

CHANGES IN RO-RO TRANSPORT TENDENCIES IN SANTANDER PORT

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Abstract

In recent years the Ro-Ro traffic has undergone major changes being the most significant the heavy loads transport in break bulk or static cargo, in other words, that the transport of bulky and heavy loads in conventional general cargo ships has move to Ro-Ro vessels over rolling platforms.

Nowadays due to the high cost and fragility of these goods is needed to be handled with the utmost care. In this article we describe the transformation suffered by this type of maritime traffic and the development in Ro-Ro vessels cargo equipment.

Keywords

Roll trailer platforms, Break bulk, Static cargo, Cargo lashing.

1. INTRODUCTION

The new Ro-Ro specialized cargo equipment, the roll trailer platforms, have enabled that the great goods move from being transported in conventional cargo ships to be carried on Ro-Ro ships, with the consequent savings in cargo handling and the rise of safety in cargo operations on board.

This fact also decreases the lashing time on board because in general cargo ships is necessary to weld structures to the hold floor for securing the goods on board and in Ro-Ro vessels this operations are carried out with lashing chains, turnbuckles, shackles, straps or slings that are made fast in the eyebolts and rings or inkwells available in the holds of Ro-Ro ships.

Due to the increasing size of the pieces that are loaded, was necessary to increase the capacities of Ro-Ro vessels, augmenting the capacity of cargo ramps in terms of strength and size and also was necessary to develop new systems to transport this kind of cargo on board this type of ships [2].

Actually, the problem that exists in the transport of oversized cargo in break bulk is their high costs and the difficulty in handling, so this type of shipments requires a high level of specialization.

Figure 1: Shipment of large parts difficult to handle.



Source: Authors.

There are companies that are exclusively dedicated to plan the transport of loads like these, looking for the best routes, handling equipment, land and sea transport and proper ships.

These companies such as Geodis Wilson [2] have developed different equipment to handle the product as quickly and safely as possible so they can offer full service offering:

- Cost efficiency and load management.
- Complete monitoring the loading and unloading.
- Search for the most competitive rate.
- Management continues at each stage of the shipment.
- Lashing loads and equipment needed.
- Permissions required.

Another important factor to consider is the preparation of the goods for transport. They need be properly packed for export, using whatever necessary mean such as boxes, crates, tarpaulins, plastic, avoiding damages to the goods during the continuous manipulations, making a package valid for different means of transport until they reach the destination.

Figure 2: Example wooden box packaging, plastic



Source: Authors.

It is important to note that the load must be properly latched in different means of transportation (truck and ship).

The damage to the cargo is common in the transportation business, so it is necessary to emphasize the use of good packaging for correctly handling and lashing to avoid costly consequences, because don't forget that we are always talking about very valuable and fragile goods.

Due to the increasing volume of the goods shipped new equipment to handle them has been developed to let the cargo operations in Ro-Ro ships. Not many years ago this type of cargo were transported in conventional general cargo vessels, needing the use of cranes to load and unload the goods on board what increased the risks of the operations on board.

Wallenius Wilhelmsen Shipping [6] not only they have invested a lot of money and time to design vessels capable of carrying these goods with huge dimensions and weights, increasing vessel sizes, width and load capacity of the ramps and increasing the width and height of the cellars or garages but also they have invested in researching and developing new cargo equipment, usually adapting the equipment at the size of a particular piece. This company transports all types of static cargo, which by definition includes any cargo that must be lifted or towed on board using special trailers. They are experts in the field of transportation of general break bulk products and other non-containerized cargo, which often require special handling and specialized solutions [2].

Goods mainly transported in these type of ships are: cars, rolling equipment, breakbulk, machinery and machine tools, power generation equipment, rail cars, boats and yachts and mining equipment.

Figure 3: Examples of different loads.



Source: Authors.

The size and weight of the machinery being shipped determine the type of equipment used to load, stow and discharge the cargo.

