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tevedoring productivity



Table 1 presents the March quarter 1997 to March quarter 1999 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 March quarter 1999 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.

Overall, national stevedoring productivity, as measured by the five-port average, improved in the March quarter 1999 compared with the December quarter 1998. The March quarter 1999 five-port average rates are the highest achieved to date.

- the five-port average crane rate (productivity per crane while the ship is worked) was 19.9 containers per hour for the March quarter compared with 18.9 in the December quarter;
- the four-port average elapsed rate (productivity per ship based on the time labour is aboard the ship) was 23.1 containers per hour for the March quarter compared with 21.9 in the December quarter. (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); and
- the five-port average net rate (productivity per ship while the ship is worked) was 28.2 containers per hour for the March quarter compared with 26.9 in the December quarter.

The Brisbane average crane rate was 18.3 containers per hour in the March quarter, up from 16.8 in the December quarter. The Brisbane elapsed rate of 21.2 containers per hour and the net rate of 24.7 containers per hour were both up on the December quarter figures. The average proportion of elapsed time not worked remained steady at approximately 14 per cent.

The Sydney average crane rate was 17.7 containers per hour in the March quarter, up from 15.7 in the December quarter. The Sydney elapsed rate of 22.6 containers per hour and the net rate of 29.5 containers per hour were both notably up on the December quarter figures. The average proportion of elapsed time not worked remained steady at approximately 23 per cent.



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The Melbourne average crane rate remained unchanged at 21.5 containers per hour in the March quarter compared with the December quarter. The Melbourne elapsed rate of 23.6 containers per hour and the net rate of 28.8 containers per hour were both down on the December quarter figures. The average proportion of elapsed time not worked decreased from approximately 21 per cent to approximately 18 per cent.

The Adelaide average crane rate remained unchanged at 23.2 containers per hour for the third consecutive quarter. Of Australia's five major container ports, Adelaide continues to retain its productivity edge as the port with the highest average crane rate. The Adelaide elapsed rate of 28.5 containers per hour was down on the December quarter, while the net rate of 30.7 containers per hour was marginally up compared with the previous quarter. The average proportion of elapsed time not worked increased from approximately 4 per cent to approximately 7 per cent, the highest recorded to date for Adelaide.

The Fremantle average crane rate was 21.4 containers per hour in the March quarter, up from 20.7 containers per hour in the December quarter. The P&O Ports elapsed data for March are not available and therefore the elapsed data for Fremantle have not been produced for this quarter. The net rate of 25.6 containers per hour was up very marginally on the December 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 March quarter 1999 five-port average showed ship visits remained unchanged whilst container throughput fell by 6.2 per cent compared with the December quarter. Compared with the March quarter of the previous year the five-port average for container ship visits rose by 3.6 per cent while the five-port average for container throughput rose by 6.3 per cent.

On a port-by-port basis, the March quarter 1999 container exchange at:

- Brisbane was down 9.6 per cent on the December quarter figure, and up 24.4 per cent compared with the March quarter 1998;
- Sydney was down 7.9 per cent on the December quarter figure, and up 3.8 per cent compared with the March quarter 1998;
- Melbourne was down 4.8 per cent on the December quarter figure, and down 2.6 per cent compared with the March quarter 1998;
- Adelaide was down 8.0 per cent on the December quarter 1998 figure, and up 33.4 per cent compared with the March quarter 1998; and
- Fremantle was down 0.8 per cent on the December quarter figure, and up 15.1 per cent compared with the March quarter 1998.

In considering the above figures one should keep in mind that the March quarter is traditionally a lower volume period for container movements in Australia.

Teus per hour

Table 9 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 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 I CONTAINER TERMINAL PERFORMANCE INDICATORS—
PRODUCTIVITY IN CONTAINERS PER HOUR**

