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Bureau of Infrastructure, Transport and Regional Economics

GPO Box 501, Canberra ACT 2601, Australia

Telephone (international) +61 2 6274 7210

Fax +61 2 6274 6816

Email: bitre@infrastructure.gov.au

Internet: www.bitre.gov.au

Foreword

Waterline reports on trends in container handling productivity on the waterfront in Australia as well as the cost of importing and exporting containers. It covers both the unloading of container ships and the transport of containers from container terminals. This *Waterline* provides the latest data available on stevedoring productivity and landside performance. This journal is published by the Bureau of Infrastructure, Transport and Regional Economics (BITRE) and provides information on freight movements on both the wharf side and the landside of five Australian major port terminals: Brisbane, Sydney, Melbourne, Adelaide and Fremantle. This *Waterline* covers port terminal activity up to the December quarter 2009.

Waterline is prepared in the Infrastructure, Surface Transport and Road Safety Statistics Section by Adam Malarz.

BITRE is particularly grateful for the assistance of the following in the provision of data used to prepare this issue of *Waterline*:

- Ports Australia
- individual port authorities and corporations
- shipping lines
- customs brokers
- road transport operators
- pilot, tug and mooring operators
- stevedoring companies: Patrick and DP World; and
- the Office of Transport Security of the Department of Infrastructure, Transport, Regional Development and Local Government.

In response to comments received from users BITRE has decided to continue publishing *Waterline* twice a year in a streamlined format to ensure that timely data remain available.

This issue of *Waterline* and back issues, including selected time series data in spreadsheet format, is available from www.bitre.gov.au.

For further information on this publication please contact:

at email: waterline@infrastructure.gov.au;

Telephone: (02) 6274 7168; Fax: (02) 6274 7727.

Gary Dolman

Head of Bureau

Bureau of Infrastructure, Transport and Regional Economics

Canberra

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In-brief

After a decline in March and June quarters of 2009, handling of containers in all major Australian ports recovered in the remainder of 2009. However, productivity of container turnaround in five ports declined somewhat in the December quarter of 2009

Beginning from September quarter 2008, the number of ships handled in Australian major container ports declined by about 18 per cent. In the same period, the number of containers handled initially declined but recovered to previous levels in the December quarter 2009. This trend indicates that shipping companies deployed larger container ships to transport containers to and from Australia than previously

In 2009, the container terminal performance rates improved significantly, as measured by *crane rates*, *vessel working rates* and *ship rates* in major Australian ports

National port interface cost indices for both monitored ship categories of 15 000-20 000 and 35 000-40 000 GT declined further in 2009 in nominal and real terms. Elapsed berth time for both monitored ship categories increased in all ports, except for Fremantle

In 2009, the dominating ship size visiting Melbourne and Sydney was 25 000-30 000 GT, 338 and 233 visits respectively, whereas for Fremantle the dominating size was 50 000-55 000 GT with 140 visits. The average TEUs per visit has been also increasing in largest ship categories visiting Australian ports

Imports of containerised cargo in five ports, as measured by TEUs exchanged, declined between December quarter 2008 from 1.45 to 1.35 million TEUs in December quarter 2009. The total container exchanges increased in the same period from 3.13 to 3.29 million TEUs due to increased imports and exports of empty containers

Cargo receipt at major container terminals improved slightly in 2009, as compared with the previous year. Ship arrival indicators indicate some improvement over the January – September 2009 period but deteriorated in the December quarter. Both indicators demonstrate a pronounced seasonal pattern.

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CHAPTER I

Landside of the port terminal

Overview

Chapter I of Waterline reports on a list of landside of port terminal indicators at the five capital city port terminals: Brisbane, Sydney, Melbourne, Adelaide and Fremantle. The chapter covers three types of indicators:

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

The size of task performed indicators include the total number of trucks, the number of containers and the number of twenty-foot equivalent units (TEUs) processed in a quarter. They also include the number of containers loaded on or unloaded from rail in a quarter.

The landside of port terminal performance indicators are the average number of containers per truck, the average TEUs per truck, container turnaround time and average truck turnaround time.

This chapter also discusses three Vehicle Booking System (VBS) indicators: the number of VBS slots available, the number of VBS slots used and the adjusted usage rates for vehicle booking system slots.

Landside of the port terminal indicators are presented in Table I.1 and Figures I.1 to Figures I.14. The notes below provide explanation of the concepts being measured, the scope of the measurement and highlights any qualifications that should be borne in mind by users of the data. The variables are discussed in the order they appear in Table I.1.

Explanatory notes

Five ports

Data under this heading relate to simple sums of, or other form of aggregation of data for the five capital city port terminals: Brisbane, Sydney, Melbourne, Adelaide and Fremantle.

Road - Total trucks

This is a count of trucks processed through the vehicle booking system and the trucks that perform bulk run deliveries at a container terminal. This indicator shows the total truck-related task performed at a port terminal in a quarter.

Road - Total containers

Counts are based on a combination of the throughput of the vehicle booking system (VBS) at the land interface and the bulk runs of containers outside the VBS. At this stage it is not possible to separate out the bulk runs from the operations under the VBS. Bulk runs tend to be at night; bulk runs also tend to use larger vehicles with higher container or TEUs per truck measures.

Road - Total TEUs

Number of twenty-foot equivalent units (TEUs) processed in a quarter. This task size indicator measures the number of standardised twenty foot equivalent units (TEUs) of containers processed on the landside of port terminals in a seven day week.

Average truck turnaround time in the quarter

This is a measure of stevedoring efficiency and shows how fast (expressed in minutes) a stevedoring company processes trucks within a terminal. The indicator measures the length of time that a truck takes from the time it enters a port terminal to the time it exits the port terminal. This measure does not include time a truck waits outside before it enters the gate of the port terminal.

Containers per truck

Count of containers divided by the number of trucks.

TEUs per truck

Count of TEUs divided by the number of trucks. TEUs per truck are a measure of truck efficiency; it encapsulates the 40ft/20 ft dimension difference and is consistent with other wharf related TEU measures. For example, suppose on a given day:

10 trucks each make a trip to the port terminal empty but leave the terminal with 2 TEUs; and

10 trucks each make a trip to the port terminal with 2 TEUs but leave the terminal empty.

Total TEUs moved = 40; total number of trucks = 20. So average TEUs per truck (for a two way (in and out) trip) is 2.

Average container turnaround time (minutes)

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

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

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

Container turnaround time (CTT) measures the port's container tracking operations measured in minutes. CTT improves (that is, it goes down) if either the vehicle utilisation rates improves, implying that the number of containers per truck increases, or the port terminal is faster in processing each truck.

Rail – total containers

Stevedoring companies count containers moved by rail only when they are hauled to an 'on dock' rail siding. They do not count containers moved by rail to a 'near dock' rail siding. "On dock" refers to situations where the rail siding is on dock in a port terminal. Near dock' rail sidings are in the neighbourhood of the port terminal but not on the dock. The rail sidings in Brisbane, Fremantle, Adelaide and DP World, Melbourne are near dock. The only complete rail figures are for the Sydney, Port Botany Container Terminal which has an on-dock rail siding.

Time slots for the vehicle booking system

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

Number of vehicle booking system timeslots available

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

When shipping schedules permit and volumes demand extra resources, additional labour and extra equipment can be deployed to the landside of a port terminal and extra time slots can be provided. Generally, resources are reallocated in this way one or two days in advance. The VBS indicators measure the supply of VBS time slots at port terminals.

Adjusted vehicle booking system usage rates

The supply of vehicle booking system time slots is not constant across time at any of the port terminals. More slots are supplied during high demand periods. For a given quarter, the usage rates for say the night time slot is given by dividing the total slots used at night by the total number of slots available in the quarter. The usage rates add up to 100 percent for each quarter.

Table 1.1 Container terminal landside performance indicators

| Port/Indicator | Mar-08 | | Jun-08 | | Sep-08 | | Dec-08 | | Mar-09 | | Jun-09 | | Sep-09 | | Dec-09 | |
|--|---------|-------|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|
| Five ports | | | | | | | | | | | | | | | | |
| Road | | | | | | | | | | | | | | | | |
| Total trucks | 461 | 764 | 482 | 235 | 507 | 328 | 500 | 910 | 412 | 415 | 409 | 456 | 440 | 753 | 499 | 009 |
| Total containers | 838 | 405 | 864 | 190 | 893 | 091 | 880 | 899 | 703 | 729 | 712 | 322 | 794 | 784 | 878 | 923 |
| Total TEUS | 1 134 | 438 1 | 1 165 | 539 | 1 253 | 145 | 1 239 | 292 | 961 | 507 | 984 | 402 | 1 117 | 423 | 1 253 | 505 |
| Truck turnaround time – mins. | 39.1 | | 38.0 | | 40.6 | | 38.1 | | 34.2 | | 35.6 | | 34.7 | | 34.9 | |
| Containers per truck | 1.7 | | 1.7 | | 1.6 | | 1.7 | | 1.7 | | 1.7 | | 1.8 | | 1.8 | |
| Avg. container turnaround time – mins. | 25.1 | | 24.0 | | 26.0 | | 24.6 | | 22.0 | | 22.6 | | 22.1 | | 23.1 | |
| TEUS per truck | 2.4 | | 2.4 | | 2.4 | | 2.4 | | 2.4 | | 2.4 | | 2.5 | | 2.4 | |
| Rail | | | | | | | | | | | | | | | | |
| Total containers (excl. Adel. and Frem.) | 71 645 | | 83 408 | | 86 954 | | 92 120 | | 82 523 | | 85 566 | | 97 279 | | 97 926 | |
| Number of VBS timeslots available | 657 005 | | 668 917 | | 667 465 | | 659 686 | | 617 056 | | 575 755 | | 623 485 | | 644 167 | |
| Overall total | 657 005 | | 668 917 | | 667 465 | | 659 686 | | 617 056 | | 575 755 | | 623 485 | | 644 167 | |
| Monday- Friday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 358 091 | | 366 142 | | 369 195 | | 353 132 | | 337 673 | | 347 817 | | 372 604 | | 365 315 | |
| Evening (1800-2400) | 145 566 | | 145 837 | | 143 686 | | 140 626 | | 140 179 | | 125 965 | | 133 834 | | 135 007 | |
| Night (2400 - 0600) | 93 701 | | 99 395 | | 102 986 | | 101 428 | | 90 224 | | 67 155 | | 75 701 | | 77 795 | |
| Sub total | 597 358 | | 611 374 | | 615 867 | | 595 186 | | 568 076 | | 540 937 | | 582 139 | | 578 117 | |
| Saturday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 32 920 | | 31 199 | | 27 914 | | 32 417 | | 27 417 | | 19 457 | | 19 498 | | 29 929 | |
| Evening (1800-2400) | 3 172 | | 4 084 | | 4 166 | | 4 555 | | 4 142 | | 1 839 | | 1 822 | | 4 610 | |
| Night (2400 - 0600) | 7 362 | | 7 398 | | 6 968 | | 7 586 | | 2 737 | | 3 285 | | 3 986 | | 6 357 | |
| Sub total | 43 454 | | 42 681 | | 39 048 | | 44 558 | | 34 296 | | 24 581 | | 25 306 | | 40 896 | |
| Sunday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 3 250 | | 1 527 | | 1 630 | | 4 197 | | 3 393 | | 2 575 | | 4 638 | | 11 950 | |
| Evening (1800-2400) | 4 577 | | 4 993 | | 2 243 | | 6 423 | | 2 646 | | 2 406 | | 5 488 | | 6 346 | |
| Night (2400 - 0600) | 8 366 | | 8 342 | | 8 677 | | 9 322 | | 8 645 | | 5 256 | | 5 914 | | 6 858 | |
| Sub total | 16 193 | | 14 862 | | 12 550 | | 19 942 | | 14 684 | | 10 237 | | 16 040 | | 25 154 | |
| Number of VBS timeslots used | | | | | | | | | | | | | | | | |
| Overall total | 546 152 | | 567 555 | | 566 593 | | 558 788 | | 527 776 | | 506 960 | | 559 740 | | 588 221 | |
| Monday- Friday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 326 571 | | 338 318 | | 337 855 | | 325 265 | | 315 215 | | 327 292 | | 352 221 | | 348 291 | |
| Evening (1800-2400) | 111 389 | | 114 351 | | 112 213 | | 111 958 | | 110 502 | | 96 526 | | 109 347 | | 120 255 | |
| Night (2400 - 0600) | 74 827 | | 81 504 | | 85 446 | | 83 317 | | 75 030 | | 58 566 | | 68 685 | | 72 096 | |
| Sub total | 512 787 | | 534 173 | | 535 514 | | 520 540 | | 500 746 | | 482 384 | | 530 253 | | 540 642 | |
| Saturday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 20 187 | | 19 154 | | 15 445 | | 19 452 | | 14 435 | | 13 056 | | 12 933 | | 22 689 | |
| Evening (1800-2400) | 625 | | 944 | | 1 206 | | 1 380 | | 1 210 | | 1 247 | | 1 317 | | 2 258 | |
| Night (2400 - 0600) | 5 641 | | 5 877 | | 5 336 | | 5 825 | | 1 733 | | 2 768 | | 3 711 | | 4 422 | |

Table 1.1 Container terminal landside performance indicators

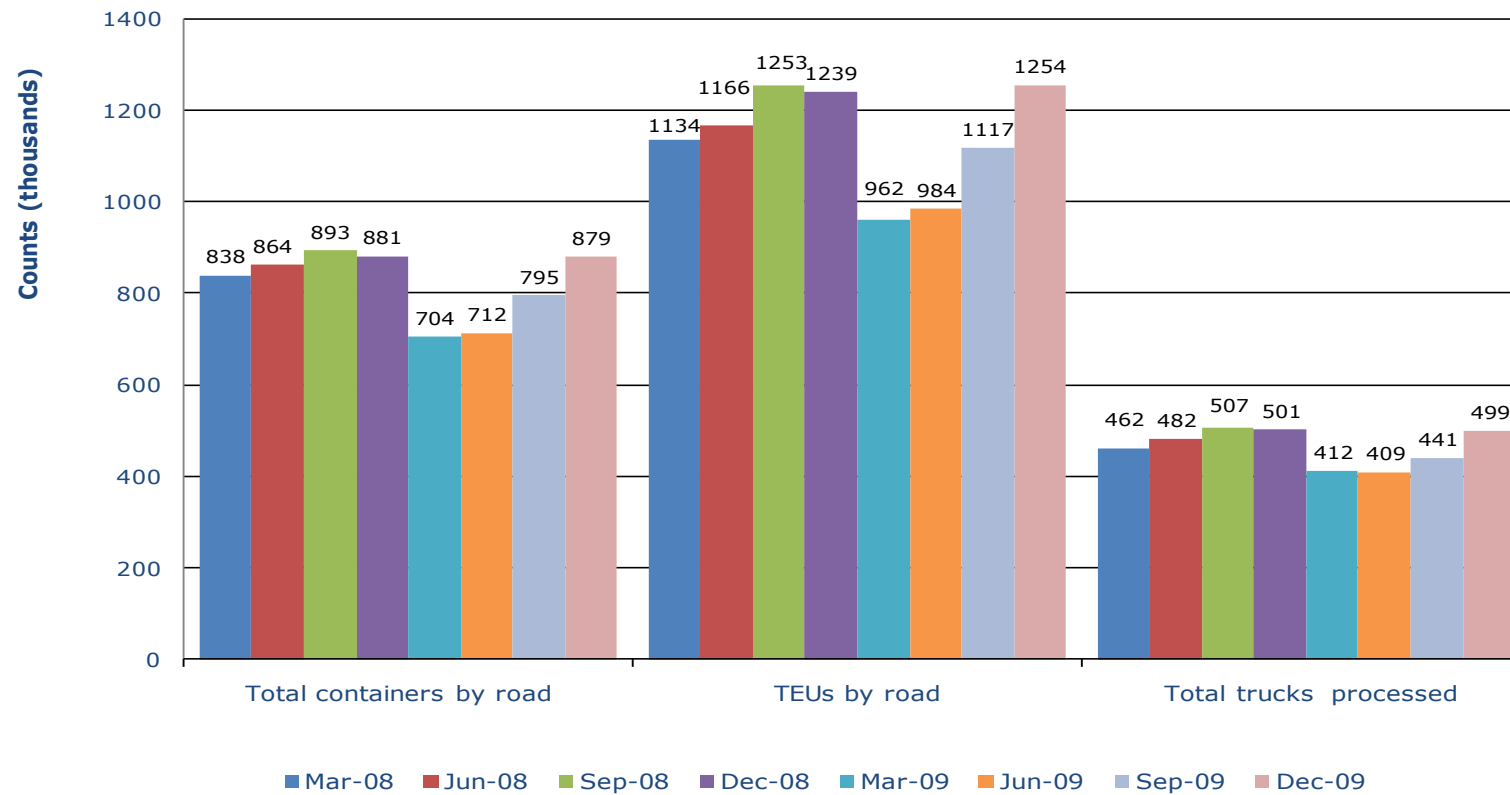
| Port/Indicator | Mar-08 | | Jun-08 | | Sep-08 | | Dec-08 | | Mar-09 | | Jun-09 | | Sep-09 | | Dec-09 | |
|--|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|
| Sydney | | | | | | | | | | | | | | | | |
| Road | | | | | | | | | | | | | | | | |
| Total trucks | 125 | 788 | 133 | 225 | 140 | 901 | 136 | 158 | 113 | 625 | 111 | 935 | 123 | 163 | 144 | 586 |
| Total containers | 222 | 230 | 227 | 445 | 244 | 910 | 242 | 330 | 190 | 120 | 186 | 230 | 218 | 899 | 257 | 143 |
| TEUS | 330 | 015 | 335 | 680 | 362 | 200 | 363 | 603 | 284 | 720 | 278 | 400 | 332 | 314 | 394 | 624 |
| Truck turnaround time – mins. | 45.8 | | 44.1 | | 51.6 | | 48.7 | | 42.2 | | 45.6 | | 45.5 | | 44.7 | |
| Containers per truck | 1.5 | | 1.5 | | 1.5 | | 1.5 | | 1.7 | | 1.7 | | 1.8 | | 1.8 | |
| Avg. container turnaround time - mins. | 34.8 | | 35.5 | | 42.6 | | 37.9 | | 32.8 | | 35.4 | | 35.0 | | 36.6 | |
| TEUS per truck | 2.3 | | 2.2 | | 2.2 | | 2.3 | | 2.2 | | 2.3 | | 2.4 | | 2.3 | |
| Rail | | | | | | | | | | | | | | | | |
| Total containers | 52 975 | | 57 067 | | 56 247 | | 58 862 | | 55 757 | | 57 017 | | 63 498 | | 62 900 | |
| Number of VBS timeslots available | | | | | | | | | | | | | | | | |
| Overall total | 182 | 176 | 183 | 633 | 178 | 481 | 187 | 112 | 165 | 547 | 141 | 455 | 164 | 745 | 181 | 402 |
| Monday- Friday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 85 493 | | 90 034 | | 92 286 | | 88 735 | | 79 473 | | 74 182 | | 83 894 | | 80 086 | |
| Evening (1800-2400) | 38 978 | | 35 822 | | 33 424 | | 34 639 | | 34 131 | | 28 094 | | 34 100 | | 36 182 | |
| Night (2400 - 0600) | 28 870 | | 30 407 | | 31 410 | | 33 959 | | 28 664 | | 27 417 | | 30 075 | | 31 027 | |
| Sub total | 153 | 341 | 156 | 263 | 157 | 120 | 157 | 333 | 142 | 268 | 129 | 693 | 148 | 069 | 147 | 295 |
| Saturday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 13 206 | | 13 071 | | 11 100 | | 11 852 | | 12 132 | | 5 656 | | 5 760 | | 10 299 | |
| Evening (1800-2400) | 2 468 | | 2 968 | | 2 553 | | 2 377 | | 2 551 | | 120 | | 8 | | 2 642 | |
| Night (2400 - 0600) | 2 754 | | 2 555 | | 2 087 | | 2 794 | | 2 316 | | 1 296 | | 1 658 | | 4 566 | |
| Sub total | 18 | 428 | 18 | 594 | 15 | 740 | 17 | 023 | 16 | 999 | 7 | 072 | 7 | 426 | 17 | 507 |
| Sunday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 3 246 | | 1 527 | | 1 302 | | 4 122 | | 1 578 | | 733 | | 2 566 | | 9 286 | |
| Evening (1800-2400) | 4 044 | | 4 297 | | 976 | | 4 901 | | 1 391 | | 1 136 | | 3 877 | | 4 378 | |
| Night (2400 - 0600) | 3 117 | | 2 952 | | 3 343 | | 3 733 | | 3 311 | | 2 821 | | 2 807 | | 2 936 | |
| Sub total | 10 | 407 | 8 | 776 | 5 | 621 | 12 | 756 | 6 | 280 | 4 | 690 | 9 | 250 | 16 | 600 |
| Number of VBS timeslots used | | | | | | | | | | | | | | | | |
| Overall total | 134 | 159 | 139 | 823 | 146 | 186 | 146 | 922 | 139 | 950 | 123 | 281 | 154 | 169 | 163 | 483 |
| Monday- Friday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 76 695 | | 80 590 | | 82 176 | | 79 326 | | 74 969 | | 70 781 | | 81 772 | | 77 442 | |
| Evening (1800-2400) | 25 055 | | 24 525 | | 26 586 | | 25 977 | | 27 410 | | 21 223 | | 30 802 | | 34 499 | |
| Night (2400 - 0600) | 22 153 | | 23 984 | | 26 638 | | 28 074 | | 25 588 | | 21 999 | | 27 479 | | 29 201 | |
| Sub total | 123 | 904 | 129 | 100 | 135 | 400 | 133 | 376 | 127 | 967 | 114 | 003 | 140 | 052 | 141 | 141 |
| Saturday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 4 991 | | 5 616 | | 5 178 | | 5 228 | | 5 304 | | 4 340 | | 5 347 | | 7 872 | |
| Evening (1800-2400) | 109 | | 220 | | 137 | | 33 | | 137 | | 3 | | 5 | | 305 | |
| Night (2400 - 0600) | 1 708 | | 1 414 | | 1 098 | | 1 987 | | 1 587 | | 1 228 | | 1 615 | | 2 714 | |
| Sub total | 6 | 808 | 7 | 250 | 6 | 413 | 7 | 248 | 7 | 028 | 5 | 571 | 6 | 967 | 10 | 891 |
| Sunday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 835 | | 724 | | 634 | | 1 630 | | 879 | | 696 | | 1 868 | | 6 170 | |
| Evening (1800-2400) | 651 | | 485 | | 596 | | 1 796 | | 971 | | 992 | | 2 630 | | 2 746 | |
| Night (2400 - 0600) | 1 961 | | 2 264 | | 3 143 | | 2 872 | | 3 105 | | 2 019 | | 2 652 | | 2 535 | |
| Sub total | 3 | 447 | 3 | 473 | 4 | 373 | 6 | 298 | 4 | 955 | 3 | 707 | 7 | 150 | 11 | 451 |
| Melbourne | | | | | | | | | | | | | | | | |
| Road | | | | | | | | | | | | | | | | |
| Total trucks | 188 | 119 | 192 | 996 | 208 | 763 | 209 | 862 | 165 | 562 | 167 | 209 | 181 | 341 | 203 | 071 |
| Total containers | 322 | 059 | 335 | 025 | 356 | 461 | 349 | 015 | 286 | 682 | 286 | 158 | 320 | 448 | 340 | 029 |
| TEUS | 459 | 639 | 477 | 662 | 515 | 555 | 502 | 706 | 404 | 365 | 406 | 723 | 460 | 103 | 492 | 353 |
| Truck turnaround time – mins. | 28.3 | | 28.5 | | 27.2 | | 25.8 | | 28.1 | | 27.1 | | 26.6 | | 26.2 | |
| Containers per truck | 1.7 | | 1.7 | | 1.7 | | 1.7 | | 1.7 | | 1.7 | | 1.8 | | 1.7 | |
| Avg. container turnaround time -mins. | 17.2 | | 17.2 | | 16.4 | | 16.0 | | 17.4 | | 17.0 | | 16.0 | | 16.4 | |
| TEUS per truck | 2.4 | | 2.5 | | 2.5 | | 2.4 | | 2.4 | | 2.4 | | 2.5 | | 2.4 | |
| Rail | | | | | | | | | | | | | | | | |
| Total containers b | 08 977 | | 12 412 | | 14 985 | | 18 511 | | 16 726 | | 17 561 | | 21 271 | | 21 749 | |
| Number of VBS timeslots available | | | | | | | | | | | | | | | | |
| Overall total | 241 | 012 | 250 | 670 | 251 | 124 | 245 | 488 | 222 | 378 | 239 | 268 | 257 | 447 | 259 | 023 |
| Monday- Friday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 135 879 | | 140 400 | | 139 851 | | 133 117 | | 123 712 | | 137 528 | | 147 206 | | 139 652 | |
| Evening (1800-2400) | 48 083 | | 50 225 | | 49 052 | | 47 844 | | 45 795 | | 45 145 | | 48 147 | | 49 635 | |
| Night (2400 - 0600) | 38 869 | | 41 793 | | 42 763 | | 42 003 | | 36 053 | | 37 640 | | 42 030 | | 43 281 | |
| Sub total | 222 | 831 | 232 | 418 | 231 | 666 | 222 | 964 | 205 | 560 | 220 | 313 | 237 | 383 | 232 | 568 |
| Saturday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 12 260 | | 11 443 | | 11 019 | | 13 566 | | 9 768 | | 10 271 | | 10 191 | | 14 673 | |
| Evening (1800-2400) | 703 | | 945 | | 1 594 | | 2 174 | | 1 589 | | 1 719 | | 1 814 | | 1 968 | |
| Night (2400 - 0600) | 2 772 | | 2 755 | | 2 857 | | 2 649 | | 0 | | 1 989 | | 2 328 | | 1 791 | |
| Sub total | 15 | 735 | 15 | 143 | 15 | 470 | 18 | 389 | 11 | 357 | 13 | 979 | 14 | 333 | 18 | 432 |
| Sunday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 0 | | 0 | | 328 | | 75 | | 1 813 | | 1 770 | | 1 688 | | 2 592 | |
| Evening (1800-2400) | 533 | | 696 | | 1 267 | | 1 522 | | 1 255 | | 1 270 | | 1 477 | | 1 968 | |
| Night (2400 - 0600) | 1 913 | | 2 413 | | 2 393 | | 2 538 | | 2 393 | | 1 936 | | 2 566 | | 3 463 | |
| Sub total | 2 | 446 | 3 | 109 | 3 | 988 | 4 | 135 | 5 | 461 | 4 | 976 | 5 | 731 | 8 | 023 |
| Number of VBS timeslots used | | | | | | | | | | | | | | | | |
| Overall total | 221 | 017 | 231 | 844 | 225 | 456 | 224 | 096 | 197 | 459 | 220 | 632 | 235 | 683 | 239 | 286 |
| Monday- Friday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 127 222 | | 131 860 | | 130 144 | | 125 083 | | 115 308 | | 130 838 | | 138 390 | | 132 104 | |
| Evening (1800-2400) | 43 300 | | 46 782 | | 44 155 | | 44 322 | | 40 900 | | 42 679 | | 45 489 | | 46 950 | |
| Night (2400 - 0600) | 34 405 | | 38 367 | | 37 691 | | 37 853 | | 31 538 | | 34 644 | | 38 609 | | 39 898 | |
| Sub total | 204 | 927 | 217 | 010 | 211 | 990 | 207 | 259 | 187 | 746 | 208 | 162 | 222 | 489 | 218 | 953 |
| Saturday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 11 099 | | 9 251 | | 6 947 | | 10 099 | | 5 870 | | 6 952 | | 6 551 | | 12 077 | |
| Evening (1800-2400) | 515 | | 612 | | 1 069 | | 1 345 | | 1 071 | | 1 244 | | 1 312 | | 1 953 | |
| Night (2400 - 0600) | 2 530 | | 2 535 | | 2 666 | | 2 286 | | 0 | | 1 540 | | 2 096 | | 1 708 | |
| Sub total | 14 | 144 | 12 | 398 | 10 | 682 | 13 | 730 | 6 | 941 | 9 | 736 | 9 | 959 | 15 | 738 |
| Sunday | | | | | | | | | | | | | | | | |
| Day (0600-1800) | 426 | | 488 | | 1 033 | | 1 305 | | 1 021 | | 1 087 | | 1 279 | | 1 687 | |
| Evening (1800-2400) | 1 520 | | 1 949 | | 1 751 | | 1 802 | | 1 751 | | 1 647 | | 1 956 | | 2 909 | |
| Night (2400 - 0600) | 1 946 | | 2 437 | | 2 784 | | 3 107 | | 2 772 | | 2 734 | | 3 235 | | 4 596 | |

