

Table 1 presents the September quarter 1997 to September quarter 1999 indicators of stevedoring productivity at 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 September 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, was down marginally in the September quarter 1999 compared with the peak level of stevedoring productivity attained in the June quarter 1999.

- the five-port average *crane rate* (productivity *per crane* while the ship is worked) was 19.6 containers per hour for the September quarter compared with 20.3 in the June quarter;
- the five-port average *elapsed rate* (productivity *per ship* based on the time labour is aboard the ship) was 23.1 containers per hour for the September quarter compared with 24.0 in the June quarter; and
- the five-port average *net rate* (productivity *per ship* while the ship is worked) was 28.9 containers per hour for the September quarter compared with 29.0 in the June quarter.

Although there was a fall in the crane rate indicator at all ports, the net ship rate indicator rose at Sydney, Adelaide and Fremantle, reflecting higher crane intensities (the number of cranes used per ship).

The marginal fall in stevedoring productivity for the September quarter 1999 mainly reflects the problems encountered at P&O terminals during the recent phasing in of new enterprise agreements, which included a reduction of the workforce in excess of 30 per cent. Over the quarter, the Sea-Land terminal at Adelaide managed to largely maintain its productivity, as did the Patrick terminal at Melbourne. On a more positive note, productivity at Brisbane, Sydney and Fremantle Patrick terminals continued to improve. The new enterprise agreement at the Adelaide Sea-Land terminal was approved in mid-1999, while the agreement covering all Patrick terminals was introduced in September 1998.

The *Brisbane* average crane rate was 18.6 containers per hour in the September quarter, down from 18.9 in the June quarter. The Brisbane elapsed rate of 19.5 containers per hour and the net rate of 24.7 containers per hour were both down on the June quarter figures. The average proportion of elapsed time not worked increased to approximately 21 per cent.

Articles in this issue

• Stevedoring productivity	1
• Coastal shipping permits	6
• Coastal freight in Australia	7
• Crew to berth ratios	10
• Waterfront reliability	14



The *Sydney* average crane rate was 18.0 containers per hour in the September quarter, down from 18.2 in the June quarter. The Sydney elapsed rate of 23.1 containers per hour and the net rate of 29.4 containers per hour were both up on the June quarter figures. The average proportion of elapsed time not worked decreased to approximately 21 per cent.

The *Melbourne* average crane rate was 20.8 containers per hour in the September quarter, down from 21.8 in the June quarter. The Melbourne elapsed rate of 24.5 containers per hour and the net rate of 30.2 containers per hour were both down on the June quarter figures. The average proportion of elapsed time not worked increased to approximately 19 per cent.

The *Adelaide* average crane rate was 23.0 containers per hour in the September quarter, down from 23.1 in the June quarter. The Adelaide elapsed rate of 29.4 containers per hour was down, while the net rate of 31.5 containers per hour was up, on the June quarter figure. The average proportion of elapsed time not worked increased to approximately 7 per cent.

The *Fremantle* average crane rate was 20.7 containers per hour in the September quarter, down from 21.7 containers per hour in the June quarter. The elapsed rate, unavailable the previous six quarters, was 20.4 containers per hour; and the net rate of 28.0 containers per hour was up on the June quarter figure. The average proportion of elapsed time not worked was approximately 27 per cent.

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 September quarter 1999 five-port average showed ship visits increased by 2 per cent, and container throughput increased by 8 per cent, compared with the June quarter. Only at Adelaide and Fremantle did the container throughput fall below the June quarter 1999 figure. Compared with the September quarter of the previous year the five-port average for container ship visits decreased by 4 per cent, while the five-port average for container throughput increased by 3 per cent.

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

- Brisbane was up 10 per cent on the June quarter figure, and up 11 per cent compared with the September quarter 1998;
- Sydney was up 11 per cent on the June quarter figure, and up 7 per cent compared with the September quarter 1998;
- Melbourne was up 9 per cent on the June quarter figure, and down 2 per cent compared with the September quarter 1998;
- Adelaide was down 2 per cent on the June quarter figure, and up 12 per cent compared with the September quarter 1998; and
- Fremantle was down 2 per cent on the June quarter figure, and down 6 per cent compared with the September quarter 1998.

In this issue of *Waterline*, table 1 includes the average of containers exchanged per ship. This activity indicator demonstrates the difference in the stevedoring task for the major ports of Sydney and Melbourne compared with Brisbane, Adelaide and Fremantle.

All else being equal, the higher the exchange per port call, the easier it is to stevedore the ship, as there are fewer re-stows. Consequently, the performance of Adelaide and Fremantle, as measured by the crane rate indicator, could be viewed favourably when compared with Melbourne. On the other hand, the performance of Sydney could be viewed less favourably when compared with Brisbane. However, a higher crane intensity allows Sydney to achieve a net rate higher than Brisbane.


**TABLE 1 CONTAINER TERMINAL PERFORMANCE INDICATORS—
PRODUCTIVITY IN CONTAINERS PER HOUR**

Port / Indicator	Quarter								
	Sep-97	Dec-97	Mar-98	Jun-98	Sep-98	Dec-98	Mar-99	Jun-99	Sep-99
Five ports									
Ships handled	907	963	909	845	1020	942	942	958	979
Total containers	431853	467122	421769	406938	493502	477744	448224	469742	506696
Crane rate	18.3	18.5	18.8	18.7	19.1	18.9	19.9	20.3	19.6
Elapsed rate	20.4	20.5	20.0 ^a	20.7 ^a	20.7 ^a	21.9 ^a	23.1 ^a	24.0 ^a	23.1
Net rate	24.3	24.3	23.4	24.7	24.2	26.9	28.2	29.0	28.9
Brisbane									
Ships handled	162	177	170	168	192	180	176	193	224
Total containers	58424	58014	49197	58939	70200	67691	61204	71008	77914
Containers handled per ship (average)	361	328	289	351	366	376	348	368	348
Crane rate	16.1	16.8	18.0	17.3	18.2	16.8	18.3	18.9	18.6
Elapsed rate	16.8	16.8	16.4	17.1	18.7	19.6	21.2	21.4	19.5
Net rate	19.1	19.6	19.1	20.2	21.9	22.9	24.7	25.9	24.7
Elapsed time not worked (per cent)	12	15	14	15	15	14	14	18	21
Sydney									
Ships handled	243	266	238	219	267	230	221	243	259
Total containers	142659	157430	137600	130513	160007	155063	142767	154062	170684
Containers handled per ship (average)	587	592	578	596	599	674	646	634	659
Crane rate	18.2	18.4	17.5	16.9	16.5	15.7	17.7	18.2	18.0
Elapsed rate	21.7	21.9	19.9	20.2	19.2	18.9	22.6	22.2	23.1
Net rate	27.9	27.7	25.7	26.2	24.2	24.6	29.5	28.7	29.4
Elapsed time not worked (per cent)	22	21	23	23	21	23	24	24	21
Melbourne									
Ships handled	268	281	276	234	309	274	271	282	278
Total containers	162591	178302	166284	147122	187696	170056	161894	167942	183058
Containers handled per ship (average)	607	635	602	629	607	621	597	596	658
Crane rate	18.6	18.8	19.5	19.2	20.2	21.5	21.5	21.8	20.8
Elapsed rate	20.5	19.9	20.1	21.0	21.8	24.3	23.6	25.8	24.5
Net rate	23.5	22.6	22.7	24.2	24.5	30.7	28.8	31.0	30.2
Elapsed time not worked (per cent)	13	12	12	13	11	21	18	17	19
Adelaide									
Ships handled	68	66	60	66	63	74	73	66	62
Total containers	20974	20773	18163	23293	21444	26319	24221	24445	23969
Containers handled per ship (average)	308	315	303	353	340	356	332	370	387
Crane rate	21.1	21.4	22.5	23.1	23.2	23.2	23.2	23.1	23.0
Elapsed rate	28.4	29.2	29.6	30.4	29.0	29.3	28.5	30.0	29.4
Net rate	29.2	30.1	30.7	31.5	30.3	30.4	30.7	31.1	31.5
Elapsed time not worked (per cent)	3	3	4	3	4	4	7	4	7
Fremantle									
Ships handled	166	173	165	158	189	184	201	174	156
Total containers	47205	52603	50525	47071	54155	58615	58138	52285	51071
Containers handled per ship (average)	284	304	306	298	287	319	289	300	327
Crane rate	18.8	18.9	19.6	21.5	22.2	20.7	21.4	21.7	20.7
Elapsed rate	17.0	18.9	na	na	na	na	na	na	20.4
Net rate	20.6	23.2	21.1	23.9	23.8	25.5	25.6	26.6	28.0
Elapsed time not worked (per cent)	18	18	na	na	na	na	na	na	27

