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bureau of transport economics

in brief

- The five-port average crane rate was 23.1 containers per hour in the June quarter 2000. This is the highest crane productivity recorded since the series commenced.
- The five-port elapsed labour rate of 30.3 containers per hour, and the ship rate of 37.5 containers per hour, both exceeded the previous quarter's figures.
- Berth availability of 94 per cent in the June quarter equalled the March quarter figure, the highest achieved since the series commenced.
- The removal of the towline charge for towage at Brisbane was the only change to ship-based or cargo-based port interface charges in January–June 2000.
- The introduction of the fuel levy resulted in an increase in road transport charges.
- Compared with 1998/99, the 1999/2000 five-port total container traffic, measured in teus, increased by 14 per cent to 3.14 million teus.

at a glance

graphs

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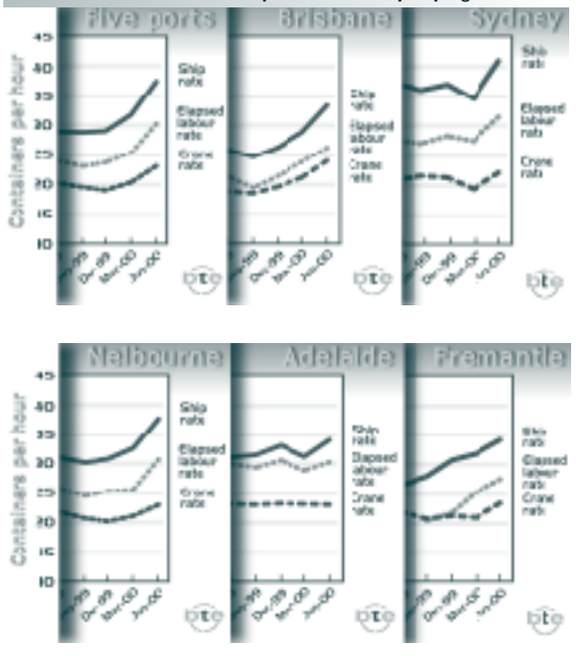
at a glance

tables

Container terminals' productivity—pages 4 & 5



3rd Transport Colloquium

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in this issue

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STEVEDORING PRODUCTIVITY

Table 1 presents the June quarter 1998 to June quarter 2000 indicators of stevedoring productivity at the five major Australian container ports, expressed in *container moves per hour*. Figures 1 to 6 present these data over the December quarter 1995 to June quarter 2000 period. The Brisbane figure is the weighted average for the container terminals operated by P&O Ports, Patrick and Sea-Land. The data for Sydney, Melbourne and Fremantle are weighted averages for the container terminals operated by P&O Ports and Patrick. The Adelaide data is for the Sea-Land container terminal.

Overall, national crane rate productivity in the June quarter 2000, as measured by the five-port average, was higher than in any previous quarter. Additionally, during the June quarter 2000, the elapsed labour rate and the ship rate continued to improve to new highs. Crane intensities (the number of cranes used per ship) also reached new peaks at most terminals during the quarter.

In summary:

- the five-port average *crane rate* (productivity *per crane* while the ship is worked) was 23.1 containers per hour for the June quarter compared with 20.4 in the March quarter 2000;
- the five-port average *elapsed labour rate* (productivity *per ship* based on the time labour is aboard the ship) was 30.3 containers per hour for the June quarter compared with 25.4 in the March quarter 2000; and
- the five-port average *ship rate* (productivity *per ship* while the ship is worked) was 37.5 containers per hour for the June quarter compared with 31.8 in the March quarter 2000.

The average crane rate remained steady at Adelaide and increased for all terminal operators at all other container ports. The notable increase in the five-port crane rate during the June quarter was largely driven by significant increases in productivity by both operators at Sydney and by one operator at Melbourne. P&O Ports container terminal performance continued to improve at each of its terminals during the June quarter, thus greatly assisting the new highs that have been achieved. The increases in productivity rates achieved by Patrick, P&O Ports and Sea-Land Brisbane confirm comments reported in the media and to BTE over the past few months.

Another contribution to the higher figures has been greater consistency in the definitions used by the various stevedoring operators in reporting their performance. When full agreement on definitions has been reached with all container stevedoring operators, the BTE will publish these in *Waterline*. Broadly, stevedoring performance indicators are only calculated on fully cellular container ships; the elapsed labour rate is calculated by subtracting non-operational delays from the time between labour aboard and labour ashore; the ship rate is calculated by subtracting operational delays from the elapsed labour rate; and the crane rate is calculated using the ship rate on a per crane basis.

The *Brisbane* (P&O Ports, Patrick, Sea-Land) average crane rate was 24.0 containers per hour in the June quarter, up from 21.2 in the March quarter. The elapsed labour rate of 26.3 containers per hour and the net ship rate of 33.4 containers per hour were both up on the March quarter figures. The average proportion of elapsed time not worked was approximately 21 per cent.

The *Sydney* (P&O Ports, Patrick) average crane rate was 22.8 containers per hour in the June quarter, up from 18.6 in the March quarter. The Sydney elapsed labour rate of 32.6 containers per hour and the net ship rate of 40.9 containers per hour were both up on the March quarter figures. The average proportion of elapsed time not worked was approximately 20 per cent.

the five-port average crane rate was higher than in any previous quarter

The *Melbourne* (P&O Ports, Patrick) average crane rate was 23.0 containers per hour in the June quarter, up from 21.2 in the March quarter. The Melbourne elapsed labour rate of 30.7 containers per hour and the net ship rate of 37.6 containers per hour were both up on the March quarter figures. The average proportion of elapsed time not worked was approximately 18 per cent.

The *Adelaide* (Sea-Land) average crane rate was 23.0 containers per hour in the June quarter. The Adelaide crane rate has been fairly constant over the past two years. The elapsed labour rate of 30.3 containers per hour and the net ship rate of 34.0 containers per hour were both up on the March quarter figures. The average proportion of elapsed time not worked was approximately 11 per cent.