Table 1.1 Container terminal landside performance indicators

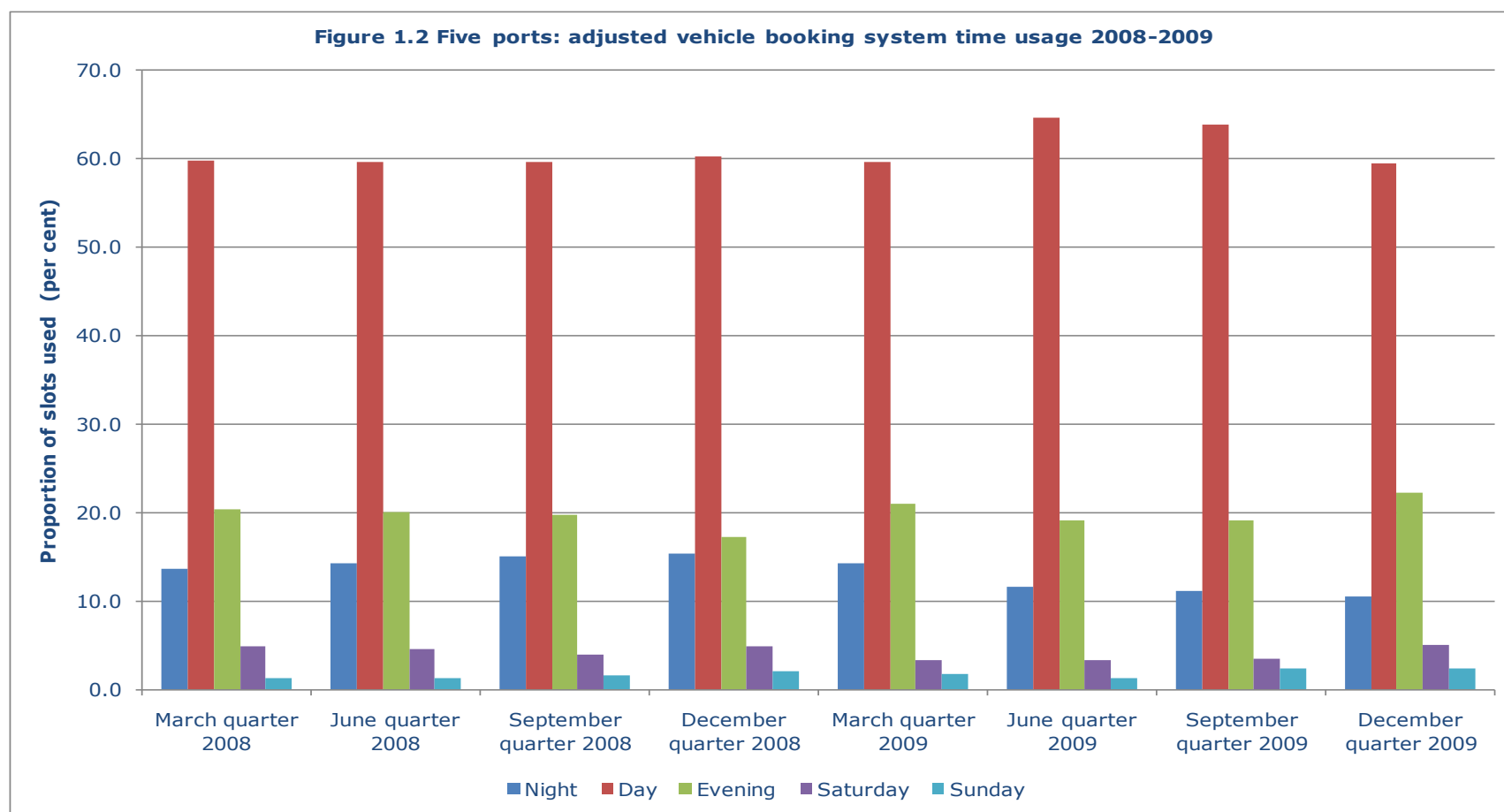
| Port/Indicator | Mar-08 | Jun-08 | Sep-08 | Dec-08 | Mar-09 | Jun-09 | Sep-09 | Dec-09 |
|---|---------|---------|---------|---------|---------|---------|---------|---------|
| Adelaide | | | | | | | | |
| Road | | | | | | | | |
| Total trucks | 23 423 | 27 381 | 21 094 | 19 239 | 21 094 | 18 289 | 19 754 | 19 924 |
| Total containers | 49 422 | 51 922 | 33 118 | 30 924 | 33 118 | 28 327 | 30 697 | 32 029 |
| TEUS | 62 092 | 73 403 | 44 236 | 41 741 | 44 236 | 38 528 | 42 709 | 44 621 |
| Truck turnaround time – mins. | 46.8 | 35.4 | 29.2 | 37.8 | 29.2 | 28.6 | 32.8 | 34.2 |
| Containers per truck | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| Avge. container turnaround time - mins. | 29.3 | 22.5 | 18.6 | 23.5 | 18.6 | 18.4 | 21.1 | 21.3 |
| TEUS per truck | 2.2 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 |
| Rail | | | | | | | | |
| Total containers | na | na | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of VBS timeslots available | | | | | | | | |
| Overall total | 37 245 | 39 706 | 40 661 | 38 033 | 40 661 | 37 492 | 40 738 | 39 156 |
| Monday- Friday | | | | | | | | |
| Day (0700-1400) | 22 517 | 23 248 | 24 239 | 22 891 | 24 239 | 22 297 | 23 869 | 23 491 |
| Evening (1400-2200) | 14 728 | 16 458 | 16 422 | 15 142 | 16 422 | 15 195 | 16 869 | 15 665 |
| Night (2200 - 0700) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sub total | 37 245 | 39 706 | 40 661 | 38 033 | 40 661 | 37 492 | 40 738 | 39 156 |
| Number of VBS timeslots used | | | | | | | | |
| Overall total | 32 919 | 33 889 | 31 601 | 30 786 | 31 601 | 25 081 | 27 541 | 28 797 |
| Monday- Friday | | | | | | | | |
| Day (0700-1400) | 21 639 | 22 632 | 22 101 | 21 106 | 22 101 | 18 297 | 19 847 | 20 017 |
| Evening (1400-2200) | 11 280 | 11 257 | 9 500 | 9 680 | 9 500 | 6 785 | 7 694 | 8 780 |
| Night (2200 - 0700) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sub total | 32 919 | 33 889 | 31 601 | 30 786 | 31 601 | 25 081 | 27 541 | 28 797 |
| Fremantle | | | | | | | | |
| Road | | | | | | | | |
| Total trucks | 53 340 | 55 687 | 57 225 | 60 191 | 50 700 | 48 914 | 49 741 | 57 143 |
| Total containers | 108 846 | 107 497 | 109 784 | 110 142 | 83 348 | 90 350 | 92 589 | 106 142 |
| TEUS | 149 558 | 147 915 | 155 815 | 159 047 | 117 657 | 128 190 | 134 866 | 154 550 |
| Truck turnaround time – mins. | 32.9 | 32.0 | 34.1 | 29.6 | 28.7 | 30.5 | 28.3 | 30.7 |
| Containers per truck | 1.8 | 1.7 | 1.6 | 1.6 | 1.6 | 1.8 | 1.9 | 1.9 |
| Avge. container turnaround time - mins. | 18.3 | 18.7 | 20.7 | 18.3 | 17.5 | 18.4 | 17.2 | 19.1 |
| TEUS per truck | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.4 | 2.3 |
| Rail | | | | | | | | |
| Total containers | na | na | na | na | na | na | na | na |
| Number of VBS timeslots available | | | | | | | | |
| Overall total | 84 513 | 86 026 | 88 413 | 87 336 | 83 778 | 83 012 | 84 837 | 86 944 |
| Monday- Friday | | | | | | | | |
| Day (0600-1800) | 62 801 | 64 710 | 66 008 | 64 228 | 61 987 | 61 558 | 64 047 | 66 769 |
| Evening (1800-2400) | 19 882 | 20 601 | 21 765 | 21 437 | 21 445 | 21 115 | 18 892 | 17 279 |
| Night (2400 - 0600) | 348 | 76 | 0 | 170 | 5 | 0 | 1 414 | 1 003 |
| Sub total | 83 031 | 85 387 | 87 773 | 85 835 | 83 437 | 82 673 | 84 353 | 85 051 |
| Saturday | | | | | | | | |
| Day (0600-1800) | 1 336 | 639 | 640 | 1 492 | 337 | 268 | 484 | 1 857 |
| Evening (1800-2400) | 1 | 0 | 0 | 4 | 2 | 0 | 0 | 0 |
| Night (2400 - 0600) | 141 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sub total | 1 478 | 639 | 640 | 1 496 | 339 | 268 | 484 | 1 857 |
| Sunday | | | | | | | | |
| Day (0600-1800) | 4 | 0 | 0 | 0 | 2 | 71 | 0 | 36 |
| Evening (1800-2400) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Night (2400 - 0600) | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| Sub total | 4 | 0 | 0 | 5 | 2 | 71 | 0 | 36 |
| Number of VBS timeslots used | | | | | | | | |
| Overall total | 71 888 | 75 696 | 77 272 | 77 669 | 75 024 | 72 252 | 73 642 | 80 717 |
| Monday- Friday | | | | | | | | |
| Day (0600-1800) | 57 883 | 61 296 | 61 679 | 60 584 | 59 345 | 59 402 | 61 700 | 64 952 |
| Evening (1800-2400) | 13 124 | 14 057 | 15 110 | 15 879 | 15 369 | 12 514 | 11 757 | 14 611 |
| Night (2400 - 0600) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sub total | 71 007 | 75 353 | 76 789 | 76 462 | 74 714 | 71 915 | 73 457 | 79 563 |
| Saturday | | | | | | | | |
| Day (0600-1800) | 877 | 343 | 483 | 1 207 | 308 | 267 | 185 | 1 118 |
| Evening (1800-2400) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Night (2400 - 0600) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sub total | 877 | 343 | 483 | 1 207 | 308 | 267 | 185 | 1 118 |
| Sunday | | | | | | | | |
| Day (0600-1800) | 4 | 0 | 0 | 0 | 2 | 70 | 0 | 36 |
| Evening (1800-2400) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Night (2400 - 0600) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sub total | 4 | 0 | 0 | 0 | 2 | 70 | 0 | 36 |

na not available
VBS stands for vehicle booking system.
a. Truck turnaround time in Brisbane includes some truck waiting time outside the terminal gate.
b. This data is incomplete because stevedores do not collect all rail data.
Note:1.The figures for total containers, total trucks, containers per truck, teus and teus per truck contain bulk runs.
2. Day, evening and night time slots have been standardised for comparative purposes.
Start and cut-off times for shifts differ between stevedoring companies and between ports. represent overall practice.
3. Stevedoring companies count containers moved by rail only when they are hauled to an 'on dock' rail siding.
They do not count containers moved by rail to a 'near dock' rail siding.
"On dock" refers to situations where the rail siding is on dock in a port terminal.
Near dock' rail sidings are in the neighbourhood of the port terminal but not on the dock.
The rail sidings in Brisbane, Fremantle, Adelaide and DP World, Melbourne are near dock.
The only complete rail figures are for the Sydney, Port Botany Container Terminal which has an on-dock rail siding..
4. The concepts used in compiling these indicators are defined in the explanatory notes.
5. All terminals are open Monday - Friday. Only Adelaide is not open on Saturday or Sunday.
Sources: Patrick, DP World.

Figure 1.1 Five major ports landside of container terminal size of task indicators, March quarter 2008 to December quarter 2009



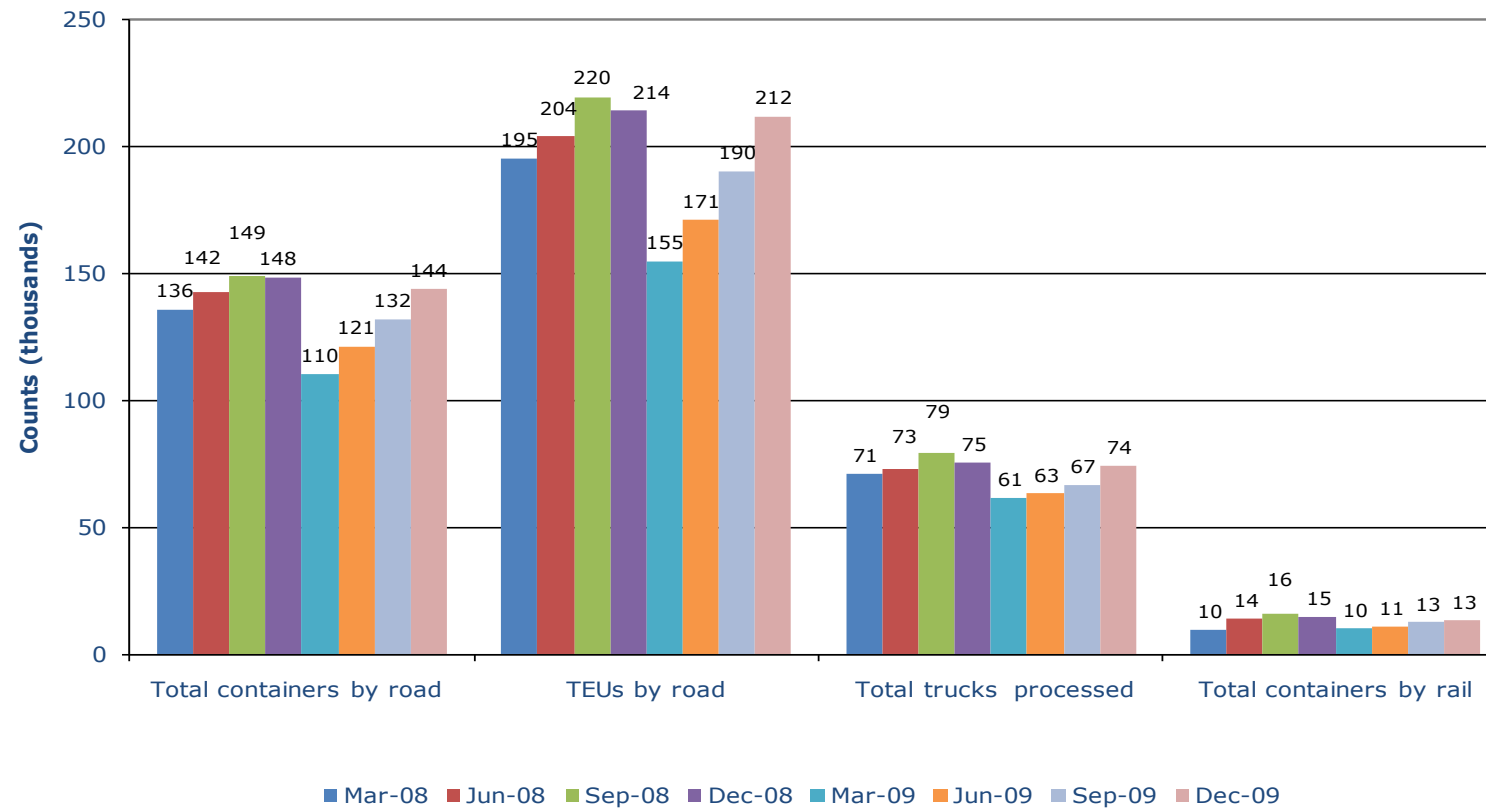
Note : The counts of containers by road, TEUs by road and trucks processed include operations under the vehicle booking system and bulk runs.
Sources: Patrick and DP World.



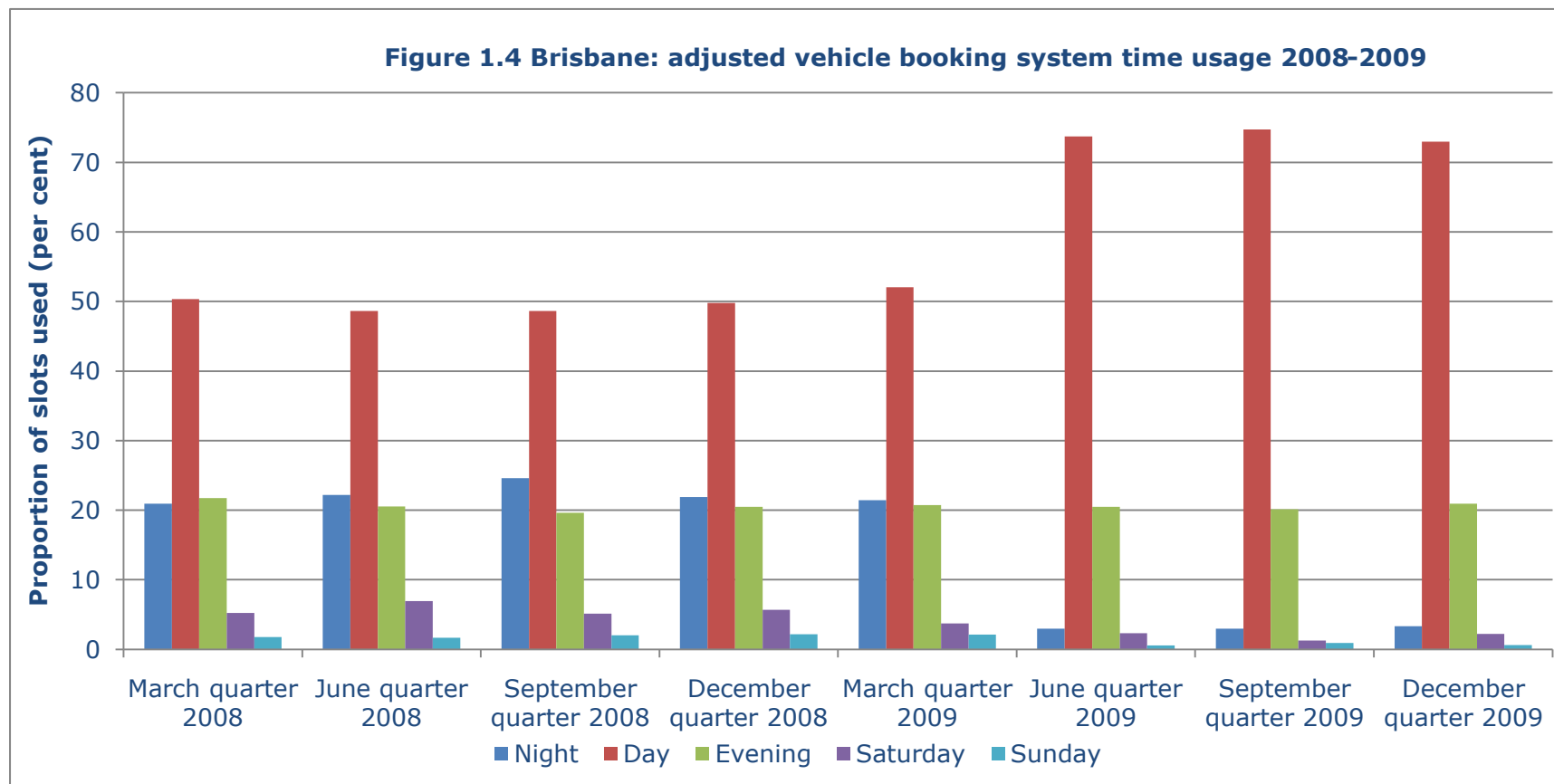
Note: The definitions of the time windows are as follows: Night (2400--0600 Monday to Friday), Day (0600-1800 Monday to Friday) and Evening (1800-2400 Monday to Friday).

Sources: Patrick and DP World.

