



SUPPLY CHAIN PERSPECTIVE

TEU & GENERAL FREIGHT MOVEMENTS



QTLC

QUEENSLAND TRANSPORT
AND LOGISTICS COUNCIL

Overview

➔ TEU (containers)

A large range of product and materials imported to and exported from Australian ports are transported in shipping containers. These are referred to as TEUs (twenty-foot equivalent units). TEUs are the most common method of international transport for importing and exporting non-bulk commodities. These goods include:

- fast-moving consumer goods (FMCG) for retail chains and national/regional agents/distributors, including food stuffs
- electronics and electrical goods
- timber products
- automotive, machinery and industrial equipment and spares
- minerals, chemicals and petroleum products
- construction and hardware related products
- primary industry commodities such as grains, cereals, cotton, sugar and meat products.
- TEUs are also used to move domestic product in Australia, including in Queensland by rail. Rail is typically used on the longer haul routes from Brisbane into northern and Far North Queensland, and interstate between Queensland and southern states.

➔ General freight¹

In 2010/11, road freight movements represented 69% (599 megatonnes) of Queensland's intrastate freight volume, rail represented 29% (251 megatonnes), sea 2% (20 megatonnes) and air 0.05%, and is forecast to increase by 355 megatonnes by 2026. This is in line with the expected increases in consumption, due to increased population and changing consumer behaviour.

As shown below, road freight is a major modal choice for the interstate freight task. The total Australian domestic freight task, including the movement of bulk commodities such as coal and iron ore, is shared by mode as follows:

- rail: 49%
- road: 35%
- coastal shipping: 17%
- air 0.01%.

¹ Freightline1 'Australian Freight Transport Overview', Department of Infrastructure and Regional Development, Bureau of Infrastructure, Transport and Regional Economics May 2014

Coal and iron ore accounts for 80% of all rail freight in Australia, while other bulk commodities such as grains, sugar and fertilisers account for a further 8%.

For non-bulk rail freight, around 8% of the total Australian task is carried on three main corridors:

- eastern states to Perth (the majority of inter-capital non-bulk rail freight)
- Melbourne to Brisbane (30% of the corridor's non-bulk rail freight)
- Brisbane to northern and Far North Queensland.

Typical products carried by interstate road freight are the major commodities and products imported to/made in and consumed in Australian cities and towns.

Key statistics:

- Road freight in capital cities is 20% of all road freight movements.
- Urban areas account for a further 10%.
- Inter-capital road freight makes up 18 to 19% of all movements.
- The remaining 50% is for movements between cities and regional areas².

Dimensions

➔ TEU

In 2012/13, 1,143,879 TEUs were moved through Queensland's ports. This represents an increase of 50,692 TEUs (or 4.6%) from the previous year³. The mix of containers imported and exported is shown in Table 1:

Table 1: Imports and exports by TEU (Queensland)

	2012/13
Export TEUs	
Full containers	366,273
Empty containers	196,599
Total exports	562,872
Import TEUs	
Full containers	494,397
Empty containers	86,610
Total imports	581,007
Total throughput	1,143,879

Source: Trade statistics for Queensland ports for the five years ending 30 June 2013

² Freightline1 'Australian Freight Transport Overview', Department of Infrastructure and Regional Development, Bureau of Infrastructure, Transport and Regional Economics May 2014

³ Trade Statistics for Queensland Ports, five years ending 30 June 2013, Department of Transport and Main Roads

Of this throughput, 95.53% of all TEUs are traded through the Port of Brisbane, which exceeded one million TEUs for the second consecutive year.

The Port of Brisbane is supported by a high level of land-side transport infrastructure. This features extensive road connections to major growth areas, including prime agricultural and mining regions, as well as access to the Brisbane Multimodal Terminal (BMT) to facilitate rail transit.

➔ General

The interstate movement of freight into and from Queensland is summarised in Table 2.

Table 2: Queensland interstate road freight movements 2012/13 (kilotonnes)

State	Freight movements from Queensland	Freight movements to Queensland
NSW	13,544	14,213
VIC	3,717	2,889
SA	638	538
NT	324	160
WA	98	117
Total	18,321	17,917

Source: Research Report 121, September 2010, road freight estimates and forecasts in Australia: interstate, capital cities and rest of state; Department of Infrastructure and Transport; Bureau of Infrastructure, Transport and Regional Economics

As shown in Table 2, 18,321 kilotonnes moves out of Queensland by road to other states, and 17,917 kilotonnes moves into Queensland.

