



Table 1 presents the December quarter 1996 to December quarter 1998 indicators of stevedoring productivity for the five major Australian container terminals, expressed in container moves per hour. Figures 1 to 6 present these data over the December quarter 1995 to December quarter 1998 period. The data for Brisbane, Sydney, Melbourne and Fremantle are weighted averages for the major terminals operated by P&O Ports and Patrick. The Adelaide data cover the Sea-Land terminal.

Fremantle elapsed rate data from one operator are not available and therefore only a four-port average indicator could be calculated. However, given that the five-port average is dominated by Melbourne and Sydney, the four-port figure calculated is a reasonable approximation of the five-port average.

Overall, national stevedoring productivity, as measured by the five-port average, changed little in the December quarter 1998 compared with the September quarter 1998.

- the five-port average crane rate (productivity per crane while the ship is worked) was 18.9 containers per hour for the December quarter compared with 19.1 in the September quarter;
- the four-port (Fremantle data not available) average elapsed rate (productivity per ship based on the time labour is aboard the ship) was 21.9 containers per hour for the December quarter compared with 20.7 in the September quarter; and
- the five-port average net rate (productivity per ship while the ship is worked) was 26.9 containers per hour for the December quarter compared with 24.2 containers in the September quarter.

The Brisbane average crane rate was 16.8 containers per hour in the December quarter, down from 18.2 in the September quarter. The Brisbane elapsed rate of 19.6 containers per hour and the net rate of 22.9 containers per hour were both up on the September quarter figures. The average proportion of elapsed time not worked decreased marginally to 14.3 per cent.

The Sydney average crane rate was 15.7 containers per hour in the December quarter, down from 16.5 in the September quarter. The Sydney elapsed rate of 18.9 containers per hour was down on the September quarter figure whilst the net rate of 24.6 containers per hour was up when compared with the previous quarter. The average proportion of elapsed time not worked increased to 23.1 per cent.

As reported in the media in recent months, Melbourne continued to show productivity improvements. The average crane rate was 21.5 containers per hour in the December quarter, up from 20.2 in the September quarter. The Melbourne elapsed rate of 24.3 containers per hour and the net rate of 30.7 containers per hour were both up substantially on the September quarter figures. The crane, elapsed and net rates are the best recorded to date in Waterline for Melbourne. Elapsed time not worked increased to 20.7 per cent, which is the highest recorded for Melbourne so far.

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The Adelaide average crane rate remained unchanged at 23.2 containers per hour in the December quarter. Of Australia's five major container ports, Adelaide continues to retain its edge as the port with the highest crane rate productivity. The Adelaide elapsed rate of 29.3 containers per hour and the net rate of 30.4 containers per hour were both up very slightly on the September quarter figures. The average proportion of elapsed time not worked fell to 3.6 per cent.

The Fremantle average crane rate was 20.7 containers per hour in the December quarter, down from 22.2 containers per hour in the September quarter. The elapsed data for September are not available from one operator and therefore the elapsed data for Fremantle have not been produced for this quarter. The net rate of 25.5 containers per hour was up on the September quarter figure.

### Container port activity

Table 1 also provides information on container ship visits and container throughput at each of the five mainland capital city ports. The December quarter 1998 five-port average showed a 7.6 per cent decrease in ship visits and a 3.2 per cent decrease in container throughput when compared with the September quarter. Compared with the December quarter of the previous year the five-port average for container ship visits fell by 2.2 per cent while the five-port average for container throughput rose by 2.3 per cent.

On a port-by-port basis, the December quarter 1998 container exchange at:

- Brisbane was down 3.6 per cent on the September quarter figure, and up 16.7 per cent when compared with the December quarter 1997;
- Sydney was down 3.1 per cent on the September quarter figure, and down 1.5 per cent when compared with the December quarter 1997;
- Melbourne was down 9.4 per cent on the September quarter figure, and down 4.6 per cent when compared with the December quarter 1997;
- Adelaide was up 22.7 per cent on the September quarter 1998 figure, and up 26.7 per cent when compared with the December quarter 1997; and
- Fremantle was up 8.2 per cent on the September quarter figure, and up 11.4 per cent when compared with the December quarter 1997.

Compared with the September quarter 1993, the first quarter that stevedoring data were collected specifically for Waterline, the five-port average for container ship visits has increased by about 38 per cent while the five-port average for container throughput, measured in teus, has increased by about 75 per cent.

### Teus per hour

Table 12 presents the stevedoring productivity indicators in terms of teus per hour. These data are retained in Waterline for the purposes of long-term historical comparison; they are not directly comparable with the data in table 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.

Nevertheless, over the period since monitoring first began in the December quarter 1989, the five-port average crane rate for the December quarter 1998 is just marginally down from the all-time high achieved in the September quarter 1998. And the average net rate for the December quarter 1998 is the highest attained to date.





**TABLE I CONTAINER TERMINAL PERFORMANCE INDICATORS—  
PRODUCTIVITY IN CONTAINERS PER HOUR**

Port/indicator	Quarter								
	Dec-96	Mar-97	Jun-97	Sep-97	Dec-97	Mar-98	Jun-98	Sep-98	Dec-98
<b>Five ports</b>									
Ships handled	907	865	891	907	963	909	845	1020	942
Total containers	416977	357848	387277	431853	467122	421769	406938	493502	477744
Crane rate	17.1	18.4	18.3	18.3	18.5	18.8	18.7	19.1	18.9
Elapsed rate	na	18.6	19.0	20.4	20.5	20.0 <sup>a</sup>	20.7 <sup>a</sup>	20.7 <sup>a</sup>	21.9 <sup>a</sup>
Net rate	21.8	23.4	23.6	24.3	24.3	23.4	24.7	24.2	26.9
Elapsed time not worked (per cent)	na	20.3	19.2	16.2	15.7	14.6 <sup>a</sup>	16.2 <sup>a</sup>	14.5 <sup>a</sup>	18.8 <sup>a</sup>
<b>Brisbane</b>									
Ships handled	141	156	164	162	177	170	168	192	180
Total containers	51815	40696	52610	58424	58014	49197	58939	70200	67691
Crane rate	16.9	17.3	16.4	16.1	16.8	18.0	17.3	18.2	16.8
Elapsed rate	17.4	17.3	16.6	16.8	16.8	16.4	17.1	18.7	19.6
Net rate	20.4	19.4	18.7	19.1	19.6	19.1	20.2	21.9	22.9
Elapsed time not worked (per cent)	15.0	10.8	11.5	11.7	14.6	13.9	15.4	14.6	14.3
<b>Sydney</b>									
Ships handled	249	251	249	243	266	238	219	267	230
Total containers	137542	126265	131004	142659	157430	137600	130513	160007	155063
Crane rate	15.4	17.7	17.7	18.2	18.4	17.5	16.9	16.5	15.7
Elapsed rate	na	18.2	18.5	21.7	21.9	19.9	20.2	19.2	18.9
Net rate	22.7	25.7	25.5	27.9	27.7	25.7	26.2	24.2	24.6
Elapsed time not worked (per cent)	na	29.4	27.6	22.4	20.7	22.5	22.9	20.7	23.1
<b>Melbourne</b>									
Ships handled	282	230	249	268	281	276	234	309	274
Total containers	161865	130459	143708	162591	178302	166284	147122	187696	170056
Crane rate	17.8	19.0	19.0	18.6	18.8	19.5	19.2	20.2	21.5
Elapsed rate	17.9	19.5	20.3	20.5	19.9	20.1	21.0	21.8	24.3
Net rate	21.7	23.0	24.0	23.5	22.6	22.7	24.2	24.5	30.7
Elapsed time not worked (per cent)	17.8	15.3	15.4	13.0	11.9	11.6	13.3	11.1	20.7
<b>Adelaide</b>									
Ships handled	74	69	65	68	66	60	66	63	74
Total containers	19047	17486	16874	20974	20773	18163	23293	21444	26319
Crane rate	19.6	19.6	21.0	21.1	21.4	22.5	23.1	23.2	23.2
Elapsed rate	22.6	24.0	28.3	28.4	29.2	29.6	30.4	29.0	29.3
Net rate	23.1	24.6	29.1	29.2	30.1	30.7	31.5	30.3	30.4
Elapsed time not worked (per cent)	2.2	2.4	2.7	2.7	3.0	3.6	3.5	4.3	3.6
<b>Fremantle</b>									
Ships handled	161	159	164	166	173	165	158	189	184
Total containers	46707	42942	43081	47205	52603	50525	47071	54155	58615
Crane rate	18.2	19.4	19.0	18.8	18.9	19.6	21.5	22.2	20.7
Elapsed rate	15.6	16.2	15.9	17.0	18.9	na	na	na	na
Net rate	20.5	20.6	19.8	20.6	23.2	21.1	23.9	23.8	25.5
Elapsed time not worked (per cent)	23.9	21.5	19.5	17.6	18.4	na	na	na	na