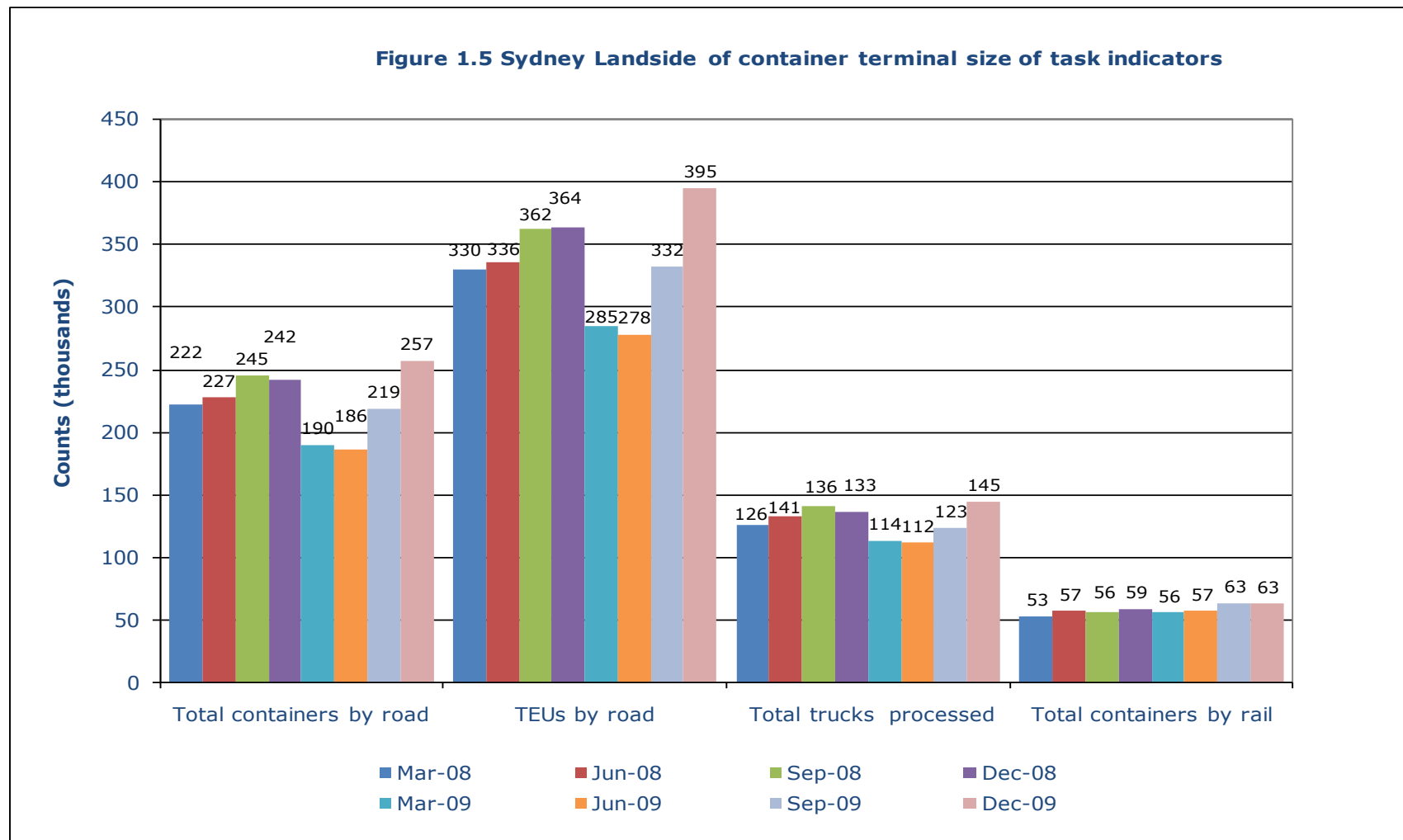
Figure 1.3 Brisbane: landside of container terminal size of task indicators



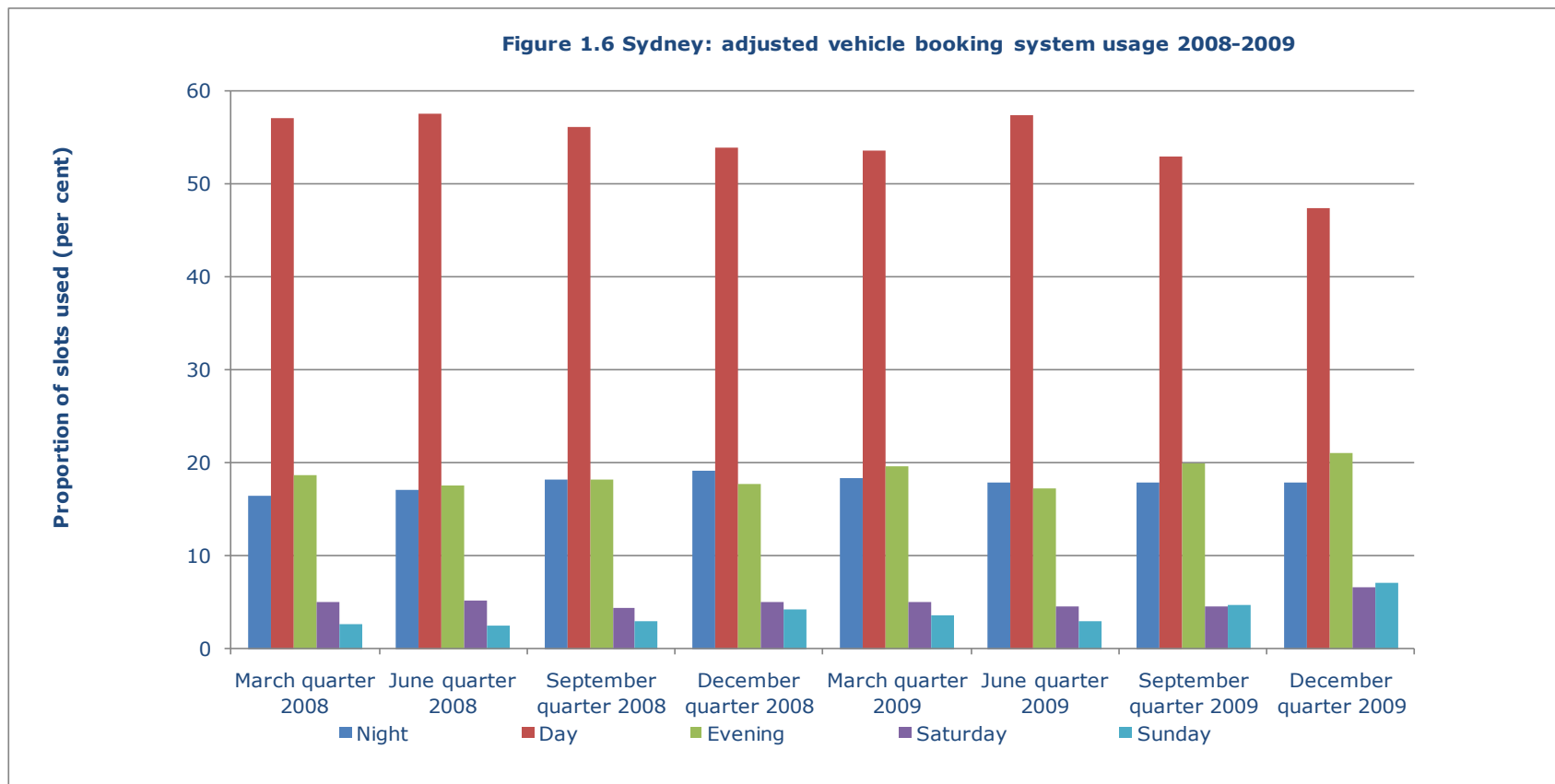
Note : The counts of containers by road, TEUs by road and trucks processed include operations under the vehicle booking system and bulk runs.
Sources: Patrick and DP World.



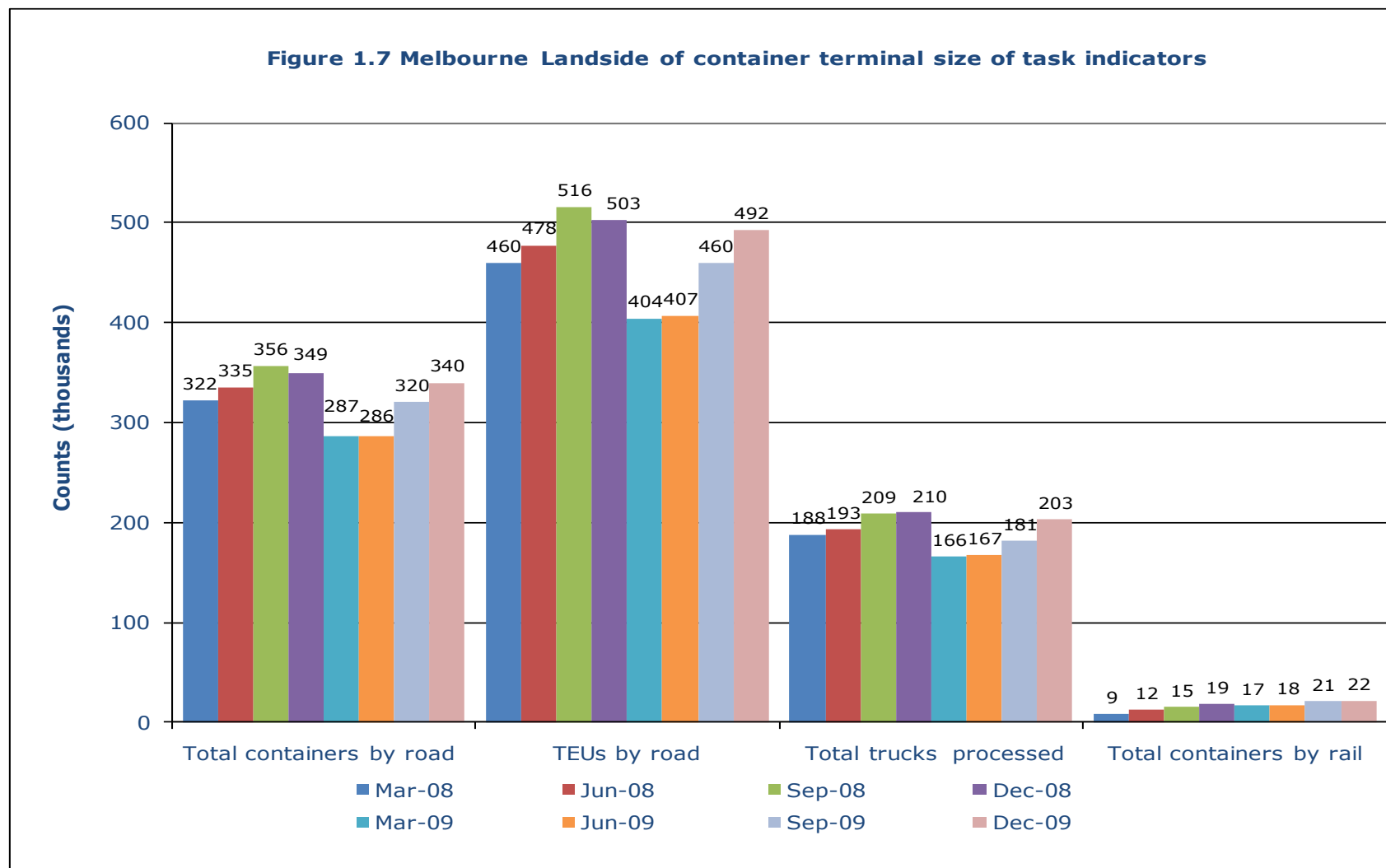
Note: The definitions of the time windows are as follows: Night (2400--0600 Monday to Friday), Day (0600--1800 Monday to Friday) and Evening (1800--2400 Monday to Friday).
Sources: Patrick and DP World.



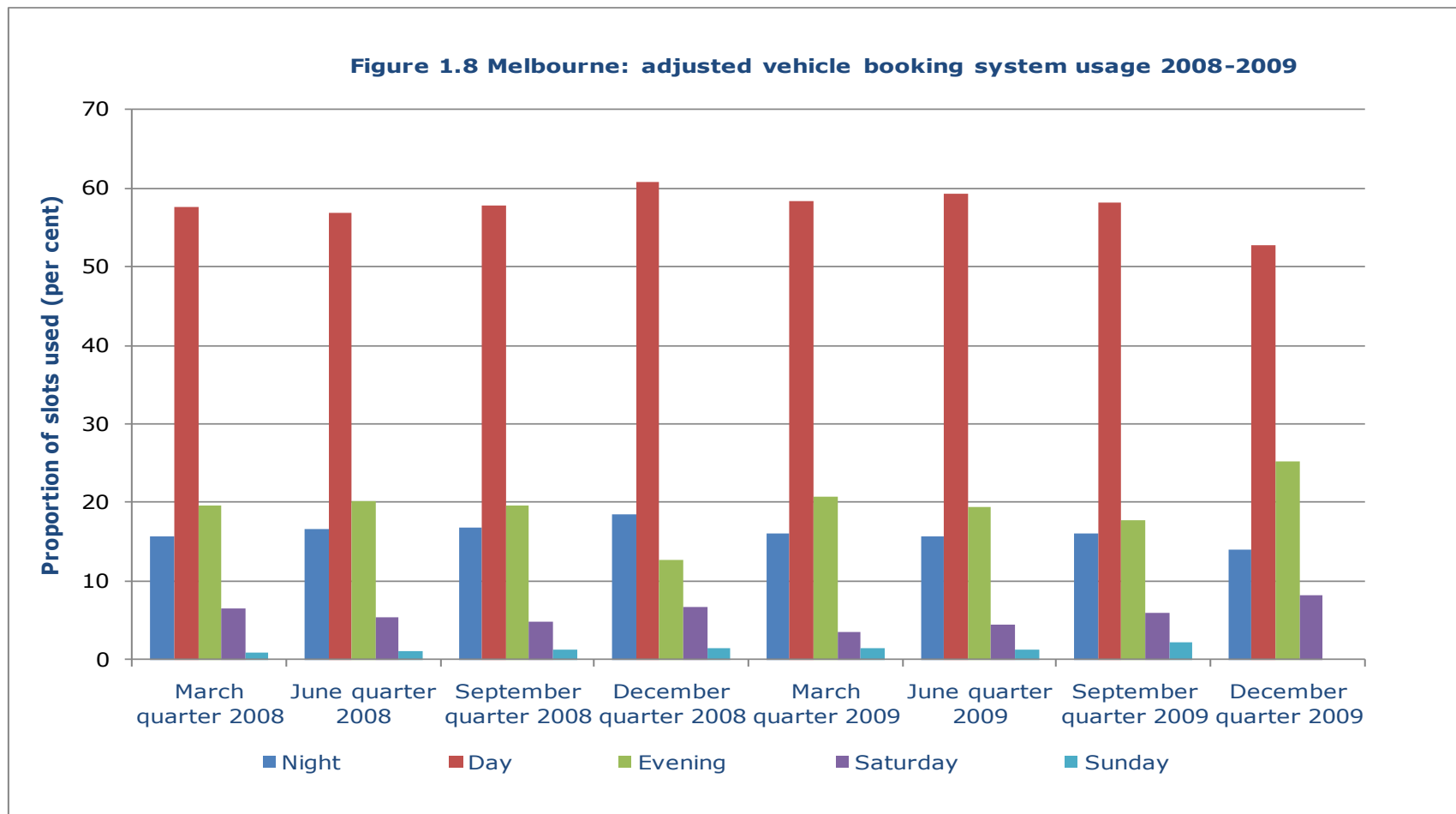
Note : The counts of containers by road, TEUs by road and trucks processed include operations under the vehicle booking system and bulk runs.
Sources: Patrick and DP World.



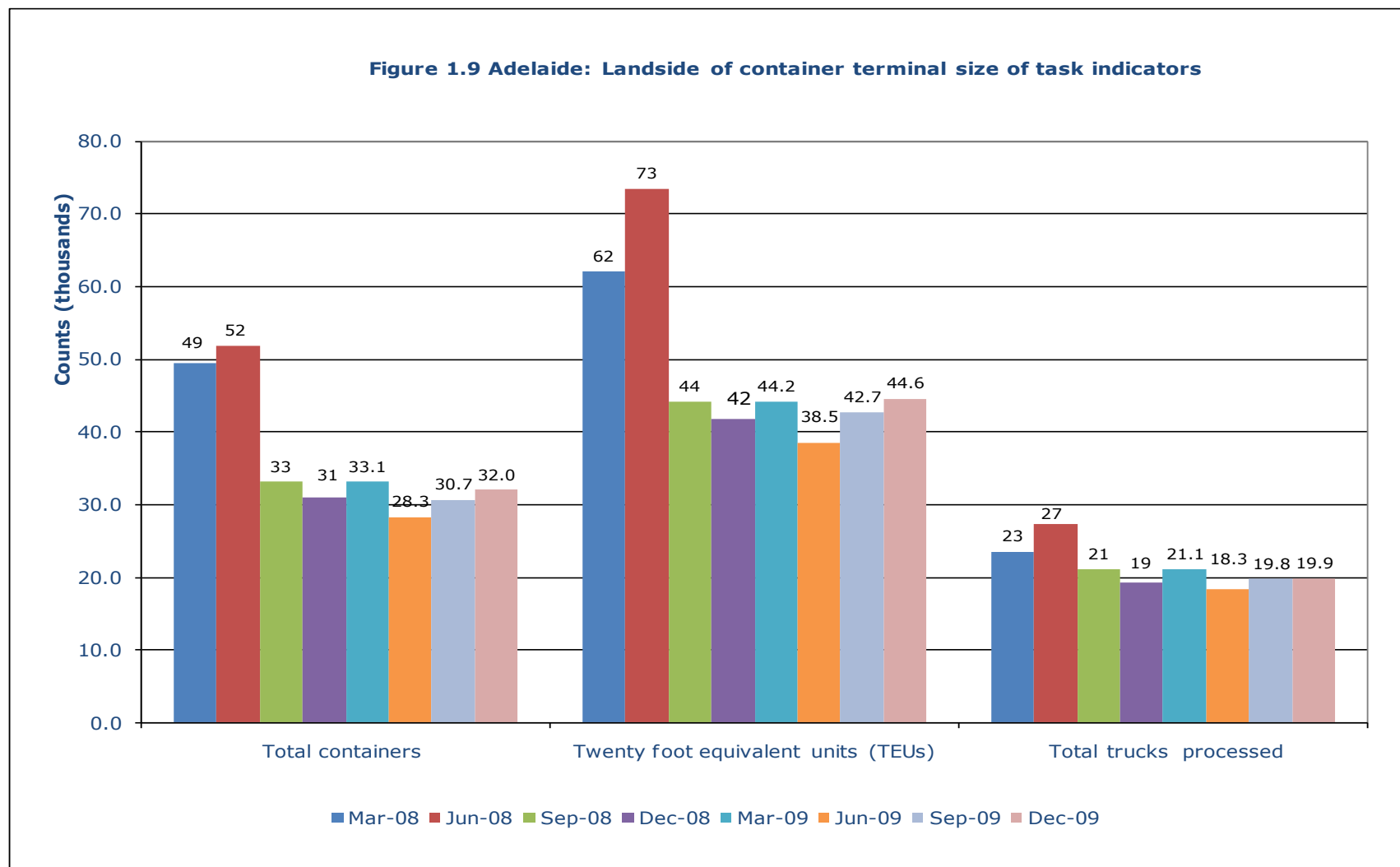
Note: The definitions of the time windows are as follows: Night (2400--0600 Monday to Friday), Day (0600--1800 Monday to Friday) and Evening (1800--2400 Monday to Friday).
Sources: Patrick and DP World.



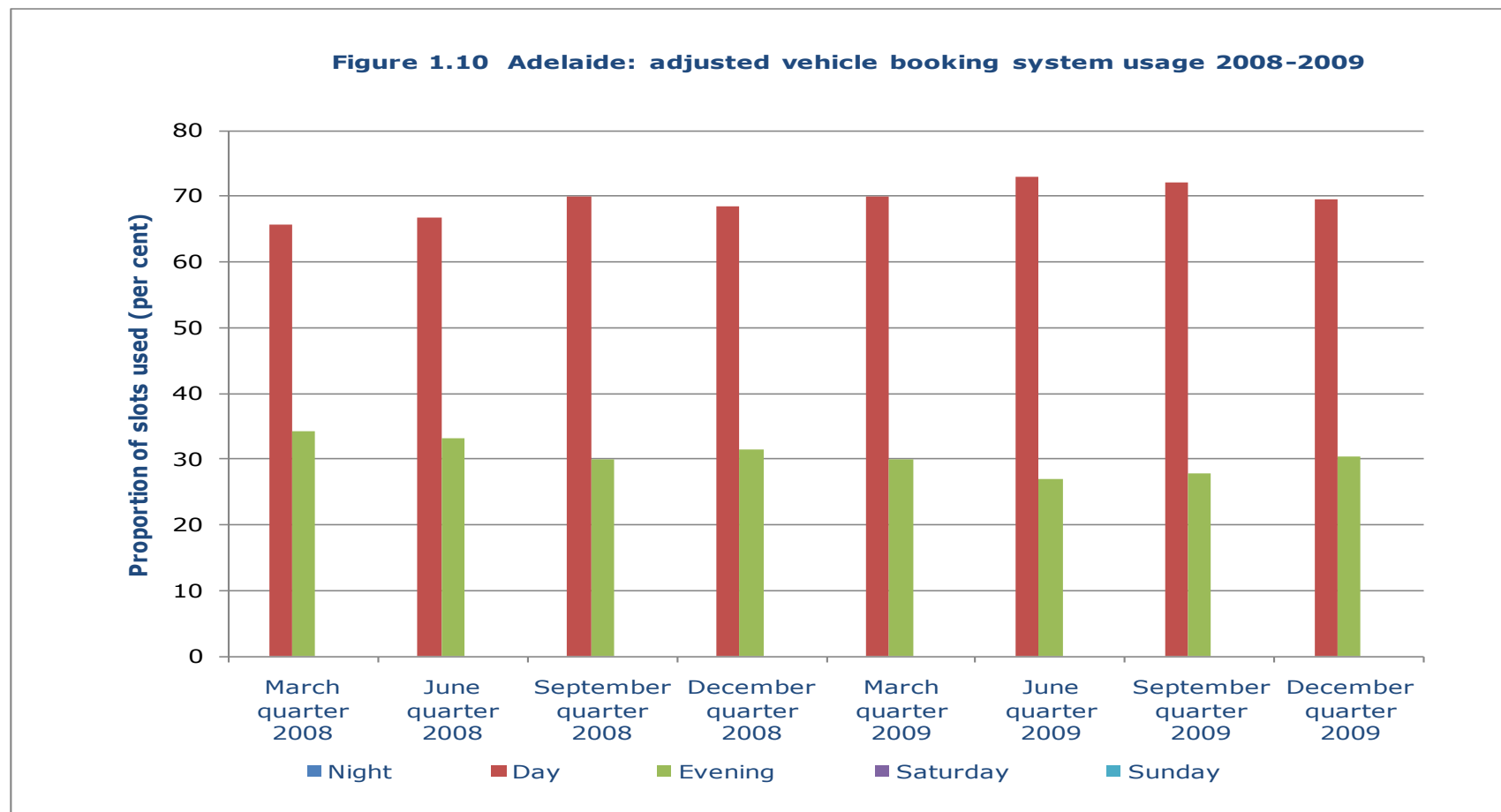
Note : The counts of containers by road, TEUs by road and trucks processed include operations under the vehicle booking system and bulk runs.
Sources: Patrick and DP World.



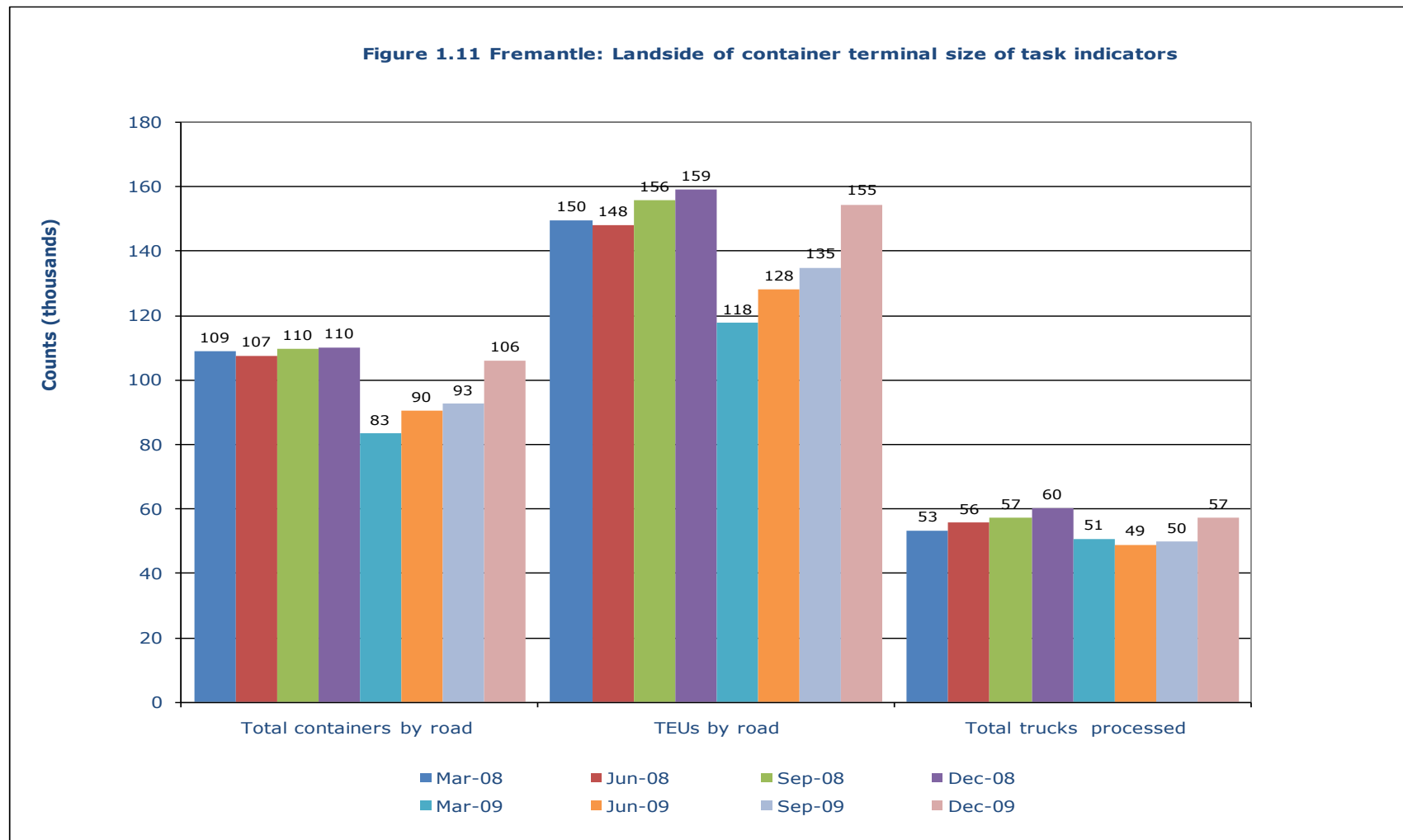
Note: The definitions of the time windows are as follows: Night (2400--0600 Monday to Friday), Day (0600--1800 Monday to Friday) and Evening (1800--2400 Monday to Friday).
Sources: Patrick and DP World.