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

	Quarter								
Port/indicator	Jun-98	Sep-98	Dec-98	Mar-99	Jun-99	Sep-99	Dec-99	Mar-00	Jun-00
Five ports									
Ships handled	845	1020	942	942	958	979	933	875	808
Total containers	406 938	493 502	477 744	448 224	469 742	506 696	557 659	517 533	505 802
Crane rate	18.7	19.1	18.9	19.9	20.3	19.6	19.1	20.4	23.1
Elapsed labour rate	20.7[a]	20.7[a]	21.9[a]	23.1[a]	24.0[a]	23.1	23.7	25.4	30.3
Ship rate	24.7	24.2	26.9	28.2	29.0	28.9	29.1	31.8	37.5
Brisbane									
Ships handled	168	192	180	176	193	224	232	219	178
Total containers	58 939	70 200	67 691	61 204	71 008	77 914	84 354	77 992	71 679
Crane rate	17.3	18.2	16.8	18.3	18.9	18.6	19.7	21.2	24.0
Elapsed labour rate	17.1	18.7	19.6	21.2	21.4	19.5	21.5	23.8	26.3
Ship rate	20.2	21.9	22.9	24.7	25.9	24.7	26.4	28.9	33.4
Elapsed time not worked (per cent)	15	15	14	14	18	21	19	18	21
Sydney									
Ships handled	219	267	230	221	243	259	244	221	218
Total containers	130 513	160 007	155 063	142 767	154 062	170 684	195 544	171 164	166 212
Crane rate	16.9	16.5	15.7	17.7	18.2	18.0	16.6	18.6	22.8
Elapsed labour rate	20.2	19.2	18.9	22.6	22.2	23.1	22.5	25.4	32.6
Ship rate	26.2	24.2	24.6	29.5	28.7	29.4	27.6	32.2	40.9
Elapsed time not worked (per cent)	23	21	23	24	23	21	18	21	20
Melbourne									
Ships handled	234	309	274	271	282	278	266	247	217
Total containers	147 122	187 696	170 056	161 894	167 942	183 058	195 723	184 710	178 156
Crane rate	19.2	20.2	21.5	21.5	21.8	20.8	20.3	21.2	23.0
Elapsed labour rate	21.0	21.8	24.3	23.6	25.8	24.5	25.4	25.7	30.7
Ship rate	24.2	24.5	30.7	28.8	31.0	30.2	30.8	32.6	37.6
Elapsed time not worked (per cent)	13	11	21	18	17	19	17	21	18
Adelaide									
Ships handled	66	63	74	73	66	62	62	56	56
Total containers	23 293	21 444	26 319	24 221	24 445	23 969	26 090	21 803	25 245
Crane rate	23.1	23.2	23.2	23.2	23.1	23.0	23.2	23.1	23.0
Elapsed labour rate	30.4	29.0	29.3	28.5	30.0	29.4	30.6	28.9	30.3
Ship rate	31.5	30.3	30.4	30.7	31.1	31.5	33.1	31.2	34.0
Elapsed time not worked (per cent)	3	4	4	7	4	7	7	7	11
Fremantle									
Ships handled	158	189	184	201	174	156	129	132	139
Total containers	47 071	54 155	58 615	58 138	52 285	51 071	55 948	61 864	64 510
Crane rate	21.5	22.2	20.7	21.4	21.7	20.7	21.2	20.9	23.3
Elapsed labour rate	na	na	na	na	na	20.4	21.7	25.3	27.5
Ship rate	23.9	23.8	25.5	25.6	26.6	28.0	30.7	31.8	34.1
Elapsed time not worked (per cent)	na	na	na	na	na	27	29	21	19

na not available

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

Notes 1. Data from the Sea-Land terminal at Brisbane are incorporated from the December quarter 1999 onwards.

2. The data in this table are expressed in containers (ie. lifts or moves) per hour and therefore are not directly comparable with the teus per hour data in table 10.

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

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

CONTAINER TERMINAL PRODUCTIVITY

FIGURE 1 FIVE MAJOR PORTS

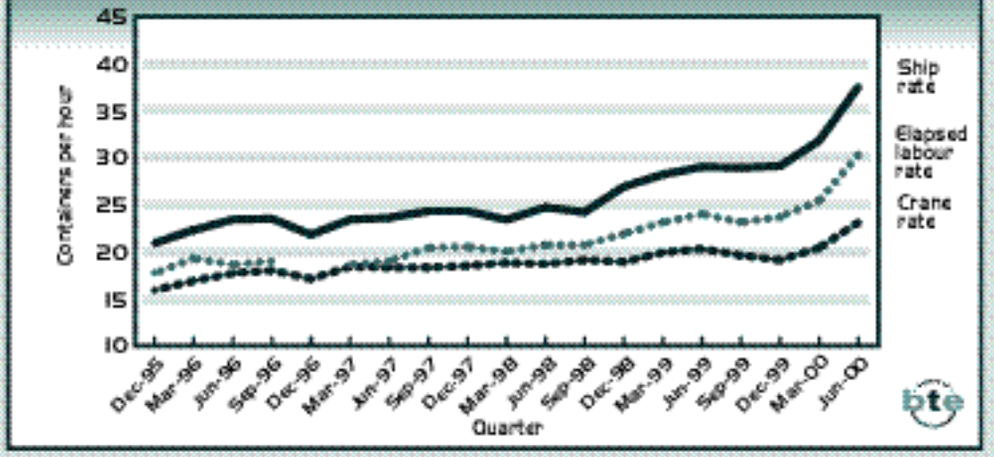


FIGURE 2 BRISBANE

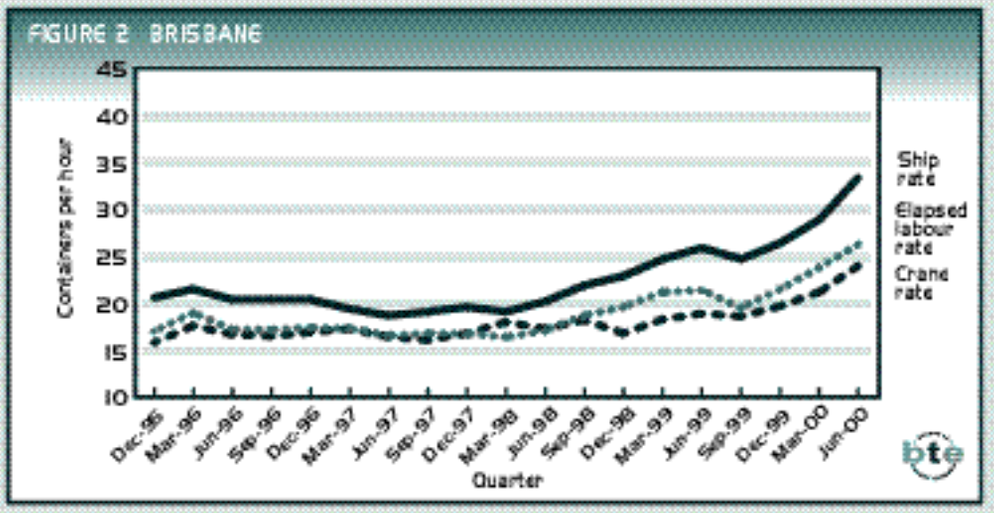
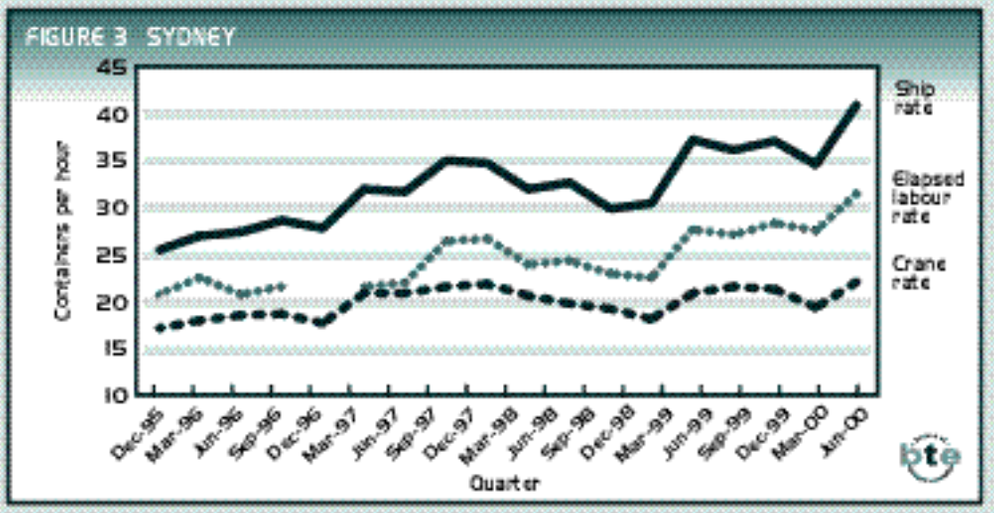