The following is noted from Table 3 regarding the Queensland road freight task:

- Due to the large distances involved, the tonne kilometre (equivalent to one tonne moved one kilometre) task is 59.4% for regional Queensland.
- Brisbane makes up 22.6% of the total tonne kilometre task.
- Interstate from and to Queensland accounts for 18%.

Table 3: Road freight estimates (billion tonne kilometres) Queensland 2013

Road freight estimates (billion tonne kilometres) Queensland 2013						
Interstate				Intrastate		
From	To	Through	Total	Brisbane	Rest of state	Total QLD
3.71	3.4	0	7.11	8.91	23.45	39.47
9.4%	8.6%	0.0%	18.0%	22.6%	59.4%	100.0%

Source: Research Report 121, September 2010, road freight estimates and forecasts in Australia: interstate, capital cities and rest of state; Department of Infrastructure and Transport; Bureau of Infrastructure, Transport and Regional Economics

➔ People working in TEU and general freight

The transport, postal and warehouse industry sector is responsible for more than 5.5% of the total employment in Queensland, involving 98,600 people. This excludes those undertaking freight movements as part of another business process, such as manufacturing, and excludes drivers who are not residents of Queensland⁴.

➔ Businesses involved in TEU and general freight

In Queensland, there are 7,454 businesses operating in this sector⁵:

- 6,833 businesses with 1-19 employees
- 568 businesses with 20-199 employees
- 53 businesses with 200 plus employees.

Road freight transport businesses account for more than 60% of this sector, with 1,000 of these businesses turning over more than \$2m a year.

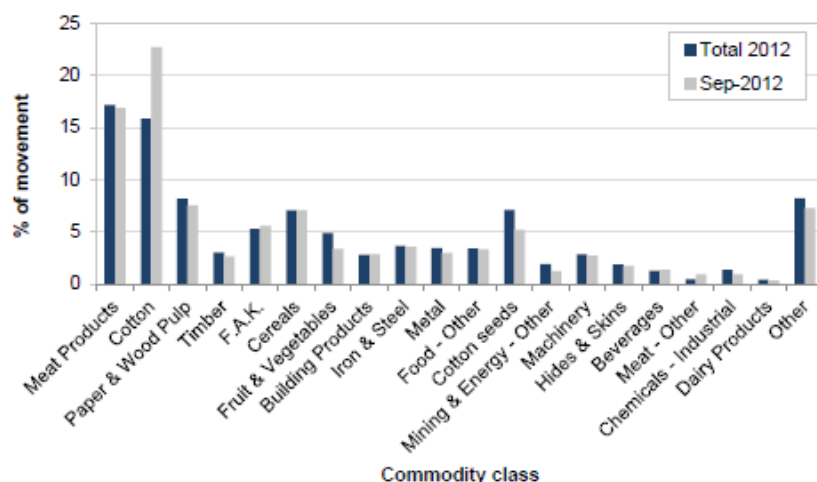
⁴ ABS 816501 Number of Australian Businesses June 2012

⁵ ABS 816501 Number of Australian Businesses June 2012

Points of origin

Figure 1 shows the make up, by commodity class, of exports through the Port of Brisbane. Tables 4 and 5 show the origin of these export containers.

Figure 1: Export TEUs by commodity class



Source: Import/Export Logistics Chain Study Summary Report, POB/QTLC, June 2013

Table 4: Origin of export TEUs

Area	Origin	%	
Brisbane	Brisbane - East	29.2	39.4
	Brisbane - South	6	
	Brisbane - North	2.4	
	Brisbane Inner City	1.6	
	Brisbane - West	0.2	
Adjacent statistical regions	Ipswich	14.7	34.3
	Gold Coast	11.7	
	Logan - Beaudesert	3	
	Moreton Bay - North	4.7	
	Moreton Bay - South	0.1	
	Sunshine Coast	0.1	
Regional Queensland	Darling Downs - Maranoa	15.7	24.8
	Queensland - Outback	0.1	
	Toowoomba	4	
	Wide Bay	5	
Interstate	Richmond - Tweed	1.5	1.5
Total		100	100