2. NEW EQUIPMENT LASTLY DEVELOPED:

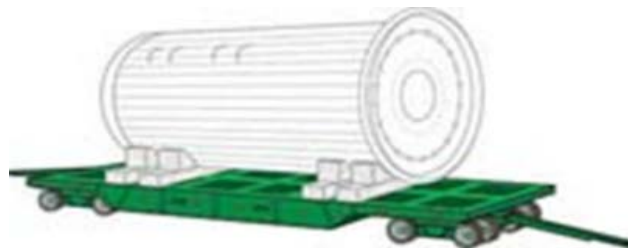
Different equipment has developed the shipping WWL [6] are:

2.1. SAMSON HEAVY-LIFT TRAILER – FOR SMALL & MEDIUM-SIZED HEAVY CARGO

The Samson heavy-lift trailer is specially designed by WWL [6] and well suited for lifts, such as transformers, generators and turbines.

For cargo weighing between 120 and 180 Tons, we use our own specially designed Samson heavy-lift trailers.

Figure 4: SAMSON WWL



Source: (WWL, 2014)

For cargo that exceeds the capacity of our own equipment, Wallenius Wilhelmsen [6] utilises jack-up trailers, also known as cometto trailers, which can be configured to the exact requirements of the cargo. Towing or trailering cargo on board eliminates the risk of potential damage during lift-on/lift-off operations.

Capacity: 2v per rail car.

Maximun cargo length: 3-12 m.

Turning radius: 43 m.

2.2. ROLLTRAILERS – FOR LARGE, HEAVY CARGO

Roll trailers are designed for Ro-Ro transport of heavy and large cargo units, but can also be used for most types of general cargo and container. Our fleet of roll trailers ranging from 20' up to 80' with capacity from 25 to 140 metric tonnes. WWL [6] also provide roll trailers fitted with rails for carriage of rail cars with bobies attached. If roll trailers are required to be modified to carry any special cargo, this will be "tailor-made" as per requirements.

Rolltrailers are also frequently used for transporting cargo into and out of the lower decks of a vessel, where the cargo is taken off the trailer and stowed loose and secured.

Figure 5: WWL RT.



Source: (WWL, 2014).

Capacity: 25 – 140 Tons..

Maximum width: 2.50 m.

Maximum height when stowed: 0.85 m.

Maximum length (in feet): 20, 30, 40, 60, 80.

Acceptable rear trailer overhang: 3 m (based on standar 100 Tons. rolltrailer).

2.3. JACK-UP TRAILER, FOR EXCEPTIONALLY HEAVY CARGO

Jack-up trailers are purpose built for carrying exceptionally heavy cargo. A jackup trailer consists of sections of four axles, which can be configured to suit the weight and size of the cargo to be carried. Most trailers have individual hydraulics on each axle and all wheel sets can turn.

Jack-up, or cometto trailers are built to carry exceptionally heavy cargo weighing several hundred Tons. A jackup trailer consists of four-axle sections that can be configured to carry cargo of almost any size and weight.

The largest configuration is 12 axles long by 8 m wide and rests on 192 wheels.

Before transfer onto a jack-up trailer, the cargo is placed on beams and support blocks in the terminal. Steel support blocks are required for heavy units that weigh 120 Tons.

or more. For cargo weighing less than 120 Tons, heavy timber support blocks may be used. Cargo specialists use the built-in hydraulic system to lower the trailer into position to take on cargo, carefully placing the trailer beneath the cargo. Once in the correct position, the trailer is elevated, carrying the full weight of the cargo and steel beams. The support blocks are then removed and the trailer is towed on board by one or more heavy-duty tow trucks. Once the trailer is in the correct position on board, support blocks are placed under the beams. The trailer is lowered until the full weight of the cargo rests on the support blocks. The trailer is then removed and the cargo secured. This operation is reversed at the port of discharge.

Maximum gross weight: up to 380 Tons.

Configurations units in four axles section maximum configuration: 12 axles x 8 m wide.

Maximum size and weight: Customised.

Figure 6: WWL JACK UP TRAILER



Source: (WWL, 2014)

2.4. AIR SHUTTLE TRAILER AND GREENHOFER, FOR RAILCARS WITH BOGIES ATTACHED

The Air shuttle has been constructed for loading and discharging assembled rail cars, e.g. with rail bogies attached. The Greenhofer is a smaller variant of the Air Shuttle and as such, it functions much in the same way. Railcars simply roll on to and off of the trailers. This process saves time, cuts costs and improves the overall quality of service provided.

