



**HD Container shipping**

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Rear Vision tells the surprising story of how the invention of the container turned the shipping industry inside out.

Keri Phillips: Hello and welcome to Rear Vision. I'm Keri Phillips and today the story of the big box that changed the world.

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Journalist [archival]: No justification for a 4% increase in freight rates for Australian wool bound for Europe. Mr Ian Sinclair, the minister for shipping and transport, was commenting in Sydney today on the agreement reached in Paris between shipping companies and representatives of the wool industry. He told Harold Abrams:

Ian Sinclair [archival]: By the end of this year there will be 13 of the UK Europe container vessels operating, and it is claimed and it has been demonstrated that container vessels have some economies. We believe those economies should be shared between the ship owners and the shippers.

Keri Phillips: Australia's minister for shipping and transport speaking about the savings to be made by first packing goods into big reusable steel boxes before loading them onto ships. But in 1970, the dawn of the container era, the minister couldn't have imagined how things would turn out.

Before the arrival of the shipping container, although some goods were carried boxed or palletised, much was carried as bulk, just loaded directly into a ship's hold. It was labour intensive and took a long time, sometimes up to three weeks, during which time the ship's crew would be idle.

In the mid-1950s, an American trucking company owner was casting about to find a cheaper and more reliable way of transporting his goods from New York to New Orleans than by road. Malcolm McLean bought an old oil tanker and began experimenting, packing goods in containers and loading them onto the ship. He wasn't the only one to think of adapting an idea that goes back thousands of years to the amphora, and by the late 1960s specifications were in place for a standard box. Professor Brian Slack of Concordia University in Canada is an expert on the story of container shipping.

Brian Slack: In the early days different lines or different experimenters in container shipping were using boxes of different dimensions. They had their own system, they built their own ships, they had their cranes which were suited to that particular type of box. But fortunately the International Standards Organisation, which is still today the most important agency that tries to standardise dimensions and features, came to conclusions that imposed on the rest of the world a standard box. And the box was identified as being eight-foot high, eight-foot wide and 20-foot long. And this is the unit of measurement today, we still call it the 20-foot equivalent unit, because in fact the ISO also allowed and considered the extension of the size in length to the 40-foot box. So you had boxes of 40 feet by eight by eight, and you had boxes of 20 feet by eight by eight. And that was the standard that all the companies who wanted to get involved in containerisation around the world have had to adopt.

And in terms of containerisation, which became a global phenomenon, it would have had great difficulty in doing that were it not for the fact that the boxes that everybody adopted were of a fixed dimensions. And the key to that is that you could design a ship to fit exclusively those dimensions of boxes. In other words, you would have various slots built into the wide open holds of ships, so you could slide the containers, either the 20-foot or the 40-foot boxes, down the slot into the hold of the ship. Similarly you could design and develop cranes on land, on the dock side, that could lift and move the containers of that dimension. This was one of the great impetuses that led to the success of containerisation.

Keri Phillips: It also meant that shipping companies had to build new ships.

Brian Slack: Definitely. It was evident from the first experiments of Malcolm McLean that you could not convert an existing ship. Some companies tried it but it was uneconomic. The carrying capacity of the ships where you were simply trying to squeeze or put boxes into the existing holds was not competitive with the ships that were designed to handle containers. And so the first vessels that were designed which were fully container vessels were developed in the 1960s, and they would have a capacity of about 1,000 or 1,500 what are called TEUs, 20-foot equivalent units. And that was far in excess of the capacity of simply converting an existing cargo vessel.

And so this was a big capital investment required for many of the companies, and this was quite a shock to shipping lines because of course for the last 50, 100 years they'd had basically the same design of vessel to carry the general cargo. Now they had to invest in new types of ships that could not carry general cargo or any other type of cargo, they were specifically designed for containers. And this represented quite a challenge to some of the existing shipping lines, and many of the traditional shipping companies ultimately decided not to pursue containerisation, simply because it was going to be too expensive for them to compete in. And furthermore, in the early days they were not convinced that the container would be successful.

Keri Phillips: Containerisation would also completely transform ports and the nature of dock work.