FIGURE 3 SYDNEY



Note These figures are based on the data contained in table 1. Readers should refer to the notes in that table.

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

CONTAINER TERMINAL PRODUCTIVITY

FIGURE 4 MELBOURNE

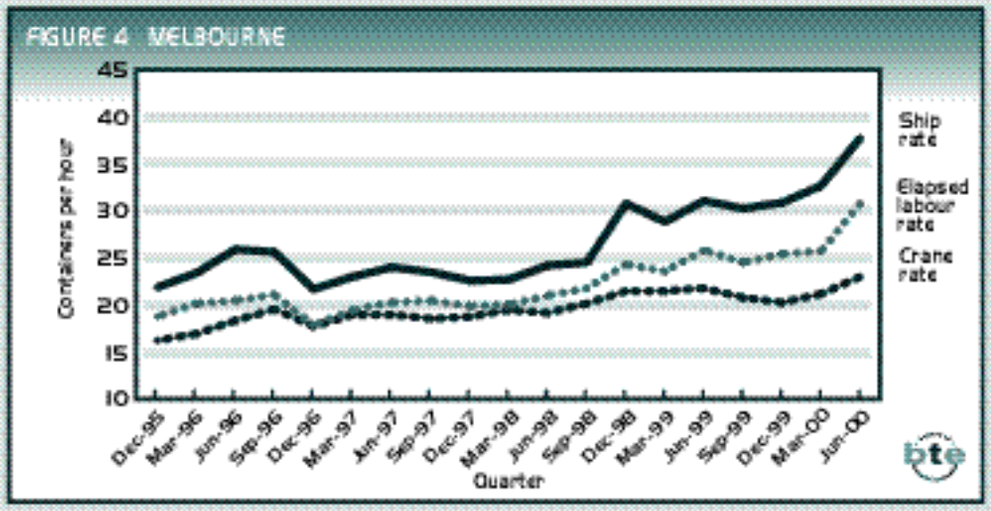


FIGURE 5 ADELAIDE

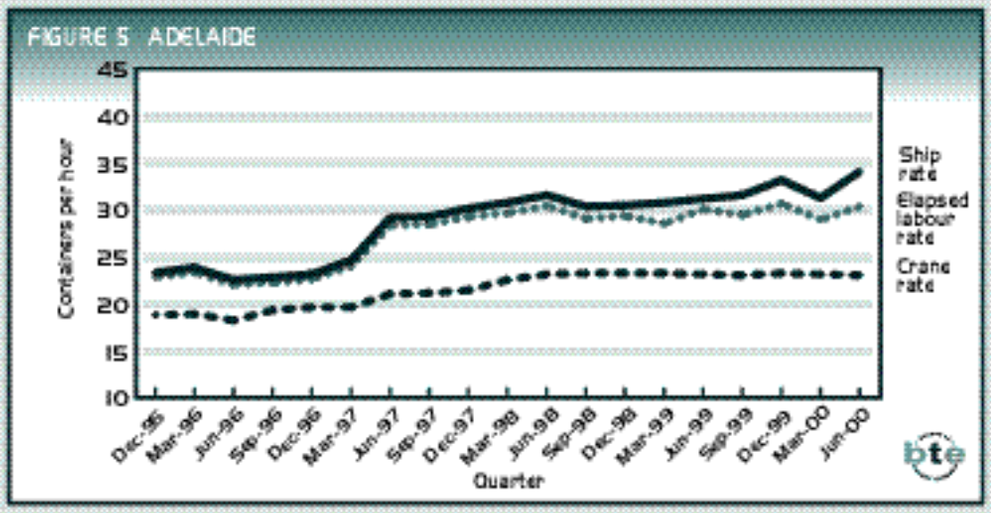
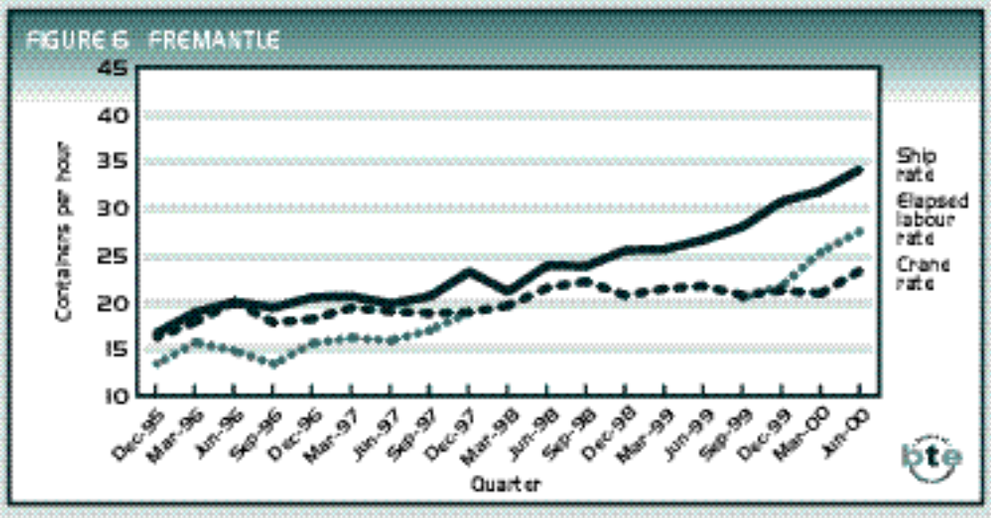


FIGURE 6 FREMANTLE



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.

The *Fremantle* (P&O Ports, Patrick) average crane rate was 23.3 containers per hour in the June quarter, up from 20.9 containers per hour in the March quarter. The elapsed labour rate of 27.5 containers per hour and the net ship rate of 34.1 containers per hour were both up on the March quarter figure. The average proportion of elapsed time not worked was approximately 19 per cent.

Teus per hour

Table 10 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 one 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.

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.