Port/indicator	Quarter								
	Mar-97	Jun-97	Sep-97	Dec-97	Mar-98	Jun-98	Sep-98	Dec-98	Mar-99
Five ports									
Ships handled	865	891	907	963	909	845	1020	942	942
Total containers	357848	387277	431853	467122	421769	406938	493502	477744	448224
Crane rate	18.4	18.3	18.3	18.5	18.8	18.7	19.1	18.9	19.9
Elapsed rate	18.6	19.0	20.4	20.5	20.0 ^a	20.7 ^a	20.7 ^a	21.9 ^a	23.1 ^a
Net rate	23.4	23.6	24.3	24.3	23.4	24.7	24.2	26.9	28.2
Elapsed time not worked (per cent)	20.3	19.2	16.2	15.7	14.6 ^a	16.2 ^a	14.5 ^a	18.8 ^a	17.9 ^a
Brisbane									
Ships handled	156	164	162	177	170	168	192	180	176
Total containers	40696	52610	58424	58014	49197	58939	70200	67691	61204
Crane rate	17.3	16.4	16.1	16.8	18.0	17.3	18.2	16.8	18.3
Elapsed rate	17.3	16.6	16.8	16.8	16.4	17.1	18.7	19.6	21.2
Net rate	19.4	18.7	19.1	19.6	19.1	20.2	21.9	22.9	24.7
Elapsed time not worked (per cent)	10.8	11.5	11.7	14.6	13.9	15.4	14.6	14.3	14.4
Sydney									
Ships handled	251	249	243	266	238	219	267	230	221
Total containers	126265	131004	142659	157430	137600	130513	160007	155063	142767
Crane rate	17.7	17.7	18.2	18.4	17.5	16.9	16.5	15.7	17.7
Elapsed rate	18.2	18.5	21.7	21.9	19.9	20.2	19.2	18.9	22.6
Net rate	25.7	25.5	27.9	27.7	25.7	26.2	24.2	24.6	29.5
Elapsed time not worked (per cent)	29.4	27.6	22.4	20.7	22.5	22.9	20.7	23.1	23.5
Melbourne									
Ships handled	230	249	268	281	276	234	309	274	271
Total containers	130459	143708	162591	178302	166284	147122	187696	170056	161894
Crane rate	19.0	19.0	18.6	18.8	19.5	19.2	20.2	21.5	21.5
Elapsed rate	19.5	20.3	20.5	19.9	20.1	21.0	21.8	24.3	23.6
Net rate	23.0	24.0	23.5	22.6	22.7	24.2	24.5	30.7	28.8
Elapsed time not worked (per cent)	15.3	15.4	13.0	11.9	11.6	13.3	11.1	20.7	18.1
Adelaide									
Ships handled	69	65	68	66	60	66	63	74	73
Total containers	17486	16874	20974	20773	18163	23293	21444	26319	24221
Crane rate	19.6	21.0	21.1	21.4	22.5	23.1	23.2	23.2	23.2
Elapsed rate	24.0	28.3	28.4	29.2	29.6	30.4	29.0	29.3	28.5
Net rate	24.6	29.1	29.2	30.1	30.7	31.5	30.3	30.4	30.7
Elapsed time not worked (per cent)	2.4	2.7	2.7	3.0	3.6	3.5	4.3	3.6	7.2
Fremantle									
Ships handled	159	164	166	173	165	158	189	184	201
Total containers	42942	43081	47205	52603	50525	47071	54155	58615	58138
Crane rate	19.4	19.0	18.8	18.9	19.6	21.5	22.2	20.7	21.4
Elapsed rate	16.2	15.9	17.0	18.9	na	na	na	na	na
Net rate	20.6	19.8	20.6	23.2	21.1	23.9	23.8	25.5	25.6
Elapsed time not worked (per cent)	21.5	19.5	17.6	18.4	na	na	na	na	na

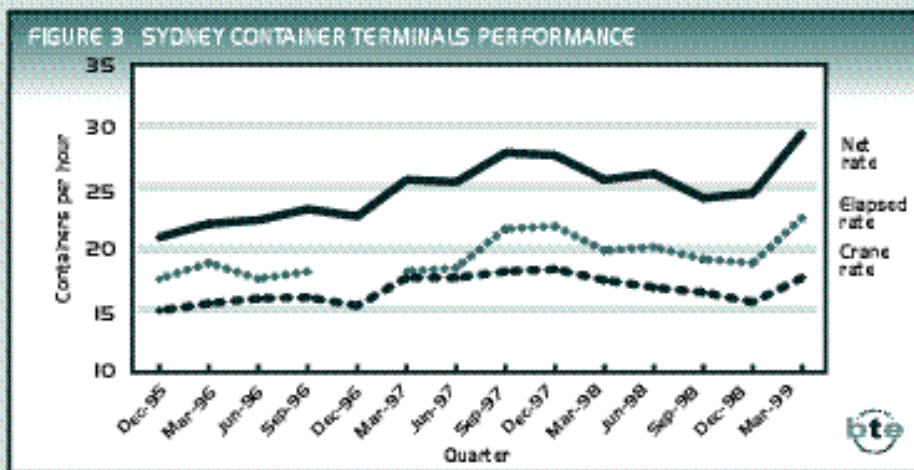
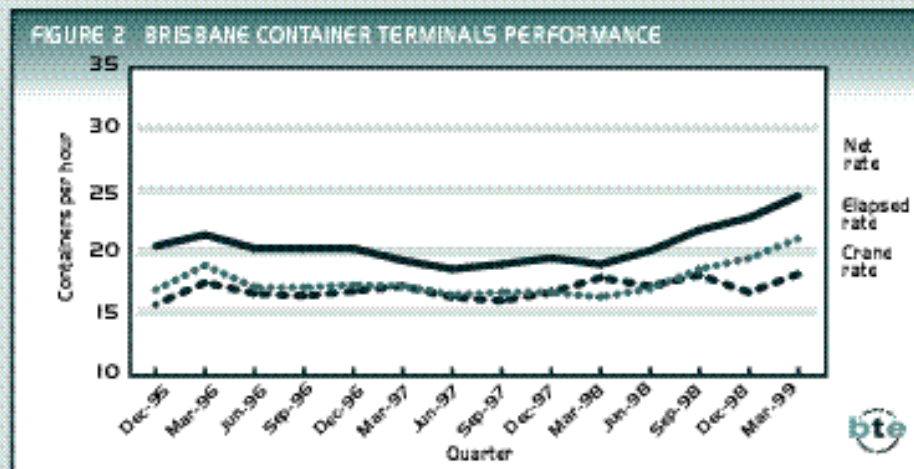
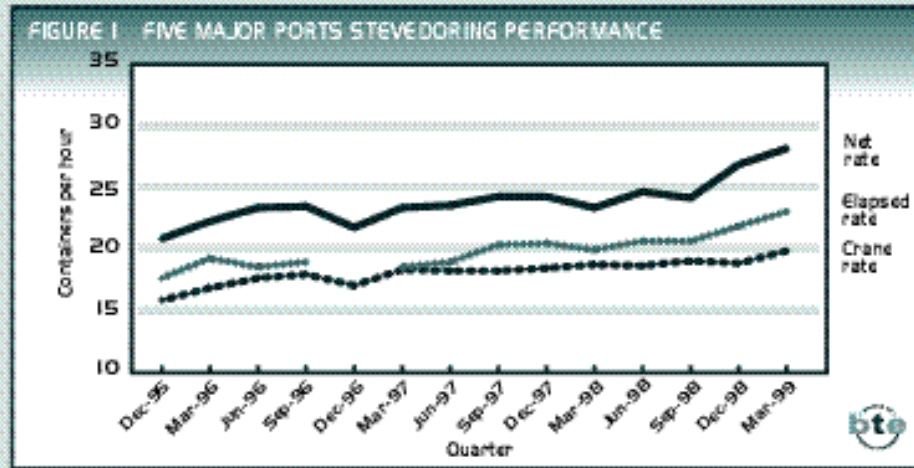
na not available

