.5**	779.9	810.2	**795.0**	854.9	850.5	**852.7**	770.2	833.8	**801.2**	802.0	694.0	**743.3**

Note: Cells may not sum to totals due to rounding.

Blank cells mean no data was reported for the categories. Backloaded trucks are reported for the first time in Waterline 57.

Sources: Flinders Adelaide Container Terminal (2015) and Flinders Ports (2015).

Table 2.5 Container terminal productivity: Fremantle

	2013						2014						2015		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
Wharfside															
Containers per hour															
Crane rate	33.0	31.3	**32.1**	31.1	31.1	**31.1**	33.0	35.6	**34.3**	35.6	36.0	**35.8**	37.1	37.0	**37.0**
Elapsed labour rate	36.2	32.5	**34.3**	30.3	33.1	**31.8**	38.1	41.1	**39.6**	43.5	44.9	**44.2**	44.9	42.8	**43.9**
Ship rate	46.5	45.7	**46.1**	35.8	38.6	**37.3**	45.0	51.1	**48.1**	50.3	52.5	**51.4**	51.6	50.9	**51.3**
TEUs per hour															
Crane rate	48.5	46.0	**47.3**	46.3	46.6	**46.5**	48.2	50.8	**49.5**	52.1	53.5	**52.8**	54.5	54.9	**54.7**
Elapsed labour rate	53.3	47.7	**50.5**	45.2	49.6	**47.5**	55.6	58.5	**57.1**	63.3	66.5	**64.9**	65.7	63.4	**64.6**
Ship rate	67.9	66.4	**67.1**	53.4	57.6	**55.6**	65.8	73.1	**69.4**	73.6	78.0	**75.9**	75.9	75.8	**75.9**
Throughput pbm	81.5	82.7	**82.1**	87.5	97.6	**92.5**	88.9	91.6	**90.3**	101.2	103.5	**102.4**	89.8	87.9	**88.9**
Landside															
Containers per truck	1.8	1.7	**1.7**	1.6	1.6	**1.6**	1.6	1.6	**1.6**	1.6	1.6	**1.6**	1.6	1.6	**1.6**
TEUs per truck	2.6	2.5	**2.5**	2.3	2.3	**2.3**	2.3	2.3	**2.3**	2.3	2.4	**2.3**	2.4	2.3	**2.3**
Per cent of trucks backloaded *(%)*										10.5	12.0	**11.3**	12.7	11.4	**12.1**
Truck turnaround time *(mins)*	23.5	24.6	**24.1**	27.7	27.9	**27.8**	27.7	28.4	**28.0**	27.2	31.7	**29.5**	30.5	33.3	**31.9**
Average container turnaround time *(mins)*	13.3	14.2	**13.8**	17.2	17.5	**17.4**	17.0	17.3	**17.1**	16.6	19.2	**17.9**	18.8	21.1	**19.9**
Whole of Container Terminal															
Ship turnaround time															
Median *(hours)*	29.0	30.8	**29.6**	33.9	34.1	**33.9**	30.6	26.6	**28.4**	28.1	28.5	**28.4**	25.2	25.1	**25.2**
95th percentile *(hours)*	66.7	54.7	**57.5**	79.1	67.0	**73.4**	51.7	44.5	**50.1**	49.9	54.4	**54.4**	49.0	43.9	**46.8**
Port congestion															
Number of ships waiting at anchorage for more than 2 hours	7	7	**14**	9	10	**19**	6	1	**7**	2	4	**6**	2	4	**6**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	5.7	5.6	**5.7**	7.3	7.8	**7.5**	4.7	0.8	**2.8**	1.5	3.2	**2.3**	1.6	3.1	**2.4**
Average waiting time at anchorage *(hours)*	14.5	16.5	**15.5**	17.2	9.2	**13.0**	11.4	9.7	**11.2**	14.9	22.3	**19.8**	16.4	9.8	**12.0**
Median of waiting time at anchorage *(hours)*	13.6	10.7	**12.2**	8.1	6.8	**7.2**	8.2	9.7	**9.7**	14.9	22.3	**15.4**	16.4	5.9	**7.7**
Total time ships spent at berth *('000 hours)*	3.4	3.5	**6.9**	4.1	4.2	**8.3**	3.5	3.2	**6.7**	3.5	3.4	**6.9**	3.0	3.0	**6.0**
Average TEUs per ship-hour at berth *(TEUs per hour)*	45.5	43.9	**44.7**	41.3	43.1	**42.2**	48.0	52.4	**50.1**	54.4	57.7	**56.0**	55.8	55.7	**55.7**
Average lifts per ship-hour at berth *(lifts per hour)*	31.1	30.0	**30.5**	27.8	28.9	**28.3**	32.9	36.6	**34.6**	37.1	38.7	**37.9**	37.7	37.2	**37.5**
Total time ships are available to stevedores *('000 hours)*	2.9	3.3	**6.2**	3.7	3.8	**7.6**	3.0	2.9	**6.0**	3.1	3.1	**6.2**	2.7	2.7	**5.4**
Average lifts per stevedores' hour *(lifts per hour)*	35.9	32.4	**34.1**	30.2	31.7	**31.0**	38.2	39.6	**38.9**	41.8	42.8	**42.3**	42.5	41.4	**42.0**
Average lifts per berth visit *(lifts)*	873.0	864.2	**868.6**	915.3	944.0	**930.0**	898.0	929.4	**913.6**	978.0	1 040.0	**1 008.2**	909.8	874.8	**892.2**

Note: Cells may not sum to totals due to rounding.

Throughput per berth metre (pbm) has been revised in Waterline 57. Coverage of container berths is more complete than in previous issues of Waterline.

Blank cells mean no data was reported for the categories. Backloaded trucks are reported for the first time in Waterline 57.

Sources: DP World (2015), Patrick (2015) and Fremantle Ports (2015).

Table 2.6 Container terminal productivity: Five ports

	2013						2014						2015		
	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun	Sep Qtr	Dec Qtr	Jul-Dec	Mar Qtr	Jun Qtr	Jan-Jun
Wharfside															
Containers per hour															
Crane rate	30.0	30.2	**30.1**	30.2	30.4	**30.3**	31.4	31.3	**31.3**	30.8	30.9	**30.9**	31.1	29.4	**30.2**
Elapsed labour rate	42.6	45.5	**44.1**	45.4	44.4	**44.9**	46.2	46.2	**46.2**	46.5	44.0	**45.2**	46.4	44.2	**45.3**
Ship rate	54.3	57.6	**56.0**	53.9	52.5	**53.2**	54.7	55.7	**55.2**	55.1	53.3	**54.2**	54.8	52.4	**53.6**
TEUs per hour															
Crane rate	44.9	44.9	**44.9**	45.3	45.4	**45.3**	46.5	46.1	**46.3**	46.0	46.5	**46.3**	46.6	43.9	**45.3**
Elapsed labour rate	63.8	63.7	**63.7**	68.5	66.7	**67.6**	68.6	68.5	**68.6**	69.8	66.3	**68.0**	70.0	66.5	**68.2**
Ship rate	81.5	86.1	**83.9**	81.2	78.6	**79.9**	81.4	82.8	**82.1**	83.0	80.6	**81.8**	82.9	79.1	**80.9**
Throughput pbm	123.8	127.8	**125.8**	127.8	132.5	**130.1**	119.0	122.9	**120.9**	113.9	116.9	**115.4**	104.9	109.0	**106.9**
Landside															
Containers per truck	1.6	1.6	**1.6**	1.6	1.6	**1.6**	1.6	1.6	**1.6**	1.6	1.6	**1.6**	1.6	1.6	**1.6**
TEUs per truck	2.3	2.3	**2.3**	2.3	2.3	**2.3**	2.3	2.3	**2.3**	2.4	2.4	**2.4**	2.4	2.3	**2.3**
Per cent of trucks backloaded *(%)*										n.a.	n.a.	**n.a.**	n.a.	n.a.	**n.a.**
Truck turnaround time *(mins)*	33.2	30.7	**32.0**	32.4	34.7	**33.6**	32.9	35.5	**34.2**	36.1	35.0	**35.5**	35.0	35.8	**35.4**
Average container turnaround time *(mins)*	21.3	19.5	**20.4**	20.7	22.0	**21.3**	20.7	22.3	**21.5**	22.7	22.0	**22.3**	22.0	22.5	**22.3**
Whole of Container Terminal															
Ship turnaround time															
Median *(hours)*	n.a.	n.a.	**n.a.**	n.a.	n.a.	**n.a.**	n.a.	n.a.	**n.a.**	n.a.	n.a.	**n.a.**	n.a.	n.a.	**n.a.**
95th percentile *(hours)*	n.a.	n.a.	**n.a.**	n.a.	n.a.	**n.a.**	n.a.	n.a.	**n.a.**	n.a.	n.a.	**n.a.**	n.a.	n.a.	**n.a.**
Port congestion															
Number of ships waiting at anchorage for more than 2 hours	128	131	**259**	152	198	**350**	111	89	**200**	80	86	**166**	93	138	**231**
Per cent of ships waiting at anchorage for more than 2 hours *(%)*	13.3	13.5	**13.4**	14.8	18.6	**16.7**	11.1	8.6	**9.8**	7.8	8.8	**8.3**	9.8	14.0	**11.9**
Average waiting time at anchorage *(hours)*	21.4	18.4	**19.9**	15.2	18.7	**16.5**	13.4	13.2	**13.3**	13.6	15.8	**14.7**	22.1	27.0	**25.0**
Median of waiting time at anchorage *(hours)*	16.5	14.0	**15.2**	12.3	14.2	**12.4**	11.8	10.7	**11.2**	8.2	8.1	**8.2**	8.8	13.1	**10.6**
Total time ships spent at berth *('000 hours)*	27.8	26.6	**54.3**	28.7	30.2	**58.9**	26.6	26.3	**52.9**	28.7	29.7	**58.4**	26.1	28.6	**54.7**
Average TEUs per ship-hour at berth *(TEUs per hour)*	52.1	55.2	**53.6**	56.7	55.3	**56.0**	57.5	58.4	**58.0**	59.0	58.3	**58.6**	58.2	55.3	**56.6**
Average lifts per ship-hour at berth *(lifts per hour)*	34.9	37.2	**36.0**	37.7	37.0	**37.3**	38.8	39.7	**39.2**	39.4	38.6	**39.0**	39.2	37.2	**38.1**
Total time ships are available to stevedores *('000 hours)*	23.4	23.0	**46.4**	25.5	27.0	**52.5**	23.8	25.0	**48.8**	26.0	27.8	**53.8**	24.0	26.5	**50.5**
Average lifts per stevedores' hour *(lifts per hour)*	41.4	43.0	**42.2**	42.5	41.4	**41.9**	43.4	41.8	**42.6**	43.4	41.3	**42.4**	43.2	41.1	**42.1**
Average lifts per berth visit *(lifts)*	1 005.7	1 019.9	**1 012.9**	1 051.9	1 051.1	**1 051.5**	1 028.2	1 014.3	**1 021.2**	1 105.6	1 176.9	**1 140.4**	1 044.6	1 022.1	**1 032.3**

Note: Cells may not sum to totals due to rounding.

Throughput per berth metre (pbm) has been revised in Waterline 57. Coverage of container berths is more complete than in previous issues of Waterline.

Blank cells mean no data was reported for the categories. Backloaded trucks are reported for the first time in Waterline 57.

n.a.: not applicable.

Sources: As for Tables 2.1 to 2.5.

CHAPTER 3
Timeslots for trucks at container terminals

Overview

This chapter reports on two main indicators:

1. The number of truck booking or appointment timeslots available at a container terminal
2. The number of truck booking or appointment timeslots used at a container terminal

The data is derived from the vehicle booking systems used by the stevedores. An important use of these statistics is to monitor the time of day and week when trucks access the container terminals to pick up or deliver containers. For this reason the count of slots available and used are provided for the following windows:

Monday to Friday Day: 6:01 AM to 6:00 PM

Monday to Friday Evening: 6:01 PM to 12:00 Midnight

Monday to Friday Night: 12:01 Midnight to 6:00 AM

Saturday Day: 6:01 AM to 6:00 PM

Saturday Evening: 6:01 PM to 12:00 Midnight

Saturday Night: 12:01 Midnight to 6:00 AM

Sunday Day: 6:01 AM to 6:00 PM

Sunday Evening: 6:01 PM to 12:00 Midnight

Sunday Night: 12:01 Midnight to 6:00 AM

The stevedores at the five container terminals do not have identical day, evening and night shifts. Thus data has been adjusted to fit into these standardised work shifts for comparative purposes.

Indicator 3.1 Number of truck timeslots available

Stevedoring companies make available a number of truck timeslots at various times in each day, based on the deployment of container handling equipment. The main factors affecting the availability of truck timeslots are the volume of containers to be processed, and terminal resources available to process containers. When shipping schedules and container volumes

demand extra resources, additional labour and extra equipment can be deployed to the landside of a container terminal and extra available timeslots are advertised normally one or two days in advance.

Indicator 3.2 Number of timeslots actually used

This is the count of timeslots actually used by trucks.

Indicator 3.3 Timeslots used by trucks in all off-peak periods as per cent of total timeslots used at container terminals

This indicator, derived from Indicator 3.2, gives the count of timeslots used by trucks during the off-peak period as a per cent of all timeslots used. The off-peak period is defined as all time periods except Monday to Friday 6:01 AM to 6:00 PM.

Results for this indicator are presented in Figure 3.1. The indicator is further divided up into Monday to Friday off-peak usage (Indicator 3.4) and week-end usage (Indicator 3.5).

Indicator 3.4 Timeslots used by trucks in Monday to Friday off-peak periods as per cent of total timeslots used

This indicator, derived from Indicator 3.2, gives a count of timeslots used by trucks during the Monday to Friday off-peak period as a per cent of all timeslots used. Results for this indicator are presented in Figure 3.2.

