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Foreword

Waterline, a bi-annual journal, was started in 1996 as part of a waterfront microeconomic reform and monitoring package agreed between the Australian Government, stevedoring companies and other stakeholders in the Australian waterfront industry. The journal is published by Bureau of Infrastructure, Transport and Regional Economics (BITRE) and provides information on freight movements on both the wharf side and the landside of five Australian major city port terminals: Brisbane, Sydney, Melbourne, Adelaide and Fremantle. This issue covers port terminal activity up to June quarter 2007.

The publication was prepared in the Maritime and Rail Statistics Section by Tony Carmody under the supervision of Godfrey Lubulwa and was desktop published by Melinda Keane.

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- stevedoring companies: Patrick and DP World; and
- the Office of Transport Security of the Department of Infrastructure, Transport, Regional Development and Local Government.

Download this issue of *Waterline* and back issues, including selected time series data in Excel spreadsheet format, from www.bitre.gov.au.

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In brief

Landside of port terminal

- The five port total of containers moved decreased from 733 677 in the March quarter 2007 to 707 166 in the June quarter 2007, a decrease of 3.6 per cent (Chapter 1).
- The five port average container turnaround time was 22.7 minutes in the March quarter 2007 and 21.9 minutes in the June quarter 2007 (Chapter 1).
- The five port total of trucks processed decreased from 445 368 in the March quarter 2007 to 428 738 in the June quarter 2007, a decrease of 3.7 per cent (Chapter 1).
- The five port average truck turnaround time was 39.1 minutes in the March quarter 2007 and 38.0 minutes in the June quarter 2007 (Chapter 1).
- The five port total of vehicle booking system (VBS) slots used increased from 485 630 in the March quarter 2007 to 495 231 in the June quarter 2007 (Chapter 1).

Wharfside of port terminal

- The five port average crane rate increased from 27.0 containers per hour in the March quarter 2007 to 27.2 containers per hour in the June quarter 2007 (Chapter 2).
- The five port average vessel working rate has increased over the period from 36.7 containers per hour in the March quarter 2007 to 37.4 in the June quarter 2007 (Chapter 2).
- The five port total of container moves decreased from 880 552 in the March quarter 2007 to 874 269 in the June quarter 2007 (Chapter 2).
- The national port interface cost index for exporting a container was \$594 per twenty foot equivalent unit (TEU) in 2001 constant prices for Jan–June 2007. This is lower than July–December 2006 when it was \$601 per TEU (Chapter 3).
- Total ship visits increased by 5.3 per cent in the year ended 30 June 2007 (Chapter 4).
- In January–June 2007, total cargo throughput was 60.0 million tonnes and total container traffic 2.6 million TEUs (Chapter 5).
- The tonnage of cargo estimated to be moved under coastal permits has fallen from 4.9 million tonnes in October–December 2006 to 3.3 million tonnes in January–March 2007 (Chapter 7).
- Harbour towage charges increased at three of the five major ports during the financial year 2006–2007 (Chapter 8).

Chapter 1 Landside performance indicators

Introduction

This chapter reports up to four quarters of data on an extended list of landside of port terminal indicators at the five capital city port terminals. There are three types of indicators on the extended list:

- indicators of size of task at the landside of port terminals
- performance indicators
- indicators of activity in the vehicle booking system.

To minimise respondent burden and the cost of data collection, the indicators are derived from data already being collected by businesses. This strategy, however, means that in a few cases the indicators will need refining over time due to changes in business-driven data capture methods.

Size of task landside of port terminal indicators

These indicate the size of task performed and include the following:

1. Total number of trucks processed in a quarter. This indicator shows the total truck-related task performed at a port terminal in a quarter in a seven day week.
2. Number of containers processed in a quarter. This indicator of task size measures containers processed on the landside of port terminals in a seven day week.
3. Number of twenty-foot equivalent units (TEUs) processed in a quarter. This task size indicator measures the number of standardised twenty foot equivalent units (TEUs) of containers processed on the landside of port terminals in a seven day week.
4. Number of containers loaded on or unloaded from rail in a quarter. This indicator estimates the total rail-related task performed at a port terminal in a quarter.

The data on these four indicators (see Table 1.1) is reported for a seven day period (Monday to Sunday), for each of the five major city ports, and as grand totals for these five ports. The counts of trucks, containers and TEUs include both the movements recorded in the stevedores' vehicle booking system (VBS) and bulk runs. These occur outside the VBS and are becoming increasingly important to landside efficiency, especially given that most bulk runs occur after hours. The data for indicators 1—3 are shown in Figure 1.1 (five major ports). The data for indicators 1—4 are shown in Figure 1.3 (Brisbane), Figure 1.5 (Sydney), Figure 1.7 (Melbourne), Figure 1.9 (Adelaide), and Figure 1.11 (Fremantle).

Landside of port terminal performance indicators

The performance indicators are:

- average number of containers per truck
- average TEUs per truck

- container turnaround time, as defined in the explanatory notes
- average truck turnaround time, as defined in the explanatory notes.

Vehicle booking system (VBS) indicators

This chapter also discusses three VBS indicators:

- the number of VBS slots available
- number of VBS slots used
- adjusted usage rates for vehicle booking system slot.

The data for the vehicle booking system (VBS) presented in Table 1.1 is standardised for the day, evening and night shifts at the container terminals at the five ports for the following days of the week: Monday to Friday, Saturday and Sunday. Table 1.1 shows both the number of timeslots made available and the number of slots used. The stevedores at the five port container terminals do not have the same day, evening and night shifts. The data has been adjusted to fit into the standardised work shifts shown in Table 1.1 for comparative purposes.

Adjusted usage rates for vehicle booking system slots

This set of VBS indicators attempts to measure the degree of synchronisation between the supply and demand for timeslots. If VBS slot supply was constant across time then a large percentage use of those available would indicate a high degree of synchronisation between their supply and demand. Table 1.1 seems to show that slots are provided to meet demand masking the actual behaviour of VBS users. The question is whether the demand pattern can be improved:

- to reduce demand in the daytime windows on Monday to Friday
- to increase use of in the evening, night and weekends.

‘Demand-supply’ mismatch measures are computed as follows. We first determine the maximum VBS timeslots available at the port terminal in each of the windows: Monday to Friday and separately for Saturday and Sunday. This quantity is used as the benchmark or reference number of timeslots that a port terminal could supply for the respective periods. The adjusted usage rates are computed as the number of VBS slots used, from Table 1.1, as a percentage of the benchmark or reference number. These usage rates are shown in Figure 1.2 (five major ports), Figure 1.4 (Brisbane), Figure 1.6 (Sydney), Figure 1.8 (Melbourne), Figure 1.10 (Adelaide), and Figure 1.12 (Fremantle).

Interpretation of the indicators

Indicators of size of task

The measures presented here are based on a combination of the throughput from the VBS at the land interface and the bulk runs of containers outside the system. At this stage it is not possible to separate out the bulk runs from the operations under the VBS. It is hypothesised that the higher the proportion of landside activity that is undertaken as bulk runs, the more efficient the interface between the port terminal and the landside transport system. Bulk runs tend to be at night and represent a

reduced impact of freight movements on daytime congestion; they also tend to use larger vehicles with higher container or TEU per truck measures. As data capture methods improve, the aim is to report bulk runs or the share of bulk runs in the total landside container movement task as a separate indicator.

Containers/TEUs per truck

Variations in this indicator provide an indirect measure of the impact of changes in the volume of the landside of port terminal task on the road network.

For example, an increase in the number of containers carried per truck implies a decrease in the total number of trucks on the road network. Similarly, a decrease in the number of containers carried per truck, keeping other things constant, implies an increase in the total number of trucks on the road network.

Average number of containers/TEUs per truck should not be interpreted as a measure of truck utilisation because the measure does not take into account the mass capacity of the vehicle.

Turnaround times

Container turnaround time is a measure of the efficiency of stevedoring companies.

Truck turnaround time measures the efficiency of stevedoring companies in the handling of an average individual truck at a port terminal in a seven day period.

VBS slots

Adjusted usage rates measure the extent of synchronisation between the businesses of port terminals that are open all the time and the operators of landside logistics businesses. The higher the level of synchronisation between the two, the higher the usage rates and the more efficient the use of available infrastructure. Overall what is most evident is that major demand for VBS slots occurs in the day shift while the lowest usages are on Saturday and Sunday.

Comparisons across port terminals

Each one of the port terminals within the scope of the performance reports in Waterline is unique. The appendix at the end of the explanatory notes contains a set of diagrams giving schematic representations of each of the five port terminals discussed in Waterline showing differences between port terminals with respect to geography, access by road and rail, and proximity to intermodal facilities. Comparisons between ports are difficult and are of very limited value due to these differences. The most useful comparisons of the landside of port terminal indicators involve within port terminal comparisons over time.

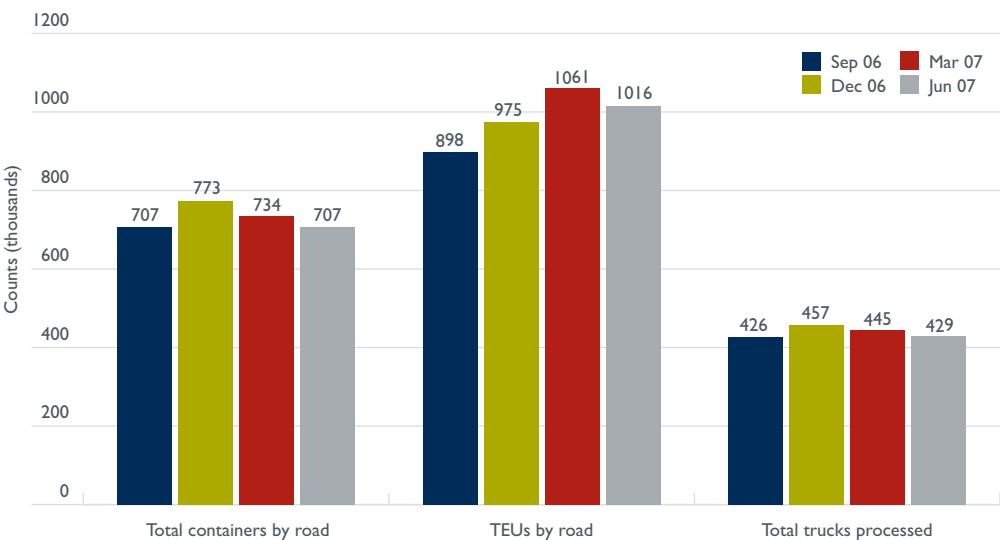
Results: five ports

Table 1.1 presents the March quarter 2007 and June quarter 2007 landside of port terminal performance indicators at the five major Australian container ports. Figure 1.1 presents the landside task indicators for the March and June quarters of 2007.

In summary:

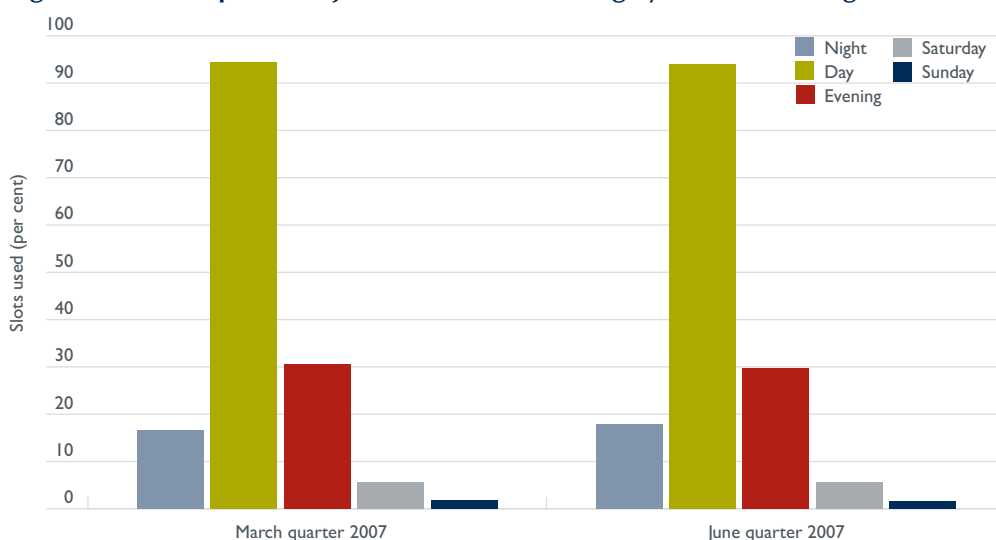
- the five port average container turnaround time was 22.7 minutes in the March quarter 2007 and 21.9 minutes in the June quarter 2007
- the five port average truck turnaround time was 39.1 minutes in the March quarter 2007 and 38.0 minutes in the June quarter 2007
- the five port average of containers per truck was 1.6 in both the March quarter 2007 the June quarter 2007
- the five port total of trucks decreased from 445 368 in the March quarter 2007 to 428 738 in the June quarter 2007, a decrease of 3.7 per cent
- the five port total of containers moved decreased from 733 640 in the March quarter 2007 to 707 166 in the June quarter 2007, a decrease of 3.6 per cent
- the five port total of TEUs moved decreased from 1 060 989 in the March quarter 2007 to 1 016 001 in the June quarter 2007, a decrease of 4.2 per cent
- the five port total of VBS slots used increased from 485 630 in the March quarter 2007 to 495 231 in the June quarter 2007
- the five port adjusted usage rates of VBS slots in the March and June 2007 quarters were
 - Monday to Friday Night shift 16.6 and 17.8 per cent
 - Monday to Friday Day shift 94.4 and 94.0 per cent
 - Monday to Friday Evening shift 30.5 and 29.7 per cent
 - Saturday 5.5 and 5.5 per cent
 - Sunday 1.8 and 1.5 per cent.

Figure 1.1 Five major ports: landside of container terminal size of task indicators



Note: The counts of containers by road, TEUs by road and trucks processed include operations under the vehicle booking system and bulk runs.

Source: Patrick and DPWorld.

Figure 1.2 Five ports: adjusted vehicle booking system time usage 2007

Note: The definitions of the time windows are as follows; Night (2400–0600 Monday–Friday), Day (0601–1800 Monday–Friday) and Evening (1801–2400 Monday–Friday).

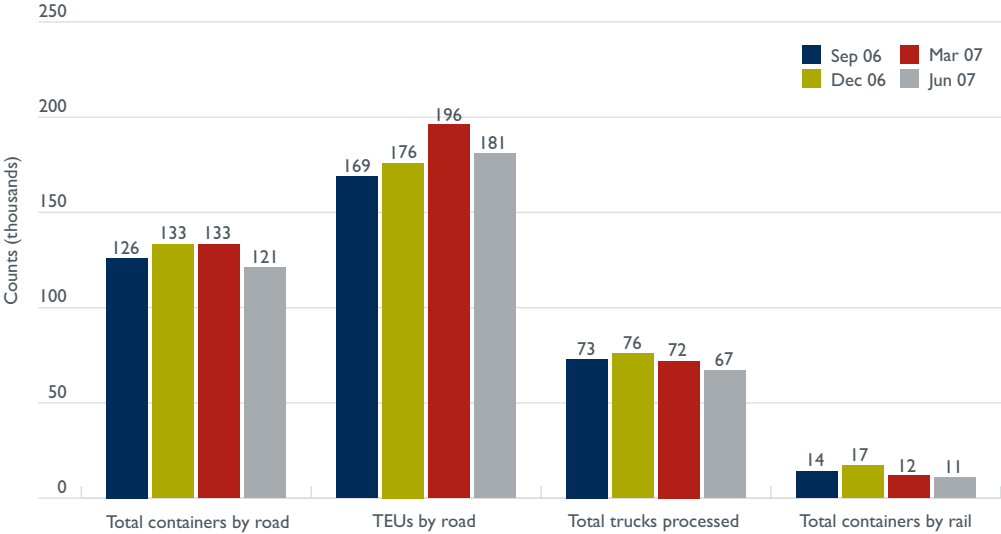
Source: Patrick and DPWorld.

Individual ports

The rest of the chapter presents the landside task indicators for Brisbane, Sydney, Melbourne, Adelaide and Fremantle respectively. The landside of port terminal infrastructure arrangements for each of these ports is unique to each port. Thus, any comparison of performance indicators between ports would be misleading. The data for Brisbane, Sydney, Melbourne and Fremantle use, where appropriate, weighted averages for the container terminals operated by DP World and Patrick. The Adelaide data are for the DP World container terminal.

The Brisbane (DP World, Patrick) average container turnaround time decreased from 26.4 minutes in the March quarter 2007 to 24.3 minutes in the June quarter 2007. The truck turnaround time decreased from 46.7 minutes in the March quarter 2007 to 42.7 minutes in the June quarter 2007. The total number of trucks decreased by 6.1 per cent in June 2007 and the total TEUs decreased by 8.1 per cent. Total containers moved decreased by 9.6 per cent.

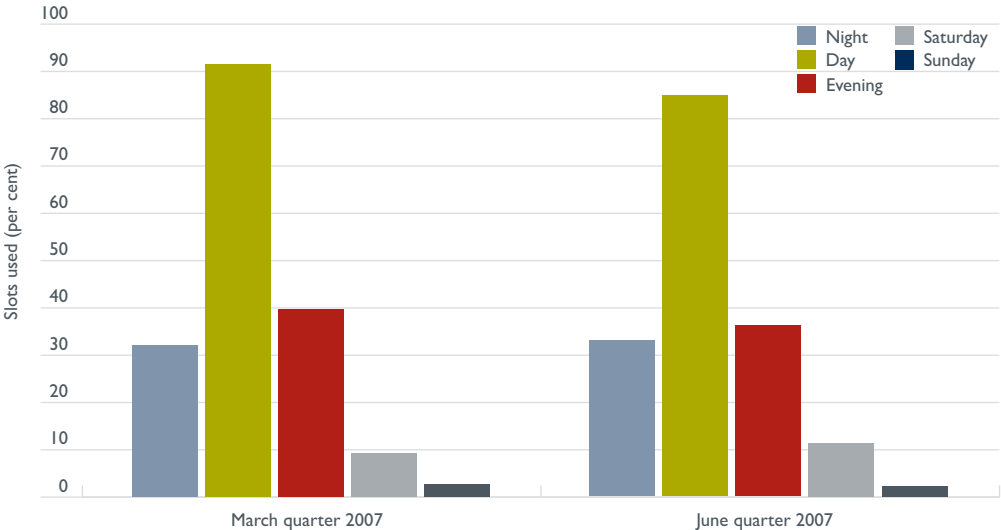
Figure 1.3 Brisbane: landside of container terminal size of task indicators



Note: The counts of containers by road, TEUs by road and trucks processed include operations under the vehicle booking system and bulk runs.

