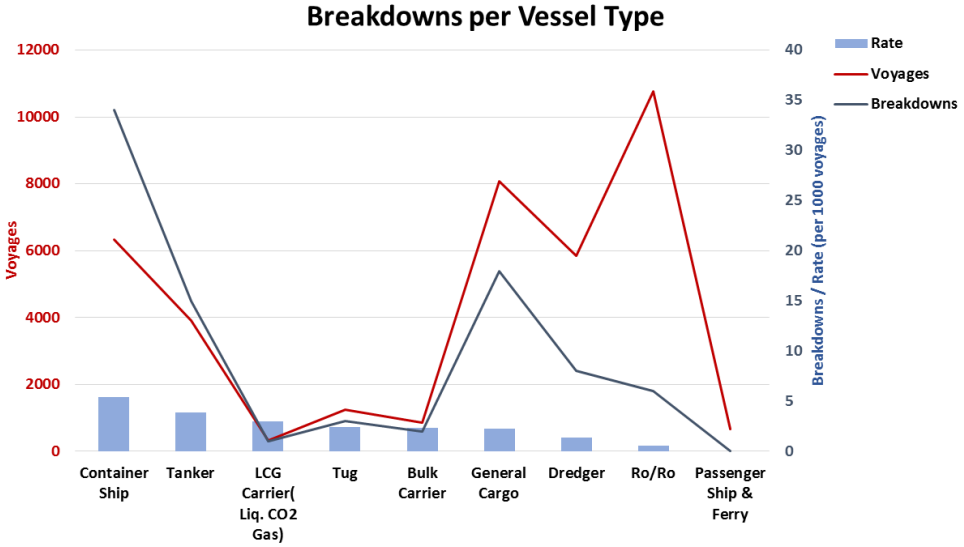
PORT OF LONDON AUTHORITY

A trend analysis of Commercial Shipping Breakdowns and Deficiencies in the Port of London
2016 and 2017

Overview

Around 35% of all Commercial Shipping occurrences in the Port of London are due to breakdowns. This report analyses these breakdowns by the type, size and age of vessels.



Definitions

Commercial Shipping:
Occurrences involving sea-going commercial ships

Voyage:
A movement into or out of the Port by a commercial ship

Breakdown:
Any incident, near miss or reported deficiency caused by failure of equipment or machinery

- There have been at total of 95 reports submitted to the harbourmaster in 2016 and 2017 combined which were caused by a mechanical failure of some description. These include simple 'Deficiency' reports, 'Near Misses' and 'Incidents'.
- In order to put the number of breakdowns into context, a comparison has been made to the number of voyages of a particular vessel type to produce a breakdown rate (Breakdowns per 1000 Voyages)

What this report shows

- **New ships (0-5 yrs)** have a high breakdown rate—**6** breakdowns per 1000 voyages.
- **Large ships** over 300m LOA have a high breakdown rate of nearly **8** breakdowns per 1000 voyages.
- **Container Ships** have the highest overall breakdown rate of all vessel types—**5** breakdowns per 1000 Voyages. A large number of the Container Ships visiting the Thames being newly build and over 300m.
- **Navigational equipment failure** is the most common breakdown at **13%** and the biggest root cause being **power failure—10%**.

Causes

- Container Ships are designed to travel over long distances efficiently and their engine configurations are less suitable for manoeuvring within a Port / Harbour compared to a ferry with CPP for example.
- Do Container Ships have sufficient time to carry out preventative maintenance and checks?
- Newer ships may have more breakdowns due to a period of 'running in', where small technical issues become apparent. Also, modern ships have additional sensors, monitoring equipment, engine software, etc. which may shut down engines rather than run at reduced efficiency.

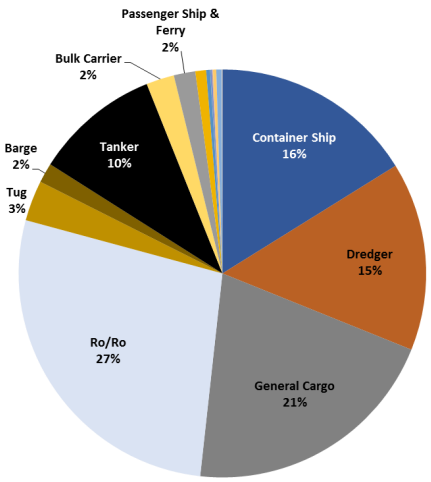
Are these trends familiar?