Indicator 3.5 Timeslots used by trucks on Saturday and Sunday as per cent of total timeslots used

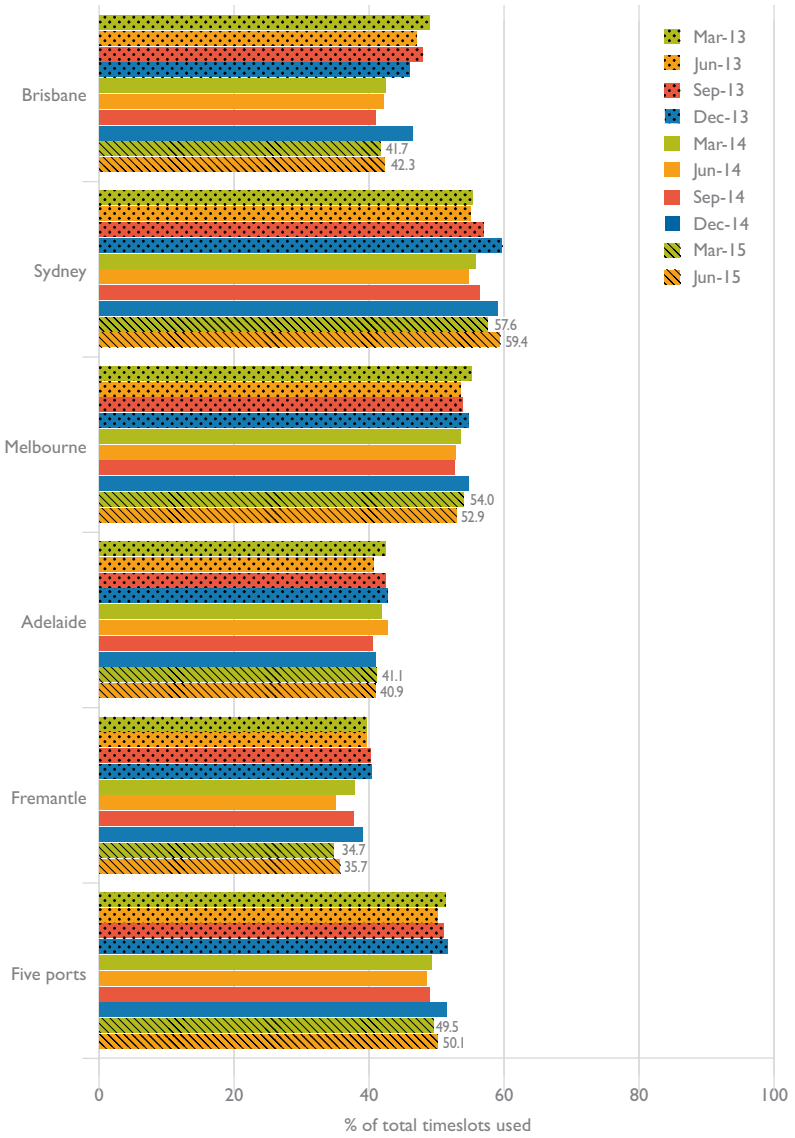
This indicator, derived from indicator 3.2, gives a count of timeslots used by trucks during the Weekend (Saturday to Sunday) as a per cent of all timeslots used. Results for this indicator are presented in Figure 3.3.

Indicator 3.6 Average TEUs handled per VBS/TAS truck timeslot

This indicator is a measure of the intensity of usage of timeslots. The indicator increases as opportunities for out/return load carrying trips in one job increase. Results for this indicator are presented in Figure 3.4.

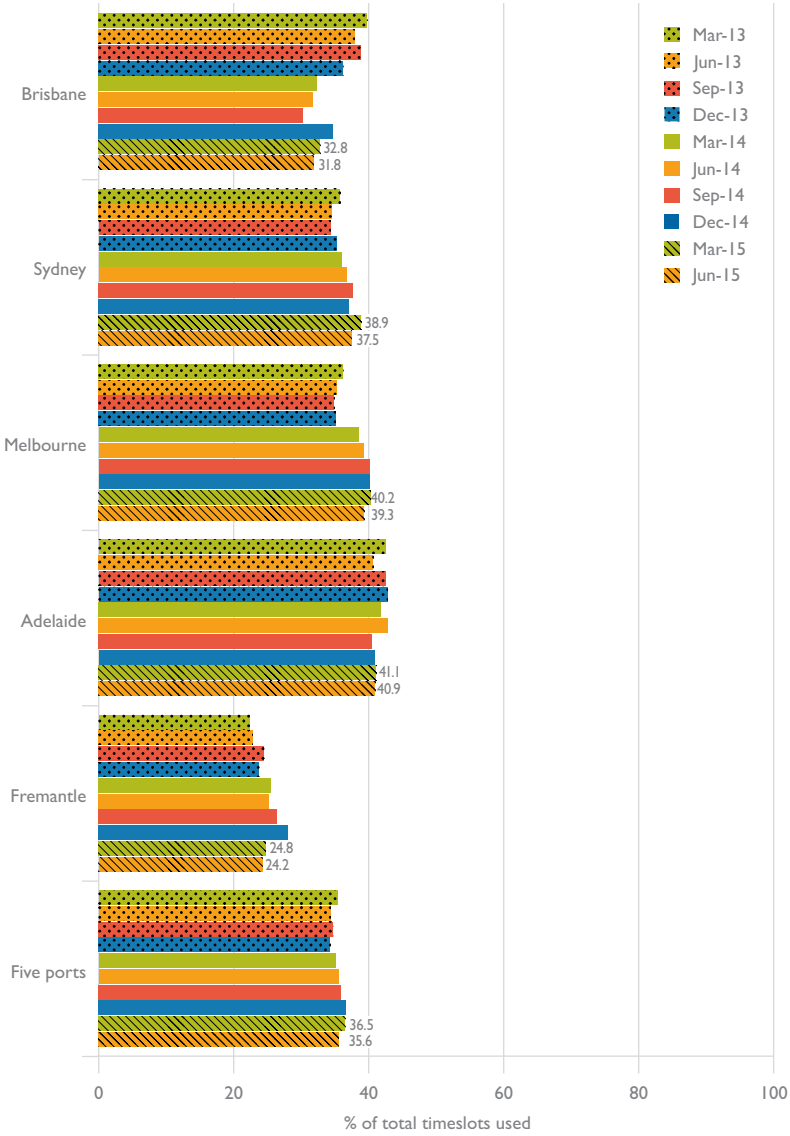
Aerial view of Port Botany showing landside connections. Photo courtesy of NSW Ports.

Figure 3.1 Timeslots used by trucks in all off-peak periods



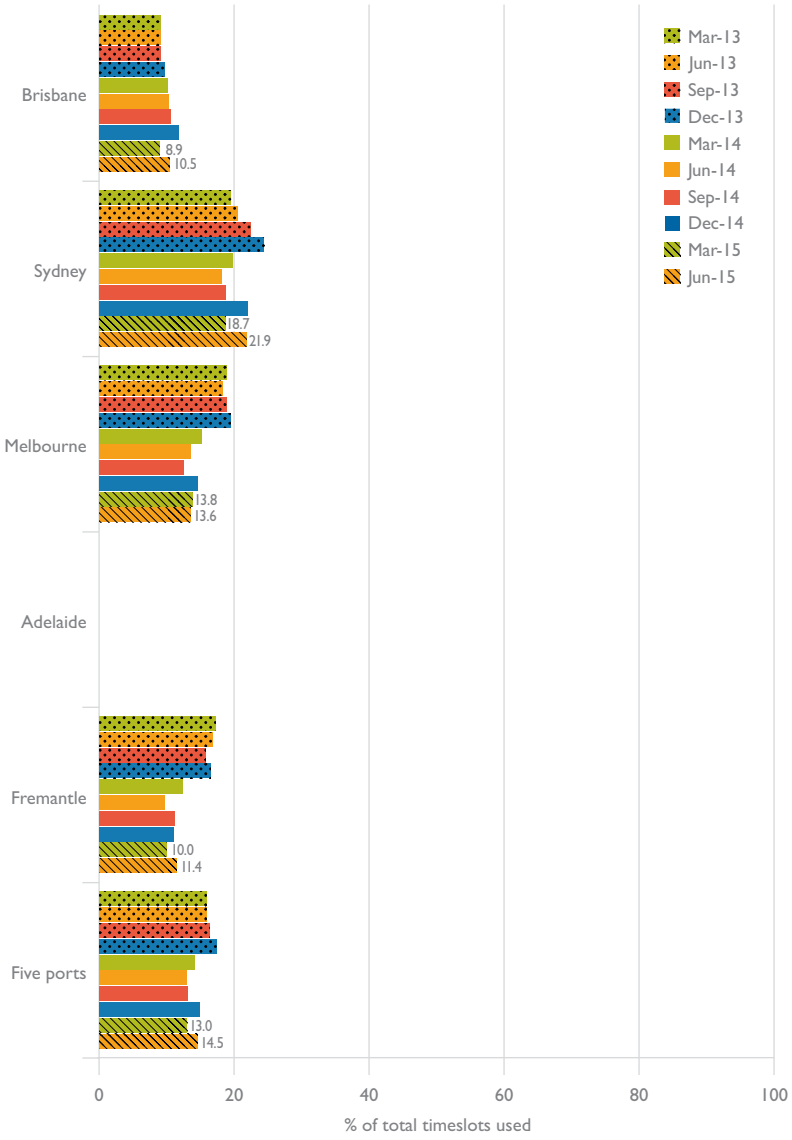
Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

Figure 3.2 Timeslots used by trucks in off-peak periods Monday to Friday



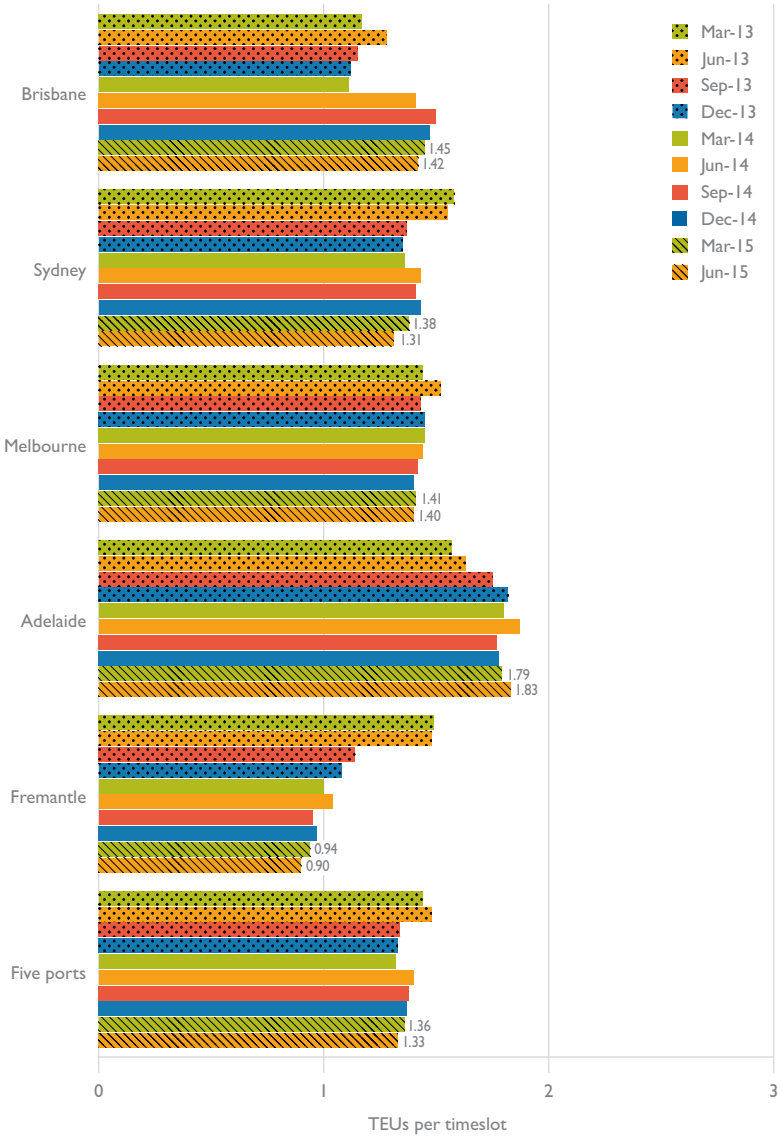
Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