Journalist [archival]: Containerisation is seen as a quick and lasting remedy for this; old, dirty, congested wharves serving equally old-fashioned vessels equipped with slow and cumbersome cargo handling gear. In 1966 the sight of muscle-powered hand barrows to move cargo from ship to shore is a straight reflection of waterfront methods and conditions of over 30 years ago. While this remains, turnaround time for shipping in some of our ports will continue to be among the world's slowest.

Jean-Paul Rodrigue: Traditionally a port used to have a relatively small imprint. That is, you had docks, you have a few warehouses, and immediately adjacent to those warehouses you could have factories or even a residential district.

Keri Phillips: Dr Jean-Paul Rodrigue is a scholar of transportation geography at Hofstra University in New York. I spoke to him by Skype.

Jean-Paul Rodrigue: In many older ports the residential district where dock workers were living were right next to or adjacent to the port facility. So when containerisation arrived you suddenly needed a lot of spaces to stack all those containers. So the old port sites were no longer judged to be suitable in the great majority of the cases, so you have to redesign them, you have to build new facilities further away. So that was, in a sense, the major impact that containers had on port facilities, it forced them to move towards new sites. So I can give you an example. The port of New York, which used to be around Manhattan or in Brooklyn in the past, let's say up to the 1950s and '60s, is now almost entirely in New Jersey.

Brian Slack: The typical old port design, what you had to do because a ship was in port for a long period of time, it meant you had to have lots of berths, and the only way you could accommodate large numbers of ships, because they were there for weeks at a time, was to have a series of finger piers usually, jetties that were put out into the ocean or out into the rivers, to enable a large number of berths to be made available. And because you were loading and unloading goods from the ship and because land transportation was very limited, the result was that you had to have the storage sheds immediately on the dock side.

And so a typical feature of the port of the 1940s and '50s was storage sheds, finger piers, lots of berthing space. But when you get to containerisation you don't need the storage space because the goods are in a container, they are not exposed to the weather, and it needs...because a ship is coming in, it's carrying now, in the early days anyway, 1,000, 1,500 containers, you had to have a lot of space on the dock to store those containers.

And so one of the very big impacts of containerisation was not the cost that the shipping lines had to face, it was the cost the ports had to face. And they had to completely rethink their operations. And many started to convert existing docks, knocking down sheds as much as they could, but these proved not to be as efficient as developing new terminals on new sites to accommodate the container vessels that were coming in. And ports began to move out of their traditional locations in the heart of cities, the old dock sides of cities, and were moving into what are called greenfield sites where new port facilities were built.

Seatrains Lines ad [archival]: At the Edgewater New Jersey terminal of Seatrain Lines, railroad, highway and ocean transportation is blended. In addition to carrying conventional railroad cars of all kinds and its own 40-foot long containers, Seatrain has arrangements with several railroads whereby container vans and trailers are handled on its vessels. All the benefits of rail shipment and containerisation, including door-to-door delivery of sealed vans are enjoyed by shippers who are dispatching cargo to ports served by Seatrain.

Keri Phillips: There were winners and losers as the shipping industry was turned inside out. Some ports struggled with the financial costs of adjusting to containerisation, while others found themselves in the wrong place.

Brian Slack: So for example, in Britain the old port cities of Liverpool and Bristol, which are on the west side of Britain, found themselves on the wrong side of the country. Britain was getting many of its containers from Rotterdam. Rotterdam was becoming Europe's main...they like to call themselves the main port of Europe, and they were investing very heavily in container facilities right from the very beginning. But that meant that to go to Liverpool or Bristol or Glasgow, that was an enormous detour, it was a time cost factor, and therefore if they were to serve the British market they would want to serve ports either on the south coast, Southampton, or on the east coast, London, but in particular a totally new port that was created and that was Felixstowe. And Felixstowe was a sleepy resort until that time and it was developed initially as a container facility. And although it is 100 kilometres from London it was within access of the metropolitan region by road and by train. And so there was a total dislocation in Britain in terms of container handling.