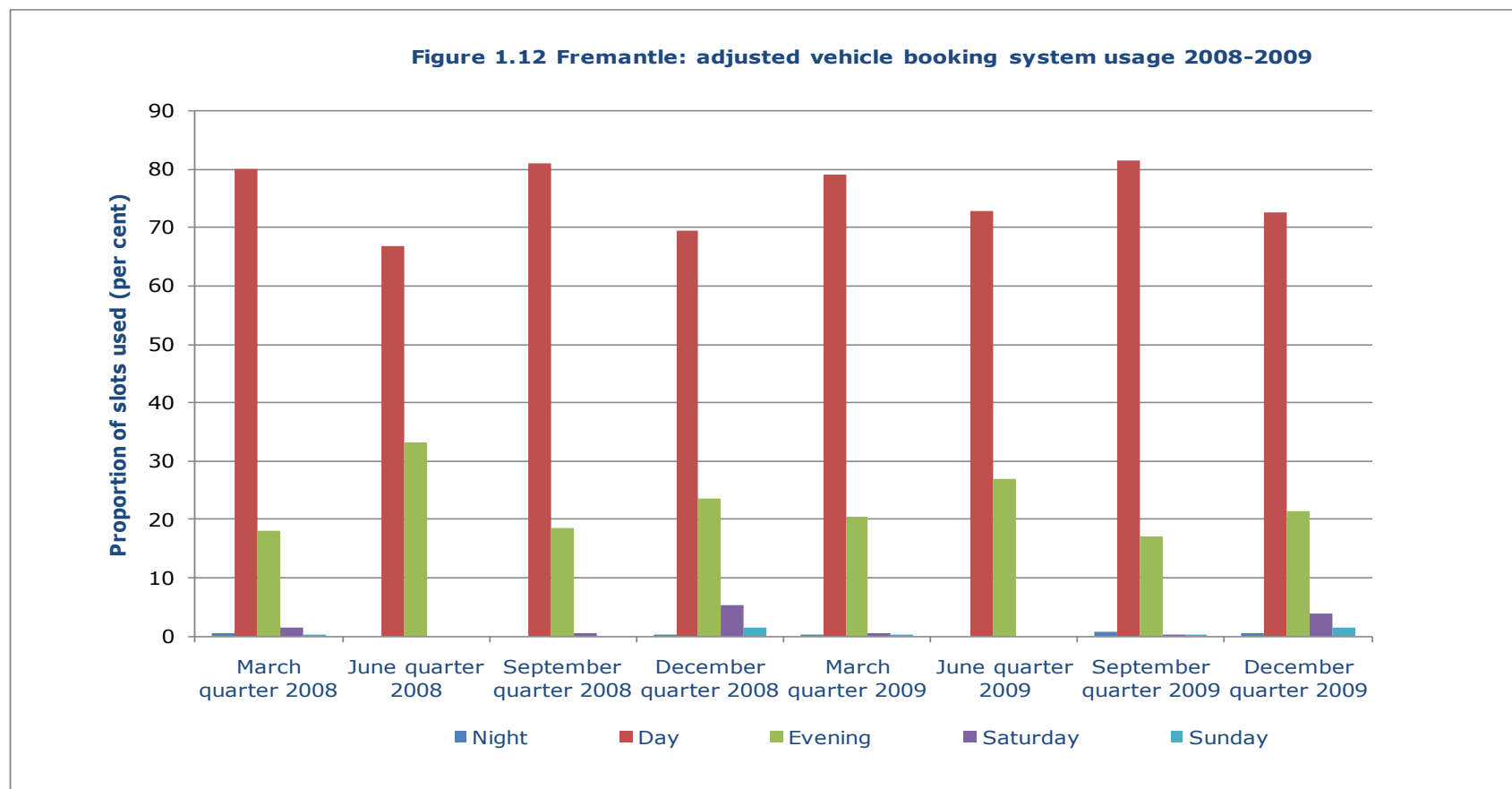
Note : The counts of containers by road, TEUs by road and trucks processed include operations under the vehicle booking system and bulk runs.
Sources: Patrick



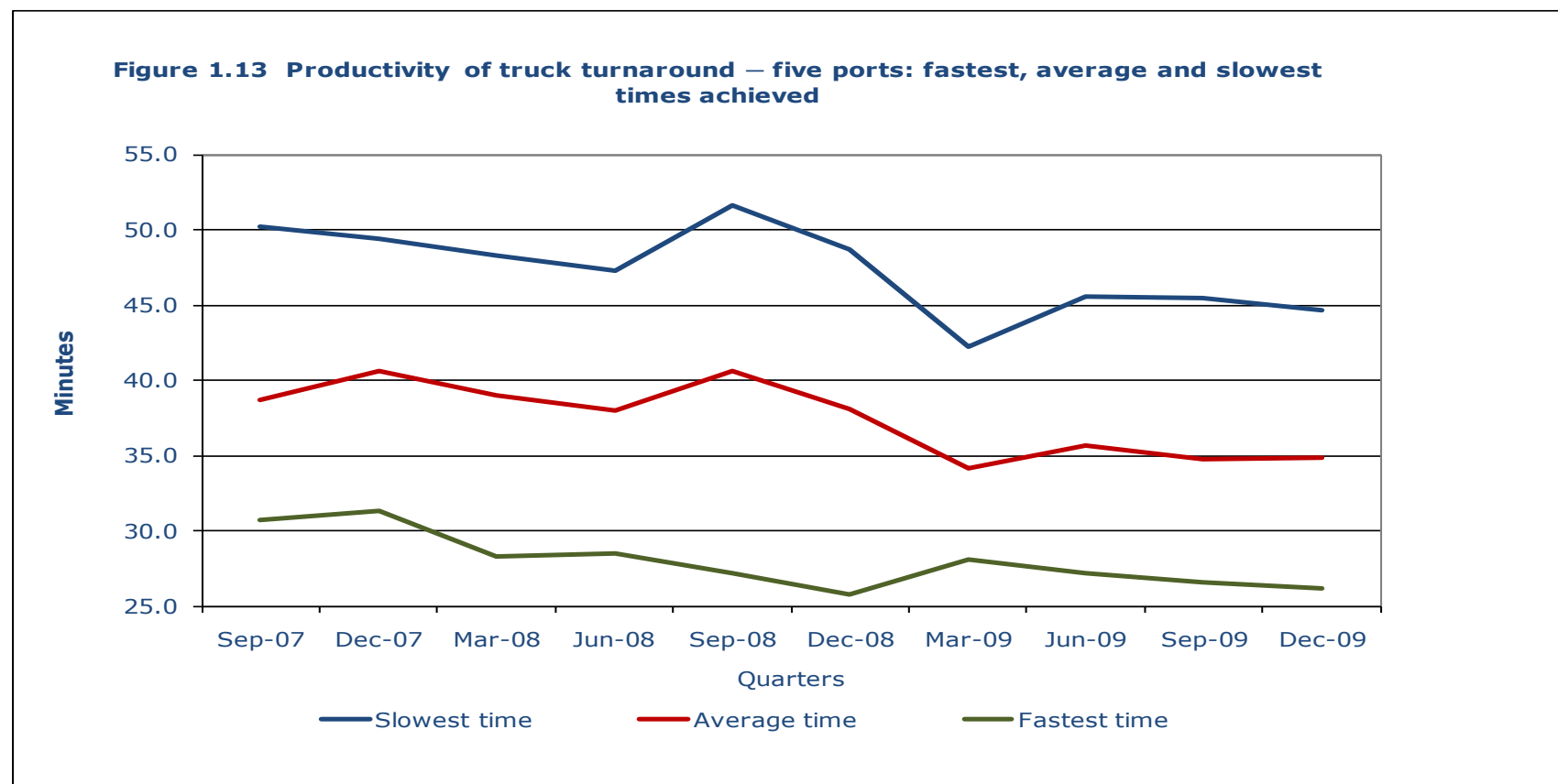
Note: The definitions of the time windows are as follows: Night (2400--0600 Monday to Friday), Day (0600--1800 Monday to Friday) and Evening (1800--2400 Monday to Friday).
Sources: Patrick



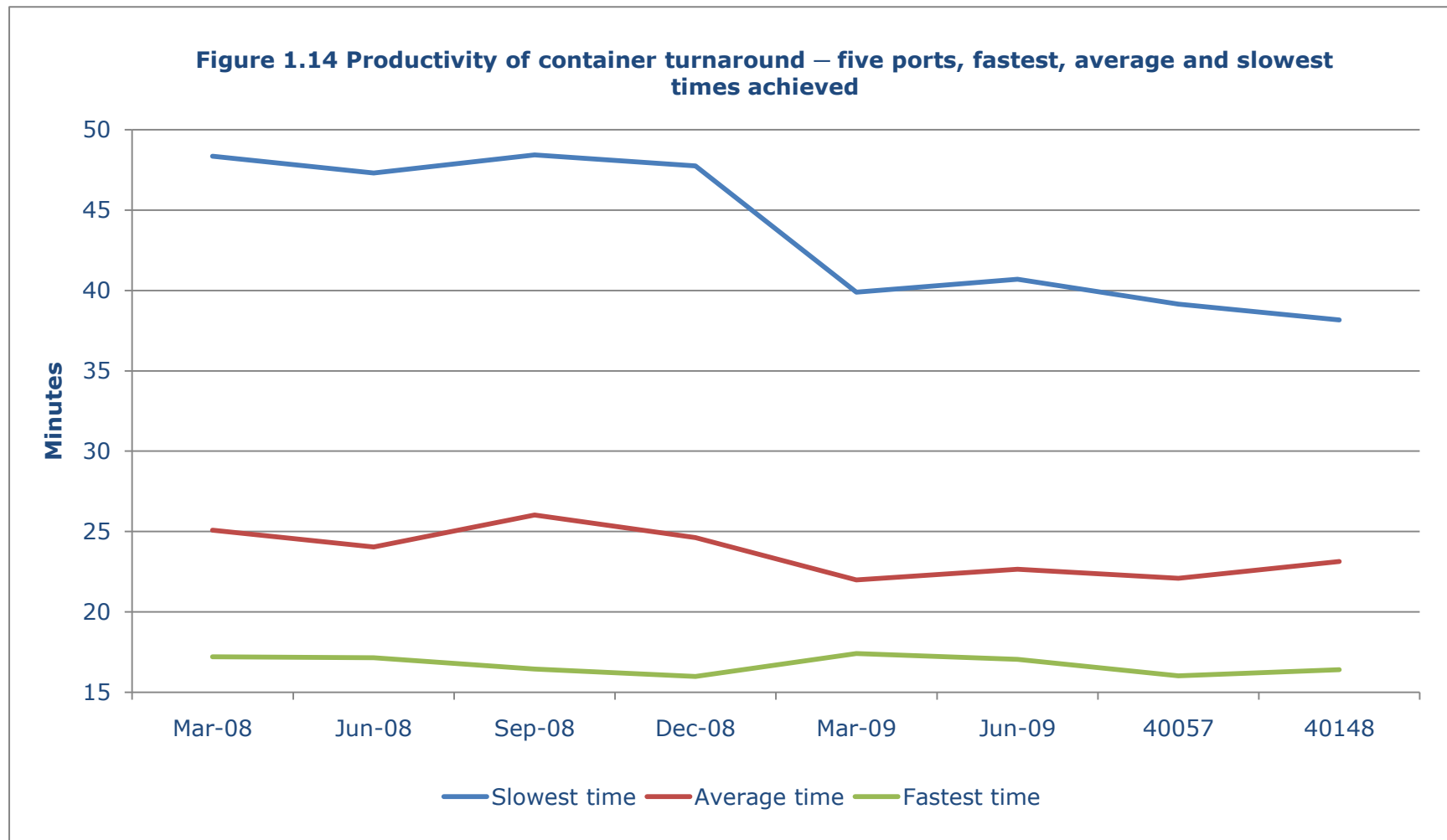
Note : The counts of containers by road, TEUs by road and trucks processed include operations under the vehicle booking system and bulk runs.
Sources: Patrick and DP World.



Note: The definitions of the time windows are as follows: Night (2400--0600 Monday to Friday), Day (0600--1800 Monday to Friday) and Evening (1800--2400 Monday to Friday).
Sources: Patrick and DP World.



Note: The upper and lower limit correspond to different port terminals in the various quarters.
 Sources: Patrick and DP World.



Note: The fastest and slowest rates correspond to different port terminals in the various quarters.
Sources: Patrick and DP World.

CHAPTER 2

Stevedoring productivity

Overview

Stevedoring productivity in this chapter refers to the productivity of moving containers from the ship to the wharf by the stevedoring companies at the five major city ports in Australia. These measures of productivity are the crane rate, the vessel working rate and the ship rate. The crane rate is the number of containers a dockside crane operator lifts on or off a container ship in an hour. The vessel working rate is a measure of the productivity of the stevedores on board a container ship in loading and unloading containers. The ship rate is the rate at which a ship is unloaded.

Stevedoring productivity indicators are presented in Table 2.1 Table 2.2 and Figures 2.1 to Figure 2.8. The notes below provide explanation of the concepts being measured, the scope of the measurement and highlights any qualifications that should be borne in mind by users of the data. The variables are discussed in the order they appear in Table 2.1.

Explanatory notes

Five ports

Data under this heading relate to simple sums of, or other form of aggregation of data for the five capital city port terminals: Brisbane, Sydney, Melbourne, Adelaide and Fremantle.

Container terminal

The movement of containers from the container vessel takes place on to a wharf or pier known as a container terminal. Unlike a traditional wharf, a container terminal needs a large area adjoining the wharf for storing unloaded containers. The containers are placed in stacks of two, three or more and are kept there until they are moved away from the terminal by truck or train. While in the terminal the containers are the responsibility of a stevedoring company.

Stevedoring

The term stevedore can refer to a company which manages the operation of loading or unloading a ship. In Australia the people who work on the waterfront are referred to as waterside workers or stevedores. A stevedoring company typically owns equipment used in the loading or discharge operation and hires labour for that purpose. A stevedoring company also may contract with a terminal owner to manage all terminal operations. Many large container ship operators have established in-house stevedoring operations to handle cargo at their own terminals and to provide stevedoring services to other container carriers. In Australia, the two major stevedoring companies are Toll/Patrick and PO Ports/Dubai Ports World.

Ships handled

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

Total containers handled

This is the total number of containers lifted on/off fully cellular ships in a given period. They should not be confused with TEUs. "Twenty foot equivalent units" is universally recognised as a measure of containers which aggregates both twenty foot and forty foot containers into twenty foot units for statistical purposes. Counts include transhipped containers and thus total container count on the wharf-side tends to be more than those on the landside of the container terminal.

TEUs Handled

The total 40-foot containers lifted on/off fully cellular ships multiplied by 2, plus the total 20-foot containers lifted on/off fully cellular ships. Counts include transhipped containers and thus total container count on the wharf-side tends to be more than those on the landside of the container terminal. Table 2.2 presents the stevedoring productivity indicators in terms of TEUs per hour. These are not directly comparable with the data in Table 2.1 because indicators based on TEUs per hour are affected by changes in the mix of 20-foot and 40-foot containers from one period to the next.

40 foot containers (per cent)

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

Crane rate (containers per hour)

This indicator measures the productivity of capital at a port terminal. This is the total containers handled divided by the elapsed crane time (defined below).

Elapsed Crane Time

This is defined as the total allocated crane hours, less operational and non-operational delays. This is the total allocated crane hours, assuming that the vessel is ready for working, less the following operational and non-operational delays:

- No labour allocated
- Closed-port holiday
- Port-wide industrial stoppage
- Total crane time spent handling break-bulk cargo and containers that require manual intervention, e.g. use of wires, chains, non-rigid spreaders or other handling gear
- Award or enterprise agreement breaks as applicable
- Adverse weather
- Delays caused by the ship or its agent
- All breakdowns, including spreader changes
- Other equipment breakdowns which stop crane operations
- Booming up for passing ships
- Handling hatch covers
- Cage work and lashing/unlashing where crane operations are affected
- Crane long-travelling between hatches and crossing accommodation
- Labour withdrawn without operator's agreement including enterprise agreement related industrial stoppages
- Over-dimensional containers requiring additional (rigid) spreader
- Spreader changes
- Waiting for export cargo
- Defective ship's gear (e.g. jammed twist-locks, broken cell guides, ballast pumps unable to maintain list/trim, etc.)

Crane time not worked (percent)

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

Vessel working rate (containers per hour)

This indicator measures labour productivity at a port terminal and is computed as the total containers handled divided by the elapsed labour time (in hours), defined below. Sometimes the vessel working rate is referred to as the 'elapsed labour rate'.

Elapsed Labour Time

This is the elapsed time between labour first boarding the ship and labour last leaving the ship, less the following non-operational delays:

- No labour allocated to ship
- Closed-port holiday
- Port-wide industrial stoppage
- Break bulk and containers that require manual interventions, eg. use of wires, chains, non-rigid spreaders or other handling gear.

For a given worker, the elapsed labour time is estimated as the difference between the time when workers first board the ship and the time when they last leave the ship, less the time when the workers have not worked for whatever reason.

Ship rate (containers per hour)

This measures the combined stevedoring productivity of capital and labour. It gives the stevedoring productivity per ship while the ship is being worked. It is computed as the product of the net crane rate and the crane intensity, defined below.

Crane Intensity

Crane intensity is the total number allocated crane hours, divided by the elapsed labour time.

Throughput pbm (tonnes per berth area expressed in square metres)

This is the quantity of container and non-container cargo which passes through the port container terminals and is measured in tonnes per berth's area in square metres. It is a measure of the density of the storage system and reflects the ability of the terminal container storage area to transfer containers from ship to shore and vice versa.

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

| <i>Port / Indicator</i> | <i>Jun-06</i> | <i>Sep-06</i> | <i>Dec-06</i> | <i>Mar-07</i> | <i>Jun-07</i> | <i>Sep-07</i> | <i>Dec-07</i> | <i>Mar-08</i> | <i>Jun-08</i> | <i>Sep-08</i> | <i>Dec-08</i> | <i>Mar-09</i> | <i>Jun-09</i> | <i>Sep-09</i> | <i>Dec-09</i> |
|------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Five ports | | | | | | | | | | | | | | | |
| Ships handled | 1 075 | 1 117 | 1 094 | 1 075 | 1 110 | 1 154 | 1 138 | 1 107 | 1 156 | 1 156 | 1 073 | 927 | 925 | 932 | 940 |
| Total containers | 795 252 | 864 475 | 923 755 | 880 552 | 874 269 | 950 996 | 1 027 779 | 949 324 | 977 870 | 1 043 867 | 1 036 375 | 833 663 | 853 558 | 933 578 | 1 037 498 |
| Crane rate | 27.0 | 27.0 | 26.8 | 27.0 | 27.2 | 26.5 | 27.2 | 27.3 | 27.5 | 27.5 | 27.5 | 28.9 | 29.8 | 29.9 | 29.5 |
| Vessel working rate | 35.3 | 35.2 | 36.1 | 36.7 | 37.4 | 37.7 | 38.4 | 39.8 | 39.1 | 38.6 | 40.7 | 38.9 | 39.4 | 41.7 | 42.2 |
| Crane time not worked (per cent) | 22 | 23 | 23 | 22 | 21 | 20 | 20 | 19.3 | 19.8 | 20.8 | 18.1 | 19.9 | 18.9 | 20.2 | 19.8 |
| 40-foot containers (per cent) | 41 | 42 | 44 | 42 | 41 | 43 | 44 | 42.9 | 42.7 | 44.7 | 44.8 | 43.7 | 42.0 | 46.2 | 47.9 |
| Ship rate | 45.2 | 46.0 | 46.8 | 47.3 | 47.1 | 47.2 | 48.0 | 49.3 | 48.7 | 48.8 | 49.6 | 48.6 | 48.5 | 52.2 | 52.6 |
| Throughput pbm | 111 | 121 | 129 | 123 | 123 | 133 | 144 | 133 | 137 | 146 | 145 | 117 | 120 | 131 | 145 |
| Brisbane | | | | | | | | | | | | | | | |
| Ships handled | 257 | 280 | 271 | 270 | 262 | 267 | 254 | 248 | 255 | 243 | 231 | 199 | 191 | 188 | 202 |
| Total containers | 129 537 | 149 996 | 157 725 | 153 481 | 146 916 | 164 803 | 177 766 | 153 170 | 162 475 | 172 604 | 171 674 | 138 155 | 137 896 | 152 392 | 168 978 |
| Crane rate | 24.0 | 23.6 | 23.0 | 22.8 | 23.0 | 23.0 | 24.5 | 22.8 | 23.1 | 25.2 | 23.8 | 26.0 | 26.9 | 27.2 | 27.6 |
| Vessel working rate | 27.0 | 25.9 | 25.1 | 26.7 | 26.2 | 26.3 | 30.1 | 29.6 | 28.5 | 32.5 | 31.4 | 30.8 | 30.8 | 33.3 | 34.7 |
| Crane time not worked (per cent) | 24 | 29 | 31 | 27 | 28 | 22 | 21 | 21.0 | 21.3 | 20.0 | 17.6 | 18.9 | 21.2 | 22.5 | 22.5 |
| 40-foot containers (per cent) | 42 | 39 | 43 | 42 | 41 | 43 | 46 | 44.6 | 43.1 | 44.5 | 44.6 | 43.1 | 43.4 | 47.1 | 49.5 |
| Stevedoring variability (per cent) | 50 | 59 | 52 | 63 | 52 | 49 | 47 | 53.6 | 46.1 | 39.5 | 46.3 | 39.4 | 39.4 | 33.9 | 37.1 |
| Ship rate | 35.6 | 36.5 | 36.5 | 36.7 | 36.6 | 33.7 | 37.9 | 37.5 | 36.3 | 40.6 | 38.1 | 38.0 | 39.1 | 42.9 | 44.7 |
| Throughput pbm | 81 | 93 | 98 | 96 | 91 | 103 | 111 | 95 | 101 | 107 | 107 | 86 | 86 | 95 | 105 |
| Sydney | | | | | | | | | | | | | | | |
| Ships handled | 307 | 318 | 322 | 305 | 317 | 338 | 342 | 321 | 343 | 351 | 321 | 274 | 275 | 276 | 279 |
| Total containers | 249 580 | 274 042 | 299 864 | 274 937 | 271 655 | 299 142 | 327 858 | 302 223 | 308 660 | 342 522 | 346 663 | 277 606 | 283 416 | 315 905 | 361 971 |
| Crane rate | 26.7 | 26.5 | 26.4 | 26.2 | 26.9 | 24.9 | 25.8 | 27.1 | 27.2 | 26.7 | 27.0 | 29.1 | 29.9 | 29.9 | 28.2 |
| Vessel working rate | 33.9 | 34.2 | 34.6 | 35.8 | 36.1 | 36.4 | 37.6 | 39.8 | 39.7 | 35.7 | 38.3 | 37.4 | 37.7 | 39.3 | 38.8 |
| Crane time not worked (per cent) | 25 | 26 | 24 | 24 | 24 | 21 | 22 | 22.1 | 22.8 | 26.1 | 22.0 | 22.8 | 21.2 | 21.8 | 20.5 |
| 40-foot containers (per cent) | 44 | 46 | 47 | 45 | 44 | 46 | 47 | 45.5 | 45.4 | 46.4 | 46.6 | 45.7 | 44.0 | 47.3 | 49.7 |
| Stevedoring variability (per cent) | 54 | 50 | 55 | 55 | 48 | 47 | 43 | 49.2 | 47.6 | 50.4 | 56.7 | 49.5 | 49.6 | 46.0 | 49.3 |
| Ship rate | 45.0 | 46.3 | 45.7 | 46.9 | 47.6 | 46.1 | 48.5 | 51.2 | 51.4 | 48.4 | 49.1 | 48.5 | 47.9 | 50.3 | 48.9 |
| Throughput pbm | 129 | 141 | 154 | 142 | 140 | 154 | 169 | 156 | 159 | 176 | 179 | 143 | 146 | 163 | 186 |
| Melbourne | | | | | | | | | | | | | | | |
| Ships handled | 318 | 321 | 314 | 316 | 326 | 333 | 331 | 326 | 346 | 353 | 316 | 268 | 266 | 274 | 275 |
| Total containers | 297 877 | 314 900 | 330 896 | 320 426 | 315 181 | 334 640 | 361 085 | 332 443 | 340 140 | 363 079 | 355 915 | 280 218 | 293 258 | 321 229 | 348 091 |
| Crane rate | 28.2 | 28.3 | 28.1 | 28.7 | 28.5 | 28.6 | 29.3 | 28.9 | 29.4 | 29.6 | 30.1 | 30.3 | 31.4 | 31.9 | 32.0 |
| Vessel working rate | 40.5 | 41.2 | 43.5 | 43.2 | 44.8 | 46.0 | 45.6 | 46.6 | 45.7 | 47.0 | 50.8 | 46.8 | 49.2 | 52.4 | 52.8 |
| Crane time not worked (per cent) | 19 | 20 | 19 | 19 | 15 | 18 | 17 | 15.7 | 17.4 | 16.8 | 15.1 | 17.0 | 15.2 | 17.1 | 16.9 |
| 40-foot containers (per cent) | 40 | 42 | 42 | 42 | 41 | 44 | 43 | 43.4 | 43.6 | 45.8 | 45.1 | 44.7 | 40.7 | 46.3 | 47.8 |
| Stevedoring variability (per cent) | 57 | 59 | 59 | 54 | 56 | 51 | 51 | 54.9 | 40.5 | 60.9 | 44.3 | 61.0 | 60.9 | 39.0 | 42.7 |
| Ship rate | 50.1 | 51.4 | 53.4 | 53.5 | 52.5 | 55.9 | 55.2 | 55.3 | 55.3 | 56.5 | 59.8 | 56.4 | 58.0 | 63.2 | 63.5 |
| Throughput pbm | 163 | 172 | 181 | 175 | 173 | 183 | 198 | 182.1 | 186.3 | 198.8 | 194.9 | 153.5 | 160.6 | 175.9 | 190.6 |
| Adelaide | | | | | | | | | | | | | | | |
| Ships handled | 67 | 68 | 65 | 67 | 74 | 86 | 82 | 84 | 77 | 68 | 67 | 56 | 60 | 59 | 59 |
| Total containers | 37 581 | 39 208 | 40 949 | 43 359 | 46 382 | 52 693 | 53 486 | 54 357 | 59 584 | 56 250 | 54 905 | 43 294 | 49 912 | 51 500 | 53 632 |
| Crane rate | 30.6 | 32.0 | 31.0 | 30.9 | 30.0 | 29.8 | 29.7 | 29.6 | 29.6 | 29.3 | 26.5 | 27.8 | 26.9 | 25.2 | 26.4 |
| Vessel working rate | 35.9 | 37.4 | 36.0 | 36.5 | 33.9 | 35.5 | 29.8 | 35.7 | 40.4 | 40.0 | 32.3 | 35.1 | 31.8 | 33.3 | 35.2 |

| | | | | | | | | | | | | | | | |
|------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Crane time not worked (per cent) | 13 | 13 | 16 | 12 | 14 | 13 | 10 | 14.2 | 9.3 | 9.6 | 9.4 | 11.1 | 7.6 | 14.2 | 15.8 |
| 40-foot containers (per cent) | 31 | 32 | 35 | 31 | 30 | 29 | 32 | 30.7 | 31.6 | 32.6 | 32.8 | 33.7 | 35.0 | 37.4 | 36.0 |
| Stevedoring variability (per cent) | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na |
| Ship rate | 41.2 | 43.2 | 42.8 | 41.7 | 39.2 | 40.9 | 33.1 | 41.6 | 44.5 | 44.2 | 35.7 | 39.5 | 34.4 | 38.8 | 41.8 |
| Throughput pbm | 80 | 83 | 87 | 92 | 99 | 112 | 114 | 116 | 127 | 120 | 117 | 92 | 106 | 110 | 114 |

Fremantle

| | | | | | | | | | | | | | | | |
|------------------------------------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|--------|--------|--------|---------|
| Ships handled | 126 | 130 | 122 | 117 | 131 | 130 | 129 | 128 | 135 | 141 | 138 | 130 | 133 | 135 | 125 |
| Total containers | 80 677 | 86 329 | 94 321 | 88 349 | 94 135 | 99 718 | 107 584 | 107 131 | 107 011 | 109 412 | 107 218 | 94 390 | 89 076 | 92 552 | 104 826 |
| Crane rate | 27.3 | 27.6 | 27.8 | 28.1 | 29.0 | 28.4 | 28.0 | 28.3 | 27.8 | 26.2 | 26.7 | 29.1 | 29.9 | 29.8 | 30.3 |
| Vessel working rate | 33.1 | 31.7 | 33.5 | 33.6 | 35.3 | 33.8 | 34.9 | 34.9 | 31.3 | 29.2 | 33.6 | 33.7 | 29.7 | 31.3 | 34.4 |
| Crane time not worked (per cent) | 26 | 27 | 27 | 29 | 26 | 28 | 25 | 24.1 | 24.1 | 26.7 | 22.1 | 26.0 | 28.6 | 28.3 | 27.9 |
| 40-foot containers (per cent) | 39 | 43 | 44 | 40 | 37 | 39 | 41 | 38.0 | 37.7 | 42.2 | 44.0 | 40.1 | 41.9 | 45.8 | 45.7 |
| Stevedoring variability (per cent) | 47 | 47 | 53 | 56 | 44 | 55 | 63 | 56.3 | 46.8 | 66.7 | 53.6 | 66.6 | 66.6 | 38.7 | 43.4 |
| Ship rate | 44.9 | 43.5 | 46.1 | 47.1 | 47.6 | 47.1 | 46.8 | 46.0 | 41.2 | 39.8 | 43.1 | 45.5 | 41.6 | 43.6 | 47.8 |
| Throughput pbm | 62 | 67 | 73 | 68 | 73 | 77 | 83 | 83.0 | 82.9 | 84.7 | 83.0 | 73.1 | 69.0 | 71.7 | 81.2 |

na not available
r revised
pbm per berth metre

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

Sources Patrick, DP World.