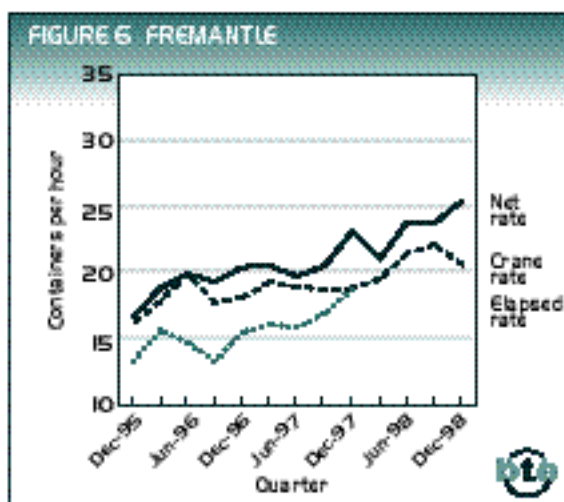
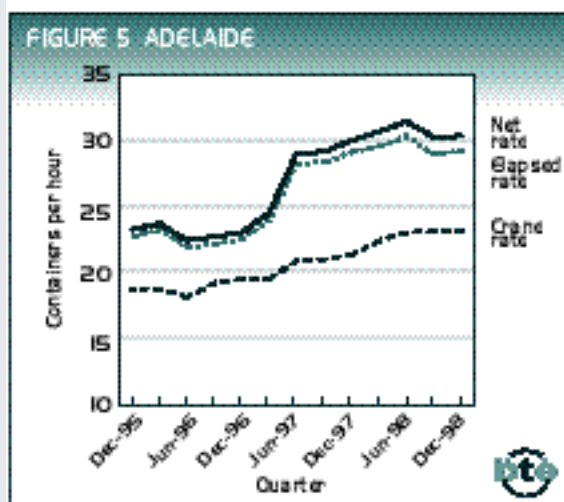
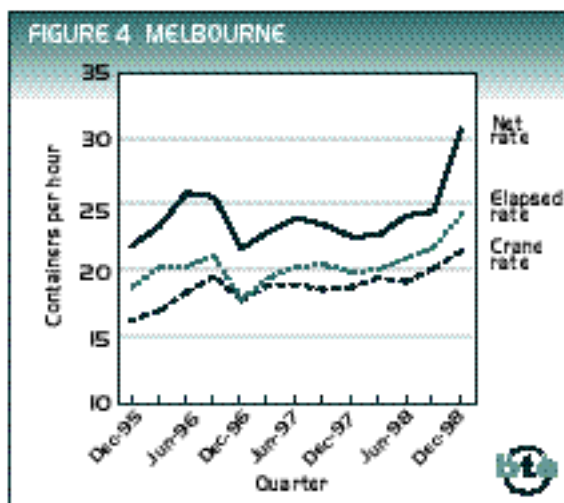
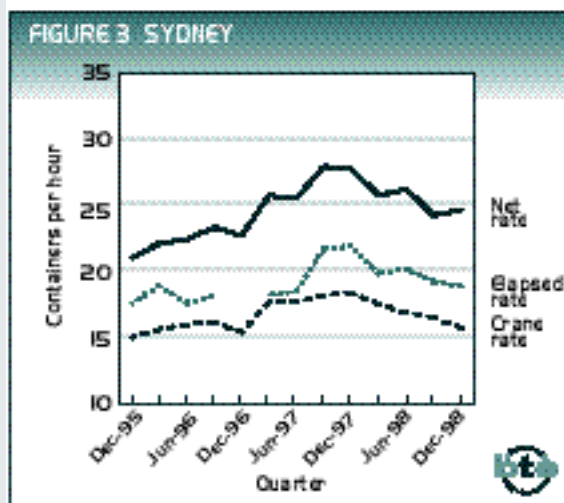
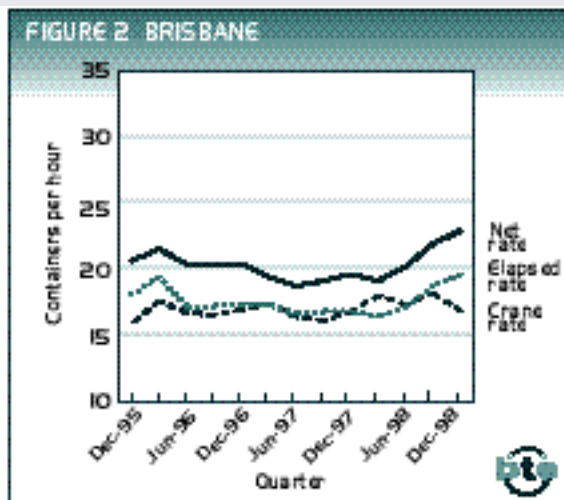
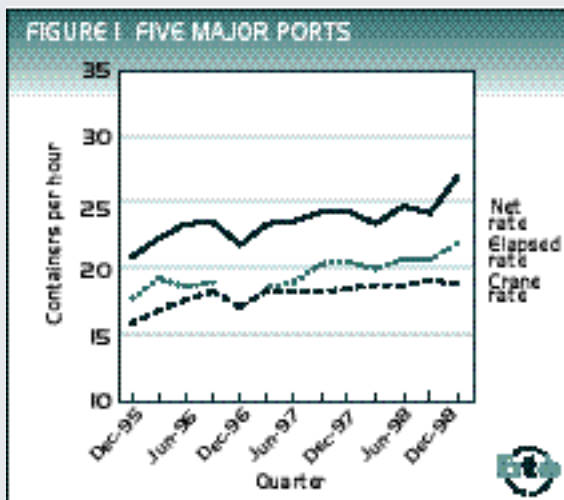
na not available

a. Four port average only as Fremantle elapsed rate data are not available.

- Notes
1. The June quarter 1998 figures do not include data for Patrick covering the 8 April to 7 May 1998 period of the major industrial dispute with the MUA.
  2. Elapsed rates and net rates from March quarter 1997 onwards are not directly comparable with earlier figures (except at Adelaide) due to changes in a terminal operator's information systems.
  3. The data in this table are expressed in containers per hour and therefore are not directly comparable with the teus per hour data in table 12.
  4. Elapsed time not worked is the difference between the net and elapsed rates as a percentage of the net rate.

Sources Patrick, P&O Ports and Sea-Land.





Note These figures are based on the data contained in table I. Readers should refer to the notes in that table.  
 Sources Patrick, P&O Ports and Sea-Land.





## WATERFRONT RELIABILITY

The Waterline reliability indicators provide partial measures of the variability of waterfront performance for container traffic at major Australian ports. The indicators cover the timeliness of selected port services, sources of other ship waiting time, aspects of stevedoring performance and the accuracy of ship arrival advice.

### Berth availability, pilotage, towage

Table 2 presents information on berth availability, pilotage and towage for a sample of ship calls in the December quarter 1998. It indicates the extent to which selected port services were available at the scheduled or confirmed time. The sample for the December quarter covers 259 ship calls, equivalent to 27 per cent of total ship calls at the major container terminals during the period. The proportion of ship calls covered at individual ports ranges from 20 per cent at Brisbane to 32 per cent at Adelaide. The sample includes calls by container ships operating to and from Europe, the Mediterranean, the Middle East, North America, Asia and New Zealand.

The berth availability indicator measures the proportion of ship arrivals where a berth is available within four hours of the scheduled berthing time. Berth availability for the sample of ship calls was 87 per cent in the December quarter 1998, compared with 91 per cent in the September quarter 1998. Caution should be used in undertaking inter-port comparisons of the berth availability data as there is significant variation between ports in sample sizes and ship call patterns.

Figure 7 provides information on berth availability over the period since data were first published by the BTE. The indicator has generally ranged between 84 per cent and 92 per cent. However, there was a substantial reduction in berth availability (to 68 per cent) during the Patrick/MUA dispute in the June quarter 1998.

Average waiting time for ships unable to obtain a berth within four hours of the scheduled berthing time was 19 hours in the December quarter 1998. This compared with a figure of 15 hours recorded during the previous quarter.

The pilotage and towage indicators reported in Waterline measure the proportion of ship movements where the service is available to the ship within one hour of the confirmed ship arrival/departure time. The proportions were virtually 100 per cent in the December quarter 1998. Performance has been consistently at or close to this level since the first data (covering the March quarter 1997) were published in Waterline.

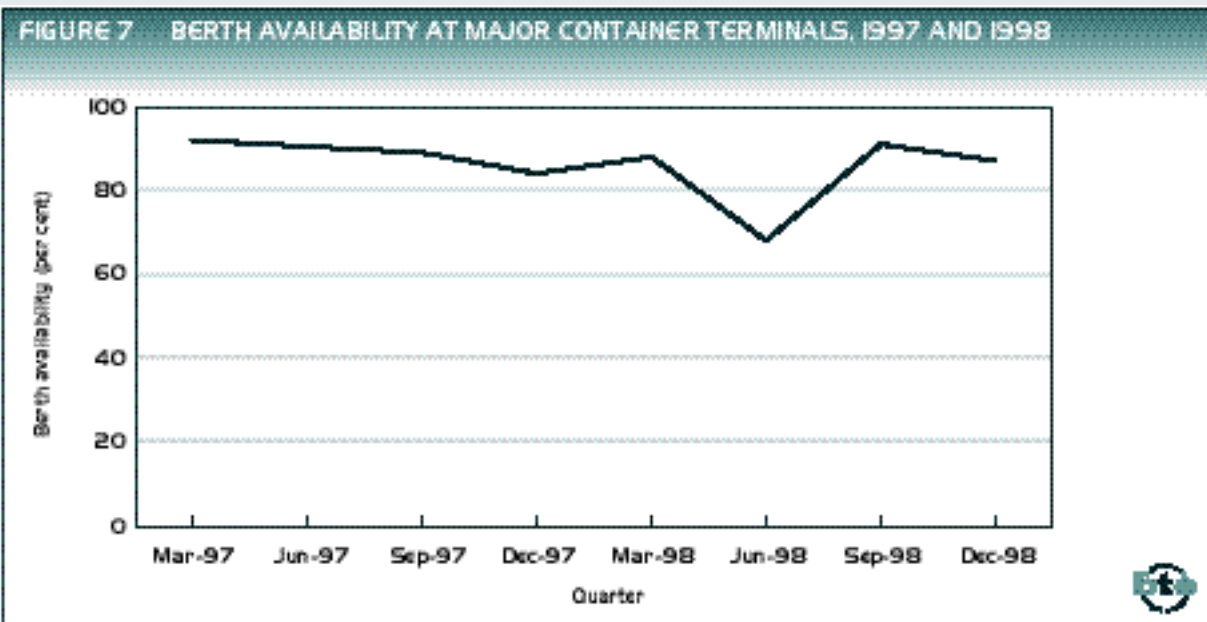
**TABLE 2 AVAILABILITY OF BERTH, PILOTAGE AND TOWAGE SERVICES AT THE SCHEDULED/CONFIRMED TIME, DECEMBER QUARTER 1998**