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 9.
 4. Elapsed time not worked is the difference between the net and elapsed rates as a percentage of the net rate.

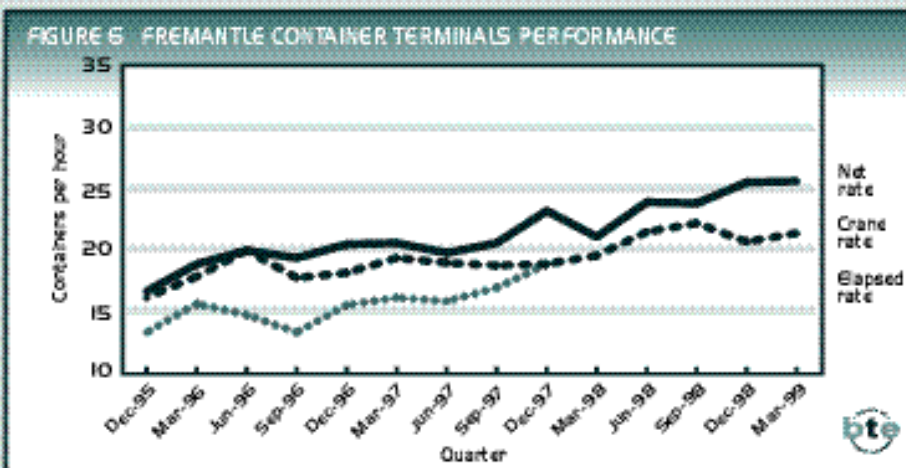
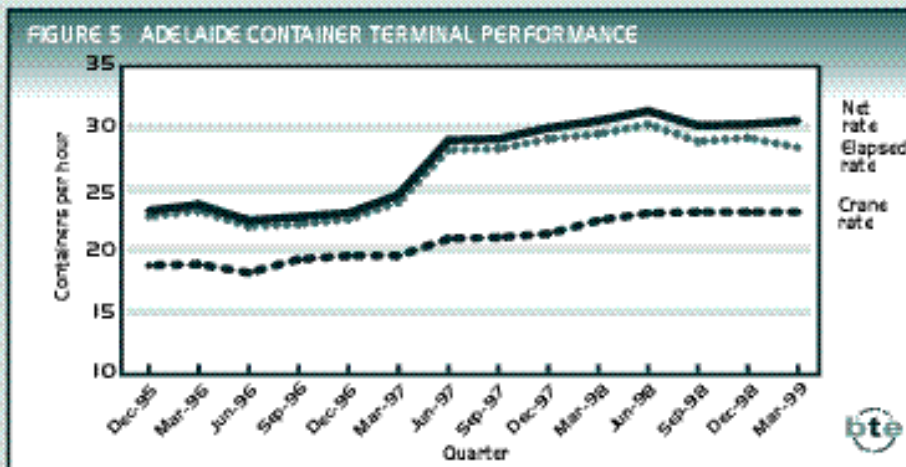
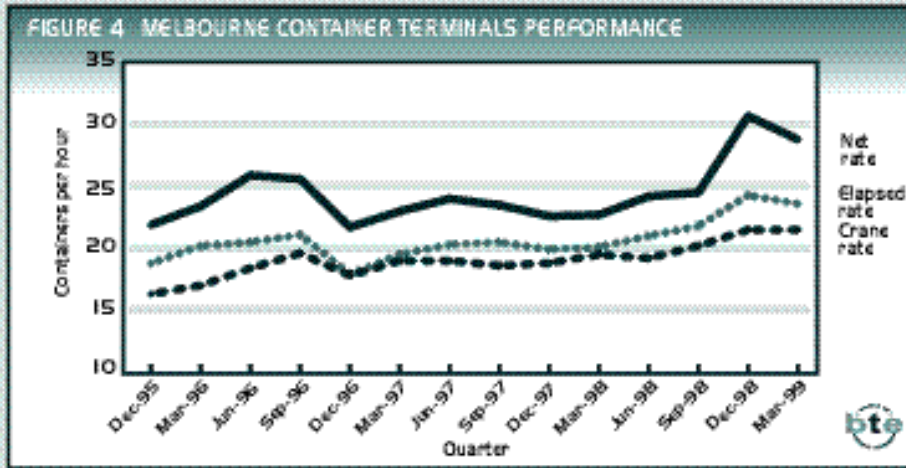
Sources Patrick, P&O Ports and Sea-Land.





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.



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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 March quarter 1999. It indicates the extent to which selected port services were available at the scheduled or confirmed time.