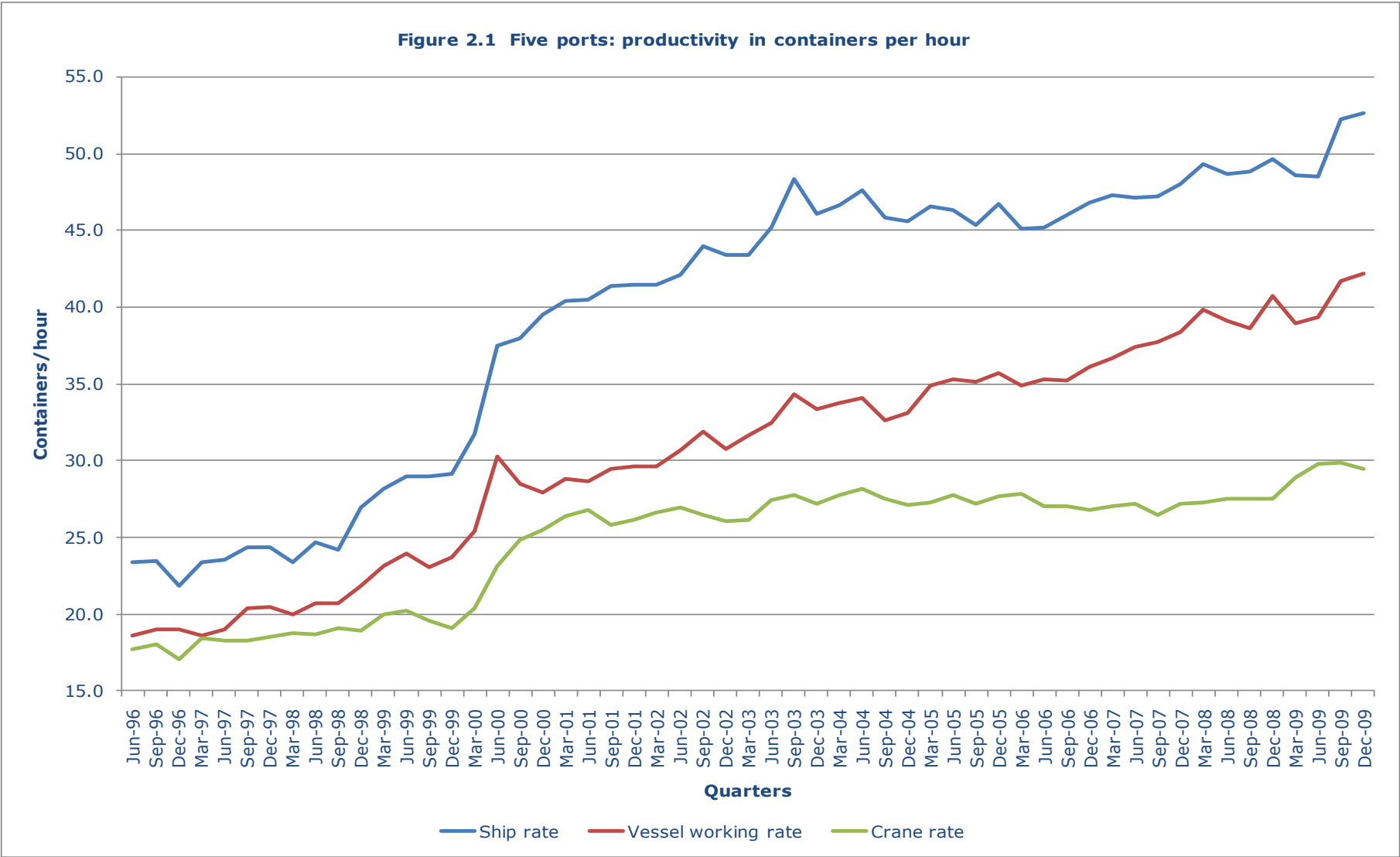
Table 2.2 Container terminal performance indicators - productivity in teus per hour

| Port / Indicator | Dec-06 | Mar-07 | Jun-07 | Sep-07 | Dec-07 | Mar-08 | Jun-08 | Sep-08 | Dec-08 | Mar-09 | Jun-09 | Sep-09 | Dec-09 |
|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Five Ports | | | | | | | | | | | | | |
| Ships handled | 1 094 | 1 075 | 1 110 | 1 154 | 1 138 | 1 107 | 1 156 | 1 156 | 1 073 | 927 | 925 | 932 | 940 |
| Total teus | 1 329 707 | 1 253 983 | 1 234 276 | 1 363 144 | 1 479 205 | 1 356 859 | 1 395 650 | 1 510 291 | 1 500 175 | 1 197 845 | 1 212 340 | 1 364 981 | 1 534 762 |
| Crane rate | 38.5 | 38.3 | 38.4 | 37.9 | 39.1 | 39.0 | 39.2 | 39.9 | 39.8 | 41.4 | 42.7 | 43.7 | 43.8 |
| Vessel working rate | 51.9 | 52.3 | 52.9 | 54.1 | 55.3 | 57.0 | 55.9 | 56.0 | 59.0 | 56.0 | 55.9 | 61.0 | 62.5 |
| Ship rate | 67.4 | 67.4 | 66.6 | 67.6 | 69.2 | 70.6 | 69.8 | 70.8 | 72.1 | 69.6 | 69.6 | 76.4 | 78.2 |
| Brisbane | | | | | | | | | | | | | |
| Ships handled | 271 | 270 | 262 | 267 | 254 | 248 | 255 | 243 | 231 | 199 | 191 | 188 | 202 |
| Total teus | 226 197 | 218 323 | 207 120 | 236 083 | 258 726 | 221 515 | 232 442 | 249 372 | 248 183 | 197 645 | 197 793 | 224 152 | 252 673 |
| Crane rate | 33.0 | 32.3 | 32.4 | 32.8 | 35.6 | 32.9 | 32.9 | 36.4 | 34.5 | 37.2 | 38.4 | 39.8 | 41.0 |
| Vessel working rate | 36.0 | 37.9 | 36.9 | 37.5 | 43.7 | 42.8 | 40.7 | 46.9 | 45.5 | 44.0 | 44.1 | 48.9 | 51.8 |
| Ship rate | 52.4 | 52.1 | 51.5 | 48.1 | 55.2 | 54.3 | 51.8 | 58.7 | 55.1 | 54.5 | 55.8 | 62.9 | 66.8 |
| Sydney | | | | | | | | | | | | | |
| Ships handled | 322 | 305 | 317 | 338 | 342 | 321 | 343 | 351 | 321 | 274 | 275 | 276 | 279 |
| Total teus | 441 497 | 399 924 | 392 505 | 437 332 | 481 442 | 439 755 | 448 857 | 501 480 | 508 196 | 404 554 | 408 159 | 465 307 | 541 938 |
| Crane rate | 38.9 | 38.2 | 38.8 | 36.5 | 37.9 | 39.5 | 39.5 | 39.1 | 39.5 | 42.2 | 43.4 | 43.8 | 42.5 |
| Vessel working rate | 51.0 | 52.0 | 52.2 | 53.1 | 55.2 | 58.1 | 57.8 | 52.4 | 56.2 | 54.6 | 54.3 | 58.0 | 58.1 |
| Ship rate | 67.4 | 68.2 | 68.8 | 67.2 | 71.1 | 74.5 | 74.9 | 70.9 | 72.0 | 70.2 | 69.4 | 73.7 | 73.7 |
| Melbourne | | | | | | | | | | | | | |
| Ships handled | 314 | 316 | 326 | 333 | 331 | 326 | 346 | 353 | 316 | 268 | 266 | 274 | 275 |
| Total teus | 470 823 | 455 538 | 445 563 | 482 599 | 516 425 | 476 655 | 488 594 | 529 223 | 516 431 | 405 493 | 412 653 | 469 802 | 514 533 |
| Crane rate | 40.0 | 40.8 | 40.2 | 41.0 | 41.9 | 41.4 | 42.2 | 43.2 | 43.7 | 43.4 | 45.2 | 46.8 | 47.4 |
| Vessel working rate | 61.9 | 61.5 | 63.4 | 66.2 | 65.2 | 66.9 | 65.6 | 68.5 | 73.7 | 67.6 | 69.3 | 76.5 | 78.0 |
| Ship rate | 76.1 | 76.1 | 74.2 | 80.1 | 78.9 | 79.3 | 79.5 | 82.3 | 86.8 | 80.6 | 83.5 | 92.6 | 94.1 |
| Adelaide | | | | | | | | | | | | | |
| Ships handled | 65 | 67 | 74 | 86 | 82 | 84 | 77 | 68 | 67 | 56 | 60 | 59 | 59 |
| Total teus | 55 227 | 56 739 | 60 134 | 68 175 | 70 647 | 71 066 | 78 420 | 74 603 | 72 937 | 57 903 | 67 378 | 70 747 | 72 937 |
| Crane rate | 41.8 | 40.4 | 39.0 | 38.6 | 39.3 | 38.7 | 38.9 | 38.9 | 35.1 | 37.2 | 36.3 | 34.7 | 35.9 |
| Vessel working rate | 48.6 | 47.8 | 43.9 | 45.9 | 39.4 | 46.7 | 52.7 | 53.0 | 42.9 | 46.9 | 42.9 | 45.7 | 47.9 |
| Ship rate | 57.8 | 54.5 | 50.8 | 52.9 | 43.8 | 54.4 | 58.6 | 58.6 | 47.4 | 52.8 | 46.4 | 53.3 | 56.9 |
| Fremantle | | | | | | | | | | | | | |
| Ships handled | 122 | 117 | 131 | 130 | 129 | 128 | 135 | 141 | 138 | 130 | 133 | 135 | 125 |
| Total teus | 135 963 | 123 459 | 128 954 | 138 955 | 151 965 | 147 868 | 147 337 | 155 613 | 154 428 | 132 250 | 126 357 | 134 973 | 152 681 |
| Crane rate | 40.0 | 39.2 | 39.9 | 39.6 | 39.5 | 38.7 | 38.3 | 37.3 | 38.5 | 41.0 | 42.4 | 43.5 | 44.1 |
| Vessel working rate | 48.3 | 47.0 | 48.4 | 47.2 | 49.4 | 48.3 | 43.1 | 41.5 | 48.4 | 47.2 | 42.1 | 45.7 | 50.3 |
| Ship rate | 66.6 | 65.9 | 65.3 | 65.7 | 66.2 | 63.5 | 56.8 | 56.6 | 62.1 | 64.0 | 59.0 | 63.9 | 69.8 |

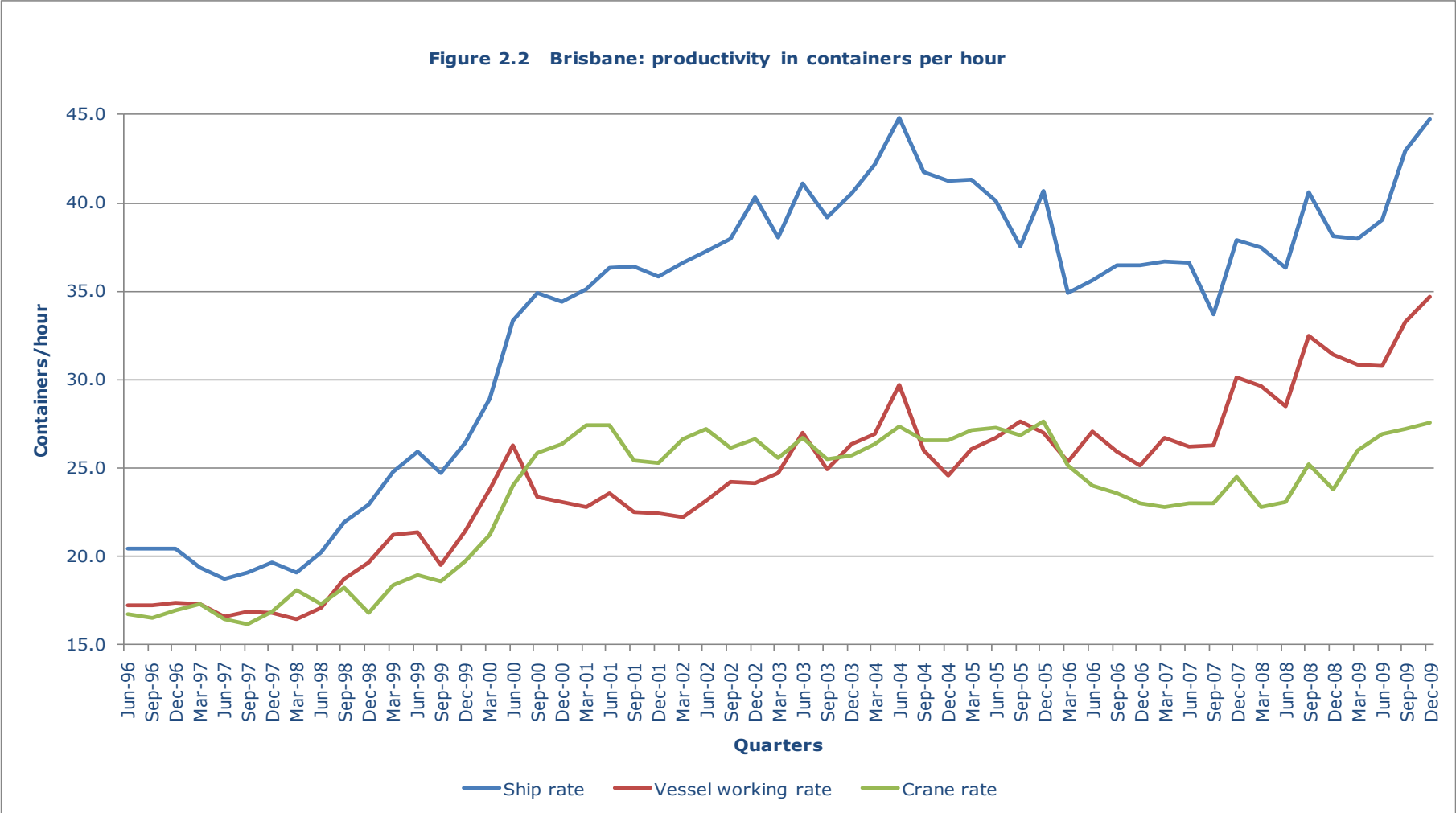
na not available

Notes 1. Data from CSX World Terminals at Brisbane are incorporated from the December quarter 1999 onwards.

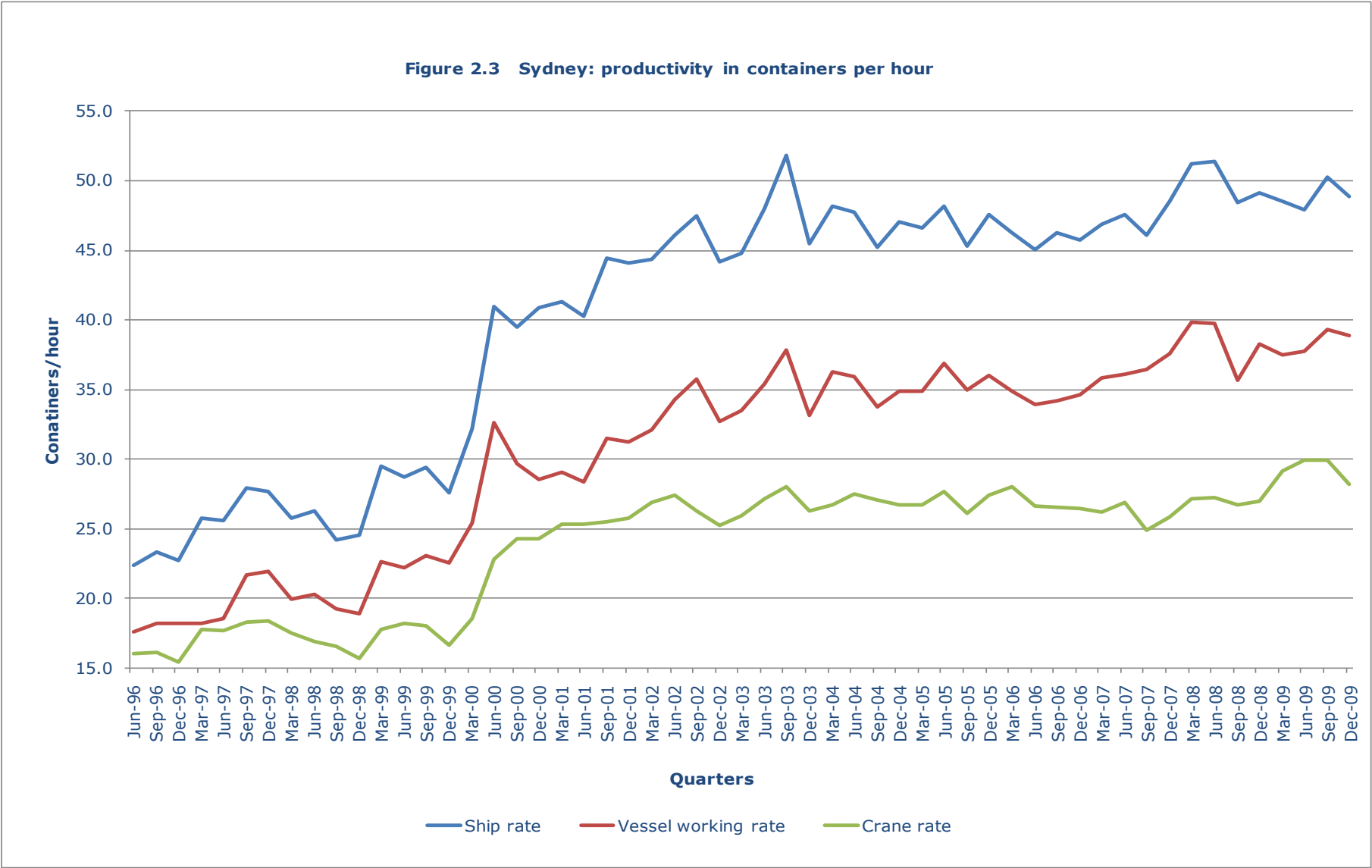
Sources Patrick, DP World.



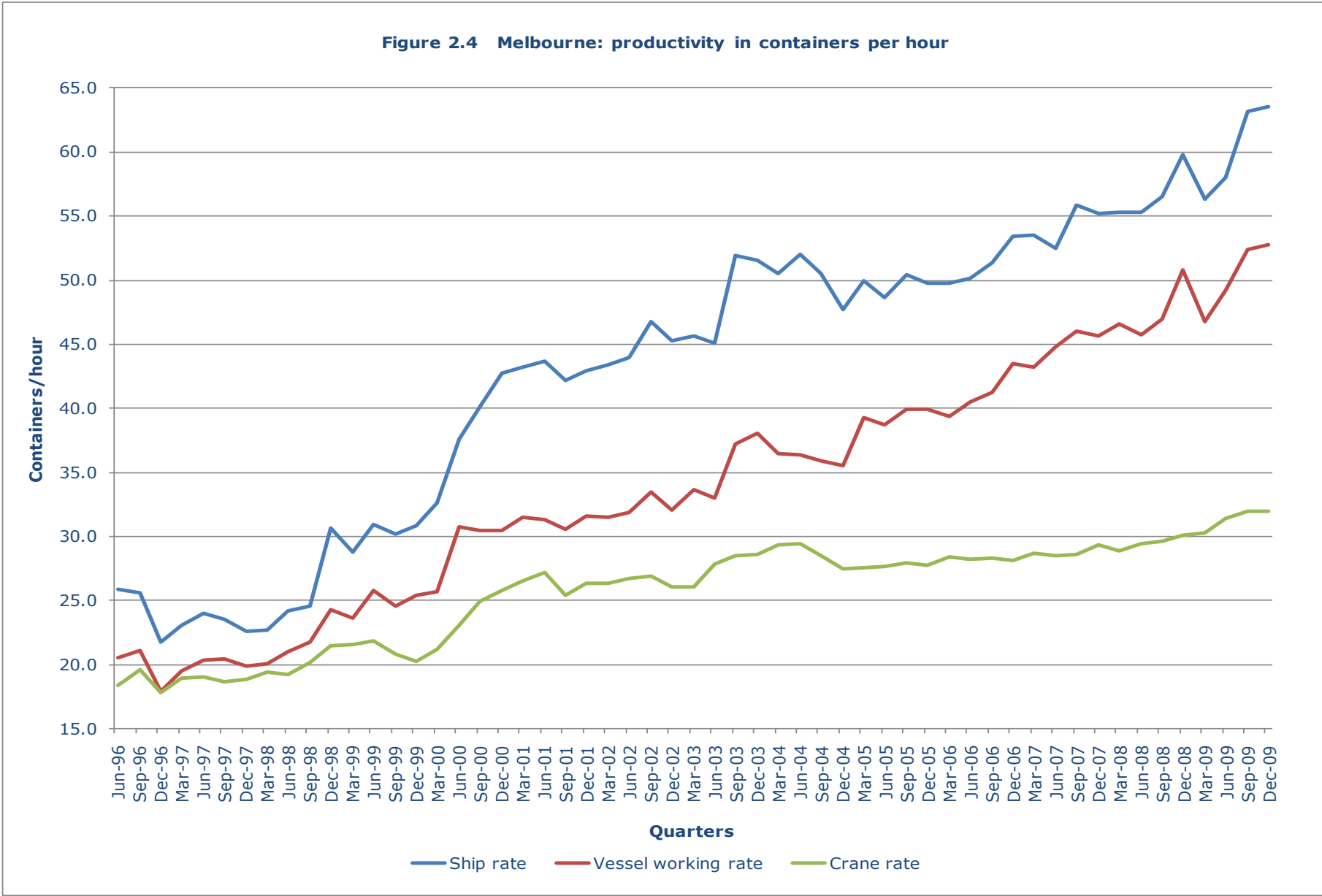
Note: these figures are based on data in Table 2.1. See explanatory notes for definition of terms.
Sources: Patrick and DP World.



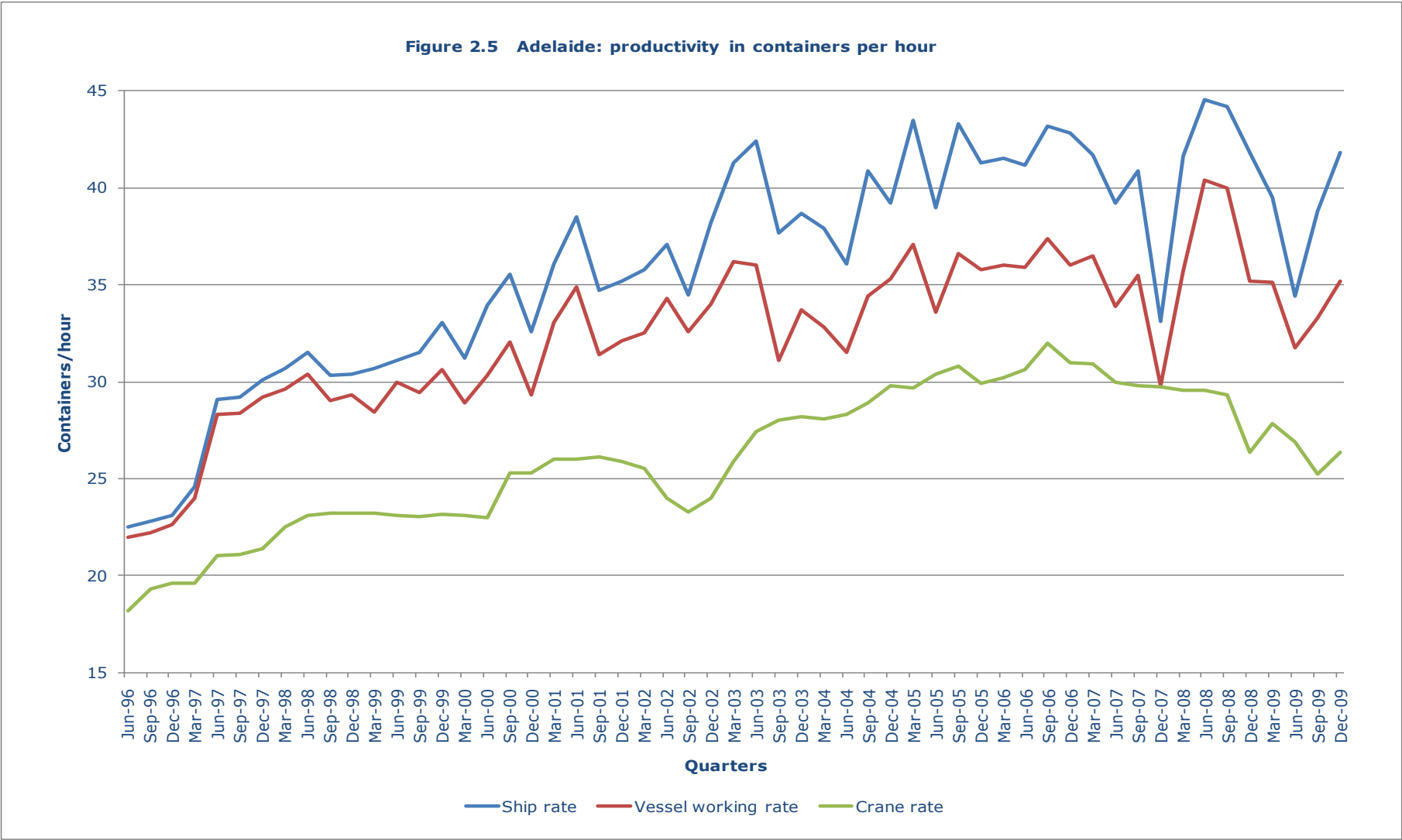
Note: these figures are based on data in Table 2.1. See explanatory notes for definition of terms.
Sources: Patrick and DP World.



