2012 Snapshot
of the
Breakbulk Shipping Industry
in Australia

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Contents

Introduction

Breakbulk is a vital component of the general cargo shipping industry that is often overshadowed by container shipping.

The 2012 Snapshot of the Australian Breakbulk Industry aims to build upon Shipping Australia Limited's 2009 Breakbulk Report and illuminate the industry's practice and issues to a broader audience. In 2009, the intended audience was breakbulk service providers and the report was focused on the principal Australian ports that transferred breakbulk cargo. The handling capability of the ports was investigated and comparative assessments of the facilities and costs were made.

The 2012 snapshot takes a different approach with the aim to provide an appreciation of the industry to the wider audience, including potential shippers and policy makers. To do this, the report outlines some of the significant influences that have shaped the industry and its operations in Australia today. For an assessment of contemporary issues, feedback was sought from Australian breakbulk services providers via a survey designed to gauge their perspectives on the state of the Australian industry.

The markets for breakbulk are a focus of this industry snapshot with two case studies examining how various services are provided. The particular influence of the mining boom as a driver of the industry is also investigated.

Definition and Scope

Breakbulk cargo consists of discrete items that are handled individually. As containers are now the dominant mode of transporting general cargo, the decision to ship goods as breakbulk is either an economic consideration or a physical necessity. One economic consideration favouring breakbulk is its efficacy for items whose weight reaches a container's capacity well before the internal space of the container is utilised. Stowing items such as steel coil and news print individually is often a more effective use of a vessel's storage space. Bundling goods into 'unitised' cargoes is also often more efficient than utilising containers and is commonly applied to weather resistant items such as timber, steel pipe and aluminium ingots.

Breakbulk is necessary for items with dimensions too large to fit or with a shape too difficult to position inside a container. This type of breakbulk cargo can be specialised plant or equipment that is dismantled into manageable sizes for transport, and then reassembled on site. Items shipped in this method are also classified as 'project cargo' and when they include items that have excessive weight these are classed as 'heavy-lift' cargo. The variety of oversized breakbulk cargoes presents a challenge to the cargo stowage planner to effectively and efficiently stow individual items for every voyage.

The following table, taken from Shipping Australia Limited's 2009 Breakbulk Report, categorises the goods that are commonly shipped by Australian breakbulk service providers.

Table 1: Principal Break Bulk Cargoes Imported into/Exported out of Australia

Machinery	Steel	Project Cargoes	General Cargoes	Others
Mining Equipment (including tyres)	Coil	Oilfield Equipment	Timber Veneer	Timber
Farm Machinery	Pipes	Refinery Equipment	Oilfield/Drilling Equipment	Newsprint
Civil Engineering	Angles and Channel	Pipes for Mining Industry	Bulker Bags e.g. Ammonium Nitrate	Paper Pulp
	Merchant Bar	Power Generation	Boats (Yachts)	Defence Equipment
		Transformers	Copper, Zinc	
		Windmills	Construction Modules	
		Steel Structures	Locomotives	

The diversity of the maritime freight industry often makes clear generalisations difficult. For example, a significant volume of Australian cargo is motor vehicles transported on specialised vessels known as pure car carriers or 'roll-on roll-off' (ro-ro) carriers. Cars are discrete items that are handled individually, but when transported on specialised vessels are not defined as breakbulk cargo.

Development of the Breakbulk Fleet

The specialisation of ships to carry single commodity cargoes revolutionised the shipping industry during the 20th century. The effect was not just on the ship design but throughout the maritime supply chain and included port design and how cargo was handled. Specialisation began with bulk commodities in the first part of the century but not realised in the general cargo sector until containers were introduced in the late 1960s. In 1969, the OCL Encounter Bay was the first container ship to come to Australia on a service operating between Australia and Europe.

The specialisation of containerships overshadowed the development of ships designed specifically for breakbulk cargoes, known as multipurpose vessels (MPV). No longer was it necessary for so many cargo compartments; gone were the 4 deck ships, the deep tanks for vegetable oils and reefer chambers for refrigerated cargo. MPV's with modern cranes were designed with broad open hatches for ease in working the cargo into square shaped holds. The flexibility of this design also enabled MPV's to be easily fitted to carry bulk commodities providing extra market versatility. The SD14, a shelter deck cargo ship, was the first breakbulk ship design to gain popular utilisation as the sector developed in parallel to containers.

In 2011, the United Nations Conference on Trade and Development reported that general cargo (i.e., breakbulk) ships had decreased in percentage of the world fleet from 17% to 7.8% between 1980 and 2011, while container ships had increased in this period from 1.6% to 14% of the world fleet. This trend is highlighted in the following table which shows an ageing breakbulk fleet with over 60% of the fleet older than 20 years while the newest container ships (younger than 4 years) made up the largest segment of the fleet at 28.2%. This data also demonstrates how the specialisation of ship design to carry containers has consistently enabled larger ships to be built. Breakbulk ships have increased in size, though not consistently, and when comparing the average capacity of the newest breakbulk ships with container ships, container ships are more than five times larger.

Table 2: Age of breakbulk fleet

Compostion of World Breakbulk and Container Fleets (Average Age and Vessel Size)							
Fleet	Average age in years (2010)		0–4 years	5–9 years	10–14 years	15–19 years	20+ years
Breakbulk	24.15	% of total	10.4	9	8.4	11	61.1
		av. size (dwt)	9,221	6,399	7,601	4,453	3,962
Container	10.7	% of total	28.2	24.4	19.7	14.8	12.9
		av. size (dwt)	47,516	44,240	32,751	26,509	23,117

Source: Compiled by the United Nations Conference on Trade and Development on the basis of data supplied by IHS Fairplay

Breakbulk Cargo

One factor that has contributed to the dominance of containers in the general cargo sector is the significant benefit of increased handling efficiency provided by unitisation and standardisation. Once the shipper has ensured that cargo is properly secured and regulations such as weight limits have been adhered to, the container has effectively unitised the cargo in the standardised dimensions of the container. This has enabled similar standardisation of all handling equipment and supporting infrastructure in the container supply chain.

The diverse dimensions of breakbulk cargoes restrict the application of a standardised handling method. For efficient handling, some breakbulk cargoes require specific handling techniques and breakbulk ships can carry cargo-specific handling equipment. Still, the efficiency benefits of unitisation and standardisation are such that, where it is possible and as much as it can be, they are applied to breakbulk cargoes.

Sawn timber is a breakbulk cargo that is strapped into unitised bundles of lengths that are determined by the shipper. Slings that are part of the ship's handling equipment are used to hook the timber bundles to the ship's crane during loading and are left in-situ with the stowed unit of timber.

This expedites the discharge at the destination port as the 'pre-slung' bundles are quickly attached to the crane's hooks by stevedores in the hold, then lifted and placed on the wharf. On the wharf, the cargo is unhooked and the stevedores also reclaim the slings from the bundle of timber which is transferred to a storage area by forklift truck. The slings are collected during the operation. When the entire consignment has been discharged, the slings are bundled and returned either to the ship or the loading port.

Example of unitised breakbulk cargo – sawn timber

Oversized breakbulk cargo can be standardised to the extent that it is possible and shipped on container or breakbulk ship by using a piece of handling equipment known as a flat-rack. A flat-rack is a steel base upon which cargo is placed; it has similar length and width dimensions of a container. Oversize breakbulk suitable to be handled with a flat-rack is referred to as 'out of gauge' cargo.

Similar benefits of containerisation can be gained using this method: the shipper secures the 'out of gauge' item to the flat-rack, effectively unitising it before presenting at the wharf. Flat-racks have standardised locking mechanisms (twistlocks) in the corners of their structure which enables the unit to be secured into existing points on the ship or on top of a standard container stack.

Standardising breakbulk cargo – Flat-rack

An appreciation of the breakbulk handling can be gained by considering four general principles of ship cargo planning:

- Safety of ship and crew
- Safety of cargo
- Highest possible port speed
- Most efficient use of space (Alderton, 2004).