Source: Import/Export Logistics Chain Study Summary Report, POB/QTLC, June 2013

Table 5: Origin of export TEUs by postcode

Exports		
Post code	Suburb	Export TEUs
4174	Hemmant	38,918
4211	Carrara	32,653
4303	Dinmore	29,490
4178	Port Of Brisbane	23,498
4605	Murgon	15,342
4172	Murarrie	15,043
4515	Kilcoy	13,730
4356	Pittsworth	12,954
4405	Dalby	11,700
4106	Rocklea	11,521
4178	Lytton	11,015
4401	Oakey	9,790
4390	Goondiwindi	8,238
4350	East Toowoomba	7,522
4285	Beaudesert	6,686
4305	North Ipswich	6,566
4343	Gatton	4,656
Remainder (65 postcodes)		41,368
Total		300,690

Source: Import/Export Logistics Chain Study Summary Report, POB/QTLC, June 2013

A high percentage of export containers (29.2%) are packed in the industrial areas close to the Port of Brisbane. The Darling Downs-Maranoa region is also responsible for a high percentage of containers (15.7%), which reflects this region's use of containers to transport agricultural exports. Ipswich and the Gold Coast also provide high numbers of containers for export.

Around 85% of imported TEUs are manufactured goods destined for distribution centres. Of all import TEUs unloaded at the Port of Brisbane, 26.7% were unpacked in or near the port. In total, 65.8% of import containers are unpacked in the Brisbane area and 27.2% in adjacent statistical areas, with the balance in regional Queensland and interstate.

Total domestic movement of TEUs throughout Queensland⁶:

- intra-state: 306,299 (65% of all intra-state containers moved to Townsville and Cairns)
- interstate: 240,892.

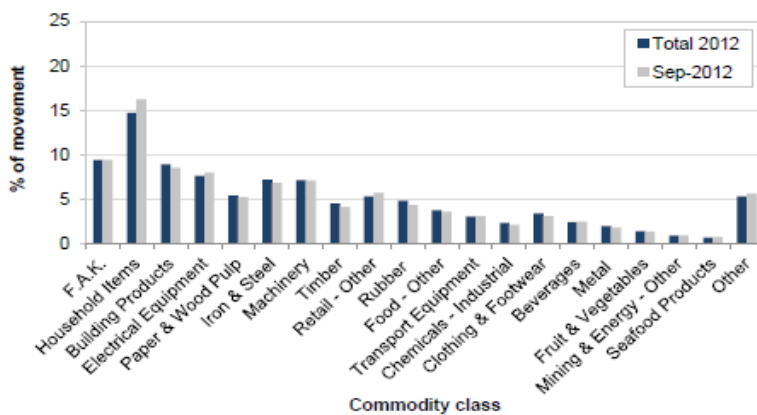
This is further discussed in the section on rail.

Points of destination

Figure 2 shows imports through the Port of Brisbane by commodity class.

⁶ Import/Export Logistics Chain Study Summary Report, QTLC, June 2013

Figure 2: Import TEUs by commodity class



Source: Import/Export Logistics Chain Study Summary Report June 2013, POB/QTLC

Table 6: Destination of import TEUs

Area	Destination	%	
Brisbane	Brisbane - East	26.7	65.8
	Brisbane - South	18.7	
	Brisbane - North	13.6	
	Brisbane - West	0.5	
	Brisbane Inner City	6.3	
Adjacent statistical regions	Gold Coast	7.2	27.2
	Ipswich	11	
	Logan - Beaudesert	4.2	
	Moreton Bay - South	2.5	
	Moreton Bay - North	1.4	
	Sunshine Coast	0.9	
Regional Queensland	Cairns	0.1	3.2
	Darling Downs - Maranoa	0.4	
	Fitzroy	0.3	
	Mackay	0.3	
	Queensland - Outback	0	
	Toowoomba	0.9	
	Townsville	0.6	
	Wide Bay	0.6	
Interstate	ACT	0	3.8
	NSW – Sydney	1.8	
	NSW – Other	0.3	
	SA	0	
	TAS	0	
	VIC – Melbourne	1.2	
	VIC – Other	0.2	
	WA	0.2	
Total		100	100

Source: Import/Export Logistics Chain Study Summary Report June 2013, POB/QTLC

Table 7: Import TEU by post code

Imports		
Post code	Suburb	Import TEUs
4178	Lytton	54,725
4174	Hemmant	36,145
4108	Coopers Plains	18,461
4106	Rocklea	17,623
4014	Virginia	15,267
4076	Wacol	15,033
4011	Hendra	15,005
4110	Acacia Ridge	15,004
4009	Eagle Farm	13,886
4172	Murarie	13,140
4300	Carole Park	11,971
4178	Port Of Brisbane	11,893
4077	Richlands	11,730
4008	Pinkenba	7,945
4500	Brendale	7,738
4207	Staplyton	7,724
4110	Heathwood	7,316
4207	Yatala	7,174
4304	Bundamba	6,660
4013	Northgate	6,383
4034	Geebung	6,227
Remainder (369 postcodes)		133,096
Total		440,146

Freight movements

➤ TEU

In 2012, there were ⁷:

- 762,693 full TEU road movements of import and export containers
- 212,271 empty TEU road movements of import and export containers
- 31,194 full TEU rail movements of import and export containers
- 25, 279 empty TEU rail movements of import and export containers.