Figure 3.3 Timeslots used by trucks on Saturday and Sunday



Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

Figure 3.4 TEUs processed per VBS truck at container terminals



Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

Table 3.1 Timeslots available and actually used by trucks: Brisbane

			2013				2014				2015	
	Weekday	Shift	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available timeslots	Monday – Friday	Day	75.2	80.6	94.3	99.4	94.4	100.7	90.2	83.0	78.1	86.7
('000)		Evening	32.7	33.0	38.3	37.7	33.5	37.5	31.7	32.6	30.6	32.5
		Night	27.7	26.3	30.5	28.0	19.4	20.8	14.2	20.4	14.3	15.7
		Sub-total	**135.7**	**139.9**	**163.1**	**165.2**	**147.4**	**159.0**	**136.1**	**136.0**	**123.0**	**134.9**
	Saturday	Day	9.2	8.0	10.5	12.4	11.5	12.8	11.2	10.3	8.7	11.5
		Evening	0.0	0.1	0.4	0.0	1.9	2.2	2.0	2.3	2.9	2.3
		Night	0.0	0.5	0.2	0.6	0.0	0.9	0.0	1.4	0.5	0.6
		Sub-total	**9.2**	**8.7**	**11.1**	**13.0**	**13.4**	**15.8**	**13.3**	**14.0**	**12.0**	**14.4**
	Sunday	Day	3.2	5.2	5.1	4.0	5.7	6.7	4.4	5.0	2.6	4.4
		Evening	0.7	0.6	0.6	0.2	0.5	0.6	0.5	0.0	0.4	0.5
		Night	2.3	2.3	2.1	1.9	1.9	1.4	0.9	0.8	0.5	0.7
		Sub-total	**6.1**	**8.1**	**7.8**	**6.1**	**8.0**	**8.7**	**5.8**	**5.8**	**3.5**	**5.6**
	Total available timeslots		**151.0**	**156.8**	**181.9**	**184.2**	**168.8**	**183.5**	**155.2**	**155.7**	**138.6**	**154.9**
Used timeslots	Monday – Friday	Day	74.0	79.5	87.4	92.3	87.8	83.6	85.0	77.2	73.0	78.8
('000)		Evening	32.1	32.2	36.2	35.3	31.9	29.9	29.8	29.3	27.3	28.8
		Night	25.5	24.6	29.2	26.6	17.3	15.9	13.7	20.8	13.8	14.6
		Sub-total	**131.6**	**136.3**	**152.9**	**154.2**	**137.0**	**129.4**	**128.6**	**127.3**	**114.1**	**122.2**
	Saturday	Day	8.7	7.6	9.1	11.2	9.5	9.7	9.7	8.7	7.1	9.6
		Evening	0.0	0.1	0.1	0.0	1.7	1.2	1.3	1.4	2.3	1.4
		Night	0.0	0.5	0.2	0.5	0.0	0.8	0.0	1.8	0.4	0.6
		Sub-total	**8.7**	**8.2**	**9.4**	**11.7**	**11.2**	**11.6**	**11.0**	**11.8**	**9.7**	**11.6**
	Sunday	Day	2.2	3.2	3.8	3.4	2.7	2.6	3.1	3.6	0.8	2.2
		Evening	0.3	0.4	0.4	0.1	0.3	0.1	0.3	0.0	0.3	0.0
		Night	1.9	1.8	1.8	1.5	1.2	0.7	0.8	1.5	0.4	0.6
		Sub-total	**4.5**	**5.3**	**5.9**	**4.9**	**4.2**	**3.3**	**4.3**	**5.1**	**1.5**	**2.8**
	Total used timeslots		**144.8**	**149.8**	**168.2**	**170.9**	**152.4**	**144.4**	**143.9**	**144.2**	**125.3**	**136.5**

Note: Data are rounded to the nearest 100. Cells with an entry of '0.0' mean that data were reported but are less than 50.

Sources: DP World (2015), Hutchison Ports Australia (2015) and Patrick (2015).

Table 3.2 Timeslots available and actually used by trucks: Sydney

			2013				2014				2015	
	Weekday	Shift	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available timeslots	Monday – Friday	Day	83.8	86.8	95.0	97.6	101.8	109.0	110.7	104.6	99.3	111.5
('000)		Evening	38.0	38.5	43.9	44.1	44.4	50.4	53.1	50.3	49.3	53.8
		Night	30.2	29.6	35.5	37.3	34.9	39.4	44.1	46.7	44.8	48.8
		Sub-total	**152.0**	**155.0**	**174.4**	**179.0**	**181.2**	**198.7**	**207.9**	**201.6**	**193.4**	**214.1**
	Saturday	Day	8.3	8.4	11.8	15.9	14.4	16.7	17.2	20.5	16.9	21.5
		Evening	2.0	2.4	3.4	4.0	1.3	2.0	2.3	4.0	2.1	3.9
		Night	5.6	5.7	6.6	7.2	3.8	3.9	4.1	5.7	5.1	6.6
		Sub-total	**15.9**	**16.5**	**21.7**	**27.1**	**19.5**	**22.7**	**23.6**	**30.1**	**24.0**	**32.0**
	Sunday	Day	11.7	13.5	16.8	17.1	13.0	13.3	12.1	14.1	9.7	14.9
		Evening	6.0	6.3	8.2	8.1	6.8	6.4	7.3	7.5	6.4	7.5
		Night	3.2	3.5	3.6	4.0	3.4	2.9	4.0	5.1	3.8	4.6
		Sub-total	**20.9**	**23.3**	**28.6**	**29.2**	**23.2**	**22.7**	**23.4**	**26.8**	**20.0**	**27.0**
	Total available timeslots		**188.7**	**194.7**	**224.8**	**235.3**	**223.9**	**244.1**	**255.0**	**258.6**	**237.4**	**273.1**
Used timeslots	Monday – Friday	Day	79.9	84.0	90.3	86.5	85.7	95.2	102.3	95.5	88.5	97.6
('000)		Evening	36.1	37.2	41.5	42.1	41.0	44.6	49.3	45.2	43.3	48.0
		Night	27.9	27.4	30.4	33.6	28.8	32.7	39.1	41.1	37.9	42.3
		Sub-total	**143.9**	**148.6**	**162.1**	**162.2**	**155.5**	**172.5**	**190.7**	**181.8**	**169.8**	**187.9**
	Saturday	Day	7.9	8.2	11.3	14.4	11.4	13.8	15.6	18.8	14.7	18.3
		Evening	1.9	2.3	3.0	3.8	1.1	1.2	2.0	3.0	1.6	3.2
		Night	5.1	5.3	5.9	6.5	3.6	3.4	3.9	5.1	4.6	6.1
		Sub-total	**14.9**	**15.9**	**20.2**	**24.7**	**16.0**	**18.4**	**21.5**	**26.9**	**21.0**	**27.6**
	Sunday	Day	11.1	13.3	15.8	16.4	12.6	11.4	11.7	12.7	9.2	14.4
		Evening	5.8	6.0	7.7	7.6	6.6	5.8	7.2	7.1	5.8	7.0
		Night	3.0	3.3	3.4	3.8	3.1	2.5	3.5	4.4	3.1	3.7
		Sub-total	**20.0**	**22.6**	**26.9**	**27.7**	**22.4**	**19.7**	**22.4**	**24.2**	**18.1**	**25.1**
	Total used timeslots		**178.8**	**187.1**	**209.2**	**214.6**	**193.9**	**210.6**	**234.6**	**233.0**	**208.8**	**240.5**

Sources: DP World (2015) and Patrick (2015).

Table 3.3 Timeslots available and actually used by trucks: Melbourne

			2013				2014				2015	
	Weekday	Shift	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available timeslots	Monday – Friday	Day	133.9	140.9	150.2	147.3	143.1	150.7	159.5	152.0	143.2	140.9
('000)		Evening	60.1	60.1	65.4	65.7	66.6	71.7	74.6	72.6	68.4	65.4
		Night	49.5	49.4	50.4	51.7	55.8	56.8	61.4	62.9	57.4	52.8
		Sub-total	**243.5**	**250.4**	**266.0**	**264.7**	**265.5**	**279.3**	**295.5**	**287.5**	**269.0**	**259.1**
	Saturday	Day	17.6	16.4	17.5	18.4	20.9	20.4	18.7	20.3	19.4	17.7
		Evening	4.2	4.3	4.6	5.6	1.8	0.8	0.6	0.5	0.3	0.4
		Night	9.6	9.1	10.7	11.1	4.0	3.9	4.6	5.5	5.9	5.0
		Sub-total	**31.4**	**29.7**	**32.8**	**35.0**	**26.8**	**25.1**	**23.9**	**26.3**	**25.5**	**23.2**
	Sunday	Day	12.4	13.2	15.3	14.8	9.2	6.9	5.8	8.9	6.2	7.8
		Evening	6.7	6.8	8.7	8.1	6.1	6.2	6.7	8.0	7.3	6.1
		Night	7.2	7.3	7.3	8.0	6.3	5.7	6.2	7.1	5.0	4.6
		Sub-total	**26.3**	**27.3**	**31.2**	**30.9**	**21.6**	**18.8**	**18.7**	**23.9**	**18.5**	**18.5**
	Total available timeslots		**301.3**	**307.4**	**330.1**	**330.6**	**313.8**	**323.2**	**338.0**	**337.8**	**313.1**	**300.8**
Used timeslots	Monday – Friday	Day	130.7	138.0	146.3	143.1	138.5	146.8	156.7	148.7	139.6	137.8
('000)		Evening	58.5	58.4	63.1	63.0	63.4	69.0	73.1	70.9	66.7	63.8
		Night	47.1	46.6	47.4	47.8	51.6	53.0	59.6	61.1	55.5	51.3
		Sub-total	**236.3**	**243.0**	**256.8**	**254.0**	**253.4**	**268.7**	**289.4**	**280.6**	**261.8**	**252.9**
	Saturday	Day	17.2	16.0	16.8	17.7	20.1	19.9	18.2	19.4	18.5	17.1
		Evening	4.1	4.1	4.3	5.4	1.5	0.7	0.6	0.5	0.2	0.4
		Night	8.7	8.2	9.0	9.2	3.5	3.8	4.5	5.4	5.6	5.0
		Sub-total	**29.9**	**28.3**	**30.1**	**32.3**	**25.1**	**24.4**	**23.4**	**25.3**	**24.4**	**22.4**
	Sunday	Day	12.2	12.9	14.6	14.2	8.7	6.6	5.6	8.6	6.0	7.5
		Evening	6.5	6.6	8.3	7.7	5.7	6.0	6.6	7.8	7.0	5.7
		Night	6.7	6.8	6.8	7.4	5.7	5.2	5.8	6.6	4.6	4.1
		Sub-total	**25.3**	**26.2**	**29.7**	**29.3**	**20.1**	**17.9**	**18.0**	**22.9**	**17.6**	**17.4**
	Total used timeslots		**291.5**	**297.6**	**316.5**	**315.6**	**298.7**	**311.0**	**330.7**	**328.8**	**303.7**	**292.7**

Sources: DP World (2015) and Patrick (2015).

Table 3.4 Timeslots available and actually used by trucks: Adelaide

			2013				2014				2015	
	Weekday	Shift	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available timeslots	Monday – Friday	Day	25.3	26.7	26.9	23.9	25.9	24.4	26.2	24.8	25.0	24.7
('000)		Evening	20.3	20.1	20.1	18.0	18.7	18.4	18.4	17.5	17.6	17.4
		Night										
		Sub-total	**45.7**	**46.7**	**47.0**	**41.9**	**44.5**	**42.8**	**44.6**	**42.3**	**42.6**	**42.1**
	Saturday	Day										
		Evening										
		Night										
		Sub-total										
	Sunday	Day										
		Evening										
		Night										
		Sub-total										
	Total available timeslots		**45.7**	**46.7**	**47.0**	**41.9**	**44.5**	**42.8**	**44.6**	**42.3**	**42.6**	**42.1**
Used timeslots	Monday – Friday	Day	23.6	25.0	26.3	24.0	25.6	24.2	25.5	25.1	24.7	24.2
('000)		Evening	17.4	17.2	19.5	17.9	18.4	18.2	17.3	17.3	17.3	16.7
		Night										
		Sub-total	**41.0**	**42.2**	**45.8**	**41.9**	**44.0**	**42.4**	**42.8**	**42.4**	**42.0**	**40.9**
	Saturday	Day										
		Evening										
		Night										
		Sub-total										
	Sunday	Day										
		Evening										
		Night										
		Sub-total										
	Total used timeslots		**41.0**	**42.2**	**45.8**	**41.9**	**44.0**	**42.4**	**42.8**	**42.4**	**42.0**	**40.9**

Note: Blank cells mean no data was reported for the categories because the VBS is not operated for trucks in night shift or on weekends at Adelaide.

Source: Flinders Adelaide Container Terminal (2015).

Table 3.5 Timeslots available and actually used by trucks: Fremantle

			2013				2014				2015	
	Weekday	Shift	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available timeslots	Monday – Friday	Day	59.0	61.4	64.8	69.3	70.9	75.1	80.5	82.5	78.3	73.9
('000)		Evening	17.9	19.1	21.0	21.1	20.9	19.3	22.0	24.9	21.5	21.5
		Night	3.8	4.1	6.0	6.4	8.5	10.4	12.2	13.4	9.0	7.2
		Sub-total	**80.8**	**84.7**	**91.8**	**96.9**	**100.3**	**104.8**	**114.7**	**120.8**	**108.8**	**102.6**
	Saturday	Day	6.2	5.2	4.4	5.5	6.7	7.0	7.3	7.6	5.6	6.0
		Evening	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Night	1.5	1.1	1.3	1.9	1.8	0.0	0.3	0.0	0.0	0.1
		Sub-total	**7.7**	**6.5**	**5.7**	**7.4**	**8.5**	**7.0**	**7.6**	**7.7**	**5.6**	**6.1**
	Sunday	Day	8.4	9.5	10.4	11.0	5.7	4.2	6.7	7.1	6.3	6.7
		Evening	0.9	1.1	1.2	1.4	0.3	0.3	0.3	0.4	0.3	0.4
		Night	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2
		Sub-total	**9.2**	**10.6**	**11.6**	**12.5**	**6.0**	**4.5**	**7.0**	**7.6**	**6.6**	**7.4**
	Total available timeslots		**97.7**	**101.7**	**109.0**	**116.7**	**114.8**	**116.2**	**129.3**	**136.1**	**121.0**	**116.0**
Used timeslots	Monday – Friday	Day	57.6	59.9	60.9	65.7	68.6	72.2	79.0	80.0	76.5	72.4
('000)		Evening	17.5	18.6	19.4	20.0	20.1	18.2	21.6	23.8	20.4	20.2
		Night	3.8	4.1	5.6	6.1	8.0	9.7	11.9	13.1	8.6	7.1
		Sub-total	**79.0**	**82.5**	**85.9**	**91.9**	**96.7**	**100.1**	**112.5**	**116.9**	**105.5**	**99.7**
	Saturday	Day	6.0	5.1	3.9	4.8	6.2	6.6	7.2	7.3	5.4	5.9
		Evening	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Night	1.4	1.1	1.2	1.9	1.8	0.0	0.2	0.0	0.0	0.1
		Sub-total	**7.5**	**6.3**	**5.1**	**6.7**	**8.0**	**6.6**	**7.4**	**7.3**	**5.5**	**6.0**
	Sunday	Day	8.2	9.3	9.7	10.2	5.4	3.9	6.6	6.7	5.9	6.3
		Evening	0.8	1.1	1.1	1.4	0.2	0.2	0.3	0.4	0.3	0.4
		Night	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2
		Sub-total	**9.0**	**10.4**	**10.9**	**11.6**	**5.6**	**4.2**	**6.9**	**7.2**	**6.2**	**6.9**
	Total used timeslots		**95.4**	**99.2**	**101.9**	**110.2**	**110.3**	**110.9**	**126.8**	**131.4**	**117.2**	**112.6**

Note: Data are rounded to the nearest 100. Cells with an entry of '0.0' mean that data were reported but are less than 50.