Source: Patrick and DPWorld.

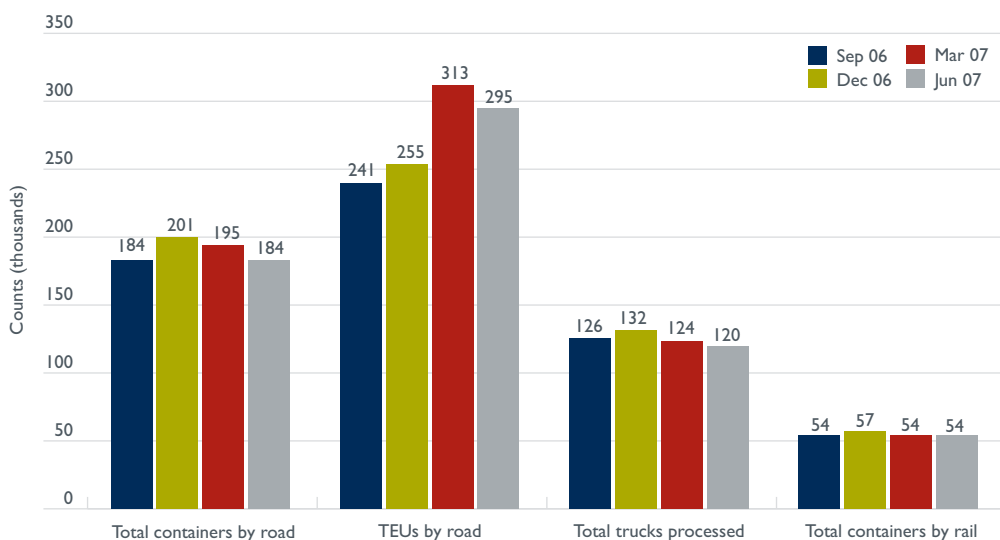
Figure 1.4 Brisbane: adjusted vehicle booking system time usage 2007



Note: The definitions of the time windows are as follows; Night (2400–0600 Monday–Friday), Day (0601–1800 Monday–Friday) and Evening (1801–2400 Monday–Friday).

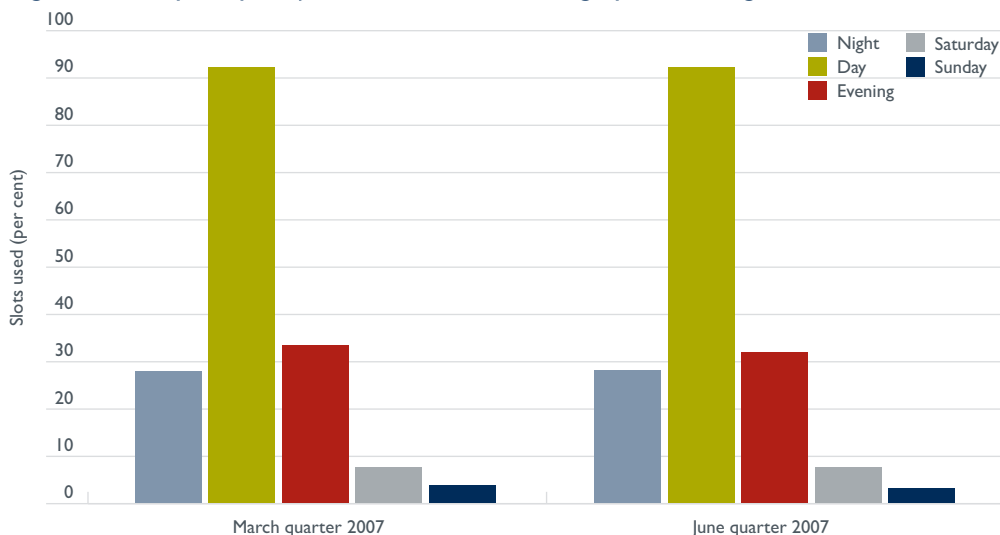
Source: Patrick and DPWorld.

The Sydney (DP World, Patrick) average container turnaround time increased from 24.9 minutes in the March quarter 2007 to 26.7 minutes in the June quarter 2007. The truck turnaround time increased from 42.8 minutes the March quarter 2007 to 44.9 minutes in the June quarter 2007. The number of trucks processed decreased by 3.6 per cent in June 2007 and the total TEUs decreased by 5.8 per cent. Total containers moved decreased by 5.5 per cent.

Figure 1.5 Sydney: landside of container terminal size of task indicators

Note: The counts of containers by road, TEUs by road and trucks processed include operations under the vehicle booking system and bulk runs.

Source: Patrick and DPWorld.

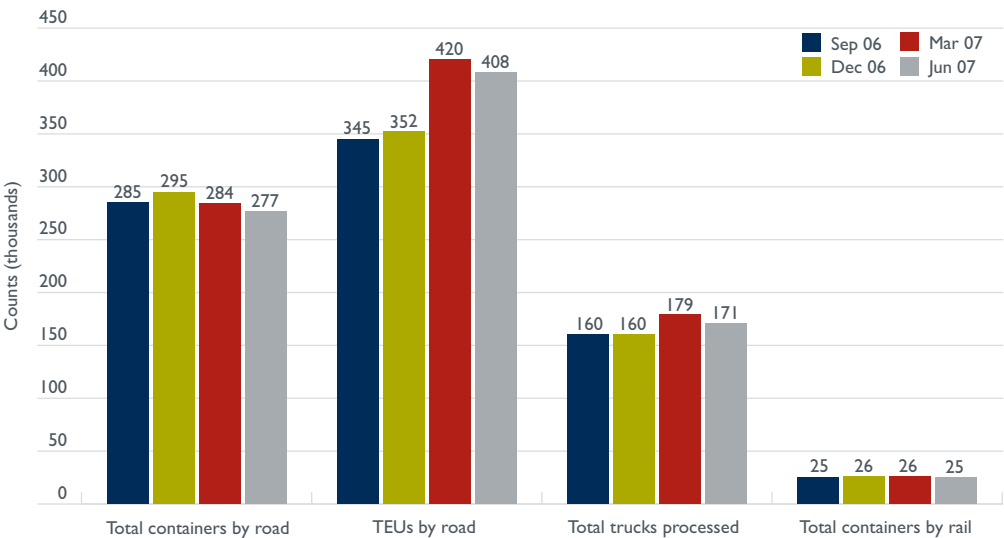
Figure 1.6 Sydney: adjusted vehicle booking system usage 2007

Note: The definitions of the time windows are as follows; Night (2400–0600 Monday–Friday), Day (0601–1800 Monday–Friday) and Evening (1801–2400 Monday–Friday).

Source: Patrick and DPWorld.

The Melbourne (DP World, Patrick) average container turnaround time increased from 17.7 minutes in the March quarter 2007 to 18.1 minutes in the June quarter 2007. The truck turnaround time increased from 30.3 minutes for the March quarter to 30.7 in the June quarter 2007. The number of trucks processed decreased by 4.8 per cent in June 2007 and the total TEUs decreased by 2.8 per cent. Total containers moved also decreased by 2.6 per cent.

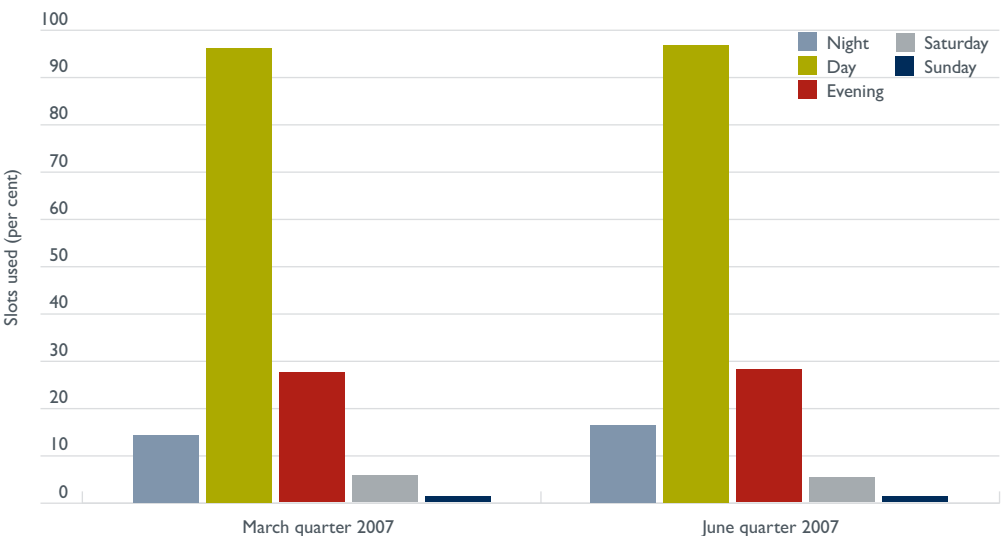
Figure 1.7 Melbourne: landside of container terminal size of task indicators



Note: The counts of containers by road, TEUs by road and trucks processed include operations under the vehicle booking system and bulk runs.

Source: Patrick and DPWorld.

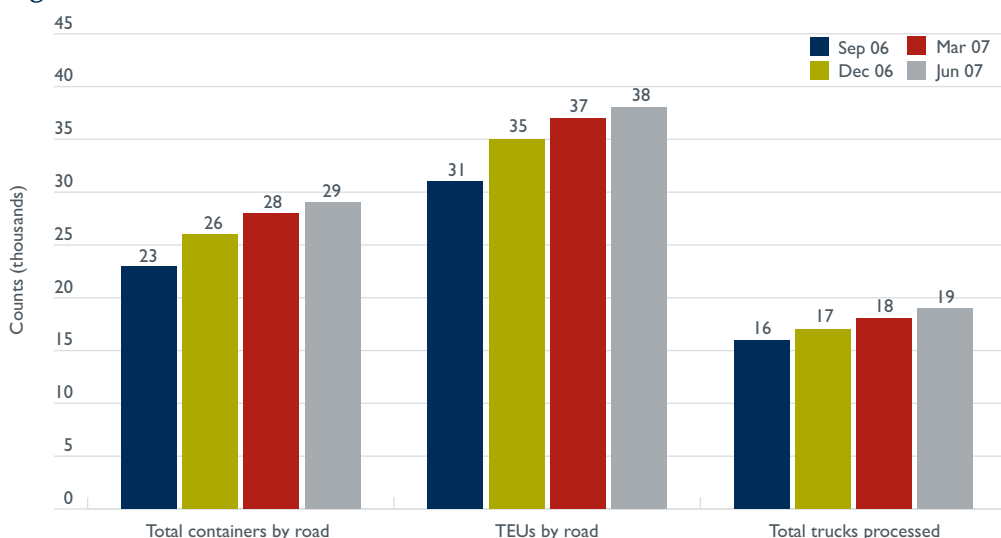
Figure 1.8 Melbourne: adjusted vehicle booking system time usage 2007



Note: The definitions of the time windows are as follows; Night (2400–0600 Monday–Friday), Day (0601–1800 Monday–Friday) and Evening (1801–2400 Monday–Friday).

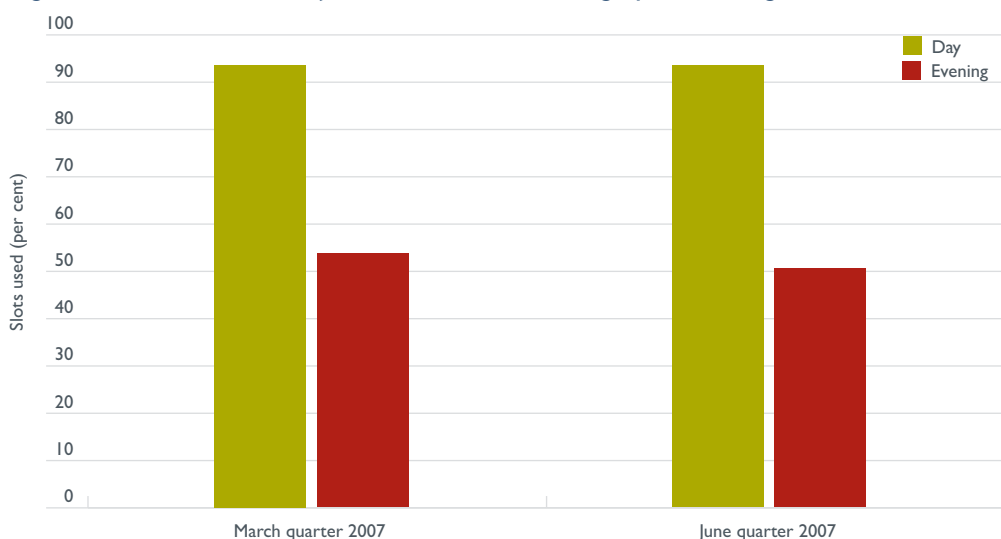
Source: Patrick and DPWorld.

The Adelaide (DP World) average container turnaround time decreased from 25.3 minutes in the March quarter 2007 to 23.0 minutes in the June quarter 2007. The truck turnaround time decreased from 39.2 minutes in the March quarter 2007 to 35.3 minutes in the June quarter 2007. The total number of trucks processed increased by 5.2 per cent in June 2007 and the total TEUs increased by 5.1 per cent. Total containers moved increased by 4.2 per cent.

Figure 1.9 Adelaide: landside of container terminal size of task indicators

Note: The counts of containers by road, TEUs by road and trucks processed include operations under the vehicle booking system and bulk runs.

Source: Patrick and DP World.

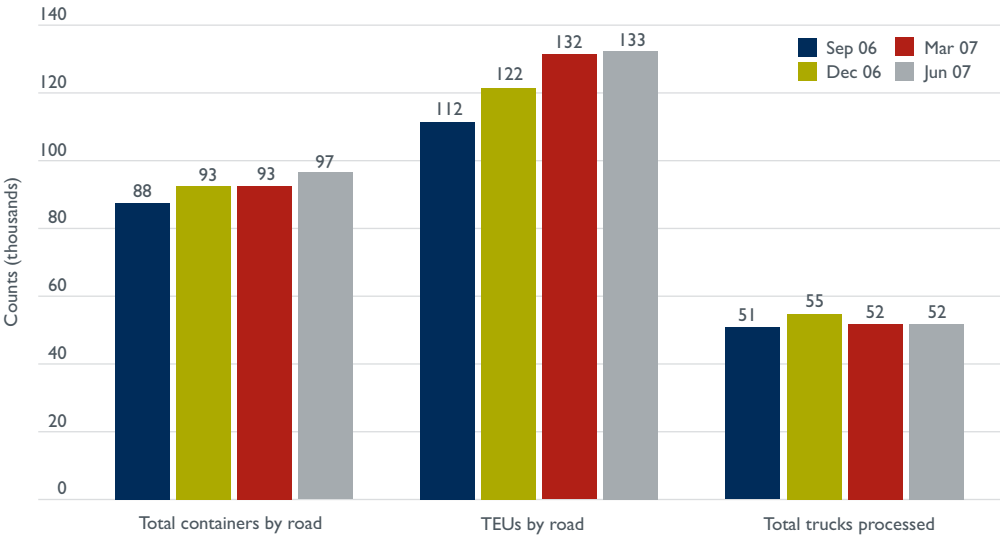
Figure 1.10 Adelaide: adjusted vehicle booking system usage 2007

Note: The definitions of the time windows are as follows: Day (0600–1800 Monday–Friday), Evening (1801–2400 Monday–Friday). There are no night shifts at this port terminal. The terminal is not open on weekends.

Source: Patrick and DP World.

The Fremantle (DP World, Patrick) average container turnaround time decreased from 19.3 minutes in the March quarter 2007 to 18.2 minutes in the June quarter 2007. The truck turnaround time increased from 33.6 minutes in the March quarter 2007 to 32.3 minutes in the June quarter 2007. The total number of trucks processed decreased by 0.4 per cent in June 2007 and the total TEUs increased by 0.6 per cent. Total containers moved increased by 3.3 per cent.

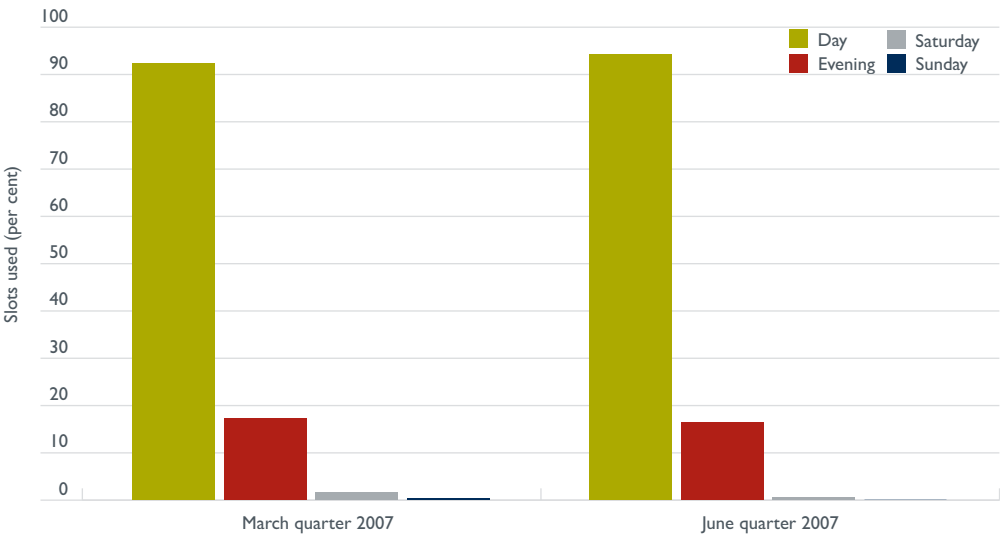
Figure 1.11 Fremantle: landside of container terminal size of task indicators



Note: The counts of containers by road, TEUs by road and trucks processed include operations under the vehicle booking system and bulk runs.

