

MODERN TRANSPORT HANDLING UNITS IN INTERMODAL TRANSPORT¹

IleCvetanovski¹, VaskaAtanasova, Verica Dančevska, Cvetanka
Cvetanovska

University “St. Kliment Ohridski”

Faculty of Technical Sciences, Makedonska Falanga 33

Bitola, Macedonia

ile.cvetanovski@tfb.uklo.edu.mk

Abstract

The standard container 20 ft that is used today is the result of 200- year evolutionary process. The use of steel containers in a different dimensions, began in 1950. Innovative solutions in container transport, which today appear as a novelty, contribute to reducing transport costs, environmental protection, development of inter-modality in the transport process, or simply contribute these innovative solutions for sustainable transport system. During the global economic crisis, the transport of empty containers leads to increased costs to the carriers, the owners of containers, as well as users themselves of the transported goods. Since the space in transport is the most important, the idea of assembled container is of great importance, especially for shipping, travel carriers, and container terminals. Accordingly, the next step in the evolutionary process in container transport will be the assembled containers.

Keywords – assembled containers; intermodal transport

INTRODUCTION

Existing researches on transport handling units, were mostly focused around saving space and means of transport during the transportation process. There are also some innovations, but research in this field is still ongoing. Many of the studies about transport handling units have proven unsuccessful because of their handling, the amount of time for their assembling and disassembling, and the poor materials from which these units were made.

¹ Professional paper

Of all the innovations which have come about transport handling units, two solutions for switching containers, as modern transport handling units look realistic and enforceable . One solution is created by professors at the Indian Institute of Technology (Indian Institute of Technology), New Delhi in India. Alternatively, the product of the Dutch company "Cargoshell" (Cargoshell BV).

ASSEMBLED CONTAINER TYPE – IIT DELHI

The assembled container type "IIT Delhi" was initiated by a former banker - Avinder Bindra. He approached the Indian Institute of Technology Delhi (IIT Delhi) about the development of the assembled container and thus initiated the development of the project. In developing the design part Anupam Cowley (Anoop Chawla) and Sudipto Mukherjee (Sudipto Mukherjee) from the institute.

The two professors, redesigned a standard container that can be folded laterally and can be loaded from above. During the assembly (Figure no. 1) the walls, doors, upper and lower parts are arranged in four layers in length. It is claimed that this design can be assembled or disassembled hydraulically in four minutes. For this purpose it's used a hydraulic platform, a container that is a quarter of the original.

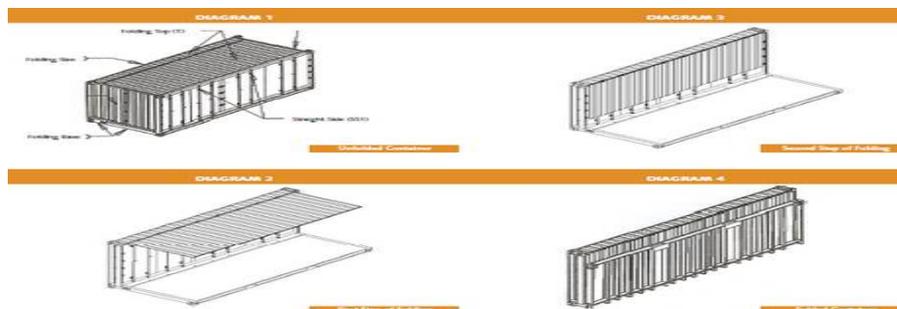


Fig.1: Phases of assembly " IIT Delhi "

This design enables the switching container ships to carry more containers in the space otherwise occupied by a container . In this way it is cut the number of required means of transport, and costs as well. On the other hand, the turnover of the transport facilities is increasing.

Assembled container of this type has the dimensions of a standard 20 ft container, and the added equipment such as cranes and forklifts should not be modified. The team investigating this platoon assembled container calculated that they can save about 25 million TEU yearly in ocean freight.

This savings represented half of the total amount of empty shipping containers, so with this kind of switching containers would be saved up to 1,000 USD for each empty container.

However, for this type of containers, special hydraulic platforms for assembly and disassembly are needed. From all this it can be drawn two important questions:

- The availability of hydraulic platforms;
- The time required to assemble or disassemble a container.