Sources: DP World (2015) and Patrick (2015).

Table 3.6 Timeslots available and actually used by trucks: Five ports

			2013				2014				2015	
	Weekday	Shift	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr	Sep Qtr	Dec Qtr	Mar Qtr	Jun Qtr
Available timeslots	Monday – Friday	Day	377.2	396.4	431.1	437.5	436.2	459.8	467.0	447.0	424.0	437.7
('000)		Evening	169.1	170.8	188.8	186.7	184.0	197.3	199.9	197.9	187.4	190.5
		Night	111.3	109.5	122.4	123.4	118.6	127.4	131.9	143.4	125.5	124.5
		Sub-total	**657.6**	**676.6**	**742.3**	**747.6**	**738.8**	**784.6**	**798.8**	**788.3**	**736.9**	**752.7**
	Saturday	Day	41.3	38.1	44.1	52.1	53.5	56.8	54.4	58.6	50.5	56.8
		Evening	6.2	6.9	8.4	9.6	5.0	5.0	5.0	6.9	5.3	6.6
		Night	16.7	16.5	18.7	20.8	9.7	8.8	9.0	12.5	11.5	12.3
		Sub-total	**64.2**	**61.4**	**71.3**	**82.5**	**68.2**	**70.6**	**68.4**	**78.1**	**67.3**	**75.7**
	Sunday	Day	35.7	41.4	47.6	46.9	33.6	31.1	29.1	35.0	24.9	33.8
		Evening	14.3	14.8	18.6	17.8	13.6	13.5	14.8	16.0	14.4	14.4
		Night	12.6	13.1	13.1	13.9	11.6	10.0	11.1	13.1	9.3	10.2
		Sub-total	**62.6**	**69.2**	**79.2**	**78.6**	**58.8**	**54.6**	**54.9**	**64.1**	**48.6**	**58.5**
	Total available timeslots		**784.4**	**807.3**	**892.8**	**908.6**	**865.7**	**909.8**	**922.1**	**930.5**	**852.7**	**886.9**
Used timeslots	Monday – Friday	Day	365.9	386.3	411.3	411.7	406.1	421.9	448.6	426.5	402.3	410.8
('000)		Evening	161.6	163.5	179.7	178.4	174.8	179.9	191.1	186.5	175.0	177.5
		Night	104.3	102.7	112.5	114.1	105.7	111.3	124.3	136.1	115.9	115.2
		Sub-total	**631.8**	**652.6**	**703.5**	**704.2**	**686.6**	**713.1**	**764.0**	**749.0**	**693.2**	**703.5**
	Saturday	Day	39.8	36.8	41.1	48.1	47.1	50.0	50.7	54.2	45.8	50.9
		Evening	6.0	6.7	7.4	9.2	4.2	3.1	3.9	4.8	4.1	5.0
		Night	15.3	15.2	16.3	18.1	8.9	7.9	8.7	12.3	10.7	11.7
		Sub-total	**61.0**	**58.7**	**64.8**	**75.4**	**60.3**	**61.0**	**63.3**	**71.3**	**60.5**	**67.6**
	Sunday	Day	33.7	38.7	43.9	44.2	29.3	24.5	27.1	31.6	21.9	30.3
		Evening	13.5	14.0	17.5	16.7	12.9	12.2	14.4	15.3	13.3	13.1
		Night	11.6	11.9	12.0	12.7	10.1	8.4	10.1	12.6	8.1	8.7
		Sub-total	**58.8**	**64.6**	**73.4**	**73.6**	**52.3**	**45.1**	**51.5**	**59.5**	**43.3**	**52.1**
	Total used timeslots		**751.6**	**775.8**	**841.7**	**853.1**	**799.3**	**819.2**	**878.8**	**879.8**	**797.0**	**823.2**

Sources: DP World (2015), Flinders Adelaide Container Terminal (2015), Hutchison Ports Australia (2015) and Patrick (2015).

CHAPTER 4
Port interface cost index

Overview

The port interface cost index (PICI) provides a measure of shore-based shipping charges which approximate costs of carting containers through Australia's mainland major city ports. The PICI is based on an indicative approach; that is, the index is not an average of all charges, but is based on those typically charged by service providers in most instances. The PICI is computed as a national average (Table 4.6) taking into account the port fees and charges for imports and exports of containers at the five major container ports (Table 4.1 to 4.5).

What PICI measures

The PICI is a measure of shore-based shipping costs or charges for containers moved through mainland capital city ports. These are called "shore-based" because they are that part of the charges paid by importers and exporters of containers which are directly related to the activity which occurs in the port and on the wharf. They do not include the total price for importing or exporting goods carried in containers paid by customers to customs brokers and freight forwarders. The index is a measure of the movements in costs to users of waterfront and related services and, signals whether the cost is increasing or decreasing. The waterfront is defined as the interface between seaports and land transport, hence the term port interface cost index. Port interface costs are estimated for standard representative ships.

The port interface cost index is based on twenty indicators which fall in four main groups:

a. Parameters used in computing the index;
b. Ship-based charges;
c. Cargo-based charges; and
d. Other charges, namely: Stevedoring costs; Customs brokers' fees; Road transport costs.

Parameters used in computing the index

These parameters enable the PICI charges to be estimated on a per TEU basis for these typical ships.

Indicator 4.1 Ship size

The port interface costs vary by ship size.

Ship size is the total internal capacity of a ship often referred to as Gross (Registered) Tonnage. The PICI has as its starting point the estimation of parameters for three typical sizes of container ships.

- 9 991 GT ship represents all ships of sizes ranging from 5 000 to 20 000 GT
- 37 394 GT ship represents all ships of sizes ranging from 35 000 to 40 000 GT
- 53 324 GT ship represents all ships of sizes ranging from 50 000 to 55 000 GT

Indicator 4.2 Average TEUs exchanged

This is the sum of indicator 4.3 and Indicator 4.6.

Indicator 4.3 Average TEUs Full (or loaded)

This is the sum of indicator 4.4 and Indicator 4.5.

Indicator 4.4 Average TEUs Full inwards (or imports)

This is the sum of full (or loaded) import containers converted to standardised twenty foot equivalent units moved into a port by ships in a GT range, divided by the number of ship visits in the GT range for the given period.

Indicator 4.5 TEUs Full outwards (or exports)

This is the sum of full (or loaded) export containers converted to standardised twenty foot equivalent units moved out of a port by ships in a GT range, divided by the number of ship visits in the GT range for the given period.

Indicator 4.6 Empty TEUs

This is the sum of empty import and empty export containers converted to standardised twenty foot equivalent units that are moved into and out of a port by ships in a GT range, divided by the number of ship visits in the GT range for the given period.

Indicator 4.7 Average number of port calls by ships in the GT range

This is the total number of ship calls to a container port by ships in the GT range, divided by the number of ship visits in the GT range for the given period.

Indicator 4.8 Average elapsed berth time for ships in GT range

This is the total number of elapsed berth time in hours for ships in the GT range, divided by the number of ship visits in the GT range for the given period. A ship's elapsed berth time (hours) is the time between a ship's arrival at berth, and a ship's departure from berth.

These parameters are summarised at the table of each of Tables 4.1 to 4.5 for each container port.

Ship-based charges ($ per ship visit)

Indicator 4.9 Total ship-based charges by ship visit

Ship-based charges are the charges ship owners pay for a port visit by the ship.

Indicator 4.10 Total ship-based charges for handling empty containers

This is also a summary cost indicator for the port. It is computed as the sum of wharfage, harbour dues, berth charges and channel fees charged per empty TEU multiplied by the average number of empty TEUs exchanged.

Ship-based charges ($ per TEU)

Indicator 4.11 Conservancy

Conservancy charges are navigation service charges levied by the government of the state in which the port is situated.

Indicator 4.12 Tonnage

Tonnage charges are based on the Gross Tonnage of the ship—port service charges levied by the port authority.

Indicator 4.13 Pilotage

Pilotage charges cover services for piloting the ship. A pilot is a mariner who guides ships through dangerous or congested waters, such as harbors or river mouths. Pilots are expert ship handlers who possess detailed knowledge of local waterways.

Indicator 4.14 Towage

Towage charges are levied by the operator of a tugboat—a boat that manoeuvres vessels by pushing or towing them.

Indicator 4.15 Mooring, unmooring charges

These relate to the services provided to moor—make fast (a ship, for example) by means of cables, anchors, or lines or to unmoor—to loosen (a ship) from moorings or anchorage. These charges can be levied either by the port authority, stevedoring company or other service providers

Indicator 4.16 Total ship-based charges per TEU

The total costs are the sum of the ship-based charges in Indicators 4.11 to 4.15.

Cargo-based fees and charges ($ per TEU)

Each of these fees and charges are discussed only once in the text below. They are however, listed separately for imports and exports in Tables 4.1 to 4.5.

Indicator 4.17 Cargo based: Wharfage

Wharfage is the charge assessed against cargo or merchandise, vessel's stores, fuel and supplies for passage on, over, under or through any wharf, pier, or bank controlled by a port authority. Wharfage is also charged for cargo passing between ships or overside ships (to or from barge, lighter or water) when berthed at a wharf, pier or bank controlled by the port authority.

Indicator 4.18 Cargo based: Harbour dues

These are monies that a ship owner must pay to a port authority for keeping a ship in a harbour. The amount of money charged is usually based on the volume of cargo the ship is carrying.

Other cargo-based charges ($ per TEU)

Indicator 4.19 Other charges: Stevedoring charge

Stevedoring charges are the charges levied by stevedoring companies for handling containers. They are estimated for Australia each year by the Australian Competition and Consumer Commission (ACCC) which monitors their price. The stevedoring costs are taken from the ACCC's annual report on the stevedoring industry.

Indicator 4.20 Other charges: Customs broker fees

These are the fees charged by customs brokers for the administrative costs associated with organising the import and export of containers for a representative consignment.

Indicator 4.21 Other charges: Road transport charges

Transport charges are estimates of what transport companies charge for transporting a container to or from the wharf from/to the metropolitan area of the capital city in which the port is situated. These charges are estimated for a representative transport distance.

Indicator 4.22 Total fees and charges ($/TEU)

This is the sum of ship-based charges per TEU, the cargo-based charges per TEU, and the other cargo-based charges per TEU. These costs enable the calculation of the national PICI measured in current and constant prices in dollars per TEU. These are computed separately for imports and exports in Tables 4.2 to 4.6.

Indicator 4.23 Port's share in national index

These shares are used in computing the national PICI and they are computed for exports and imports separately as follows.

For each port compute the port shares for imports:

a. Compute PICI (port k, imports) is given by the average (total) port interface cost for imports (indicator 4.22) times the total TEUs imported through the port (indicator 4.4);
b. Compute PICI (5 ports, imports) is the sum PICI (Brisbane, imports), PICI (Sydney, imports), PICI (Melbourne, imports), PICI (Adelaide, imports), PICI (Fremantle, imports);
c. Then share (port k, imports) = PICI (port k, imports)/ PICI (5 ports, imports).

Similarly for each port compute the port shares for exports:

d. Compute PICI (port k, exports) is given by the average (total) port interface cost for exports (indicator 4.22) times the total TEUs imported through the port (indicator 4.5);

e. Compute PICI (5 ports, exports) is the sum PICI (Brisbane, exports), PICI (Sydney, exports), PICI (Melbourne, exports), PICI (Adelaide, exports), PICI (Fremantle, exports);

f. Then share (port k, exports) = PICI (port k, exports)/ PICI (5 ports, exports).

Indicator 4.24 National Port Interface Cost index for ships in GT range

The national port interface cost indexes are the main outputs of the PICI calculations. These indexes are computed separately for imports and exports and for each of the ship GT ranges monitored in Waterline:

- 5 000 to 20 000 GT
- 35 000 to 40 000 GT
- 50 000 to 55 000 GT.

The national PICI for ships in a GT range is the national average cost per TEU. From BTCE (1993) this is a weighted average of individual port estimates computed as follows, taking imports shipped in ships in the 5 000 to 20 000 GT as an example.