Capacity: 47,5 Tons.

Maximum length (adjustable): 21,35 m.

Maximum width: 2,45 m.

Maximum Height (when stowed): 0,55 -0,84 m

Greenhofer Capacity: 15 Tons.

Maximum cargo length: 25 m

Figure 7: WWL RT WITH RAILS.



Source: Authors and WWL, 2014.

2.5. RUBBER TYRE BOGIES – FOR RAILCAR SHELLS

The RTB (Rubber tyre bogies) concept was developed for under-deck Ro-Ro service for railcars shipped with or without bogies attached. RTBs are fitted with air brakes. WWL's RTBs have road permits for use in the USA.

Number of units: 2 per railcar shell

Capacity: 45 Tons.

Maximum length, width and height: Customised

Figure 8: WWL RUBBER TYRE BOGIES (WWL, 2014)



Source: (WWL, 2014)

2.6. BOLSTERS, FOR HEAVY, BULKY CARGO

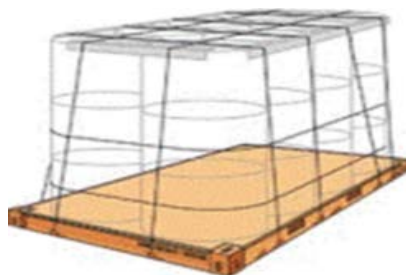
A bolster is ideal for cargo too heavy or too bulky to fit into a container. Shippers can collect bolsters for stuffing at their own premises, and consignees can pick up the loaded bolsters at our terminals in the discharge port.

Capacity: 23,5 Tons.

Maximum length: 6,10 m.

Maximum height (when stowed): 0,23 m.

Maximum width: 2,44 m.

Figure 9: WWL BOLSTER (WWL, 2014)

Source: (WWL, 2014).

3. STATISTICS RO-RO VESSELS IN SANTANDER PORT ([1]; [5] FROM 2001-2013

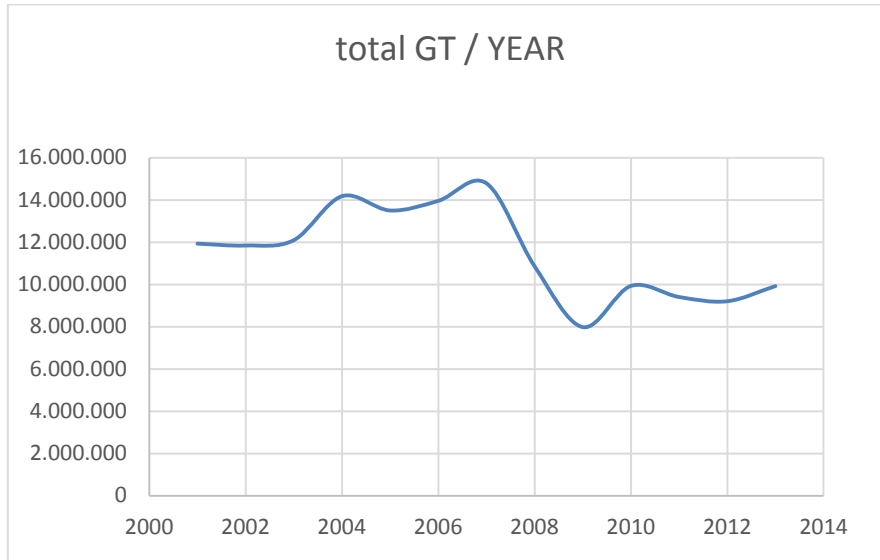
The evolution of the total RO-RO vessel traffic in the Santander port [1] in the last decade is shown in the two following graphics, describing the evolution in total GT per year and in vessels per year.

Table 1: The evolution of the total RO-RO vessel traffic in the Santander port.