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. 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 13.

3. 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.



Teus per hour

Table 13 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.



CONTAINER TERMINALS' PRODUCTIVITY

FIGURE 1 FIVE MAJOR PORTS

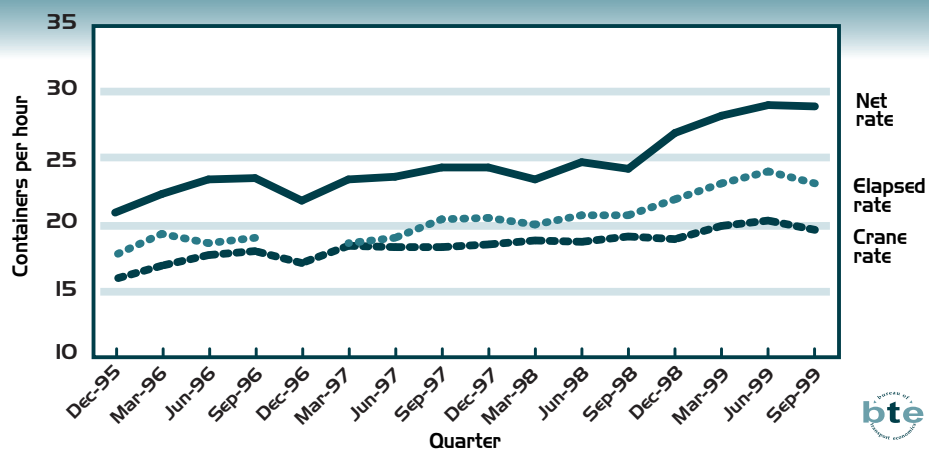


FIGURE 2 BRISBANE

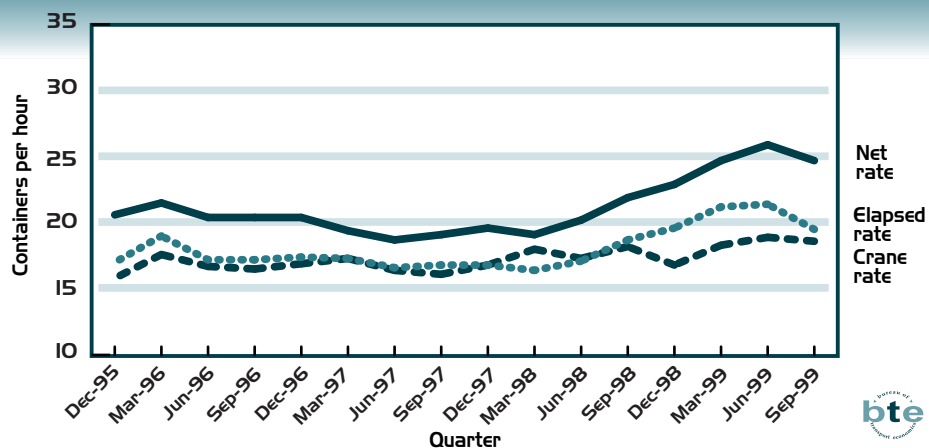
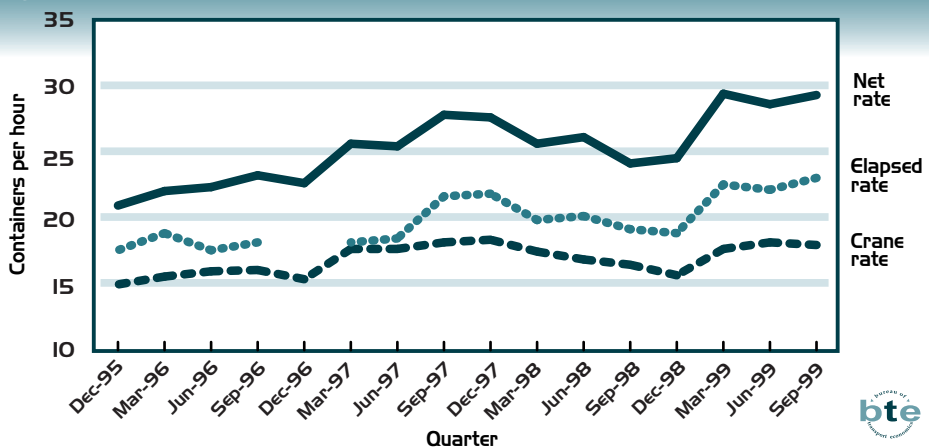


FIGURE 3 SYDNEY



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.