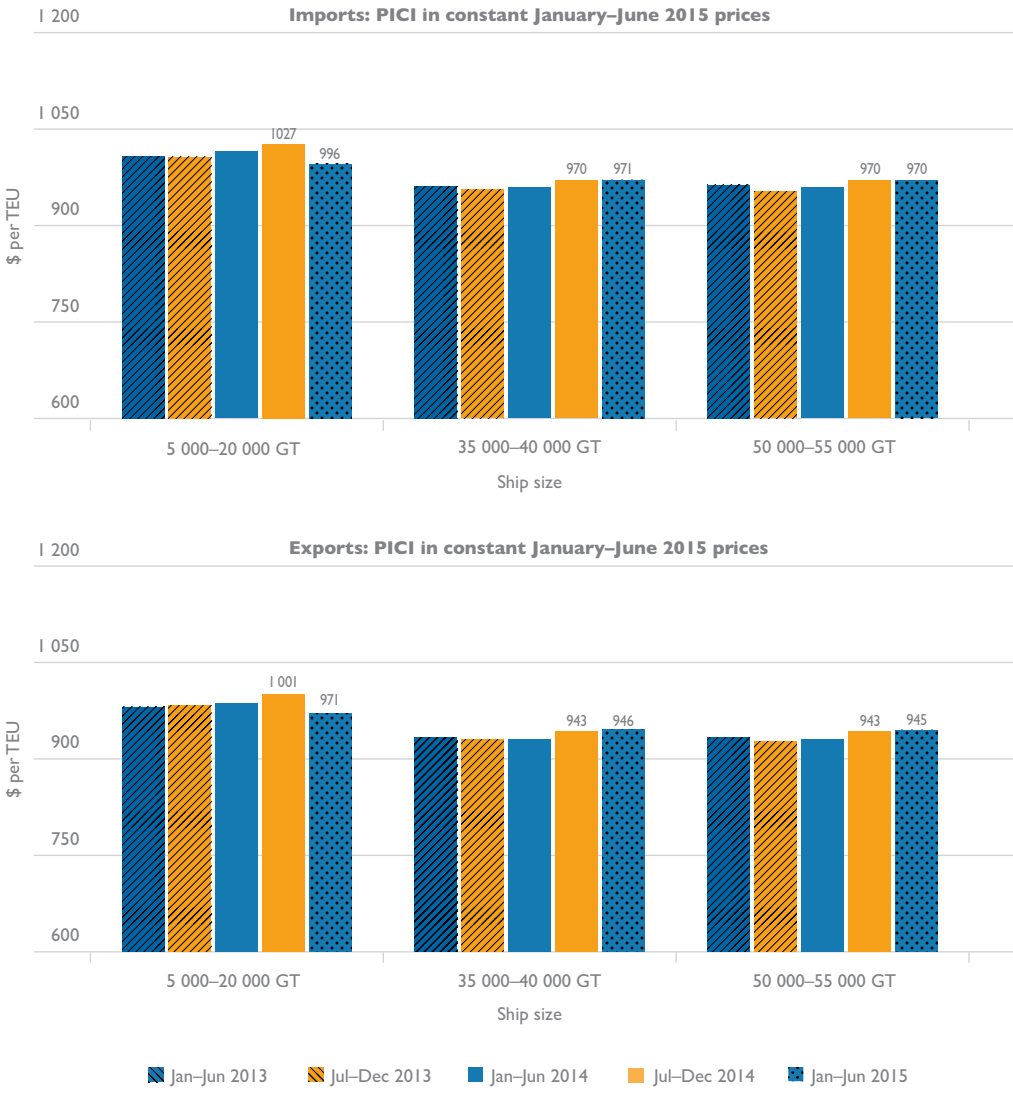
Now let $TC_{Br,M}$, $TC_{Sy,M}$, $TC_{Mel,M}$, $TC_{Ad,M}$, $TC_{Fr,M}$, respectively stand for the sum of ship-based, cargo-based and other fees and charges on each TEU of imports transported to a Brisbane port (Br), Sydney port (Sy), Melbourne port (Mel), Adelaide (Ad) and Frematle (Fr) for ships in the 5 000 to 20 000 GT range.

Then PICI for imports shipped in ships in the 5 000 to 20 000 GT

$$= b_{1*} TC_{Br,M} + b_{2*} TC_{Sy,M} + b_{3*} TC_{Mel,M} + b_{4*} TC_{Ad,M} + b_{5*} TC_{Fr,M}$$

The shares b_1, b_2, b_3, b_4, b_5 are as computed in Indicator 4.23. Note that these shares are different for imports and exports.

Figure 4.1 Port Interface Cost Index for container imports and exports, by ship size



Sources: BITRE estimates based on data in Tables 4.1 to 4.5 and data from ABS (2015).

Quay cranes at Port Botany. Photo courtesy of NSW Ports

Table 4.1 Port interface costs by ship type – parameters and estimates: Brisbane

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015
Parameters used in estimation of the port interface fees and charges [a]															
Total TEUs exchanged	374	310	258	286	289	1 260	1 187	1 127	1 273	1 138	1 471	1 396	1 232	1 489	1 330
Loaded	288	241	222	223	223	973	934	839	957	849	1 019	1 031	858	1 034	917
Loaded inwards	167	154	137	104	97	638	602	552	620	539	550	582	507	617	548
Loaded outwards	121	86	85	119	126	335	332	287	336	310	469	449	350	417	370
Empty	86	69	37	63	66	287	253	287	316	289	452	365	374	455	413
No of port calls by ships in GT range	5	5	5	4	5	3	3	3	4	3	3	3	4	4	3
Elapsed berth time for ships in GT range *(hours)*	23	17	16	19	19	23	23	26	27	25	24	21	22	24	22
Charges per ship visit *($)*															
Total ship-based charges	21 817	22 161	23 126	23 851	24 092	40 956	41 599	43 106	44 374	44 822	48 417	49 178	50 913	52 402	52 919
Empty TEUs [b]	1 604	1 315	698	1 234	1 289	5 343	4 833	5 482	6 208	5 662	8 408	6 968	7 134	8 935	8 097
Ship-based charges ($/TEU)															
Conservancy	5	6	8	7	7	6	6	7	6	7	7	7	9	7	8
Tonnage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pilotage	21	26	32	30	30	12	13	14	13	14	12	13	15	13	14
Towage	26	31	39	36	36	13	14	15	14	16	12	13	15	13	15
Mooring, unmooring [c]	6	8	11	11	11	2	2	3	2	3	2	2	2	2	2
Total ship-based charges *($/TEU)*	58	72	90	83	83	32	35	38	35	39	33	35	41	35	40
Fees and charges for imports *($/TEU)*															
Ship-based charges	58	72	90	83	83	32	35	38	35	39	33	35	41	35	40
Cargo-based charges															
Wharfage	32	33	33	34	36	32	33	33	34	36	32	33	33	34	36
Harbour dues	62	63	63	56	66	62	63	63	56	66	62	63	63	56	66
Other charges															
Stevedoring	177	177	176	176	172	177	177	176	176	172	177	177	176	176	172
Customs brokers' fees	151	142	149	150	150	151	142	149	150	150	151	142	149	150	150
Road transport charges	446	452	456	459	466	446	452	456	459	466	446	452	456	459	466
Total fees and charges *($/TEU)*	**926**	**939**	**967**	**959**	**974**	**900**	**902**	**916**	**910**	**930**	**900**	**902**	**919**	**911**	**930**
Port's share in national index [d]	**17%**	**18%**	**16%**	**16%**	**17%**	**16%**	**17%**	**15%**	**15%**	**16%**	**16%**	**17%**	**15%**	**15%**	**16%**

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015
Fees and charges for exports *($/TEU)*															
Ship-based charges	58	72	90	83	83	32	35	38	35	39	33	35	41	35	40
Cargo-based charges															
Wharfage	32	33	33	34	36	32	33	33	34	36	32	33	33	34	36
Harbour dues	62	63	63	56	66	62	63	63	56	66	62	63	63	56	66
Other charges															
Stevedoring	177	177	176	176	172	177	177	176	176	172	177	177	176	176	172
Customs brokers' fees	159	157	164	164	164	159	157	164	164	164	159	157	164	164	164
Road transport charges	446	452	456	459	466	446	452	456	459	466	446	452	456	459	466
Total fees and charges *($/TEU)*	**934**	**954**	**982**	**973**	**989**	**908**	**917**	**931**	**925**	**944**	**909**	**917**	**934**	**925**	**945**
Port's share in national index[e]	**17%**	**18%**	**16%**	**16%**	**17%**	**16%**	**17%**	**15%**	**15%**	**16%**	**16%**	**17%**	**15%**	**15%**	**16%**

a The average TEUs exchanged and the ship call parameters are mean values for ships in the GT category for the period in question.

b Sum of wharfage, harbour dues, berth charges and channel fees charged per empty TEU multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d This is estimated as the TEU imports brought to the port as a per cent of five ports TEU imports.

e This is estimated as the TEU exports brought to the port as a per cent of five ports TEU exports.

Notes: Estimates of charges and fees are rounded to the nearest whole dollar. A value of zero indicates that the charge or fees per TEU is less than fifty cents.

Sources: BITRE estimates based on ship call data from port authorities and other sources as described in text.

Table 4.2 Port interface costs by ship type – parameters and estimates: Sydney

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015
Parameters used in estimation of the port interface fees and charges [a]															
Total TEUs exchanged	204	179	196	203	485	2 115	1 824	1 861	2 071	2 174	2 088	2 323	1 998	2 220	2 427
Loaded	154	141	153	154	437	1 395	1 191	1 195	1 360	1 483	1 460	1 606	1 303	1 512	1 693
Loaded inwards	63	71	69	54	172	1 011	846	867	963	998	1 051	1 179	928	1 083	1 135
Loaded outwards	92	70	84	100	265	384	345	328	397	485	409	427	376	429	558
Empty	50	37	42	49	49	720	633	666	711	691	628	717	695	709	733
No of port calls by ships in GT range	3	4	4	4	6	2	3	3	3	2	3	3	3	4	3
Elapsed berth time for ships in GT range *(hours)*	20	18	17	25	27	34	35	28	33	35	34	36	29	37	40
Charges per ship visit *($)*															
Total ship-based charges	19 772	20 078	20 260	21 261	23 351	41 954	42 663	42 884	44 595	49 453	50 727	51 649	51 863	55 433	60 663
Empty TEUs [b]	629	484	547	649	649	9 080	8 178	8 613	9 438	9 167	7 913	9 271	8 982	9 404	9 731
Ship-based charges ($/TEU)															
Conservancy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tonnage	24	28	26	27	11	9	10	10	10	10	13	12	13	13	12
Pilotage	8	9	9	9	8	2	3	3	2	4	2	2	2	2	4
Towage	52	60	56	56	24	7	8	8	7	7	7	7	8	7	7
Mooring, unmooring [c]	13	15	13	13	5	2	2	2	2	2	2	2	2	2	2
Total ship-based charges *($/TEU)*	97	112	104	105	48	20	23	23	22	23	24	22	26	25	25
Fees and charges for imports *($/TEU)*															
Ship-based charges	97	112	104	105	48	20	23	23	22	23	24	22	26	25	25
Cargo-based charges															
Wharfage	114	117	117	125	125	114	117	117	125	125	114	117	117	125	125
Harbour dues	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other charges															
Stevedoring	177	177	176	176	172	177	177	176	176	172	177	177	176	176	172
Customs brokers' fees	148	148	153	153	153	148	148	153	153	153	148	148	153	153	153
Road transport charges	522	525	525	529	517	522	525	525	529	517	522	525	525	529	517
Total fees and charges *($/TEU)*	**1 058**	**1 079**	**1 075**	**1 088**	**1 014**	**981**	**990**	**995**	**1 005**	**989**	**985**	**989**	**998**	**1 008**	**991**
Port's share in national index [d]	**33%**	**31%**	**34%**	**34%**	**34%**	**32%**	**29%**	**32%**	**32%**	**32%**	**32%**	**29%**	**32%**	**32%**	**32%**

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015
Fees and charges for exports *($/TEU)*															
Ship-based charges	97	112	104	105	48	20	23	23	22	23	24	22	26	25	25
Cargo-based charges															
Wharfage	70	72	72	79	79	70	72	72	79	79	70	72	72	79	79
Harbour dues	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other charges															
Stevedoring	177	177	176	176	172	177	177	176	176	172	177	177	176	176	172
Customs brokers' fees	138	138	137	144	144	138	138	137	144	144	138	138	137	144	144
Road transport charges	522	525	525	529	517	522	525	525	529	517	522	525	525	529	517
Total fees and charges *($/TEU)*	**1 004**	**1 025**	**1 013**	**1 033**	**960**	**927**	**936**	**933**	**950**	**934**	**932**	**934**	**936**	**953**	**937**
Port's share in national index[e]	**34%**	**31%**	**34%**	**34%**	**34%**	**32%**	**29%**	**32%**	**32%**	**32%**	**32%**	**29%**	**32%**	**32%**	**32%**

a The average TEUs exchanged and the ship call parameters are mean values for ships in the GT category for the period in question.

b Sum of wharfage, harbour dues, berth charges and channel fees charged per empty TEU multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d This is estimated as the TEU imports brought to the port as a per cent of five ports TEU imports.

e This is estimated as the TEU exports brought to the port as a per cent of five ports TEU exports.

Notes: Estimates of charges and fees are rounded to the nearest whole dollar. A value of zero indicates that the charge or fees per TEU is less than fifty cents.

Sources: BITRE estimates based on ship call data from port authorities and other sources as described in text.