YEAR	VESSELS PER YEAR	GT	GT MEDIO	CARGO CARS	GT CARS	CARGO CARS + RORO+ BB	GT
2001	500	11.936.505	23.873	335	9.324.009	165	2.612.496
2002	481	11.847.955	24.632	263	3.010.537	218	8.837.418
2003	505	12.100.951	23.962	312	4.046.875	193	8.054.076
2004	565	14.183.718	25.104	319	3.452.534	246	10.731.184
2005	581	13.507.532	23.249	350	3.693.169	231	9.814.363
2006	570	13.962.535	24.496	330	3.848.391	240	10.114.144
2007	568	14.793.314	26.045	350	6.026.063	218	8.767.251
2008	404	10.863.243	26.889	282	6.538.665	122	4.324.578
2009	325	7.984.220	24.567	215	3.330.419	110	4.653.801
2010	415	9.934.921	23.940	293	4.419.641	122	5.515.280
2011	408	9.409.613	23.063	310	4.838.916	98	4.570.697
2012	360	9.209.392	25.582	238	3.806.304	122	5.403.088
2013	355	9.926.993	27.963	226	3.756.535	129	6.170.458

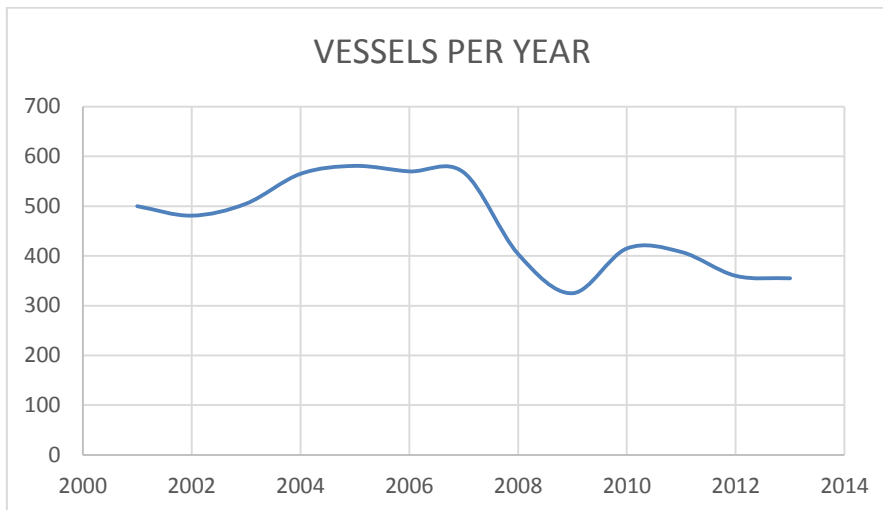
Source: Authors.

Figure 10: Curve GT per year.



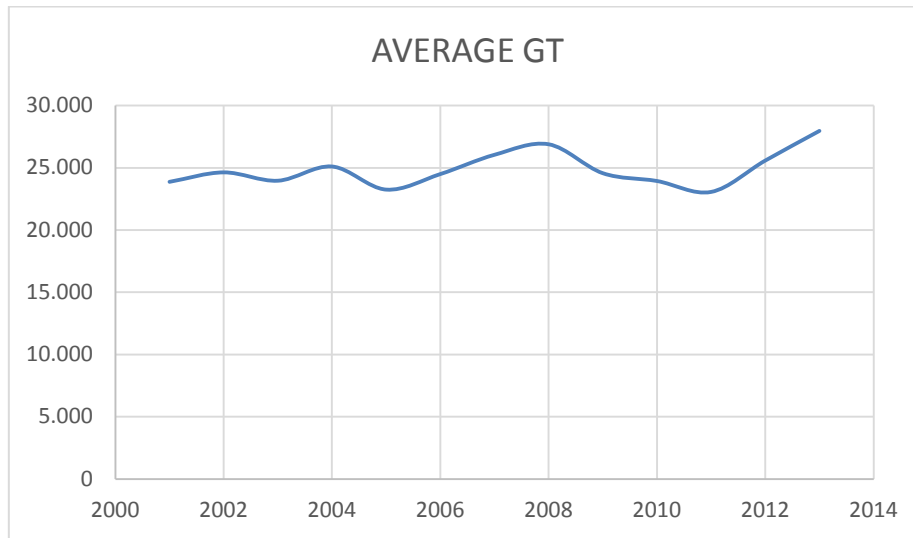
Source: Authors.