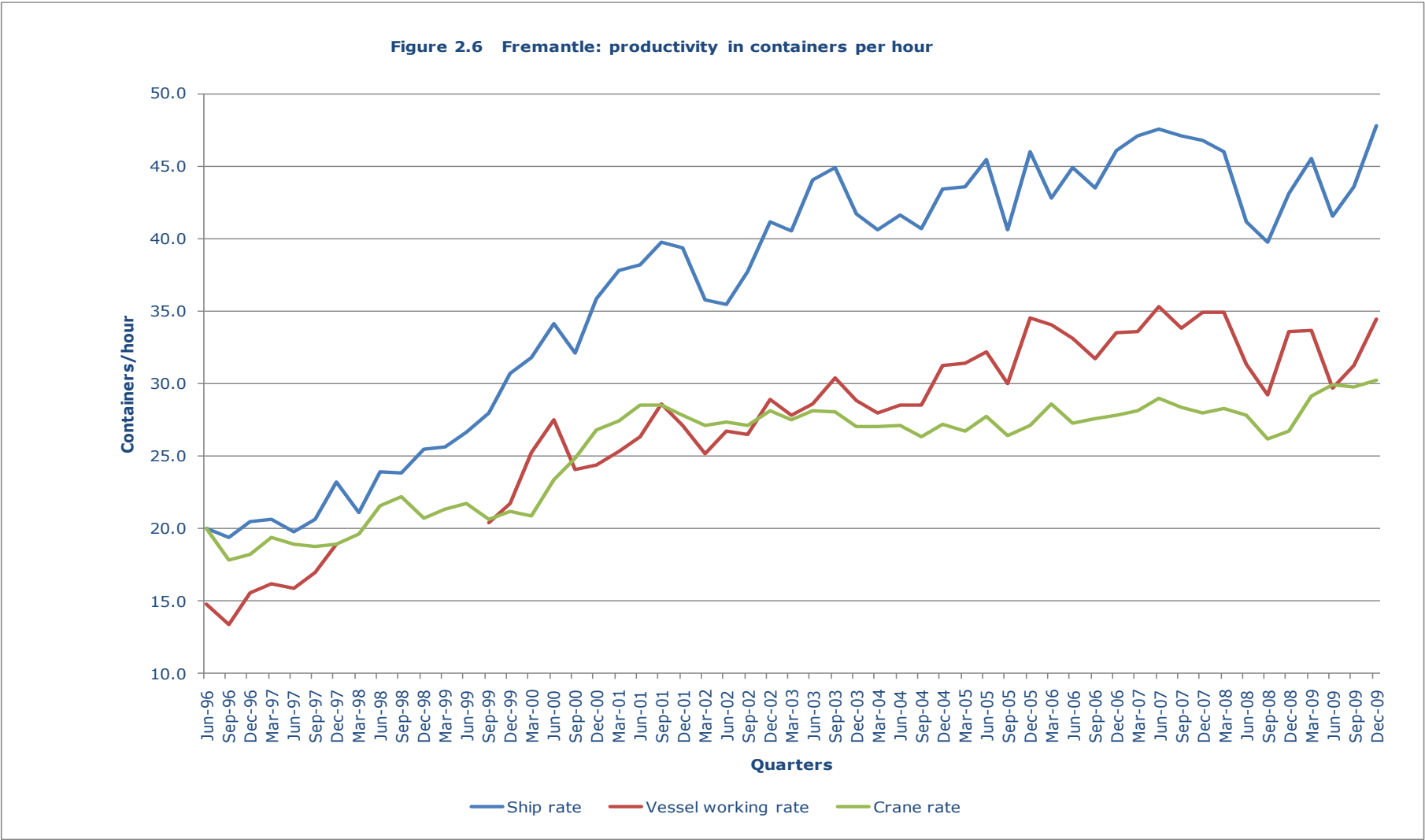
Note: these figures are based on data in Table 2.1. See explanatory notes for definition of terms.
Sources: Patrick and DP World.



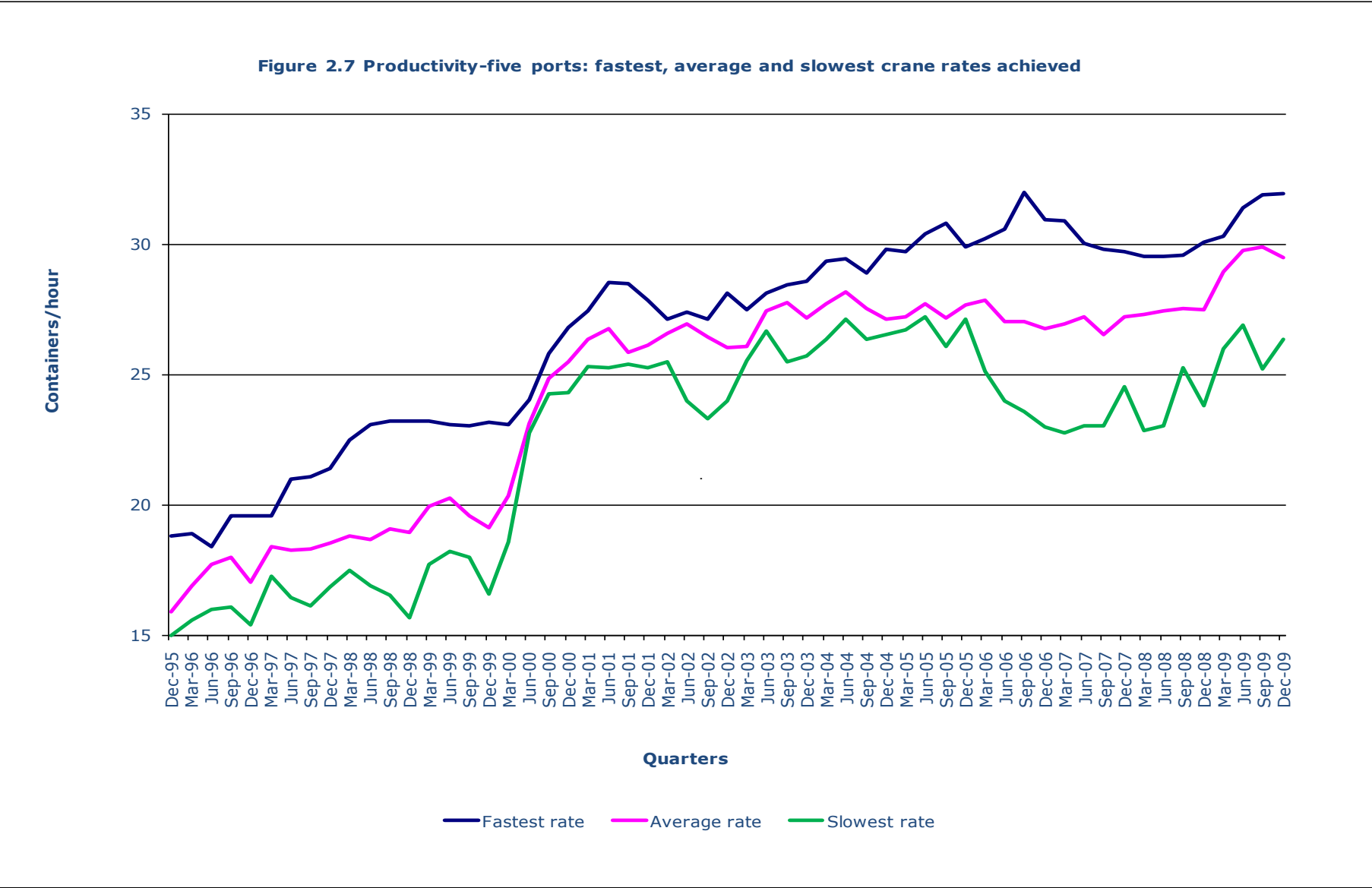
Note: these figures are based on data in Table 2.1. See explanatory notes for definition of terms.
Sources: Patrick and DP World.



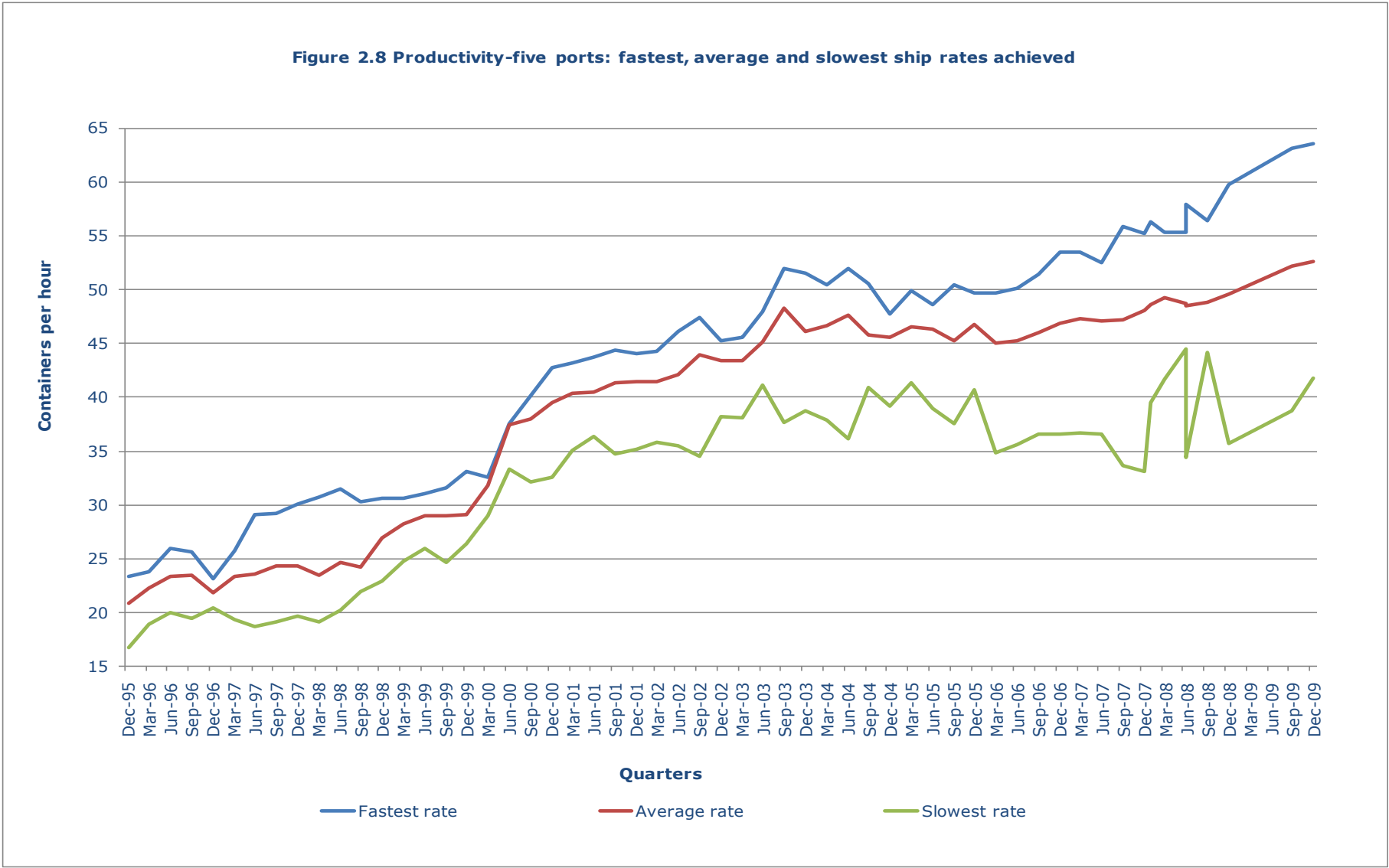
Note: these figures are based on data in Table 2.1. See explanatory notes for definition of terms.
Sources: Patrick and DP World.



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



Note: The fastest and slowest rates correspond to different port terminals in the various quarters.
Sources: Patrick and DP World.



Note: The fastest and slowest rates correspond to different port terminals in the various quarters.
Sources: Patrick and DP World.

CHAPTER 3

Port interface cost index

Overview

The port interface cost index provides a measure of shore-based shipping costs (charges) for containers moved through Australian mainland major city ports. These five ports account for approximately 90 per cent of Australia's container traffic. Data are presented in Tables 3.1 to 3.8. 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.

Explanatory notes

Vessel size

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

Parameters

The Port Interface Cost Index (PICI) has as its starting point the estimation of parameters for two typical sizes of container ships:

- 17 215 GT vessel represents all vessels of sizes ranging from 15 000 to 20 000;
- 37 394 GT vessel represents all vessels of sizes ranging from 35 000 to 40 000.

These parameters enable the PICI charges to be estimated on a per TEU basis. The parameters are summarised in Table 3.1 and they are:

- Average TEU exchanged for each vessel size;
- Average number of port calls; and
- Elapsed berth time (hours).

It is then possible to estimate ship based and cargo based charges per TEU for these typical vessels. These are presented in Tables 3.2 and 3.3. Ship based charges are the charges vessel owners pay for a port visit by the vessel. Cargo based charges are the charges levied on the actual cargo of containers.

The port interface costs per TEU consist of the total costs which affect the import and export of a container. They are presented in [Tables 3.4](#) and [3.5](#). The total costs are the sum of the ship-based charges, the cargo-based charges, the stevedoring costs, customs brokers' fees and transport charges. The stevedoring costs are taken from the ACCC annual report on the stevedoring industry. Together these costs enable the calculation of the national port interface index measured in current and constant (2001) prices in dollars per TEU. This is the final result and provides an estimate of how much it costs to import or export one TEU.

What PICI measures

The port interface cost index is a measure of shore-based shipping costs or charges for containers moved through mainland capital city ports. These are called 'shore-based' because they are that part of the charges paid by importers and exporters of containers which are directly related to the activity which occurs in the port and on the wharf. They do not include the total price for importing or exporting goods carried in containers paid by customers to customs brokers and freight forwarders.

The index is a measure of the movements in costs to users of waterfront and related services and, therefore, whether the cost is increasing or decreasing. The waterfront is defined as the interface between seaports and land transport, hence the term port interface cost index.

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

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

Data sources

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

TEUs

This is an industry standard measure of shipping containers. TEUs are twenty foot equivalent units.

TEUs loaded

Twenty foot equivalent container units loaded with goods.

TEUs empty

Twenty foot equivalent empty containers.

TEUs loaded inwards

These are imported twenty foot equivalent containers.

TEUs loaded outwards

These are exported twenty foot equivalent containers.

Number of port calls

This the average numbers of visits of vessels in a particular GT range.

Elapsed berth time (hours)

This is the average time between arrival at, and departure from, their berth of all vessels in a particular GT range.

Ship-based charges

These charges are levied on container ships once they come into harbour. These include the following items:

- Conservancy charges which are navigation service charges levied by the government of the state in which the port is situated.
- Tonnage charges that are based on the Gross Tonnage of the vessel—port service charges levied by the port authority.
- Pilotage charge to cover services for piloting the ship.
- Towage charges levied by the tug boat operator.
- Mooring & Unmooring - charge levied either by the port authority or the stevedoring company,
- Berth hires charges sometimes charged by the stevedores.

Cargo-based charges

These include the following items:

- wharfage charges that are levied on each container by the port authorities,
- harbour dues that are levied on each container by the port authorities, such as channel infrastructure fees,
- berth charges that are sometimes charged by port authorities.

Port Interface Costs

These costs are the sum of the ship based charges and the cargo based charges with the addition of a stevedoring charge and customs brokers and transport charges. They include ship-based charges and cargo-based charges as shown under the heading port and related charges. They also include:

Stevedoring charges

Stevedoring and port and related charges are estimated for a standard representative ship transferring an average number of containers. Stevedoring charges are the charges levied by stevedoring companies for handling containers. They are estimated for Australia each year by the ACCC which monitors their price.

Customs brokers' fees

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

Road transport charges

Transport charges are estimates of what transport companies charge for transporting a container to or from the wharf from/to the metropolitan area of the capital city in which the port is situated. These charges are estimated for a representative transport distance.

Individual port index

Port interface costs are calculated for each of the five ports for each six month period. They are shown as the import total or the export total in the Port Interface Cost tables and are the total cost of importing or exporting a container (TEU).

National Index

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

Table 3.1 Parameters used in the port interface cost indices, 2009

| | Brisbane | | Sydney | | Melbourne | | Adelaide | | Fremantle | |
|-------------------------------------|-----------------|----------------|-----------------|----------------|------------------|----------------|-----------------|----------------|------------------|----------------|
| | <i>Jan-June</i> | <i>Jul-Dec</i> | <i>Jan-June</i> | <i>Jul-Dec</i> | <i>Jan-June</i> | <i>Jul-Dec</i> | <i>Jan-June</i> | <i>Jul-Dec</i> | <i>Jan-June</i> | <i>Jul-Dec</i> |
| | 2009 | 2009 | 2009 | 2009 | 2009 | 2009 | 2009 | 2009 | 2009 | 2009 |
| Vessel size GT 17 215 | | | | | | | | | | |
| Average Teus exchanged ^a | | | | | | | | | | |
| All | 557 | 672 | 775 | 1 003 | 883 | 1024 | 885 | 813 | 1 435 | 1 562 |
| Loaded | 384 | 495 | 603 | 751 | 760 | 890 | 561 | 605 | 1 179 | 1 264 |
| Empty | 173 | 177 | 171 | 253 | 123 | 134 | 324 | 207 | 256 | 298 |
| Loaded inwards | 197 | 261 | 387 | 515 | 420 | 557 | 198 | 234 | 491 | 658 |
| Loaded outwards | 187 | 233 | 217 | 235 | 340 | 334 | 363 | 371 | 687 | 606 |
| Ship call parameters ^a | | | | | | | | | | |
| Number of port calls | 2 | 2 | 3 | 3 | 3 | 4 | 2 | 3 | 13 | 13 |
| Elapsed berth time (hrs) | 15 | 19 | 26 | 30 | 24 | 25 | 22 | 25 | 39 | 38 |
| Vessel size GT 37 394 | | | | | | | | | | |
| Average Teus exchanged ^b | | | | | | | | | | |
| All | 1 185 | 1 374 | 1 912 | 2 322 | 2 138 | 2 287 | 1 031 | 1 176 | 1 076 | 1 056 |
| Loaded | 855 | 1 011 | 1 397 | 1 570 | 1 767 | 1 865 | 815 | 956 | 743 | 809 |
| Empty | 331 | 362 | 515 | 752 | 370 | 422 | 215 | 220 | 333 | 247 |
| Loaded inwards | 513 | 668 | 958 | 1175 | 984 | 1 152 | 364 | 447 | 369 | 546 |
| Loaded outwards | 342 | 343 | 439 | 395 | 783 | 713 | 451 | 509 | 374 | 263 |
| Ship call parameters ^b | | | | | | | | | | |
| Number of port calls | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |
| Elapsed berth time (hrs) | 27 | 28 | 35 | 42 | 30 | 30 | 25 | 29 | 31 | 29 |

na not available

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

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

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

Table 3.2 Port and related charges for ships in the 15 000–20 000 GT, range, 2009

| | <i>Brisbane</i> | | <i>Sydney</i> | | <i>Melbourne</i> | | <i>Adelaide</i> | | <i>Fremantle</i> | |
|--|-----------------|----------------|----------------|----------------|------------------|----------------|-----------------|----------------|------------------|----------------|
| | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> |
| | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> |
| Ship-based charges (\$/TEU) | | | | | | | | | | |
| Conservancy | 5.13 | 4.28 | - | - | - | - | 3.03 | 3.03 | - | - |
| Tonnage | - | - | 9.53 | 7.51 | 6.35 | 5.61 | 6.07 | 7.42 | 2.06 | 2.09 |
| Pilotage | 12.63 | 10.56 | 4.28 | 3.30 | 8.58 | 8.19 | 5.06 | 6.20 | 1.81 | 1.66 |
| Towage ^a | 17.99 | 15.67 | 13.38 | 10.33 | 11.76 | 10.60 | 14.92 | 16.37 | 7.41 | 6.79 |
| Mooring, unmooring ^b | 4.04 | 3.35 | 3.92 | 3.03 | 1.57 | 1.04 | - | - | 0.68 | 0.68 |
| Berth hire ^c | - | - | - | - | - | - | - | - | - | - |
| Total ^c | 39.78 | 33.85 | 31.11 | 24.17 | 28.26 | 25.44 | 29.09 | 33.02 | 11.96 | 11.22 |
| Cargo-based charges (\$/TEU) | | | | | | | | | | |
| Wharfage | | | | | | | | | | |
| Imports | 29.98 | 30.35 | 89.65 | 91.45 | 39.05 | 40.04 | 70.91 | 73.26 | 56.53 | 61.44 |
| Exports | 29.98 | 30.35 | 51.15 | 52.15 | 39.05 | 40.04 | 70.91 | 73.26 | 56.53 | 61.44 |
| Harbour dues | 46.20 | 46.67 | - | - | - | - | - | - | - | - |
| Berth charge | - | - | - | - | - | - | - | - | 16.93 | 18.40 |
| Channel infrastructure fees | | | | | 35.65 | 36.65 | | | | |
| Total port and related charges (\$/TEU) ^d | | | | | | | | | | |
| Loaded imports | 115.96 | 110.87 | 120.76 | 115.61 | 101.96 | 101.01 | 100.00 | 106.28 | 85.43 | 91.06 |
| Loaded exports | 115.96 | 110.87 | 82.26 | 76.32 | 101.96 | 101.01 | 100.00 | 106.28 | 85.43 | 91.06 |
| Charges per ship visit (\$/visit) | | | | | | | | | | |
| Total ship-based charges | 22 165 | 22 744 | 24 097 | 24 248 | 24 097 | 24 248 | 25 754 | 26 828 | 17 118 | 17 532 |
| Empty TEUs ^e | 2 935 | 3 051 | 1 885 | 2 835 | 1219 | 1359 | 0 | 0 | 2 212 | 2 762 |

- not applicable

r. revised

a. After enquiries at all ports the number of tugs required for towage in Adelaide and Fremantle used in PICI calculations was revised in Waterline 43.

b. Due to lack of data from operators mooring and unmooring charges for Brisbane are BITRE estimates.

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

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

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

Note: Port and related charges are based on the parameters described in table 3.

Sources: BITRE 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.

Table 3.3 Port and related charges for ships in the 35 000–40 000 GT range, 2009

| | <i>Brisbane</i> | | <i>Sydney</i> | | <i>Melbourne</i> | | <i>Adelaide</i> | | <i>Fremantle</i> | |
|--|-----------------|----------------|----------------|----------------|------------------|----------------|-----------------|----------------|------------------|----------------|
| | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> |
| | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> |
| Ship-based charges (\$/TEU) | | | | | | | | | | |
| Conservancy | 5.24 | 4.55 | - | - | - | - | 3.95 | 3.70 | - | - |
| Tonnage | - | - | 8.39 | 7.05 | 5.70 | 5.46 | 8.25 | 8.48 | 5.94 | 6.73 |
| Pilotage | 8.20 | 7.13 | 3.15 | 2.59 | 4.50 | 4.62 | 4.35 | 4.29 | 2.41 | 2.46 |
| Towage ^a | 10.68 | 9.68 | 5.73 | 4.72 | 5.21 | 5.09 | 16.48 | 14.54 | 14.64 | 14.92 |
| Mooring, unmooring ^b | 1.90 | 1.62 | 2.04 | 1.68 | 0.65 | 0.47 | - | - | 0.91 | 1.01 |
| Berth hire ^c | - | - | - | - | - | - | - | - | - | - |
| Total ^c | 26.02 | 22.98 | 19.31 | 16.04 | 16.06 | 15.63 | 33.03 | 31.01 | 23.90 | 25.11 |
| Cargo-based charges (\$/TEU) | | | | | | | | | | |
| Wharfage | | | | | | | | | | |
| Imports | 29.98 | 30.35 | 89.65 | 91.45 | 39.05 | 40.04 | 70.91 | 73.26 | 56.53 | 61.44 |
| Exports | 29.98 | 30.35 | 51.15 | 52.15 | 39.05 | 40.04 | 70.91 | 73.26 | 56.53 | 61.44 |
| Harbour dues | 46.20 | 46.67 | - | - | - | - | - | - | - | - |
| Berth charge | - | - | - | - | - | - | - | - | 16.93 | 18.40 |
| Channel infrastructure fees | - | - | - | - | 35.65 | 36.65 | - | - | - | - |
| Total port and related charges (\$/TEU) ^d | | | | | | | | | | |
| Loaded imports | 102.20 | 100.00 | 108.96 | 107.48 | 89.76 | 91.20 | 103.93 | 104.27 | 97.37 | 104.95 |
| Loaded exports | 102.20 | 100.00 | 70.46 | 68.19 | 89.76 | 91.20 | 103.93 | 104.27 | 97.37 | 104.95 |
| Charges per ship visit (\$/visit) | | | | | | | | | | |
| Total ship-based charges | 30 844 | 31 570 | 36 911 | 37 238 | 34 327 | 35 736 | 34 042 | 36 455 | 25 716 | 26 514 |
| Empty TEUs ^e | 5 620 | 6 246 | 5 668 | 8 443 | 3 668 | 4 271 | 0 | 0 | 2 839 | 2 289 |

- not applicable

a. After enquiries at all ports the number of tugs required for towage in Adelaide and Fremantle used in PICI calculations was revised in Waterline 43.

b. Due to lack of data from operators mooring and unmooring charges for Brisbane are BITRE estimates.