TABLE 2 AVAILABILITY OF BERTH, PILOTAGE AND TOWAGE SERVICES AT THE SCHEDULED/CONFIRMED TIME, MARCH QUARTER 1999

Port/operation	(Number of ship calls)								Total no. of ship calls
	Delay (hrs)								
	0	1	2	3	4	5-10	11-20	>20	
Brisbane									
Berth availability	34	0	0	1	0	0	1	0	36
Pilotage	36	0	0	0	0	0	0	0	36
Towage	36	0	0	0	0	0	0	0	36
Sydney									
Berth availability	63	1	1	0	0	4	2	0	71
Pilotage	70	1	0	0	0	0	0	0	71
Towage	71	0	0	0	0	0	0	0	71
Melbourne									
Berth availability	70	0	1	3	2	4	3	1	84
Pilotage	83	0	1	0	0	0	0	0	84
Towage	83	0	1	0	0	0	0	0	84
Adelaide									
Berth availability	22	0	0	0	0	2	0	0	24
Pilotage	22	2	0	0	0	0	0	0	24
Towage	24	0	0	0	0	0	0	0	24
Fremantle									
Berth availability	49	3	0	0	0	0	1	0	53
Pilotage	53	0	0	0	0	0	0	0	53
Towage	53	0	0	0	0	0	0	0	53
Five ports									
Berth availability	238	4	2	4	2	10	7	1	268
Pilotage	264	3	1	0	0	0	0	0	268
Towage	267	0	1	0	0	0	0	0	268

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.



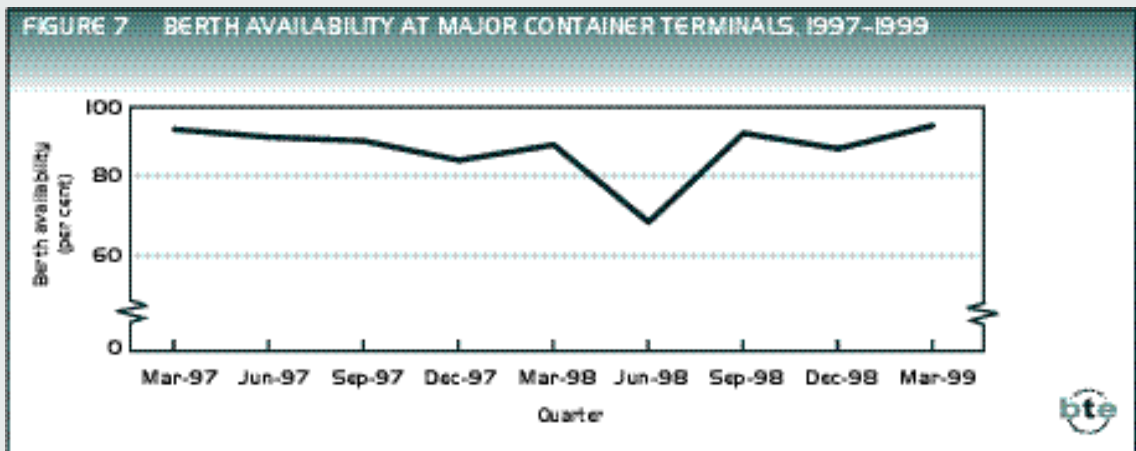
The sample for the March quarter covers 268 ship calls, equivalent to 28 per cent of total ship calls at the major container terminals during the period. The proportion of ship calls covered at individual ports ranges from 20 per cent at Brisbane to 33 per cent at Adelaide. The sample includes calls 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 93 per cent in the March quarter 1999, up from 87 per

cent in the December quarter 1998. Figure 7 provides information on berth availability over the period since the March quarter 1997.

Average waiting time for ships unable to obtain a berth within four hours of the scheduled berthing time was 11 hours in the March quarter 1999. This was down from the figure of 19 hours that was recorded in the previous quarter.

Caution should be used in undertaking inter-port comparisons of the berth availability data in table 2. 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.

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 close to 100 per cent in the March quarter 1999. Performance has been at similar levels since the first data (covering the March quarter 1997) were published in Waterline.

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 March quarter 1999, forty-seven 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 similar to the proportion of 45 per cent that was recorded in the December quarter 1998. The average duration of other waiting time incidents was 7.3 hours per incident in the March quarter 1999, compared with 7.8 hours per incident in the previous quarter.

In the March quarter 1999, around one quarter of the ship calls that incurred other waiting time were affected by two or more incidents. The average number of incidents per affected ship call (1.3) was similar to the average figures in earlier quarters (ranging from 1.3 to 1.4).

Table 3 summarises the data on other waiting time incidents in the March quarter 1999. The shipping lines identified a total of 169 incidents (affecting 127 ship calls) for the sample of ship calls over this period. These incidents reflected both ship-related and waterfront factors.

The total waiting time attributable to particular incident types reflects the number of incidents and the waiting time associated with individual incidents. The data provided by shipping lines indicate that four incident types accounted for around 81 per cent of the total hours attributed to other ship waiting time in the March quarter 1999:

- Early ship arrival (44 per cent);
- Awaiting labour (18 per cent);





- Ship repairs or maintenance (11 per cent);
- Crane breakdown (8 per cent).

The proportion of other ship waiting time attributed to early ship arrival was well above the proportions for this incident type in earlier quarters (ranging from 4 per cent to 23 per cent). The relatively high proportion of early ship arrivals in the March quarter 1999 reflects an increase in the frequency of these incidents and several incidents of long duration.