Figure 11: Curve Vessels per year



Source: Authors.

We can see that the curves are very similar and in the next graphic we can also appreciate that the average GT has a tendency to increase until 2008 where begins to decline and in 2012 the tendency is again to rise.

Figure 12: Curve Average GT per year

Source: Authors.

If we pay attention to the graphics in Figures 10 to 12 and compare them with this last one which indicates the average tonnage of vessels entered in the port of Santander in the last 10 years, we can see that in the years 2011 and 2012 the difference in trend is clear, because in this last graphic the trend is increasing, which indicates that even though the total number of vessels and the total GT is lesser, the vessel size has increased.

The import through the Santander port of new machinery (machine tools, mining equipment, big dumpers 777) used for construction by large companies like Caterpillar and Volvo during the crisis years (2009 to 2011) have suffered a dramatically decreasing and have seen their import volume decreasing almost in a 90%, but this decrease in the volume of import cargo was replaced in part in the subsequent years by a rise of the volume of export of second hand machinery to countries in development.

Since mid-2011 a growing number of large tonnage RO-RO ships start to arrive at the port of Santander to load second hand construction machinery because of the increasing need for these machinery in ports of South America like Panama (works in the channel), Peru (heavy railway system), New Zealand and Australia, where they also begin to build public works and look for second hand machinery.

Also since 2011 begins the export through the port of Santander [1] of large trains manufactured in Spain that depart toward Peru (Callao), New Zealand and Australia, and like this kind of merchandise is very large it needs a very special and careful handling that do the above cited company [6]. This transport supposes for the port of Santander a monthly entry of two large ships of 60,000 tones.

Table 2: [1] [5]

YEAR	VESSELS PER YEAR	CARGO CARS	CARGO CARS + RORO+ BB
2001	500	67%	33%
2002	481	55%	45%
2003	505	62%	38%
2004	565	56%	44%
2005	581	60%	40%
2006	570	58%	42%
2007	570	62%	38%
2008	404	70%	30%
2009	325	66%	34%
2010	415	71%	29%
2011	408	76%	24%
2012	360	66%	34%
2013	373	64%	36%

Source: Authors.

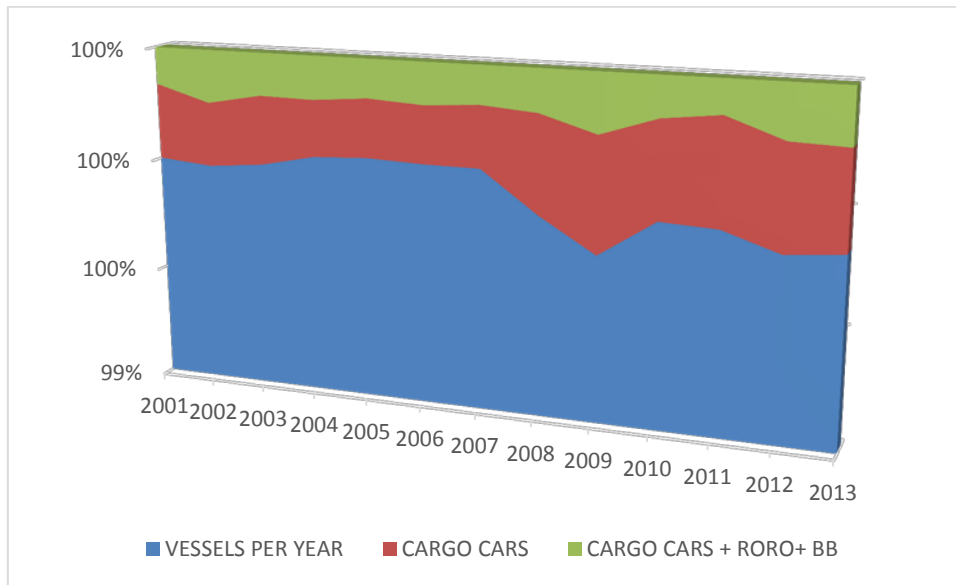
If we see the percentages, the 63% of the 6037 vessels docked at Raos Pier in Santander in the last 13 years, were vessels mostly loaded only with cars and the other 37% of remaining ships loaded with machinery, cars and merchandise oversized in BB.