Table 4.3 Port interface costs by ship type – parameters and estimates: Melbourne

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015
Parameters used in estimation of the port interface fees and charges [a]															
Total TEUs exchanged	476	442	400	407	700	2 026	1 904	2 032	2 286	2 151	2 354	2 577	2 456	2 623	2 575
Loaded	340	335	294	289	585	1 702	1 597	1 701	1 877	1 752	1 983	2 078	1 979	2 059	2 039
Loaded inwards	139	151	103	53	218	973	1 004	1 014	1 198	1 095	1 133	1 202	1 094	1 246	1 190
Loaded outwards	201	185	191	236	367	729	593	687	679	657	850	876	885	812	850
Empty	136	106	106	118	116	324	307	331	410	400	371	499	477	565	535
No of port calls by ships in GT range	3	3	3	3	5	3	3	3	3	3	3	3	3	4	3
Elapsed berth time for ships in GT range *(hours)*	38	29	26	23	25	29	28	28	31	27	29	29	29	31	30
Charges per ship visit *($)*															
Total ship-based charges	24 473	25 162	25 438	26 810	27 115	48 038	49 680	50 053	53 903	54 176	58 247	60 371	60 758	65 883	66 121
Empty TEUs [b]	2 279	1 867	1 869	2 088	2 047	5 421	5 398	5 831	7 256	7 080	6 208	8 786	8 386	9 999	9 477
Ship-based charges ($/TEU)															
Conservancy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tonnage	11	13	14	16	9	10	11	10	11	11	12	12	12	13	13
Pilotage	15	17	19	19	11	6	7	6	6	6	6	5	6	5	6
Towage	23	25	29	29	17	7	8	8	7	7	6	6	6	6	6
Mooring, unmooring [c]	2	2	2	2	1	0	1	0	0	0	0	0	0	0	0
Total ship-based charges *($/TEU)*	51	57	64	66	39	24	26	25	24	25	25	23	25	25	26
Fees and charges for imports *($/TEU)*															
Ship-based charges	51	57	64	66	39	24	26	25	24	25	25	23	25	25	26
Cargo-based charges															
Wharfage	67	71	71	71	71	67	71	71	71	71	67	71	71	71	71
Harbour dues	39	39	39	40	40	39	39	39	40	40	39	39	39	40	40
Other charges															
Stevedoring	177	177	176	176	172	177	177	176	176	172	177	177	176	176	172
Customs brokers' fees	153	153	153	153	155	153	153	153	153	155	153	153	153	153	155
Road transport charges	529	531	534	536	536	529	531	534	536	536	529	531	534	536	536
Total fees and charges *($/TEU)*	**1 016**	**1 027**	**1 036**	**1 043**	**1 013**	**989**	**996**	**997**	**1 000**	**999**	**990**	**994**	**997**	**1 002**	**1 000**
Port's share in national index [d]	**39%**	**40%**	**39%**	**39%**	**39%**	**37%**	**38%**	**37%**	**37%**	**36%**	**37%**	**38%**	**37%**	**37%**	**36%**

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015
Fees and charges for exports *($/TEU)*															
Ship-based charges	51	57	64	66	39	24	26	25	24	25	25	23	25	25	26
Cargo-based charges															
Wharfage	67	71	71	71	71	67	71	71	71	71	67	71	71	71	71
Harbour dues	39	39	39	40	40	39	39	39	40	40	39	39	39	40	40
Other charges															
Stevedoring	177	177	176	176	172	177	177	176	176	172	177	177	176	176	172
Customs brokers' fees	142	142	143	144	150	142	142	143	144	150	142	142	143	144	150
Road transport charges	529	531	534	536	536	529	531	534	536	536	529	531	534	536	536
Total fees and charges *($/TEU)*	**1 006**	**1 017**	**1 026**	**1 033**	**1 008**	**978**	**986**	**988**	**991**	**994**	**979**	**983**	**988**	**993**	**995**
Port's share in national index[e]	**40%**	**40%**	**39%**	**39%**	**39%**	**38%**	**38%**	**37%**	**37%**	**37%**	**38%**	**38%**	**37%**	**37%**	**37%**

a The average TEUs exchanged and the ship call parameters are mean values for ships in the GT category for the period in question.

b Sum of wharfage, harbour dues, berth charges and channel fees charged per empty TEU multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d This is estimated as the TEU imports brought to the port as a per cent of five ports TEU imports.

e This is estimated as the TEU exports brought to the port as a per cent of five ports TEU exports.

Notes: Estimates of charges and fees are rounded to the nearest whole dollar. A value of zero indicates that the charge or fees per TEU is less than fifty cents.

Sources: BITRE estimates based on ship call data from port authorities and other sources as described in text.

Table 4.4 Port interface costs by ship type – parameters and estimates: Adelaide

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015
Parameters used in estimation of the port interface fees and charges [a]															
Total TEUs exchanged						1 037	903	981	1 023	1 041	1 268	1 337	1 363	1 109	1 065
Loaded						824	673	750	757	786	1 055	1 069	1 104	903	872
Loaded inwards						347	293	306	329	336	504	525	490	425	414
Loaded outwards						477	380	444	427	450	551	544	614	478	458
Empty						213	230	231	266	255	214	268	259	206	194
No of port calls by ships in GT range						2	2	2	2	2	2	3	2	2	2
Elapsed berth time for ships in GT range *(hours)*						24	22	23	21	23	26	29	28	23	22
Charges per ship visit ($)															
Total ship-based charges						39 574	40 189	40 496	41 940	42 828	46 130	48 463	48 410	48 556	48 823
Empty TEUs [b]						1 380	1 519	1 521	1 815	1 736	1 388	1 769	1 712	1 405	1 320
Ship-based charges ($/TEU)															
Conservancy						5	5	5	5	5	5	5	5	6	6
Tonnage						9	10	10	9	9	10	10	10	11	11
Pilotage						5	7	6	6	6	4	4	4	6	6
Towage						19	22	21	21	21	17	17	16	21	22
Mooring, unmooring [c]						-	-	-	-	-	-	-	-	-	-
Total ship-based charges *($/TEU)*						38	45	41	41	41	36	36	36	44	46
Fees and charges for imports *($/TEU)*															
Ship-based charges						38	45	41	41	41	36	36	36	44	46
Cargo-based charges															
Wharfage						79	82	82	84	84	79	82	82	84	84
Harbour dues						6	7	7	7	7	6	7	7	7	7
Other charges															
Stevedoring						177	177	176	176	172	177	177	176	176	172
Customs brokers' fees						148	148	148	149	149	148	148	148	148	148
Road transport charges						348	350	354	358	377	348	350	354	358	377
Total fees and charges *($/TEU)*						**798**	**808**	**808**	**814**	**829**	**796**	**800**	**802**	**817**	**833**
Port's share in national index [d]						**5%**	**6%**	**6%**	**6%**	**5%**	**5%**	**6%**	**6%**	**6%**	**5%**

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015
Fees and charges for exports *($/TEU)*															
Ship-based charges						38	45	41	41	41	36	36	36	44	46
Cargo-based charges															
Wharfage						79	82	82	84	84	79	82	82	84	84
Harbour dues						6	7	7	7	7	6	7	7	7	7
Other charges															
Stevedoring						177	177	176	176	172	177	177	176	176	172
Customs brokers' fees						111	111	112	112	112	111	111	112	112	112
Road transport charges						348	350	354	358	377	348	350	354	358	377
Total fees and charges *($/TEU)*						**761**	**771**	**771**	**777**	**792**	**759**	**763**	**766**	**780**	**797**
Port's share in national index[e]						**5%**	**6%**	**6%**	**6%**	**5%**	**5%**	**6%**	**6%**	**6%**	**5%**

a The average TEUs exchanged and the ship call parameters are mean values for ships in the GT category for the period in question.

b Sum of wharfage, harbour dues, berth charges and channel fees charged per empty TEU multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d This is estimated as the TEU imports brought to the port as a per cent of five ports TEU imports.

e This is estimated as the TEU exports brought to the port as a per cent of five ports TEU exports.

Notes: Estimates of charges and fees are rounded to the nearest whole dollar. A value of zero indicates that the charge or fees per TEU is less than fifty cents.
Blank cells mean the data are not reported.

Sources: BITRE estimates based on ship call data from port authorities and other sources as described in text.

Table 4.5 Port interface costs by ship type – parameters and estimates: Fremantle

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015
Parameters used in estimation of the port interface fees and charges [a]															
Total TEUs exchanged	2 339	2 709	2 532	2 831	2 499	971	854	793	786	748	1 447	1 519	1 451	1 620	1 483
Loaded	1 944	2 112	2 120	2 251	1 999	725	664	637	641	610	1 129	1 152	1 129	1 225	1 130
Loaded inwards	1 117	1 303	1 218	1 359	1 197	461	453	424	449	426	727	753	679	746	707
Loaded outwards	826	809	902	893	802	264	211	213	192	184	403	399	450	479	423
Empty	395	597	413	580	499	246	190	156	146	138	318	368	322	395	353
No of port calls by ships in GT range	8	13	12	13	13	3	3	3	2	2	3	4	3	4	4
Elapsed berth time for ships in GT range *(hours)*	46	48	35	33	32	27	27	22	19	19	26	34	28	29	26
Charges per ship visit *($)*															
Total ship-based charges	12 105	12 676	12 644	13 299	13 348	31 702	33 092	32 985	34 399	34 596	37 579	39 269	39 141	40 844	41 063
Empty TEUs [b]	4 064	6 443	4 452	6 574	5 659	2 528	2 055	1 685	1 650	1 560	3 263	3 967	3 474	4 478	4 004
Ship-based charges ($/TEU)															
Conservancy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tonnage	1	1	1	1	1	8	10	11	11	12	8	8	8	8	8
Pilotage	2	2	2	2	2	5	6	6	7	7	3	3	3	3	3
Towage	2	2	2	2	2	18	22	23	24	26	14	14	15	13	15
Mooring, unmooring [c]	1	0	0	0	1	1	1	2	2	2	1	1	1	1	1
Total ship-based charges *($/TEU)*	5	5	5	5	5	33	39	42	44	46	26	26	27	25	28
Fees and charges for imports *($/TEU)*															
Ship-based charges	5	5	5	5	5	33	39	42	44	46	26	26	27	25	28
Cargo-based charges															
Wharfage	68	72	72	75	75	68	72	72	75	75	68	72	72	75	75
Harbour dues	32	34	34	35	35	32	34	34	35	35	32	34	34	35	35
Other charges															
Stevedoring	177	177	176	176	172	177	177	176	176	172	177	177	176	176	172
Customs brokers' fees	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163
Road transport charges	455	458	453	457	458	455	458	453	457	458	455	458	453	457	458
Total fees and charges *($/TEU)*	**900**	**908**	**902**	**911**	**909**	**928**	**942**	**939**	**950**	**950**	**921**	**929**	**924**	**932**	**931**
Port's share in national index [d]	**11%**	**11%**	**11%**	**11%**	**11%**	**10%**	**11%**	**11%**	**11%**	**10%**	**10%**	**11%**	**11%**	**11%**	**10%**

	5 000 to 20 000 GT ships					35 000 to 40 000 GT ships					50 000 to 55 000 GT ships				
	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015
Fees and charges for exports *($/TEU)*															
Ship-based charges	5	5	5	5	5	33	39	42	44	46	26	26	27	25	28
Cargo-based charges															
Wharfage	62	72	72	75	75	62	72	72	75	75	62	72	72	75	75
Harbour dues	32	34	34	35	35	32	34	34	35	35	32	34	34	35	35
Other charges															
Stevedoring	177	177	176	176	172	177	177	176	176	172	177	177	176	176	172
Customs brokers' fees	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97
Road transport charges	455	458	453	457	458	455	458	453	457	458	455	458	453	457	458
Total fees and charges *($/TEU)*	**829**	**842**	**837**	**845**	**843**	**856**	**876**	**873**	**884**	**884**	**849**	**863**	**859**	**866**	**865**
Port's share in national index[e]	**10%**	**11%**	**11%**	**11%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**

a The average TEUs exchanged and the ship call parameters are mean values for ships in the GT category for the period in question.

b Sum of wharfage, harbour dues, berth charges and channel fees charged per empty TEU multiplied by the average number of empty TEUs exchanged.

c BITRE estimates.

d This is estimated as the TEU imports brought to the port as a per cent of five ports TEU imports.

e This is estimated as the TEU exports brought to the port as a per cent of five ports TEU exports.

Notes: Estimates of charges and fees are rounded to the nearest whole dollar. A value of zero indicates that the charge or fees per TEU is less than fifty cents.
Blank cells mean the data are not reported.

Sources: BITRE estimates based on ship call data from port authorities and other sources as described in text.

Table 4.6 The national port interface cost indices, by size of ship

		Jan–Jun 2013	Jul–Dec 2013	Jan–Jun 2014	Jul–Dec 2014	Jan–Jun 2015
	ABS GDP deflator (100.0 for Jan–Jun 2015)	99.5	100.7	100.8	100.2	100.0
				($ per TEU)		
5 000 – 20 000 GT ships	Import costs: in nominal price	1 003	1 014	1 023	1 029	996
	Import costs: constant 2015 price	1 008	1 007	1 015	1 027	996
	Export costs: nominal price	975	989	995	1 004	971
	Export costs: in constant 2015 price	981	983	987	1 001	971
35 000 – 40 000 GT ships	Import costs: in nominal price	956	962	967	972	971
	Import costs: constant 2015 price	961	956	959	970	971
	Export costs: nominal price	928	936	937	945	946
	Export costs: in constant 2015 price	933	930	930	943	946
50 000 – 55 000 GT ships	Import costs: in nominal price	957	959	967	972	970
	Import costs: constant 2015 price	963	953	959	970	970
	Export costs: nominal price	929	933	937	945	945
	Export costs: in constant 2015 price	934	927	930	943	945

Notes: Blank cells mean the data are not reported.

