Research Paper Technology

The System View on the Prognosis of Maritime Transport

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ABSTRACT

The paper deals with the prognosis of development of maritime transport in the world. This topic is very current. Until now there was an increase of maritime transport, except in the years 2008 - 2009 when there was a decline due to the global crisis. According to objective knowledge, it is clear that the volume of transport cannot increase endlessly, because of stagnant needs of new goods and also because of the development and use of new technologies. This paper assesses planned constructions, which could significantly affect the development of maritime transport.

KEYWORDS maritime transport; new technology; prognosis; RFID; 3D technology

INTRODUCTION

According to statistics of Eurostat - in terms of value, about two-thirds of foreign trade in the Europe passes through maritime ports. Another fact is that the US, the EU are two biggest trading subjects of the contemporary world (according to Cheu et al. (2013)), the China is also rank among them. In 2010, the exchange of goods between the US and the EU had the value of 412 billion EUR. According to statistics import from the China to the EU reached in 2010 the value of 282.5 billion EUR and export from the EU to the China reached 113.3 billion EUR. It is necessary to consider the probability of an increase in the transport of goodsbetween the Asia and the EU and between the EU and the USA.

1 Current status and expected changes in shipping lanes

a) Main global shipping lanes to / from European maritime ports

Shipping routes connect maritime ports. Artificial structures are also a part of the world's shipping lanes they had a major impact to shorten routes, and therefore they help to cut the costs of shipping. Any change of them will have an impact on operation and on throughput in certain ports.

The Suez Canal–is currently 13 m deep and 80-180 m wide, the annual capacity is about 20 000 vessels.

The Panama Canal - the canal length is 81.6 km, the width is 150-305 m, and the average depth is up to 13 m. By building the Panama Canal, the former route between New York and San Francisco (20,917 kilometres) has been shortened by more than half – by about 11,272 kilometers. The canal is open 365 days a year, 24 hours a day. Crossing through the canal takes eight to ten hours, but usually it is 24 hours (lot of ships).

Fig. 1. Shipping lane via the Suez Canal



Source: the author

The shipping lane from Los Angeles to Hamburg via the Panama Canal has alength of 7,995 nautical miles and it takesabout 23 days and 19 hours.

b) The Trans-Siberian Railway

Although the majority of goods between East Asia and the EU (99%) (Logistics 12/2012) is transported on sea; railway transport is an important alternative. It is based on the Trans-Siberian Railway (9,289 km), which leads from the EU to Vladivostok. This transport corridor has currently insufficient capacity and there are also disadvantages like the climatic conditions in Siberia. Beside the Trans-Siberian Railway, the railway connection between Europe and Asia to China and then via Turkey and Iran to Pakistan and Indiais developing.

Fig. 2 The scheme of Trans-Siberian railway



Source: Logistics 12/2012, 2012. The development of railway transport across Siberia.

Sea……35 days, 19 000 km

Railway…..15 days, 9 300 km

c) The Nicaragua Canal

This canal (probable route in red) would also use water areas of the lake Cocibolca and the San Juan River, which flows from it into the Gulf of Mexico. The canal would be

significantly longer than the Panama Canal (shown in green). The Panama Canal's capacity is unsuitable and big tankers with oil and coal cannot pass through it. The modernization has started; the probable date of completion is the year 2016.

In the near future works on the project which was approved by Parliament in Nicaragua already last year should be initiated. Expected construction time is still 5-10 years.Apart from the canal there should be a railway along it; two free trade zones, two airports etc. will be constructed.

Fig. 3 The map with plotting of theplanned routeof the Nicaragua Canal (red) compared with plotting of the currentPanama Canal(green).