CONTAINER TERMINALS' PRODUCTIVITY

FIGURE 4 MELBOURNE

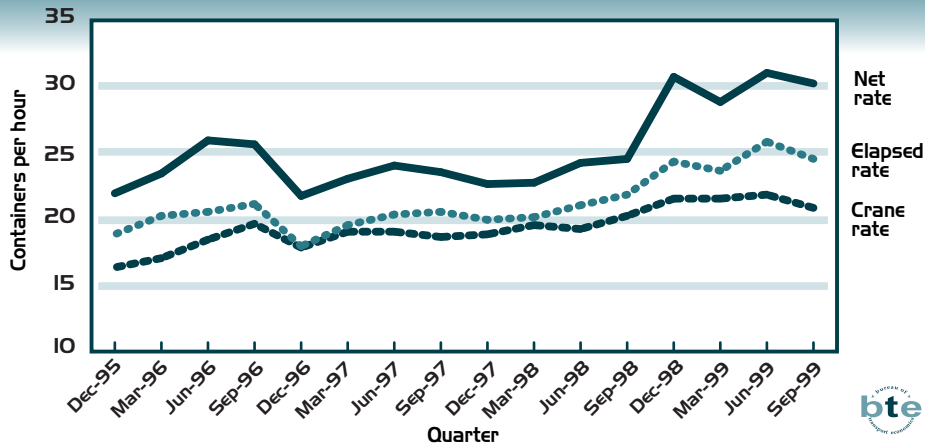


FIGURE 5 ADELAIDE

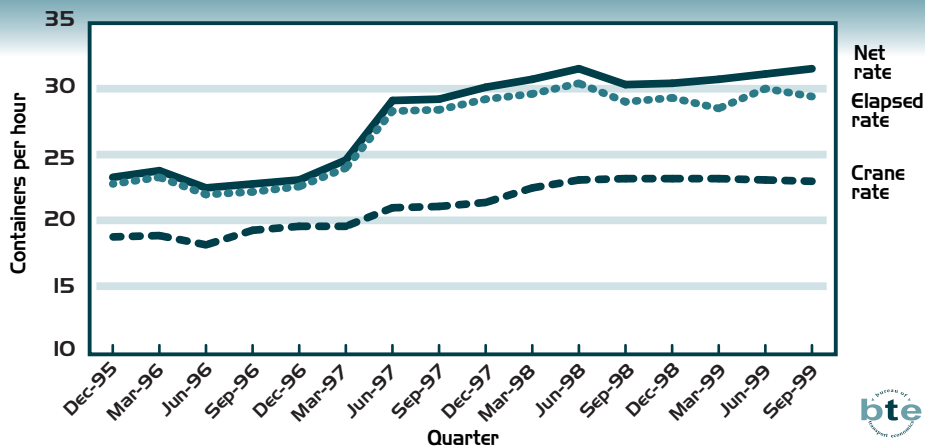
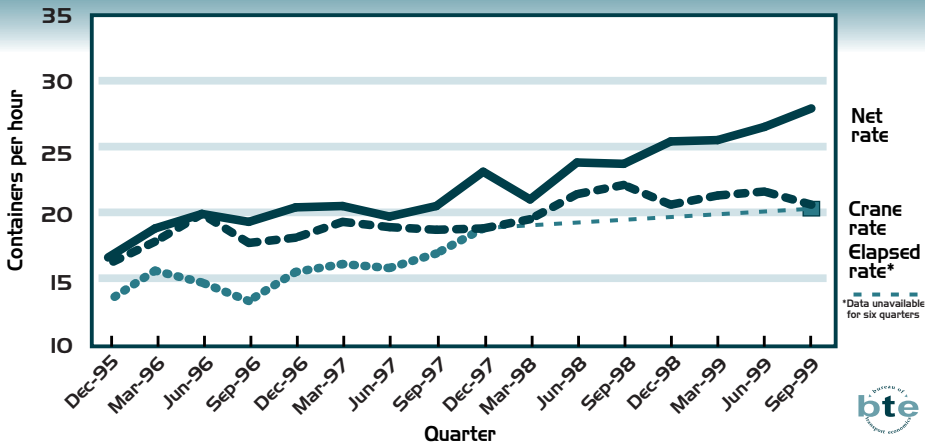


FIGURE 6 FREMANTLE



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.

COASTAL SHIPPING PERMITS

During the financial year 1998/99, the overall tonnage of cargo moved under a combination of single voyage permits (SVPs) and continuing voyage permits (CVPs) increased by 40 per cent (from 5,193,854 to 7,284,303 tonnes) compared with the previous financial year, and by 563 per cent (from 1,098,329 to 7,284,303 tonnes) compared with 1990/91. The increasing amount of coastal trade moved by way of coastal permits over the past eight years clearly reflects both an increase in shippers' (cargo owners') requirements that is not being met by local ship operators, and the reduced administrative burden for foreign ship operators obtaining coastal shipping permits, particularly CVPs. The increased number of permits issued over this period has been especially marked in the bulk trades.

TABLE 2 SINGLE VOYAGE PERMITS ISSUED

Year	September quarter		December quarter		March quarter		June quarter		FINANCIAL YEAR TOTAL	
	Permits	Tonnes	Permits	Tonnes	Permits	Tonnes	Permits	Tonnes	Permits	Tonnes
1990/91	32	195 711	38	450 622	44	262 431	26	189 565	140	1 098 329
1991/92	34	422 161	61	414 191	49	243 049	59	241 373	203	1 320 774
1992/93	62	238 017	69	147 514	83	211 430	93	298 769	307	895 730
1993/94	108	202 252	125	292 664	119	412 029	118	498 571	470	1 405 516
1994/95	110	899 222	112	970 068	116	832 308	90	665 499	428	3 367 097
1995/96	91	1 077 022	100	653 940	107	575 662	123	930 077	421	3 236 701
1996/97	142	1 026 438	146	1 110 332	135	661 784	149	1 056 709	572	3 855 263
1997/98	197	1 307 362	214	1 009 151	184	1 266 030	184	1 301 204	779	4 883 747
1998/99	186	1 584 240	187	1 580 034	144	1 336 882	187	2 381 904	704	6 883 060
1999/00	168	1 799 908								

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 Cross-Modal & Maritime Transport Division of the Department of Transport & Regional Services.

Single voyage permits

Table 2 updates the information published in *Waterline* 19. It presents data on the number of SVPs issued, and tonnes of cargo carried, over the period from the September quarter 1990 to September quarter 1999. The number of SVPs issued in the September quarter 1999 declined by 10 per cent compared with the June quarter 1999, while the associated tonnes of cargo carried declined by 24 per cent.

Total SVPs issued in the 1998/99 financial year declined by about 11 per cent compared with the number issued in 1997/98, but was 403 per cent up on the number issued back in 1990/91. Tonnes of cargo carried using SVPs increased by 33 per cent compared with 1997/98, and was 527 per cent higher than the 1990/91 level of tonnage. The indicators for the past year show that although the

TABLE 3 SUMMARY OF SINGLE VOYAGE PERMITS ISSUED AND CARGO COMMITTED, SEPTEMBER QUARTER 1999

Cargo Category	Permits issued	Tonnes committed
Petroleum Products	18	290 515
Crude Oil & Feedstocks	15	723 000
Liquefied Gas	9	31 120
Other Bulk Liquids	2	5 180
Dry Bulk	28	590 950
General Cargo		
- containerised	86	156 306
- break bulk	10	2 837
Total	168	1 799 908

Source Cross-Modal & Maritime Transport Division of the Department of Transport & Regional Services.

total number of SVPs issued has declined, the associated total tonnage carried has actually increased. The decline in SVPs issued may be a reflection of the marked increase in CVPs issued over the past year.

Table 3 shows a breakdown of SVPs by cargo types for the September quarter 1999. Containerised cargo permits continue to be the major component of the total number of



TABLE 4 CONTINUING VOYAGE PERMITS ISSUED

Year	September quarter		December quarter		March quarter		June quarter		FINANCIAL YEAR TOTAL	
	Permits	Tonnes ^a	Permits	Tonnes ^a	Permits	Tonnes ^a	Permits	Tonnes ^a	Permits	Tonnes ^a
1998/99	3	35 820	12	140 270	4	53 400	22	171 753	41	401 243
1999/00	14	127 011								

a. Tonnes committed to be carried under the permits.

Source Cross-Modal & Maritime Transport Division of the Department of Transport & Regional Services.



permits issued. On the other hand, bulk cargo continues to account for around 90 per cent of total tonnage moved under permit.

Continuing Voyage Permits

While CVPs have been available for some time, they were rarely requested or issued. However, during the 1998/99 financial year, 41 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. From table 4 we can see that, over the past four complete quarters, approximately 492,434 tonnes of coastal trade were moved using CVPs.

General information

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 that may obtain a coasting trade licence. Any ship, regardless of registry, is able to obtain a licence provided the crew is paid Australian wage rates while it is engaged in the coasting trade, and the ship is not in receipt of foreign government subsidies nor received such a subsidy in the previous twelve months.

Ships that obtain a licence must also conform to the requirements of the *Navigation Act 1912*, including: specified safety; manning; and crew qualifications, rehabilitation and compensation provisions. 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 SVP is \$22 and for a cargo SVP is \$200. The application fee for a CVP is \$400.