Source: Patrick and DPWorld.

Figure 1.12 Fremantle: adjusted vehicle booking system usage 2007



Note: The definitions of the time windows are as follows; Night (2400–0600 Monday–Friday), Day (0601–1800 Monday–Friday) and Evening (1801–2400 Monday–Friday).

Source: Patrick and DPWorld.

Conclusion

This chapter presents the most comprehensive list of indicators of activity, and of the efficiency of the movement of containers on the landside of the five major city container terminals in Australia. It is planned to keep the list of indicators stable over time to facilitate the construction of a time series which at this stage is, at the most, four quarters. In the medium term it may be possible to add to this list of indicators. Possible candidates include:

- a proxy for the time trucks spend waiting outside port terminals
- the dwell time for containers—an estimate of the time a container spends at a port terminal
- the shares of bulk runs in counts on the landside of port terminals of trucks, containers and TEUs.

Table 1.1 Container terminal landside performance indicators

Port/Indicator	Sep 06	Dec 06	Mar 07	Jun 07
<i>5 Ports</i>				
Road				
Total trucks	425 706	457 328	445 368	428 738
Total containers	707 089	773 293	733 640	707 166
TEUs	898 483	974 557	1 060 989	1 016 001
Truck turnaround time—mins.	36.7	37.3	39.1	38.0
Containers per truck	1.5	1.4	1.6	1.6
Avg. container turnaround time—mins.	24.5	24.9	22.7	21.9
TEUs per truck	2.1	2.1	2.3	2.3
Rail				
Total containers	na	na	na	na
Number of VBS timeslots available				
Overall total			573 853	592 074
Monday–Friday				
Day (0601–1800)			326 434	333 425
Evening (1801–2400)			130 546	134 787
Night (2400–0600)			71 247	78 357
Sub total			528 227	546 569
Saturday				
Day (0601–1800)			24 519	24 100
Evening (1801–2400)			3 251	3 149
Night (2400–0600)			5 532	6 216
Sub total			33 302	33 465
Sunday				
Day (0601–1800)			2 438	2 146
Evening (1801–2400)			2 863	2 641
Night (2400–0600)			7 023	7 253
Sub total			12 324	12 040
Number of VBS timeslots used				
Overall total			485 630	495 231
Monday–Friday				
Day (0601–1800)			308 126	313 340
Evening (1801–2400)			99 445	99 042
Night (2400–0600)			54 316	59 373
Sub total			461 887	471 755
Saturday				
Day (0601–1800)			13 869	13 478
Evening (1801–2400)			597	515
Night (2400–0600)			3 458	4 471
Sub total			17 924	18 464
Sunday				
Day (0601–1800)			610	169
Evening (1800–2400)			1 179	1 026
Night (2400–0600)			4 030	3 817
Sub total			5 819	5 012

continued

Table 1.1 Container terminal landside performance indicators (continued)

Port/Indicator	Sep 06	Dec 06	Mar 07	Jun 07
<i>Brisbane</i>				
Road				
Total trucks	72 660	75 976	71 784	67 376
Total containers	126 112	132 686	133 297	120 543
TEUs	168 695	175 761	196 312	180 501
Truck turnaround time—mins. ^a	53.2	50.0	46.7	42.7
Containers per truck	1.7	1.7	1.7	1.7
Avg. container turnaround time—mins.	32.2	30.7	26.4	24.3
TEUs per truck	2.3	2.3	2.4	2.5
Rail				
Total containers ^b	14 007	16 558	11 595	11 495
Number of VBS timeslots available				
Overall total			98 283	109 418
Monday–Friday				
Day (0601–1800)			44 006	48 309
Evening (1801–2400)			21 479	23 805
Night (2400–0600)			22 036	26 076
Sub total			87 521	98 190
Saturday				
Day (0601–1800)			5 241	5 814
Evening (1801–2400)			175	68
Night (2400–0600)			1 927	2 300
Sub total			7 343	8 182
Sunday				
Day (0601–1800)			0	0
Evening (1801–2400)			638	10
Night (2400–0600)			2 781	3 036
Sub total			3 419	3 046
Number of VBS timeslots used				
Overall total			77 607	81 609
Monday–Friday				
Day (0601–1800)			40 621	41 345
Evening (1801–2400)			17 584	17 654
Night (2400–0600)			14 207	16 071
Sub total			72 412	75 070
Saturday				
Day (0601–1800)			3 115	3 554
Evening (1801–2400)			18	11
Night (2400–0600)			908	1920
Sub total			4 041	5 485
Sunday				
Day (0601–1800)			0	0
Evening (1801–2400)			0	0
Night (2400–0600)			1 154	1 054
Sub total			1 154	1 054

continued

Table 1.1 Container terminal landside performance indicators (continued)

Port/Indicator	Sep 06	Dec 06	Mar 07	Jun 07
<i>Sydney</i>				
Road				
Total trucks	126 255	131 780	124 478	120 055
Total containers	184 136	200 725	194 814	184 120
TEUs	241 380	254 925	312 613	294 545
Truck turnaround time—mins.	40.0	43.4	42.8	44.9
Containers per truck	1.3	1.5	1.3	1.3
Avg. container turnaround time—mins.	30.4	32.9	24.9	26.7
TEUs per truck	1.9	1.9	2.1	2.1
Rail				
Total containers	54 219	56 789	54 174	53 612
Number of VBS timeslots available				
Overall total			168 936	169 013
Monday–Friday				
Day (0601–1800)			79 857	79 603
Evening (1801–2400)			37 848	37 779
Night (2400–0600)			28 399	28 559
Sub total			146 104	145 941
Saturday				
Day (0601–1800)			11 083	11 054
Evening (1801–2400)			2 382	2 340
Night (2400–0600)			2 555	2 758
Sub total			16 020	16 152
Sunday				
Day (0601–1800)			2 224	2 132
Evening (1801–2400)			1 756	2 035
Night (2400–0600)			2 832	2 753
Sub total			6 812	6 920
Number of VBS timeslots used				
Overall total			131 841	129 803
Monday–Friday				
Day (0601–1800)			73 871	73 667
Evening (1801–2400)			26 662	25 438
Night (2400–0600)			22 356	22 350
Sub total			122 889	121 455
Saturday				
Day (0601–1800)			4 196	4 168
Evening (1801–2400)			50	38
Night (2400–0600)			1 742	1 770
Sub total			5 988	5 976
Sunday				
Day (0601–1800)			440	155
Evening (1801–2400)			718	528
Night (2400–0600)			1 806	1 689
Sub total			2 964	2 372

continued

Table 1.1 Container terminal landside performance indicators (continued)

<i>Port/Indicator</i>	<i>Sep 06</i>	<i>Dec 06</i>	<i>Mar 07</i>	<i>Jun 07</i>
<i>Melbourne</i>				
Road				
Total trucks	159 808	160 035	179 376	170 839
Total containers	285 218	295 096	284 238	276 977
TEUs	345 254	351 972	419 669	407 763
Truck turnaround time—mins.	30.4	28.1	30.3	30.7
Containers per truck	1.5	1.8	1.6	1.6
Avg. container turnaround time—mins.	19.8	18.0	17.7	18.1
TEUs per truck	2.2	2.2	2.3	2.3
Rail				
Total containers ^b	24 625	25 866	25 500	25 165
Number of VBS timeslots available				
Overall total			192 107	200 146
Monday–Friday				
Day (0601–1800)			123 774	126 677
Evening (1801–2400)			36 871	38 860
Night (2400–0600)			20 812	23 722
Sub total			181 457	189 259
Saturday				
Day (0601–1800)			7 022	6 928
Evening (1801–2400)			692	741
Night (2400–0600)			1 050	1 158
Sub total			8 764	8 827
Sunday				
Day (0601–1800)			9	0
Evening (1801–2400)			467	596
Night (2400–0600)			1 410	1 464
Sub total			1 886	2 060
Number of VBS timeslots used				
Overall total			180 491	188 627
Monday–Friday				
Day (0601–1800)			119 859	123 488
Evening (1801–2400)			34 332	35 893
Night (2400–0600)			17 753	20 952
Sub total			171 944	180 333
Saturday				
Day (0601–1800)			5 681	5 475
Evening (1801–2400)			529	466
Night (2400–0600)			808	781
Sub total			7 018	6 722
Sunday				
Day (0601–1800)			0	0
Evening (1801–2400)			459	498
Night (2400–0600)			1 070	1 074
Sub total			1 529	1 572

continued

Table 1.1 Container terminal landside performance indicators (continued)

Port/Indicator	Sep 06	Dec 06	Mar 07	Jun 07
<i>Adelaide</i>				
Road				
Total trucks	15 795	17 370	17 945	18 875
Total containers	23 219	25 756	27 799	28 968
TEUs	31 354	35 042	36 585	38 461
Truck turnaround time—mins.	31.5	34.1	39.2	35.3
Containers per truck	1.5	1.5	1.6	1.5
Avg. container turnaround time—mins.	21.4	23.0	25.3	23.0
TEUs per truck	2.0	2.0	2.0	2.0
Rail				
Total containers	na	na	na	na
Number of VBS timeslots available				
Overall total			33 429	34 362
Monday–Friday				
Day (0701–1400)			19 503	20 236
Evening (1401–2200)			13 926	14 126
Night (2200–0700)			0	0
Sub total			33 429	34 362
Number of VBS timeslots used				
Overall total			28 961	29 363
Monday–Friday				
Day (0701–1400)			18 411	19 054
Evening (1401–2200)			10 550	10 309
Night (2200–0700)			0	0
Sub total			28 961	29 363
<i>Fremantle</i>				
Road				
Total trucks	51 188	54 797	51 785	51 593
Total containers	88 404	93 274	93 492	96 558
TEUs	111 800	121 815	132 395	133 192
Truck turnaround time—mins.	24.0	27.4	33.6	32.3
Containers per truck	1.5	1.7	1.7	1.7
Avg. container turnaround time—mins.	15.7	17.6	19.3	18.2
TEUs per truck	2.2	2.2	2.3	2.4
Rail				
Total containers	na	na	na	na
Number of VBS timeslots available				
Overall total			81 098	79 135
Monday–Friday				
Day (0601–1800)			59 294	58 600
Evening (1801–2400)			20 422	20 217
Night (2400–0600)			0	0
Sub total			79 716	78 817

continued

Table 1.1 Container terminal landside performance indicators (continued)

Port/Indicator		Sep 06	Dec 06	Mar 07	Jun 07
Saturday					
Day (0601–1800)				1 173	304
Evening (1801–2400)				2	0
Night (2400–0600)				0	0
Sub total				1 175	304
Sunday					
Day (0601–1800)				205	14
Evening (1801–2400)				2	0
Night (2400–0600)				0	0
Sub total				207	14
Number of VBS timeslots used					
Overall total				66 730	65 829
Monday–Friday					
Day (0601–1800)				55 364	55 786
Evening (1801–2400)				10 317	9 748
Night (2400–0600)				0	0
Sub total				65 681	65 534
Saturday					
Day (0601–1800)				877	281
Evening (1801–2400)				0	0
Night (2400–0600)				0	0
Sub total				877	281
Sunday					
Day (0601–1800)				170	14
Evening (1801–2400)				2	0
Night (2400–0600)				0	0
Sub total				172	14

na not available.

VBS stands for vehicle booking system.

a. Truck turnaround time in Brisbane includes some truck waiting time outside the terminal gate.

b. This data is incomplete because stevedores do not collect all rail data. Note that these figures do not include containers handled by the Dynon Terminal.

- Note:
1. The figures for total containers, total trucks, containers per truck, TEUs and TEUs per truck, contain bulk runs.
 2. Day, evening and night time slots have been standardised for comparative purposes. Start and cut-off times for shifts differ between stevedoring companies and between ports.
 3. Stevedoring companies count containers moved by rail only when they are hauled to an 'on dock' rail siding. They do not count containers moved by rail to or from a 'near dock' rail siding. 'On dock' refers to situations where the rail siding is on dock in a port terminal. 'Near dock' rail sidings are in the neighbourhood of the port terminal but not on the dock. The rail sidings in Brisbane, Fremantle, Adelaide and DP World, Melbourne are near dock. The only complete rail figures are for the Sydney, Port Botany container terminal which has an on-dock rail siding.
 4. The concepts used in compiling these indicators are defined in the explanatory notes.
 5. All terminals are open Monday–Friday. Only Adelaide is not open on Saturday or Sunday.

Sources: Patrick 2007a, DP World 2007a.

Chapter 2 Stevedoring productivity

National crane rate productivity, as measured by the five port average, was 27.0 containers per hour in the March quarter 2007 (3.1 per cent lower than the March quarter 2006 rate of 27.8). In the June quarter 2007, the crane rate increased to 27.2 containers per hour (0.6 per cent higher than the June quarter 2006 rate of 27.0).

Table 2.1 presents the March quarter 2006 to June quarter 2007 indicators of stevedoring productivity at the five major Australian container ports, expressed in container moves per hour. Figures 2.1 to 2.6 present these data over the June quarter 1996 to June quarter 2007 period. The data are weighted averages of responses from stevedores operating at the respective container terminals.

In summary:

- the five-port average crane rate (average productivity per crane while the ship is worked) was 27.0 in the September quarter 2006, 26.8 in the December quarter 2006, 27.0 in the March quarter 2007, and 27.2 containers per hour for the June quarter 2007
- the five port total of container moves decreased from 880 552 in the March quarter 2007 to 874 269 moves in the June quarter 2007
- the five-port average vessel working rate (productivity per ship based on the time labour is aboard the ship) was 35.2 in the September quarter 2006, 36.1 in the December quarter 2006, 36.7 in the March quarter 2007, and 37.4 containers per hour in the June quarter 2007. The June quarter 2007 rate was 6.1 per cent greater than the June quarter 2006 rate.

The Brisbane average crane rate decreased from 23.0 in the December quarter 2006 to 22.8 in the March quarter 2007, and increased to 23.0 containers per hour in the June quarter 2007. The vessel working rate changed from 25.1 containers per hour in the December quarter 2006 to 26.7 in the March quarter 2007, and then to 26.2 in the June quarter 2007.

The Sydney average crane rate was 26.4 in the December quarter 2006 and decreased to 26.2 in the March quarter 2007. It increased to 26.9 containers per hour in the June quarter 2007. The vessel working rate was 34.6 containers per hour in the December quarter 2006 and 35.8 in the March quarter 2007. It again increased to 36.1 in the June quarter 2007.

The Melbourne average crane rate was 28.1 in the December quarter 2006 and 28.7 in the March quarter 2007. It decreased to 28.5 containers per hour in the June quarter 2007. The vessel working rate was 43.5 containers per hour in the December quarter 2006 and decreased to 43.2 in the March quarter 2007. It increased to 44.8 in the June quarter 2007.

The Adelaide average crane rate was 31.0 in the December quarter 2006 and 30.9 in the March quarter 2007. It decreased to 30.0 containers per hour in the June quarter 2007. The vessel working rate increased from 36.0 containers per hour in the December quarter 2006 to 36.5 in the March quarter 2007, and decreased to 33.9 in the June quarter 2007.

The Fremantle average crane rate was 27.8 in the December quarter 2006 and 28.1 in the March quarter 2007. It increased to 29.0 containers per hour in the June quarter 2007. The vessel working rate was 33.5 containers per hour in the December quarter 2006 and 33.6 in the March quarter 2007, it increased to 35.3 in the June quarter 2007.

Table 2.1 Container terminal performance indicators: productivity in containers per hour

<i>Port / Indicator</i>	<i>Mar 06</i>	<i>Jun 06</i>	<i>Sep 06</i>	<i>Dec 06</i>	<i>Mar 07</i>	<i>Jun 07</i>
Five ports						
Ships handled	1 026	1 075	1 117	1 094	1 075	1 110
Total containers	741 960	795 252	864 475	923 755	880 552	874 269
Crane rate	27.8	27.0	27.0	26.8	27.0	27.2
Vessel working rate	34.9	35.3	35.2	36.1	36.7	37.4
Crane time not worked (per cent)	23	22	24	23	22	21
40-foot containers (per cent)	41	41	42	44	42	41
Ship rate	45.1	45.2	46.0	46.8	47.3	47.1
Throughput pbm (containers per metre)	104	111	121	129	123	123
Brisbane						
Ships handled	262	257	280	271	270	262
Total containers	124 908	129 537	149 996	157 725	153 481	146 916
Crane rate	25.1	24.0	23.6	23.0	22.8	23.1
Vessel working rate	25.4	27.0	25.9	25.1	26.7	26.2
Crane time not worked (per cent)	27	24	29	31	27	28
40-foot containers (per cent)	42	42	39	43	42	41
Stevedoring variability (per cent)	44	51	59	52	63	52
Ship rate	34.9	35.6	36.5	36.5	36.7	36.6
Throughput pbm (containers per metre)	78	81	93	98	96	91
Sydney						
Ships handled	293	307	318	322	305	317
Total containers	231 970	249 580	274 042	299 864	274 937	271 655
Crane rate	28.0	26.7	26.5	26.4	26.2	26.9
Vessel working rate	34.8	33.9	34.2	34.6	35.8	36.1
Crane time not worked (per cent)	25	25	26	24	24	24
40-foot containers (per cent)	44	44	46	47	46	45
Stevedoring variability (per cent)	47	54	50	55	55	48
Ship rate	46.3	45.0	46.3	45.7	46.9	47.6
Throughput pbm (containers per metre)	119	129	141	154	142	140
Melbourne						
Ships handled	293	318	321	314	316	326
Total containers	273 641	297 877	314 900	330 896	320 426	315 181
Crane rate	28.4	28.2	28.3	28.1	28.7	28.5
Vessel working rate	39.3	40.5	41.2	43.5	43.2	44.8
Crane time not worked (per cent)	21	19	20	19	19	15
40-foot containers (per cent)	41	40	42	42	42	41
Stevedoring variability (per cent)	58	57	59	59	54	56
Ship rate	49.7	50.1	51.4	53.4	53.5	52.5
Throughput pbm (containers per metre)	150	163	173	181	176	173

continued

Table 2.1 Container terminal performance indicators: productivity in containers per hour (continued)

Port / Indicator	Mar 06	Jun 06	Sep 06	Dec 06	Mar 07	Jun 07
Adelaide						
Ships handled	66	67	68	65	67	74
Total containers	34 260	37 581	39 208	40 949	43 359	46 382
Crane rate	30.2	30.6	32.0	31.0	30.9	30.0
Vessel working rate	36.0	35.9	37.4	36.0	36.5	33.9
Crane time not worked (per cent)	13	13	13	16	12	14
40-foot containers (per cent)	33	31	32	35	31	30
Stevedoring variability (per cent)	na	na	na	na	na	na
Ship rate	41.5	41.2	43.2	42.8	41.7	39.2
Throughput pbm (containers per metre)	73	80	83	87	92	99
Fremantle						
Ships handled	112	126	130	122	117	131
Total containers	77 181	80 677	86 329	94 321	88 349	94 135
Crane rate	28.6	27.3	27.6	27.8	28.1	29.0
Vessel working rate	34.1	33.1	31.7	33.5	33.6	35.3
Crane time not worked (per cent)	20	26	27	28	29	26
40-foot containers (per cent)	38	39	43	44	40	37
Stevedoring variability (per cent)	46	47	47	53	56	44
Ship rate	42.8	44.9	43.5	46.1	47.1	47.6
Throughput pbm (containers per metre)	60	63	67	73	68	73

na not available.

r revised.

pbm per berth metre.