- This analysis has been shared with relevant berths / terminals in London, Ports local to London, UK Chamber of Shipping, International Association of Classification Societies, UK P&I Club, UKMPG, BPA and MAIB.
- Do these trends appear in your Port? We'd appreciate any comment or feedback to add to our analysis. SafetyManagement@pla.co.uk

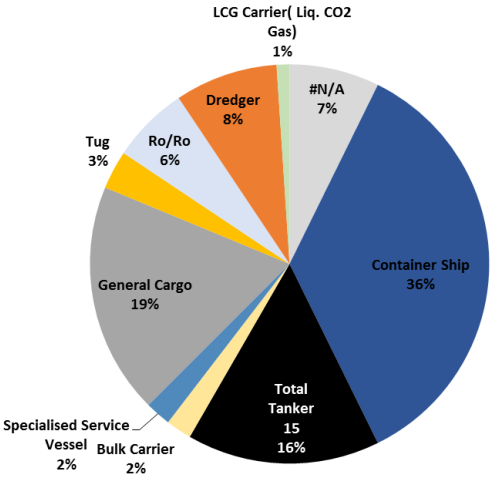
Types of Vessels Visiting the Thames

- The pie chart on the right represents the proportion of the total number of Commercial Shipping voyages (39,160) over 2016/17 per vessel type. Vessel types with small percentages have not been labelled.
- The expected trend is that the more voyages a particular vessel type has, the more breakdowns that would occur.

Proportion of Voyages per Vessel Type



Proportion of Breakdowns per Vessel Type

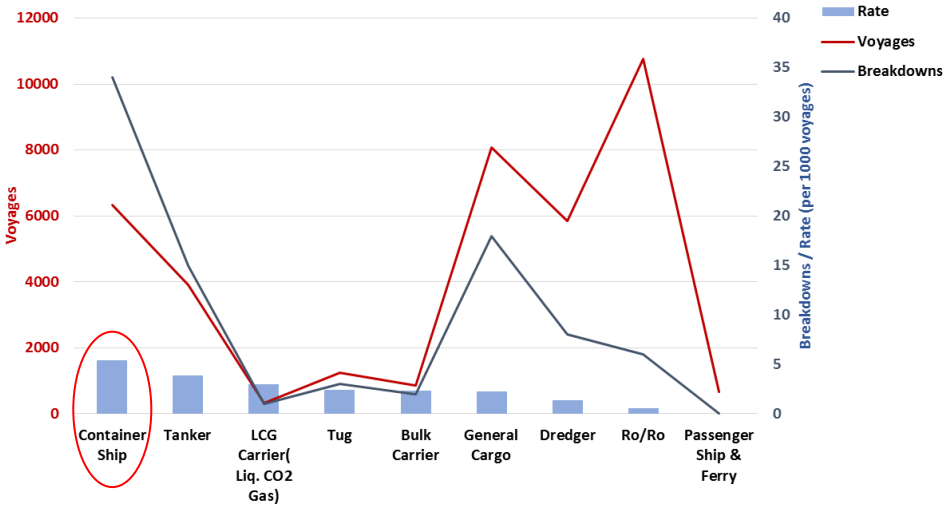


- However, the pie chart to the left shows the proportion of breakdowns per vessel type, over the same period.
- Ro-Ro vessels are responsible for the most voyages on the river **(27%)**, however very few breakdowns occur on these vessels **(6%)**
- Knowing the number of voyages and the number of breakdowns, a breakdown rate—number of breakdowns per 1000 voyages—can be calculated (see below). Consideration has been made where there have been fewer voyages which may skew a breakdown rate—this is mentioned where appropriate.
- Not all vessel types are included, as the number of voyages for certain vessel types are minimal and/or there have been no breakdowns for that vessel type (no rate can be produced)
- There is no single stand-out type of breakdown, however around **13%** are failures of navigational equipment and **10%** are power system failures. Unfortunately, we were unable to identify the root cause of 23% of the breakdowns, however the PLA will endeavour to investigate further wherever possible.

Breakdown Rate—By Vessel Type

- Ro-Ro vessels and Dredgers have a large number of voyages (10,755 and 5,850 respectively), with very few breakdowns, hence their breakdown rate is much lower. These vessels are designed for frequent manoeuvers, therefore their engine arrangements and controls are more suited.
- Tankers (3,902 voyages) have a lower breakdown rate than Container Ships at around **4** breakdowns for every 1000 voyages.