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

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

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

Note: Port and related charges are based on the parameters described in table 3.

Sources: BITRE 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.

Table 3.4 Port interface costs for ships in the 15 000–20 000 GT range, 2009

| | Brisbane | | Sydney | | Melbourne | | Adelaide | | Fremantle | |
|---------------------------|-----------------|----------------|-----------------|----------------|------------------|----------------|-----------------|----------------|------------------|----------------|
| | Jan-June | Jul-Dec | Jan-June | Jul-Dec | Jan-June | Jul-Dec | Jan-June | Jul-Dec | Jan-June | Jul-Dec |
| | 2009 | 2009 | 2009 | 2009 | 2009 | 2009 | 2009 | 2009 | 2009 | 2009 |
| | \$/TEU | | | | | | | | | |
| Import | | | | | | | | | | |
| Ship-based charges | 40 | 34 | 31 | 24 | 28 | 25 | 29 | 33 | 12 | 11 |
| Cargo-based charges | 76 | 77 | 90 | 91 | 74 | 76 | 71 | 73 | 73 | 80 |
| Stevedoring ^p | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 |
| Customs brokers' fees | 150 | 150 | 131 | 131 | 156 | 156 | 143 | 143 | 148 | 148 |
| Road transport charges | 331 | 338 | 373 | 369 | 448 | 448 | 299 | 299 | 319 | 319 |
| Import total ^a | 768 | 770 | 797 | 787 | 878 | 877 | 713 | 720 | 724 | 730 |
| Export | | | | | | | | | | |
| Ship-based charges | 40 | 34 | 31 | 24 | 28 | 25 | 29 | 33 | 12 | 11 |
| Cargo-based charges | 76 | 77 | 51 | 52 | 74 | 76 | 71 | 73 | 73 | 80 |
| Stevedoring ^p | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 |
| Customs brokers' fees | 95 | 95 | 116 | 116 | 126 | 126 | 100 | 100 | 120 | 120 |
| Road transport charges | 331 | 338 | 373 | 369 | 448 | 448 | 299 | 299 | 319 | 319 |
| Export total ^a | 713 | 715 | 743 | 733 | 848 | 847 | 670 | 677 | 696 | 701 |

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

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

Notes 1. Based on parameters described in table 3.2.

2. Waterline data on customs brokers' fees and road transport charges are collected for the purpose of monitoring trends in charges over time. They should not be used for inter-port comparisons, as sample characteristics are based on findings contained in *Port interface cost index* (BTCE 1993, Report 84) and further updates done in 2001 and 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 BITRE 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; stevedoring charge data supplied by the ACCC 2010; ABS 2010.

Table 3.5 Port interface costs for ships in the 35 000–40 000 GT range, 2009

| | <i>Brisbane</i> | | <i>Sydney</i> | | <i>Melbourne</i> | | <i>Adelaide</i> | | <i>Fremantle</i> | |
|-------------------------------|-----------------|----------------|----------------|----------------|------------------|----------------|-----------------|----------------|------------------|----------------|
| | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> |
| | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> | <i>2009</i> |
| | <i>\$/TEU</i> | | | | | | | | | |
| Import | | | | | | | | | | |
| Ship-based charges | 26 | 23 | 19 | 16 | 16 | 16 | 33 | 31 | 24 | 25 |
| Cargo-based charges | 76 | 77 | 90 | 91 | 74 | 76 | 71 | 73 | 73 | 80 |
| Stevedoring ^p | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 |
| Customs brokers' fees | 150 | 150 | 131 | 131 | 156 | 156 | 143 | 143 | 148 | 148 |
| Road transport charges | 331 | 338 | 373 | 369 | 448 | 448 | 299 | 299 | 319 | 319 |
| Import total ^a | 754 | 759 | 785 | 779 | 866 | 867 | 717 | 718 | 736 | 744 |
| Export | | | | | | | | | | |
| Ship-based charges | 26 | 23 | 19 | 16 | 16 | 16 | 33 | 31 | 24 | 25 |
| Cargo-based charges | 76 | 77 | 51 | 52 | 74 | 76 | 71 | 73 | 73 | 80 |
| Stevedoring ^p | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 |
| Customs brokers' fees | 95 | 95 | 116 | 116 | 126 | 126 | 100 | 100 | 120 | 120 |
| Road transport charges | 331 | 338 | 373 | 369 | 448 | 448 | 299 | 299 | 319 | 319 |
| Export total ^a | 699 | 704 | 731 | 725 | 835 | 837 | 674 | 675 | 708 | 715 |

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

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

Notes 1. Based on parameters described in table 3.2.

2. Waterline data on customs brokers' fees and road transport charges are collected for the purpose of monitoring trends in charges over time. They should not be used for inter-port comparisons, as sample characteristics are based on findings contained in *Port interface cost index* (BTCE 1993, Report 84) and further updates done in 2001 and 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 BITRE 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; stevedoring charge data supplied by the ACCC 2010; ABS 2010.

Table 3.6 **The national port interface cost index for ships in the 35 000–40 000 GT range, 2003–2009**

| | <i>Jul-Dec</i> 2003 | <i>Jan-Jun</i> 2004 | <i>Jul-Dec</i> 2004 | <i>Jan-Jun</i> 2005 | <i>Jul-Dec</i> 2005 | <i>Jan-Jun</i> 2006 | <i>Jul-Dec</i> 2006 | <i>Jan-Jun</i> 2007 | <i>Jul-Dec</i> 2007 | <i>Jan-Jun</i> 2008 | <i>Jul-Dec</i> 2008 | <i>Jan-Jun</i> 2009 | <i>Jul-Dec</i> 2009 |
|---------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Imports in current prices | 661 | 674 | 684 | 739 | 737 | 764 | 773 | 766 | 781 | 843 | 848 | 806 | 806 |
| Imports in 2001 prices | 620 | 621 | 618 | 651 | 632 | 642 | 629 | 616 | 616 | 642 | 616 | 597 | 594 |
| Exports in current prices | 614 | 623 | 636 | 691 | 692 | 717 | 726 | 726 | 732 | 788 | 793 | 764 | 764 |
| Exports in 2001 prices | 576 | 573 | 575 | 608 | 593 | 603 | 591 | 584 | 578 | 600 | 576 | 566 | 563 |

Note: Exports and imports in constant 2001 dollars are calculated by using deflator based on trend series of non-farm GDP chain volume and current prices of the sesonally adjusted series.

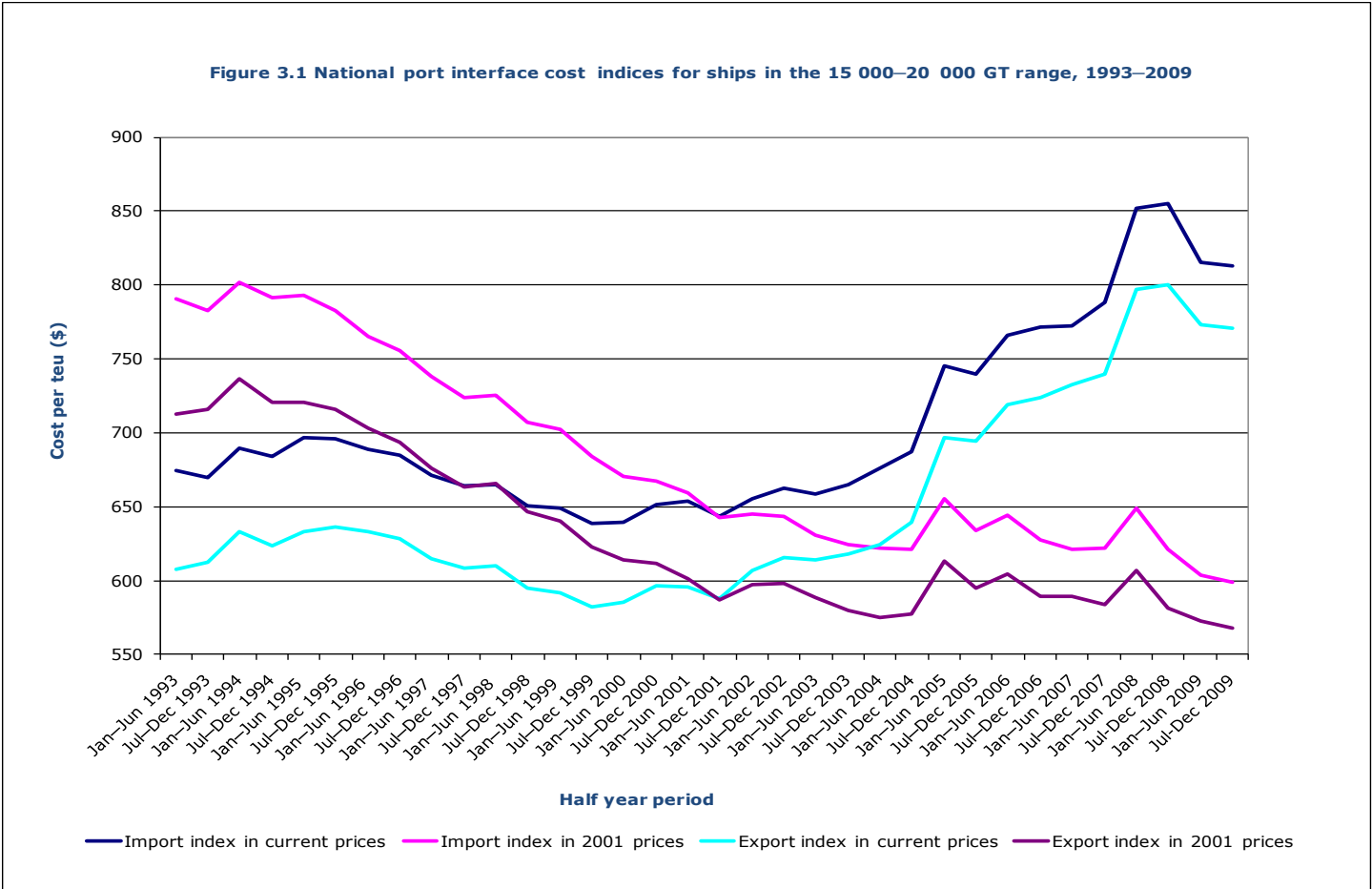
Sources: BITRE estimates based on: ship call data supplied by port authorities/corporations; price schedules of port authorities/corporations, towage operators and pilotage service providers; surveys of customs brokers and road transport operators; stevedoring charges data supplied by the ACCC 2010; and ABS 2010.

TABLE 3.7 **The national port interface cost index for ships in the 15 000–20 000 GT range, 2003-2009**

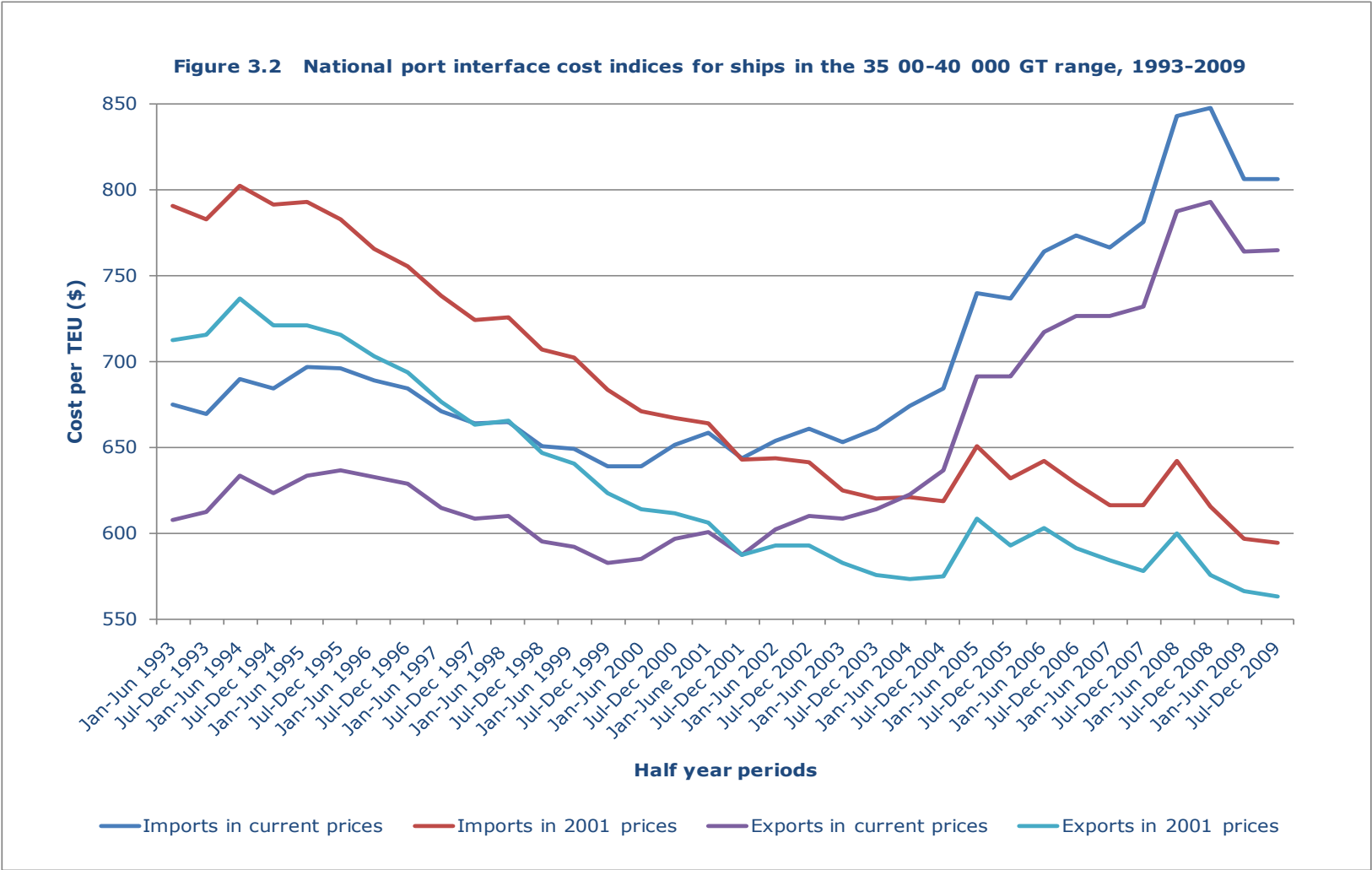
| | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> | <i>Jan-Jun</i> | <i>Jul-Dec</i> |
|---------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | 2003 | 2003 | 2004 | 2004 | 2005 | 2005 | 2006 | 2006 | 2007 | 2007 | 2008 | 2008 | 2009 | 2009 |
| Imports in current prices | 659 | 665 | 676 | 687 | 745 | 739 | 766 | 771 | 772 | 789 | 852 | 855 | 815 | 813 |
| Imports in 2001 constant prices | 631 | 624 | 622 | 621 | 655 | 634 | 644 | 627 | 621 | 622 | 649 | 621 | 604 | 599 |
| Exports in current prices | 614 | 618 | 624 | 639 | 697 | 694 | 719 | 724 | 733 | 740 | 797 | 800 | 773 | 771 |
| Exports in 2001 constant prices | 588 | 580 | 575 | 578 | 613 | 595 | 605 | 589 | 589 | 584 | 607 | 581 | 573 | 568 |

Note: Exports and imports in constant 2001 dollars are calculated by using deflator based on trend series of non-farm GDP chain volume and current prices of the sesonally adjusted series.

Sources: BITRE estimates based on: ship call data supplied by port authorities/corporations; price schedules of port authorities/corporations, towage operators and pilotage service providers; surveys of customs brokers and road transport operators; stevedoring charges data supplied by the ACCC and industry sources; and ABS 5206.041 National Accounts table (seasonally adjusted).



Sources: BITRE estimates based on: ship call data supplied by port authorities/corporations; price schedules of port authorities/corporations, towage operators and pilotage service providers; surveys of customs brokers and road transport operators; stevedoring charges data supplied by the ACCC and industry sources; and ABS 5206.041 National Accounts table (seasonally adjusted).



Sources: BITRE estimates based on: ship call data supplied by port authorities/corporations; price schedules of port authorities/corporations, towage operators and pilotage service providers; surveys of customs brokers and road transport operators; stevedoring charges data supplied by the ACCC and industry sources; and ABS 5206.041 National Accounts table.

CHAPTER 4

Ship visits

Overview

This chapter illustrates trends in container ship size over time for ships which visit the five ports covered by *Waterline*.

Table 4.1 provides the five port total number of ship visits and the average number of TEUs exchanged per ship visit for container vessels with sizes ranging from 5 000 to 60 000 GT. Table 4.2 lists the distribution of ship visits by vessel gross tonnage on a five port basis.

Explanatory notes

Ship calls

Ship visits measures the number of times a ship calls at a port or ports, for example, a ship that sails to Australia 3 times and makes a total of 15 port calls in a year counts as 1 ship, 3 voyages and 15 port calls.

Data sources

The estimates reported are based on ship call data supplied by port authorities for Brisbane, Sydney, Melbourne, Adelaide and Fremantle.

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

| GT | Jan-June 2002 | Jul-Dec 2002 | Jan-June 2003 | Jul-Dec 2003 | Jan-June 2004 | Jul-Dec 2004 | Jan-June 2005 | Jul-Dec 2005 | Jan-June 2006 | Jul-Dec 2006 | Jan-June 2007 | Jul-Dec 2007 | Jan-June 2008 | Jul-Dec 2008 | Jan-June 2009 | Jul-Dec 2009 |
|--------------------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|
| 5 000-10 000 | | | | | | | | | | | | | | | | |
| Average TEUs exchanged | 239 | 187 | 161 | 193 | 333 | 204 | 283 | 368 | 267 | 560 | 391 | 402 | 319 | 554 | 325 | 444 |
| Total ship visits | 66 | 78 | 75 | 72 | 93 | 80 | 71 | 67 | 93 | 108 | 144 | 131 | 159 | 158 | 121 | 123 |
| 10 000-15 000 | | | | | | | | | | | | | | | | |
| Average TEUs exchanged | 712 | 424 | 405 | 485 | 688 | 628 | 554 | 506 | 464 | 656 | 711 | 864 | 511 | 554 | 421 | 420 |
| Total ship visits | 79 | 59 | 53 | 54 | 40 | 84 | 89 | 106 | 136 | 108 | 116 | 125 | 103 | 63 | 46 | 42 |
| 15 000 - 20 000 | | | | | | | | | | | | | | | | |
| Average TEUs exchanged | 763 | 839 | 839 | 826 | 971 | 885 | 693 | 800 | 685 | 890 | 873 | 1 116 | 845 | 919 | 849 | 994 |
| Total ship visits | 285 | 223 | 181 | 191 | 153 | 266 | 316 | 439 | 406 | 430 | 224 | 209 | 189 | 210 | 130 | 84 |
| 20 000 - 25 000 | | | | | | | | | | | | | | | | |
| Average TEUs exchanged | 762 | 818 | 902 | 990 | 1014 | 935 | 818 | 859 | 685 | 925 | 878 | 942 | 857 | 904 | 736 | 1 117 |
| Total ship visits | 233 | 241 | 182 | 214 | 199 | 306 | 321 | 294 | 374 | 256 | 163 | 148 | 207 | 220 | 148 | 138 |
| 25 000 - 30 000 | | | | | | | | | | | | | | | | |
| Average TEUs exchanged | 888 | 1 070 | 1 027 | 1 031 | 959 | 1 071 | 956 | 1 021 | 882 | 1 101 | 991 | 2 528 | 1 049 | 1 163 | 1 038 | 1 217 |
| Total ship visits | 186 | 252 | 286 | 323 | 344 | 185 | 332 | 377 | 395 | 475 | 558 | 618 | 545 | 458 | 329 | 356 |
| 30 000 - 35 000 | | | | | | | | | | | | | | | | |
| Average TEUs exchanged | 1 014 | 1 149 | 1 262 | 1 374 | 1 478 | 896 | 1 216 | 1 434 | 1 152 | 1 329 | 1 185 | 1 296 | 806 | 1 041 | 882 | 1 060 |
| Total ship visits | 216 | 232 | 175 | 257 | 247 | 191 | 223 | 141 | 198 | 156 | 177 | 235 | 243 | 205 | 176 | 131 |
| 35 000 - 40 000 | | | | | | | | | | | | | | | | |
| Average TEUs exchanged | 1 262 | 1 403 | 1 408 | 1 445 | 1 474 | 1 385 | 1 394 | 1 454 | 1 137 | 1 383 | 1 605 | 1 867 | 1 643 | 1 760 | 1 654 | 1 870 |
| Total ship visits | 203 | 223 | 214 | 189 | 225 | 228 | 227 | 225 | 178 | 223 | 313 | 357 | 333 | 379 | 310 | 334 |
| 40 000 - 45 000 | | | | | | | | | | | | | | | | |
| Average TEUs exchanged | 1 228 | 1 465 | 1 450 | 1 558 | 1 601 | 1 098 | 1 511 | 1 653 | 1 177 | 1 435 | 1 630 | 1 819 | 1 773 | 1 777 | 1 477 | 1 798 |
| Total ship visits | 195 | 172 | 162 | 186 | 181 | 143 | 196 | 165 | 223 | 249 | 212 | 173 | 136 | 139 | 160 | 184 |
| 45 000 - 50 000 | | | | | | | | | | | | | | | | |
| Average TEUs exchanged | 808 | 938 | 1 201 | 1 270 | 1 379 | 0 853 | 1 279 | 1 433 | 914 | 1 029 | 1 236 | 1 651 | 1 536 | 1 675 | 1 690 | 1 884 |
| Total ship visits | 5 | 38 | 72 | 77 | 75 | 32 | 65 | 77 | 88 | 81 | 154 | 153 | 145 | 123 | 133 | 112 |
| 50 000 - 55 000 | | | | | | | | | | | | | | | | |
| Average TEUs exchanged | 1 134 | 1 027 | 995 | 1 044 | 1 366 | 795 | 1 735 | 1 250 | 1 321 | 1 373 | 1 232 | 1 807 | 1 606 | 1 761 | 1 880 | 2 367 |
| Total ship visits | 60 | 55 | 61 | 69 | 22 | 71 | 89 | 60 | 55 | 55 | 110 | 101 | 166 | 225 | 284 | 270 |
| 55 000 - 60 000 | | | | | | | | | | | | | | | | |
| Average TEUs exchanged | 1069 | 1166 | 1252 | 0 | 0 | 681 | 537 | 0 | 0 | 596 | 659 | 1 457 | 0 | 0 | 557 | 0 |
| Total ship visits | 15 | 14 | 3 | 0 | 0 | 6 | 8 | 0 | 0 | 2 | 1 | 11 | 0 | 0 | 42 | 0 |
| Total ship visits | 1 543 | 1 587 | 1 464 | 1 632 | 1 579 | 1 592 | 1 937 | 1 951 | 2 146 | 2 143 | 2 172 | 2 261 | 2 226 | 2 180 | 1 879 | 1 774 |

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

Table 4.2 Ship visits by port, 2009

| <i>Number of ship visits</i> | <i>Brisbane</i> | <i>Sydney</i> | <i>Melbourne</i> | <i>Adelaide</i> | <i>Fremantle</i> | <i>Total</i> |
|------------------------------|-----------------|---------------|------------------|-----------------|------------------|--------------|
| 5000 -10 000 | 87 | 97 | 75 | 0 | 1 | 260 |
| 10 000-15 000 | 26 | 25 | 32 | 0 | 19 | 102 |
| 15 000 - 20 000 | 47 | 59 | 92 | 24 | 29 | 251 |
| 20 000 - 25 000 | 73 | 101 | 136 | 7 | 5 | 322 |
| 25 000 - 30 000 | 95 | 233 | 338 | 43 | 90 | 799 |
| 30 000 - 35 000 | 49 | 83 | 129 | 16 | 65 | 342 |
| 35 000 - 40 000 | 180 | 178 | 203 | 40 | 62 | 663 |
| 40 000 - 45 000 | 48 | 67 | 84 | 52 | 82 | 333 |
| 45 000 - 50 000 | 102 | 60 | 51 | 5 | 20 | 238 |
| 50 000 - 55 000 | 60 | 174 | 105 | 27 | 140 | 506 |
| above 55 000 | 0 | 42 | 0 | 0 | 0 | 42 |
| Total | 767 | 1 119 | 1 245 | 214 | 513 | 3 858 |

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

CHAPTER 5

Non-Financial performance Indicators

Overview

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

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

Explanatory notes

Cargo throughput (tonnes)

This is the quantity of container and non-container cargo which passes through the port and is measured in tonnes.

Non-containerised general cargo (tonnes)

This is cargo which is not carried in containers.

Containerised cargo (TEUs exchanged)

This is the cargo which is carried in containers normalised as twenty foot equivalent containers.

Average total employment

This is the total employment of the port authorities. It does not include the waterside workers employed by stevedoring and other companies providing port services.