It has been posted as vessels that load mainly cars the feeders vessels (small Ro-Ro ships) that make regular routes between any port in Europe and Santander, transporting cars that have been loaded in ports such as Zeebrugge, Southampton and Le Havre proceeding from non-EU ports with destination Santander. In these ports the transshipment of cars from transoceanic ships to (smaller) feeders vessels is done and they are finally discharged into Santander Port.

In the other hand is the opposite case, in the port of Santander [1] huge pieces and cars are loaded onto feeder ships and they are transshipped in ports such as Zeebrugge, Southampton and Le Havre to ocean vessels which would be transported this cargo to its final destination.

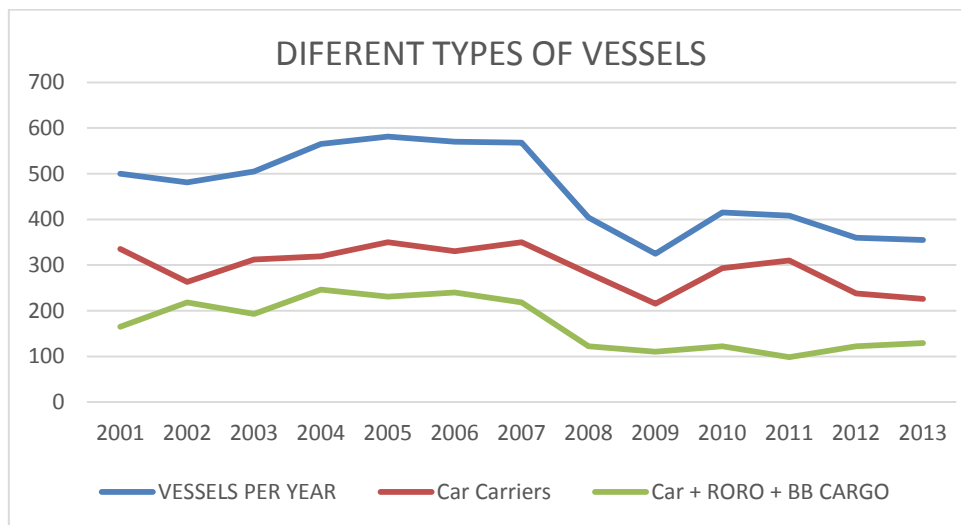
The other ships (car + Ro-Ro + BB cargo) are the vessels making transoceanic lines, bound for America, Africa, New Zealand, Australia ... loaded with cars, Ro-Ro cargo (agricultural and construction equipment) and oversized merchandise.

Figure 13: Curve % Vessels types per year



Source: Authors.