Port/operation	(Number of ship calls)								Total no. of ship calls
	Delay (hrs)								
	0	1	2	3	4	5-10	11-20	>20	
<b>Brisbane</b>									
Berth availability	31	1	0	0	1	0	2	1	36
Pilotage	36	0	0	0	0	0	0	0	36
Towage	36	0	0	0	0	0	0	0	36
<b>Sydney</b>									
Berth availability	43	1	2	2	1	8	2	8	67
Pilotage	67	0	0	0	0	0	0	0	67
Towage	67	0	0	0	0	0	0	0	67
<b>Melbourne</b>									
Berth availability	69	0	0	1	1	5	2	3	81
Pilotage	81	0	0	0	0	0	0	0	81
Towage	81	0	0	0	0	0	0	0	81
<b>Adelaide</b>									
Berth availability	18	1	2	0	0	2	1	0	24
Pilotage	24	0	0	0	0	0	0	0	24
Towage	23	1	0	0	0	0	0	0	24
<b>Fremantle</b>									
Berth availability	44	4	2	0	1	0	0	0	51
Pilotage	50	0	0	0	0	1	0	0	51
Towage	51	0	0	0	0	0	0	0	51
<b>Five ports</b>									
Berth availability	205	7	6	3	4	15	7	12	259
Pilotage	258	0	0	0	0	1	0	0	259
Towage	258	1	0	0	0	0	0	0	259

*Note* Inter-port comparisons should be interpreted with caution as there is significant variation between ports in factors such as sample sizes and ship call patterns.

*Sources* Data for a sample of ship calls provided by shipping lines.





Sources Data for a sample of ship calls provided by shipping lines.

### Other waiting time

The seven shipping lines that supplied information for table 2 also provided data on other ship waiting time. This category incorporates waiting time that is attributable to factors other than the unavailability of a berth, pilot or towage service at the scheduled/confirmed time. The data on other ship waiting time reported in Waterline exclude ship schedule adjustments.

In the December quarter 1998, 45 per cent of ship calls in the sample were affected by other waiting time incidents that had a duration of at least one hour. This was below the proportion of 57 per cent that was recorded in the September quarter 1998. The average duration of other waiting time incidents was 7.8 hours per incident in the December quarter 1998, compared with 9.0 hours per incident in the previous quarter.

**TABLE 3 OTHER SHIP WAITING TIME INCIDENTS AT THE FIVE MAINLAND CAPITAL CITY PORTS, DECEMBER QUARTER 1998**

Incident type	(Number of incidents)							Total no. of incidents
	Ship waiting time (hrs)							
	1	2	3	4	5-10	11-20	>20	
Awaiting labour	8	8	3	1	13	8	5	46
Early ship arrival	5	5	5	2	10	3	5	35
Stevedoring finished early	3	10	2	2	3	0	0	20
Crane breakdown	7	3	4	3	1	1	0	19
Pilot/tug booking not at preferred time	3	3	1	2	1	0	0	10
Stevedoring finished late	0	0	0	0	4	1	2	7
Late ship arrival	0	1	0	2	2	0	0	5
Industrial action	0	1	0	0	2	1	0	4
Ship repairs or maintenance	0	0	0	0	4	0	0	4
Weather or tides	0	1	1	0	0	0	0	2
Other	2	1	2	0	5	0	3	13
<b>Total incidents</b>	<b>28</b>	<b>33</b>	<b>18</b>	<b>12</b>	<b>45</b>	<b>14</b>	<b>15</b>	<b>165<sup>a</sup></b>

a. These incidents affected 117 of the 259 ship calls covered in table 2.

Sources Data for a sample of ship calls provided by shipping lines.

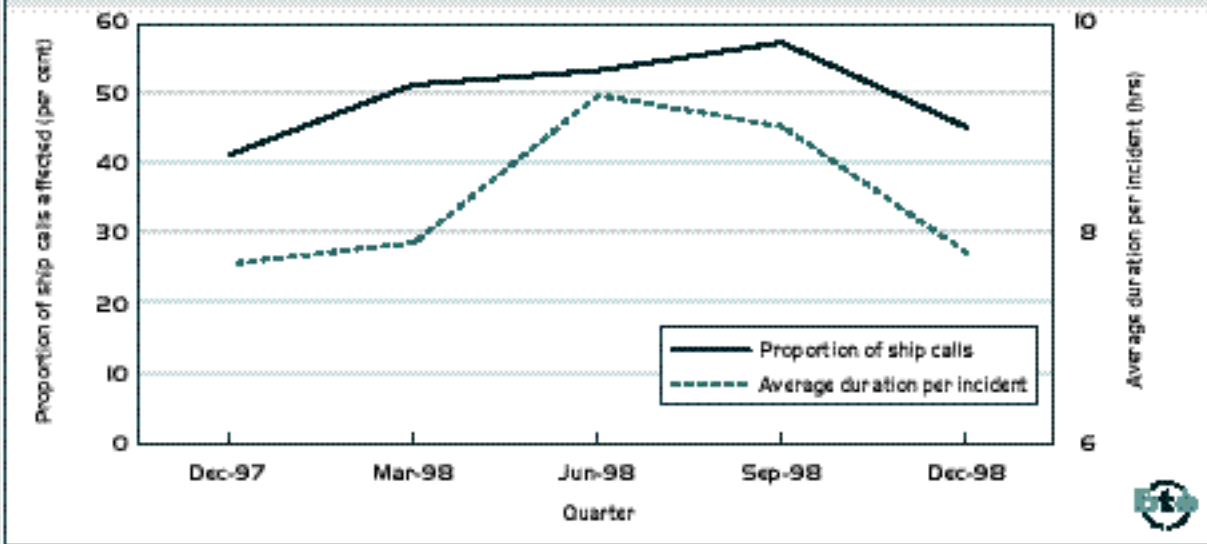


Table 3 summarises the data on other waiting time incidents in the December quarter 1998. The shipping lines identified a total of 165 incidents (affecting 117 ship calls) for the sample of ship calls over this period. Around one-third of the ship calls that incurred other waiting time were affected by two or more incidents.

The total waiting time attributable to particular incident types reflects the number of incidents and the waiting time associated with individual incidents.



**FIGURE 8 OTHER SHIP WAITING TIME INCIDENTS AT MAJOR CONTAINER TERMINALS 1997 AND 1998**



Sources Data for a sample of ship calls provided by shipping lines.

In the December quarter 1998, three incident types accounted for around 70 per cent of the total hours attributable to other ship waiting time:

- Awaiting labour (35 per cent);
- Early ship arrival (23 per cent);
- Stevedoring finished late (12 per cent).

Figure 8 provides information on other ship waiting time over the period since the December quarter 1997. The proportion of ship calls affected by other ship waiting time in a particular quarter has varied between 41 per cent and 57 per cent. The average duration of other waiting time incidents has ranged from 7.7 hours to 9.3 hours. The BTE's database indicates that, in individual quarters, there have been 1.3-1.4 incidents (on average) for each ship call affected by other waiting time.

### Stevedoring

Table 4 presents the available information on two aspects of stevedoring reliability at major container terminals – stevedoring rate and cargo receipt. Data are not available for Adelaide or Fremantle. As noted in Waterline 17, a third indicator (stevedoring completion) is no longer published by the BTE due to major changes in one terminal operator's work practices and recording activities.

Stevedoring rate provides a partial indicator of the variability of stevedoring productivity at each port. It is defined as the proportion of ship visits where the average crane rate for the ship is within two containers per hour (plus or minus) of the quarterly average crane rate for the terminal. In the December quarter 1998, the stevedoring rate indicator ranged from 52 per cent to 60 per cent at the three ports for which data are available.

Cargo receipt is the proportion of receipts (exports) completed by the stevedore's cut-off time. It provides a partial indicator of one factor that can affect container terminal performance. In the December quarter 1998, the cargo receipt indicator ranged between 79 per cent and 97 per cent at the three ports for which data are available.