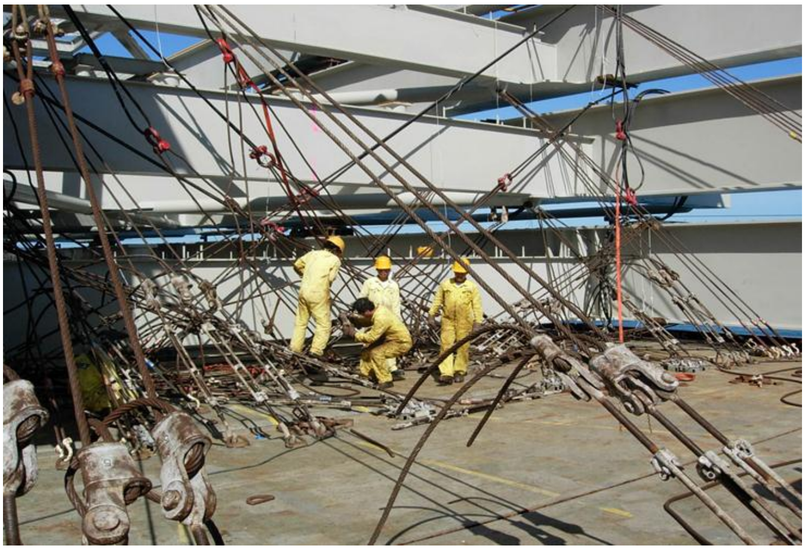
Safety of ship and crew

Safety of the crew and stevedores who are handling breakbulk cargo is a heightened priority when handling breakbulk cargo as exposure to workplace risks is directly correlated to the increased labour intensity required. Breakbulk cargo employs a larger number of stevedores per tonne of cargo and requires workers to be in direct contact with the cargo, often in confined spaces. The lack of standardisation also requires stevedores to be skilled in a number of cargo handling techniques and to be capable of assessing a range of potential risks in the workplace.

Safety of cargo

Loading and discharging breakbulk, particularly heavy-lift cargoes, requires stevedoring skills not required in container trades. Using the ship's ballast to take the weight of a heavy lift from the dock is a technique used to keep the ship stable throughout the lift. The less (deadweight) cargo in the hold, the more the ship will roll as heavy pieces are hoisted on board.

The vagaries and forces of the sea encountered during the voyage must also be accounted for to ensure cargo safety. Lashing and securing of cargo is a complicated and often time-consuming process. The following picture shows an example of the labour intensity required when securing wharf deck frames with steel cable stays on board the Happy Ranger in Western Australia.



Highest possible port speed

A ship cargo plan will position items in the ship's hold to facilitate the highest possible port speed (i.e. reduce the ship's port transit time by making the load and discharge operations as effective as possible). An accurate estimation of the ship's port transit time is an important consideration for a ship cargo planner as they are also responsible for the ship's scheduling. The cargo handling rate is one of the factors used to calculate the port transit time and, for reasons already outlined, breakbulk can be significantly slower than other cargo types. The lack of standardised breakbulk cargo also makes applying the handling rate of specific cargoes the only real method of calculating the transit time. Making estimations of port transit time for containers and bulk cargoes is relatively less complicated.

The handling rate, however, is only one factor for estimating the port transit time of a breakbulk ship in Australia: port congestion can also have a significant influence. Weather conditions are another factor which has to be accounted for. High winds can halt operations involving large items, and some breakbulk cargo can only be effectively handled during daylight hours. To account for all the variables, the most useful measure of the breakbulk handling rate is cargo and port specific.

Most efficient use of space

The ship planner has detailed knowledge of the ship's carry capability but to make the most efficient use of space requires specific information of the cargo to be loaded. For breakbulk, this requires the parameters of individual items to be known, such as dimensions, weight, centre of gravity, lifting points and lashing points and the number of tiers on which the cargo can be stacked. Additionally, the efficient use of space requires communicating the stowage plan and the intricacies of the cargo parameters effectively to the stevedores.

For all other cargo types, the planner has to account for fewer parameters, and the parameters are more readily known and easily communicated. For bulk cargo planners, loading a precise volume of grain, for example, can be accurately calculated using the grain's stowage factor (volume to weight ratio). The stowage of ores and minerals can also be accurately calculated using knowledge of the ore's specific gravity (weight to volume ratio), moisture content and angle of repose of the cargo.

Breakbulk Ships

Multipurpose Vessels

The typical modern MPV is geared with minimum 50 tonne cranes and can carry equipment suitable for handling a range of general cargo including containers. This diversity of cargo is demonstrated in the following picture of the Sampogracht. Most MPV are able to load a full cargo of containers in the holds and on deck. The holds of an MPV can also be reconfigured to carry bulk commodities, often by converting the pontoon's tween deck hatch covers into vertical bulkheads. In the Australian market there is often an imbalance of trade by cargo type (general cargo import and bulk cargo export); in this scenario, an MPV can be reconfigured to import and export cargo opportunities and maximise its utilisation.

Image source: Spliethoff

Heavy-Lift Vessels

Heavy-lift vessels are a similar design to MPV but have considerably heavier cranes to handle heavy structures such as industrial plant, machinery and container cranes and a sophisticated ballasting system to handle very heavy pieces. Open hatches enable the large heavy cargo to be placed directly into the hold without needing to be manoeuvred into position. The heavy vessel in the following picture is gearless vessels with no cranes.

Image source: Royal Australian Navy Media Library

Ro-ro Vessels

Ro-ro vessels are named from the abbreviation of 'roll-on, roll-off' which is a reference to the method of loading and discharging cargo on these vessels by driving the cargo over the access quarter or stern ramps rather than loading via hatches with cranes. Ramps internally provide access to large covered cargo decks for wheeled cargo and for forklifts to easily manoeuvre and position breakbulk cargo. Ro-ro vessels require little specific port infrastructure to efficiently transfer cargo which makes them particularly suitable for wheeled mining machinery like trucks and scrapers that are often delivered in regional areas; however, ports in those areas are often unable to accommodate the largest available ro-ro tonnage. The Tamerlane, pictured below, is large ro-ro vessel at 67,140 Gross Tonnage and suitable to carry heavy-lift cargoes.

Image source: Wallenius Wilhelmsen logistics

Side Loading

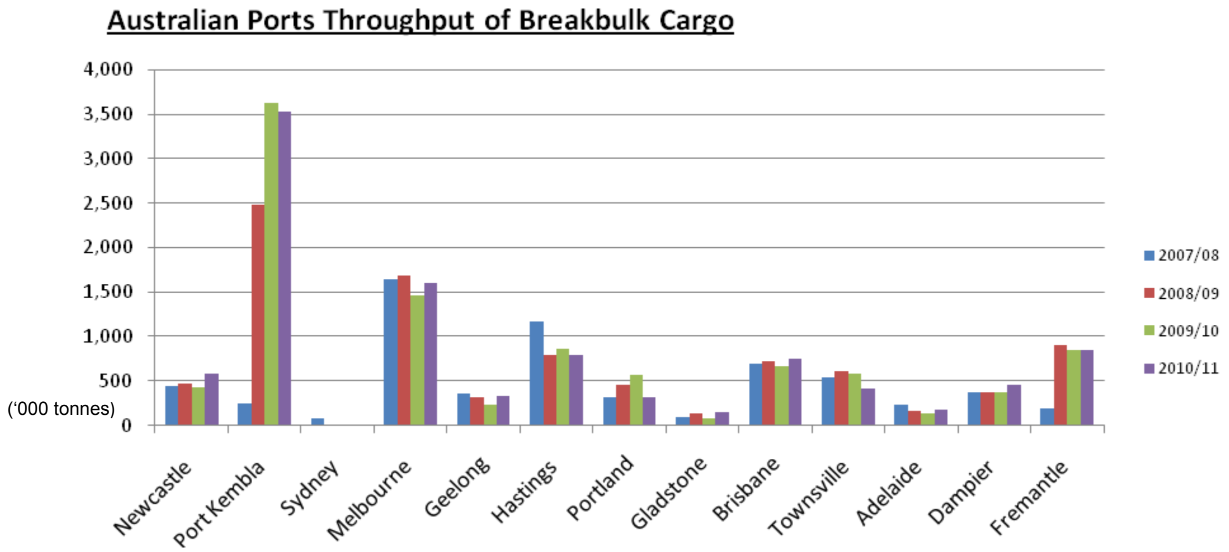
A recent design innovation in the breakbulk fleet is the side-loading system of the Spliethoff S Class vessel. The S Class is equipped within five x 16 tonne internal elevators that enable forklifts or clamp trucks to transition cargo smoothly and efficiently between ship and wharf. The operators quote the cargo handling efficiencies for aluminum ingots and printing paper to be 440 and 310 tonnes per hour, respectively. Side loading breakbulk cargo with forklifts reduces labour, lashing and demurrage material and also the potential for cargo to be damaged.

This innovation is an example of the continual development of technology that exists in the breakbulk shipping sector.

Image source: Spliethoff

Australian Breakbulk Ports

The following graph depicts the mass tonne volume of breakbulk cargo throughput of Australian ports from July 2007 to June 2011. It should be reiterated that this data does not include motor vehicles. It is collated using data from Ports Australia, the Victorian Essential Services Commission, individual port annual reports and direct consultation. The graph clearly shows Port Kembla handling the greatest volume of breakbulk contrasted with the insignificant throughput in Sydney's ports. The ports of Newcastle, Gladstone and Dampier are prominent exporting ports for the mining industry and the importance of breakbulk cargo to that industry is noted in a following section of this report.