The March quarter 1999 proportions for several other incident types were well below their peak levels that were recorded during 1998. The major changes included time awaiting labour (peak of 35 per cent), late completion of stevedoring (peak of 24 per cent)

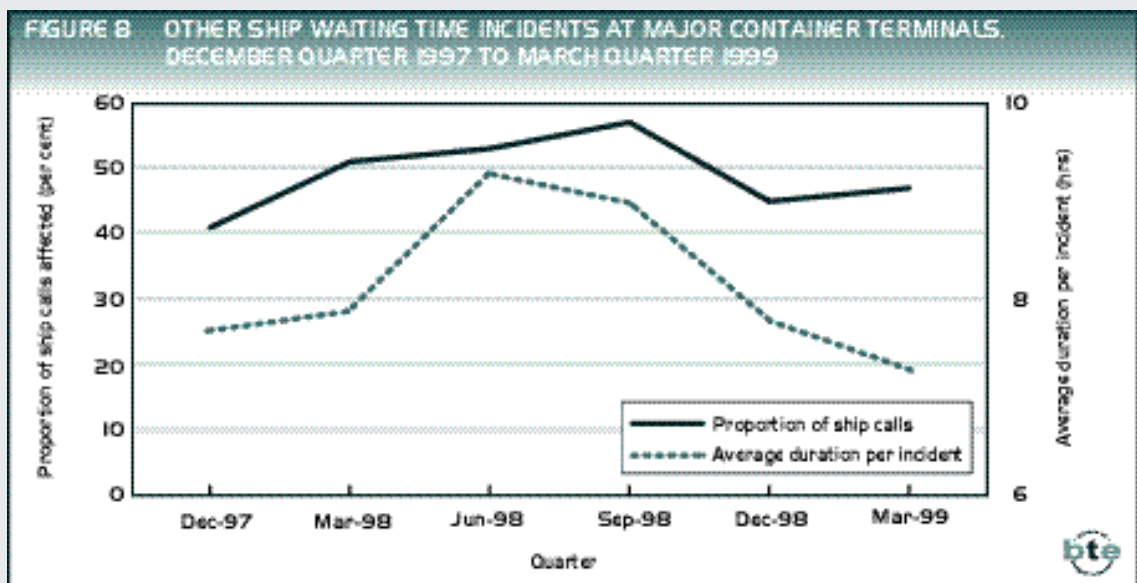
and industrial action (peak of 20 per cent). The total waiting time attributed to these three incident types represented 20 per cent of other ship waiting time in the March quarter 1999.

Figure 8 provides information on other ship waiting time over the period since the December quarter 1997. It indicates that the proportion of ship calls affected and the average duration per incident have recently been below the

TABLE 3 OTHER SHIP WAITING TIME INCIDENTS AT THE FIVE MAINLAND CAPITAL CITY PORTS, MARCH QUARTER 1999

Incident type	(Number of incidents)							Total no. of incidents
	Ship waiting time (hrs)							
	1	2	3	4	5-10	11-20	>20	
Early ship arrival	9	4	9	4	14	6	4	50
Awaiting labour	4	14	2	6	14	1	0	41
Crane breakdown	5	9	4	3	4	0	0	25
Stevedoring finished early	3	7	6	2	2	0	0	20
Pilot/tug booking not at preferred time	3	2	2	0	0	0	0	7
Ship repairs or maintenance	0	1	3	0	2	0	1	7
Weather or tides	0	0	1	2	1	0	0	4
Industrial action	0	0	0	1	1	0	0	2
Stevedoring finished late	0	0	0	0	1	0	0	1
Late ship arrival	0	0	0	0	1	0	0	1
Other	3	6	0	0	0	0	2	11
Total incidents	27	43	27	18	40	7	7	169^a

a. These incidents affected 127 of the 268 ship calls covered in table 2.
Sources Data for a sample of ship calls provided by shipping lines.



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





peak levels that were recorded for these indicators in the June and September quarters 1998.

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.

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 March quarter 1999, the stevedoring rate indicator ranged from 50 per cent to 62 per cent at the three ports for which data are available. Factors that potentially affect this indicator include the mix of ships handled at each port, typical cargo stowage patterns on the ships, and operating practices at the terminals.

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 March quarter 1999, the cargo receipt indicator ranged between 82 per cent and 97 per cent at the three ports for which data are available. There was little or no change in the figures for individual ports compared with the previous quarter.

TABLE 4 STEVEDORING AND SHIP ARRIVAL RELIABILITY INDICATORS, DECEMBER QUARTER 1998 AND MARCH QUARTER 1999

Indicator	(per cent)									
	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	Oct-Dec 1998	Jan-Mar 1999	Oct-Dec 1998	Jan-Mar 1999	Oct-Dec 1998	Jan-Mar 1999	Oct-Dec 1998	Jan-Mar 1999	Oct-Dec 1998	Jan-Mar 1999
Stevedoring										
Stevedoring rate	57	62	60	56	52	50	na	na	na	na
Cargo receipt	90	90	79	82	97	97	na	na	na	na
Ship arrival										
Advice at 24 hrs	57	82	49	55	na	na	63	69	53	64
Advice inside 24 hrs	92	91	94	96	na	na	95	91	90	87
na not available										
Sources AAPMA, Patrick and P&O Ports										



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 55 per cent and 82 per cent in the March quarter 1999. The major change from the previous quarter was a significant increase at Brisbane, reversing the decline reported for this port in the previous quarter.