The same thing was true in the Mediterranean. The Mediterranean, which had been an important place of shipping, found itself now a backwater because the container ships coming from Asia were not willing to call at them, and they went straight through the Suez Canal, through the Strait of Gibraltar, to Rotterdam. All through the world we see ports having some success and other ports failing. One example of this was in the United States when, with the growth of Asian trade, the east coast ports like New York and Baltimore and Philadelphia found themselves on the wrong side of the United States. And so, yes, there were winners and losers in ports.

The other very big loser, and people don't really talk about this but on the other hand it was probably the most serious effect of containerisation, was to reduce the amount of manpower in the ports. Whereas before, gangs of labourers working long hours in the port on long shifts resulted in a very large labour force being required, but with containers, manpower was supplanted by cranes and other kinds of dockside equipment. And the result was a significant, I mean a very large reduction in the need for manpower. I mean, there were gainers on this, that some of the dock workers were able to stay on and gain higher salaries with the mechanisation that was going on. The crane drivers, for example, received very generous salaries. But the demand for labour that once existed in port cities has diminished very, very significantly, and I think that is probably the biggest change and dislocation that has occurred as a result of containerisation.

Keri Phillips: This is Rear Vision with Keri Phillips on RN, online, on mobile and by podcast. Today we're hearing the story of container shipping and how it changed the world. The workers on these new kinds of ships also found that their lives had been transformed, and not in a good way. Journalist Rose George travelled by container ship from the British port Felixstowe to Singapore for her book Ninety Percent of Everything.

Rose George: Well, is it a hard life? All the Filipino crew said to me when I asked them if they enjoyed their job, they said it's dollar for homesickness. Seafarers often joke (except they are not really joking) that their job is prison with a salary. So it can be good money with a good **company**, with a good manning agency it can be good money, and that is why they are at sea, after all, they are there to earn money. For a Filipino, for example, a decent job on a...even as an AB, an able seaman on a ship can be a wage that is three times that of a government employee in Manila. So that's why they are at sea. But they have all very, very carefully calculated how long they are going to be there. They've figured out that it's 12 years or 15 years and then they can go home. They are not at sea for the love of being at sea, at least no one I met was.

Now, my captain was a very different matter because he had been at sea for 42 years, so he had seen a different shipping world when he grew up. He had these ships that had all the break bulk cargoes, so all the mixture of items, not these containers, and what that meant was that it took longer to unload and load up a ship. So a ship was longer in port. Whereas today, because containerisation has made shipping so incredibly efficient, even a ship like the one I was on, which was carrying nearly 7,000 containers, even that could be fully discharged and charged in less than 24 hours. And we were never in port for more than 24 hours. And that means that the people on **board** have often, on average, no more than two hours ashore, which means they often don't leave the dock area, they can't go into town, they don't get any proper R&R when they are ashore. It's not like it used to be. It is a much harder rhythm of life at sea, and it is hard work.

So even at sea a ship needs to be constantly cared for because it rusts, things break, there are all these massive metal objects, it's a very harsh environment and it has to be maintained constantly. And of course if you are a watch officer then you have to be on the bridge, you have to be there, you have to watch. So they are basically tired a lot of the time and then they don't get enough relaxation ashore. So fatigue is a really big problem in the industry.

Keri Phillips: Are container ships particularly dangerous environments?

Rose George: Yes, they are, because you are surrounded by heavy machinery on the ship, you're surrounded by huge metal boxes that can fall, and most importantly you're surrounded by weather and you're surrounded by an ocean which is the most dangerous element on the planet. As much as there are countless regulations, safety regulations governing ships, but two ships a week still sink.

Keri Phillips: What about the containers themselves? I've heard that sometimes they fall off ships, is that true?

Rose George: It is true, and you can see some of these on YouTube, you can see some crazy stacks of containers. Yes, they do fall off. It's quite hard to know how many do fall off, but the figure that is put about by, for example, the European Union says that 2,000 containers fall off in European waters. The figure you'll mostly hear is 10,000 a year, though I'm not quite sure how that has been arrived at. The World Shipping Council says it's not that many. So there are all sorts of debate about it. But if you talk to yachters and particularly people who travel great distances on yachts, they will generally have seen a shipping container bobbing about at some point. So they are out there.

Keri Phillips: As well as the lives of workers on the docks and on deck, those of workers in the old industrial world and those in what would be called emerging economies were also transformed by container shipping.