Relative to New South Wales, the Victorian ports of Melbourne, Geelong, Hastings and Portland are shown in the graph to share a much more balanced distribution of that state's breakbulk freight task. Throughput data collected annually between July 2005 and June 2010 by the Victorian Essential Services Commission, in the single unit of mass tonnes, provides the opportunity to examine the relative significance of breakbulk with other cargo throughput within each and between each of the ports. The following tables represent breakbulk cargo data specific to each port in total mass tonnes and as a percentage of total port throughput.

Table 4: Volume of breakbulk cargo in Victoria

Breakbulk Throughput for Victorian Ports ('000 tonnes)						
Year ending June 30	2005	2006	2007	2008	2009	2010
Melbourne	1,555	1,539	1,559	1,649	1,692	1,463
Geelong	294	291	361	356	324	234
Portland	365	653	466	448	473	578
Hastings	1,002	1,025	1,123	1,164	793	860
Total	3,216	3,508	3,509	3,617	3,282	3,134

Port of Melbourne's throughput of general cargo is the largest in Australia and in 2009/10 handed 35% of the nation's container trade (PoMC, 2011) and 47% of Victoria's breakbulk cargo in mass tonnes.

Table 5: Proportion of breakbulk cargo in Victorian ports

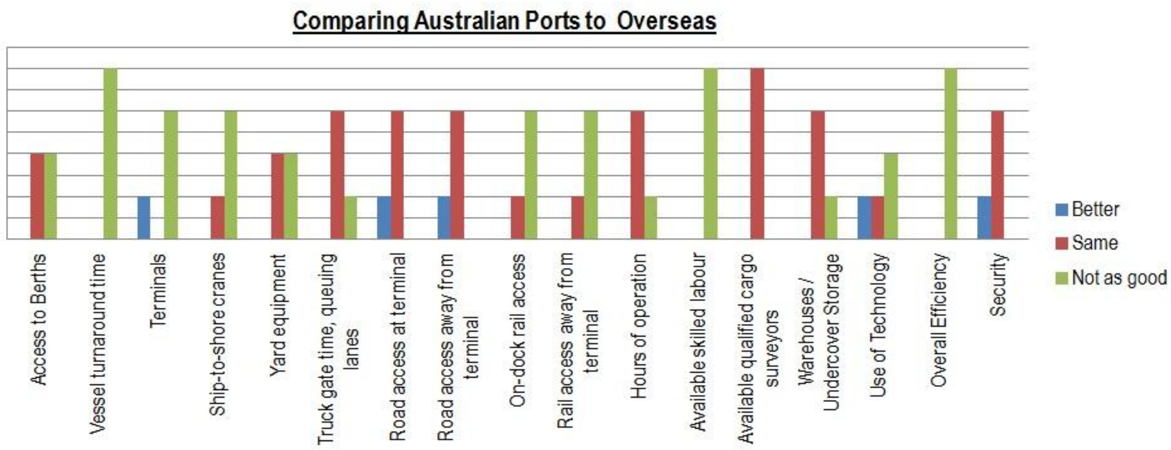
% Breakbulk of Total Throughput for Victorian Ports (mass tonnes)						
Year ending June 30	2005	2006	2007	2008	2009	2010
Melbourne	5.49%	5.54%	5.28%	5.35%	5.81%	4.83%
Geelong	2.33%	2.74%	2.88%	3.32%	3.27%	2.61%
Portland	10.01%	18.59%	15.31%	13.75%	16.37%	19.40%
Hastings	28.53%	33.25%	34.55%	39.40%	29.88%	33.81%
Victorian total	6.69%	7.80%	7.26%	7.57%	7.37%	7.00%

While the Port of Melbourne handles almost the total of the other three ports combined, breakbulk made up less than 5% of its total mass tonne throughput in 2009/10.

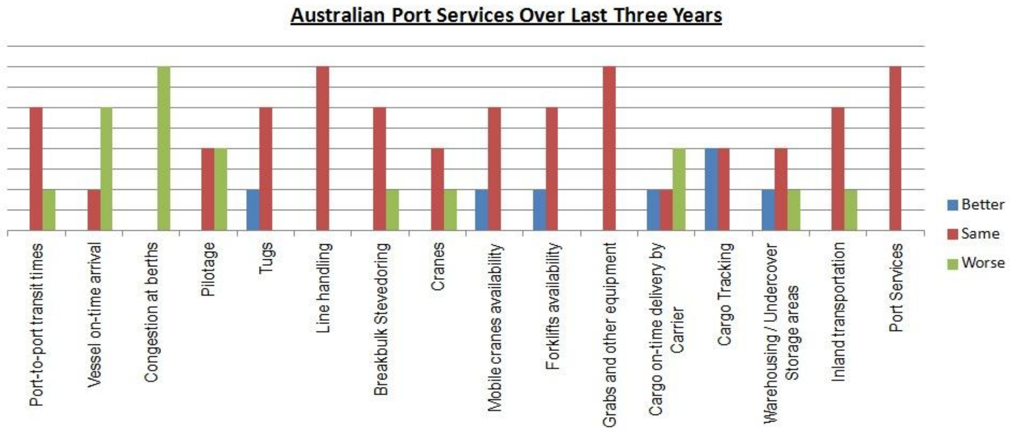
Australian Port Breakbulk Services

The 2012 Breakbulk Service Providers Survey presents an aggregated assessment of how well the ports in Australia facilitate breakbulk cargo throughput.

When asked to compare a range of port services and facilities with the overseas ports which they most utilised, the survey respondents were critical of all aspects relating to the Australian ports. Only in five of the seventeen aspects were Australian ports described as better, which in all cases was the minority view. The majority view – "that the Australian ports were not as good as overseas ports" – was recorded for seven out of the possible seventeen aspects, with 'vessel turn-around-time', 'lack of availability of skilled labour' and 'overall efficiency' universally reported as not being as good in Australian ports. The figure below shows how survey respondents compared Australian ports to overseas ports.



When asked their view on the development of Australian port services provided for breakbulk cargo during the last three years, respondents indicated no majority view that any of the services had improved. On the contrary, they reported that 'vessel arrival time' had deteriorated and it was universally agreed that 'congestion at berths' had become worse. The next figure shows the respondents' rankings of Australian port services over the last three years.



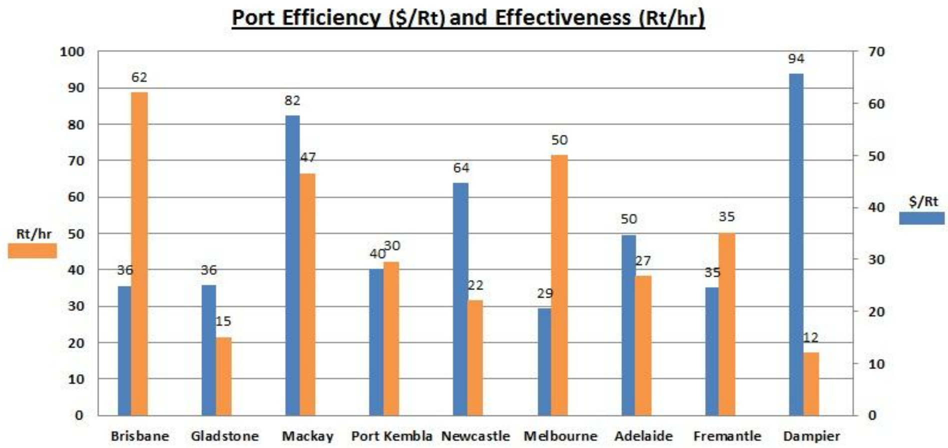
A list of Australian ports and their breakbulk facilities is presented in the first appendix.

Port Operations

To assess a possible framework for future breakbulk port productivity monitoring, the survey asked the respondents to provide the following data relating to their port calls in 2011:

- Revenue tonnes transferred
- Vessel turn-around-time
- Total port costs.

Measures of a port's breakbulk effectiveness and efficiency were calculated from the surveyed data for each port which recorded greater than 20 port calls in 2011. The results are presented in the following graph. Direct comparisons between ports is not appropriate because each port is subject to a varied set of parameters, but over time these measures would be useful for the comparison of individual ports.



Effectiveness is concerned with timeliness and is calculated as the revenue tonnes per ship turn-around-time (Rt/hr). This dataset consisted of 1,177 port calls, 2,115,581 revenue tonnes and total turn-around-time of 55,493 hours. Efficiency is concerned with cost and is calculated from the surveyed data as the revenue tonnes transferred per total port cost (Rt/$). This dataset was not as comprehensive as the previous dataset, due to commercial sensitivity, but still consisted of 836 port calls, 1,745,763 revenue tonnes and total port costs of $66,641,644. The effectiveness and efficiency scores for the Port of Townsville were 7 and 184, respectively; these outlying results were influenced by the $145 M infrastructure expansion projects commenced in 2011 involving the breakbulk berths 8 and 10.