Port turnaround times (hours)

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

Table 5.1 Non-financial performance indicators, selected Australian ports, 2006-2009

| | Jan-Jun 2006 | Jul-Dec 2006 | Jan-Jun 2007 | Jul-Dec 2007 | Jan-Jun 2008 | Jul-Dec 2008 | Jan-Jun 2009 | Jul-Dec 2009 |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Five ports^d | | | | | | | | |
| Total cargo throughput ('000 tonnes) | 58 358 | 60 694 | 59 953 | 62 591 | 63 756 | 64 049 | 61 063 | 61 831 |
| Non-containerised general cargo ('000 tonnes) ^a | 2 506 | 2 522 | 2 768 | 2 701 | 2 826 | 2 855 | 1 842 | 17 673 |
| Containerised cargo (teus exchanged) | | | | | | | | |
| Full import | 1 028 263 | 1 242 921 | 1 166 116 | 1 389 211 | 1 305 203 | 1 449 281 | 1 121 703 | 1 345 190 |
| Empty import | 135 758 | 137 911 | 139 096 | 136 768 | 142 714 | 140 312 | 155 333 | 199 562 |
| Full export | 750 402 | 807 702 | 778 137 | 817 213 | 849 152 | 876 847 | 857 981 | 776 687 |
| Empty export | 402 163 | 500 511 | 540 582 | 627 401 | 563 815 | 666 821 | 411 197 | 968 612 |
| TOTAL | 2 316 586 | 2 689 045 | 2 623 931 | 2 970 593 | 2 858 884 | 3 133 261 | 2 546 214 | 3 290 051 |
| Average total employment ^b | 1 056 | 1 076 | 1 114 | 1 141 | 1 154 | 1 222 | 1 254 | 1 251 |
| Port turnaround time (hrs) ^c | | | | | | | | |
| Median result | - | - | - | - | - | - | - | - |
| 95th percentile | - | - | - | - | - | - | - | - |
| Brisbane | | | | | | | | |
| Total cargo throughput ('000 tonnes) | 13 226 | 13 936 | 14 130 | 15 006 | 14 716 | 15 808 | 16 086 | 15 697 |
| Non-containerised general cargo ('000 tonnes) ^a | 459 | 466 | 546 | 516 | 542 | 670 | 316 | 458 |
| Containerised cargo (teus exchanged) | | | | | | | | |
| Full import | 149 226 | 186 666 | 177 073 | 216 280 | 196 074 | 218 787 | 158 988 | 133 943 |
| Empty import | 34 164 | 40 400 | 38 023 | 32 133 | 33 613 | 37 363 | 37 174 | 100 812 |
| Full export | 115 564 | 136 672 | 120 261 | 125 275 | 130 028 | 139 042 | 131 578 | 30 456 |
| Empty export | 71 123 | 75 844 | 100 106 | 114 465 | 92 892 | 104 798 | 68 437 | 480 766 |
| TOTAL | 370 077 | 439 582 | 435 463 | 488 153 | 452 607 | 499 990 | 396 177 | 745 977 |
| Average total employment ^b | 256 | 258 | 293 | 312 | 312 | 342 | 353 | 350 |
| Port turnaround time (hrs) ^c | | | | | | | | |
| Median result | 30 | 36 | 33 | 35 | 33 | 26 | 32 | 33 |
| 95th percentile | 51 | 57 | 54 | 54 | 51 | 45 | 70 | 76 |
| Sydney | | | | | | | | |
| Total cargo throughput ('000 tonnes) | 13 505 | 14 024 | 13 772 | 14 886 | 14 558 | 14 715 | 13 099 | 14 169 |
| Non-containerised general cargo ('000 tonnes) ^a | 304 | 331 | 347 | 270 | 262 | 142 | 1 | 6 622 |
| Containerised cargo (teus exchanged) | | | | | | | | |
| Full import | 342 216 | 419 784 | 380 056 | 459 364 | 428 179 | 489 703 | 386 403 | 496 239 |
| Empty import | 9 490 | 9 616 | 9 762 | 9 796 | 9 224 | 10 840 | 15 580 | 12 962 |
| Full export | 173 932 | 192 703 | 176 919 | 188 416 | 196 678 | 222 367 | 220 061 | 223 290 |
| Empty export | 168 830 | 213 006 | 218 275 | 248 943 | 237 825 | 262 222 | 176 744 | 261 042 |
| TOTAL | 694 468 | 835 109 | 785 012 | 906 519 | 871 906 | 985 132 | 798 788 | 993 533 |
| Average total employment ^b | 243 | 246 | 244 | 240 | 223 | 244 | 260 | 267 |
| Port turnaround time (hrs) ^c | | | | | | | | |
| Median result | 27.8 | 29.5 | 29.6 | 29.8 | 27.9 | 29.6 | 29.0 | 34.6 |
| 95th percentile | 48 | 56 | 53 | 57 | 47 | 56 | 54 | 63 |
| Melbourne | | | | | | | | |
| Total cargo throughput ('000 tonnes) | 13 781 | 14 884 | 14 628 | 15 159 | 15 665 | 15 542 | 13 560 | 14 995 |
| Non-containerised general cargo ('000 tonnes) ^a | 1 081 | 1 061 | 1 175 | 1 184 | 1 251 | 1 273 | 1 028 | 1 055 |
| Containerised cargo (teus exchanged) | | | | | | | | |
| Full import | 416 323 | 485 828 | 463 052 | 542 218 | 508 357 | 557 940 | 422 482 | 532 350 |
| Empty import | 60 806 | 55 592 | 54 843 | 47 900 | 50 920 | 48 483 | 59 685 | 47 694 |
| Full export | 339 949 | 355 544 | 343 064 | 354 504 | 372 536 | 359 377 | 353 155 | 375 205 |
| Empty export | 126 118 | 158 613 | 177 075 | 205 955 | 174 254 | 231 319 | 124 911 | 170 507 |
| TOTAL | 943 196 | 1 055 577 | 1 038 034 | 1 150 577 | 1 106 067 | 1 197 119 | 960 233 | 1 125 756 |
| Average total employment ^b | 199 | 196 | 201 | 209 | 223 | 228 | 224 | 217 |
| Port turnaround time (hrs) ^c | | | | | | | | |
| Median result | 30 | 31 | 31 | 32 | 30 | 31 | 30 | 30 |
| 95th percentile | 52 | 62 | 63 | 65 | 56 | 62 | 56 | 62 |

| | | | | | | | | |
|--|---------|---------|---------|---------|---------|---------|---------|---------|
| Adelaide | | | | | | | | |
| Total cargo throughput ('000 tonnes) | 5 137 | 5 212 | 5 072 | 5 014 | 5 283 | 4 952 | 4 767 | 4 713 |
| Non-containerised general cargo ('000 tonnes) ^a | 193 | 181 | 180 | 196 | 187 | 190 | 73 | 105 |
| Containerised cargo (teus exchanged) | | | | | | | | |
| Full import | 23 483 | 30 277 | 31 441 | 38 144 | 40 656 | 40 260 | 40 656 | 47 581 |
| Empty import | 18 024 | 21 342 | 23 583 | 28 340 | 29 018 | 27 862 | 26 461 | 24 052 |
| Full export | 43 954 | 46 606 | 50 233 | 57 587 | 59 075 | 59 382 | 59 075 | 59 748 |
| Empty export | 4 954 | 7 979 | 7 656 | 12 710 | 14 591 | 16 724 | 6 125 | 10 379 |
| TOTAL | 90 415 | 106 204 | 112 913 | 136 781 | 143 340 | 144 228 | 132 317 | 141 760 |
| Average total employment ^b | 97 | 97 | 99 | 103 | 107 | 107 | 109 | 112 |
| Port turnaround time (hrs) ^c | | | | | | | | |
| Median result | 19 | 20 | 21 | 20 | 21 | 25 | 24 | 28 |
| 95th percentile | 32 | 32 | 35 | 34 | 35 | 39 | 48 | 54 |
| Fremantle | | | | | | | | |
| Total cargo throughput ('000 tonnes) | 12 709 | 12 638 | 12 352 | 12 525 | 13 534 | 13 032 | 13 550 | 12 258 |
| Non-containerised general cargo ('000 tonnes) ^a | 468 | 482 | 520 | 535 | 585 | 580 | 423 | 9 433 |
| Containerised cargo (teus exchanged) | | | | | | | | |
| Full import | 97 015 | 120 366 | 114 494 | 133 205 | 131 937 | 142 591 | 113 174 | 135 077 |
| Empty import | 13 274 | 10 961 | 12 885 | 18 599 | 19 939 | 15 764 | 16 433 | 14 042 |
| Full export | 77 003 | 76 177 | 87 660 | 91 431 | 90 835 | 96 679 | 94 112 | 87 988 |
| Empty export | 31 138 | 45 069 | 37 470 | 45 328 | 44 253 | 51 758 | 34 980 | 45 918 |
| TOTAL | 218 430 | 252 573 | 252 509 | 288 563 | 284 964 | 306 792 | 258 699 | 283 025 |
| Average total employment ^b | 261 | 280 | 277 | 277 | 289 | 302 | 309 | 305 |
| Port turnaround time (hrs) ^c | | | | | | | | |
| Median result | 21 | 25 | 27 | 26 | 29 | 31 | 28 | 26 |
| 95th percentile | 48 | 54 | 55 | 51 | 62 | 67 | 57 | 46 |

- not applicable

a. Excludes bulk cargoes.

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

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

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

Source: Ports Australia

CHAPTER 6

Stevedoring and ship arrival reliability

Overview

This chapter presents two quarterly indicators of waterfront reliability: stevedoring cargo receipt and ship arrival advice.

Explanatory notes

Stevedoring-cargo receipt

Tables 6.1a & 6.1b present the information on cargo receipt at major container terminals. The indicator for each port is prepared by combining each stevedore's cargo availability figures with the proportion of container lifts handled at the stevedore's terminals at the port to produce the weighted mean presented in Table 6.1. Stevedoring reliability data was not available for Adelaide.

Ship arrival

Tables 6.1a & 6.1b also include data for two indicators of ship arrival advice.

The first indicator is the percentage of ship arrivals within one hour of the most recently advised arrival time available to the port authority/corporation at 24 hours prior to actual arrival. Data was not available for Melbourne.

The second indicator is the percentage of ship arrivals within one hour of the last scheduled arrival time advised inside the 24 hours prior to actual arrival. Data was not available for Melbourne.

Table 6.1a Stevedoring and ship arrival reliability indicators, March and June quarters 2009

| Indicator | Brisbane | | Sydney | | Melbourne | | Adelaide | | Fremantle | |
|----------------------|----------|----------|---------|----------|-----------|----------|----------|----------|-----------|----------|
| | Jan-Mar | Apr-June | Jan-Mar | Apr-June | Jan-Mar | Apr-June | Jan-Mar | Apr-June | Jan-Mar | Apr-June |
| Stevedoring | | | | | | | | | | |
| Cargo receipt | 96.5 | 94.0 | 88.0 | 87.5 | 90.6 | 92.8 | 0.0 | 0.0 | 96.6 | 94.1 |
| Ship arrival | | | | | | | | | | |
| Advice at 24 hrs | 97.7 | 98.1 | 48.8 | 48.2 | na | na | 100.0 | 100.0 | 62.1 | 57.5 |
| Advice inside 24 hrs | 98.4 | 92.3 | 96.5 | 96.4 | na | na | 100.0 | 97 | 89.6 | 92.2 |

na not available
Sources: Ports Australia, Patrick, DP World Terminals

Table 6.1b Stevedoring and ship arrival reliability indicators, September and December quarters 2009

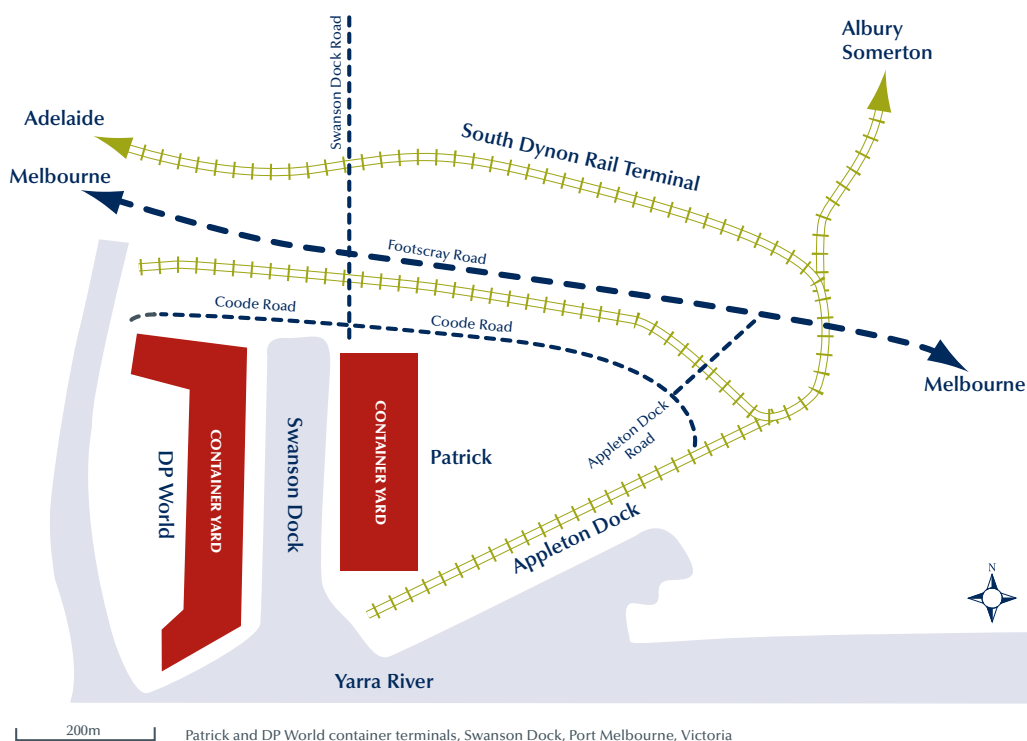
| Indicator | Brisbane | | Sydney | | Melbourne | | Adelaide | | Fremantle | |
|----------------------|----------|---------|---------|---------|-----------|---------|----------|---------|-----------|---------|
| | Jul-Sep | Oct-Dec | Jul-Sep | Oct-Dec | Jul-Sep | Oct-Dec | Jul-Sep | Oct-Dec | Jul-Sep | Oct-Dec |
| Stevedoring | | | | | | | | | | |
| Cargo receipt | 94.3 | 92.8 | 86.7 | 79.5 | 91.7 | 91.1 | 0.0 | 0.0 | 97.0 | 93.4 |
| Ship arrival | | | | | | | | | | |
| Advice at 24 hrs | 94.4 | 97.8 | 47.9 | 41.3 | na | na | 95.0 | 100.0 | 57.8 | 55.6 |
| Advice inside 24 hrs | 94.0 | 95.6 | 95.8 | 92.7 | na | na | 100.0 | 100 | 92.1 | 85.6 |

na not available
Sources: Ports Australia, Patrick, DP World Terminals

APPENDIX A

Diagrams of five major Australian container port terminals

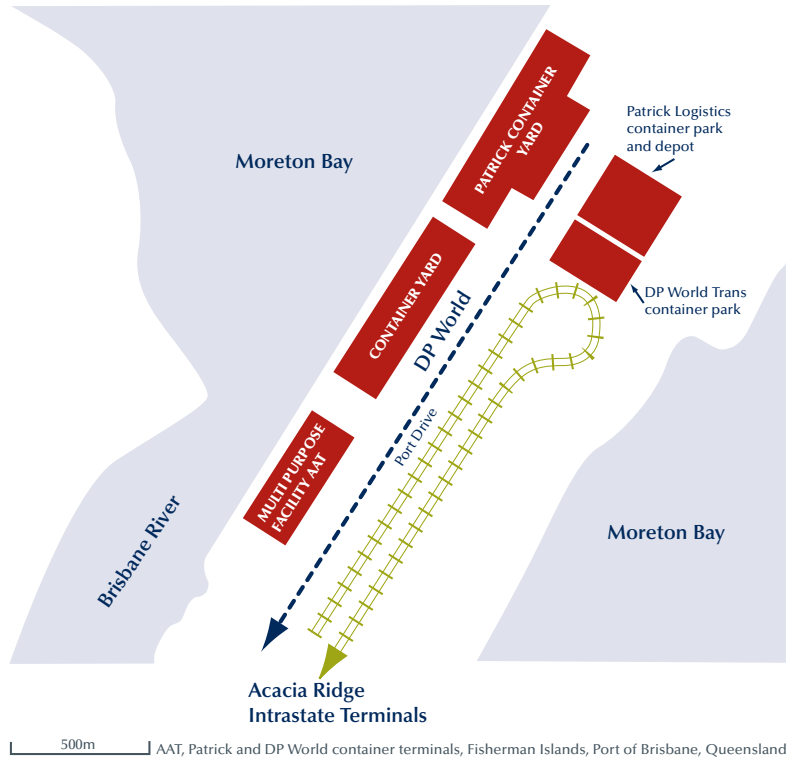
FAI Patrick and DP World terminals—Swanson dock, Port Melbourne, Victoria



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

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

FA2 Patrick and DP World terminals—Fisherman Islands, Port of Brisbane, Queensland

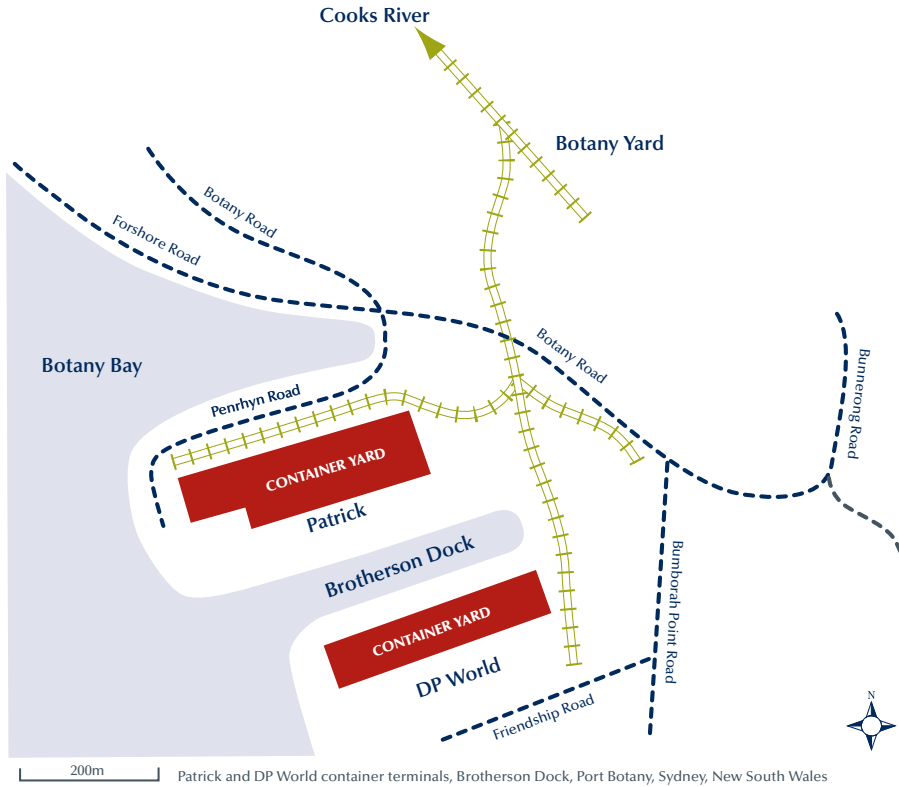


Note: This is a purpose built container terminal and includes a near dock rail terminal shared by the two stevedores for export and import containers and Australian Amalgamated Terminals (AAT) which provides a multi purpose facility with container handling capacity which can be used for motor vehicles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

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

FA3

Patrick and DP World terminals—Brogherson dock, Port Botany, Sydney, New South Wales

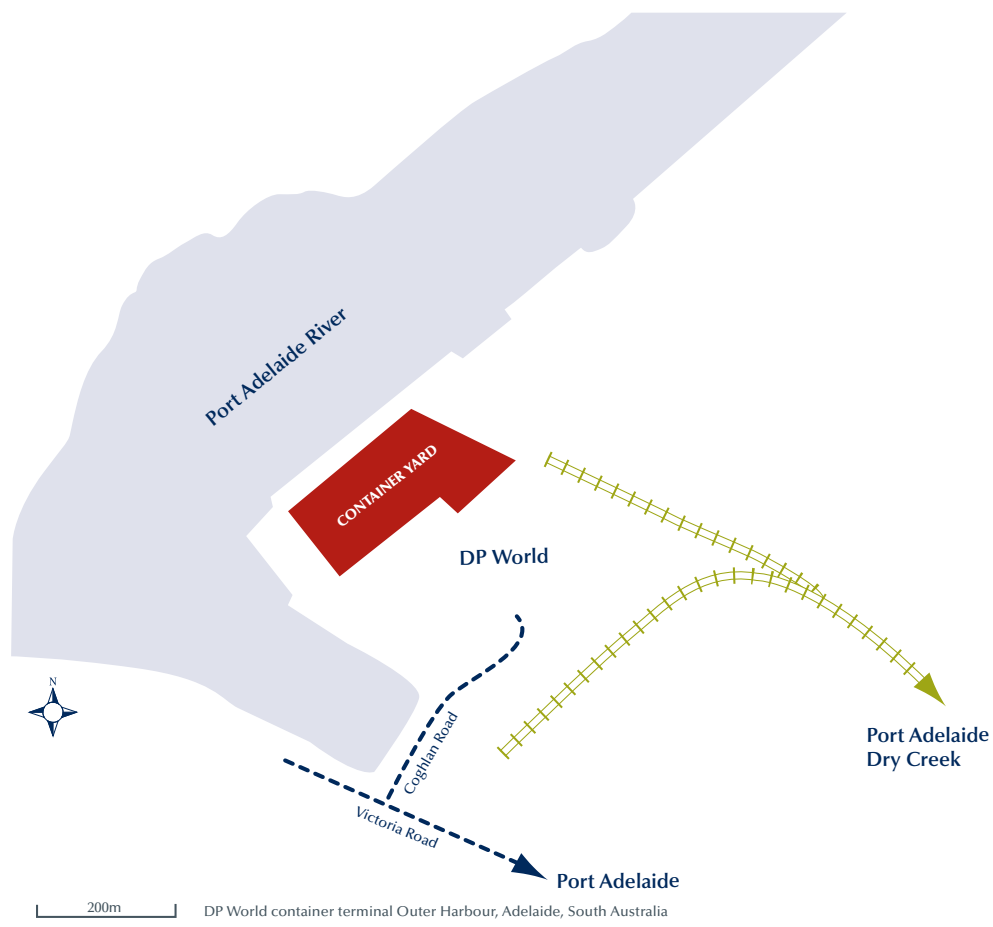


Patrick and DP World container terminals, Brogherson Dock, Port Botany, Sydney, New South Wales

Note: Port Botany has on-dock rail terminals. Access for both DP World and Patrick is directly adjacent to the container yards making it easier to load containers directly on to trains. Trains with containers for both the stevedores are split up at the Botany Rail Yard which is adjacent to the container terminal at Brogherson dock. DP World Transport has an intermodal terminal adjacent to the Port Botany container terminals which is used primarily for empty containers. Further down (about 8 kilometres) along the Botany Freight Rail Line, the Cooks River terminal is also used for empty containers. To the west of the metropolitan area are intermodal terminals at Yennora, Leightonfield, Minto and Camellia. Development of the Port Botany rail link is planned as part of an Auslink National Project. The diagram is correct as at March 2007.

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

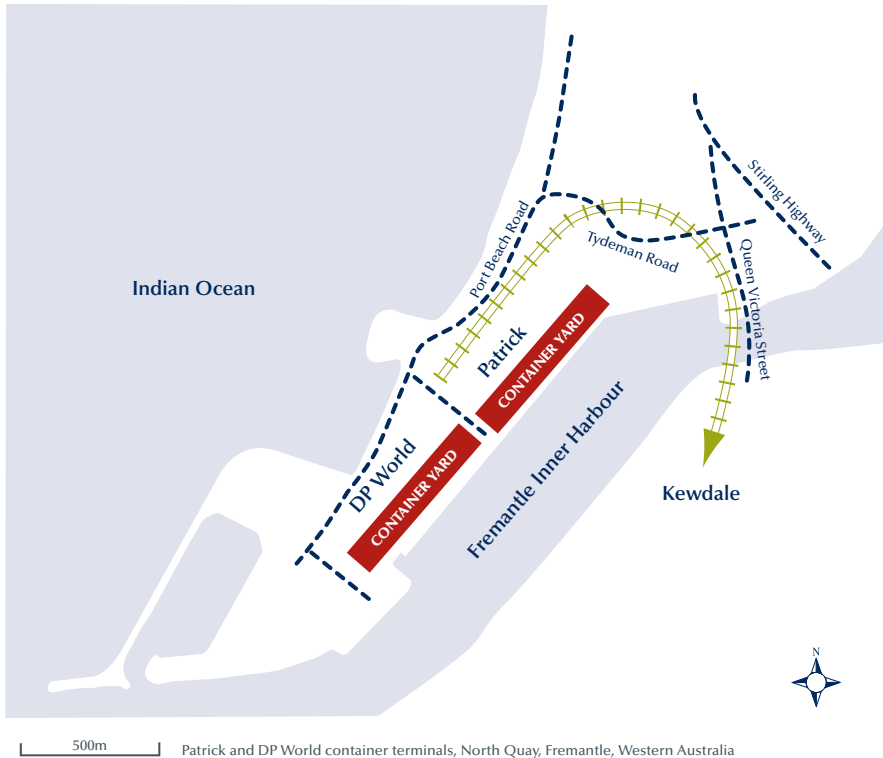
FA4 DP World terminal—Outer Harbour, Adelaide



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

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

FA5 Patrick and DP World container terminals—North Quay, Fremantle



500m Patrick and DP World container terminals, North Quay, Fremantle, Western Australia

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

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

Abbreviations

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

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