- Notes:
1. The definitions used in compiling the stevedoring productivity data are detailed in explanatory notes at the end of the journal.
 2. The data in this table are expressed in container moves per hour and therefore are not directly comparable with the TEUs per hour data in Table 2.2.
 3. Crane time not worked is the difference between the ship and the vessel working rates as a percentage of the vessel working rate.
 4. Time series data on indicators in this table is available as an excel spreadsheet at www.bitre.gov.au.

Sources: Patrick 2007b, DP World 2007a.

Figure 2.1 Five major ports: productivity in containers per hour

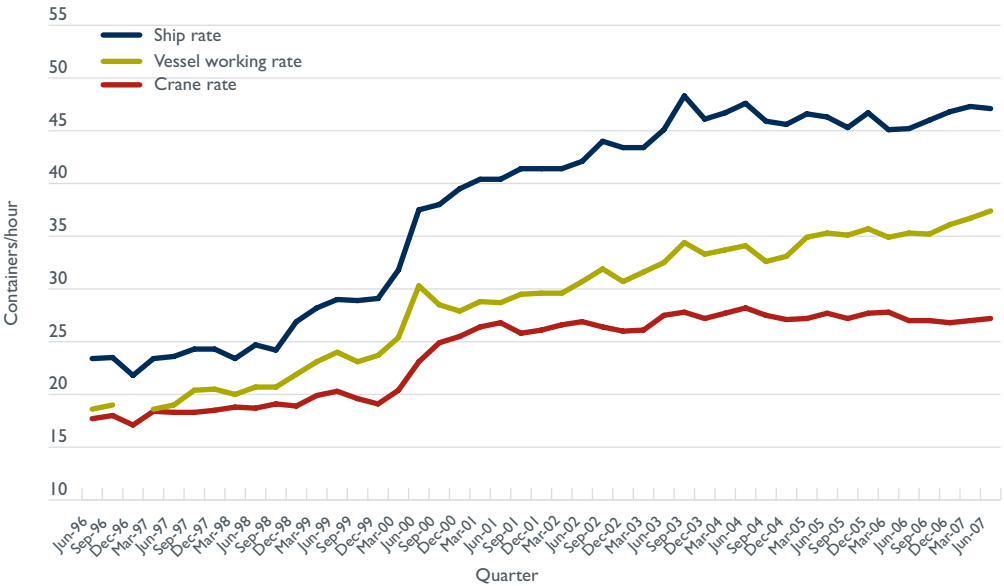
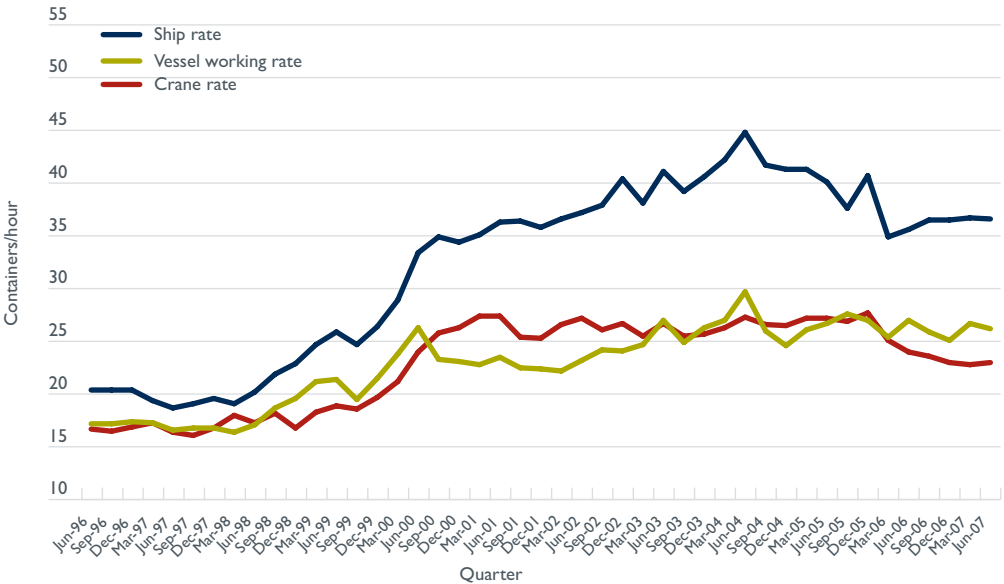


Figure 2.2 Brisbane: productivity in containers per hour



Note: These figures are based on data in Table 2.1. See explanatory notes for definition of terms.
Sources: Patrick 2007b and DPWorld 2007a.

Figure 2.3 Sydney: productivity in containers per hour

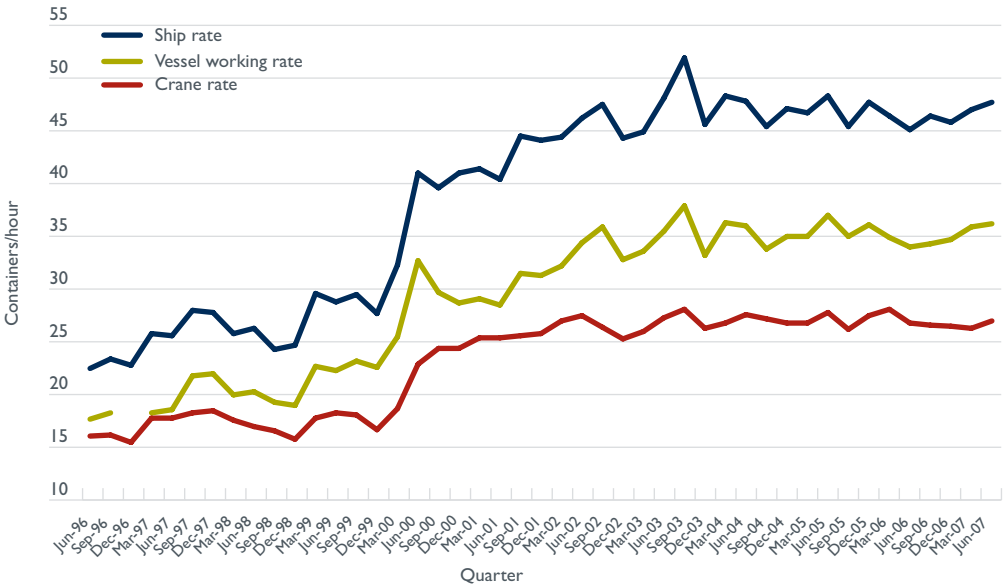
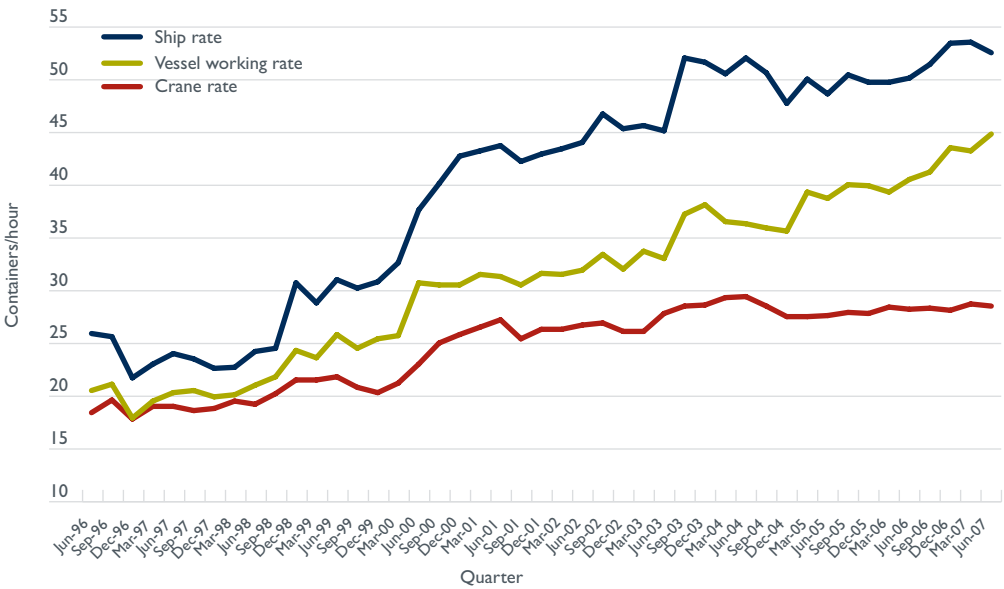


Figure 2.4 Melbourne: productivity in containers per hour



Note: These figures are based on data in Table 2.1. See explanatory notes for definition of terms.
 Sources: Patrick 2007b and DPWorld 2007a.

Figure 2.5 Adelaide: productivity in containers per hour

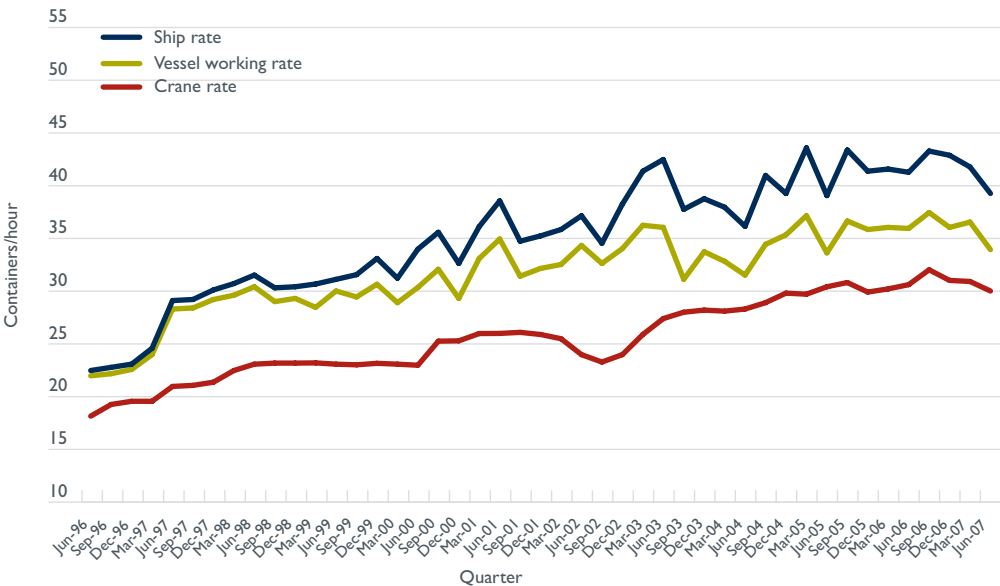
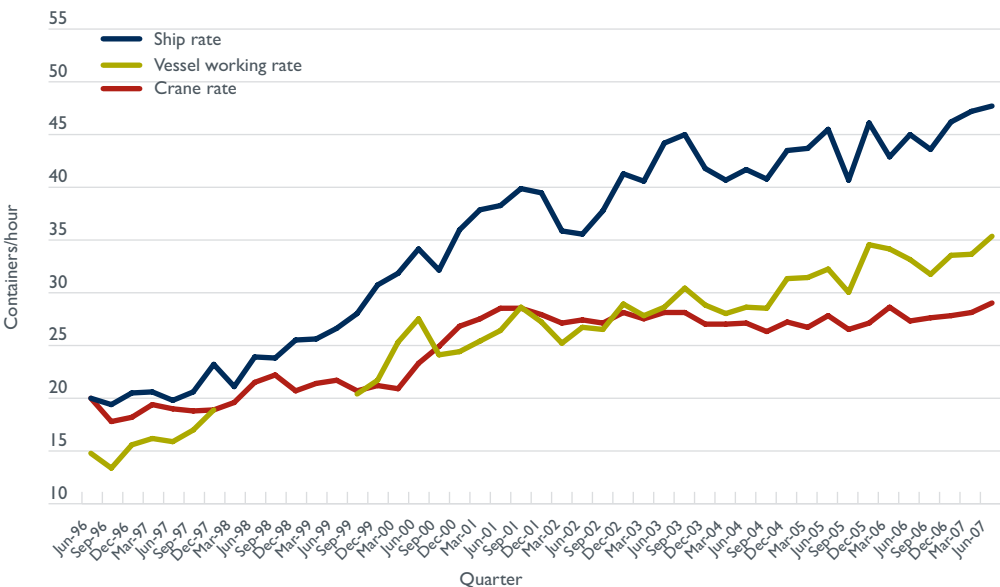


Figure 2.6 Fremantle: productivity in containers per hour



Note: These figures are based on data in Table 2.1. See explanatory notes for definition of terms.
Sources: Patrick 2007b and DP World 2007a.

TEUs per hour

Table 2.2 presents the stevedoring productivity indicators in terms of TEUs per hour. These data are retained in *Waterline* for the purpose of long-term historical comparison. They are not directly comparable with the data in Table 2.1 because indicators based on TEUs per hour may be affected by changes in the mix of 20-foot and 40-foot containers from one period to the next.

Table 2.2 Container terminal performance indicators: productivity in TEUs per hour

	Dec 05	Mar 06	Jun 06	Sep 06	Dec 06	Mar 07	Jun 07
Five Ports							
Ships handled	1 043	1 026	1 075	1 117	1 094	1 075	1 110
Total TEUs	1 194 998	1 048 694	1 120 123	1 229 340	1 329 707	1 253 983	1 234 276
Crane rate	39.5	39.4	38.0	38.4	38.5	38.3	38.4
Vessel working rate	51.0	49.3	49.6	50.1	51.9	52.3	52.9
Ship rate	66.8	63.8	63.7	65.6	67.4	67.4	66.6
Throughput pbm (TEUs per metre)	167.4	146.9	157.0	172.3	186.3	175.7	173.0
Brisbane							
Ships handled	261	262	257	280	271	270	262
Total TEUs	204 553	176 840	184 468	208 853	226 197	218 323	207 120
Crane rate	39.7	35.8	34.4	32.7	33.0	32.3	32.4
Vessel working rate	38.8	36.2	38.8	35.9	36.0	37.9	36.9
Ship rate	58.5	49.7	51.1	50.6	52.4	52.1	51.5
Throughput pbm (TEUs per metre)	127.3	110.0	114.8	130.0	140.8	135.9	128.9
Sydney							
Ships handled	297	293	307	318	322	305	317
Total TEUs	385 180	334 708	358 563	399 648	441 497	399 924	392 505
Crane rate	39.7	40.4	38.2	38.7	38.9	38.2	38.8
Vessel working rate	52.2	50.3	48.8	50.0	51.0	52.1	52.2
Ship rate	68.9	66.8	64.6	67.5	67.4	68.2	68.8
Throughput pbm (TEUs per metre)	198.3	172.4	184.6	205.8	227.3	205.9	202.1
Melbourne							
Ships handled	300	293	318	321	314	316	326
Total TEUs	428 845	384 742	415 981	445 767	470 823	455 538	445 563
Crane rate	39.4	40.0	39.3	40.1	40.0	40.8	40.2
Vessel working rate	56.5	55.3	56.5	58.4	61.9	61.5	63.4
Ship rate	70.5	70.0	70.0	72.8	76.1	76.1	74.2
Throughput pbm (TEUs per metre)	234.9	210.7	227.8	244.1	257.8	249.5	244.0
Adelaide							
Ships handled	66	66	67	68	65	67	74
Total TEUs	48 319	45 721	49 296	51 899	55 227	56 739	60 134
Crane rate	39.7	40.33	40.14	42.3	41.8	40.4	39.0
Vessel working rate	47.5	48.08	47.07	49.5	48.5	47.8	43.9
Ship rate	54.8	55.38	53.99	57.2	57.8	54.5	50.8
Throughput pbm (TEUs per metre)	102.8	97.3	104.9	110.4	117.5	120.7	127.9

continued

Table 2.2 Container terminal performance indicators: productivity in TEUs per hour (continued)

	<i>Dec 05</i>	<i>Mar 06</i>	<i>Jun 06</i>	<i>Sep 06</i>	<i>Dec 06</i>	<i>Mar 07</i>	<i>Jun 07</i>
Fremantle							
Ships handled	119	112	126	130	122	117	131
Total TEUs	128 101	106 683	111 815	123 173	135 963	123 459	128 954
Crane rate	38.6	39.5	37.6	39.4	40.0	39.2	39.9
Vessel working rate	49.4	47.2	45.9	45.2	48.3	47.0	48.4
Ship rate	65.7	59.2	62.2	62.0	66.6	65.9	65.3
Throughput pbm (TEUs per metre)	99.2	82.6	86.6	95.4	105.3	95.6	99.8

na not available.

r revised.

pbm per berth metre.