All ports and transport terminals should be equipped with such special platforms because otherwise jointed container would be useless. Also, because of planning a larger number of switching containers, more hydraulic platforms will be needed. One platform is expected to have a value as two empty containers.

ASSEMBLED CONTAINER TYPE - CARGOSHELL

On June 29, 2009 in Rotterdam was held the official presentation of the new concept of container - "Cargoshell"-(Picture no.2).

Although it kept the good features of the previous containers, Cargoshell offered numerous innovations in terms of the material they were made



Fig. 2. Container "Cargoshell "

Just like the model " IIT Delhi " and " Cargoshell ", the container occupies only a quarter of its size when folded . This means that the trips by boats, trucks etc. will be reduced, energy will be saved and emissions reduced.

Instead of hydraulic platform assembling "Cargoshell " container , you need a truck that has a built-in hydraulic lifting system (Figure No. 3) . It can be , etc. " spider " vehicles which are used for lifting incorrectly parked vehicles. That way, the assembly of " Cargoshell " it becomes much more accessible and economically justified . Besides, the time it takes for its assembly or disassembly is much smaller. It can be performed for an incredible 30 seconds.



Fig. 3. Hydraulic truck and assembled " Cargoshell "

ENVIRONMENTAL PROTECTION

The volume of steel containers remains the same regardless of whether they are full or empty . But with the new design of switching containers, vehicles can carry up to four empty containers in the space, which otherwise has so far occupied an empty container . This means that the demand for vehicles will be reduced by 75 % . In particular, for maritime terminal in Rotterdam, it would mean a reduction of 10,000 ferry trips a year and around 250 trucks a day would be less present on the roads.

If the same activity makes fewer trips it indicates that energy is significantly saved. Because it is generated from fossil fuels, with each saving the level of CO₂ emissions are reduced. Also, because of the reduced traffic movement, traffic safety and pollution are significantly improved.

Energy is also saved when handling empty containers. With the new concept, manipulative transport means that with one step you can move four containers. Thereby, the reduced time needed to manipulate, directly increases efficiency.

Pollution is reduced because it does not allow containers that for example, would drop from a ship, sunk to the bottom of the sea (Figure No. 4) , but are taken out from the floating marine area.



Fig.4. -Containers falling overboard during transport

To be protected from corrosion, steel containers should be protected with artificial colors. The new material from which the assembled containers are made, does not corrode when in contact with air or sea water, and therefore does not require protective paints and coatings. Also, due to the ability of the material to be in different colors even during production itself, there is no need of any coloring because of decorative or advertising reasons. So, over the entire life durability of the container, there is no need to renew the external color, which is quite different from steel containers in which the process should be repeated several times. When we take into account the huge number of containers that exist in the world , it becomes clear how much quantity of color is saved using these switching containers.

REPRESENTATION OF EMPTY CONTAINERS IN THE TRANSPORT PROCESS

The exploitation of a container ranges from 10 to 15 years, depending on how the container was used. A well-maintained container can be usable up to 20 years. Still, the total period of utilization of the container, on average 6% of the time accounts for transport by road, 16% of the time spent on the terminal belongs, 16% for ocean transportation, 6% for repair, and the remaining 56% for the exploitation period of the container for the time spent without load. Previous analysis show that the role of empty containers in the overall process of transporting goods is of great importance.

Empty containers were never something desirable for mobile terminals. One reason is because they occupy big space that could be used for another purpose.

Most often when containers are sent from one terminal to another, they must be returned empty due to lack of cargo. In this way, more unfavorable effects are created, including larger financial costs, that lead to bigger product pricing. With the new concept of assembled containers, this problem can be overcome.

Let's take for example, the transportation from Shanghai to Los Angeles. If on that relation went four ships filled with containers after unloading of the goods the empty ones can be brought back only in one ship.

The remaining ships will certainly have to come back, but instead of empty, can now be loaded with other goods.

Savings with such transport are enormous. The cost calculations show that the same relation (Shanghai - Los Angeles) use the boat type "B9 - Emma Mærsk" obtained the following effects:

The ship is 400 meters long, 56 meters wide and can carry 15,200 20 ft. containers. The fuel consumption is of 13,000 kilograms per hour. Because diesel fuel weighs 900 grams per liter, it appears that consumption will be 13.4 m³ per hour, or 345 m³ per day. That is a cube with sides of 7 m.