Brian Slack: What happened in the early years was the goods that used to be transported under general freight, general cargo, which were manufactured goods, and some raw materials but basically it was machinery, it was domestic goods, it was stuff that was manufactured, semi-manufactured, or were components of manufacturing. And these were the goods that were the **bread-and-butter** of containerisation, at least in the earlier days.

And the big factor, and I think I may have mentioned this originally, was the reduction in transport costs, that you could fill a container with lots of manufactured goods, the shipping lines were only charging rates per container. So, for example, a figure that I like to quote is that if a pair of sneakers in the United States which are made in **China** and in the United States are selling for \$100 and \$150 or more costs 25 cents to transport because you are stuffing the box with lots of boxes of sneakers. So the transport costs of manufactured goods and finished products was very good.

But sooner or later you hit a barrier in the sense that virtually all the cargos that traditionally could be converted have been converted, and we are reaching today something like 80%, maybe 90% of this market has now been converted to containers.

Jean-Paul Rodrigue: Essentially globalisation could not have existed without containerisation. It goes hand in hand. That is, all the outsourcing, off-shoring of large manufacturing activities in developing economies could have been made possible because of the container. It's also absolutely incredible what you can see be put into containers, everything you can think of. Of course classic consumer goods, televisions, apparel, shoes, of course refrigerated goods, fresh fruits, vegetables, meat. And actually a dirty little secret is that the leading containerised export of North America is actually waste products, waste metals, waste paper, which are put into containers and then shipped across the Pacific to be brought to **China**, and those are going to be recycled into consumer goods and then be re-exported back to the United States.

I've seen coffee put into containers, wood, even coal in some instances. Pretty much everything that can be shipped, if it can be done economically, is going to be put into a container.

Keri Phillips: How easy is it to work out whether or not it's economic?

Jean-Paul Rodrigue: There's a lot of factors behind this. One aspect is the price of containerised shipping on average has declined over the last 20, 30 years ago because of economies of scale. The ships are getting bigger and the ports are getting bigger so it is of course cheaper to move things around. In some cases since you have, let's say, imbalance flows, that is you have a lot of empties in one direction and a lot of full containers in the other. What happens is on some trade routes it becomes cheaper to ship goods in one direction than the other because of this imbalance, which means that some people have some kind of an export subsidy because of this imbalanced trade. And to go back to this example I was mentioning to you, that the leading export of North America is waste products, this trade is possible because on one direction you have a lot of empties that are asking to be filled with something and the shipping rates are lower, so it becomes possible to do something like that.

Keri Phillips: Just looking at crime and containerisation, has the advent of containerisation increased the level of crime? Has it contributed to crime or fraud in any way?

Jean-Paul Rodrigue: You have to be cautious about this. Containerisation enabled to remove a form of crime. What I mean by this is dock workers in the past had a lot of opportunity to steal from the goods they were handling. So when containerisation was introduced it removed a lot of that risk. So that form of crime was virtually almost disappeared. However, other forms of crime have emerged because of containerisation, and we talk about the movement of illicit goods, illegal goods. You could talk about also maybe drugs a little bit, but most of the illicit trade being carried by containers involved let's say fake goods. I would say examples, you could think about fake handbags, fake shoes, things like that, which containerisation has probably promoted in the sense that since a container is anonymous, it is a little bit easier to carry stuff that can be judged illegal.

Journalist [archival]: The next generation of giant ships has hit our shores, and the new super-sized ships need jumbo ports and facilities.

Journalist [archival]: Every port in Australia is moving to upgrade its facilities, either by channel deepening or by developing the land nearby to increase capacity and improve road and rail links. One of these is the Port of Melbourne. In 2008 it was dredged to allow for bigger ships, and last week the state government announced plans to develop a third container terminal.

Keri Phillips: This is Rear Vision with Keri Phillips on RN, online, on mobile and by podcast. Today we are hearing the story of container shipping and how it changed the world.

Ships themselves have continued to become bigger, and Brian Slack says they haven't yet reached the limit.