More information on coastal permits can be found on the Department of Transport and Regional Services' internet site at: <http://www.dotrs.gov.au/>



COASTAL FREIGHT IN AUSTRALIA

The BTE data services team collects coastal shipping data annually from all Australian ports. The data are primarily used to calculate the coastal freight task around Australia. The results of these analyses are published annually as an information paper, the most recent being Information Paper 45, *Coastal Freight in Australia, 1997/98*.

The port data collected are stored in an Access database and are available for future analyses. The BTE took over the collection in 1997 and has published three years of



TABLE 5 AUSTRALIAN COASTAL FREIGHT SUMMARY, 1993/94-1997/98

Year	Loaded (kilotonnes)			Discharged (kilotonnes)		
	Interstate	Intrastate	Total ^a	Interstate	Intrastate	Total ^a
1993/94	30 769	14 505	45 274	31 748	14 228	45 976
1994/95	33 692	15 498	49 190	34 180	16 286	50 466
1995/96	31 982	15 815	47 798	31 808	16 229	48 037
1996/97	32 581	16 562	49 144	32 505	17 530	50 035
1997/98	34 322	18 200	52 522	34 741	18 968	53 710

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

Note Reasons for discrepancies between loaded and discharged tonnages in this and other tables are listed in the 'Statistical issues' section on page 9.

Source Australian port authorities—personal communications.



analyses, 1995/96, 1996/97 and 1997/98. The BTE is presently collecting data for the 1998/99 information paper. It is expected that this paper will be published in May 2000. For further information about these papers and their databases, please contact the BTE data team by email at data.team@dotrs.gov.au or by telephone on 02 6274 6751.

Tables 5 to 7 and the following text is an extract from *Coastal Freight in Australia, 1997/98*.

Scope and coverage

This publication contains details of interstate and intrastate cargo loaded and discharged at Australian ports for the financial year 1997/98. It excludes trade from small craft at isolated locations in northern and western regions of Australia. Cargo loaded or discharged at Christmas Island, the Cocos (Keeling) Islands and Norfolk Island is also excluded.

TABLE 6 COASTAL FREIGHT FLOWS BETWEEN AUSTRALIAN PORTS, 1997/98

Port of origin	Port of destination															Total
	kilotonnes															
	Syd	Rest of NSW	Melb	Rest of Vic	Bris	Rest of Qld	Adel	Rest of SA	Frem	Rest of WA	Hobart	Rest of Tas	Darwin	Rest of NT		
Sydney	0	1 445	44	45	302	40	10	0	74	1	32	284	13	0	2 290	
Rest of NSW	3	1 640	147	1 130	164	212	21	1 103	0	26	16	104	15	0	4 582	
Melbourne	338	18	49	0	129	242	120	63	108	240	158	1 185	70	0	2 719	
Rest of Vic	3 122	38	0	8	1 581	33	61	0	25	0	212	177	0	0	5 259	
Brisbane	175	2	24	14	1	1 820	9	0	23	0	0	18	9	0	2 096	
Rest of Qld	285	1 274	349	128	169	8 549	0	186	28	0	5	51	39	0	11 061	
Adelaide	124	90	710	27	445	0	8	36	9	162	0	0	0	0	1 612	
Rest of SA	421	1 692	775	0	253	0	1 638	0	0	33	138	129	0	0	5 079	
Fremantle	0	30	55	806	162	4	23	0	0	963	10	99	200	0	2 353	
Rest of WA	1 256	6 856	276	362	18	0	1 026	0	1 188	410	0	0	1	0	11 393	
Hobart	0	0	378	0	0	0	0	0	0	0	0	0	0	0	378	
Rest of Tas	352	473	1 853	0	0	0	1	40	48	41	224	23	2	0	3 057	
Darwin	0	1	0	4	0	0	0	0	6	39	11	0	16	0	77	
Rest of NT	0	96	0	0	0	0	29	0	0	0	0	433	9	0	566	
Total ^a	6 076	13 655	4 660	2 524	3 225	10 900	2 947	1 428	1 509	1 915	807	2 503	374	0	52 522	

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

Source Australian port authorities—personal communications.





Sources

Tonnage figures and pack details have been derived from data supplied by port authorities.

To obtain tonne-kilometre figures, a port-to-port distance figure (including pilotage) was applied to individual port tonnages. Where optional routes within Australia could reasonably be used, the shorter distance has been used. The main reference for distances was *The Ports of Australia*, 13th edition, 1993, published by the Australian Chamber of Shipping.

Definitions

Australian Transport Freight Commodity Code Classification (ATFCC)

A systematic classification of commodities transported by sea, air, road, rail and pipeline, developed jointly by the former Commonwealth Department of Transport and the Australian Bureau of Statistics. It has been designed to facilitate standardised classification of goods carried by these modes to, from and within Australia. The ATFCC is aligned with the Standard International Trade Classification (SITC) at divisional (2-digit) level of classification.

Freight

Includes all cargo lifted, including empty containers, but excludes ship stores and bunkers.

tonne-kilometres

The product of tonnes of freight carried between two ports and the sea route distance, including pilotage, between the two ports.

Statistical issues

Statistics provided by port authorities on tonnages loaded and discharged do not always balance. The most common reasons for this lack of consistency are:

- Port authorities record cargo as having been discharged during the month the vessel arrives in port. Similarly, cargo loaded is recorded against the month of the vessel's departure. Consequently, cargo loaded at the end of June and discharged in early July will not be recorded in the same financial year by the two ports. The effect of this may be offset to some degree at the end of the financial year, when the reverse applies.
- A port authority's record of cargo loaded and discharged is based on information provided by the ships' agents. This information could be incorrect because the agent may provide only summary statistics for different types of cargo. The agent may also not know the true origin or destination of particular consignments, and may therefore record the last or next port of call respectively. This particularly applies to liquid and dry bulk commodities, where the cargo originates from, or is destined for, several ports.
- The commodity recorded by the agent may not be classified in the same way at the ports of loading and discharge. For example, gypsum loaded in South Australia is classified as fertiliser at NSW ports, and petroleum products are classified as kerosene in Cairns.

The BTE has endeavoured to reconcile some of these data problems as far as possible, but takes no responsibility for correctness or accuracy. Reconciliation was not attempted for many of the smaller shipments.



TABLE 7 COASTAL FREIGHT LOADED BY PACK TYPE, 1997/98

	State of destination							
	kilotonnes							
State of origin	NSW	Vic	Qld	SA	WA	Tas	NT	Total
Dry bulk								
NSW	2 947	26	250	1 045	9	404	0	4 681
Vic	38	8	21	61	0	13	0	142
Qld	1 526	462	8 621	186	28	56	17	10 895
SA	2 047	600	657	1 606	174	267	0	5 350
WA	6 869	855	4	0	52	2	0	7 782
Tas	814	640	0	40	7	224	0	1 725
NT	96	0	0	0	0	443	13	552
Sub total ^a	14 336	2 591	9 554	2 938	269	1 409	30	31 126
Liquid bulk								
NSW	77	145	376	9	0	14	13	634
Vic	3 440	0	1 913	173	261	611	70	6 468
Qld	173	45	1 868	9	0	18	0	2 113
SA	278	907	40	44	0	0	0	1 269
WA	1 273	636	150	1 045	2 469	73	185	5 830
Tas	0	161	0	0	0	0	0	161
NT	0	4	0	29	0	0	3	36
Sub total ^a	5 241	1 899	4 348	1 309	2 730	715	270	16 512
Container								
NSW	3	96	68	1	67	13	5	252
Vic	37	0	50	9	101	640	0	838
Qld	34	8	21	0	21	0	31	115
WA	2	4	1	5	7	0	0	19
SA	0	6	30	4	31	34	12	119
Tas	9	680	0	1	19	12	0	721
NT	0	0	0	0	1	0	0	1
Sub total ^a	85	794	170	20	246	700	49	2 064
Non bulk								
NSW	61	1 099	23	80	25	6	10	1 304
Vic	1	49	0	1	11	469	0	530
Qld	3	0	29	0	2	0	1	35
SA	1	1	0	28	23	0	0	54
WA	0	1	0	0	10	0	4	15
Tas	3	750	0	0	63	11	2	828
NT	0	0	0	0	44	0	9	54
Sub total ^a	69	1 900	53	108	178	486	25	2 820
Total ^a	19 731	7 183	14 125	4 375	3 424	3 310	374	52 522

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

Source Australian port authorities—personal communications.