Values in constant 2015 prices are derived using the ABS GDP deflator with Jan–Jun 2015 as the base period. Constant price = Nominal or current price* (Base period deflator/ Current year deflator)

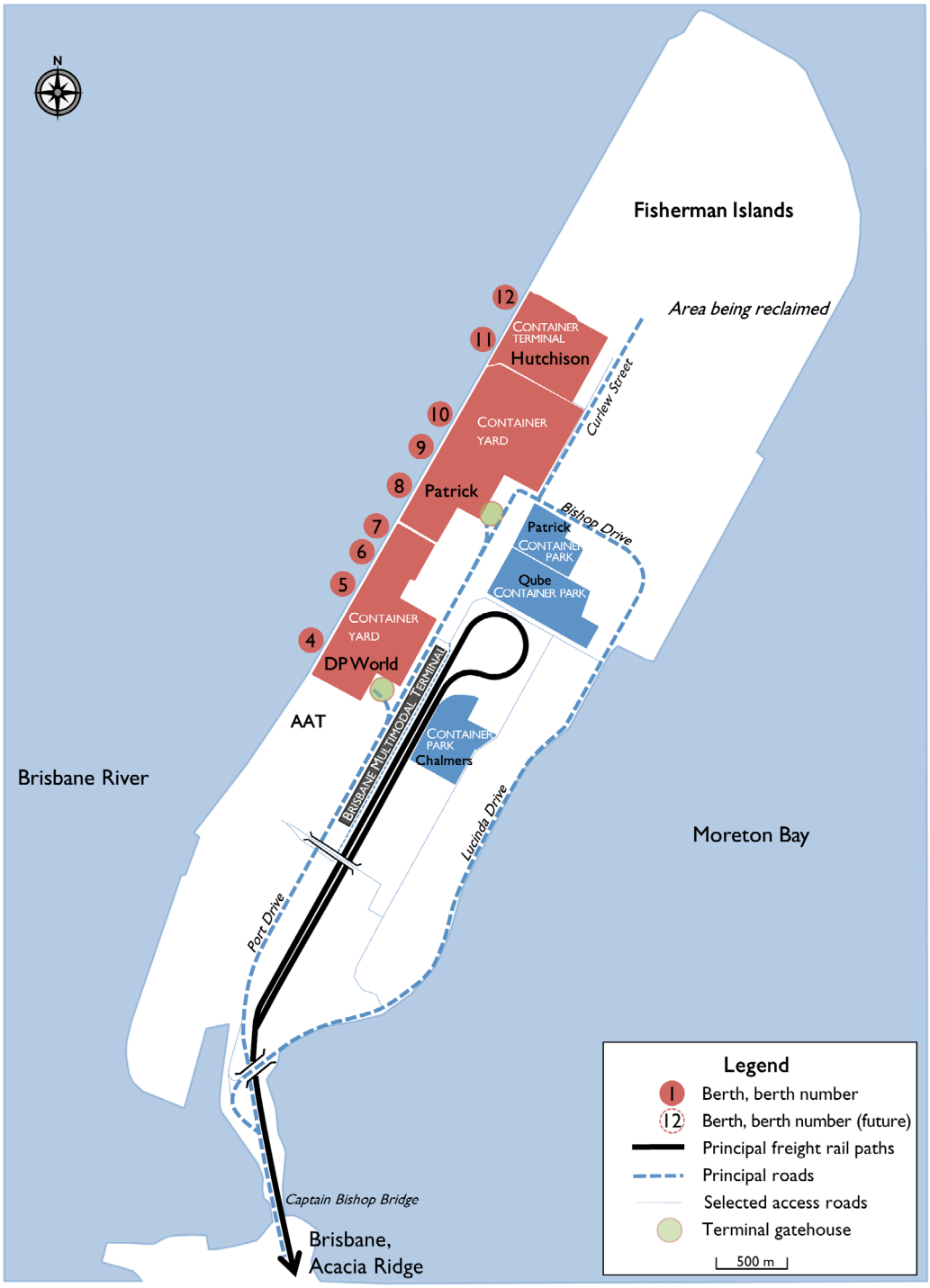
Sources: BITRE estimates based on data in Tables 4.1 to 4.5 and data from ABS (2015).

APPENDIX A

Maps of five major Australian container ports

This appendix presents maps and supplementary information such as facilities and services at the five major Australian container ports.

Brisbane (Fisherman Islands terminals)



(Last updated: November 2014)

Brisbane (Fisherman Islands Terminals)

The Port of Brisbane is managed and developed by the Port of Brisbane Pty Ltd, under a 99-year lease from the Queensland Government.

Dockside

Stevedores. The map shows the DP World, Patrick and Hutchison Ports Australia terminals. Some containers are also handled by Australian Amalgamated Terminals (AAT), who provide a multi-purpose, multi-user facility that is based at Berths 1–3, to the west of the DP World container yard.

Berths. DP World operates from container berths 4–7. The Patrick container berths are 8–10. The Hutchison berths are Berth 11 and (in the second-phase development) Berth 12.

Equipment. DP World has 6 cranes, including 2 post-Panamax cranes and 2 Super post-Panamax cranes. Patrick has 5 cranes, consisting of 3 Panamax cranes and 2 post-Panamax cranes; in addition, Patrick has 27 automated straddle carriers. Hutchison's first phase development includes 2 post-Panamax cranes and 6 automated stacking cranes.

Road

Road access to the area is via the bridge to Fisherman Islands, over the Captain Bishop Bridge. Access to the DP World and Patrick terminals is via Port Drive or Lucinda Drive/Bishop Drive/Curlew Street; access to the Hutchison terminal is via Curlew Street.

Rail

Facilities. An intermodal facility is provided on Fisherman Islands — the Brisbane Multimodal Terminal. Train lengths of up to 850 metres are permitted. Containers are shifted by road between that terminal and the container terminals. In that context, rail access is classed as having "near-dock" facilities.

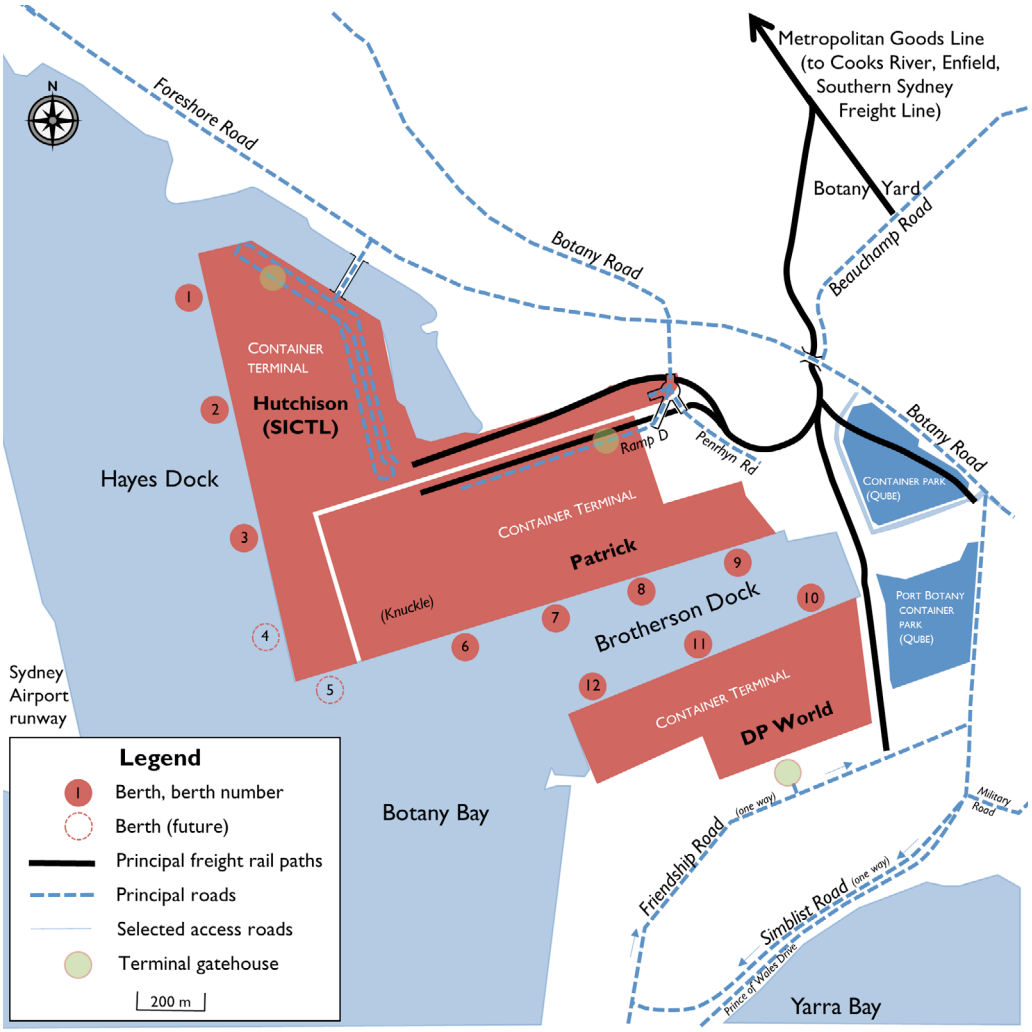
Services. Scheduled rail services to the Brisbane Multimodal Terminal include:

Long-haul:

- bulk coal from West Moreton and grain from western Queensland, both via narrow gauge;
- reefer containers containing meat from northern abattoirs, by narrow-gauge trains;
- some containers are taken from Fisherman Islands—the presumption is that they are mainly empty containers;
- there are no scheduled standard-gauge container trains.

National rail connections. Dual narrow and (national) standard gauge tracks are installed between Fisherman Islands and the interstate/intrastate intermodal terminal at Acacia Ridge.

Sydney (Port Botany Terminals)



(Last updated: November 2015)

Sydney (Container Terminals at Port Botany)

Port Botany is managed by NSW Ports Consortium, which has a 99-year lease of the State-owned assets at the port.

Dockside

Stevedores. The three container terminals at Port Botany are served by the stevedores Patrick, DP World and Hutchison (Sydney International Container Terminals Limited, SICTL).

Berths. Patrick operates four berths, numbers 6–9. DP World's three berths are numbered 10–12. Hutchison has three operational berths (1–3), with berths 4 and 5 to be added in the future.

Equipment. DP World equipment includes 4 twin-lift quay cranes and 4 single-lift quay cranes. DP World took delivery of their latest twin-lift, post-Panamax crane in March 2015. Patrick equipment includes 7 twin-lift quay cranes and 1 single-lift quay crane. The Hutchison terminal includes 4 post-Panamax quay cranes.

The Patrick terminal has implemented an automated container yard, with 45 automated straddle carriers (AutoStrads). Automatic operations commenced on 2 April 2015.

Road

Access to the DP World terminal is via Friendship Road (one-way). The Patrick terminal is accessed from Penrhyn Road. Hutchison's terminal is accessed via a bridge from Foreshore Road.

Rail

Facilities. Each stevedore has rail facilities near to, but not on, its berths.

DP World has 3 sidings of 340 metre length. Patrick has 2 sidings of 650 metre length. Hutchison's terminal has 2 rail sidings of 680 metres; these are parallel to the Patrick sidings.

Services. Scheduled rail container services between Botany and the hinterland include:

Short-haul:

- Yennora, Cooks River and Minto.

Long-haul:

- logs and grain from Kelso (Southern Shorthaul Railroad; Pacific National);
- reefer containers carrying processed meat, and grain in standard containers from Dubbo (Fletcher Export International/Southern Shorthaul Railroad; Qube);
- specialised grain transport from Coonamble (Qube);
- cotton and agricultural produce from Nevertire, Warren, Warren South, Trangie, Narrabri, Wee Waa, Narromine and Forbes (Qube; Genesee & Wyoming; Sydney Rail Services);
- paper products and grain from Harefield (Qube);
- scrap metal from Canberra (Espee Railroad Services);

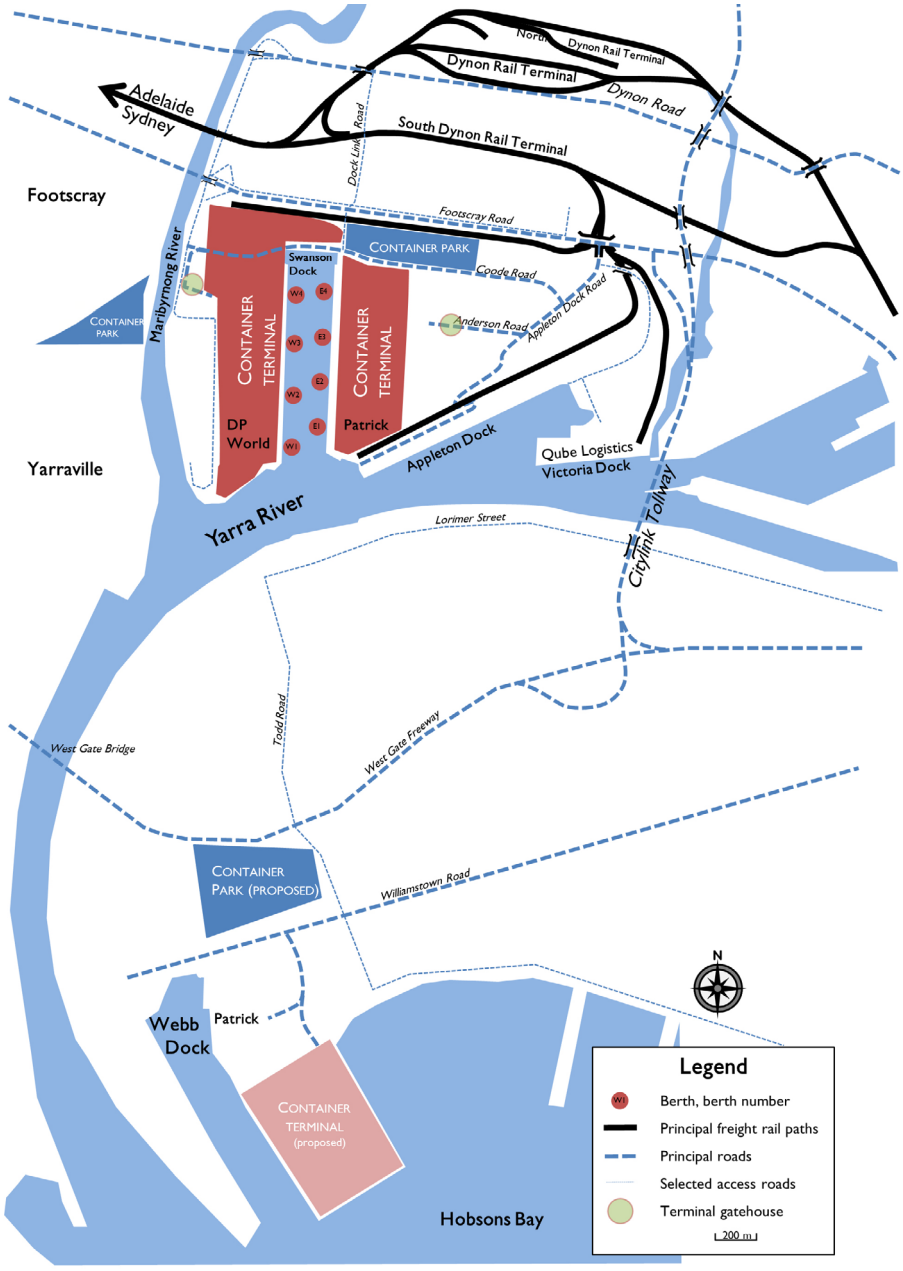
- aluminium, logs and agricultural produce from Walsh Point, Carrington and Sandgate [Newcastle] (Qube and Crawfords Freightlines/Sydney Rail Services).