Shanghai and Los Angeles are located at a distance of 8,700 nautical miles (16,112 kilometers). If you are traveling at full speed - 25 nodes per hour, the trip will last 15 days. The number of days multiplied by the amount of fuel consumed per day (345 m³), and all that multiplied by 3 (the number of empty vessels) gives an amount of fuel the size of a cube with sides of 25 meters (Figure no. 5).

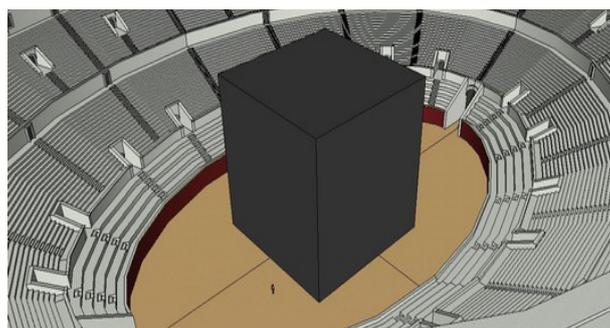


Fig. 5. Display of a cube with a side length of 25 meters



Fig. 6. View the largest cargo ship for transporting containers

The Danish company Maersk built the largest container ship in the world for the transport of containers, the ship is 400 meters long and high as a twenty-story building.

The cargo ship is so long that it cannot pass through the Panama Canal, and the depth of the bottom cannot be docked at any harbor in North or South America. This ship can transport more than 18,000 containers filled with goods in them or for example that is 111 million pairs of shoes. The Danish company Maersk is a leading container transport and has ordered construction of 20 such giants at a cost of 185 million dollars for one. The sole purpose of these vessels is transportation from major ports in East Asia, such as Shanghai, Hong Kong and Singapore to ports in Northern Europe or Rotterdam and Hamburg.

Fitting into the European transportation network, with full appreciation of modern transport technologies, technical and other technological advancements, market adjustment, and improve the energy balance of the country, Macedonian require new traffic system quality and higher speed service. Respecting the situation, and recognizing the real needs of the Macedonian economy in the European transition, our country approached to the reconstruction of traffic in all its branches, how could be involved in the European process and to become a full member of the European traffic system 21st century.



Fig. 7. View the latest wagons procured in Macedonia

From a total of 150 wagons , 75 will be allocated to container transport and the rest to transport ore, coal and similar.

Organized by the Chinese company "Kosko", which manages the Greek port of Igoumenitsa in Piraeus and forwarder "Schenker" as organizer of shipping MR-Transport rail tested three test rail compositions loaded with goods from Sony factories (computer parts and monitors) in Győr, Hungary (which were taken for a great time of 52 hours of driving) and Hewlett Packard factory in Pardubice, Czech Republic. It is a new rail container transport, first from the south to central Europe, that so far walked from the north, from Hamburg to the south of the continent.

All trains havd 36 to 38 containers at the request of the " Schenker " MR - Transport provided their wagons . All this shows that Macedonia is making quite modernization of transport means in handling all traffic branches.

CONCLUSION

Classic steel containers have proved very convenient means of transporting goods. They are common all over the world, and there is almost no place on the planet where it hasn't arrived some container . But one of their main weakness is the space they occupy when they are empty, and the participation of empty containers in the overall transport is really big. That is why there were created switching containers. The ability to conquer the market with two models - "IIT Delhi " and "Cargoshell ."

Their main feature is that when folded,they take up only a quarter of the space when disassembled . It would mean :

- saving a great deal of space in ports ;
- fewer trips by boat ;
- fewer trucks on the roads ;
- Tackling the less manipulative means;

- increase efficiency;
- increasing the capacity of the ports ...

All this contributes to energy savings , in other words, saving money and also reducing CO2.

Other improvements apply only to " Cargoshell ." It is made from strong plastic fiber and are achieved multiple benefits . In fact , this new material:

- is 25 % lighter than steel ;
- not subject to corrosion, must be protected with paint and varnish;
- offers the possibility of writing the advertisements even when casting of plastics ;
- allows smooth satellite tracking ;
- serves as an insulator ;
- easy to clean and maintain .

In addition , there have been innovations in a way that opens the door (such as rolling) and the ability to sail in case of falling into the seawater.

As a fundamental flaw appears the initial investment and prospects of success depend on several factors, including the interest of transport companies to this new concept, as well as their willingness to invest for the purchase of switching containers.

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