Mining Ports

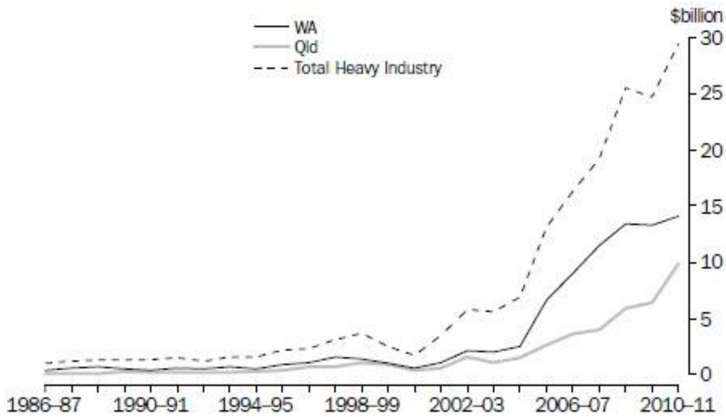
Results of the 2012 Breakbulk Service Provider Survey demonstrated a wide range of breakbulk cargo being imported in 2011. It was a significant finding that mining equipment was reported as being the single cargo common to all respondents. To develop on this finding, the role of breakbulk shipping in the mining industry and the ports which support it were examined.

For a number of Australian ports, the vast majority of cargo throughput by volume is exported bulk mineral resources. The annual exports of coal by the Ports of Gladstone and Newcastle and of iron ore by Ports Hedland and Dampier rank these ports amongst the highest productive mining ports in the world. As a percentage of the annual throughput volume, breakbulk cargoes are quite insignificant as general cargoes amounted to less than 1% for these ports in the 2010/11 financial year.

Despite the relatively low volume of breakbulk imports, the import of equipment and industrial plant is essential to the operation and development of the mining industry. Breakbulk cargoes include oversized machinery such as bulldozers, cranes, buckets, dump trucks, steel in various forms, and rubber items such as conveyor belting and tyres. Breakbulk also includes industrial plant that is imported as project cargo in the form of structural modules that are assembled on-site. This method of constructing mining infrastructure by assembling pre-fabricated modules reduces the demand for skilled labour in remote areas which is a major problem presently facing the mining industry.

The increasing significance of investment in construction for the mining industry was featured in an article published by the Australian Bureau of Statistics, which collects data on engineering construction activity. Reported quarterly, the data collected by the ABS calculates the total value of the imported structures used for mining activities plus the associated installation costs. One of the conclusions of ABS in the article was that “there is evidence that the high level of engineering construction activity in the resources sector will continue for some time”. To the extent that these structures have the potential to be imported as breakbulk cargo, this report can provide an indication of the demand for breakbulk and project cargo services. The estimation of ‘heavy industry’ is an aggregate of mining infrastructure investment and does not include supporting structure less likely to require breakbulk handling such as workers’ accommodation and office buildings.

As the following graph illustrates, in 2010-11, Western Australia and Queensland accounted for 82% of the total investment in heavy industry, at 14.1 and 9.9 billion dollars respectively – a record for this survey by both states.

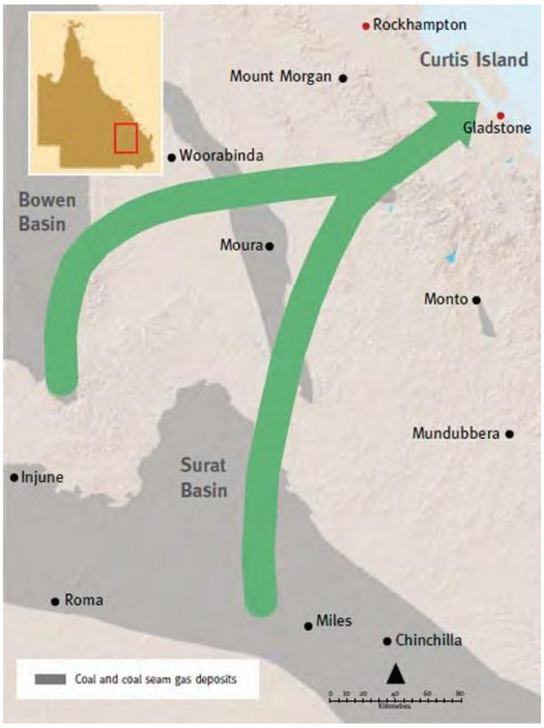


An indication of potential demand for breakbulk cargo services in Queensland and Western Australia can be drawn from the future mining projects proposed in those states.

In Queensland, there are seven LNG projects, three of which are currently under construction, that collectively are expected to generate $45 billion in capital expenditure (Qld Gov., 2012). These projects would result in gas piped to Gladstone for export, making Gladstone the most convenient port for handling the breakbulk cargoes required in construction of this infrastructure.

Natural gas is proposed as a cleaner energy that will assist in the transition from fossil fuels to renewable energy sources.

The following table details the projects in North Western Australia beginning or under consideration for the next five years that total a $183 billion investment (WA Gov., 2012).



LNG industry - gas fields to Gladstone

The breakbulk cargoes to support the construction of these projects represent an indication of the potential future throughput for the ports in the Pilbara.

Table 6: Western Australia major resource projects, October 2012

Projects	$ billion	Mtpa (target)	Construction jobs	Operational jobs	Start up
Iron and steel					
Rio Tinto – Pilbara 283 Iron Ore Expansion	10.2	53	n.a.	n.a.	2013
Hancock Prospecting – Iron Ore Mine & Infrastructure – Roy Hill[1]	9.5	55	8,500	2,000	2014
Fortescue Metals Group – Chichester & Solomon Hub T115 (Includes Port & Rail)	8.3	60	7,000	6,000	2012
CITIC Pacific – Sino Iron – Cape Preston Mine & Processing	8.1	24 (70)	3,500	800	2012
Australian Premium Iron Ore JV – West Pilbara Mine, Rail & Port (Stage 1)[1]	7.4	30	3,500	1,000	2014
Oil and gas					
Gorgon JV Gas Processing Plant	43.0	15.6 (25.6)	5,000	300	2014
Browse LNG Precinct[1]	30.0	12 (50)	8,000	600	2017
Chevron – Wheatstone LNG	29.0	8.9 (25)	5,500	400	2016
Inpex/Total – Ichthys Gas Field	15.3*	- (8.4 NT)	1,000	400	2016
Shell – Prelude Floating LNG Plant	12.0	3.6	n.a.	350	2016
Other projects					
Oakajee Port, Rail & Industrial Estate[1]	5.9	45 (100)	2,500	250	2015
Anketell Port & Strategic Industrial Area[1]	4.6	100 (350)	n.a.	n.a.	2014

[1] Under consideration.
Mtpa - Million tonnes per annum.

Port of Gladstone

In 2009/10, the total throughput of the Port of Gladstone was 84.3 million tonnes (Mt) and 64 Mt of coal making it the fourth largest coal export terminal in the world. Severe weather and flooding in Queensland during the 2010/11 financial year ended the trend of record throughputs for the port with total throughput comprising 76.4 Mt (69.6% coal and 24.4% alumina). The port consists of 6 main wharf centres including 16 wharfs with breakbulk handled on four wharfs at the Boyne, Auckland Point No. 1, 3 and 4 wharfs.

Auckland Point is operated by the Gladstone Ports Corporation and is a multi-user/product facility. Auckland Point No.1 and 3 wharfs handle breakbulk and also cater for the export of dry bulk and import of petroleum and chemical products, respectively. Auckland Point No. 4 wharf facilities are designed to handle general cargoes, containers, breakbulk and also heavy-lift project cargoes. Its 172m length limits the size of vessels which can be berthed but extension work is being undertaken and is scheduled for completion in 2012.

The Auckland Port No. 4 wharf is expecting increased utilisation with demand for project cargoes associated with the building of liquefied natural gas (LNG) infrastructure on Curtis Island. This demand will also require corresponding investment in port handling facilities. One such investment was unveiled in February 2012 when Northern Stevedore Services introduced a new mobile crane to the port which will enhance heavy-lift and general cargo handling capacity. The LHM 550 crane which is the largest and fastest of its type in Australia will lift 150 tonne at 22 metres. A twin-lift container spreader will also significantly improve general stevedoring productivity (Northern Stevedores, 2012).

Newcastle

Coal was first exported from the Port of Newcastle when 50 tonnes were shipped to Bangladesh in 1799. Today the Port of Newcastle is Australia’s largest coal export terminal and in 2010/2011 a record 108.26 million tonnes were exported. That was the first year that over 100 million tonnes were exported, representing more than 94% of the total port throughput. This level of productivity has been supported by the integrated planning and co-ordination of the coal supply chain. Initially established in 2003 as the Hunter Valley Coal Chain Planning Group, then in 2005 transitioned to the Hunter Valley Coal Chain Logistics Team and again to its present form, the Hunter Valley Coal Chain Coordinator Limited (HVCCC) is the centralised organisation co-ordinating the Hunter Valley coal supply chain. One of the functions performed by the HVCCC is daily tracking of coal export productivity and the number of vessels in the queue. This data is available to be viewed on their website (HVCC, 2012).