Breakdowns per Vessel Type

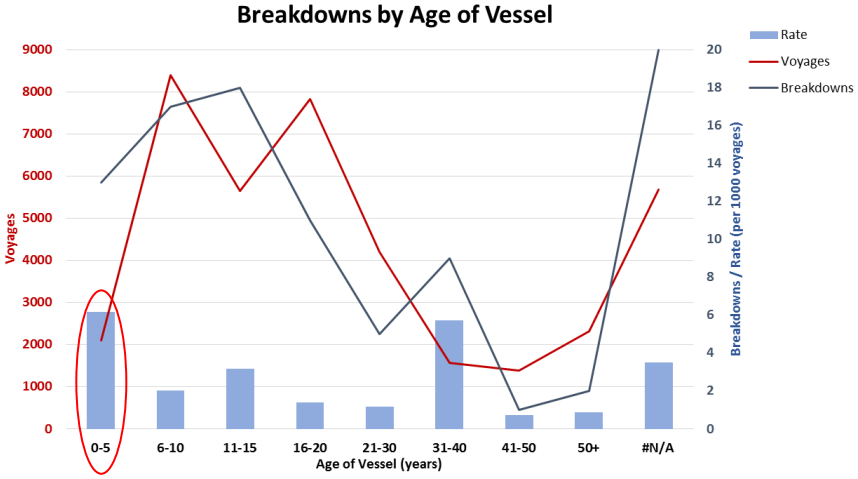


Container Ships

- Even though Container Ships make up only 16% of vessel movements, they are responsible for **36%** of breakdowns and hence the highest breakdown rate, with **5.4** breakdowns per 1000 Voyages (6,327 total voyages).
- The high breakdown rate for Container Ships may be due to the fact they are designed to be efficient over long distances rather than 'manoeuvring' and so, breakdowns may occur when reducing engine revs or manoeuvring. Ro-Ro and dredgers are designed for frequent manoeuvers, therefore their engines and controls are more suited.
- Container Ships may not have sufficient time to undertake preventative maintenance and checks.
- There may be a correlation between the age of vessels and the breakdown rate. The Container Ships we get on the Thames tend to be less than 15 years old.

Age of Vessels

- A comparison between the number of voyages and the number of breakdowns by vessel age is shown on the below graph, which produces a breakdown rate for each 'age range'.



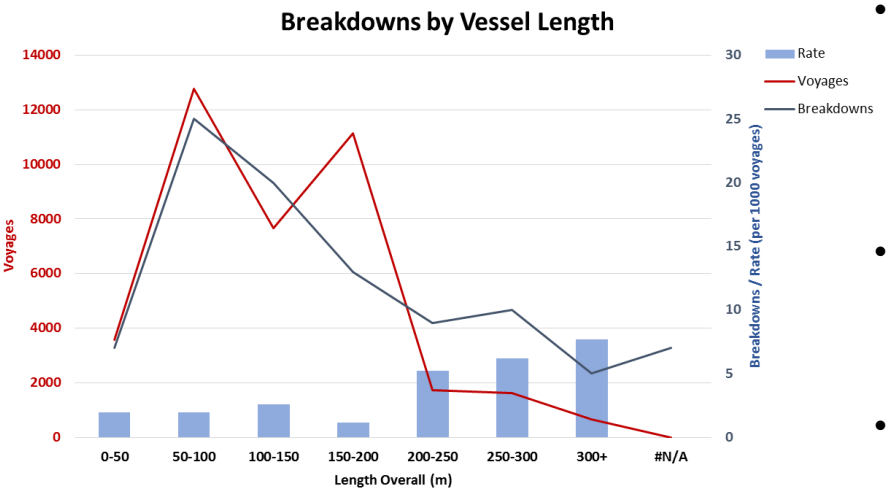
- The most common age range of vessels visiting the Thames is between 6 and 10 years old, followed by 16 to 20 years.
- An expected trend would be for the breakdown rate to increase as the age of the vessels increases.
- However, the highest rate is for newly built vessels (0-5 yrs old) at **6** breakdowns per 1000 POLARIS voyages (2,110 total voyages).

- Looking at vessels 0-5 yrs old—the most common vessel type is Container Ships (1144 voyages, with 10 breakdowns) creating a breakdown rate of **8.7** breakdowns per 1000 POLARIS voyages.
- The age range with the next highest breakdown rate is between 30 and 40 years old. The most common vessel type in this age range is General Cargo vessels (970 voyages, with 6 breakdowns) followed by Dredgers (311 voyages, with only 1 breakdown however).

Summary

- New vessels under 5 yrs old are more likely to have a breakdown and have the highest breakdown rate of any other age range. The majority of the voyages for vessels less than 5 years old are Container Ships **(54%)** followed by Tankers at **15%**.
- The reason for this high rate may be due to a degree of 'running in' time for new vessels and engines. More modern engines also have additional sensors, engine software, etc. which may shut down engines without warning rather than run at reduced efficiency.

Size of Vessels



- The most common vessel to visit the Thames is 50 – 100m LOA, which has a total of 12,762 voyages. This length range is also responsible for the most breakdowns **(25)**, however has a small breakdown rate – **2** breakdowns per 1000 voyages.
- The highest breakdown rate is for vessels 300+m. There has only been 651 movements but with 5 breakdowns, they have a rate of **7.7** breakdowns per 1000 voyages.
- All vessels over 300m visiting the Thames have been Container Ships.

Trends

- **Container Ships** showed a worsening trend 2016-17, but so far in 2018 shows improvement.
- **Tankers** showed an improving breakdown trend 2016-17, however is slightly higher for the start of 2018.
- **General Cargo** vessels showed a slightly improving trend 2016-17, however the first part of 2018 shows a worse breakdown rate.
- Ro/Ro vessels have the lowest breakdown rate, which has been steadily increasing

	Rate				
Vessel	2016	2017	Trend	2018 (to mid Feb)	Trend
Container	4.38	6.13	↑	2.02	↓
Tanker	5.41	2.44	↓	3.60	↗
General Cargo	2.02	2.43	↗	4.16	↑
Ro/Ro	0.39	0.72	↗	1.48	↗
Total	2.38	2.51	↗	2.00	↘