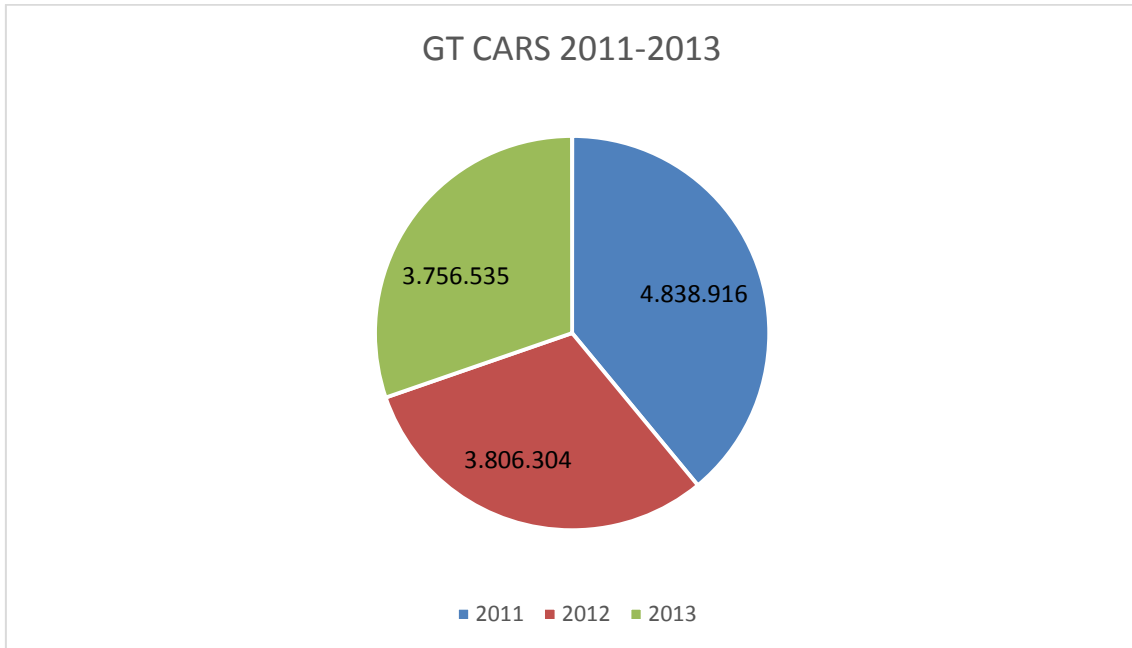
Figure 14: Curve with diferents types of vessels



Source: Authors.

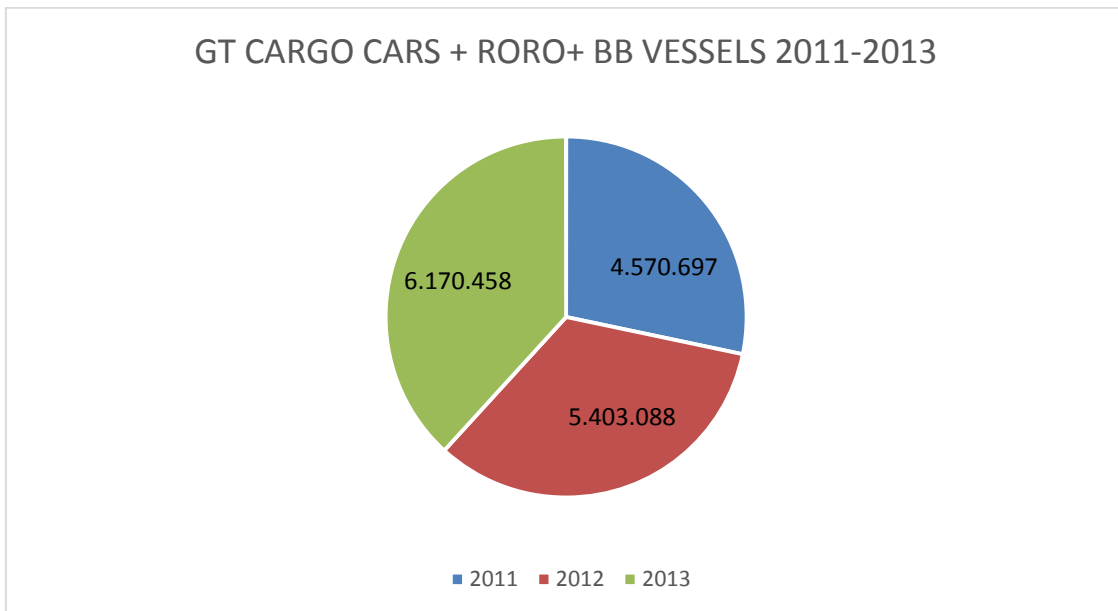
We can see in these graphs that during the last three years has been increased the number of ships aim to load Ro-Ro cargo and BB merchandise, and the number of vessels coming to load cars is proportionally declining.