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 7 presents information on the crew to berth ratio, and its components, for Australian merchant shipping. As the BTE is still auditing the data, the September quarter 1999 merchant shipping data in this issue of *Waterline* should be regarded as preliminary. The overall crew to berth ratio for merchant shipping increased to 2.103 in the September quarter 1999, compared with 2.089 in the June quarter, but it is lower than the 2.133 figure recorded in the September quarter 1993 when monitoring commenced.

Table 8 shows the individual components of the crew to berth ratio for merchant shipping, by crew classification, for the September 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 rose to 1.034 in the September quarter, compared with 1.026 in the June 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 increased to 0.962 in the September quarter, compared with 0.955 in the June quarter

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

- compensation leave, which fell to 0.036, compared with 0.042 in the June quarter, representing a fall of about 50 per cent compared with the September quarter 1993 figure when merchant shipping monitoring began;
- long service leave, which increased to 0.038, compared with 0.034 in the June quarter;
- study leave, which remained constant at 0.027, compared with the June quarter; and
- training and other paid leave, which increased to 0.005, compared with 0.004 in the June quarter.

Offshore shipping

Figure 8 presents information on the crew to berth ratio, and its components, for Australian offshore shipping. As the BTE is still auditing the data, the September quarter 1999 offshore shipping data in this issue of *Waterline* should be regarded as preliminary. The overall crew to berth ratio for offshore shipping fell to 2.317 in the September quarter 1999, compared with 2.359 in the June quarter, and 2.327 in the March quarter 1995 when monitoring commenced.

Table 9 shows the individual components of the crew to berth ratio for offshore shipping, by crew classification, for the September quarter 1999. 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 September quarter increased to 1.154, compared with 1.153 in the June quarter.

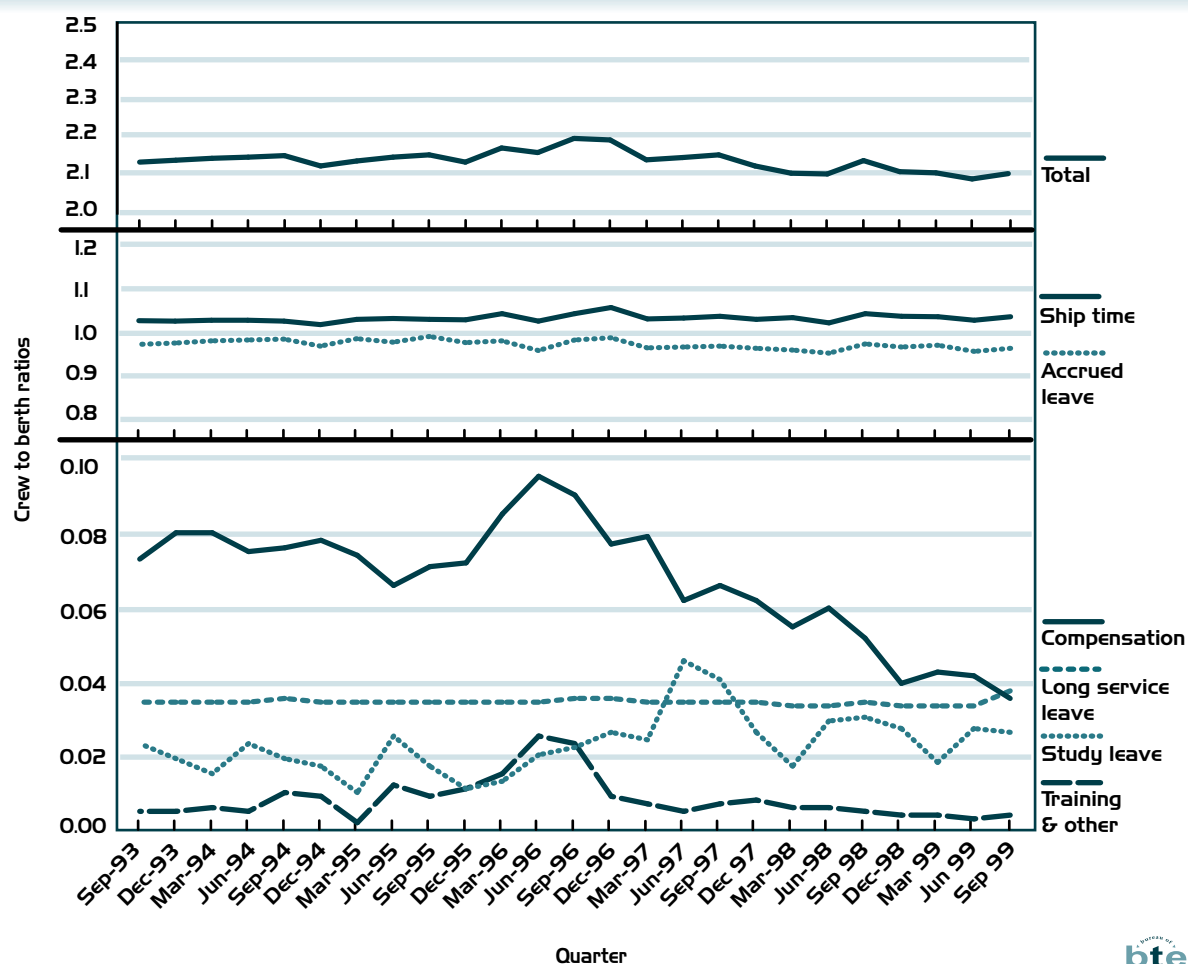
Ship time also represents a significant part of the offshore crew to berth ratio and reflects days paid for ship duty (which may include travelling time and days signing on and off). The ship time ratio remained constant at 1.005 in the September quarter, compared with the June quarter.

Other components of the offshore crew to berth ratio were:

- compensation leave, which fell to 0.083, compared with 0.115 in the June quarter, representing a fall of about 28 per cent compared with the previous quarter and a fall of 17 per cent compared with the March quarter 1995 figure when offshore shipping monitoring began;
- long service leave, which fell to 0.038, compared with 0.039 in the June quarter;
- study leave, which fell to 0.037, compared with 0.040 in the June quarter; and
- training and other leave, which fell to zero, compared with 0.007 in the June quarter.