Throughput other than coal at the Newcastle Port in 2011 was 6.23 Mt which is approximately 6% of the total throughput. However, the Newcastle Port Corporation (NPC) is committed to “growth through diversity” and reported that the more than 40 commodities which comprised this 6% had a combined total value of $3.83 billion which is 22% of the total value of the cargo throughput. Within these 40 commodities is 1.3 Mt of other traded commodities including project cargo.

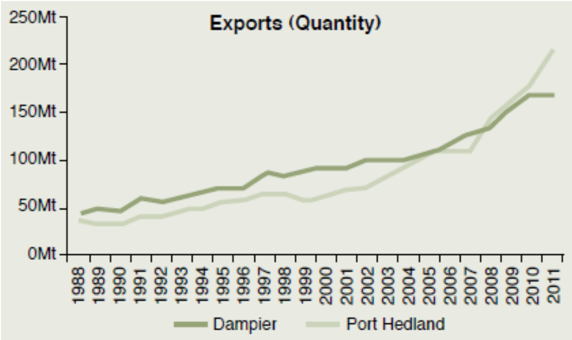
In 2010, the NPC opened the Mayfield No. 4 berth to cater for general purpose cargo with future provisions for containerised cargoes. This is a deep-water multipurpose berth with 1 Ha of hardstand area to handle and store cargo. NPC’s strategy was to develop the Mayfield site as the location for the next container terminal in New South Wales. However, the NSW Ports Minister has stated that the state’s new freight strategy would see Port Kembla developed as the next container terminal once Port Botany reached capacity. This development provides the opportunity for greater utilisation of the Mayfield facilities by breakbulk and heavy-lift trades.

Pilbara Ports

The following overview of two of Australia's north-western ports – Ports Hedland and Dampier (the Pilbara Ports) – illustrates some of the opportunities and challenges for breakbulk in the region. Scheduled to begin in 2014, the Western Australian Government intends to consolidate seven of the state's eight port authorities into four regional port authorities. Under the plan, Port Hedland and the Dampier Port Authority will be consolidated to become the Pilbara Ports Authority which will also include the ports at Cape Preston, Port Walcott, Varanus Island, Barrow Island, Airlie Island, Thevenard Island and Onslow and proposed new ports at Anketell and Ashburton North.

Port Hedland and Dampier are separated by a three hour drive and are Australia's two largest iron ore exporting facilities that in 2011 exported 202 and 136 million tonne (Mt) of the ore respectively.

In addition to iron ore, Dampier exported 17 Mt of LNG, 4.8 Mt of condensate and 4.2 Mt of salt.



In 2011, the volume of general cargo handled in Port Hedland and Dampier was 216,000 and 461,000 tonnes, respectively.

At the time of writing, Port Hedland and Dampier are both experiencing extended delays (of between three and four weeks) for ships waiting to berth. Queuing for berths is not limited to ships waiting to load ore but also occurring for ships importing general cargoes. The table below shows examples of delays of greater than three weeks experienced by general cargo ships in Port Hedland this year.

Table 7: Breakbulk vessels days at Port Hedland

Vessel Name	Arrival Date/Time	Departure Date/Time	Days at port
HAPPY RIVER	7/06/2012 13:25	1/07/2012 13:36	24
FRAUKE	13/06/2012 2:30	7/07/2012 20:31	24
DARLING RIVER	13/06/2012 14:31	9/07/2012 17:59	26

Compiled from data retrieved from http://www.phpa.com.au/shipping/qryDepartedrpt.asp

Ports Hedland and Dampier have infrastructure development plans to increase the general cargo handling capacity in response to the port congestion. Port congestion at these ports has resulted from the increasing demand for general cargo driven by the expansion of the mining sector. A study released in 2011 by the Australian Maritime Complex confirmed that there is a "severe deficiency in marine based common use infrastructure in the North West of Western Australia to support existing and new industries" (AMC, 2011). The report assessed a number of port development locations on the Pilbara coast suitable for a common use facility and identified a number of key attributes in relation to Ports Hedland and Dampier, as shown in the following table. Both ports were identified as having very good existing industrial capabilities that would be able to support industrial logistical needs. While the timeframe for the Dampier expansion is shorter, the potential for greater future expansion is found to be at Port Hedland.

Table 8: Potential for port expansion in the Pilbara

Location	Expandability	Support Infrastructure	Development Timeframe
Port Hedland	Extensive land available as well as additional land for future requirements. Key issues are port congestion and bulk material shipping priority.	Very good both industrial and logistics	PHPA indicates 2 to 3 years
Dampier	Limited	Good to very good	Current expansion by late 2013

The Dampier proposal for increasing general cargo handling capacity is the Dampier Marine Service Facility. The planning for this facility is well advanced and environmental approval has been granted; however, funding has not been forthcoming and projected timeframes for developed has lapsed. The facility if constructed would increase the number of berths and cater for vessels up to 65,000 dwt, a roll-on roll-off wharf facility and upgrade of the heavy load-out facilities. This development would reduce berth congestion and “provide industry standard general cargo handling facilities to meet forecast demand” (DPA, 2011).

The Port Hedland proposal is for Lumsden Point to be a common user facility focused on importing general cargoes. In June 2012, a steering committee was formed for the project with the working title of the Pilbara Maritime Common Use Facility. Four feasibility studies are currently being undertaken which will form the basis of the business case to be considered by the Western Australian Cabinet before continuing the project.

Aspects of the Lumsden Point development include:

- 2 Handymax berths, 400m length, land-backed with 13m berth pocket and a 10m channel
- 100m-wide corridor to link the berth to a 15 hectare laydown area
- A nearby 40 hectare industry support site.

An additional deficiency for breakbulk cargo handling in the Pilbara is the lack of biosecurity inspection facilities. It has been reported that cargoes destined for ports in the North-West are diverted to Fremantle to be discharged and then trucked to their destination, adding to the pressure already placed on the Great Northern Highway network. The Department of Agriculture Fisheries and Forestry – Biosecurity has stated it is willing to work with all stakeholders on ways and means of reducing the biosecurity risks to an acceptable level which would enable imports to be discharged in the Pilbara Ports. DAFF Biosecurity would need to be assured that off-shore inspection/risk mitigation was up to the standards and that regular audits would ensure compliance with these standards.

Australian Breakbulk Markets

The notable findings of the 2012 Breakbulk Service Provider Survey in relation to the market in Australia provided the following points:

- All service providers surveyed reported that in the ratio of 'import to export' breakbulk cargo, importing was at least 8O% of the volume they handled in 2011.
- No single trade relationship could be identified as dominant as respondents provided various regions as being the most commonly serviced, these being China, Southern Asia, Europe and North America.
- Collectively, the shipping agents showed little to no indication of the desire to extend their breakbulk cargo services beyond what was currently offered or controlled; their common focus was to concentrate efforts on port-to-port transit times and their company's reputation.

Survey respondents reported that they actively conduct market research with the priority placed on forecasting future business. While formal market research is widely conducted, face-to-face contact and negotiation with customers were also valued as important activities for the assessment of market conditions. The survey responses were divided in opinion on whether the number of breakbulk vessel providers would reduce or stay the same, but there was no expectation of new entrants.

Breakbulk Services

The following table categorises project and tramping as two freight markets typical of breakbulk cargo services. On either side of the freight market spectrum, as shown in this table, are charter and liner markets which are commonly service bulk and container cargoes, respectively. A typical example for a vessel operating in the charter market would be serving a single client who charters the vessel for a period of time to transport a single bulk commodity between two points. Vessels can also be fixed for specific voyages and cargo, which in this table is referred to as the project freight market.

Table 9: The breakbulk shipping sector

Cargo	Bulk Cargo		General General			
	Liquid	Dry	Breakbulk			Container
Ship type	Specialist				Non-specialised	Container ship
	Tanker, LNG	Bulker	**Heavy lift**	**RoRo**	**MPV**	
Cargo characteristics:	Homogeneous		Overweight >50 tonne	wheeled palletised	Oversize bundled	Containerised-pre-stowed
Handling equipment:	pump, pipe compressor	conveyer belt auger, grab	on-board heavy gauge cranes	Forklift mafi truck	on-board cranes slings	dock-side cranes Container spredder
Freight Market	Charter		Project		Tramping	Liner
market objective:	minimise per unit cost		one-time specific service		maximise utilisation	reliability & speed

Tramping describes the freight market where a ship takes the best available cargoes without a fixed trading pattern, usually fixing prompt shipment dates. The ability to carry a variety of cargoes provides the opportunity for multipurpose vessels to combine a tramping service with either a liner or charter service as a return leg or to carry contract bulk cargo back to an original loading area. In contrast to the charter market, the liner freight market has many clients and operates between advertised routes and with set timetables and port schedules. The liner freight market is particularly suited to container ships but there is also a market for breakbulk liner services in Australia.