### Ship arrival

Table 4 includes data for two indicators of ship arrival advice. The first indicator is the proportion of ship arrivals within one hour (plus or minus) of the most recently advised arrival time available to the port authority/corporation at 24 hours prior to actual arrival. The proportion at the four ports for which data are available ranged between 49 per cent and 63 per cent in the December quarter 1998. The major change from the previous quarter was a significant decline at Brisbane.

The second indicator is the proportion of ship arrivals within one hour (plus or minus) of the last scheduled arrival time advised inside the 24 hours prior to actual arrival. The proportion at the four ports ranged between 90 per cent and 95 per cent in the December quarter 1998.

**TABLE 4 STEVEDORING AND SHIP ARRIVAL RELIABILITY INDICATORS, SEPTEMBER AND DECEMBER QUARTERS 1998**

Indicator	(per cent)									
	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	Jul-Sep	Oct-Dec	Jul-Sep	Oct-Dec	Jul-Sep	Oct-Dec	Jul-Sep	Oct-Dec	Jul-Sep	Oct-Dec
<b>Stevedoring</b>										
Stevedoring rate	56	57	65	60	na	52	na	na	na	na
Cargo receipt	97	90	82	79	97	97	na	na	na	na
<b>Ship arrival</b>										
Advice at 24 hrs	79	57	49	49	na	na	66	63	55	53
Advice inside 24 hrs	96	92	88	94	na	na	94	95	91	90

na not available

Sources AAPMA, Patrick and P&O Ports.

### PORT INTERFACE COST INDEX

The Port Interface Cost Index provides a measure of shore-based shipping costs (charges) for containers moved through the Australian mainland capital city ports. Data for the periods January-June 1998 and July-December 1998 are presented in tables 5 to 7. 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. The indicative approach was adopted because of the difficulty of obtaining data on the multitude of factors affecting the prices charged by each service provider, particularly for towage and road transport charges, and customs brokers' fees.

### Port and related charges

Table 5 provides the parameters used to determine the port and related charges in table 6. These parameters relate to a representative port call by a containership (Lloyd's ship classification UCC). The representative ship was selected from the ship size range with the most port calls by UCC-type ships during the periods covered by Waterline earlier in the 1990s. Typically, the ship size range of 15 001 to 20 000 GRT had the most port calls at each port. The other cost parameters are then determined by taking the mean of all port calls in the range that contains the representative ship.

It is important to directly connect the mean number of teus exchanged per port call with the size of the representative ship. This is because most port and related charges, particularly towage and port authority tonnage charges, are dependent upon the size of the ship. However, shipping economics are such that, the larger the ship being used to transport the cargo, the more likely ship operators are to attempt to exchange higher volumes of cargo per port call. As a result, the per unit (teu) cost of exchanging cargo at a particular port remains roughly the same for each port call regardless of the size of the ship. It is for this reason that comparative port charge analyses that keep the cargo exchange constant while varying the ship size are misleading. A discussion of this, in relation to the Port Interface Cost Index, can be found in Waterline 4, October 1995, pp. 9-13. That article also demonstrates that the BTE's Port Interface Cost Index is a reasonable approximation of port interface costs for most container movements across the Australian mainland capital city ports.





TABLE 5 PARAMETERS USED IN THE PORT INTERFACE COST INDEX, 1998

Indicator	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998
<b>Vessel size</b>										
GRT	17215	17215	17215	17215	17215	17215	17215	17215	17215	17215
NRT	8372	8372	8372	8372	8372	8372	8372	8372	8372	8372
<b>Teus exchanged<sup>a</sup></b>										
Total	347	447	719	858	662	868	327	560	330	363
Loaded	273	346	578	679	553	719	260	427	265	282
Empty	74	101	141	179	109	149	67	133	65	81
Loaded inwards	126	164	358	432	290	389	114	187	139	149
Loaded outwards	147	182	220	247	263	330	146	240	126	133
<b>Ship call parameters<sup>a</sup></b>										
Number of port calls	3	4	3	3	3	4	3	6	5	7
Elapsed berth time (hrs)	24	26	37	42	33	35	15	20	16	20

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

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



Table 6 provides the port and related charges at the five mainland capital city ports for the periods January-June 1998 and July-December 1998. Port and related charges comprise ship-based charges and cargo-based charges.

### Ship-based charges

On a per teu basis, ship-based port and related charges fell at all ports in the July-December 1998 period compared with the January-June 1998 period. This outcome is mainly the result of an increase in the mean number of teus exchanged per port call at all ports and a reduction in the number of tugs required for towage at Brisbane, Melbourne and Fremantle. However, to a lesser extent, changes in the average number of port calls made by the indicative vessel during the period and changes in the elapsed berth time also impacted on the charges in some ports. Only at Melbourne and Fremantle were there any actual changes in ship-based charges:

- a 14 per cent decrease in tonnage charges and a 6 per cent decrease in mooring and unmooring charges at Melbourne; and
- a 0.6 per cent increase in conservancy charges at Fremantle.

On a per ship-call basis, these actual changes in charges contributed 3 per cent towards the decrease in total ship-based charges per ship visit at Melbourne, and a tiny increase of 0.03 per cent at Fremantle which was compensated by the decrease in costs per teu attributable to changes in the tug-usage and average-teus-exchanged parameters. At Brisbane and Adelaide, only changes in the parameters upon which the total ship-based charges per ship visit are calculated were responsible for the apparent decrease in charges. Total ship-based charges per ship visit remained unchanged at Sydney.

At Brisbane the 33 per cent fall in ship-based charges per teu resulted from a decrease in tug requirements and an increase in average teus exchanged for the indicative ship range. At Sydney the 16 per cent fall in ship-based charges per teu was due solely to an increase in average teus exchanged. At Melbourne the 28 per cent fall in ship-based charges per teu resulted from a decrease in tugs required and an increase in average teus exchanged. At Adelaide the 42 per cent fall in ship-based charges per teu resulted from an increase in average teus exchanged and an increase in the average number of port calls per ship per period. At Fremantle the 38 per cent fall in ship-based charges per teu resulted from a decrease in tugs required, an increase in average teus exchanged and an increase in the average number of port calls per ship.





TABLE 6 PORT AND RELATED CHARGES, 1998

Indicator	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998
<b>Ship-based charges (\$/teu)</b>										
Conservancy	6.45	5.01	-	-	-	-	4.60	1.53	2.40	1.46
Tonnage	-	-	9.34	7.82	9.23	6.03	11.34	7.27	7.68	6.97
Pilotage	14.78	11.48	4.73	3.96	8.29	6.32	7.19	4.20	6.34	5.75
Towage	29.17	16.99	13.59	11.39	11.10	7.05	37.63	21.96	29.86	13.55
Mooring, unmooring	4.93	3.83	4.38	3.67	1.51	1.08	-	-	3.34	3.03
Berth hire <sup>a</sup>	-	-	-	-	11.84	9.66	-	-	-	-
Total <sup>b</sup>	55.33	37.31	32.03	26.84	41.97	30.14	60.76	34.96	49.62	30.76
<b>Cargo-based charges (\$/teu)</b>										
Wharfage										
Imports	26.00	26.00	60.00	60.00	34.30	33.00	53.00	53.00	47.30	47.30
Exports	26.00	26.00	45.00	45.00	34.30	33.00	53.00	53.00	47.30	47.30
Harbour dues	42.00	42.00	-	-	-	-	-	-	-	-
Berth charge	-	-	-	-	-	-	-	-	13.90	13.90
<b>Total port and related charges (\$/teu)<sup>b</sup></b>										
Loaded imports	123	105	92	87	76	63	114	88	111	92
Loaded exports	123	105	77	72	76	63	114	88	111	92
<b>Charges per ship visit (\$/visit)</b>										
Total ship-based charges	19197	16667	23036	23036	27786	26173	19860	19581	16352	11171
Empty teus <sup>c</sup>	1055	1439	1410	1790	1088	596	0	0	501	624
-	<i>not applicable</i>									
a.	<i>Charged by stevedores and itemised separately from basic stevedoring charge.</i>									
b.	<i>Components may not sum to totals due to rounding.</i>									
c.	<i>Sum of wharfage, harbour dues and berth charge per empty teu, multiplied by average exchange of empty teus.</i>									
Note	<i>Port and related charges are based on the parameters described in table 5.</i>									
Sources	<i>BTCE estimates based on: ship call data supplied by relevant port authorities/corporations, and price schedules of relevant port authorities/corporations, towage operators and pilotage service providers.</i>									



While caution should always be used when making port comparisons on a per teu basis, Sydney remains the lowest-cost port for ship-based charges. This is significant from a cargo owner's point of view. However, from the point of view of ship operators using ships similar to the representative ship in table 5, Fremantle remains the lowest cost port for ship-based charges on a per ship-visit basis.

### Cargo-based charges

At Melbourne, wharfage for a full teu fell by nearly 4 per cent and for an empty teu by nearly 60 per cent. There were no other changes in port and related cargo-based charges in the July-December 1998 period.

### Changes in total port and related charges per teu

At Brisbane, on a per teu basis, total port and related charges fell 15 per cent for both loaded imports and loaded exports for the period July-December 1998. This fall was due to a combination of fewer tugs required per ship movement and a 29 per cent increase in teus exchanged.

At Sydney, on a per teu basis, total port and related charges fell by about 6 per cent for loaded imports and loaded exports in the July-December 1998 period. As there were no changes in any of the port and related costs at Sydney during this period, this decrease demonstrates the impact a 19 per cent increase in the mean teu exchange can have on the per unit charge.