FIGURE 7 CREW TO BERTH RATIOS—AUSTRALIAN MERCHANT SHIPPING

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

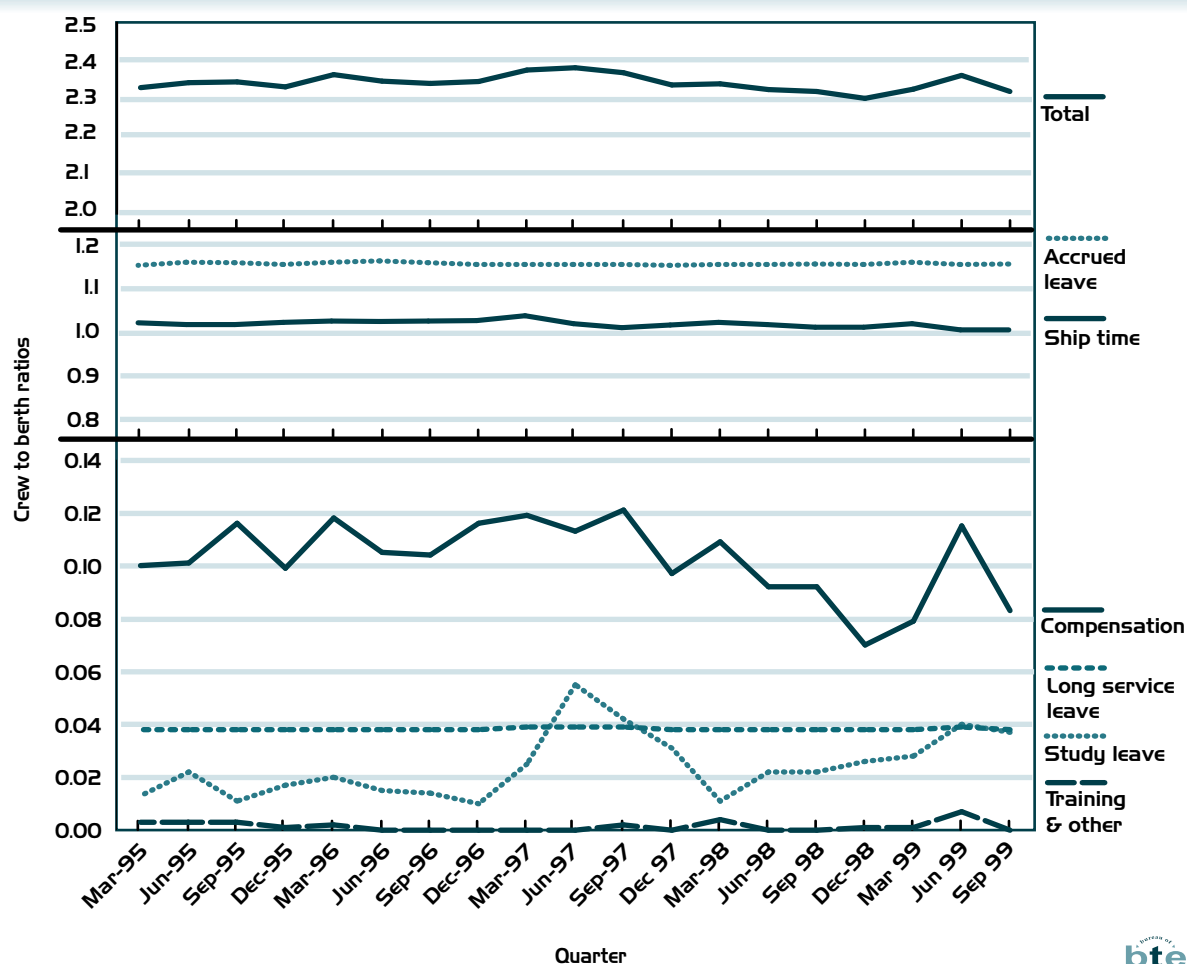
Crew type	Ship time	Accrued leave	Compensation	Long service leave	Study leave	Training & other	Total ^a
Deck officers	1.054	0.978	0.023	0.039	0.056	0.015	2.164
Engineers	1.059	0.981	0.025	0.039	0.051	0.006	2.161
All officers	1.057	0.980	0.024	0.039	0.053	0.010	2.163
Integrated ratings	1.013	0.946	0.042	0.037	0.000	0.000	2.038
Catering crew	1.015	0.947	0.067	0.037	0.008	0.001	2.076
All ratings	1.013	0.946	0.048	0.037	0.002	0.000	2.047
All crew	1.034	0.962	0.036	0.038	0.027	0.005	2.103
Previous quarter	1.026	0.955	0.042	0.034	0.027	0.004	2.089
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 Initial level for September quarter 1993.

Source Data provided by ship operators.



FIGURE 8 CREW TO BERTH RATIOS—AUSTRALIAN OFFSHORE SHIPPING

TABLE 9 OFFSHORE SHIPPING CREW TO BERTH RATIOS BY ACTIVITY AND CREW CLASSIFICATION, SEPTEMBER QUARTER 1999^p

Crew type	Ship time	Accrued leave	Compensation	Long service leave	Study leave	Training & other	Total ^a
Deck officers	1.006	1.153	0.068	0.038	0.032	0.000	2.297
Engineers	1.006	1.154	0.023	0.038	0.097	0.000	2.318
All officers	1.006	1.154	0.043	0.038	0.069	0.000	2.309
Integrated ratings	1.005	1.153	0.174	0.039	0.000	0.000	2.371
Catering crew	1.004	1.154	0.084	0.037	0.000	0.000	2.279
All ratings	1.005	1.154	0.129	0.038	0.000	0.000	2.325
All crew	1.005	1.154	0.083	0.038	0.037	0.000	2.317
Previous quarter	1.005	1.153	0.115	0.039	0.040	0.007	2.359
Initial level ^b	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.





WATERFRONT RELIABILITY

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

This article presents data on reliability in the September quarter 1999. It also includes final indicators for the June quarter 1999, which replace the provisional indicators reported in the previous issue of *Waterline*.

Berth availability, pilotage, towage

Table 10 presents information on berth availability, pilotage and towage for a sample of ship calls in the September quarter 1999. It indicates the extent to which selected port services were available at the scheduled or confirmed time.

TABLE 10 AVAILABILITY OF BERTH, PILOTAGE AND TOWAGE SERVICES AT THE SCHEDULED/CONFIRMED TIME, SEPTEMBER QUARTER 1999

(Number of ship calls)									Total no. of ship calls
Port/operation	Delay (hrs)								
	0	1	2	3	4	5-10	11-20	>20	
Brisbane									
Berth availability	26	0	0	1	0	0	2	0	29
Pilotage	29	0	0	0	0	0	0	0	29
Towage	29	0	0	0	0	0	0	0	29
Sydney									
Berth availability	57	0	1	0	3	1	0	2	64
Pilotage	64	0	0	0	0	0	0	0	64
Towage	64	0	0	0	0	0	0	0	64
Melbourne									
Berth availability	73	1	1	2	1	2	4	5	89
Pilotage	89	0	0	0	0	0	0	0	89
Towage	89	0	0	0	0	0	0	0	89
Adelaide									
Berth availability	15	0	0	1	0	2	0	0	16
Pilotage	16	0	0	0	0	0	0	0	16
Towage	16	0	0	0	0	0	0	0	16
Fremantle									
Berth availability	40	0	0	0	0	0	1	0	41
Pilotage	41	0	0	0	0	0	0	0	41
Towage	41	0	0	0	0	0	0	0	41
Five ports									
Berth availability	211	1	2	4	4	3	7	7	239
Pilotage	239	0	0	0	0	0	0	0	239
Towage	239	0	0	0	0	0	0	0	239

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. Sample sizes for several ports are small.

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



The sample for the September quarter 1999 covers 239 ship calls, equivalent to 24 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 13 per cent at Brisbane to 32 per cent at Melbourne. The relatively low proportion for Brisbane partly reflects the unavailability of September quarter 1999 data from one of the shipping lines that participates in the BTE survey.