Brian Slack: Ship size has grown enormously, and each time a new ship size emerges people say, oh, that's the biggest ship that is ever going to be built. By the 1980s ships had grown from 1,000 to 1,500 TEUs, as they were in the 1970s, they were now at 4,000 TEUs. In other words, they had more than doubled in size in the space of a decade.

The reason they grew to about 4,000 TEUs was the limits of the Panama Canal. The Panama Canal, which was a major thoroughfare between the Pacific and the Atlantic, was limited to vessels of about 4,200 TEUs. So what happened was in the late 1980s one of the shipping lines, APL, decided to build ships bigger than the Panama Canal, they're called post-Panamax ships. And there was then a spurt of growth to 6,000 and 7,000 TEUs. By the year 2000 and they were pushing 8,000 or 9,000 TEUs. By 2007 they were pushing 14,000 TEUs, and by this year, 2013, 2014, ships are coming on-stream which are 18,000 TEUs. So when you think back from 1960 to the present day, we have seen an 18-fold increase in the size of vessels.

Now, so far I've spoken about capacity, from 1,000 TEU capacity to 18,000 TEU capacity, that's meant the ships have had to get a lot bigger, they are a lot longer, they are now over 400 metres in length. They are wider because they've got to be able to accommodate a lot more containers. And they are certainly much deeper, they draw much more water. All these things cause problems to ports again. I mean, the effect of those dimensional changes means that ports now have to provide berths, not of 200 metres or 300 metres but of 400 metres, which requires more and more space. They now have to have more and more cranes to work the ship because the ship is now carrying 18,000 TEUs. They need to be offloaded quickly and effectively in the space of two days, and so they have to put more cranes, and those cranes are very expensive, they are \$30 million, \$40 million each.

And the other very big constraint is of course depth of water, and this becomes a real issue, that ports that wants to be in the game, as it is, who want to attract these lines that the big shipping companies are operating will have to dredge or deepen their channels, which is a very costly item and it's also an item that has quite a lot of environmental consequences. And so one of the challenges I think that containerisation is going to have to face is the enormous increase in the size of vessels which limits the number of ports that those ships can call at.

Keri Phillips: Rose George says that she was astonished by what she learned about container shipping.

Rose George: Well, just the vastness of it and how it reaches everywhere and everyone. For example, I'm sitting here in a radio studio and I'm looking around, and it's very difficult for me to isolate something that I am sure did not come by ship. In fact probably the only thing I can be sure of is the water that's in the cup. And pretty much everything else probably came by ship because certainly in the UK we are not really a manufacturing nation anymore, so we have to import a lot. So we are absolutely fundamentally dependent on ships, and I think that's the most astonishing thing I learnt, just how much we do depend on ships. And at the same time how invisible the industry is.

Keri Phillips: And who have been the big winners from containerisation?

Rose George: We have, if we think we are winners by having cheap clothes, cheap electronics, cheap everything. There's no way that any of that would be possible without shipping. There's no way that we could **buy** a \$5 T-shirt without it costing so little to ship it, so it can be as little as a couple of cents per unit to ship. Shipping may not have created globalisation but it certainly underpins it. So I guess the consumer is the winner.

Brian Slack: There has obviously been a lot of negative impacts. I think that many ports see themselves trapped in a constant cycle of having to invest in equipment, in channels, in new port facilities, which may or may not be used. And equally I think labour has suffered significantly. But the benefits of containers I think more than outweigh them in general. Obviously if you are in a place like Baltimore, an American port which has lost a lot of container **business** or at least until fairly recently, I think that the viewpoint from there is, well, we've lost out.

But containerisation has led to...has helped and facilitated globalisation. World trade has expanded. We wouldn't have had, in my opinion, the enormous expansion of international trade without the container. The growth of **China** and the industrialisation of **China** I don't think would have occurred to the same degree as it has without the container. And I think that globalisation, for better or for worse, has been one of the products of containerisation.

Keri Phillips: Professor Brian Slack of Concordia University in Canada. The other guests on Rear Vision today were Rose George, the author of Ninety Percent of Everything, and Dr Jean-Paul Rodrigue from Hofstra University in New York.

Judy Rapley is the sound engineer for today's Rear Vision. I'm Keri Phillips. Bye til next time.

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**IPD** container

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