Berth availability, pilotage, towage

Table 2 presents information on berth availability, pilotage and towage for a sample of ship calls in the June quarter 2000. 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, JUNE QUARTER 2000

(Number of ship calls)

Port/operation	Delay (hrs) 0	1	2	3	4	5–10	11–20	>20	Total no. of ship calls
Brisbane									
Berth availability	39	0	0	1	1	1	1	0	43
Pilotage	43	0	0	0	0	0	0	0	43
Towage	43	0	0	0	0	0	0	0	43
Sydney									
Berth availability	78	1	0	0	0	0	0	0	79
Pilotage	79	0	0	0	0	0	0	0	79
Towage	79	0	0	0	0	0	0	0	79
Melbourne									
Berth availability	75	0	3	0	0	3	5	3	89
Pilotage	89	0	0	0	0	0	0	0	89
Towage	89	0	0	0	0	0	0	0	89
Adelaide									
Berth availability	24	0	0	0	0	1	0	0	25
Pilotage	25	0	0	0	0	0	0	0	25
Towage	25	0	0	0	0	0	0	0	25
Fremantle									
Berth availability	37	0	0	0	0	2	1	0	40
Pilotage	40	0	0	0	0	0	0	0	40
Towage	40	0	0	0	0	0	0	0	40
Five ports									
Berth availability	253	1	3	1	1	7	7	3	276
Pilotage	276	0	0	0	0	0	0	0	276
Towage	276	0	0	0	0	0	0	0	276

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 June quarter 2000 covers 276 ship calls, equivalent to around 34 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 24 per cent at Brisbane to 45 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 94 per cent in the June quarter 2000. This was the same as the figure that was recorded in the previous quarter. 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.

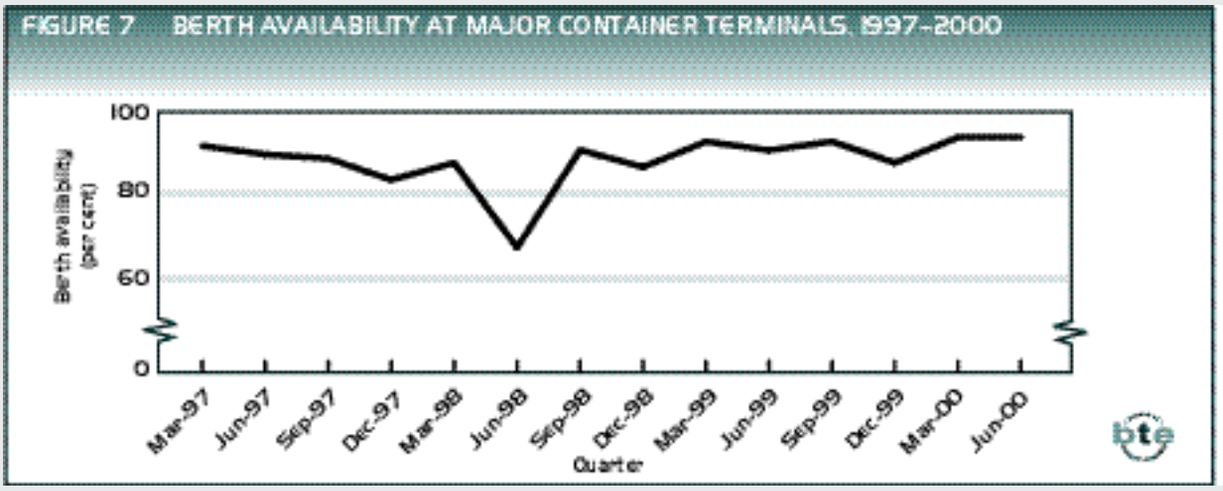
Figure 7 provides information on berth availability since the March quarter 1997. The figure of 94 per cent recorded in the March and June quarters 2000 was the highest level for the berth availability indicator since the series commenced.

Berth availability was 94 per cent

Average waiting time for ships unable to obtain a berth within four hours of the scheduled berthing time was 13 hours in the June quarter 2000. This was down from the figure of 16 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 proportion was 100 per cent for each indicator in the June quarter 2000. Performance has been at similar levels since the first data (covering the March quarter 1997) were published in *Waterline*.

FIGURE 7 BERTH AVAILABILITY AT MAJOR CONTAINER TERMINALS, 1997–2000



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

Other waiting time

The five 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.

47 per cent of **ship calls** were affected by *other waiting time incidents* that had a **duration** of at least one hour

Table 3 summarises the data on other waiting time incidents, which had a duration of at least one hour, in the June quarter 2000. The shipping lines identified a total of 179 incidents (affecting 130 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 largest single source of other ship waiting time in the June quarter 2000 was the category of awaiting stevedoring labour, which accounted for 31 per cent of total waiting time.

In the June quarter 2000, 47 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 March quarter 2000 was 51 per cent. The average duration of other waiting time was 7 hours per affected ship call in the June quarter 2000, down slightly from 8 hours per affected ship call in the previous quarter.

TABLE 3 OTHER SHIP WAITING TIME INCIDENTS AT THE FIVE MAINLAND CAPITAL CITY PORTS, JUNE QUARTER 2000

(Number of incidents)

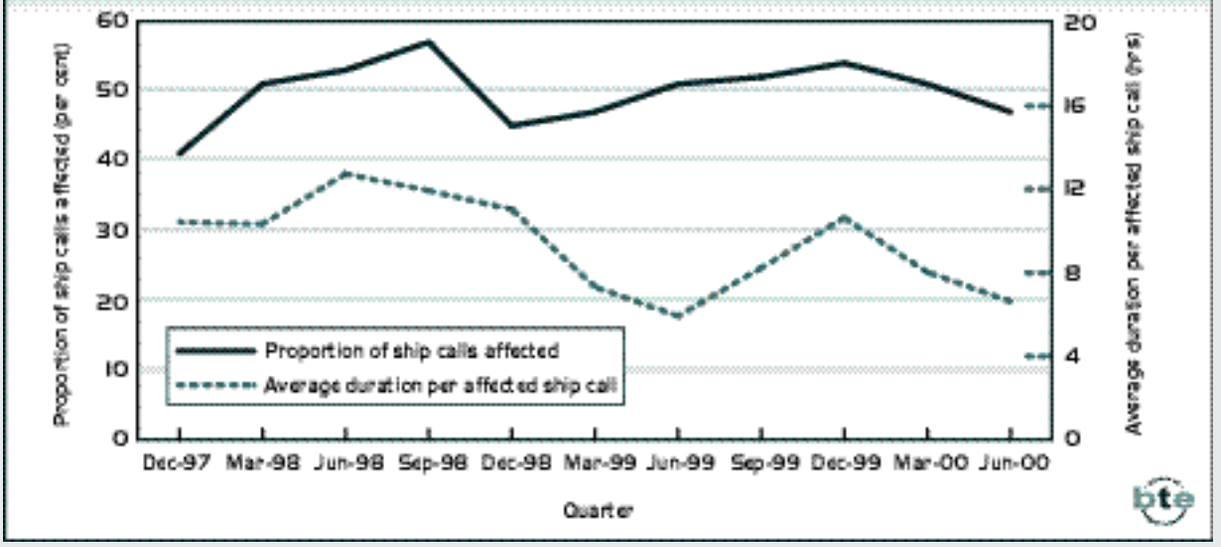
Incident type	Ship waiting time (hrs) 1	2	3	4	5–10	11–20	>20	Total no. of incidents
Awaiting labour	6	14	11	3	10	4	3	51
Stevedoring finished early	11	16	2	1	2	0	0	32
Early ship arrival	2	6	3	3	10	1	0	25
Crane breakdown	6	8	4	2	0	0	0	20
Pilot/tug booking not at preferred time	4	7	2	1	1	0	0	15
Late ship arrival	0	0	0	0	2	3	2	7
Ship repairs or maintenance	0	1	1	1	1	2	1	7
Weather or tides	1	1	0	2	3	0	0	7
Stevedoring finished late	0	1	0	0	0	0	0	1
Industrial action	0	0	0	1	0	0	0	1
Other	2	2	2	1	3	1	2	13
Total incidents	**32**	**56**	**25**	**15**	**32**	**11**	**8**	**179[a]**