Of those movements:

- 45% of TEUs were transported by HPV (Super B-Doubles, A-Doubles and B-Doubles) with 45% by semi-trailers, 9% by side-loaders and less than 1% by rigid trucks
- each truck carried, on average, two TEUs
- 56,000 TEU were moved by rail.

For each TEU movement, there were between 1.8 to 2.0 average vehicle movements.

⁷ Import/Export Logistics Chain Study Summary Report, POB/QTLC, June 2013

➤ General freight⁸

The extent of the general freight task in Queensland is summarised below:

- The total interstate freight task is 36.2 megatonnes a year.
- Approximately 3,300 B-Doubles enter and leave Queensland on interstate haulage runs daily (32 tonnes per unit of movement).
- Approximately 8,300 heavy vehicle general freight movements occur around Brisbane daily (15 tonnes per unit of movement).
- Approximately 21,900 heavy vehicle general freight movements occur around regional Queensland daily (15 tonnes per unit of movement).

Transport mode

➤ TEU

TEUs are transported by a wide variety of vehicles including:

- tilt tray and rigid
- side-lifter/swing-lifter
- articulated
- B-Double
- A-Double
- Super B combinations.

➤ General freight⁹:

- More than 95% of the domestic freight task is carried in heavy vehicles with a gross vehicle mass greater than 4.5 tonnes.
- Articulated trucks account for 78% of all movements, of which B-Doubles move approximately 40% of the total task.
- Heavy rigid vehicles account for 18% of all movements.
- Heavy vehicles account for around 10% of the total road use.

⁸ Road freight estimates and forecasts in Australia: interstate, capital cities and rest of state; Research Report 121; Australian Government; Department of Infrastructure and Transport; Bureau of Infrastructure, Transport and Regional Economics; 2010

⁹ Freightline1 'Australian Freight Transport Overview', Department of Infrastructure and Regional Development, Bureau of Infrastructure, Transport and Regional Economics May 2014

➤ Rail

Rail is used domestically to move product into the north of the state on the north coast line, with typically 70 scheduled services a week. From Brisbane, the main locations serviced are Rockhampton, Mackay, Townsville and Cairns, with inter-regional services between Gladstone and Townsville. Product for western regions can be transhipped via these locations. There are dedicated meat refrigerated container trains, known as the Sea-Freighter, that have the capacity to move more than 20,000 TEUs a year to Brisbane for export. The Sea-Freighter can carry standard 20 foot and 40 foot refrigerated containers¹⁰.

Interstate rail is used to bring freight into Queensland from southern locations.

There are an estimated 2,000 daily heavy vehicle movements into and out of the South East Queensland intermodal terminals network. This figure is based on TEU data generated from the IMEX Study 2013¹¹ and the TMR Traffic Census 2012¹², and is subject to vehicle configuration used and the extent of container triangulation employed.

Main routes

High volume TEU movements are depicted in Figure 3 below.

Figure 3: TEU movements



Source: Import/Export Logistics Chain Study Summary Report, POB/QTLC, June 2013

¹⁰ Port of Brisbane Pty Ltd, Shipping Handbook 2013/14

¹¹ Import/Export Logistics Chain Study Summary Report, QTLIC, June 2013

¹² Traffic Census 2012, Queensland Department of Transport and Main Roads

➔ General freight

Main interstate routes include:

- Pacific Highway between Brisbane and Sydney
- Newell Highway between Brisbane and Melbourne
- all major national and state highways in Queensland for line haul, then local road networks for access to final destinations.

Key nodal infrastructure

TEU supply chains involve:

- ports
- container packing and unloading facilities
- points of production
- points of consumption and/or storage and distribution
- container parks
- intermodal terminals.

For the general freight chain it involves:

- trailer loading and unloading facilities
- points of production and intermediate value adding and processing
- points of consumption or storage and distribution
- intermodal terminals
- heavy vehicle decoupling yards and rest areas.