At Melbourne, on a per teu basis, total port and related charges fell 17 per cent for loaded imports and loaded exports for the period July-December 1998. This decrease was the result of a 31 per cent increase in the mean teu exchange and a reduction in both the number of tugs required and wharfage charges.



At Adelaide, on a per teu basis, total port and related charges fell 23 per cent for loaded imports and loaded exports in the July-December 1998 period. This is the fourth consecutive period in which Adelaide's average number of teus exchanged has risen, on each occasion leading to a further reduction in total port and related charges on a per teu basis. This latest decrease in costs per teu was the result of a substantial increase in both the mean teu exchange (71 per cent) and the average number of port calls per ship per period.

At Fremantle, on a per teu basis, total port and related charges fell 17 per cent for loaded imports and loaded exports in the July-December 1998 period. This fall was due to a combination of fewer tugs required and a 10 per cent increase in average teus exchanged for ships in the indicative ship range.

### Stevedoring charges per teu

The last ACCC survey of container terminal operations provided a provisional estimate of stevedoring charges of \$203 per teu in 1995. For the January-June 1997 period, the BTE contacted a range of shipping lines and terminal operators in an interim attempt to obtain more recent estimates for container stevedoring charges. As a result, it was estimated that average revenue for container stevedoring was approximately 7.5 per cent, or \$15, per teu lower than the ACCC's provisional 1995 estimate. This led to a provisional stevedoring charge of \$188 being used for the Port Interface Cost Index.

Earlier this year the Commonwealth Treasurer directed the ACCC to undertake a monitoring program of the prices, costs and profits of the container stevedoring companies at the major Australian container ports. Once the results of this survey become available it will allow us to include more up-to-date stevedoring charges in the Port Interface Cost Index.

### Land-based charges per teu

The average charges for customs brokers' fees and road transport charges for the January-June 1998 and July-December 1998 Port Interface Cost Index are included in table 7. These charges are based on data provided by approximately 40 customs brokers and 50 road transport operators. Customs brokers' fees for imports are higher than the fee for exports, reflecting the more complex clearance procedures for import containers.

**TABLE 7 PORT INTERFACE COSTS, 1998**

Indicator	(\$/teu)									
	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998
<b>Imports</b>										
Ship-based charges	55	37	32	27	42	30	61	35	50	31
Cargo-based charges	68	68	60	60	34	33	53	53	61	61
Stevedoring <sup>p</sup>	188	188	188	188	188	188	188	188	188	188
Customs brokers' fees	123	123	152	152	138	138	131	132	143	143
Road transport charges	185	185	288	288	251	251	158	168	195	195
<b>Total imports<sup>a</sup></b>	<b>620</b>	<b>602</b>	<b>719</b>	<b>714</b>	<b>653</b>	<b>640</b>	<b>591</b>	<b>576</b>	<b>637</b>	<b>618</b>
<b>Exports</b>										
Ship-based charges	55	37	32	27	42	30	61	35	50	31
Cargo-based charges	68	68	45	45	34	33	53	53	61	61
Stevedoring <sup>p</sup>	188	188	188	188	188	188	188	188	188	188
Customs brokers' fees	77	77	111	111	89	89	71	73	70	70
Road transport charges	185	185	288	288	251	251	158	168	195	195
<b>Total exports<sup>a</sup></b>	<b>574</b>	<b>555</b>	<b>663</b>	<b>658</b>	<b>604</b>	<b>591</b>	<b>532</b>	<b>518</b>	<b>564</b>	<b>545</b>

*p* provisional pending updating of stevedoring charge using detailed survey data  
*a* Components may not sum to totals due to rounding.

Notes 1. Based on parameters described in table 5.  
 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 a weighted average for several major Australian ports. Stevedoring charges vary between ports but detailed data for individual ports are not publicly available.

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





The July-December 1998 period indicated no movement in aggregate customs brokers' fees apart from a rise, in Adelaide, of 1 per cent in import fees and 3 per cent in export fees. Similarly, there was no movement in average road transport charges other than a 6 per cent rise in Adelaide. However, a recurrent comment from many of our Sydney contacts was that waiting time at terminals had increased by up to 3 hours, which understandably increased charges by the standard rate per hour. On this occasion we have not incorporated these extra demurrage costs into our calculations as the index is indicative of average charges for the full six month period and the BTE does not believe, at this stage, that the additional waiting time is widespread. However, should the BTE receive similar reports of delays in our next round of compiling the index, the additional demurrage charges will be incorporated.

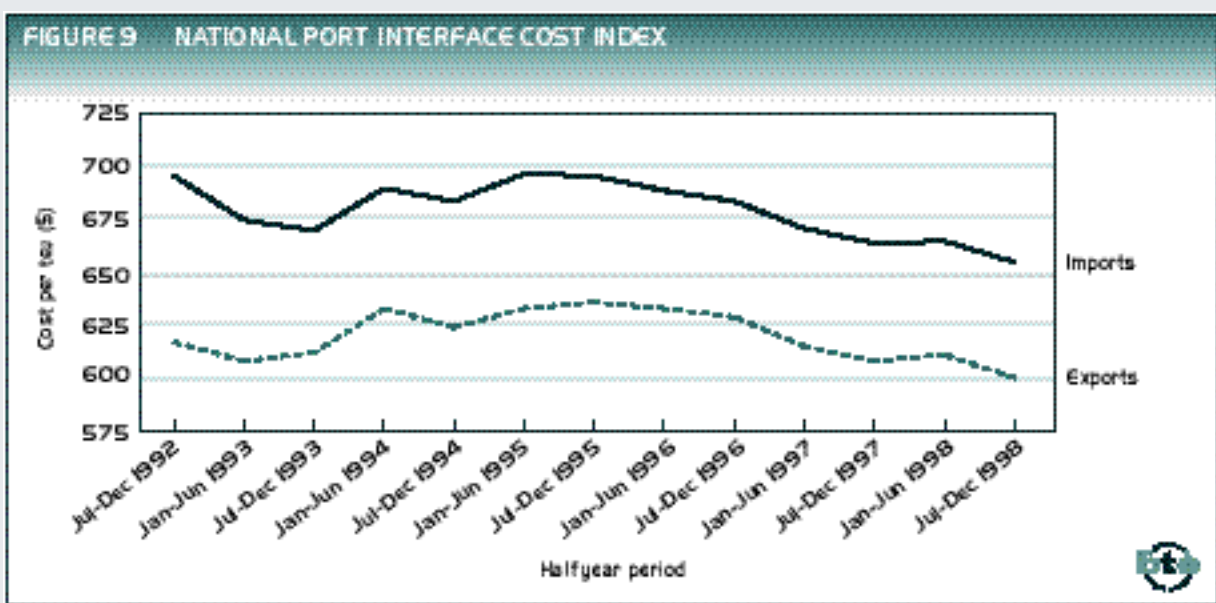
One of the parameters used to estimate road transport charges is the time taken to move containers from (to) the wharf to (from) the customer's warehouse. Both distance and traffic congestion impact upon this parameter and help explain, to some extent, the significant difference between road transport charges at Melbourne and Sydney compared with Brisbane, Adelaide and Fremantle.

### Indices for individual ports

Table 7 indicates that port interface costs per teu fell at all five major container ports in Australia between January-June 1998 and July-December 1998. However, the changes in the port interface cost indices should be interpreted with caution given the provisional nature of the reported stevedoring charges. Even if stevedoring charges did not change during the July-December 1998 period, care should also be taken in making inter-port comparisons of port interface costs. 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 tend to vary between ports.

### National index

Figure 9 provides the National Port Interface Cost Index back to the July-December 1992 period. Between the January-June 1998 and July-December 1998 periods, national import charges decreased by 1.6 per cent to \$655 per teu and export charges decreased by 1.8 per cent to \$600 per teu. Overall, this fall in national charges was primarily the outcome of a significant increase in the average number of teus exchanged by ships in the indicative range at all ports, together with improved tug operations in three of the five ports.



Sources BTE estimates based on ship call data supplied by port authorities/corporations; price schedules of port authorities/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.




**TABLE 8 FINANCIAL PERFORMANCE INDICATORS, SELECTED AUSTRALIAN PORT AUTHORITIES/CORPORATIONS, 1996/97 & 1997/98**

Indicator	(\$/teu)									
	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	1996/97	1997/98	1996/97	1997/98	1996/97 <sup>e</sup>	1997/98	1996/97	1997/98	1996/97	1997/98
	<i>per cent</i>									
Return on assets <sup>a</sup>	6.7	6.3	15.5	12.5	12.7	8.1	19.6	24.5	14.9	20.0
Dividend payout ratio <sup>b</sup>	36.3	25.9	61.3	50.0	27.4	41.7	64.6	23.9	0.0	10.0
Debt/equity <sup>c</sup>	0.1	0.1	102.9	44.4	33.6	25.6	87.6	63.7	109.1 <sup>r</sup>	64.9
	<i>\$ million</i>									
EBIT <sup>d</sup>	28.1	27.2	52.0	54.6	59.6	41.3	23.1	25.8	15.8	22.0
Ave. total assets in service	415.7	429.2	335.4	435.9	469.8	507.7	117.6	105.4	106.1	109.9
Dividends paid	7.3	4.8	14.6	12.7	7.4	8.0	4.0	4.7 <sup>f</sup>	0.0	1.3
Operating profit <sup>d</sup>	20.0	18.5	23.8	25.5	27.1	19.2	6.1	19.6	5.0	12.6
Total debt	0.4	0.3	150.6	150.5	114.4	102.5	45.0	35.0	44.2	33.5
Total equity	399.4	409.8	146.4	339.4	340.3	400.3	51.4	55.0	40.5	51.6

*r* revised

*a.* EBIT (earnings before interest and tax) as a proportion of total assets.