a. These incidents affected 130 of the 276 ship calls covered in table 2.

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

Figure 8 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 of other waiting time per affected ship call in each quarter.

FIGURE 8 OTHER SHIP WAITING TIME INCIDENTS AT MAJOR CONTAINER TERMINALS, 1997–2000



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

Stevedoring

Table 4 presents the available information on two aspects of stevedoring reliability at major container terminals—stevedoring rate and cargo receival. Data are not available for Adelaide.

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. The main change over the period covered by table 4 was a decline in the stevedoring rate indicator at Sydney.

Cargo receival is the proportion of receivals (exports) completed by the stevedore's cut-off time. It provides a partial measure of one factor that can affect container terminal performance. The only change over the period covered by table 4 was an increase in the cargo receival indicator at Sydney.

TABLE 4 STEVEDORING AND SHIP ARRIVAL RELIABILITY INDICATORS, MARCH AND JUNE QUARTERS 2000

(per cent)

Indicator	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	Jan–Mar	Apr–Jun	Jan–Mar	Apr–Jun	Jan–Mar	Apr–Jun	Jan–Mar	Apr–Jun	Jan–Mar	Apr–Jun
Stevedoring										
Stevedoring rate	na	44	59	47	50	52	na	na	43	39
Cargo receival	na	93	80	85	94	94	na	na	99	99
Ship arrival										
Advice at 24 hrs	na	na	50	61	na	na	51	58	56	54
Advice inside 24 hrs	na	na	98	96	na	na	93	95	88	90

na not available

Sources AAPMA, Patrick and P&O Ports.

Ship arrival

Table 4 includes data for two indicators of ship arrival advice. Brisbane data have not been available for the last two quarters, but are expected to be available again from the September quarter 2000.

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, this indicator increased at Sydney and Adelaide, and was virtually unchanged at Fremantle, in the June quarter 2000.

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*. This indicator did not change significantly at any of the ports for which data were available in the June quarter 2000.

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 July–December 1999 and January–June 2000 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, road transport, and customs brokers' charges.

Brief overview of changes in port interface charges

Other than the removal of the towline charge for towage at Brisbane, there were no other changes to ship-based or cargo-based charges in January–June 2000. The stevedoring charge cannot be updated until the ACCC stevedoring monitoring report is released later in the year. Customs brokers' fees remained largely constant, and the introduction of the fuel levy resulted in an overall increase in road transport charges. Looking ahead, the introduction of the GST will cause adjustments in the July–December port interface cost index which will be published in *Waterline* at the end of the first quarter 2001.

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 container ship (Lloyd's ship classification UCC). The representative ship was selected from the ship-size range with the most port calls by UCC-type ships. The ship-size range of 15 000 to 20 000 GRT has had the most port calls at each port since monitoring of port charges commenced in 1992. 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 tonnage charges, depend on the size of the ship. However, shipping economics dictate that the larger the ship being used to transport the cargo, the greater the tendency of ship operators to exchange higher volumes of cargo per port call. As a result, the per unit (in this case 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

TABLE 5 PARAMETERS USED IN THE PORT INTERFACE COST INDEX, 1999/2000

Indicator	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000
Vessel size										
GRT	17215	17215	17215	17215	17215	17215	17215	17215	17215	17215
NRT	8372	8372	8372	8372	8372	8372	8372	8372	8372	8372
Teus exchanged[a]										
Total	443	484	930	854	1080	1042	619	630	400	620
Loaded	353	370	769	667	908	864	493	486	327	472
Empty	90	114	161	187	172	178	126	144	73	148
Loaded inwards	171	169	492	423	492	454	191	192	179	236
Loaded outwards	182	201	277	244	416	410	302	294	148	235
Ship call parameters[a]										
Number of port calls	4	4	3	3	4	3	6	5	7	4
Elapsed berth time (hrs)	24	20	48	38	42	39	22	24	21	22

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.

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 6 provides the port and related charges at the five mainland capital city ports for July–December 1999 and January–June 2000. Port and related charges comprise ship-based charges and cargo-based charges.

TABLE 6 PORT AND RELATED CHARGES, 1999/2000

Indicator	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000
Ship-based charges ($/teu)										
Conservancy	5.13	4.70	-	-	-	-	1.39	1.91	-	-
Tonnage	-	-	7.22	7.86	4.16	4.31	6.84	6.94	6.33	4.08
Pilotage	11.57	10.61	3.38	3.68	5.08	5.26	3.79	3.73	5.23	3.37
Towage	17.12	15.32	7.88	8.58	6.37	6.60	19.86	19.52	12.31	7.94
Mooring, unmooring	3.86	3.54	3.38	3.69	0.87	0.90	-	-	2.75	1.78
Berth hire[a]	-	-	-	-	9.41	9.06	-	-	-	-
Total[b]	37.68	34.17	21.86	23.81	25.89	26.14	31.88	32.10	26.62	17.17
Cargo-based charges ($/teu)										
Wharfage										
Imports	26.00	26.00	60.00	60.00	25.90	25.90	53.00	53.00	47.30	47.30
Exports	26.00	26.00	45.00	45.00	25.90	25.90	53.00	53.00	47.30	47.30
Harbour dues	42.00	42.00	-	-	-	-	-	-	-	-
Berth charge	-	-	-	-	-	-	-	-	13.90	13.90
Total port and related charges ($/teu)[b]										
Loaded imports	106	102	82	84	52	52	85	85	88	78
Loaded exports	106	102	67	69	52	52	85	85	88	78
Charges per ship visit ($/visit)										
Total ship-based charges	16702	16522	20334	20334	27959	27242	19745	20228	10641	10641
Empty teus[c]	1283	1625	-	-	-	-	-	-	562	1140

- not applicable

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

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

c. Sum of wharfage, harbour dues and berth charge per empty teu, multiplied by average exchange of empty teus.