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 87 per cent and 96 per cent in the March quarter 1999.



COASTAL SHIPPING PERMITS

Part VI of the Navigation Act 1912 provides for licensed vessels to carry passengers and cargo in the coasting trade. The Act does not restrict the class of vessels which may obtain a coasting trade licence. Any ship, regardless of registry, is able to obtain a licence provided the crew are paid Australian wage rates while it is engaged in the coasting trade, the ship is not in receipt of foreign government subsidies, and it has not received such a subsidy in the previous twelve months.

Ships which obtain a licence must also conform to the requirements of the Navigation Act, including specified provisions relating to safety, manning, and crew qualifications, rehabilitation and compensation. Where suitable licensed vessels are not available, the Act also provides for the issue of single or continuing voyage permits to unlicensed vessels, where this is considered to be in the public interest. The application fee for a passenger Single Voyage Permit (SVP) is \$22 and for a cargo SVP is \$200. The application fee for a Continuing Voyage Permit (CVP) is \$400.

The increasing number of permits for coastal trade over the past eight years indicates that shippers' (cargo owners') requirements are not being met by local ship operators. Overall, the tonnage moved under the combination of both SVPs and CVPs for 1998 increased by 360 per cent compared with 1991, and by 40 per cent compared with 1997.

Single voyage permits

Table 5 updates the information published in Waterline 17. It presents data on the number of SVPs issued, and cargo carried, over the period from the March quarter 1991 to March quarter 1999. The number of SVPs issued in the March quarter 1999 fell by 23 per cent compared with the December quarter 1998, while tonnes of cargo carried fell by 15 per cent.

Total SVPs issued in 1998 increased by about 350 per cent compared with the number issued in 1991, and by 5 per cent compared with the number issued in 1997. Tonnes of cargo carried using SVPs also increased by about 350 per cent compared with 1991, and by 34 per cent compared with 1997.

TABLE 5 CARGO CARRIED UNDER SINGLE VOYAGE PERMITS, 1991-1999

Year	Jan-Mar		Apr-Jun		Jul-Sep		Oct-Dec		Total	
	Permits	Tonnes	Permits	Tonnes	Permits	Tonnes	Permits	Tonnes	Permits	Tonnes
1991	44	262 431	26	189 565	34	422 161	61	414 191	165	1 288 348
1992	49	243 049	59	241 373	62	238 017	69	147 514	239	869 953
1993	83	211 430	93	298 769	108	202 252	125	292 664	409	1 005 115
1994	119	412 029	118	498 571	110	899 222	112	970 068	459	2 779 890
1995	116	832 308	90	665 499	91	1 077 022	100	653 940	397	3 228 769
1996	107	575 662	123	930 077	142	1 026 438	146	1 110 332	518	3 642 509
1997	135	661 784	149	1 056 709	196 ^r	1 234 786 ^r	224 ^r	1 319 258 ^r	704	4 272 537
1998	184	1 266 030	184	1 301 204	186	1 584 240	187	1 580 034	741	5 731 508
1999	144	1 336 882								

^r revised

Note From mid-1997, the data have been collected as SVPs issued; prior data were collected as SVPs used. As most SVPs issued are also used, the differences in the data are likely to be insignificant.

Source Maritime Transport Division, Department of Transport and Regional Services.






Over the last three quarters, the number of SVPs issued has declined compared with the respective quarters of the previous year. However, this decline may be a reflection of the substantial increase in CVPs issued since September 1998.

Table 6 shows a breakdown of SVPs by cargo types for the March quarter 1999. Containerised cargo permits continue to be the major component of the total number of permits issued. Over the period 1996–1999 there has been an increase of about 50 per cent in tonnage for each cargo type.

TABLE 6 SINGLE VOYAGE PERMITS ISSUED AND CARGO CARRIED, MARCH QUARTER 1999

Cargo type	Permits	Tonnes
Petroleum products	15	317 300
Crude oil and feedstock	10	444 000
Liquefied gas	5	24 870
Other bulk liquids	5	10 200
Dry bulk	10	399 200
General cargo		
-containerised	94	140 731
-break bulk	5	581
Total	144	1 336 882

Source Maritime Transport Division, Department of Transport and Regional Services.



Continuing Voyage Permits


While CVPs have been available for some time, they were rarely requested or issued. However, between September 1998 and May 1999 twenty-four CVPs were issued. Each CVP covers a six-month period which may otherwise have required some six or seven SVPs. Continuing voyage permits can thus provide efficiencies and cost savings for vessels making multiple visits to Australian ports over short periods. Table 7 shows that, since September 1998, approximately 245 002 tonnes of coastal trade have been moved using CVPs.

TABLE 7 CARGO CARRIED UNDER CONTINUING VOYAGE PERMITS

Year	Jul-Sep		Oct-Dec		Jan-Mar		Apr-Jun ^b		Total	
	Permits	Tonnes	Permits	Tonnes	Permits	Tonnes	Permits	Tonnes	Permits	Tonnes
1998/99	3 ^a	35 820 ^a	12	140 270	4	53 400	5	15 512	24	245 002

a. Data cover September only.
 b. Data cover period to 17 May 1999.

Source Maritime Transport Division, Department of Transport and Regional Services.



More information on SVPs and CVPs can be found on the Department's Internet site at <http://www.dotrs.gov.au/>.