Note: For data back to the December quarter 1993, refer to an excel spreadsheet available at www.bitre.gov.au.

Sources: Patrick 2007b, DP World 2007a.

Chapter 3 Port interface cost index

The port interface cost index provides a measure of shore-based shipping costs (charges) for containers moved through Australian mainland major city ports. These five ports account for approximately 90 per cent of Australia's container traffic.¹ Data for July–December 2006 and January–June 2007 are presented in Tables 3.1 to 3.6. The port interface cost index is based on an indicative approach; that is, the index is not an average of all costs, but is based on those costs typically charged by service providers in most instances.

Port and related charges

Table 3.1 provides the parameters used to determine the port and related charges in Tables 3.2 and 3.3. These parameters relate to a representative port call by container ships using the Lloyd's ship classification unitised cellular container ship (UCC). For the 15 000 to 20 000 GT range² the representative vessel size used is 17 215 GT, and for the 35 000 to 40 000 GT range the representative vessel size 37 394 GT.

Tables 3.2 and 3.3 provide the port and related charges at the five mainland major city ports for the 15 000 to 20 000 GT range and the 35 000 to 40 000 GT range respectively, for July–December 2006 and January–June 2007. Port and related charges comprise ship-based charges and cargo-based charges.

Ship-based charges

While overall ship-based charges changed little in January–June 2007, there were some significant changes in charges per TEU, mainly reflecting the variation in the average number of TEUs exchanged per ship call.

Compared to the previous period, July–December 2006, the overall changes in total ship-based charges per TEU in January–June 2007 for ships in the 15 000 to 20 000 GT range were:

- Brisbane–34 per cent increase
- Sydney–21 per cent increase
- Melbourne–17 per cent increase
- Adelaide–4 per cent increase
- Fremantle–20 per cent decrease.

For ships in this range, compared to July–December 2006, the average number of TEUs exchanged decreased by 24 per cent at Brisbane, by 16 per cent at Sydney and by 13 per cent at Melbourne. The TEUs exchanged increased by 25 per cent at Fremantle, and by 6 per cent at Adelaide, compared to the July–December 2006 period.

1. Based on TEU numbers for Australian ports published by Australian Association of Port and Maritime Authorities (AAPMA). (aapma.org.au/trade/stats/?Id=5)

2. To obtain a sufficient sample size for Adelaide and Fremantle containers exchanged (average), the ship size range was increased to 10 000 GT to 26 000 GT.

Compared to the previous period, the overall changes in total ship-based charges per TEU in January–June 2007 for ships in the 35 000 to 40 000 GT range were:

- Brisbane—40 per cent decrease
- Sydney—10 per cent decrease
- Melbourne—3 per cent decrease
- Adelaide—9 per cent decrease
- Fremantle—4 per cent decrease.

In the 35 000 to 40 000 GT range, the average number of TEUs exchanged increased at all ports in January–June 2007 period when compared to the previous period. In Sydney they increased by 13 per cent, in Adelaide by 23 per cent and in Brisbane by 69 per cent. In both Fremantle and Melbourne they increased by 5 per cent.

Fremantle has the lowest ship-based charges on a per ship visit basis for ships in the 15 000 to 20 000 GT and the 35 000 to 40 000 GT ranges.

Cargo-based charges

There have been no increases in cargo-based charges in the 15 000–20 000 GT range and in the 35 000–40 000 GT range in this period.

Stevedoring charges per TEU

The stevedoring charges per TEU used in this issue of Waterline are those published in the most recently available ACCC report on stevedoring prices (ACCC 2007). These charges are \$173.27 per TEU.

Land-based charges per TEU

Average customs brokers' fees and road transport charges for July–December 2006 and January–June 2007 are included in Tables 3.4 and 3.5. These charges are based on data provided by some 30 customs brokers and 30 road transport operators.

Customs brokers' fees for imports are higher than fees for exports, reflecting the more complex clearance procedures for import containers. During January–June 2007 the average customs broker fee for imports decreased by 19 per cent for Brisbane and increased by 2 per cent for Adelaide. It remained the same for Sydney, Melbourne and Fremantle. For exports, the average fee increased by 23 per cent at Brisbane and by 3 per cent at Adelaide but remained the same for Sydney, Melbourne and Fremantle.

Road transport charges increased by 12 per cent at Brisbane and by 4 per cent at Adelaide. They decreased by 3 per cent at Sydney, and by 1 per cent for Melbourne and Adelaide. One of the parameters used to estimate road transport charges is the time taken to move containers between the wharf and the customer's warehouse. Both distance and traffic congestion impact on this parameter and therefore, help explain the significant difference between road transport charges at Melbourne and Sydney compared with Brisbane, Adelaide and Fremantle.

Indices for individual ports

Table 3.4 indicates that for ships in the 15 000 to 20 000 GT range, between July–December 2006 and January–June 2007, costs per TEU for import containers increased by 2 per cent at Brisbane and by 1 percent at Fremantle. They decreased by 1 per cent at Sydney and did not change at Melbourne and Adelaide. For exports they increased by 10 per cent for Brisbane and by 2 per cent for Fremantle. They decreased by 1 per cent for Sydney and were unchanged for Melbourne and Adelaide.

Table 3.5 indicates that for ships in the 35 000 to 40 000 GT range, costs per TEU for import containers between July–December 2006 and January–June 2007 decreased at Brisbane and Sydney by 2 per cent and at Melbourne and Adelaide by 1 per cent. They increased at Fremantle by 2 per cent. Export costs increased by 5 per cent at Brisbane and by 2 per cent at Fremantle. They decreased by 2 per cent at Sydney and 1 per cent at Melbourne and Adelaide.

These results should be interpreted with caution. The use of a single stevedoring charge for all ports reflects the scope of the available information, which is not disaggregated on an individual port basis. In practice, container stevedoring charges vary between ports.

National index

Figure 3.1 provides the national port interface cost index for ships in the 15 000 to 20 000 GT range from 1993 onwards. In current prices, the national index for imports increased from \$771 per TEU in July–December 2006 to \$772 in January–June 2007, and the index for exports increased from \$724 per TEU to \$733 per TEU.

In real terms (2001 prices), the national cost index per import TEU decreased from \$640 per TEU to \$626 per TEU and for exports from \$601 to \$594 per TEU.

Table 3.6 shows the national port interface cost index from July–December 2001 for ships in the 35 000 to 40 000 GT range. The national index for imports decreased from \$773 per TEU in July–December 2006 to \$766 per TEU in January–June 2007 in current prices. The index for exports remained at \$726 per TEU in current prices.

Table 3.1 Parameters used in the port interface cost indices, 2006–07

	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
Vessel size GT 17 215										
Average TEUs exchanged^a										
All	761	580	1 052	884	985	861	729	776	1 204	1 506
Loaded	570	399	742	656	810	751	441	451	1 016	1 354
Empty	191	181	310	227	175	110	287	324	188	152
Loaded inwards	327	225	479	402	495	332	133	114	594	646
Loaded outwards	243	175	264	255	315	419	308	338	422	708
Ship call parameters^a										
Number of port calls	4	5	4	4	3	3	3	2	2	7
Elapsed berth time (hrs)	26	23	28	26	23	23	20	42	30	12
Vessel size GT 37 394										
Average TEUs exchanged^b										
All	640	1 080	1 788	2 025	1 876	1 972	724	889	1 200	1 255
Loaded	512	709	1 302	1 386	1 463	1 483	576	694	761	870
Empty	128	372	486	639	413	489	148	195	439	386
Loaded inwards	298	425	877	989	883	573	200	259	367	439
Loaded outwards	215	284	425	397	579	910	376	436	394	431
Ship call parameters^b										
Number of port calls	5	4	2	3	2	3	2	2	4	2
Elapsed berth time (hrs)	24	28	37	36	33	31	19	37	29	12

na not available.

a. Mean value for ships between 15 000 and 20 000 GT.

b. Mean value for ships between 35 000 and 40 000 GT.

Sources: BITRE estimates based on ship call data supplied by relevant port authorities and corporations and other service providers.

Table 3.2 Port and related charges for ships in the 15 000–20 000 GT range, 2006–07

	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	Jul-Dec 2006	Jan-Jun 2007	Jul-Dec 2006	Jan-Jun 2007	Jul-Dec 2006	Jan-Jun 2007	Jul-Dec 2006	Jan-Jun 2007	Jul-Dec 2006	Jan-Jun 2007
Ship-based charges (\$/TEU)										
Conservancy	3.64	4.78	–	–	–	–	3.10	3.40	0.00	0.00
Tonnage	–	–	7.02	8.36	5.29	6.06	6.98	9.25	2.43	1.94
Pilotage	9.24	12.14	3.15	3.75	7.45	8.53	6.04	5.67	2.01	1.60
Towage ^a	12.18	16.62	9.16	11.32	9.66	11.60	16.62	15.61	8.44	6.75
Mooring, unmooring	2.82	3.73	2.68	3.31	1.37	1.57	–	–	0.77	0.61
Berth hire ^b	–	–	–	–	–	–	–	–	–	–
Total ^c	27.88	37.27	22.01	26.73	23.77	27.76	32.73	33.93	13.65	10.91
Cargo-based charges (\$/TEU)										
Wharfage										
Imports	28.60	28.60	67.65	67.65	37.40	37.40	63.17	63.17	53.59	53.59
Exports	28.60	28.60	51.15	51.15	37.40	37.40	63.17	63.17	53.59	53.59
Harbour dues	46.20	46.20	–	–	–	0.00	–	0.00	–	–
Berth charge	–	–	–	–	–	0.00	–	0.00	16.05	16.05
Total port and related charges (\$/TEU)^c										
Loaded imports	102.68	112.07	89.65	94.38	61.17	65.16	95.91	97.10	83.28	80.54
Loaded exports	102.68	112.07	73.15	77.88	61.17	65.16	95.91	97.10	83.28	80.54
Charges per ship visit (\$/visit)										
Total ship-based charges	21 224	21 609	23 145	23 624	23 418	23 886	23 856	26 321	16 429	16 429
Empty TEUs ^d	2 986	2 819	0	0	1 584	995	0	0	1 521	1 229

– Not applicable.

r. Revised.

a. After enquiries at all ports the number of tugs required for towage in Adelaide and Fremantle used in PICI calculations has been revised.

b. Charged by stevedores and itemised separately from basic stevedoring charge.

c. Components may not sum to totals due to rounding.

d. Sum of wharfage, harbour dues and berth charge per empty TEU, multiplied by average exchange of empty TEUs.

Note: Port and related charges are based on the parameters described in Table 3.1.

Sources: BITRE estimates based on ship call data supplied by relevant port authorities and corporations, and price schedules of relevant port authorities and corporations, towage operators and pilotage service providers.

Table 3.3 Port and related charges for ships in the 35 000–40 000 GT range, 2006–07

	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
Ship-based charges (\$/TEU)										
Conservancy	9.41	5.57	—	—	—	—	6.44	5.25	—	—
Tonnage	—	—	8.97	7.92	6.04	5.74	9.82	12.14	5.30	5.06
Pilotage	26.18	15.51	3.37	2.97	4.97	4.73	6.08	4.95	2.01	1.92
Towage ^a	18.30	11.27	5.70	5.23	5.42	5.42	21.54	17.54	12.58	12.02
Mooring, unmooring	3.35	2.00	2.02	1.86	0.72	0.68	—	—	0.77	0.74
Berth hire ^b	—	—	—	—	—	—	—	—	—	—
Total ^c	57.24	34.36	20.07	17.99	17.15	16.58	43.88	39.88	20.66	19.74
Cargo-based charges (\$/TEU)										
Wharfage										
Imports	28.60	28.60	67.65	67.65	37.40	37.40	63.17	63.17	53.59	53.59
Exports	28.60	28.60	51.15	51.15	37.40	37.40	63.17	63.17	53.59	53.59
Harbour dues	46.20	46.20	—	—	—	—	—	—	—	—
Berth charge	—	—	—	—	—	—	—	—	16.05	16.05
Total port and related charges (\$/TEU)^c										
Loaded imports	132.04	109.16	87.72	85.64	54.55	53.98	107.06	103.05	90.30	89.38
Loaded exports	132.04	109.16	71.22	69.14	54.55	53.98	107.06	103.05	90.30	89.38
Charges per ship visit (\$/visit)										
Total ship-based charges	36 638	37 122	35 866	36 416	32 173	32 695	31 767	35 446	24 787	24 787
Empty TEUs ^d	2 000	5 805	0	0	3 741	4 434	0	0	3 550	3 121

— Not applicable.

r. Revised.

a. After enquiries at all ports the number of tugs required for towage in Adelaide and Fremantle used in PICI calculations has been revised.

b. Charged by stevedores and itemised separately from basic stevedoring charge.

c. Components may not sum to totals due to rounding.

d. Sum of wharfage, harbour dues and berth charge per empty TEU, multiplied by average exchange of empty TEUs.

Note: Port and related charges are based on the parameters described in Table 3.1.

Sources: BITRE estimates based on: ship call data supplied by relevant port authorities and corporations, and price schedules of relevant port authorities and corporations, towage operators and pilotage service providers.

Table 3.4 Port interface costs for ships in the 15 000–20 000 GT range, 2006–07

	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
	\$/TEU									
Import										
Ship-based charges	28	37	22	27	24	28	33	34	14	11
Cargo-based charges	75	75	68	68	37	37	63	63	70	70
Stevedoring ^p	173	173	173	173	173	173	173	173	173	173
Customs brokers' fees	136	110	135	135	140	140	134	136	167	167
Road transport charges	279	311	435	424	396	391	259	256	315	328
Import total ^a	691	707	833	827	770	770	662	662	738	749
Export										
Ship-based charges	28	37	22	27	24	28	33	34	14	11
Cargo-based charges	75	75	51	51	37	37	63	63	70	70
Stevedoring ^p	173	173	173	173	173	173	173	173	173	173
Customs brokers' fees	110	136	107	107	97	97	81	84	91	91
Road transport charges	279	311	435	424	396	391	259	256	315	328
Export total ^a	665	733	789	782	727	726	609	610	662	673

r. Revised.

p. Updated annually after the release of the ACCC stevedoring monitoring report.

a. Components may not sum to totals due to rounding.

Notes: 1. Based on Table 3.2.

2. *Waterline* data on customs brokers' fees and road transport charges are collected for the purpose of monitoring trends in charges over time. They should not be used for inter-port comparisons, as sample characteristics may vary between ports.3. The stevedoring charge used in *Waterline* is from the ACCC's annual stevedoring monitoring report and is the weighted average for Brisbane, Sydney, Melbourne, Adelaide, Fremantle and Burnie. Stevedoring charges vary between ports but detailed data for individual ports are not publicly available.

Sources: BITRE estimates based on: ship call data supplied by port authorities and corporations; price schedules of port authorities and corporations, towage operators and pilotage service providers; surveys of customs brokers and road transport operators; stevedoring charges data supplied by the ACCC and industry sources; ABS 2007.

Table 3.5 Port interface costs for ships in the 35 000–40 000 GT range, 2006–07

	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
\$/TEU										
Import										
Ship-based charges	57	34	20	18	17	17	44	40	21	20
Cargo-based charges	75	75	68	68	37	37	63	63	70	70
Stevedoring ^p	173	173	173	173	173	173	173	173	173	173
Customs brokers' fees	136	110	135	135	140	140	134	136	167	167
Road transport charges	279	311	435	424	396	391	259	256	315	328
Import total ^a	720	704	831	818	764	758	673	668	745	758
Export										
Ship-based charges	57	34	20	18	17	17	44	40	21	20
Cargo-based charges	75	75	51	51	37	37	63	63	70	70
Stevedoring ^p	173	173	173	173	173	173	173	173	173	173
Customs brokers' fees	110	136	107	107	97	97	81	84	91	91
Road transport charges	279	311	435	424	396	391	259	256	315	328
Export total ^a	695	730	787	774	721	715	621	616	669	682

r. Revised.

p. Updated annually after the release of the ACCC stevedoring monitoring report.

a. Components may not sum to totals due to rounding.

- Notes:
1. Based on Table 3.3.
 2. Waterline data on customs brokers' fees and road transport charges are collected for the purpose of monitoring trends in charges overtime. They should not be used for inter-port comparisons, as sample characteristics may vary between ports.
 3. The stevedoring charge used in Waterline is from the ACCC's annual stevedoring monitoring report and is the weighted average for Brisbane, Sydney, Melbourne, Adelaide, Fremantle and Burnie. Stevedoring charges vary between ports but detailed data for individual ports are not publicly available.

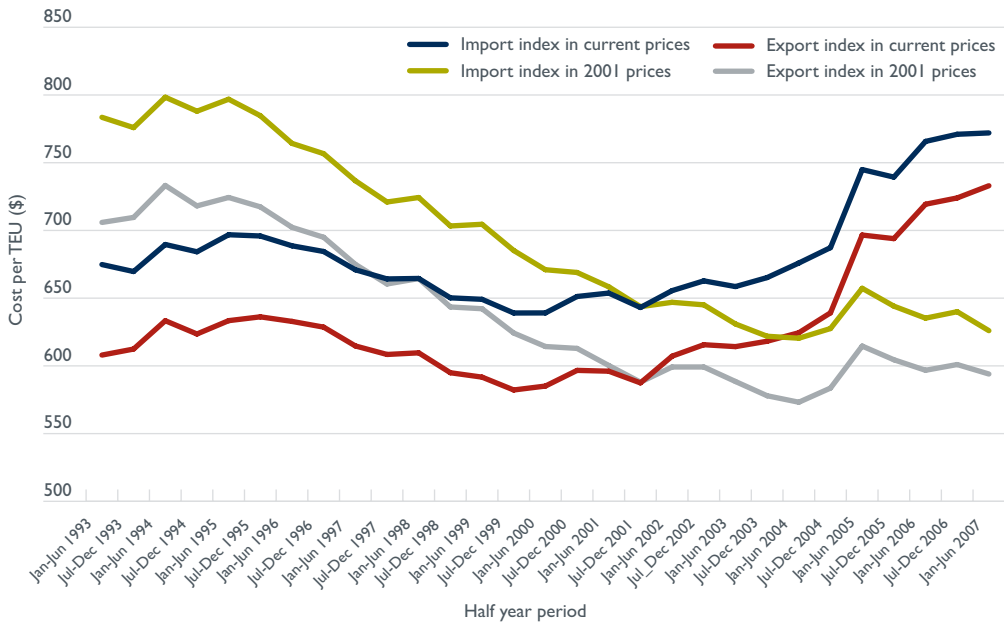
Sources: BITRE estimates based on: ship call data supplied by port authorities and corporations; price schedules of port authorities and corporations, towage operators and pilotage service providers; surveys of customs brokers and road transport operators; stevedoring charges data is from ACCC 2007; ABS 2007.