Note Port and related charges are based on the parameters described in table 5.

Sources BTE 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.

Ship-based charges

Compared with July–December 1999, the only actual change to ship-based charges in January–June 2000 was the removal of the towline charge for towage at Brisbane.

All other apparent changes to ship-based charges resulted from changes to the parameters (viz. average teu-exchange, average elapsed berth time, average number of port calls) on which the ship-based charges are calculated. On a teu basis, the overall changes in ship-based charges in January–June 2000 were:

- at *Brisbane*—a 9 per cent fall in ship-based charges per teu, resulting from a 9 per cent increase in the average teu-exchange;
- at *Sydney*—a 9 per cent increase in ship-based charges per teu, resulting from an 8 per cent fall in the average teu-exchange;
- at *Melbourne*—a 1 per cent increase in ship-based charges per teu, resulting from a 3 per cent fall in average teu-exchange, partially countermanded by the 7 per cent decrease in the elapsed berth time which caused a decrease in the berth hire charge;
- at *Adelaide*—a 1 per cent increase in ship-based charges per teu, resulting from a 2 per cent increase in the tonnage charge caused by the 9 per cent increase in the elapsed berth time, and partially countermanded by a 2 per cent increase in the average teu-exchange;
- at *Fremantle*—a 35 per cent fall in ship-based charges per teu, resulting from a 55 per cent increase in average teu-exchange. (On the basis of port-wide all-inclusive container figures in the non-financial indicators table on page 15, Fremantle experienced an unusually high exchange in empty containers and full export containers during January–June 2000.)

Fremantle experienced an unusually high container throughput

While caution should always be used when making port comparisons on a per teu basis, Fremantle has overtaken Sydney to become the lowest-cost port for ship-based charges. From the point of view of ship operators using ships similar to the representative ship in table 5, Fremantle continues to remain the lowest cost port for ship-based charges on a per ship-visit basis.

Cargo-based charges

There were no changes in cargo-based charges in January–June 2000.

Changes in total port and related charges per loaded teu

Total port and related charges per loaded teu, for January–June 2000:

- at *Brisbane*—fell by about 3 per cent, solely due to the 9 per cent fall in the ship-based component;
- at *Sydney*—increased by about 2 per cent for imports and 3 per cent for exports, solely due to the 9 per cent increase in the ship-based component;
- at *Melbourne*—increased by about half of one per cent, solely due to the one per cent increase in the ship-based component;
- at *Adelaide*—remained almost constant; and
- at *Fremantle*—fell by about 11 per cent, solely due to the 35 per cent fall in the ship-based component.

Stevedoring charges per teu

The stevedoring charges used in this issue of *Waterline* are those published in the most recent ACCC report on stevedoring prices (October 1999). As these prices refer to the first half of 1999, they will need to be revised when the ACCC publishes its results for 1999/2000.

Land-based charges per teu

The average charges for customs brokers' fees and road transport charges for the July–December 1999 and January–June 2000 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 fees for exports, reflecting the more complex clearance procedures for import containers.

During January–June 2000 there was a 2 per cent average fall in customs brokers' fees for imports at Sydney and at Fremantle. No other changes were recorded.

Road transport charges increased at all five port cities. The increase was mostly a result of the introduction of the fuel levy. A few operators were able to absorb the fuel levy, but most companies had to pass on the increase to their clients. Road transport charges increased by about 3 per cent at Brisbane, Melbourne and Adelaide; by about 2 per cent at Fremantle; and by about one per cent at Sydney. 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 on this parameter and therefore, to some extent, help explain the significant difference between road transport charges at Melbourne and Sydney compared with Brisbane, Adelaide and Fremantle.

TABLE 7 PORT INTERFACE COSTS, 1999/2000

	Brisbane		Sydney		Melbourne		Adelaide		Fremantle	
Indicator	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000
Import										
Ship-based charges	38	34	22	24	26	26	32	32	27	17
Cargo-based charges	68	68	60	60	26	26	53	53	61	61
Stevedoring[p]	181	181	181	181	181	181	181	181	181	181
Customs brokers' fees	123	123	152	149	138	138	132	132	141	138
Road transport charges	185	190	293	296	252	260	169	173	199	203
Import total[a]	596	597	707	709	623	631	566	571	609	600
Export										
Ship-based charges	38	34	22	24	26	26	32	32	27	17
Cargo-based charges	68	68	45	45	26	26	53	53	61	61
Stevedoring[p]	181	181	181	181	181	181	181	181	181	181
Customs brokers' fees	77	77	111	111	89	89	73	73	67	67
Road transport charges	185	190	293	296	252	260	169	173	199	203
Export total[a]	549	550	651	656	574	582	508	513	535	529

p provisional pending updating of stevedoring charge by the ACCC.

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 monitored by the ACCC and is the weighted average for Brisbane, Sydney, Melbourne, Adelaide, Fremantle and Burnie. Stevedoring charges vary between ports but detailed data for individual ports are not publicly available.

Sources 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 charge data supplied by the ACCC.

