



Tin Cans Which Changed the World

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Abstract

An amazing 90% of cargo shipped today is containerized. What began in 1956 as an experiment by trucking firm owner, Malcom McLean, transformed the shipping industry and accelerated expansion of the global economy. With the advent of a standardized container and container ships, ports around the world made improvements in facilities and deepened their channels in order to accommodate the bulky vessels. Today, the race is not yet over as ports in numerous countries, including the United States, continue to scramble to increase their capabilities. This article traces the sixty-year history of the remarkable role of Malcom McLean and the shipping container, its tremendous impact on the global economy, and where it is going in the future.

In 1954, the Oscar for Best Picture went to “On the Waterfront” which dramatically exposed the life of a longshoreman. Marlon Brando won Best Actor for his portrayal of the physically draining work, long hours, and dangerous conditions longshoremen endured as they loaded and unloaded tons of cargo off and on ships and trucks. Just two years after this movie was released, an experiment took place which would eventually strip most longshoremen of their jobs as well as put some ports out of business. In the sixty years since, the acceleration of innovation in the shipping world has completely changed how the waterfront looks and operates. The spark which ignited these changes was as ordinary as a large metal box or as it is known today, a shipping container. This article gives a short history of the remarkable role of the shipping container, its tremendous impact on business both here and abroad, and where it is going in the future.

Shipping containers are the centerpiece of a highly automated intermodal system of cranes, ships, trucks, and railroads used to take products where they need to go cheaply and quickly.

Described as having all the romance of a tin can, historian Marc Levinson claims the shipping container “changed the shape of the world economy.” Without this key component and the resulting changes in the shipping process, the global economy we now enjoy could still be many years off.

What is now known as intermodal transport began in 1937 as a vision of Malcom McLean, the owner of a small North Carolina trucking firm. Transportation historian, Brian Cudahy, noted during this period it took almost as much time to load and unload trucks as it did to sail the goods across the ocean. The tedious loading process required the men to hoist various types of cargo from the pier into a hold in the ship where others then carefully stow everything for the journey by sea. After driving a load of cotton bales to the port in New York City, McLean found himself waiting impatiently for several days while longshoremen transferred the bales onto a cargo ship. Frustrated with the inefficient process, he knew there had to be a better way.

After this experience, Cudahy reported McLean spent years discussing the problem with others and trying to come up with efficiencies. Almost twenty years after his exasperating wait in New York City, McLean was ready to test an idea. He personally oversaw the loading of 58 trailer trucks which had their running gear removed, onto a ship. The tanker, *Ideal X*, had been fitted with a special platform deck McLean designed which would stabilize the trailers. Cudahy noted the loaded ship left Newark on April 26, 1956, and arrived in Houston six days later. From the experiment, McLean determined the costs to load the *Ideal X* with containers was \$0.16 per ton compared to the standard \$5.83 per ton to load a regular cargo ship of the time. And so the revolution began...

In a short period of time, McLean’s shipping containers were forcibly changing the entire shipping process, including accelerating the obsolescence of the traditional cargo ship. According to Cudahy, McLean formalized the design of modern day containerships in 1957. He rebuilt a World War II cargo ship which was able to transport 226 of the now standardized twenty-foot containers (TEUs) stacked in below-deck racks as well as on the deck. McLean’s innovation not only changed how goods were shipped by sea but by land. During the Viet Nam war, he observed his ships which were delivering war supplies were returning empty from Asia. This gave rise to a triangular trade route where McLean’s ships would load imports from Japan and Hong Kong after dropping off the war supplies in Viet Nam. In order to more efficiently distribute these imports, McLean collaborated with Southern Pacific Railroad to develop the double-stack freight car which could easily carry the goods into the heartland.

McLean’s vision gave birth to a truly intermodal system as cranes were designed to quickly move them from each transportation source, and trucks and boxcars were modified to securely lock in the containers and take them to their destination. The efficiency of moving cargo overseas and inland skyrocketed as well as the rate of importing and exporting goods. Before the “container ship revolution,” *The Economist* magazine reported 15 tons of cargo could be unloaded from a conventional ship per hour versus an incredible 300 to 400 tons per hour off a container ship today. McLean’s seemingly simple innovation was responsible for a staggering growth in the global economy. According to *The Economist*, this growth positively correlated with the number of container ports - in 1966 only 1% of the world’s countries had container ports, by 1983 90% did.

James Utterback, an MIT professor, has developed a theory on the dynamics of innovation where he suggests the rates of product innovation and process innovations are interdependent over time and “are linked to important transformations in the characteristics of product, process, competition, and organization.” This is certainly true of the shipping container - this basic product was innovative when introduced in 1956 but who could have imagined its impact when the processes of moving it were transformed? Gone are the dangers and the grueling days of manual labor experienced by Marlon Brando’s character and his co-workers on the docks of New York City. When “On the Waterfront” was filmed, there were around 50,000 longshoremen at the Port of New York and New Jersey – today there are around 4,000. Although the opportunities for employment in this field dramatically fell, the quality of the working conditions

improved significantly. Today's longshoremen still do some manual labor but most of them are highly specialized equipment operators moving the container with cranes, forklifts, and other heavy machinery. The radically improved productivity per man combined with continued union involvement has dramatically increased longshoremen's pay with many making as much as \$100,000 annually. However, with the gains in "smart" technology and robotics, it will be interesting to see how the longshoremen unions will protect the jobs of their remaining members.

As Utterback predicted, shipping magnates are still improving the process of getting more and more of these "tin cans" to more places faster. The physical capability of container ships has steadily improved since 1956 when McLean experimented with the makeshift deck he fitted onto the *Ideal X*. According to the *BBC News Magazine*, new container ships in the early 1970s could carry between 500 and 1,000 TEUs. By 1985, new ships could carry 4,500 TEUs, and by 2000, some ships could carry 8,000 of the containers. As the container ships grew larger, ports around the world made improvements in facilities and deepened their channels in order to accommodate the bulky vessels. The Panama Canal previously could only handle ships carrying 5,000 TEUs or less, but a ten-year expansion project was just completed in early 2016 which will allow ships carrying up to 13,000 TEUs to transit the canal. In anticipation, the east coast ports of Norfolk, Baltimore, and New York have been dredged to accommodate the larger ships. Not surprisingly, other east coast ports are scrambling to increase their capabilities. The U.S. Army Corps of Engineers reports in the United States, current port investments range from \$6 billion to \$8 billion annually in federal, local, and private money.

Today, a staggering 90% of all bulk cargo travels in one of McLean's colorful "tin cans." When his days "on the waterfront" ended with his passing in 2001, containerships around the world blew their whistles in honor of the "father of the shipping container." McLean lived long enough to see his experiment with 58 modified trailers grow to a container ship which could carry 8,000 TEUs. Today, he likely would have been surprised to learn there are three new Maersk mega-container ships which can carry 18,000 of his containers through the world's busiest trade route between Asia and Northern Europe. Then again, maybe he wouldn't be surprised...

About the Author

Captain Jeanne McDonnell (ret.) served in the U.S. Navy on active duty for over 25 years. Assignments included command of Naval Support Activity Norfolk and Transient Personnel Unit Norfolk, and service on the Joint Staff, Navy Staff, Commander Naval Surface Forces Atlantic, and Joint Forces Staff College. She earned the Doctor of Strategic Leadership degree at the Regent University School of Business & Leadership. Please contact the author at jeanmc1@regent.edu.