Rail access. Railway sidings at Botany Yard are used to regulate train entry to the port; to split trains, where necessary, for onwards movements to the port, and to re-form trains from port-terminal wagon rakes for movements to Cooks River, Enfield and beyond.

National and regional rail connections. The port is linked to the intrastate and interstate rail network, including the Southern Sydney Freight Line, and Northern Sydney Freight Corridor via the Metropolitan Freight Network (including the Port Botany Goods Line).

Ship at berth at Port Botany. Photo courtesy of NSW Ports.

Melbourne



(Last updated: November 2014)

Melbourne (Swanson, Appleton and Victoria Dock terminals)

The Port of Melbourne Corporation, a public corporation, manages the port.

Dockside

Stevedores. DP World's container terminal is at Swanson Dock West. Patrick has a container terminal is across the dock at Swanson Dock East. Patrick also handles some containers along with general freight at its 3-berth Webb Dock East site.

Logistics. Qube Logistics has a container and general cargo terminal at Victoria Dock, with one berth.

Equipment. The Patrick terminal has 8 cranes, of which 3 are post-Panamax; the DP World terminal has 8 cranes, including 3 post-Panamax. Patrick has 42 straddle carriers while DP World has 48 straddle carriers.

Berths. There are 4 container berths at Patrick's Swanson Dock East—berths E1–E4. There are 4 berths at DP World's Swanson Dock West—berths W1–W4. There is one general cargo berth at Victoria Dock (berth 24), which handles containers.

Road

Access to the DP World terminal is via Coode Road. Access to the Patrick terminal is via Appleton Dock Road; an access road leads to the Qube terminal from Appleton Dock Road.

Rail

Facilities. Import and export containers are rail-served to near the dockside. Containers are also railed through the Dynon rail terminals (to the north of the docks) and conveyed by road between those terminals and the on-dock container stacks.

- West Swanson Intermodal Terminal serves DP World. This is a single dual-gauge (standard and broad) siding of 510 metres, running just to the south of Footscray Road; there is also a locomotive run-around track;
- Appleton Dock rail yard serves Patrick. The yard has two dual (standard and broad) gauge tracks of 640 metres in length and a locomotive run-around track;
- Qube's Victoria Dock sidings have two dual-gauge (standard and broad) sidings, with 630 metre lengths, plus a locomotive run-around track.

Services. Scheduled rail services shifting containers include:

Long-haul:

- rice from Deniliquin to Victoria Dock sidings (Qube, broad gauge);
- paper products from Maryvale to Victoria Dock sidings (Qube, broad gauge);
- milk products from Shepparton/Mooroopna to Victoria Dock sidings (Qube, broad gauge);

- meat and milk products from Westvic/Warrnambool to Appleton Dock (Pacific National, broad gauge);
- grain and other agricultural products from Tocumwal to Appleton Dock (Pacific National, broad gauge);
- cotton, wine and agricultural products, including fruit in reefer containers, from Merbein/Mildura to Appleton Dock (Pacific National, broad gauge);
- grain and other agricultural products from Dooen to West Swanson Dock (SCT/ Wimmera Container Line, standard gauge);
- car parts from Adelaide (Port Flat) to Appleton Dock (Patrick, standard gauge);
- cotton, beverages, meat and agricultural products from Griffith, Wumbulgal, Leeton and Ettamogah to Appleton Dock (Pacific National, standard gauge).

Port rail containers also arrive by road shuttles from the Dynon railway terminals, including:

- Adelaide (Islington) to South Dynon (Pacific National, standard gauge).

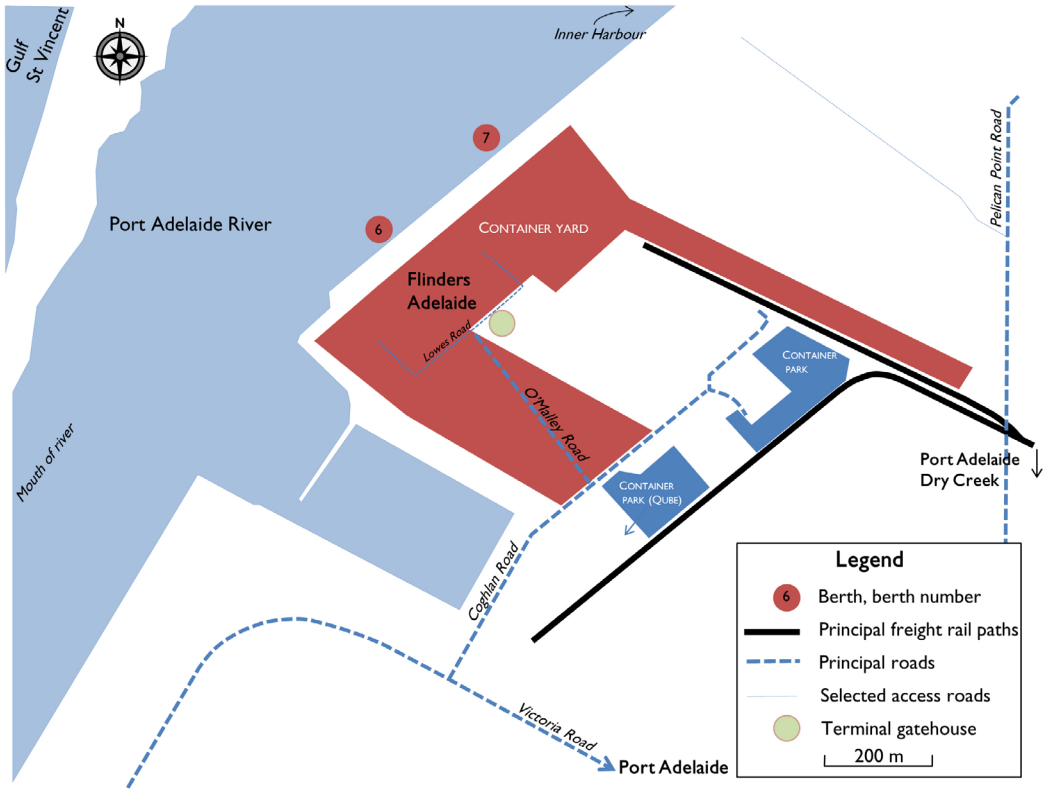
Rail linkages. The dock area consists of rail facilities near the docks and the nearby intermodal container terminals at South Dynon, Dynon and North Dynon. Although there is an eastern link from the Dynon terminals towards the east (Southern Cross and Flinders Street), the container movements are to and from the west via the Tottenham–Dynon line.

Of the five container ports represented here, the Port of Melbourne is unique in the proximity of intermodal terminals near to the docks as well as the on/near-dock facilities.

National rail connections. Principal freight rail paths are shown; most tracks (including dockside tracks) are dual gauge (namely, broad- and standard-gauge tracks). Access to the interstate network is via the dual-gauge track to the west, via Tottenham.

Vessels alongside at Port Botany. Photo courtesy of NSW Ports.

Adelaide (Flinders Adelaide Container Terminal at Outer Harbor/Pelican Point)



(Last updated: November 2014)

Adelaide (Flinders Adelaide Container Terminal at Outer Harbor/Pelican Point)

Flinders Ports manages the port facilities in Adelaide; these are at Outer Harbor and the Inner Harbour (up the Port Adelaide River).

Dockside

Stevedores. Port Adelaide's Outer Harbor Container Terminal is operated by Flinders Adelaide, using two berths.

Berths. The map shows the container terminal located in the outer harbour (at Outer Harbor) of Port Adelaide; the Inner Harbour at Port Adelaide is not shown. The Flinders Adelaide container facilities use berths 6 and 7.

Equipment. The terminal has four travelling container-handling cranes (Panamax-standard). The terminal commissioned two new post-Panamax cranes in June 2015.

Road

Flinders Adelaide Container Terminal is accessed in O'Malley Road, leading from Coghlan Road.

Rail

Facilities. The Outer Harbor terminal has two sets of standard-gauge rail sidings. Two sidings, each of 640 metre length, serve the Flinders Adelaide Container Terminal. The other set of sidings serve the Qube Logistics terminal and container park.

Services. Scheduled railed movements to the dockside include:

Short-haul:

- Penfield (Direk) to Flinders Adelaide (SCT Logistics).

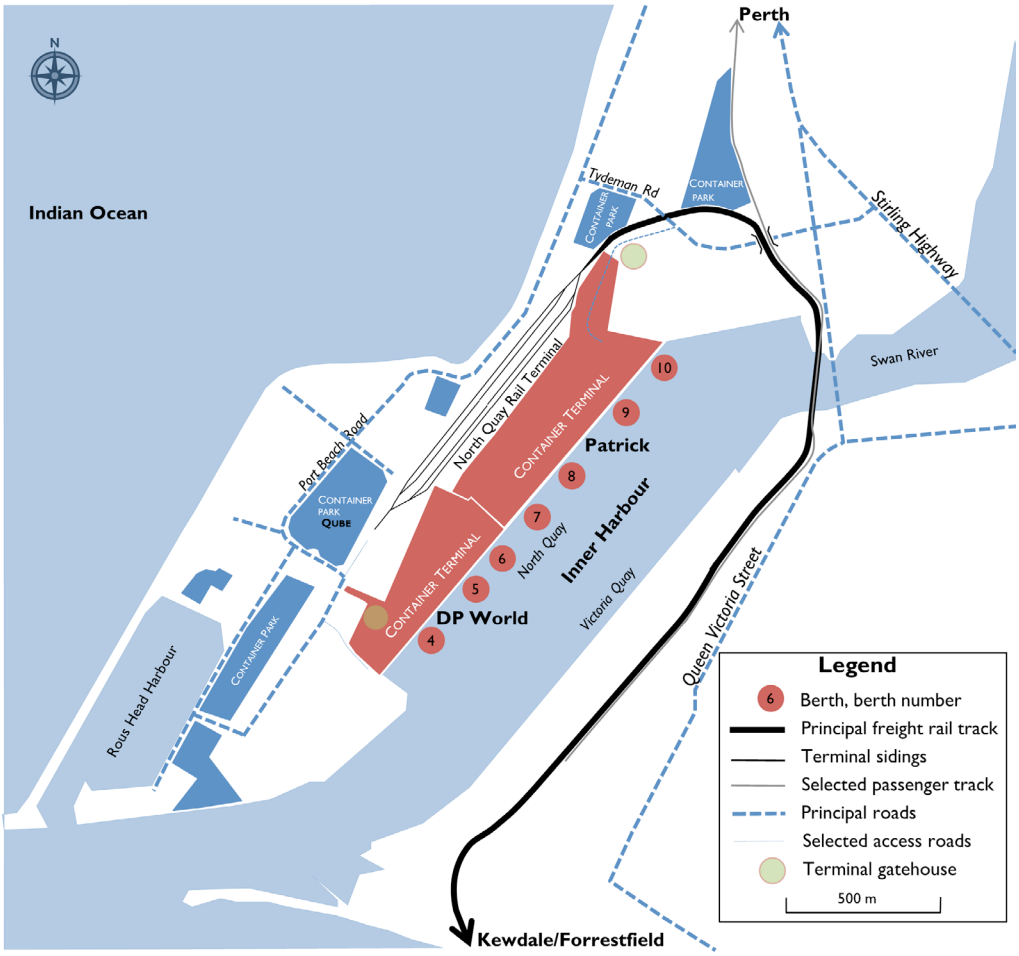
Long-haul:

- containerised lead from Port Pirie, agricultural products from Bowmans Intermodal Terminal, via Port Flat. (Patrick PortLink SA)
- bulk grain from various producers. Some of this is containerised at Viterra's (ABB) grain loader (inverter) for export.

Rail linkages. The Outer Harbor facility is at the extremity of a freight-only railway between Outer Harbor, Port Adelaide and Dry Creek.

National rail connections. The Outer Harbor–Dry Creek line connects with the interstate network at Dry Creek. Nearby intermodal terminals include the Asciano terminals at Port Flat and Islington and the SCT Logistics terminal at Penfield (Direk).

Fremantle (North Quay Terminals in the Inner Harbour)



(Last updated: December 2015)

Fremantle (North Quay Terminals in the Inner Harbour)

Fremantle Ports, a Western Australian Government trading enterprise, manages the port.

Dockside

Stevedores. Container stevedoring is undertaken at North Quay in the Inner Harbour by Patrick and DP World. Patrick have four berths and DP World has three berths.

Berths. Patrick's berth 10 is a multi-purpose container, ro-ro and general cargo facility. The six other stevedore berths are dedicated container ship berths.

Equipment. The Patrick terminal has 4 cranes, of which 3 are post-Panamax; the DP World terminal has 3 cranes, including 2 post-Panamax. DP World commissioned its second post-Panamax crane in April 2015.

Road

The principal roads on this peninsula are Tyderman Road (from the Stirling Highway) and Port Beach Road/Rudderham Drive. The DP World terminal is accessed via Rudderham Drive while the Patrick terminal is accessed via Tyderman Road.

Rail

Facilities. North Quay Rail Terminal, to the west of the Patrick terminal, serves both Patrick and DP World container terminals. The sidings at that location are around 690 metres in length, accommodating blocks of 600 metre-length trains. The Rail Terminal has dual-gauge tracks.

Services. Scheduled rail services to the port include the following (standard-gauge) trains:

Short-haul:

- A container train operates between Kewdale/Forrestfield and the North Quay Rail Terminal. (Intermodal Link Services/SCT)

Long-haul:

- nickel matte from Kalgoorlie for WMC Resources/BHP Billiton. (Aurizon)

Rail linkages. Trains access the Rail Terminal on a dual narrow- and standard-gauge freight-only line from Midland. Freight and passenger trains share a track on the bridge over the Swan River.

National rail connections. The rail link to Midland, on the interstate network, includes spur tracks to interstate intermodal terminals at Kewdale and Forrestfield.

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