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 worked 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 9 presents information on the crew to berth ratio, and its components, for Australian merchant shipping. As the BTE is still auditing the data, the March quarter 1999 merchant shipping data in this issue of Waterline should be regarded as preliminary. The overall crew to berth ratio for merchant shipping fell to 2.105 in the March quarter 1999, compared with 2.108 in the December quarter, and 2.133 in the September quarter 1993 when monitoring commenced. The ratio for the March quarter (2.105) is one of the lowest total merchant shipping figures since crew to berth monitoring began; lower ratios were reported in the March (2.104) and June (2.102) quarters 1998.

Table 8 shows the individual components of the crew to berth ratio for merchant shipping, by crew classification, for the March quarter 1999. 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 1.034 in the March quarter, compared with 1.035 in the December quarter.

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 rose to 0.969 in the March quarter, compared with 0.965 in the December quarter.

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

- compensation leave, which rose to 0.043, compared with 0.040 in the December quarter, representing a fall of about 41 per cent since merchant shipping monitoring began in the September quarter 1993;
- long service leave, which remained constant at 0.034, compared with the December quarter;
- study leave, which fell to 0.019, compared with 0.028 in the December quarter; and
- training and other paid leave, which remained constant at 0.005, compared with the December quarter.

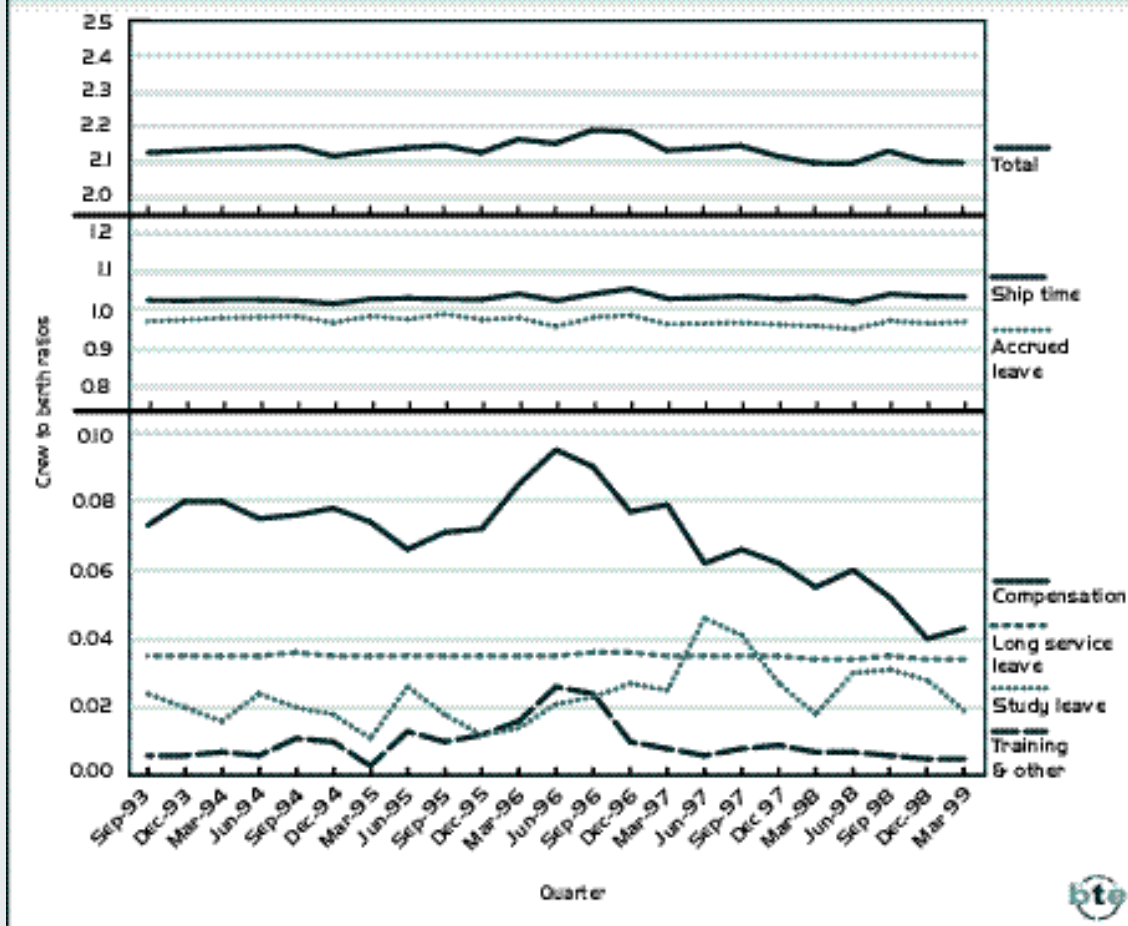
Offshore shipping

Due to an incomplete data set for the March quarter 1999, we have been unable to publish any offshore shipping figures in this edition of Waterline.





FIGURE 9 CREW TO BERTH RATIOS—AUSTRALIAN MERCHANT SHIPPING



Sources Data provided by ship operators.



TABLE 8 MERCHANT SHIPPING CREW TO BERTH RATIOS BY ACTIVITY AND CREW CLASSIFICATION, MARCH QUARTER 1999^p

Crew type	Ship time	Accrued leave	Compensation	Long service leave	Study leave	Training & other	Total ^a
Deck officers	1.050	0.984	0.015	0.035	0.036	0.016	2.136
Engineers	1.037	0.972	0.026	0.035	0.044	0.007	2.121
All officers	1.044	0.978	0.020	0.035	0.040	0.011	2.128
Integrated ratings	1.024	0.960	0.056	0.034	0.000	0.000	2.075
Catering crew	1.027	0.961	0.089	0.035	0.000	0.000	2.112
All ratings	1.025	0.960	0.064	0.034	0.000	0.000	2.084
All crew	1.034	0.969	0.043	0.034	0.019	0.005	2.105
Previous quarter	1.035	0.965	0.040	0.034	0.028	0.005	2.108
Initial level ^b	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. Monitoring commenced in the September quarter 1993.