Table 3.6 The national port interface cost index for ships in the 35 000–40 000 GT range, 2003–2007

	Jan-Jun 2003	Jul-Dec 2003	Jan-Jun 2004	Jul-Dec 2004	Jan-Jun 2005	Jul-Dec 2005	Jan-Jun 2006	Jul-Dec 2006	Jan-Jun 2007
	\$/TEU								
Imports in current prices	653	661	674	684	739	737	764	773	766
Imports in 2001 prices	625	618	619	625	652	642	649	642	621
Exports in current prices	608	614	623	636	691	692	717	726	726
Exports in 2001 prices	583	574	572	581	610	603	609	603	589

Sources: BITRE estimates based on: ship call data supplied by port authorities and corporations; price schedules of port authorities and corporations, towage operators and pilotage service providers; surveys of customs brokers and road transport operators; stevedoring charges data supplied by the ACCC and industry sources; ABS 2007.

Figure 3.1 National port interface index for ships in the 15 000–20 000 GT range, 1993–2007



Sources: BITRE estimates based on: ship call data supplied by port authorities and corporations; price schedules of port authorities and corporations, towage operators and pilotage service providers; surveys of customs brokers and road transport operators; stevedoring charges data supplied by the ACCC and industry sources; and ABS 2007. Data for years before 2006 is from previous issues of *Waterline*.

Chapter 4 Ship visits

This chapter presents information which charts the trends in container ship size over time for those ships which visit the five ports covered by *Waterline*. This information is based on data in Chapter 3 of *Waterline*.

Table 4.1 provides the five port total number of ship visits and the average number of TEUs exchanged per ship visit for container vessels with sizes ranging from 5 000 to 60 000 GT.

Average TEUs began to fall in a number of ship ranges. Those which have fallen most steeply are those ships in the ranges 30 000–35 000 GT, 50 000–55 000 GT and 20 000–25 000 GT.

Total ship visits increased by 5.3 per cent in financial year 2007 compared with the preceding year, with ship visits peaking at 2172 for the six months to June 2007. The largest variations in visits was in the 15 000–20 000 GT range where there were 430 visits in the six month period to December 2006 and 224 in the period to June 2006. In the 20 000–25 000 range the number decreased from 256 to 163.

The number of ship visits decreased in the 15 000–20 000 GT, 40 000–45 000 GT and the 20 000–25 000 GT ranges.

On a five port basis Table 4.2 shows the distribution of ship visits by vessel gross tonnage. The median for Sydney, Melbourne and Brisbane was in the 20 000–25 000 GT range. For Adelaide it was in the 25 000–30 000 GT range and for Fremantle in the 30 000–35 000 GT range.

For Sydney, the 75th percentile ship visit occurred in the 30 000–35 000 GT range, for Brisbane in the 25 000–30 000 GT range, for Melbourne in the 30 000–35 000 GT range, for Adelaide in the 35 000–40 000 GT range and for Fremantle in the 35 000–45 000 GT range.

Table 4.1 Five port average number of TEUs exchanged and total ship visits per 6 month period for selected GT ranges, weighted by number of ships

GT	Dec-01	Jun-02	Dec-02	Jun-03	Dec-03	Jun-04	Dec-04	Jun-05	Dec-05	Jun-06	Dec-06	Jun-07
<i>5 000–10 000</i>												
Average TEUs exchanged	285	239	187	161	193	333	204	283	368	267	560	391
Total ship visits	77	66	78	75	72	93	80	71	67	93	108	144
<i>10 000–15 000</i>												
Average TEUs exchanged	707	712	424	405	485	688	628	554	506	464	656	711
Total ship visits	108	79	59	53	54	40	84	89	106	136	108	116
<i>15 000–20 000</i>												
Average TEUs exchanged	885	763	839	840	826	971	885	693	800	685	890	873
Total ship visits	293	285	223	181	191	153	266	316	439	406	430	224
<i>20 000–25 000</i>												
Average TEUs exchanged	830	762	818	902	990	1014	935	818	859	685	925	878
Total ship visits	240	233	241	182	214	199	306	321	294	374	256	163
<i>25 000–30 000</i>												
Average TEUs exchanged	777	888	1 070	1 027	1 031	959	1 071	956	1 021	882	1 102	991
Total ship visits	129	186	252	286	323	344	185	332	377	395	475	558
<i>30 000–35 000</i>												
Average TEUs exchanged	1 061	1 014	1 149	1 262	1 374	1 478	896	1 216	1 434	1 152	1 329	1 185
Total ship visits	196	216	232	175	257	247	191	223	141	198	156	177
<i>35 000–40 000</i>												
Average TEUs exchanged	1 223	1 262	1 403	1 408	1 445	1 474	1 385	1 394	1 454	1 137	1 383	1 345
Total ship visits	197	203	223	214	189	225	228	227	225	178	223	313
<i>40 000–45 000</i>												
Average TEUs exchanged	1 246	1 228	1 465	1 450	1 558	1 601	1 099	1 511	1 653	1 177	1 435	1 630
Total ship visits	176	195	172	162	186	181	143	196	165	223	249	212
<i>45 000–50 000</i>												
Average TEUs exchanged	0	808	938	1 201	1 271	1 379	853	1 279	1 434	914	1 029	1 236
Total ship visits	0	5	38	72	77	75	32	65	77	88	81	154
<i>50 000–55 000</i>												
Average TEUs exchanged	1 062	1 134	1 027	995	1 044	1 366	795	1 735	1 250	1 321	1 373	1 232
Total ship visits	56	60	55	61	69	22	71	89	60	55	55	110
<i>55 000–60 000</i>												
Average TEUs exchanged	1 019	1 069	1 166	1 252	0	0	681	537	0	0	596	659
Total ship visits	17	15	14	3	0	0	6	8	0	0	2	1
Total ship visits	1 489	1 543	1 587	1 464	1 632	1 579	1 592	1 937	1 951	2 146	2 143	2 172

Source: BITRE estimates based on ship call data supplied by relevant port authorities and corporations.:

Table 4.2 Ship visits by port, 2006–07

<i>Number of ship visits</i>	<i>Brisbane</i>	<i>Sydney</i>	<i>Melbourne</i>	<i>Adelaide</i>	<i>Fremantle</i>	<i>Total</i>
5,000–10,000	78	128	46	0	0	252
10,000–15,000	54	54	76	0	40	224
15,000–20,000	266	178	148	43	19	654
20,000–25,000	76	151	159	13	20	419
25,000–30,000	302	259	292	68	112	1033
30,000–35,000	58	113	121	19	22	333
35,000–40,000	108	157	155	61	55	536
40,000–45,000	63	98	118	60	122	461
45,000–50,000	35	63	64	23	50	235
50,000–55,000	17	47	46	16	39	165
above 55,000	0	3	0	0	0	3
Total	1057	1251	1225	303	479	4315

Source: BITRE estimates based on ship call data supplied by relevant port authorities and corporations.

Chapter 5 Port performance–non-financial

The non-financial data presented in this chapter supplements the data presented for container productivity in Chapter 2. This data covers the total non-bulk cargo which goes through the five mainland major city ports covered in *Waterline*. This cargo consists of general cargo and containerised cargo. The total of containers is for the whole port rather than for the container terminals.

The January–June 2004 to January–June 2007 non-financial indicators for the five mainland capital city ports are presented in Table 5.1. A longer time series of this data is available in an Excel spreadsheet at www.bitre.gov.au.

Cargo throughput

Total cargo throughput at the five ports was 60.0 million tonnes for January–June 2007, compared with 60.7 million tonnes for the previous half-year July–December 2006 and 58.4 million tonnes for January–June 2006. This represented an increase of 2.7 per cent in total cargo throughput for the five ports compared with January–June 2006 and an decrease of 1.2 per cent compared with July–December 2006.

Compared with January–June 2006, total cargo throughput in January–June 2007 increased by 6.8 per cent at Brisbane, and by 2.0 per cent at Sydney, but decreased by 6.1 per cent at Melbourne, 1.3 per cent at Adelaide and 2.8 per cent at Fremantle.

Non-containerised general cargo throughput at the five ports was 2.768 million tonnes for January–June 2007, which represents a increase of 9.8 per cent on the 2.522 million tonnes throughput for July–December 2006 and an increase of 10.5 per cent on the 2.506 million tonnes throughput for January–June 2006.

Total container traffic throughput for the five ports was 2.623 million TEUs for January–June 2007, which represents a decrease of 2.4 per cent on the 2.689 million TEUs throughput for July–December 2006 and an increase of 13 per cent on the 2.316 million TEUs throughput for January–June 2006.

Compared with January–June 2006, loaded TEUs at the five ports increased by 13 per cent, with loaded imports increasing by 13 per cent and loaded exports increasing by 13 per cent.

Table 5.1 Non-financial performance indicators, selected Australian ports, 2004–2007

	Jan–Jun 2004	Jul–Dec 2004	Jan–Jun 2005	Jul–Dec 2005	Jan–Jun 2006	Jul–Dec 2006	Jan–Jun 2007
Five ports ^d							
Total cargo throughput ('000 tonnes)	57 713	58 593	57 064	57 776	58 358	60 694	59 953
Non-containerised general cargo ('000 tonnes) ^a	2 285	2 338	2 518	2 572	2 506	2 522	2 768
Containerised cargo (TEUs exchanged)							
Full import	952 302	1 043 324	978 300	1 139 342	1 028 263	1 242 921	1 166 116
Empty import	129 114	125 158	135 088	129 224	199 487	137 911	139 096
Full export	694 261	721 595	719 329	755 826	686 673	807 702	778 137
Empty export	364 000	455 000	411 302	445 509	402 163	500 511	540 582
TOTAL	2 139 677	2 406 077	2 244 019	2 469 901	2 316 586	2 689 045	2 623 931
Average total employment ^b	914	934	967	1 037	1 056	1 076	1 114
Port turnaround time (hrs) ^c							
Median result	–	–	–	–	–	–	–
95th percentile	–	–	–	–	–	–	–
Brisbane							
Total cargo throughput ('000 tonnes)	12 326	13 006	12 967	13 531	13 226	13 936	14 130
Non-containerised general cargo ('000 tonnes) ^a	392	373	447	461	459	466	546
Containerised cargo (TEUs exchanged)							
Full import	124 773	158 781	133 594	172 175	149 226	186 666	177 073
Empty import	31 676	37 379	34 136	33 218	34 164	40 400	38 023
Full export	100 760	114 029	113 090	130 459	115 564	136 672	120 261
Empty export	52 117	73 495	61 643	60 349	71 123	75 844	100 106
TOTAL	309 326	383 684	342 463	396 201	370 077	439 582	435 463
Average total employment ^b	225	238	248	253	256	258	293
Port turnaround time (hrs) ^c							
Median result	32	35	28	27	30	36	33
95th percentile	51	57	54	53	51	57	54
Sydney							
Total cargo throughput ('000 tonnes)	12 738	13 215	12 635	13 219	13 505	14 024	13 772
Non-containerised general cargo ('000 tonnes) ^a	307	299	329	312	304	331	347
Containerised cargo (TEUs exchanged)							
Full import	323 051	366 037	320 732	378 451	342 216	419 784	380 056
Empty import	7 222	5 262	7 670	9 929	9 490	9 616	9 762
Full export	154 195	161 310	158 342	171 320	173 932	192 703	176 919
Empty export	157 721	185 558	170 699	191 297	168 830	213 006	218 275
TOTAL	642 189	718 167	657 443	750 997	694 468	835 109	785 012
Average total employment ^b	198	198	200	241	243	246	244
Port turnaround time (hrs) ^c							
Median result	32	33	28	29	28	30	30
95th percentile	55	55	51	50	48	56	53

continued

Table 5.1 Non-financial performance indicators, selected Australian ports, 2004–2007 (continued)

	<i>Jan–Jun 2004</i>	<i>Jul–Dec 2004</i>	<i>Jan–Jun 2005</i>	<i>Jul–Dec 2005</i>	<i>Jan–Jun 2006</i>	<i>Jul–Dec 2006</i>	<i>Jan–Jun 2007</i>
Melbourne							
Total cargo throughput ('000 tonnes)	14 222	14 115	14 211	13 978	13 782	14 884	14 628
Non-containerised general cargo ('000 tonnes) ^a	1 032	1 015	1 127	1 060	1 081	1 061	1 175
Containerised cargo (TEUs exchanged)							
Full import	386 413	446 960	406 623	456 345	416 323	485 828	463 052
Empty import	57 082	51 113	59 334	51 035	60 806	55 592	54 843
Full export	315 000	323 454	329 766	330 003	339 949	355 544	343 064
Empty export	118 038	152 055	141 136	149 346	126 118	158 613	177 075
TOTAL	876 533	973 582	936 859	986 729	943 196	1 055 577	1 038 034
Average total employment ^b	170	171	184	191	199	196	201
Port turnaround time (hrs) ^c							
Median result	38	39	33	32	30	31	31
95th percentile	65	78	60	54	52	62	63
Adelaide							
Total cargo throughput ('000 tonnes)	4 982	5 273	4 699	4 832	5 137	5 212	5 072
Non-containerised general cargo ('000 tonnes) ^a	213	263	207	282	193	182	180
Containerised cargo (TEUs exchanged)							
Full import	19 317	20 564	19 785	24 201	23 483	30 277	31 441
Empty import	14 073	16 774	19 663	21 280	18 024	21 342	23 583
Full export	41 734	39 277	40 259	46 933	43 954	46 606	50 233
Empty export	5 244	7 503	6 760	6 562	4 954	7 979	7 656
TOTAL	80 368	84 118	86 467	98 976	90 415	106 204	112 913
Average total employment ^b	95	97	95	94	97	97	99
Port turnaround time (hrs) ^c							
Median result	24	23	22	21	19	20	44
95th percentile	43	60	41	34	32	33	56
Fremantle							
Total cargo throughput ('000 tonnes)	13 445	12 985	12 551	12 217	12 709	12 638	12 352
Non-containerised general cargo ('000 tonnes) ^a	341	389	409	457	468	482	520
Containerised cargo (TEUs exchanged)							
Full import	98 748	111 982	97 566	108 170	97 015	120 366	114 494
Empty import	19 061	14 630	14 285	13 762	77 003	10 961	12 885
Full export	82 572	83 525	77 872	77 111	13 274	76 177	87 660
Empty export	30 880	36 389	31 064	37 955	31 138	45 069	37 470
TOTAL	231 261	246 526	220 787	236 998	218 430	252 573	252 509
Average total employment ^b	226	230	241	258	261	280	277
Port turnaround time (hrs) ^c							
Median result	29	31	24	23	21	25	27
95th percentile	63	60	51	56	48	54	55

- Not applicable.

a. Excludes bulk cargoes.

b. Comparisons between ports are not appropriate because each port authority/corporation has a different structure.

c. Port turnaround times refer only to ships calling at container terminals. Comparisons between ports are not appropriate because each port has a different set of parameters to measure the turnaround time. Normally, only inter-temporal comparison at individual ports is of use.

d. Components may not sum to totals due to rounding.

Note: Longer time series data on these indicators is available in an excel spreadsheet at www.bitre.gov.au.

The five major ports covered are Brisbane, Sydney, Melbourne, Adelaide and Fremantle.

Source: AAPMA 2007.

Chapter 6 Stevedoring and ship arrival reliability

This chapter deals with two aspects of waterfront reliability; stevedoring cargo receipt and ship arrival advice. These indicators cover two essential aspects of the logistic chain which results in the distribution of shipping containers from the dockside: the reliability of the arrival of the container ship and the availability of containers for export.

Stevedoring reliability

Table 6.1 presents the available information on cargo receipt, one indicator of stevedoring reliability at major container terminals. The indicator for each port is prepared by combining each stevedore's cargo availability figures with the proportion of container lifts handled at the stevedore's terminals at the port to produce the weighted mean presented in Table 6.1.

Stevedoring reliability in the March quarter 2007 decreased at Melbourne, Sydney and Brisbane and Fremantle compared with the previous quarter. Stevedoring reliability in the June quarter 2007 increased for Brisbane, Sydney, Melbourne and Fremantle compared with the previous quarter. It was not available for Adelaide.

Ship arrival

Table 6.1 also includes data for two indicators of ship arrival advice.

The first indicator is the percentage of ship arrivals within one hour of the most recently advised arrival time available to the port authority/corporation at 24 hours prior to actual arrival. Compared with the previous quarter, the March quarter 2007 indicator rose at Brisbane, Sydney and Fremantle. It was not available for Melbourne and fell at Adelaide. In the June quarter 2007, the indicator rose at Adelaide, fell at Brisbane and remained the same at Sydney and Fremantle. It was not available for Melbourne.

The second indicator is the percentage of ship arrivals within one hour of the last scheduled arrival time advised inside the 24 hours prior to actual arrival. In the March quarter 2007, this indicator rose at Sydney and Brisbane and fell at Fremantle and Adelaide. It was not available for Melbourne. In the June quarter 2007 this indicator rose at Adelaide but did not change at Fremantle and Sydney, while it fell at Brisbane. It was not available for Melbourne.