Case Study in Breakbulk Liner Service

Multipurpose vessels operating in the Australian liner market often carry a combination of breakbulk and container cargoes. Swire Shipping, for example, performs a number of regularly scheduled breakbulk/container services with its fleet of multipurpose ships from Australia to New Zealand and the Pacific Islands, South East Asia, the US and Canadian West Coasts and North Asia. To maintain an 18 day frequency for its Trans-Tasman liner service, Swire Shipping employs two multipurpose vessels between Australian and New Zealand ports. The typical breakbulk cargoes it transports are steel coil and plate, timber, and project cargoes of various descriptions including machinery and industrial plant.

On 26 February 2012, the Ankergracht called at Port Kembla's Berth 106 in the inner harbour to discharge unitised breakbulk cargo and load an overweight project cargo consisting of industrial plant. Cargo stevedoring was performed by Port Kembla stevedore teams consisting of personnel on the wharf, in the hold and also operating the ship's cranes. Prior knowledge of the cargo stowage plan by stevedores assisted in planning cargo operations and reducing the vessel's time in port. In accordance with the plan, deck officers of the ship worked with the stevedores in the discharging and loading operations. Such planning also considers cargo distribution to ensure vessel stability during the voyage which requires the heaviest cargo to be loaded into the lower hold. In this shipment, access to the lower hold was required for the overweight breakbulk cargo being loaded and resulted in some lighter deck cargo needing to be discharged and re-loaded.

The breakbulk cargo discharged from the Ankergracht was bundled sawn timber from New Zealand plantations bound together with steel strapping. This treated timber is suitable for outdoor and structural use and is not weather-sensitive. It can be transported without any protective wrapping and does not require undercover storage on the wharf. The unloading operation, pictured below, utilised slings put in place around the bundles when they were loaded in New Zealand.

Slings around bundles are connected to the crane.

The overweight cargo sections of the industrial plant were lifted directly from truck trailers driven onto the wharf to the side of the vessel, under the ship’s crane hook.

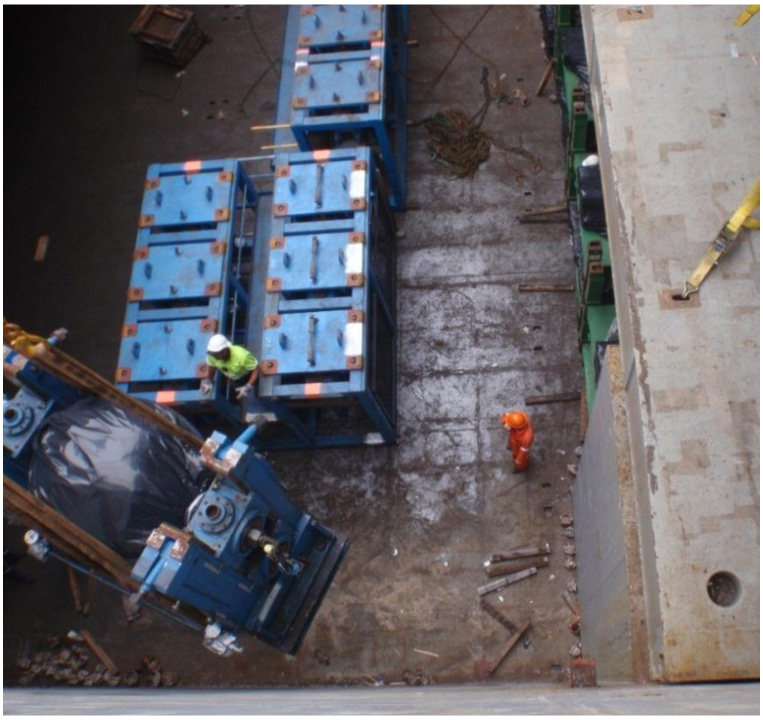
Breakbulk cargo on the wharf in preparation for loading

To reduce the time in port for loading the cargo, all sections of the plant were in the marshalling area on a number of trailers before the ship arrived. Two trucks then alternated to bring the trailers with the cargo onto the wharf.

Sections of the breakbulk cargo in the marshalling area

Using heavy gauge slings, the spread wires (attached to the crane) were attached to marked lifting points on the overweight cargo. Lifting points are important to ensure correctly rated equipment is used and that the cargo is evenly balanced while being lifted and lowered into the hold (as pictured below). Once each item of the cargo was secured in the hold, the removable tween deck pontoons were replaced, slings were returned to the ship equipment store and hatches were closed, and the Ankergracht departed Port Kembla for Newcastle late on 27 February.

Lifting off the wharf



Inside the hold, stevedores and crew work to position the cargo as it is lowered.

Case Study in Breakbulk Tramping and Project Cargo

Construction of the Macarthur Wind Farm (MWF) will result in the establishment of Australia's largest wind farm near Hamilton, 260 kilometres west of Melbourne. This large-scale renewable energy project is enabled by breakbulk shipment of highly engineered industrial plant manufactured in Denmark by Vestas, a world leader in this technology. Vestas has installed over 40,000 wind turbine generators worldwide and its business model includes project management of all aspects including site selection, procurement, construction and operation. The MWF project cargo will be shipped between Denmark and southeast Australia by eight single chartered services at approximately 5 week intervals.

Transport issues for the turbines are considered in their design, and the design facilitates the dismantling of the turbines into standardised modules that comply with the local road weight, height and width limits at the site. The dimensions of each oversize turbine component are listed in the following images.

Blade, Length – 54.65 m, Height – 4 m

Nacelle, L – 12.8 m, H– 3.4 m, W - 4 m

Hub , L – 5.4 m, H - 3.7 m, W – 3.8 m

The 54.65 metre turbine blades are transported as individual modules fixed between the two purpose-designed frames at each end. The frames also serve as lifting points and are able to be secured to each other or to the deck of the ship and to specialised truck trailers. The landside operators coordinated the discharging with the ship's officers after consulting the stowage and lift configuration plans. These plans are based upon the loading and stowage plans for the voyage provided by the original cargo planners in Europe.

The shipment studied for this case was the fourth of the eight to be undertaken and consisted of 21 sets of turbines on board the multipurpose vessel, Donaugracht, which departed the Port of Esbjerg on 1 February 2012 and arrived in Portland Port on 11 March. Being predominately a bulk cargo port required that additional stevedores were hired to complement the permanent staff to perform the discharging of the turbines. Working two shifts a day from 06:00 to 23:00, the discharging of 21 sets of turbines could be completed in four days.

A summary of the stevedore operations during discharge of the project cargo is as follows:

1. Hooking on cargo to designated lifting points on the cargo and unhooking when on shore.

This is performed by stevedores who have to position themselves carefully amongst the cargo to physically hook the cargo to the spreaders which are attached to the cranes.

2. Lifting off the ship and placing onto the truck.

For the 55 metre blades, two cranes are required to be attached for the lift. Operated in tandem, the cranes place the blades directly onto trucks which are driven on the wharf alongside the vessel.

3. Releasing from the crane and securing on to the truck trailer.

On the wharf, stevedores must physically position themselves using a forklift operated platform to handle the unhooking process. Once the turbine was secured to a truck trailer it was driven to a lay-down area near the port where the various windmill components were crane-lifted off the trailer to be stored. Road transport provider works closely with construction contractors to coordinate delivery with the construction schedules.

As an MPV with the flexibility to carry a range of cargo types, the Donaugracht is able to be deployed into the tramp shipping market. As such, after discharging the turbines, the Donaugracht departed Portland on 17 March for Newcastle to be loaded with a bulk concentrate shipment to Europe.

Conclusion

The Scale of Breakbulk

There isn't a single common unit of measure used across all maritime cargoes which makes determining the relative size of any specific cargo sector a subjective assessment. This report puts forward two statistics, calculated in common units of measure and covering each maritime cargo sector, which can provide an indication of the breakbulk sector's current proportion of seaborne trade:

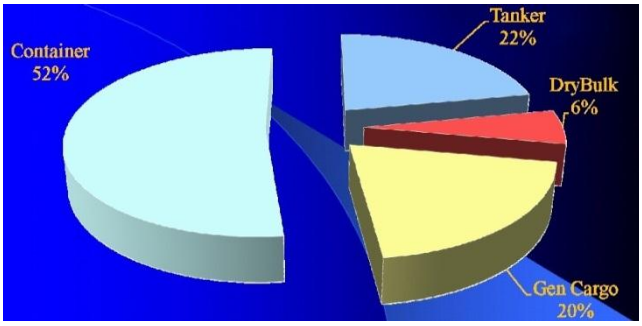
1. General cargo ships account for 7.8% of the world fleet's deadweight tonnage (UNTDAC, 2011)

2. Breakbulk cargo was 7.3 % of the mass tonne cargo throughput of Victorian ports from 2005 to 2010 (ESC, 2011).

Based on these statistics, it is reasonable to estimate that breakbulk accounts for approximately 7.5% of the volume of seaborne trade. Breakbulk cargoes range from semi-processed items such as steel coil and sawn timber to highly engineered project cargoes like wind turbine blades. Therefore, when the value of breakbulk cargo is considered in relation to the value of other cargoes such as bulk commodities it would be expected that its proportional value would be greater than its proportional mass volume.