*b.* Dividends paid out as a proportion of operating profit.

*c.* Total debt as a proportion of total equity.

*d.* Includes abnormals.

*e.* These data are based on the Melbourne Port Corporation's audited financial statements for the period 1 March 1996 to 30 June 1997 as published in the 1997 Annual Report.

*f.* A capital dividend of \$11.6 million has been excluded.

Source AAPMA.



## PORT PERFORMANCE - FINANCIAL

Information on the financial performance of the five mainland capital city port authorities/corporations in 1996/97 and 1997/98 is presented in table 8.

### Earnings and assets

Earnings before interest and tax (EBIT) increased in 1997/98 at Sydney Ports Corporation (5 per cent), Ports Corp SA (12 per cent), and Fremantle Port Authority (39 per cent). It fell at Port of Brisbane Corporation (3 per cent) and Melbourne Port Corporation (31 per cent).

Operating profit after income tax in 1997/98 increased by 7 per cent at Sydney Ports Corporation, 220 per cent at Ports Corp SA and 152 per cent at Fremantle Port Authority. It fell by 8 per cent at Port of Brisbane Corporation and 29 per cent at Melbourne Port Corporation.

Average total assets in service in the 1997/98 financial year rose at Port of Brisbane Corporation (3 per cent), Sydney Ports Corporation (30 per cent), Melbourne Port Corporation (8 per cent) and Fremantle Port Authority (4 per cent). During the same period average total assets fell 10 per cent at Ports Corp SA.

Return on assets (EBIT as a proportion of total assets) increased in 1997/98 at Ports Corp SA (25 per cent) and at Fremantle Port Authority (35 per cent). The return on assets in 1997/98 decreased at Port of Brisbane Corporation (6 per cent), Sydney Ports Corporation (19 per cent) and Melbourne Port Corporation (36 per cent).

### Dividends

Dividends paid in 1997/98 increased at Melbourne Port Corporation (8 per cent) and Ports Corp SA (18 per cent) but fell at Port of Brisbane Corporation (34 per cent) and Sydney Ports Corporation (12 per cent). No dividend was paid by the Fremantle Port Authority in 1996/97.

The dividend payout ratio (dividends paid out as a proportion of operating profit) in 1997/98 rose at Melbourne Port Corporation (52 per cent). It fell at the Brisbane (29 per cent), Sydney (18 per cent) and South Australia (63 per cent) port corporations.



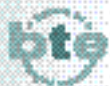


### Debt and equity

Total debt in 1997/98 decreased at all five port authorities/corporations: 22 per cent at Brisbane, 0.1 per cent at Sydney, 10 per cent at Melbourne, 22 per cent at South Australia and 24 per cent at Fremantle.

Total equity in 1997/98 increased at all five port authorities/corporations: 3 per cent at Brisbane, 132 per cent at Sydney, 18 per cent at Melbourne, 7 per cent at South Australia and 27 per cent at Fremantle.

The debt/equity ratio fell at all five port authorities/corporations: 24 per cent at Brisbane, 57 per cent at Sydney, 24 per cent at Melbourne, 27 per cent at South Australia and 41 per cent at Fremantle.



## PORT PERFORMANCE - NON-FINANCIAL

Non-financial indicators for the five mainland capital city ports in 1998 are presented in table 9. The January-June 1998 indicators include the period of the major industrial dispute between Patrick and the MUA and therefore it is difficult to compare the January-June 1998 figures with earlier or later published indicators for the individual ports.

### Cargo throughput

Total cargo throughput at the five ports increased to 46.7 million tonnes in the July-December 1998 period, compared with 45.2 million tonnes in the January-June 1998 period. There were increases in throughput at Sydney (4 per cent), Melbourne (14 per cent), and Fremantle (5 per cent); and decreases at Brisbane (6 per cent) and Adelaide (7 per cent). Overall this resulted in a rise of 3 per cent in total throughput for the five ports compared with the previous half year, and a rise of 7 per cent when compared with the same half-year period of the previous year.

The tonnage of non-containerised general cargo handled at the five ports rose by 2 per cent to 2.42 million tonnes in the July-December 1998 period (2.38 million tonnes in the January-June 1998 period). This result was achieved through increases at Melbourne (11 per cent), Adelaide (12 per cent) and Fremantle (9 per cent); and falls at Brisbane (7 per cent) and Sydney (19 per cent). The non-containerised general cargo throughput for the five ports in the July-December 1998 period represents a 4 per cent decrease when compared with the same half-year period in 1997.

Measured in teus, container traffic for the five ports rose by 14 per cent to 1.4 million teus in the July-December 1998 period (1.2 million teus in January-June 1998). Throughput of loaded teus rose by 12 per cent, with loaded imports increasing by 16 per cent and loaded exports increasing 9 per cent. During the July-December 1998 period throughput of loaded containers increased at all ports: Brisbane (7 per cent), Sydney (17 per cent), Melbourne (13 per cent), Adelaide (2 per cent) and Fremantle (7 per cent).

The annual 1998 five-ports total container traffic, measured in teus, increased by 8 per cent when compared with 1997.



TABLE 9 NON-FINANCIAL PERFORMANCE INDICATORS, SELECTED AUSTRALIAN PORTS, 1998

Indicator	Brisbane		Sydney		Melbourne		Adelaide		Fremantle		Five ports <sup>d</sup>	
	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998	Jan-Jun 1998	Jul-Dec 1998
<b>Total cargo throughput ('000 tonnes)</b>	10700	10082	10969	11435	9334	10649	3075	2848	11142	11727	45220	46741
<b>Non-containerised general cargo ('000 tonnes)<sup>a</sup></b>	517	481	385	310	991	1100	118	132	366	399	2376	2422
<b>Containerised cargo (teus exchanged)</b>												
Full import	57082	62980	189423	226977	217602	254315	19454	19744	53984	58041	537545	622057
Empty import	22450	24630	7504	9159	30878	35220	7855	8209	11134	15313	79821	92531
Full export	66838	70168	116244	129669	197025	215915	24730	25365	48819	51833	453656	492950
Empty export	11412	14388	66857	84751	50596	62293	3582	5781	14098	16205	146545	183418
Total	157782	172166	380028	450556	496101	567743	55621	59099	128035	141392	1217567	1390956
<b>Average total employment<sup>b</sup></b>	152	na	200	192	70	73	167	167	184	180	773	na
<b>Turnaround time (hrs)<sup>c</sup></b>												
Median result	36	35	36	43	44	36	20	21	24	23	-	-
95th percentile	97	69	73	77	132	66	57	48	58	51	-	-

- not applicable

na not available

a. Excludes bulk cargoes.

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

c. Turnaround times refer only to ships calling at container terminals. Comparisons between ports are not appropriate since 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.

Source AAPMA.