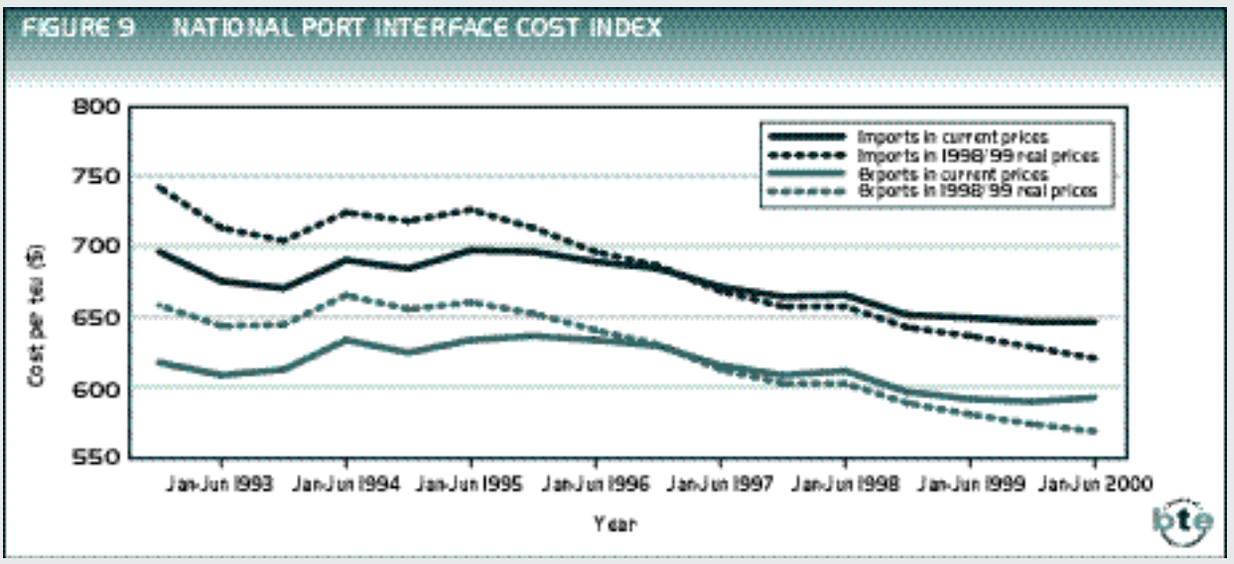
Indices for individual ports

Table 7 indicates that, between July–December 1999 and January–June 2000, there were changes in total port interface costs ranging from -1.5 per cent to +1.4 per cent across the five ports. However, this should be interpreted with caution given the provisional nature of the reported stevedoring charges. Even if stevedoring charges did not change during January–June 2000, care should still 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 1992. In overall terms, there was little movement in the national index between July–December 1999 and January–June 2000. In current prices, national import charges remained steady at $646 per teu, while export charges increased by 0.5 per cent to $592 per teu. In real prices (using ABS chain volume statistics to calculate the deflator), national import charges fell by 1.3 per cent per teu, and export charges fell 0.8 per cent per teu.

FIGURE 9 NATIONAL PORT INTERFACE COST INDEX



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 supplied by the ACCC; and ABS gross non-farm product deflator data.

PORT PERFORMANCE—NON-FINANCIAL

The non-financial indicators include throughput across all wharves at each of the five major container ports. The July–December 1999 and January–June 2000 non-financial indicators for the five mainland capital city ports are presented in table 8. Cargoes in Australia experience seasonal fluctuations; for instance, container throughput tends to be significantly higher during July–December than during the preceding January–June. Therefore, comparisons in the article below generally focus on the earlier corresponding season (in this instance January–June 1999) in preference to the immediately preceding season.

Cargo throughput

Total cargo throughput at the five ports was 48.3 million tonnes for January–June 2000, compared with 47.8 million tonnes for January–June 1999, and 48.7 million tonnes for July–December 1999. Compared with the corresponding January–June period of the previous year, total cargo throughput increased at Brisbane (11 per cent), Sydney (3 per cent), Melbourne (one per cent) and Adelaide (15 per cent). It declined at Fremantle (13 per cent). Overall this resulted in an increase of one per cent in total cargo throughput for the five ports compared with January–June 1999, and a decrease of three-quarters of one per cent compared with July–December 1999.

Non-containerised general cargo throughput at the five ports was 2.28 million tonnes for January–June 2000,compared with 2.24 million tonnes for January–June 1999 (an increase of 1.4 per cent), and 2.31 million tonnes for July–December 1999 (a decrease of 1.3 per cent).

Total container traffic throughput for the five ports,measured in teus, was 1.57 million teus for January–June 2000, compared with 1.36 million teus for January–June 1999 (an increase of 16 per cent), and similar to July–December 1999 (an increase of 0.3 per cent). Compared with January–June 1999, throughput of loaded teus increased by 13 per cent, with loaded imports increasing by 14 per cent and loaded exports increasing 12 per cent.

Compared with 1998/99, the annual 1999/2000 five-port total container traffic, measured in teus, increased by 14 per cent to 3.14 million teus.

TABLE 8 NON-FINANCIAL PERFORMANCE INDICATORS, SELECTED AUSTRALIAN PORTS, 1999/2000

Indicator	Brisbane		Sydney		Melbourne		Adelaide		Fremantle		Five ports[d]	
	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000	Jul–Dec 1999	Jan–Jun 2000
Total cargo throughput ('000 tonnes)	11 190	11 859	12 543	11 811	11 120	10 846	3 112	3 604	10 698	10 174	48 663	48 294
Non-containerised general cargo ('000 tonnes)[a]	328[r]	330	375	348	1 093	1 092	167	168	342	338	2 305	2 276
Containerised cargo (teus exchanged)												
Full import	80 820	77 990	275 821	242 228	295 480	278 325	17 378	18 049	60 132	62 132	729 631	678 724
Empty import	27 606	32 583	11 319	8 312	42 995	41 992	6 877	9 325	11 960	21 682	100 757	113 894
Full export	85 819	92 838	155 479	139 587	249 443	251 730	27 505	27 581	49 716	61 863	567 962	573 599
Empty export	14 652	20 308	78 921	98 842	60 374	67 456	4 594	4 197	12 480	17 398	171 021	208 201
TOTAL	208 897	223 719	521 540	488 969	648 292	639 503	56 354	59 152	134 288	163 075	1 569 371	1 574 418
Average total employment[b]	220	234	189	188	80	80	156	151	167	169	812	822
Port turnaround time (hrs)[c]												
Median result	32	30	43	35	43	39	21	19	25	23	-	-
95th percentile	60	66	84	67	85	71	43	35	50	49	-	-

- not applicable
r revised
a. Excludes bulk cargoes.
b. Comparisons between ports are not appropriate because each port authority/corporation has a different structure.
c. Port turnaround times refer only to ships calling at container terminals. Comparisons between ports are not appropriate because each port has a different set of parameters to measure the turnaround time. Normally, only inter-temporal comparison at individual ports is of use.
d. Components may not sum to totals due to rounding.

Source AAPMA.