**Table 6.1 Stevedoring and ship arrival reliability indicators,
March and June quarters 2007**

<i>Indicator</i>	<i>Brisbane</i>		<i>Sydney</i>		<i>Melbourne</i>		<i>Adelaide</i>		<i>Fremantle</i>	
	<i>Jan–Mar</i>	<i>Apr–Jun</i>	<i>Jan–Mar</i>	<i>Apr–Jun</i>	<i>Jan–Mar</i>	<i>Apr–Jun</i>	<i>Jan–Mar</i>	<i>Apr–Jun</i>	<i>Jan–Mar</i>	<i>Apr–Jun</i>
	<i>per cent</i>									
Stevedoring										
Cargo receipt (%)	94.4	96.4	84.6	91.2	84.1	87.4	0.0	0.0	95.2	95.4
Ship arrival										
Advice at 24 hrs (%)	51.1	45.5	43.0	43.0	na	na	95.5	96.2	55.4	55.4
Advice inside 24 hrs (%)	96.3	95.3	94.7	94.7	na	na	97.6	98.0	91.1	91.1

na not available.

Sources: AAPMA 2007, Patrick 2007b, DPWorld 2007a.

Chapter 7 Coastal shipping permits

In order for foreign vessels to trade on the Australian coast it is necessary for them to obtain shipping permits. Permits can be obtained for a single voyage or for a series of voyages along the coast. The extent to which these permits are sought and issued is a proxy measure of the competition which exists between Australian flag and foreign flag vessels.

At the time of release of Waterline 43 Single Voyage Permits (SVPs) and Continuing Voyage Permits (CVPs) data is only available up to the first quarter of 2007. Total tonnages planned to be shipped under cargo permits issued to applicants under SVPs and CVPs decreased from 4886 thousand tonnes for October–December 2006 to 3320 thousand tonnes for January–March 2007.

Single voyage permits

The number of SVPs issued for January–March 2007 was 236 compared with 244 for October–December 2006 and 187 for January–March 2006. The associated estimated cargo to be carried was 2909 thousand tonnes for January–March 2007 compared with 4476 thousand tonnes for October–December 2006, and 2947 thousand tonnes for January–March 2006.

Table 7.1 gives a breakdown of SVPs by cargo type for January–March 2007. General cargo (including containerised cargo) permits now represent 3.4 per cent by weight, while making up 38.6 per cent of total permits issued. Bulk cargo accounts for 96.6 per cent of the total tonnage moved under SVPs.

Continuing voyage permits

The number of CVPs issued for January–March 2007 was 35 which was the same as for October–December 2006. There were 38 issued for January–March 2006. The associated estimated cargo to be carried in January–March 2007 was 411 thousand tonnes compared with 409 thousand tonnes for October–December 2006, and 497 thousand tonnes for January–March 2006.

Table 7.2 gives a breakdown of CVPs by cargo type for January–March 2007. General cargo (including containerised cargo) permits now represent 47.5 per cent by weight, while making up 85.7 per cent of total permits issued. Bulk cargo accounts for over 52.5 per cent of the total tonnage moved under CVPs.

More information on coastal permits can be found on the Department of Infrastructure, Transport, Regional Development and Local Government internet site at www.infrastructure.gov.au/maritime/freight/licences/index.aspx.

Table 7.1 Summary of single voyage permits issued, January–March 2007

<i>Cargo Category</i>	<i>Permits</i>	<i>Tonnes</i>
Petroleum products	44	1 059 128
Liquefied gas	5	9 212
Other bulk liquids	13	72 296
Dry bulk	83	1 670 769
General cargo	91	98 067
Total	236	2 909 472

Note: Tonnages are the pre-voyage estimated tonnes to be carried.

Source: Department of Transport and Regional Services 2007a .

Table 7.2 Summary of continuing voyage permits issued, January–March 2007

<i>Cargo Category</i>	<i>Permits</i>	<i>Tonnes</i>
Liquefied gas	4	23 662
Dry bulk	1	192 155
General cargo	30	195 094
Total	35	410 911

Note: Tonnages are the pre-voyage estimated tonnes to be carried.

Source: Department of Transport and Regional Services 2007a.

Chapter 8 Harbour towage charges

Waterline provides a survey of the changes in harbour towage charges every twelve months. This is the cost of providing tugs into and out of the five mainland capital city ports and a selection of regional ports and in Tasmania.

Table 8.1 provides the publicly available towage charges for the five mainland capital city ports while Table 8.2 shows data for a selection of regional ports as at 30 June 2006 and 30 June 2007 for the two representative vessel sizes, 19 999 GT and 59 999 GT.

Eight of the ten ports recorded changes to towage charges during the 2006-07 financial year:

- *Brisbane*—a 2.0 per cent increase in the 19 999 GT vessel size and a 2.2 per cent increase in the 59 999 GT vessel size
- *Sydney*—a 2.1 per cent increase in the 19 999 GT vessel size and 2.1 per cent increase in the 59 999 GT vessel size
- *Melbourne*—a 2.6 per cent increase in the 19 999 GT vessel size and a 2.6 per cent increase in the 59 999 GT vessel size
- *Adelaide*—no change for both vessel sizes
- *Fremantle*—no change for both vessel sizes
- *Bunbury*—a 3.8 per cent increase for both vessel sizes
- *Burnie*—no change in the 19 999 GT vessel size
- *Gladstone*—4.1 increase for both vessel sizes
- *Newcastle*—a 4.5 per cent increase in the 19 999 GT vessel size and a 18.1 per cent increase in the 59 999 GT vessel size
- *Port Kembla*—no change for both vessel sizes.

Towage charges are collected for the purpose of monitoring trends in charges over time. They should be interpreted with caution and should not be used for inter-port comparisons as local conditions vary between ports, and charges may vary for individual ship operators based on negotiated contracts.

Table 8.1 Harbour towage charges, five major ports, 30 June 2006 and 30 June 2007

Capital city port	Brisbane		Sydney ^b		Melbourne		Adelaide		Fremantle		5 ports average	
	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun
Vessel size (GT)	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
	(\$ per tug ^a)											
19 999 GT	3031	3091	2980	3042	3663	3757	3918	3918	2541	2541	3227	3399
59 999 GT	4451	4549	3443	3515	4070	4175	5587	5587	4301	4301	4370	4425

BITRE estimates based on towage operators' tariff schedules, where there is more than one operator; the charges have been averaged.

a. Cost for each tug to assist a ship arriving at or departing from a berth within the limits of the port at any time.

b. Sydney is represented by tariffs charged at Port Botany only.

Source: Various towage companies.

Table 8.2 Harbour towage charges, five regional and Tasmanian ports 30 June 2006 and 30 June 2007

Regional Port	Bunbury		Burnie		Gladstone		Newcastle		Port Kembla ^b		5 ports average	
	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun	30 Jun
Vessel size (GT)	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
	(\$ per tug ^a)											
19 999 GT	3 285	3 409	3 280	3 280	1 909	1 988	1 711	1 788	2 563	2 563	1 893	2 581
59 999 GT	4 897	5 084	na	na	3 556	3 703	2 402	2 837	6 655	6 655	3 153	4 523

na Not applicable.

BITRE estimates based on towage operators' tariff schedules, where there is more than one operator; the charges have been averaged.

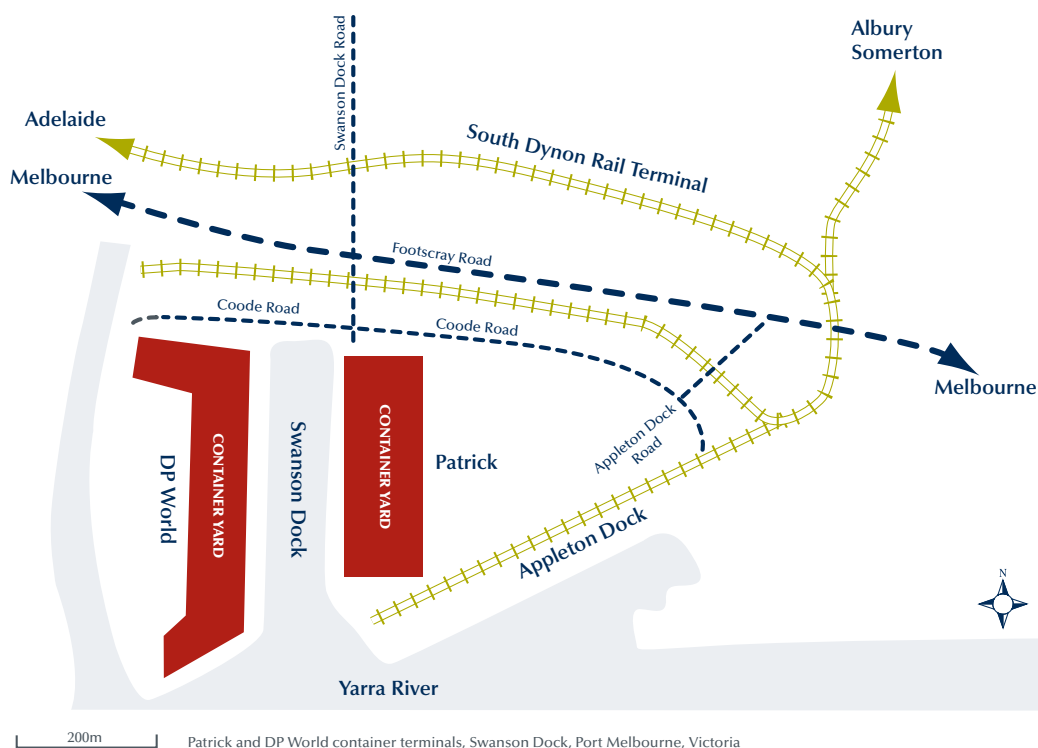
a. Cost for each tug to assist a ship arriving at or departing from a berth within the limits of the port at any time.

b. The 30 June 2006 per tug cost has increased from that given in Waterline 41 as the number of tugs for a 59 999 GT vessel is 3 in and out not 4 as was previously used in the calculation.

Source: Various towage companies.

Appendix A Diagrams of five major Australian container port terminals

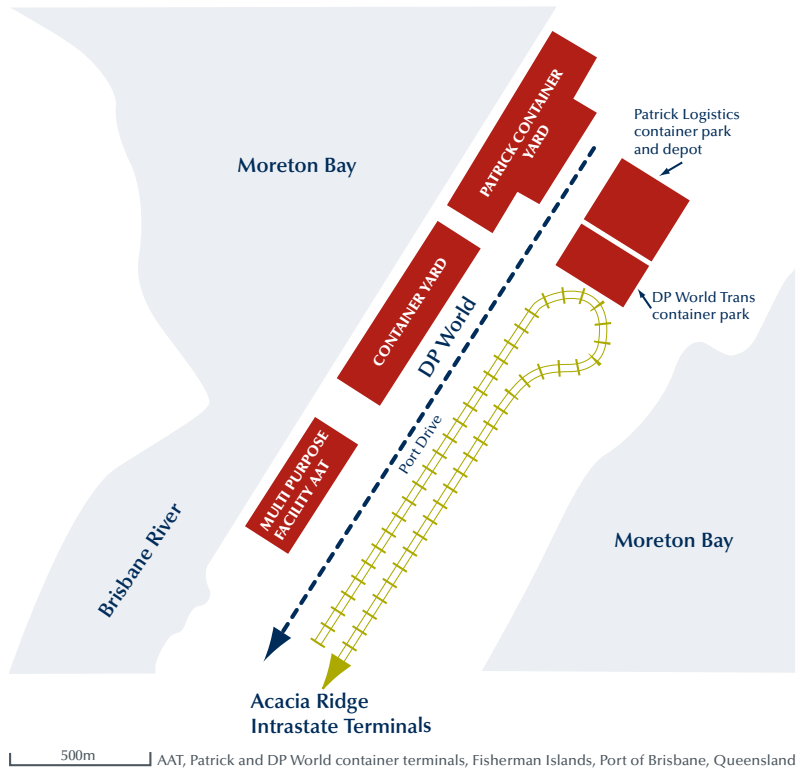
Figure A.1 Patrick and DP World terminals—Swanson dock, Port Melbourne, Victoria



Note: For DP World and Patrick trains from the Swanson Dock to access the rail network they have to cross Footscray Road. This access is being improved with a grade separation funded by an Auslink National Project. The trains pass through the South Dynon rail terminal which is only a few hundred metres north of Footscray Road. The diagram is correct as at March 2007.

Source: DOTARS (2006), DOTARS (2007a), DP World (2007b), Google Maps Australia (2007), Patrick (2007c), Port of Melbourne (2006), SKM (2003).

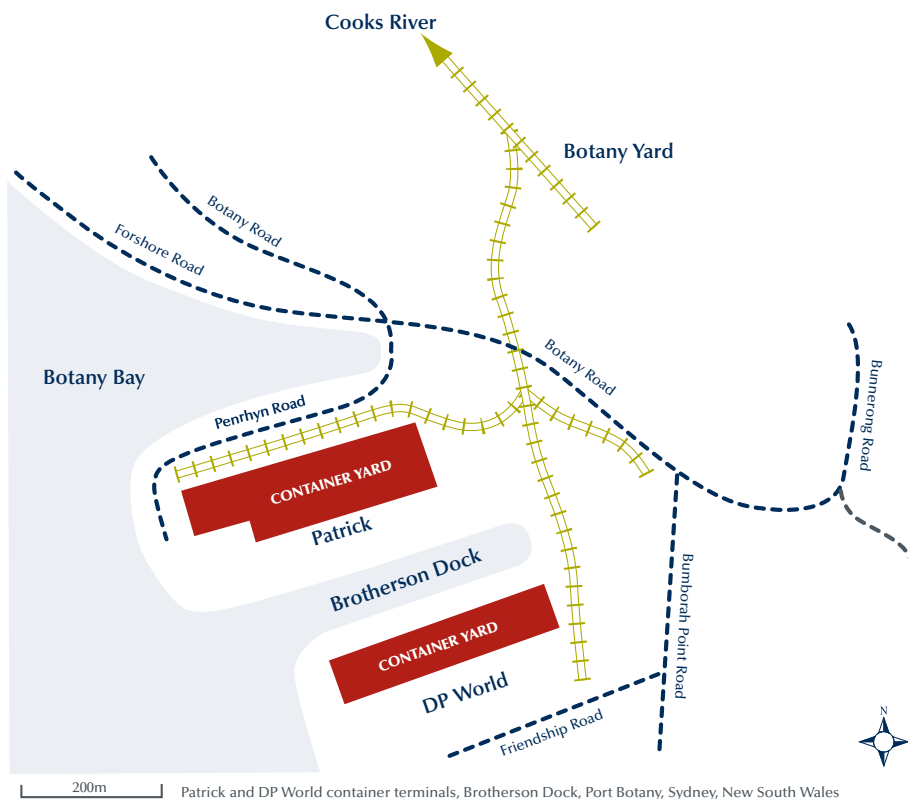
Figure A.2 Patrick and DP World terminals—Fisherman Islands, Port of Brisbane, Queensland



Note: This is a purpose built container terminal and includes a near dock rail terminal shared by the two stevedores for export and import containers and Australian Amalgamated Terminals (AAT) which provides a multi purpose facility with container handling capacity which can be used for motor vehicles as well as other stevedoring activities. Berths 1 to 3 are leased by AAT, berths 4 to 6 are leased by DPWorld and Berths 7 to 9 are leased by Patrick for their Autostrad container terminal. The rail terminal has a direct turning loop which avoids shunting of trains. The Fisherman Islands terminal is connected to the Acacia Ridge terminal and to regional terminals. The Acacia Ridge multi-modal container terminal is connected to the intrastate narrow gauge rail network as well as the interstate standard gauge network. The diagram is correct as at March 2007.

Source: DPWorld (2007b), Google Maps Australia (2007), DOTARS (2006), Patrick (2007c), Port of Brisbane (2007).

Figure A.3 Patrick and DP World terminals—Brotherson dock, Port Botany, Sydney, New South Wales

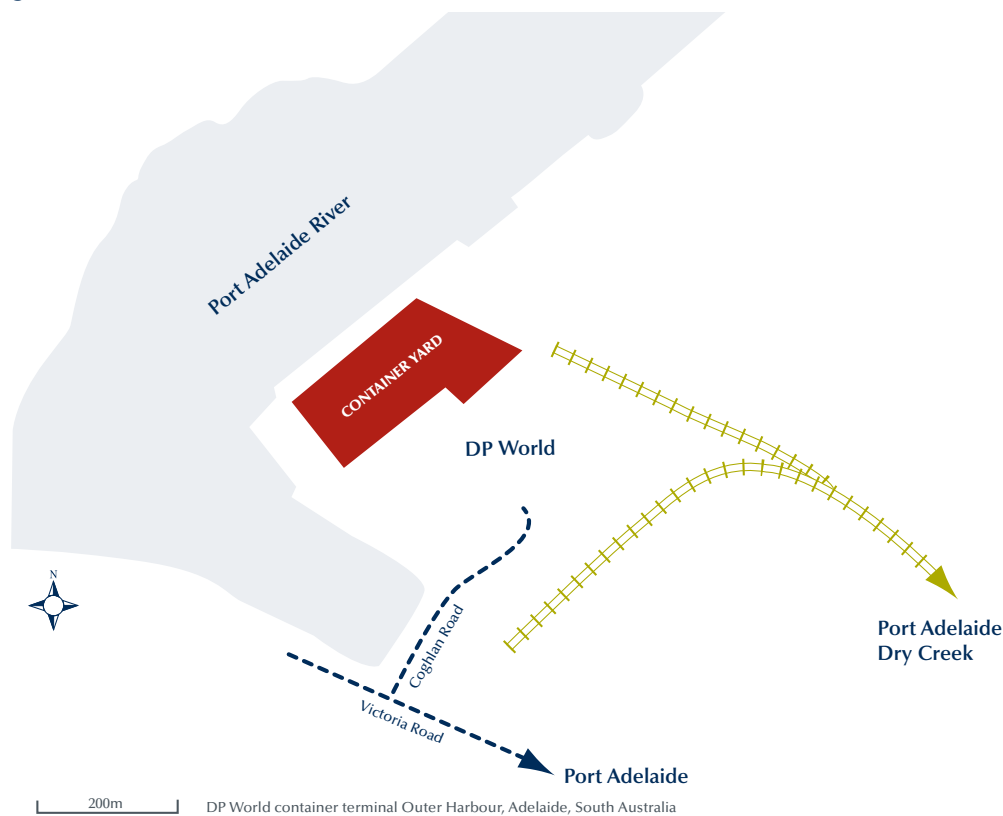


Patrick and DP World container terminals, Brotherson Dock, Port Botany, Sydney, New South Wales

Note: Port Botany has on-dock rail terminals. Access for both DP World and Patrick is directly adjacent to the container yards making it easier to load containers directly on to trains. Trains with containers for both the stevedores are split up at the Botany Rail Yard which is adjacent to the container terminal at Brotherson dock. DP World Transport has an intermodal terminal adjacent to the Port Botany container terminals which is used primarily for empty containers. Further down (about eight kilometres) along the Botany Freight Rail Line, the Cooks River terminal is also used for empty containers. To the West of the metropolitan area are intermodal terminals at Yennora, Leightonfield, Minto and Camellia. Development of the Port Botany rail link is planned as part of an Auslink National Project. The diagram is correct as at March 2007.