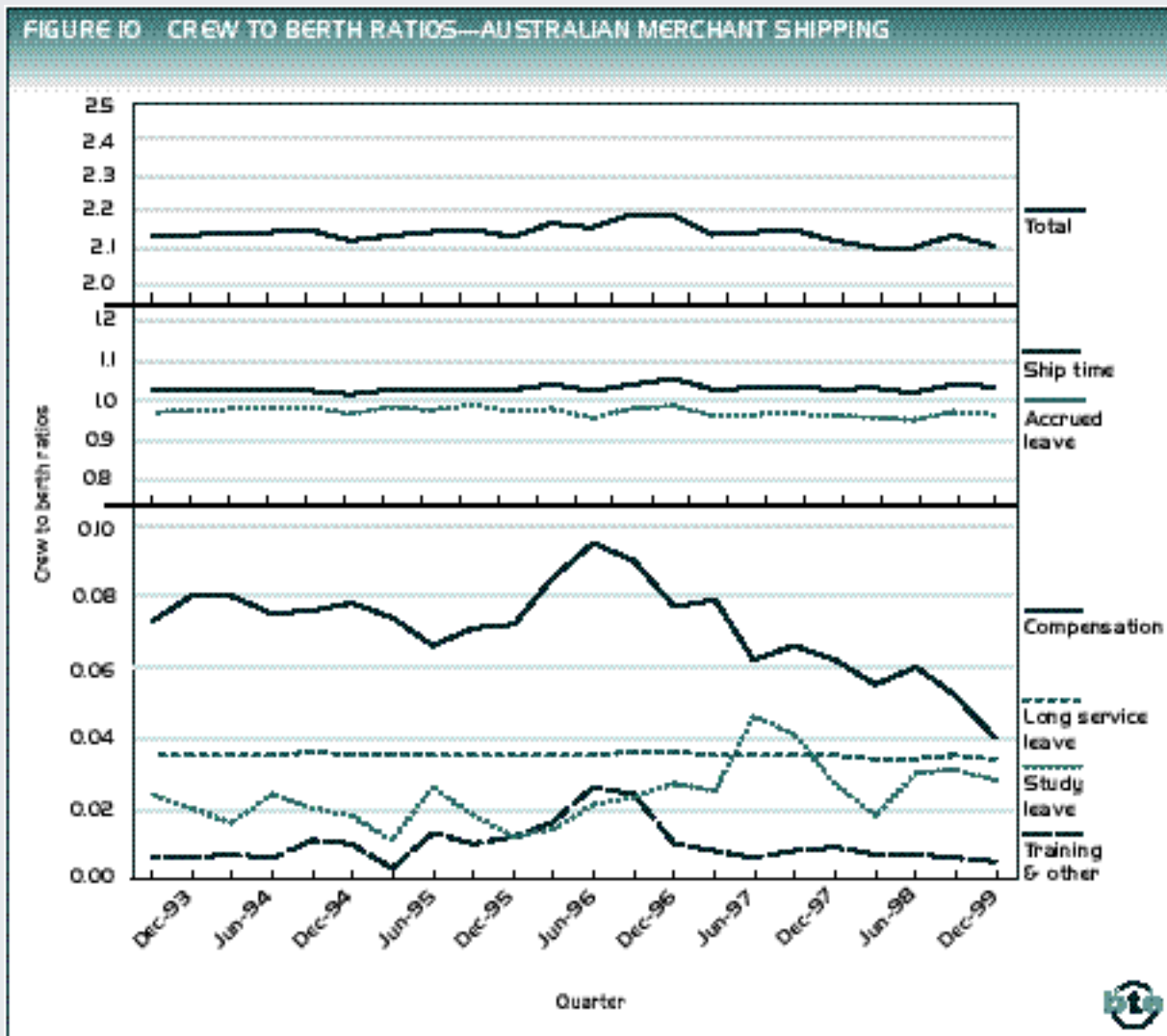
## CREW TO BERTH RATIOS

The BTE monitors crew to berth ratios for Australian merchant and offshore shipping on a quarterly basis. The crew to berth ratio is defined as the number of seafarer days paid over a period of time, divided by the number of berth days operated. Berth days operated is defined as the sum, over the period, of the number of people required each day by the relevant statutory authority and the ship operator to carry out the work of the ship(s) in a safe and efficient manner.

### Merchant shipping

Figure 10 presents information on the crew to berth ratio, and its components, for Australian merchant shipping. As the BTE is still auditing the data, the December quarter 1998 merchant shipping data in this issue of Waterline are classified as preliminary. The overall crew to berth ratio for merchant shipping fell to 2.108 in the December quarter 1998, compared with 2.137 in the September quarter (a 1.4 per cent decrease) and 2.133 in the initial September quarter 1993 (a 1.2 per cent decrease). This represents the third lowest total merchant shipping figure since the crew to berth monitoring began. The two lower ratio totals occurred in the March and June quarters 1998.

Table 10 shows the individual components of the crew to berth ratio for merchant shipping, by crew classification, for the December quarter 1998. Ship time is the largest component of the crew to berth ratio for merchant shipping, and reflects days paid for ship duty (which may include travelling time and days signing on and off). The ship time ratio fell to 1.035 in the December quarter, compared with 1.041 in the September quarter.



**TABLE 10 MERCHANT SHIPPING CREW TO BERTH RATIOS BY ACTIVITY AND CREW CLASSIFICATION, DECEMBER QUARTER 1998<sup>p</sup>**

Crew type	Ship time	Accrued leave	Compensation	Long service leave	Study leave	Training & other	Total <sup>a</sup>
Deck officers	1.062	0.986	0.019	0.035	0.029	0.012	2.142
Engineers	1.054	0.977	0.035	0.036	0.090	0.008	2.200
<b>All officers</b>	<b>1.058</b>	<b>0.981</b>	<b>0.027</b>	<b>0.036</b>	<b>0.060</b>	<b>0.010</b>	<b>2.172</b>
Integrated ratings	1.015	0.951	0.050	0.034	0.000	0.001	2.051
Catering crew	1.017	0.951	0.052	0.034	0.000	0.001	2.054
<b>All ratings</b>	<b>1.016</b>	<b>0.951</b>	<b>0.050</b>	<b>0.034</b>	<b>0.000</b>	<b>0.001</b>	<b>2.052</b>
<b>All crew</b>	<b>1.035</b>	<b>0.965</b>	<b>0.040</b>	<b>0.034</b>	<b>0.028</b>	<b>0.005</b>	<b>2.108</b>
Previous quarter	1.041	0.972	0.052	0.035	0.031	0.006	2.137
Initial level <sup>b</sup>	1.025	0.971	0.073	0.035	0.024	0.006	2.133

*p* preliminary

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

*b.* Initial level for September quarter 1993.

Source Data provided by ship operators.







Accrued leave gives effect to leave with pay for weekends and public holidays worked, annual leave with pay of five weeks per annum, sick leave, compassionate leave and leave in lieu of a 35 hour week. The accrued leave ratio fell to 0.965 in the December quarter, compared with 0.972 in the September quarter.

Other components of the merchant shipping crew to berth ratio were:

- compensation leave, which fell to 0.040, compared with 0.052 in the September quarter (This represents a fall of 45.5 per cent since the initial September quarter 1993 merchant shipping monitoring period.);
- long service leave, which fell to 0.034, compared with 0.035 in the September quarter;
- study leave, which fell to 0.028 compared with 0.031 in the September quarter; and
- training and other paid leave, which fell to 0.005 compared with 0.006 in the September quarter.

### Offshore shipping

Figure 11 presents information on the crew to berth ratio, and its components, for Australian offshore shipping. As the BTE is still auditing the data, the December quarter 1998 offshore shipping data in this issue of Waterline are classified as preliminary. The overall crew to berth ratio for offshore shipping fell to 2.299 in the December quarter 1998, compared with 2.317 in the September quarter 1998 (a 0.8 per cent decrease), and 2.327 in the initial March quarter 1995 (a 1.7 per cent decrease). The December quarter 1998 ratio total is the lowest to date.

Table 11 shows the individual components of the crew to berth ratio for offshore shipping, by crew classification, for the December quarter 1998. Accrued leave is the largest component of the crew to berth ratio for offshore shipping, and comprises paid leave to compensate for work on public holidays, intervals of leave associated with the two crew duty system, annual leave and time spent travelling in off-duty time. The accrued leave ratio for the December quarter fell to 1.153, compared with 1.154 in the September quarter.

Ship time also represents a significant part of the offshore crew to berth ratio and reflects days paid for ship duty (which may include travelling time and days signing on and off). The ship time ratio for the December quarter remained constant at 1.011 when compared with the September quarter.

Other components of the offshore crew to berth ratio were:

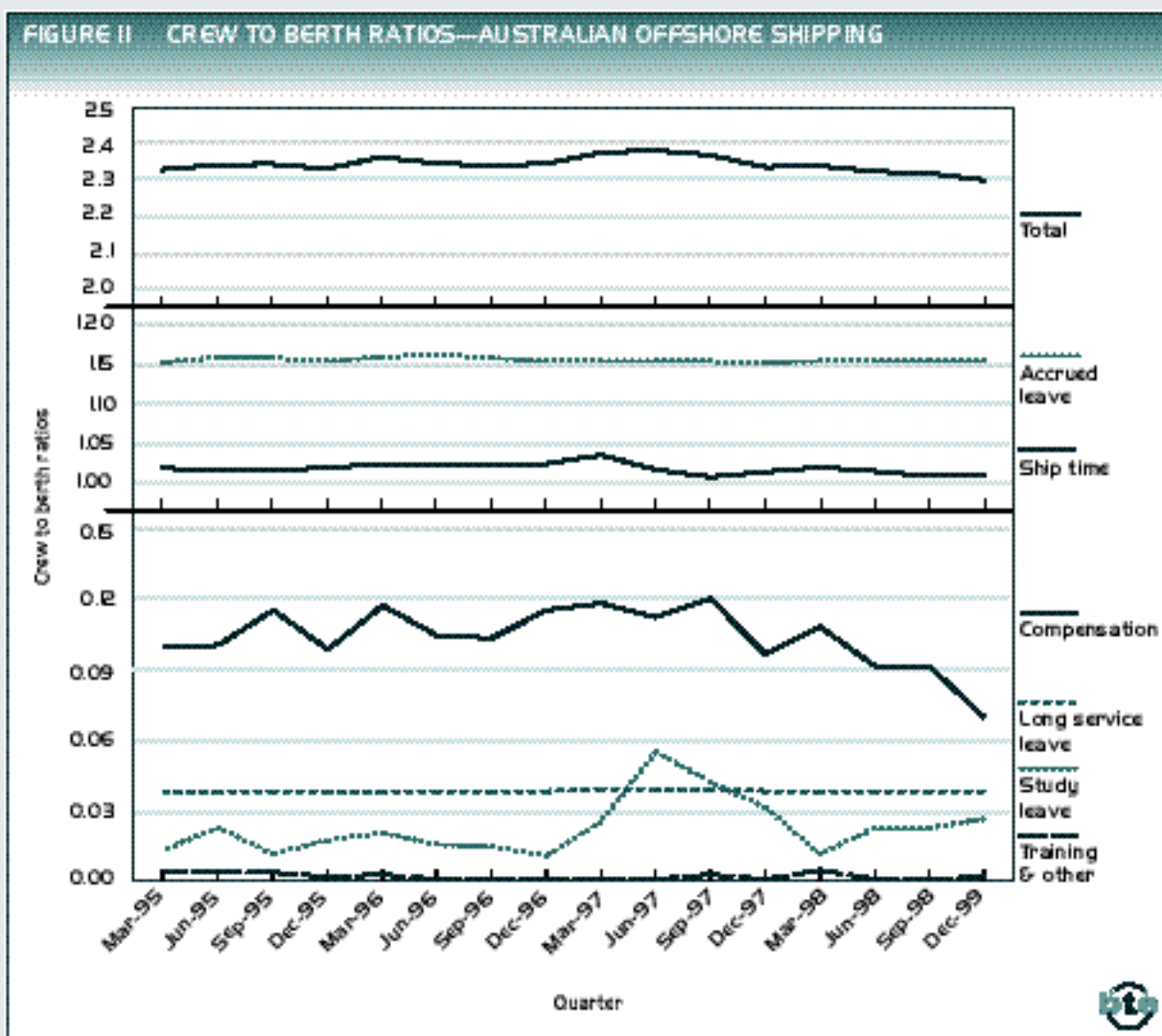
- compensation leave, which fell to 0.070, compared with 0.092 in the September quarter (This represents a fall of 30.7 per cent since the initial March quarter 1995 offshore shipping monitoring period.);
- long service leave, which remained constant at 0.038;
- study leave, which rose to 0.026, compared with 0.022 in the September quarter; and
- training and other leave, which rose to 0.001, compared with 0.000 in the September quarter.