TABLE 9 TEU THROUGHPUT AT THE FIVE MAJOR AUSTRALIAN PORTS, 1995–2000

	teus											per cent		
	Jan–Jun 1995	Jul–Dec 1995	Jan–Jun 1996	Jul–Dec 1996	Jan–Jun 1997	Jul–Dec 1997	Jan–Jun 1998	Jul–Dec 1998	Jan–Jun 1999	Jul–Dec 1999	Jan–Jun 2000	Change in teu throughput over five years	Market share Jan–Jun 1995	Market share Jan–Jun 2000
Brisbane														
Full imports	39 009	37 075	39 286	44 765	43 883	55 283	57 082	62 980	61 369	80 820	77 990	100	8.8	11.5
Empty imports	16 850	22 435	24 942	22 918	23 720	26 982	22 450	24 630	28 376	27 606	32 583	93	24.6	28.6
Full exports	50 650	54 646	55 527	60 295	61 627	67 356	66 838	70 168	82 906	85 819	92 838	83	13.3	16.2
Empty exports	11 212	8 037	7 491	7 774	7 650	10 165	11 412	14 388	12 886	14 652	20 308	81	9.5	9.8
Total teus	117 721	122 193	127 246	135 752	136 880	159 786	157 782	172 166	185 537	208 897	223 719	90	11.6	14.2
Sydney														
Full imports	166 140	178 643	167 875	192 764	180 102	214 301	189 423	226 977	218 094	275 821	242 228	46	37.3	35.7
Empty imports	6 910	7 583	10 170	10 304	9 419	8 165	7 504	9 159	13 006	11 319	8 312	20	10.1	7.3
Full exports	97 353	109 955	107 105	116 017	115 636	133 463	116 244	129 669	126 359	155 479	139 587	43	25.6	24.3
Empty exports	55 339	51 574	51 809	54 032	52 172	62 252	66 857	84 751	70 565	78 921	98 842	79	46.8	47.5
Total teus	325 742	347 755	336 959	373 117	357 329	418 181	380 028	450 556	428 024	521 540	488 969	50	32.2	31.1
Melbourne														
Full imports	187 394	202 013	193 089	222 273	209 843	243 319	217 602	254 315	241 834	295 480	278 325	49	42.0	41.0
Empty imports	29 431	31 168	36 082	37 955	34 265	39 124	30 878	35 220	38 766	42 995	41 992	43	43.0	36.9
Full exports	176 400	185 724	186 167	201 630	200 601	213 186	197 025	215 915	220 387	249 443	251 730	43	46.3	43.9
Empty exports	41 681	45 015	43 884	42 350	35 477	49 080	50 596	62 293	52 431	60 374	67 456	62	35.2	32.4
Total teus	434 906	463 920	459 222	504 208	480 186	544 709	496 101	567 743	553 418	648 292	639 503	47	42.9	40.6
Adelaide														
Full imports	9 617	10291	9 004	12 144	13 226	16 261	19 454	19 744	19 280	17 378	18 049	88	2.2	2.7
Empty imports	5 856	5 155	6 030	8 239	5 866	8 461	7 855	8 209	8 552	6 877	9 325	59	8.5	8.2
Full exports	16 889	16 824	19 167	22 959	22 895	24 630	24 730	25 365	28 271	27 505	27 581	63	4.4	4.8
Empty exports	1 552	1 317	1 567	1 668	1 500	2 939	3 582	5 781	5 384	4 594	4 197	170	1.3	2.0
Total teus	33 914	33 587	35 768	45 010	43 487	52 291	55 621	59 099	61 487	56 354	59 152	74	3.3	3.8
Fremantle														
Full imports	43 546	42 041	41 908	45 420	44 125	54 848	53 984	58 041	53 309	60 132	62 132	43	9.8	9.2
Empty imports	9 466	7 883	12 165	9 603	9 318	10 474	11 134	15 313	14 230	11 960	21 682	129	13.8	19.0
Full exports	39 389	38 980	44 661	41 275	43 079	46 483	48 819	51 833	53 159	49 716	61 863	57	10.3	10.8
Empty exports	8 483	8 048	6 994	8 942	7 802	10 962	14 098	16 205	13 607	12 480	17 398	105	7.2	8.4
Total teus	100 884	96 952	105 728	105 240	104 324	122 767	128 035	141 392	134 305	134 288	163 075	62	10.0	10.4
Five Ports														
Full imports	445 706	470 063	451 162	517 366	491 179	584 012	537 545	622 057	593 886	729 631	678 724	52		
Empty imports	68 513	74 224	89 389	89 019	82 588	93 206	79 821	92 531	102 930	100 757	113 894	66		
Full exports	380 681	406 129	412 627	442 176	443 838	485 118	453 656	492 950	511 082	567 962	573 599	51		
Empty exports	118 267	113 991	111 745	114 766	104 601	135 398	146 545	183 418	154 873	171 021	208 201	76		
Total teus	1 013 167	1 064 407	1 064 923	1 163 327	1 122 206	1 297 734	1 217 567	1 390 956	1 362 771	1 569 371	1 574 418	55		

Source *AAPMA data in Waterline, various issues.*

Cargo throughput series

Teu throughputs covering the past five years are presented in table 9. Over this period, five-port teu throughputs increased by more than 50 per cent in all category breakdowns. The last two columns in the table indicate the market share in teu traffic for each of the five ports for January–June 1995 and for January–June 2000. Overall, the smaller ports of Brisbane, Adelaide and Fremantle have experienced slight gains in market share at the expense of the larger ports of Sydney and Melbourne.

Employment

Table 8 indicates that average employment at the five mainland capital city port authorities/corporations rose by one per cent in the January–June 2000 period compared with the previous half-year. It declined by 14 per cent compared with July–December 1996, the earliest comparable period since BTE monitoring commenced. Prior to this period, major reforms throughout the Australian port authority sector were at various stages at each of the ports.

ABBREVIATIONS

AAPMA	Association of Australian Ports and Marine Authorities
ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
BTE	Bureau of Transport Economics
GRT	Gross registered tonnage
GST	Goods and services tax
NRT	Net registered tonnage
teu	Twenty-foot equivalent unit
UCC	Container ship
viz.	namely

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bureau of bte transport economics

As at 27 September 2000

TABLE 10 CONTAINER TERMINAL PERFORMANCE INDICATORS, SELECTED AUSTRALIAN PORTS— PRODUCTIVITY IN TEUS PER HOUR

	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	Dec-99	Mar-00	Jun-00
Five ports																	
Ships handled	827	871	907	865	891	907	963	909	845	1020	942	942	958	979	933	875	808
Total teus	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	726 590	678 046	666 967
Crane rate	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	24.8	26.6	30.4
Elapsed rate	22.6	23.6	na	23.1	23.8	26.0	25.8	na	na	na	na	na	na	30.1	30.8	33.3	40.0
Net rate	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	37.8	41.7	49.5
Brisbane																	
Ships handled	133	140	141	156	164	162	177	170	168	192	180	176	193	224	232	219	178
Total teus	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	106 096	97 431	90 932
Crane rate	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	24.6	26.4	30.5
Elapsed rate	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	27.0	29.8	33.4
Net rate	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	33.1	36.1	42.3
Sydney																	
Ships handled	216	228	249	251	249	243	266	238	219	267	230	221	243	259	244	221	218
Total teus	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	260 927	229 014	224 445
Crane rate	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	22.1	24.8	30.9
Elapsed rate	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	30.1	34.0	44.1
Net rate	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	36.8	43.0	55.4
Melbourne																	
Ships handled	262	274	282	230	249	268	281	276	234	309	274	271	282	278	266	247	217
Total teus	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	257 147	243 277	236 306
Crane rate	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	26.5	27.9	30.3
Elapsed rate	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	33.4	33.8	40.5
Net rate	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	40.4	43.0	49.4
Adelaide																	
Ships handled	63	70	74	69	65	68	66	60	66	63	74	73	66	62	62	56	56
Total teus	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	30 597	27 736	30 551
Crane rate	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	27.2	29.4	27.8
Elapsed rate	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	35.9	36.8	36.7
Net rate	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	38.8	39.7	41.1
Fremantle																	
Ships handled	153	159	161	159	164	166	173	165	158	189	184	201	174	156	129	132	139
Total teus	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	71 823	80 588	84 733
Crane rate	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	27.2	27.4	30.5
Elapsed rate	17.6	16.0	18.6	19.7	19.5	21.0	22.2	na	na	na	na	na	na	25.8	27.9	33.0	36.0
Net rate	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	38.8	41.6	44.7

na not available

Notes 1. Data from the Sea-Land terminal at Brisbane are incorporated from the December quarter 1999 onwards.

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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