Source: DOTARS (2007b), DP World (2007b), Freight Industry Advisory Board (2005), Google Maps Australia (2007), DOTARS (2006), Patrick (2007c).

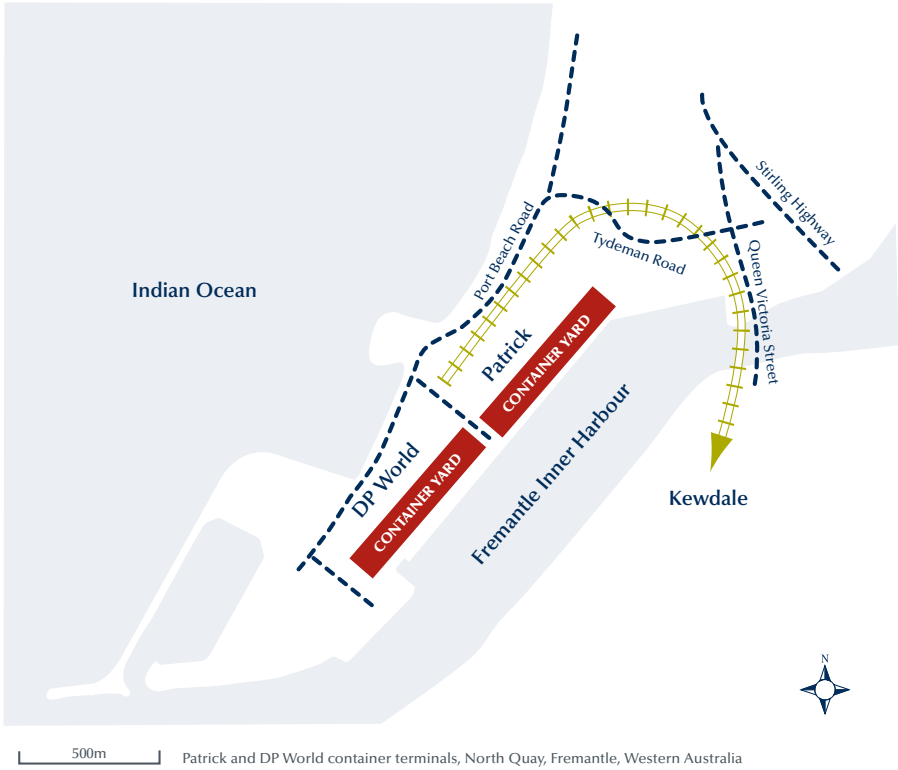
Figure A.4 DP World terminal—Outer Harbour, Adelaide



Note: This is the only container terminal at Adelaide. It is operated by DP World stevedores, is located at Pelican Point, Outer Harbour, approximately 10 kilometres from Port Adelaide. It has an on-dock rail terminal adjacent to a container depot which in turn is connected via Port Adelaide to the Dry Creek intermodal terminal by a dual gauge (broad and standard gauge) line. The link is to be improved as an Auslink National Project by a new rail bridge across the Port River and Port Adelaide as Stage 3 of the Port River Expressway Upgrade (DOTARS 2007c). The diagram is correct as at March 2007.

Source: DOTARS (2007c), DP World (2007b), Google Maps Australia (2007), DOTARS (2006).

Figure A.5 Patrick and DP World container terminals—North Quay, Fremantle



Note: The container terminal has a rail terminal adjacent to the Patrick container yard. The DP World terminal is located further along the dock. The rail terminal on North Quay has recently been upgraded as an Auslink National Project. The new link is dual gauge providing access for narrow gauge trains to the terminal. Containers travelling by rail have as origin/destination the Perth metropolitan area, regional Western Australia or are land bridged to Adelaide. However interstate containers (land bridge) are not dispatched directly from the Inner Harbour rail terminal but from Kewdale, which is Perth's only intermodal terminal. The diagram is correct as at March 2007.

Source: Department of Planning and Infrastructure (2004), DOTARS (2006), DP World (2007b), Fremantle Ports (2007), Google Maps Australia (2007), DOTARS (2007d), Patrick (2007c).

Appendix B Explanatory notes about terms in *Waterline*

Introduction

Waterline provides a vehicle for publishing descriptive data and various productivity indicators related to waterfront activities. These activities take place in three main parts of the port terminal:

- on the landside of port terminal
- at the wharf side of port terminal
- within the port terminal.

The information in *Waterline* falls under these three broad categories. These explanatory notes briefly describe these activities and the indicators associated with them. To correctly interpret the information in *Waterline* the reader should be clear about the following issues: the scope of coverage of *Waterline*, the sources of the various data items, and the measures of output used in *Waterline*.

Scope

Waterline data relates to five mainland major ports in Australia—namely Brisbane, Sydney, Melbourne, Adelaide and Fremantle.

Waterline focuses on containerised cargo and excludes all other cargo types.

Waterline includes only fully cellular ships in its calculations. Fully cellular ships are defined as purpose-built container ships equipped with 40-foot cell guides below deck as a minimum, and exclude such vessels if used for mixed cargoes of containers and general cargo.

Data sources

The measures of port terminal productivity are based on all available data about container movements at the five port terminals. Those measures are based on a census of activities at those port terminals.

Data on costs are based on a sample of ships that call at each of the mainland major ports in Australia. The chosen samples are all ships in the 15 000–20 000 GT range and all ships in the 35 000–40 000 GT range. These vessels represent almost 40 per cent of vessels in the 15 000–45 000 GT range, which itself is almost 85 per cent of all ship visits to these ports in 2005.

Two measures of output are used in *Waterline*

Containers handled—This is the total number of containers lifted on/off fully cellular ships.

Twenty foot equivalent units (TEUs)—This is the number of containers calculated as 20 foot equivalent units. This means that a 20 foot container is counted as one container

or TEU and a 40 foot container is counted as two 20 foot containers or two TEUs. By definition for any given period TEUs handled are more than containers handled.

Terms used

Container turnaround time (minutes)—This indicator measures the efficiency in the handling of an individual container at a port terminal in a seven day period. This measure includes more than just the time it takes to bring a container from the container storage yard and put it on a truck or take it from the truck. It is related to the truck turnaround time as follows:

Container turnaround time = (average truck turnaround time in a quarter)
divided by (the average number of containers on a truck in a quarter).

In this definition, average truck turnaround time (TTT) in the quarter is a measure of the efficiency with which trucks are processed within a given terminal. The TTT indicator measures the length of time (in minutes) that a truck takes from the time it enters a port terminal to the time it exits the port terminal. The time spent at the gate is not included in this measure. It also does not include time spent queuing outside the terminal gate.

Container turnaround time (CTT) recognises the task for the terminal and is a better measure of the performance of a terminal. CTT improves (that is, it goes down) if either the vehicle utilisation rates improves, implying that the number of containers per truck increases, or the port terminal is faster in processing each truck.

Average truck turnaround time in the quarter—This is a measure of the efficiency with which trucks are processed within a given terminal. The indicator measures the length of time (in minutes) that a truck takes from the time it enters a port terminal to the time it exits the port terminal.

Vehicle booking system—Stevedoring companies make available a number of vehicle booking slots per day per time zone, based on the deployment of container handling equipment. The major driver of the availability of VBS time slots is the volume of containers and terminal resources required to receive and deliver containers over a 24 hour period, seven days a week.

When shipping schedules permit and volumes demand, extra resources in the form of labour time and extra equipment can be deployed to the landside of a port terminal and extra time slots can be provided. Generally, resources are reallocated in this way one or two days in advance. The VBS indicators attempt to measure the supply of, and demand for, VBS time slots at port terminals. They are also an indication of the supply of infrastructure at a port terminal for use by the landside of logistics businesses during this period. Whilst these numbers reflect the infrastructure supplied, this supply, particularly for the evening, night and weekend shifts is frequently limited only by demand.

Containers handled—The total number of containers lifted on/off fully cellular ships.

Crane intensity—This is the total number allocated crane hours, divided by the elapsed time from labour first boarding the ship to labour last leaving the ship.

Crane rate—The total containers/TEUs handled divided by the Elapsed Crane Time.

Elapsed crane time—The total allocated crane hours, less operational and non-operational delays.

Elapsed labour time—This is the elapsed time between labour first boarding the ship and labour last leaving the ship, less non-operational delays.

Ship rate—The Crane Rate multiplied by Crane Intensity (as defined above).

Ships—Only fully cellular ships are included in calculations. Fully cellular ships are defined as purpose-built container ships equipped with 40-foot cell guides below deck as a minimum, and exclude such vessels if used for mixed cargoes of containers and general cargo.

TEUs handled—The total 40-foot containers lifted on/off fully cellular ships multiplied by two, plus the total 20-foot containers lifted on/off fully cellular ships.

Vessel working rate—The total containers/TEUs handled divided by the Elapsed Labour Time.

Container terminal—The movement of containers from the container vessel takes place on to 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 unloaded containers. The containers are placed in stacks of two, three or more and are kept there until they are moved away from the terminal by truck or train. While in the terminal the containers are the responsibility 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 discharge operation and hires labour for that purpose. Today, a commercial stevedoring company also may contract with a terminal owner to manage all terminal operations. Many large container ship operators have established in-house stevedoring operations to handle cargo at their own terminals and to provide stevedoring services to other container carriers. In Australia the two major stevedoring companies are Patrick and Dubai Ports World.

Total containers—This is the total number of containers lifted on/off fully cellular ships in a given period. They should not be confused with TEUs. ‘Twenty foot equivalent units’ is universally recognised a measure of containers which aggregates both 20 foot and 40 foot containers into twenty foot units for statistical purposes.

Forty foot containers (per cent)—This is the number of 40 foot containers as a percentage of total containers handled. The higher this indicator is, the larger the degree to which productivity measured as TEUs per hour, overstates the actual productivity. With TEUs per hour used as the measure one container lift becomes two lifts. This is why the table which tabulates containers in TEUs should not be used for measuring productivity.

Crane rate (containers per hour)—This indicator measures the productivity of capital at a port terminal. This is the total containers handled divided by the elapsed crane time. Elapsed crane time is defined as the total allocated crane hours, less operational and non-operational delays.

Vessel working rate (containers per hour)—This indicator measures labour productivity at a port terminal. It is computed as the total containers handled divided by the elapsed labour time (in hours). Sometimes the vessel working rate is referred to as the ‘elapsed labour rate’. For a given worker, the elapsed labour time is estimated as the difference between the time when workers first board the ship and the time when they last leave the ship, less the time when the workers have not worked for whatever reason.

Crane time not worked (percent)—This is the time when a crane could not be used for any reason (operational or non-operational) as a percentage of the total time allocated to a crane.

Ship rate (containers per hour)—This indicator measures the combined stevedoring productivity of capital and labour. It gives the stevedoring productivity per ship while the ship is being worked. It is computed as the crane rate times the crane intensity where crane intensity is (total number of allocated crane hours/ elapsed labour time).

Throughput pbm (tonnes per berth metre squared)—This is the quantity of container and non-container cargo which passes through the port container terminals and is measured in tonnes per berth metre squared. It is a measure of the density of the storage system and reflects the ability of the terminal container storage area to transfer containers from ship to shore and vice versa.

Port interface cost index

The port interface cost index 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, therefore, 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.

Stevedoring and port and related charges are estimated for a standard representative ship transferring an average number of containers. Also land transport and custom's agent's charges are estimated for a representative transport distance for land transport and a representative consignment for customs agents charges.

The Port Interface Cost Index provides estimates in the changes in five major cost elements by port for exports and imports. The five cost components covered are: (a) Ship based charges (b) Cargo-based charges (c) Stevedoring costs (d) Customs brokers' fees (e) road transport costs. The construction of the Port Interface Cost Index is a four stage task:

Stage 1: involves the determination of the vessel sizes to represent all vessels of interest that are used to transport containerised cargo. Two vessel sizes are used to represent all vessels of interest. These are: Vessel size of Gross tonnage equal to 17 215 represents all vessels of sizes ranging from 15 000 to 20 000; and Vessel size of Gross tonnage equal to 37 394 represents all vessels of sizes ranging from 35 000 to 40 000. This size determination was calculated at the commencement of the *Waterline* series and is still used. These two ranges are selected to provide the standard representative ships used in the calculations.

Stage 2: The BTRE calculates key parameters for containers carried by the two representative vessels from data provided by port authorities.

Stage 3: The BTRE estimates ship-based charges and cargo based charges for the representative vessels from price data obtained from port authorities and other maritime operators and transport companies and customs brokers.

Stage 4: BTRE constructs a Port Interface Cost Index for the five ports showing how the various cost components have changed over the recent past.

Vessel size: This is the total internal capacity of a vessel. It is often referred to as Gross Tonnage.

TEUs: This is an industry standard measure of shipping containers.

TEUs are 20 foot equivalent units.

TEUs loaded means containers loaded with goods.

TEUs empty means empty containers.

TEUs loaded inwards means imported.

TEUs loaded outwards means exported.

Number of port calls—The average number of visits of vessels in a particular GT range.

Elapsed berth time (hours)—The average time between arrival at and departure from their berth of all vessels in a particular GT range.

Ship-based charges—These charges are levied on container ships once they come into harbour. They include:

- conservancy charges which are navigation service charges levied by the government of the state in which the port is situated
- tonnage charges that are based on the Gross Tonnage of the vessel. They are port service charges levied by the port authority
- pilotage charge to cover services for piloting the ship
- towage charges levied by the tug boat operator
- mooring & Unmooring—charge levied either by the port authority or the stevedoring company
- berth hires charges sometimes charged by the stevedores.

Cargo-based charges include the following items:

- Wharfage charges that are levied on each container by the port authorities
- Harbour dues that are levied on each container by the port authorities
- Berth charge that are sometimes charged by port authorities.

Port Interface costs—These costs are the sum of the ship-based charges, cargo-based charges, stevedoring charges, customs brokers and transport charges. Ship-based charges and cargo-based charges are defined above.

Stevedoring charges—Stevedoring, ship-based and cargo-based charges are estimated for a standard representative ship transferring an average number of containers. Stevedoring charges are the charges levied by stevedoring companies for handling containers. They are estimated for Australia each year by the ACCC.

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

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 city in which the port is situated. These charges are estimated for a representative transport distance.

Individual port index—Port interface costs are calculated for each of the five ports for each six month period. They are shown for imports or exports in the Port Interface Cost tables and are the total cost of importing or exporting a container (TEU).

National Index—The National Port Interface Cost Index is the Australian average for each six month period of importing or exporting a container in an average ship.

Ship visits

Ship visits measure the number of times a ship calls at a port or ports. For example, a ship that sails to Australia three times and makes a total of 15 port calls in a year counts as one ship, three voyages and 15 ship calls.

Non-financial performance indicators

Cargo throughput (tonnes)—This is the quantity of container and non-container cargo which passes through the port and is measured in tonnes.

Non-containerised general cargo (tonnes)—This is cargo which is not carried in containers.

Containerised cargo (TEUs exchanged)—This is the cargo which is carried in containers normalised as twenty foot equivalent containers.

Average total employment—This is the total employment of the port authorities. It does not include the waterside workers employed by stevedoring companies.

Port turnaround times (hours)—This is the time in hours a container ship is in a port. It is measured as a median of all the container ships in port over a six month period. It is also measured as the 95th percentile for those ships. The 95th percentile says that 95 per cent of the time, the turnaround time is below this amount. Conversely, 5 per cent of the time, turnaround time is above that amount.

Coastal shipping permits

Under the Navigation Act 1912 (section 286) vessels may be licensed to participate in Australia's coastal trade irrespective of flag and crew nationality. An unlicensed ship may be granted a permit to trade on the Australian coast in the carriage of either cargo or passengers where:

- there is no suitable licensed ship available for the shipping task
- or the service carried out by licenced ships is inadequate
- and it is considered to be desirable in the public interest that an unlicensed ship be allowed to undertake that shipping task.

Single voyage permits (SVP)—This permit is issued for a single voyage between designated ports for the carriage of a specified cargo or passengers

Continuing voyage permits (CVP)—This permit is issued for a period of up to three months and enables a vessel to carry specified cargo between specified ports for that period.

Abbreviations

AAPMA	Association of Australian Ports and Marine Authorities
ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
Avge	Average
BTCE	Bureau of Transport and Communications Economics
BITRE	Bureau of Infrastructure, Transport and Regional Economics
CVP	Continuing Voyage Permit
DOTARS	Department of Transport and Regional Services
DP	Dubai Ports
Five port	The five mainland major city ports (Brisbane, Sydney, Melbourne, Adelaide, Fremantle)
GT	Gross tons, formerly abbreviated as GRT
hrs	hours
na	Not available
Mins	minutes
Pbm	Per berth metre
PICI	Port Interface Cost Index
r	revised
SVP	Single Voyage Permit
TEUs	Twenty-foot equivalent units
TTT	Truck turnaround time
UCC	Unitized Cellular Container vessel
VBS	Vehicle Booking System

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