To calculate the value of the world breakbulk seaborne trade the following estimation relied on separating the values of automotive product from general cargo. In 2008 the value of automotive products was 7.8% of world merchandise (WTO,2009), subtracting this from the 20% value of general cargo identified for the same period (Mandryk, 2009), gives an estimated value for breakbulk as 12% of the value of the world seaborne trade.

Value of Seaborne Trade



(Mandryk, 2009)

This divergence in size and value shows breakbulk to be punching above its weight in terms of its significance in the maritime industry and the value it provides to the industries it supports

Supporting the Development of the Mining Industry

In 2010, when the National Resources Sector Employment Taskforce was established to inform the expansion of the mining industry and to address the challenge of skill shortages, it estimated that short-term construction jobs were likely to peak at around 45,000 between 2012 and 2013. The taskforce also identified that there was a need at the regional level to understand the impact of resource projects on local employment markets and infrastructure adequacy. It is the author's opinion that greater appreciation of breakbulk shipping, and its application in the management of mining construction projects, provides an opportunity to develop this understanding.

Breakbulk shipping of modular cargoes for on-site assembly while abiding to a construction schedule enables labour resources to be efficiently allocated; thus, reducing costs and improving construction quality. Maximising efficiency is dependent on predictable scheduling which in turn is supported by sufficient port infrastructure. Currently in the Pilbara, where large investments in mining construction are planned, insufficient breakbulk cargo handling capacity at the ports is contributing to significant ship berthing delays. Cost-benefit analyses of the proposed developments at the Ports Hedland and Dampier to increase the breakbulk cargo handling capacity should include consideration of how improved project cargo operations can benefit the mining sector.

Monitoring Port Productivity

The survey of Australian-based breakbulk operator and agents produced results that were very critical of the overall efficiency of the service provided by the ports in Australia when compared to ports overseas. Vessel turn-around-times and the availability of skilled labour were identified as areas of particular concern. These factors would also contribute to the respondents' observations that berth congestion in Australian ports had become worse over the last three years.

When presented with the results of port effectiveness and efficiency calculated from the survey data, the ports that responded identified factors along the breakbulk supply chain that contributed to port performance and cargo throughput. One port authority described how the recent increased demand on the breakbulk supply chain had highlighted for them how pressure on one part of the chain can have a cumulative effect. The increase in demand for wharf storage space was compounded by consignees using the wharf for temporary storage and pressure on trucking resources was also compounded by the resistance of warehouses to increase hours for deliveries.

The challenge of setting key performance indicators (KPI) was recognised in the 2009 Breakbulk Report when it recommended that research into the design of KPIs was needed to measure the ports' breakbulk services. The 2012 report chose to measure, per port call, the 'revenue tonnes, time in port, total ports costs' to research the potential of the measures as KPIs. The strength of these three measures is that they are clear and objective and the results are consistent with customer satisfaction and efficient port performance.

The Hunter Valley Coal Chain Coordinator collates current information on supply chain effectiveness in terms of the volume of coal loaded and vessels queued at the port. The information is made available on its website, and this approach is worthy of consideration and possible broader application. Applying a similar concept to regularly calculate the effectiveness (revenue tonnes / time in port) of breakbulk cargo supply chains in Australian ports could potentially be a useful monitoring tool for the industry. One of the challenges for monitoring breakbulk cargo throughput is that the variation in types of cargo prevents readily comparable data being collected. If the trade-offs inherent in calculating breakbulk KPI are recognised and acceptable to supply chain participants, monitoring over time would provide individual ports an indication of how well their chain operates as a whole. Dissemination of this information to all supply chain participants would provide a point of reference for developing performance benchmarks for improving the productivity of Australia's breakbulk supply chains.

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Appendix 1: Australian Ports That Handle Breakbulk Cargo

State/ Territory	Breakbulk Ports	Breakbulk Berths	Principal Breakbulk Cargoes	Rail/Road Connection	Handling Facilities	Storage Areas
QLD	Cairns	Wharves No.7-8	General Cargo	Road	Forklifts	6600m2 of open storage
		Smith's Creek Wharf	General Cargo	Road	Forklifts	1360m2 of open storage and a 1,225m2 shed
	Townsville	No. 3	Ingots, refined copper, nickel, zinc, live cattle	Road/Rail	Forklifts	No
		No. 8	Scrap metal	Road	Forklifts	Shed
		No. 10	Live cattle and mining supplies	Road	Slewing luffing crane, forklifts	No
	Mackay	M1	Mining machinery, trucks, cranes, bulldozers etc.	Road	Cranes, forklifts etc. can be hired from local companies	10,000m2 of easily accessible hard stand areas and additional lay down areas available
		M4		Road		
		M5		Road		
	Port Alma	No. 1	Scrap metal, general cargo	Road	Forklifts	576m2 shed
		No. 2	General cargo, scrap metal	Road	Forklift, general fixed leg crane	No
	Gladstone	Boyne Wharf	General cargoes, aluminium	Road	No	Sealed open area near wharf approach
		Auckland Point 1	Break bulk cargoes	Road	No	Shed owned by Globex adjacent to Auckland Point 2
		Auckland Point 3	Break bulk cargoes	Road	Mobile crane, forklifts etc.	No
		Auckland Point 4	General cargo, scrap metal, project cargo.	Road	Mobile crane, forklifts etc.	1.5ha of general storage, 2100m2 shed and 3.5 of heavy storage
	Brisbane	Hamilton No. 4	General cargo	Road	Forklifts	3400m2 shed
		Pinkenba Bulk Terminal	General Cargo, Project cargo, break bulk cargo	Road	Forklifts and mobile cranes	Approx 10,000m2 pavement storage & additional storage land adjacent.
		AAT Terminal	Timber, steel, paper pulp, project cargo, machinery etc.	Road	Forklifts, terminal cranes(2) & mobile cranes etc.	15,000m2 shed and 6ha open storage area
		General Purpose Berth and Terminal	Project Cargo, general cargo, break bulk cargo	Road	Forklifts and mobile cranes	Terminal capacity: 20,000m2 heavy-duty pavement

State/ Territory	Breakbulk Ports	Breakbulk Berths	Breakbulk Cargoes	Rail/Road Connection	Handling Facilities	Storage Areas
NSW	Newcastle	Eastern Basin 1	Aluminium, steel, timber products	Road & Rail	Forklifts	4ha stacking area, warehouse 7120m2
		Eastern Basin 2	Aluminium, steel, timber products	Road & Rail	Forklifts	Shared facilities with Eastern Basin 1
		Western Basin 4 (heavy duty berth)	Project cargoes e.g. power generators, rail wagons	Road & Rail	Stern ramp	A backup storage area of 1.5 hectares is available
		Mayfield 4		Road & Rail	Designed for mobile or rail mounted ship-to-shore cranes	10,000m2 hardstand area
	Port Kembla	Berth 103 (AAT)	Timber products, steel, general cargo, project cargo etc.	Road	Forklifts, harbour crane	5,000m2 shed
		Berth 105-106 (AAT)		Road/Rail	Forklifts, harbour cranes, mobile cranes	Various small shed with total capacity about 3,000m2
		Berth 107		Road	Forklifts, mobile cranes	15,000m2 shed
		Grain Berth 104 (overflow only)	General cargo	Road	No	No
		Berth 109-107	Steel products	Road	Privately owned by BlueScope	Privately owned by BlueScope
		Port Kembla Gateway (overflow only)	General cargo, project cargo	Road	An old luffing crane (not in use)	No
VIC	Port Hasting (Westernport)	SW1 & SW2	Steel slab, steel, other cargoes on request	Road	Mobile equipment	25,000m2 (Hardstand) 6000m2 (Warehousing)
	Melbourne	Appleton Dock B, C & D	Steel, timber and project cargo	Road/Rail	FaucoWharf crane, mafi trailer, forklifts	Shed area 24,000m2
		Webb Dock East	General cargo	Road	2 x mobile cranes 100T, Portainer crane 55T,Forklifts, Prime movers, Mafi trainers	38 Ha terminal Stacking Area Shed area Berth 3&4 18,000m2.
		South Wharf, berth 27 -30	Timber, iron, Steel & paper products	Road	Forklifts.	Cargo shed area 9,300m2
		24 Victoria Dock	General cargo	Road	No	5,800m2 shed
	Geelong	Corio Quay North 1&2	Steel, pulp, aluminium ingots	Road/Rail	Forklifts	6,500m2 hard stand storage, 2,776m2 shed
		Corio Quay South 1	Steel, pulp	Road/Rail	Stern ramp, forklifts	4,000m2 shed, 1,122m2 canopy
		Lascelles wharf	Steel, aluminium ingots, pulp Project cargo	Road	Forklifts	14,000 m2 hard stand storage
	Portland	KSA1	Break bulk cargo	Road/Rail	Handling facility for break bulk	2530m2 shed, 0.5ha open storage areas
		KSA2	Break bulk cargo	Road/Rail	Handling facility for break bulk	5570m2 shed, 0.5ha open storage areas
		Berth 5	Break bulk cargo, logs	Road	Handling facility for break bulk	5,570m2 shed, 0.9ha open storage areas
		Berth 6	Break bulk cargo, logs, livestock	Road	Handling facility for break bulk	0.4ha open storage areas