Source Data provided by ship operators.





ABBREVIATIONS

AAPMA	Association of Australian Ports and Marine Authorities
BTE	Bureau of Transport Economics
CVP	Continuing Voyage Permit
MUA	Maritime Union of Australia
SVP	Single Voyage Permit
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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For further information on BTE publications contact:
 Fran O'Brien, Publications Officer
 email: bte@dotrs.gov.au
 ☎ 02 6274 7210



TABLE 9 CONTAINER TERMINAL PERFORMANCE INDICATORS, SELECTED AUSTRALIAN PORTS—PRODUCTIVITY IN TEUS PER HOUR

	Mar-96	Jun-96	Sep-96	Dec-96	Mar-97	Jun-97	Sep-97	Dec-97	Mar-98	Jun-98	Sep-98	Dec-98	Mar-99
Five ports													
Ships handled	748	827	871	907	865	891	907	963	909	845	1020	942	942
Total teus	411538	440098	497140	519206	441697	483372	549247	585474	527881	514409	633107	612019	573444
Crane rate	20.3	21.3	22.3	21.2	22.8	22.8	23.2	23.3	23.5	23.6	24.4	24.2	25.5
Elapsedrate	23.2	22.6	23.6	na	23.1	23.8	26.0	25.8	na	na	na	na	na
Netrate	27.1	28.5	29.1	27.2	29.0	29.5	31.0	30.8	29.6	31.3	31.3	34.7	36.2
Brisbane													
Ships handled	124	133	140	141	156	164	162	177	170	168	192	180	176
Total teus	39037	51008	66115	62904	47471	65572	73184	71043	58857	74023	87373	84200	75444
Crane rate	20.0	19.9	20.6	20.6	20.0	20.5	20.2	20.5	21.6	21.6	22.5	20.9	22.6
Elapsedrate	21.5	20.5	20.9	21.1	20.3	20.6	21.2	20.8	19.9	21.5	23.6	24.7	26.3
Netrate	24.4	24.3	25.1	24.9	22.7	23.3	24.0	24.2	23.0	25.4	27.5	28.7	30.6
Sydney													
Ships handled	206	216	228	249	251	249	243	266	238	219	267	230	221
Total teus	146038	148290	156344	174982	158323	167705	183978	201535	176466	168234	209619	203042	187287
Crane rate	19.5	19.9	20.3	19.6	22.3	20.5	23.5	23.5	22.5	21.8	21.6	20.4	23.2
Elapsedrate	23.8	22.1	23.1	na	22.7	23.6	28.0	28.2	25.6	26.1	25.4	24.8	29.6
Netrate	28.0	27.9	29.5	28.9	22.7	23.3	36.1	35.5	33.1	33.9	32.0	32.3	38.8
Melbourne													
Ships handled	228	262	274	282	230	249	268	281	276	234	309	274	271
Total teus	162911	170884	203371	202376	162156	177070	208200	223465	207346	185803	242456	219549	206727
Crane rate	20.5	22.3	24.5	22.4	23.6	23.5	23.6	23.6	24.3	24.3	26.1	27.7	27.5
Elapsedrate	24.4	25.0	26.5	22.1	24.3	25.1	26.0	25.2	25.3	26.8	28.4	31.7	30.2
Netrate	28.3	31.7	32.2	27.2	28.7	29.7	29.9	28.7	28.6	30.7	31.9	39.7	36.9
Adelaide													
Ships handled	47	63	70	74	69	65	68	66	60	66	63	74	73
Total teus	15955	18803	20519	23351	21953	20933	25982	25188	22260	27975	25493	32556	31326
Crane rate	21.5	21.5	22.7	24.0	24.6	26.0	26.1	26.0	27.5	27.7	27.6	28.7	30.0
Elapsedrate	26.6	26.1	26.2	27.7	30.2	35.1	35.2	35.4	36.3	36.5	34.5	36.2	36.8
Netrate	27.2	26.7	26.8	28.3	30.9	36.0	36.2	36.5	37.6	37.8	36.0	37.6	39.7
Fremantle													
Ships handled	143	153	159	161	159	164	166	173	165	158	189	184	201
Total teus	47597	51113	50791	56593	51784	52092	57903	64243	62922	58374	68166	72672	72660
Crane rate	21.2	23.4	20.8	21.5	23.3	22.9	23.1	23.6	24.5	26.7	27.9	25.7	26.6
Elapsedrate	18.3	17.6	16.0	18.6	19.7	19.5	21.0	22.2	na	na	na	na	na
Netrate	22.2	23.5	22.6	24.2	25.0	24.0	25.5	28.8	26.4	29.8	30.2	31.7	32.0

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 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. For data back to the December quarter 1989, refer to Waterline '15.

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





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For further information on this publication please contact:

Anthony Carlson at tony.carlson@dotrs.gov.au or tel 02 6274 6628 fax 02 6274 6816, or Gita Curnow at gita.curnow@dotrs.gov.au or tel 02 6274 6067

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