Figures 15: Graph GT cars 2011-2013



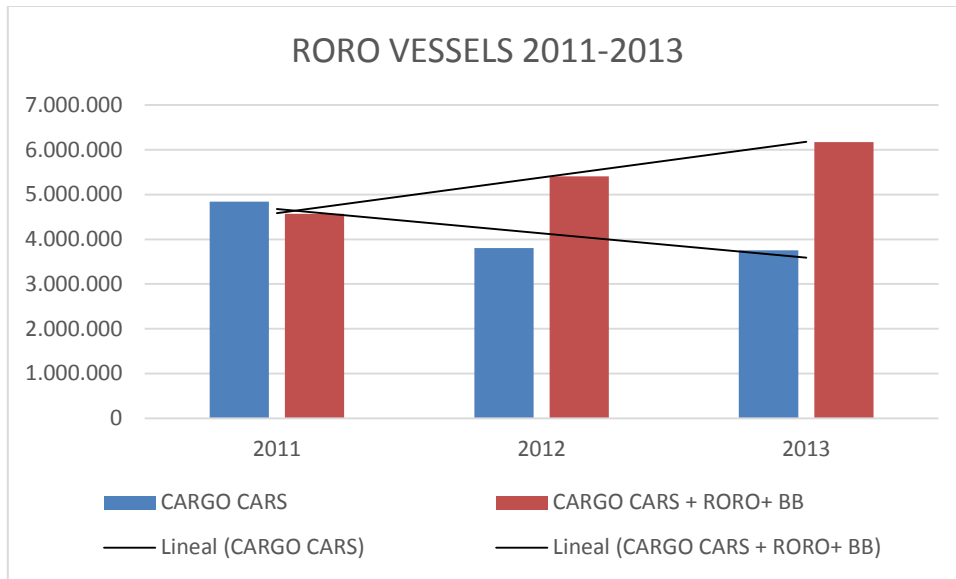
Source: Authors.

Figure 16: Graph GT cars + RoRo + BB vessels 2011-2013



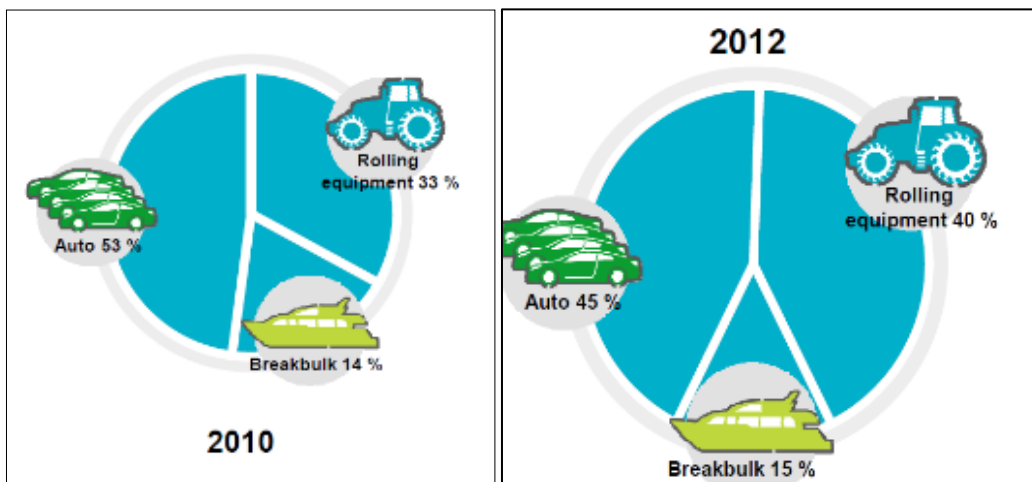
Source: Authors.

Figure 17: Graph Total RoRo vessels 2011-2013



Source: Authors.

Figure 18: Mundial Traffic RORO 2010/ Mundial Traffic RORO 2012 [6]



Source: Authors

CONCLUSIONS

The trend of increasing size of ships is result of increasing the size of the goods, and this explains the need for companies to develop new equipment to transport increasingly heavy and bulky goods, not always weight gain associated with increasing size, this implies great difficulty in the development of devices that allow them to easily and safely handle such goods.

Companies develop new charging equipments that cater to the type and size of the goods.

We can see the change in the form of product handling, the tendency is to change the use of conventional vessel roll-on/roll-off vessels and thus make safer, cheaper and faster handling of large goods.

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