State/ Territory	Breakbulk Ports	Breakbulk Berths	Principal Breakbulk Cargoes	Rail/Road Connection	Handling Facilities	Storage Areas
NSW	Newcastle	Eastern Basin 1	Aluminium, steel, timber products	Road & Rail	Forklifts	4ha stacking area, warehouse 7120m2
		Eastern Basin 2	Aluminium, steel, timber products	Road & Rail	Forklifts	Shared facilities with Eastern Basin 1
		Western Basin 4	Project cargoes	Road & Rail	Stern ramp	A backup storage area of 1.5 hectares is available
		Mayfield 4	Project cargo, Heavy lift	Road & Rail	No	10,000m2 hardstand area
	Port Kembla	Berth 103 (AAT)	Timber products, steel, general cargo, project cargo etc.	Road	Forklifts, harbour crane	5,000m2 shed
		Berth 105-106 (AAT)		Road/Rail	Forklifts, harbour cranes, mobile cranes	Various small shed with total capacity about 3,000m2
		Berth 107		Road	Forklifts, mobile cranes	15,000m2 shed
		Grain Berth 104 (overflow only)	General cargo	Road	No	No
		Berth 109-107	Steel products	Road	Privately owned by BlueScope	Privately owned by BlueScope
		Port Kembla Gateway berths 202,203	General cargo, project cargo	Road	Luffing crane. 5,500 m2 hardstand	Various sheds total capacity 4,000m2
VIC	Port Hasting (Westernport)	SW1 & SW2	Steel slab, steel and other cargoes on request	Road	Mobile equipment	25,000m2 (Hardstand) 6000m2 (Warehousing)
	Melbourne	Appleton Dock B, C & D	Steel, timber and project cargo	Road/Rail	Fauco Wharf crane, mafi trailer, forklifts	Shed area 24,000m2
		Webb Dock East	General cargo	Road	2 x mobile cranes 100T, Portainer crane 55T,Forklifts, Prime movers, Mafi trainers	38 Ha terminal Stacking Area Shed area Berth 3&4 18,000m2.
		South Wharf, berth 27 -30	Timber, iron, Steel & paper products	Road	Forklifts.	Cargo shed area 9,300m2
		24 Victoria Dock	General cargo	Road	No	5,800m2 shed
	Geelong	Corio Quay North 1&2	Steel, pulp, aluminium ingots	Road/Rail	Forklifts	6,500m2 hard stand storage, 2,775.5m2 shed
		Corio Quay South 1	Steel, pulp	Road/Rail	Stern ramp, forklifts	4000.5m2 shed, 1122m2 canopy
		Lascelles wharf	Steel, aluminium ingots, pulp Project cargo.	Road	Forklifts	14,000 m2 hard stand storage
	Portland	KSA1	Break bulk cargo	Road/Rail	Nil	2550m2 shed, 0.5ha open storage areas
		KSA2	Break bulk cargo	Road/Rail	Nil	5250m2 shed, 0.5ha open storage areas
		Berth 5	Break bulk cargo	Road	Nil	2550m2 shed, Approx. 1 Ha open
		Berth 6	Break bulk cargo	Road	Nil	Approx. 1 Ha open storage areas

State/ Territory	Breakbulk Ports	Breakbulk Berths	Principal Breakbulk Cargoes	Rail/Road Connection	Handling Facilities	Storage Areas
SA	Port Adelaide	IH18	General cargo, steel, scrap, logs, windmills etc.	Road	All equipment has to hire from stevedores.	4092m2 shed
		IH19	General cargo, steel, scrap, logs, windmills, machinery etc.	Road	All equipment has to hire from stevedores.	2877m2 shed
		IH20	General cargo, steel, scrap, logs, windmills, machinery etc.	Road	All equipment has to hire from stevedores.	2640m2 shed
		IH29	General cargo, steel etc.	Road	All equipment has to hire from stevedores.	A small backup shed
		Osborne 1&2	General cargo	Road	No	No
	Port Pirie	No. 5	Zinc (mainly), copper, general cargo, project cargoes e.g. windmills, locomotives	Road	All equipment has to hire from stevedores.	Open storage area only
		No. 7	Project cargoes	Road	All equipment has to hire from stevedores.	Open storage area only
TAS	Bell Bay	No. 6	Project cargoes	Road/Rail	Mobile Cranes	casual storage areas
		No. 2	Project cargoes	Road/Rail	Mobile Cranes	3 Ha
		No. 5	General cargo	Road/Rail	Stevedores 40 t Mobile Harbour Crane	2.5ha marshalling area
	Burnie	No. 4	Ro/Ro, conventional cargoes	Road/Rail	Forklifts, cranes etc.	Container storage within terminal
		No. 6	Logs, heavy lifts	Road	80t Post Panamax portainer crane	Storage shed 1,500m2
		No. 7	Logs, woodchips	Road	Forklifts, woodchip loader	Forest product storage, adjacent to wharf
	Hobart	Macquarie No6	Lay up only	Road	none	Shed (3,988m2) & casual storage areas
		Macquarie No5	Lay up only	Road	none	Shed (4,500m2) & casual storage areas
		Macquarie No4	Veneer, Logs, Zinc & Project Cargoes	Road	Mobile cranes	Shed (2,660m2) & casual storage areas
		Macquarie No3	General & Antarctic resupply	Road	Mobile cranes	Shed (2,130m2) & casual storage areas

State/ Territory	Breakbulk Ports	Breakbulk Berths	Principal Breakbulk Cargoes	Rail/ Road Connection	Handling Facilities	Storage Areas
WA	Esperance	No. 2	General cargo, Nickel Bulk bags	Road/Rail	Hybrid shore crane 3 x 16T GP forklifts 4 x FELs 1 x Excavator 2 x Skid Steers	Cosmos nickel shed
	Albany	Berth 1&2, land backed	General cargo, Project cargo	Road	Mobile cranes up to 15T, forklift trucks	Transit shed 5,000m2. Hardstand 2-4 Ha
	Bunbury	No. 5	Scrap metal, general cargo	Road/Rail	Forklifts	A large storage shed
	Fremantle	North Quay 1	Steel, timber, machinery	Road	No	16,130m2 staking areas
		North Quay 2	Steel, timber, machinery	Road	No	7,495m2 stacking areas
		North Quay 11	Steel, timber, machinery	Road	No	26,203m2 stacking areas, an old shed with open end face west (shared with No. 12)
		North Quay 12	Steel, timber, machinery	Road	No	12,906m2 stacking areas, shed 12d 3,000 m2
		Victoria Quay, H Berth	Machinery	Road	No	28,755m2 stacking area,
	Geraldton	No. 2 & 4	Steel pipes, cattle, rail wagon	Road	No	No
		No. 6 (main break bulk berth)	Steel pipes, cattle, rail wagon	Road	No	No
	Dampier	Dampier Cargo Wharf (7 berths)	General cargo, mining machinery, project cargoes e.g. rail wagons, rail wheels etc.	Road	No	Very limited storage areas. Contact DPA for information on availability.
	Port Hedland	PHPA No. 1	livestock, general cargo, steel	Road	No	9,000m2 open hard standing space
		PHPA No. 2	General cargo, livestock, heavy lifts	Road	No	20,000m2 open hard standing space
		PHPA No. 3	General cargo, livestock	Road	No	No
	Broome	Berth 4-12	Offshore drilling equipment, mining and resources project cargo, bulk bags, containers	Road	1 x 250t, 2×100t & 2×45t mobile crane, 8t forklifts	Landside storage facilities can be hired from Toll Mermaid Logistics Broome, Kitson Logistics, Regal Transport, Toll West Broome.
NT	Darwin	East Arm Wharf	Steel, heavy lifts e.g. machinery	Road/Rail	Gantry crane, forklifts etc.	10ha of sealed hardstand, Transit shed