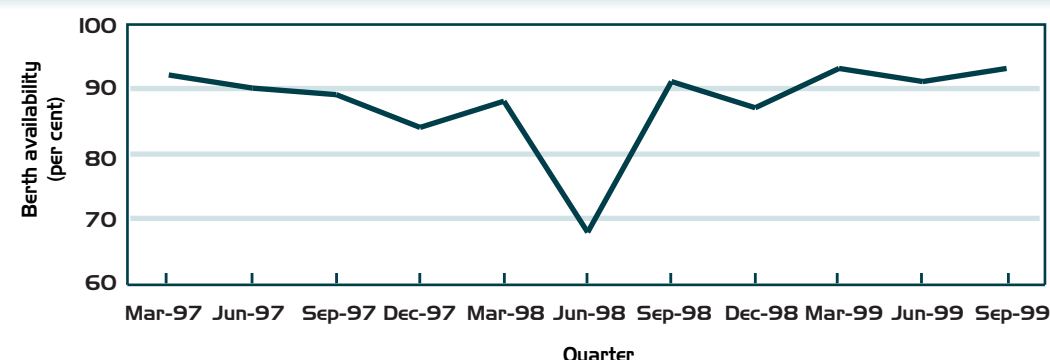
The *berth availability* indicator measures the proportion of ship arrivals where a berth is available within four hours of the scheduled

berthing time. Berth availability for the sample of ship calls was 93 per cent in the September quarter 1999. This was similar to the figure of 91 per cent that was recorded in the June quarter 1999. 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 9 provides information on berth availability over the period since the March quarter 1997.



FIGURE 9 BERTH AVAILABILITY AT MAJOR CONTAINER TERMINALS, MARCH QUARTER 1997 TO SEPTEMBER QUARTER 1999



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

Average waiting time for ships unable to obtain a berth within four hours of the scheduled berthing time was 22 hours in the September quarter 1999. This was up from the figure of 14 hours that was recorded in 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 100 per cent in the September quarter 1999. That is, pilotage and towage services were provided within one hour of the confirmed time in all surveyed cases. Performance has been at similar levels since the first data (covering the March quarter 1997) were published in *Waterline*.

Revised data provided to the BTE have resulted in an amended figure of 100 per cent for the pilotage indicator at Melbourne in the March quarter 1999 and the June quarter 1999.

Other waiting time

The seven shipping lines that supplied information for table 10 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.

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

Incident type	(Number of incidents)							Total no. of incidents
	Ship waiting time (hrs)							
	1	2	3	4	5-10	11-20	>20	
Stevedoring finished early	19	9	6	7	4	0	0	45
Awaiting labour	2	9	5	4	13	7	3	43
Early ship arrival	4	5	7	3	11	5	1	36
Pilot/tug booking not at preferred time	4	5	2	2	0	0	0	13
Crane breakdown	3	3	1	2	1	0	0	10
Weather or tides	4	1	1	1	4	2	0	13
Industrial action	0	0	1	1	4	0	1	7
Late ship arrival	0	1	1	0	0	1	1	4
Ship repairs or maintenance	0	1	0	1	1	0	1	4
Stevedoring finished late	1	0	0	0	0	0	0	1
Other	4	3	2	3	1	3	0	16
Total incidents	41	37	26	24	39	18	7	192 ^a

a. These incidents affected 125 of the 239 ship calls covered in table 10.

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



In the September quarter 1999, 52 per cent of ship calls in the sample were affected by other waiting time incidents that had a duration of at least one hour. The corresponding proportion in the June quarter 1999 was 51 per cent. The average dura-

tion of other waiting time incidents was 8.2 hours per incident in the September quarter 1999, compared with 5.9 hours per incident in the previous quarter.

Table 11 summarises the data on other waiting time incidents in the September quarter 1999. The shipping lines identified a total of 192 incidents (affecting 125 ship calls) for the sample of ship calls over this period. These incidents involved 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 71 per cent of the total hours attributed to other ship waiting time in the September quarter 1999:

- Awaiting stevedoring labour (31 per cent);
- Early ship arrival (22 per cent);
- Completion of stevedoring earlier than forecast (10 per cent);
- Late ship arrival (8 per cent).

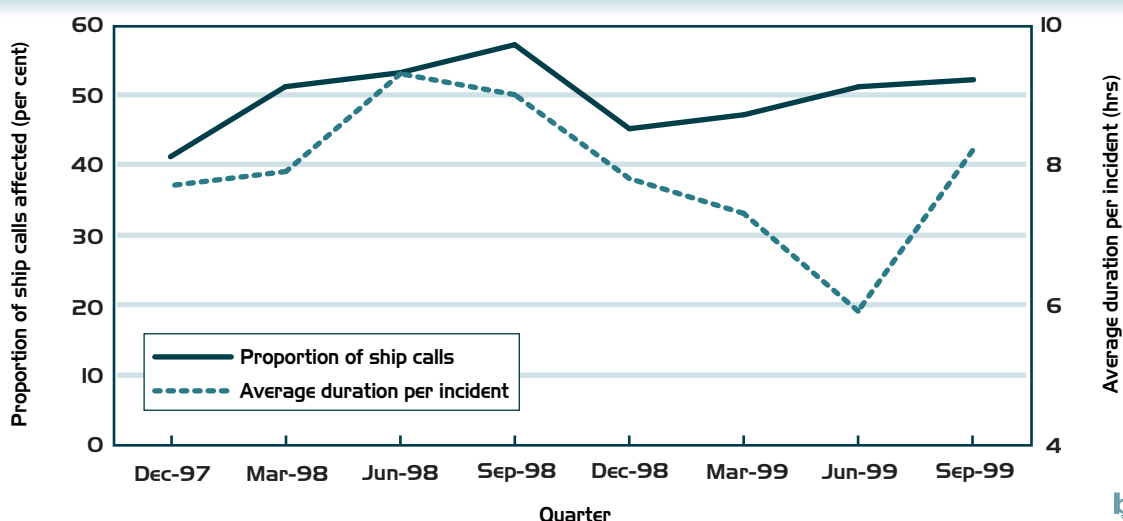
Figure 10 provides information on other ship waiting time over the period since the December quarter 1997. It indicates the proportion of ship calls affected and the average duration per incident in each quarter.

Stevedoring

Table 12 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, and partial data for the September quarter 1999 has been obtained for Melbourne. The BTE expects that September quarter 1999 data for Melbourne will be published in the next issue of *Waterline*.

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

FIGURE 10 OTHER SHIP WAITING TIME INCIDENTS AT MAJOR CONTAINER TERMINALS, DECEMBER QUARTER 1997 TO SEPTEMBER QUARTER 1999



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



crane rate for the ship is within two containers per hour (plus or minus) of the quarterly average crane rate for the terminal. Compared with the previous quarter, the stevedoring rate indicator declined at Brisbane and increased at Sydney.

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. Compared with the previous quarter, the cargo receipt indicator increased at the two ports for which data are available.

Ship arrival

Table 12 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*. Compared with the previous quarter, there were significant declines in this indicator at three ports and little change at the other port.

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 only significant change in the latest period was a large increase at Fremantle, which reversed a significant decline in the previous period.

TABLE 12 STEVEDORING AND SHIP ARRIVAL RELIABILITY INDICATORS, JUNE AND SEPTEMBER QUARTERS 1999

Indicator	(per cent)									
	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	Apr-Jun	Jul-Sep	Apr-Jun	Jul-Sep	Apr-Jun	Jul-Sep	Apr-Jun	Jul-Sep	Apr-Jun	Jul-Sep
Stevedoring										
Stevedoring rate	51	44	42	48	41	a	na	na	na	na
Cargo receipt	84	91	73	77	97	a	na	na	na	na
Ship arrival										
Advice at 24 hrs	70	63	59	53	na	na	76	59	50	52
Advice inside 24 hrs	95	93	96	93	na	na	92	93	75	90

a Data from one terminal operator not available at time of publication.
na not available

Sources AAPMA, Patrick and P&O Ports.