### Erratum

In the December 1998 issue of Waterline (p. 2), the standard shipping container was stated as measuring "20 feet long by 8.5 feet square". This information was incorrect. According to International Standards Organisation (ISO) figures published in Containerisation International Yearbook 1998 (p. 750), the standard length of a 20 foot container is 19 feet 10.5 inches with a standard width of 8 feet. Furthermore, the ISO quotes three standard heights for a 20 foot container; 8 feet 6 inches, 8 feet and less than 8 feet.

While the "8.5 feet square" was an editorial oversight, we wonder how many of our readers are aware that a standard 20 foot container is not quite 20 feet long.





**TABLE II OFFSHORE SHIPPING CREW TO BERTH RATIOS BY ACTIVITY AND CREW CLASSIFICATION, DECEMBER QUARTER 1998<sup>p</sup>**

Crew type	Ship time	Accrued leave	Compensation	Long service leave	Study leave	Training & other	Total <sup>a</sup>
Deck officers	1.009	1.153	0.060	0.038	0.048	0.000	2.308
Engineers	1.010	1.153	0.017	0.037	0.063	0.003	2.283
<b>All officers</b>	<b>1.009</b>	<b>1.153</b>	<b>0.039</b>	<b>0.038</b>	<b>0.055</b>	<b>0.002</b>	<b>2.296</b>
Integrated ratings	1.009	1.153	0.077	0.037	0.000	0.001	2.277
Catering crew	1.027	1.153	0.205	0.040	0.000	0.003	2.427
<b>All ratings</b>	<b>1.012</b>	<b>1.153</b>	<b>0.098</b>	<b>0.038</b>	<b>0.000</b>	<b>0.001</b>	<b>2.302</b>
<b>All crew</b>	<b>1.011</b>	<b>1.153</b>	<b>0.070</b>	<b>0.038</b>	<b>0.026</b>	<b>0.001</b>	<b>2.299</b>
Previous quarter	1.011	1.154	0.092	0.038	0.022	0.000	2.317
Initial level <sup>b</sup>	1.021	1.151	0.100	0.038	0.013	0.003	2.327

*p* preliminary  
*a.* Components may not sum to totals due to rounding.  
*b.* Initial level for March quarter 1995.

Source Data provided by ship operators.





**TABLE 12 CONTAINER TERMINAL PERFORMANCE INDICATORS, SELECTED AUSTRALIAN PORTS—PRODUCTIVITY IN TEUS PER HOUR**

	Dec-95	Mar-96	Jun-96	Sep-96	Dec-96	Mar-97	Jun-97	Sep-97	Dec-97	Mar-98	Jun-98	Sep-98	Dec-98
<b>Five ports</b>													
Ships handled	728	748	827	871	907	865	891	907	963	909	845	1020	942
Total teus	425731	411538	440088	497140	519206	441697	483372	549247	585474	527881	514409	633107	612019
Crane rate	19.2	20.3	21.3	22.3	21.2	22.8	22.8	23.2	23.3	23.5	23.6	24.4	24.2
Elapsed rate	21.7	23.2	22.6	23.6	na	23.1	23.8	26.0	25.8	na	na	na	na
Net rate	25.3	27.1	28.5	29.1	27.2	29.0	29.5	31.0	30.8	29.6	31.3	31.3	34.7
<b>Brisbane</b>													
Ships handled	132	124	133	140	141	156	164	162	177	170	168	192	180
Total teus	46439	39037	51008	66115	62904	47471	65572	73184	71043	58857	74023	87373	84200
Crane rate	18.9	20.0	19.9	20.6	20.6	20.0	20.5	20.2	20.5	21.6	21.6	22.5	20.9
Elapsed rate	21.0	21.5	20.5	20.9	21.1	20.3	20.6	21.2	20.8	19.9	21.5	23.6	24.7
Net rate	24.6	24.4	24.3	25.1	24.9	22.7	23.3	24.0	24.2	23.0	25.4	27.5	28.7
<b>Sydney</b>													
Ships handled	203	206	216	228	249	251	249	243	266	238	219	267	230
Total teus	143746	146038	148230	156344	174982	158323	167705	183978	201535	176496	168234	209619	203042
Crane rate	18.5	19.5	19.9	20.3	19.6	22.3	20.5	23.5	23.5	22.5	21.8	21.6	20.4
Elapsed rate	21.8	23.8	22.1	23.1	na	22.7	23.6	28.0	28.2	25.6	26.1	25.4	24.8
Net rate	25.7	28.0	27.9	29.5	28.9	22.7	23.3	36.1	35.5	33.1	33.9	32.0	32.3
<b>Melbourne</b>													
Ships handled	227	228	262	274	282	230	249	268	281	276	234	309	274
Total teus	173566	162911	170884	203371	202376	162156	177070	208200	223465	207346	185803	242456	219549
Crane rate	19.6	20.5	22.3	24.5	22.4	23.6	23.5	23.6	23.6	24.3	24.3	26.1	27.7
Elapsed rate	22.8	24.4	25.0	26.5	22.1	24.3	25.1	26.0	25.2	25.3	26.8	28.4	31.7
Net rate	26.4	28.3	31.7	32.2	27.2	28.7	29.7	29.9	28.7	28.6	30.7	31.9	39.7
<b>Adelaide</b>													
Ships handled	42	47	63	70	74	69	65	68	66	60	66	63	74
Total teus	17318	15955	18803	20519	23351	21963	20933	25982	25188	22260	27975	25493	32556
Crane rate	21.4	21.5	21.5	22.7	24.0	24.6	26.0	26.1	26.0	27.5	27.7	27.6	28.7
Elapsed rate	26.1	26.6	26.1	26.2	27.7	30.2	35.1	35.2	35.4	36.3	36.5	34.5	36.2
Net rate	26.7	27.2	26.7	26.8	28.3	30.9	36.0	36.2	36.5	37.6	37.8	36.0	37.6
<b>Fremantle</b>													
Ships handled	124	143	153	159	161	159	164	166	173	165	158	189	184
Total teus	44662	47597	51113	50791	55593	51784	52092	57903	64243	62922	58374	68166	72672
Crane rate	19.2	21.2	23.4	20.8	21.5	23.3	22.9	23.1	23.6	24.5	26.7	27.9	25.7
Elapsed rate	15.8	18.3	17.6	16.0	18.6	19.7	19.5	21.0	22.2	na	na	na	na
Net rate	19.8	22.2	23.5	22.6	24.2	25.0	24.0	25.5	28.8	26.4	29.8	30.2	31.7

na not available

- Notes 1. The June quarter 1998 figures do not include data for Patrick covering the 8 April to 7 May 1998 period of the major industrial dispute with the MJUA  
 2. Elapsed rates and net rates from March quarter 1997 onwards are not directly comparable with earlier figures (except at Adelaide) due to changes in a terminal operator's information systems.  
 3. For data back to the December quarter 1989, refer to Waterline 15.

Sources Patrick, P&O Ports and Sea-Land.



## ABBREVIATIONS

AAPMA	Association of Australian Ports and Marine Authorities
ACCC	Australian Competition and Consumer Commission
BTE	Bureau of Transport Economics
GRT	Gross Registered Tonnage
MUA	Maritime Union of Australia
NRT	Net Registered Tonnage
teu	Twenty-foot equivalent unit

## DEFINITIONS

**Elapsed time**—the total time over which the ship is worked, measured from labour aboard to labour ashore.

**Elapsed rate**—the number of containers or teus moved per elapsed hour.

**Net time**—the elapsed time minus the time unable to work the ship due to award shift breaks, ship's fault, weather, awaiting cargo, industrial disputes, closed holidays, or shifts not worked at the ship operator's request.

**Net rate**—the number of containers or teus moved per net hour.

**Crane rate**—the number of containers or teus moved per net crane hour.

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