A Farewell and Many Thanks

This is my last issue of *Waterline*. In the New Year, I will be taking up a policy position in the Cross-Modal and Maritime Transport Division of DoTRS. I want to take this opportunity to thank all our data suppliers for their continued support of *Waterline*. It is the willingness of industry stakeholders to provide their data that ensures *Waterline* remains relevant and timely.

Although there are many individuals who have contributed to the success of *Waterline*, I want to say a special thank you to John Hirst (AAPMA), Llew Russell (LSS) and the Hon. Peter Morris (former Member for Shortland). Their encouragement, support and promotion of *Waterline*, particularly in those early days when some saw *Waterline* as yet another ineffectual study, has helped *Waterline* to become an important reference document in the maritime industry.

Of course, the prominence of *Waterline* could not have been achieved without the efforts of my colleagues, Kym Starr and Gita Curnow, and the BTE's publication and design team.

Finally, *Waterline* would never have happened if not for my boss for many years, Neil Gentle. It was Neil who allowed me to pursue the idea of a regular maritime publication, providing great advice and most importantly, championing the cause to ensure management support. For that opportunity, I am very grateful.

Have a safe and happy season, and an efficient and effective New Year.

Anthony Carlson



TABLE 13 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	Jun-99	Sep-99
Five ports															
Ships handled	748	827	871	907	865	891	907	963	909	845	1020	942	942	958	979
Total teus	411 538	440 098	497 140	519 206	441 697	483 372	549 247	585 474	527 881	514 409	633 107	612 019	573 444	602 501	660 593
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	25.9	25.4
Elapsed rate	23.2	22.6	23.6	na	23.1	23.8	26.0	25.8	na	na	na	na	na	na	30.1
Net rate	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	37.3	37.7
Brisbane															
Ships handled	124	133	140	141	156	164	162	177	170	168	192	180	176	193	224
Total teus	39 037	51 008	66 115	62 904	47 471	65 572	73 184	71 043	58 857	74 023	87 373	84 200	75 444	88 311	98 944
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	23.4	23.3
Elapsed rate	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	26.7	24.7
Net rate	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	32.2	31.2
Sydney															
Ships handled	206	216	228	249	251	249	243	266	238	219	267	230	221	243	259
Total teus	146 038	148 290	156 344	174 982	158 323	167 705	183 978	201 535	176 496	168 234	209 619	203 042	187 287	203 536	226 784
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	24.0	23.7
Elapsed rate	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	29.3	30.6
Net rate	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	38.0	38.9
Melbourne															
Ships handled	228	262	274	282	230	249	268	281	276	234	309	274	271	282	278
Total teus	162 911	170 884	203 371	202 376	162 156	177 070	208 200	223 465	207 346	185 803	242 456	219 549	206 727	215 379	241 775
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	28.1	27.4
Elapsed rate	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	33.1	32.4
Net rate	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	39.7	39.9
Adelaide															
Ships handled	47	63	70	74	69	65	68	66	60	66	63	74	73	66	62
Total teus	15 955	18 803	20 519	23 351	21 963	20 933	25 982	25 188	22 260	27 975	25 493	32 556	31 326	29 569	28 271
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	27.9	27.2
Elapsed rate	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	36.3	34.7
Net rate	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	37.6	37.2
Fremantle															
Ships handled	143	153	159	161	159	164	166	173	165	158	189	184	201	174	156
Total teus	47 597	51 113	50 791	55 593	51 784	52 092	57 903	64 243	62 922	58 374	68 166	72 672	72 660	65 706	64 819
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	27.3	26.1
Elapsed rate	18.3	17.6	16.0	18.6	19.7	19.5	21.0	22.2	na	na	na	na	na	na	25.8
Net rate	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	33.4	35.3

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 disputation 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.



ABBREVIATIONS

DEFINITIONS

AAPMA	Association of Australian Ports and Marine Authorities
ATFCC	Australian Transport Freight Commodity Code Classification
BTE	Bureau of Transport Economics
CVP	Continuing Voyage Permit
MUA	Maritime Union of Australia
SITC	Standard International Trade Classification
SVP	Single Voyage Permit
teu	Twenty-foot equivalent unit

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.

Issue number 22 of Waterline is due for release late March 2000



Some recent BTE publications

Information Sheet 14

Urban Transport—Looking Ahead
(1999) Free from BTE

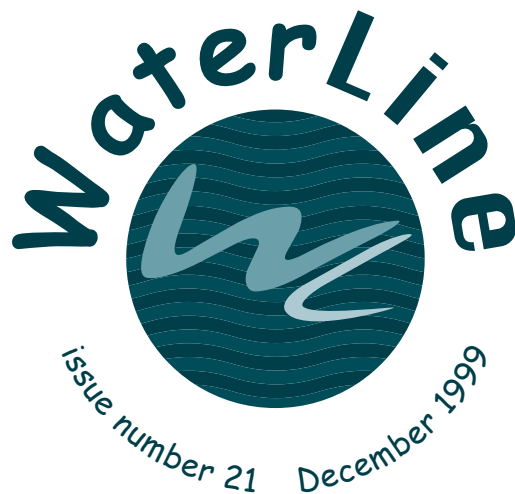
Information Sheet 15

Trends in Trucks and Traffic
(1999) Free from BTE

Working Paper 40

Competitive Neutrality Between Road and Rail
(1999) Free from BTE

Publications available from BTE Information Services. Tel (02) 6274 7210



Greetings of the Season and Best Wishes for the Coming Year

ACKNOWLEDGMENTS

This issue of *Waterline* was compiled by Anthony Carlson and Gita Curnow. The article on coastal freight was prepared by Stephen Wheatstone and Lara Smigielski. The crew to berth data were prepared by Tim Risbey. The reliability article was written by Kym Starr. Desktop publishing by Thomas Smith.

The BTE is particularly grateful for the assistance of the Cross-Modal & Maritime Transport Division of the Department of Transport & Regional Services, the Association of Australian Ports and Marine Authorities, individual port authorities/corporations throughout Australia, shipping lines, ship operators, the Australian Shipowners Association, the Australian Mines & Metals Association, and the stevedoring companies Patrick, P&O Ports and Sea-Land.

For further information on this publication please contact:

Joe Motha at joe.motha@dotrs.gov.au

tel (02) 6274 6800 fax (02) 6274 6816, or

Gita Curnow at gita.curnow@dotrs.gov.au

tel (02) 6274 6067

This publication is available free of charge from the Bureau of Transport Economics, GPO Box 501, Canberra ACT 2601. Australia Tel (02) 6274 7210.

Copies may also be downloaded from our internet site

<http://www.bte.gov.au>

The Bureau of Transport Economics operates within the Commonwealth Department of Transport and Regional Services

ISSN 1324-4043

© Commonwealth of Australia 1999. This work is copyright. Apart from any use as permitted under the *Copyright Act 1968*, no part may be reproduced by any process without prior written permission. Requests and inquiries concerning reproduction and rights should be addressed to the Manager, Legislative Services, AusInfo, GPO Box 84, Canberra ACT 2601.

INDEMNITY STATEMENT: The Bureau of Transport Economics has taken due care in preparing these analyses. However, noting that data used for the analyses have been provided by third parties, the Commonwealth gives no warranty as to the accuracy, reliability, fitness for purpose, or otherwise of the information.

PRINTED BY NATIONAL CAPITAL PRINTING, CANBERRA