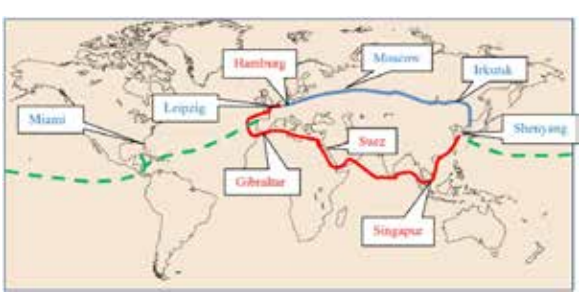


Source:www.iDnes.7.6.2013

d) Comparison of different variants

The current shipping route Asia - Europe is 20,000 kilometers, the transportation time is 33-40 days, the railway route Asia - Europe is 11,000 kilometers, the transportation time is 18-21 days. Future route of the canal through the Nicaragua can act as a connection of Asia –USA (East Coast –e.g.Miami) in variant it is possible to assess the possibility of connection up to European ports.

Fig. 4 The connection between Europe and Asia – shipping route and railway corridor

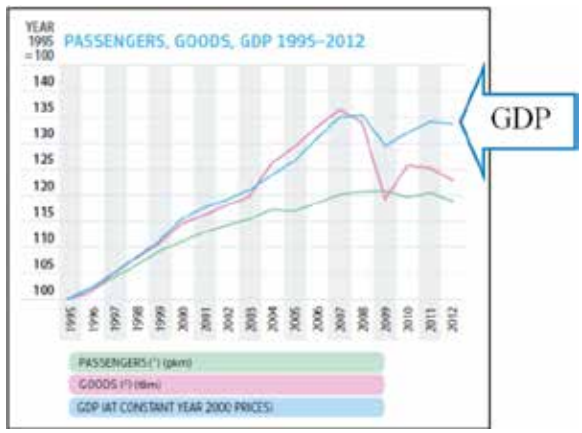


Source: the author

3 Expected development of maritime transport

According to statistics (Fig.1) the volume of world container trade is increasing in the long perspective. However, according to the "Statistical Pocket Book 2014" (Fig. 7), there has been a decline in freight and passenger transport in relation to GDP decline during the global crisis. But in the years 2010 - 2012 it can be observed, that during the increase, respectively the stagnation of GDP there is a decline in freight transport in particular.

Fig. 5A percentage growth of freight and passengers transport and GDP in the EU-27 from 1995 to 2012, modification of the author



Source: EC, „EU transport in figures. Statistical pocket book 2014"

This fact allows us to ask whether the volume of maritime transport is approaching the maximum, or whether changes in society reduce shopping needs, which could lead also to a reduction in demand for goods that are transported from great distances

New technologies

Development of transport will be affected significantly by the 3D printing. It will mean the extreme decentralization of production and also manufacturing in the customer's location.

3D printing is a process of production of three-dimensional objects from suitable material through specific devices. Printing successively layer by layer is under computer's control.

3D printing technology beginnings appeared in the second half of the 20th century. After 2003, when the development of technology accelerated due to expiration of some patents, there are new technologies, terminology and materials, but for clarity they are more often called simply "3D printing". The material is applied from the nozzles on a moving platform. Patterned layers create a 3D object. Printing technology of physical 3D objects from digital data is called "additive manufacturing". The quantity of material, rotation of a platform and design of object is controlled with special graphical software - "SCAD".

The product is produced - "printed" - according to the final design, layer by layer.

Various materials are currently used (plastics, glass, metal, polymers, human tissues, wax, food, sand, mixtures of adhesives etc.).The paper surface is not coveredby one layer, but three-dimensional objects are created by layering.

Areas of use of 3D printing technology:

- Medicine and Research
- Food Industry
- Consumer products
- Design, architecture, electrical engineering, mechanical engineering
- Education
- Automotive and aerospace industry
- Arms industry

Here arises the opportunity to design and print your own products for daily consumption. Current experiments are with materials such as:

- White plastic (thermoplastic material

ABS (acrylonitrile butadiene styrene)).

- Ceramics and glazing (ceramic

composition of aluminum oxide and silicon oxide, the completed product is after remove from the printer glazing and then hardened, sintered, in fire as well as classic ceramics).

- Wood (a mixture containing about one

third of the wood fibers (directly from wood or wood waste from sawing machines dust) and two thirds of PLA material (polylactic acid).

- Metal (electrical components).

- Textiles (materials for printing on thread

and fabrics. There has been already lingerie

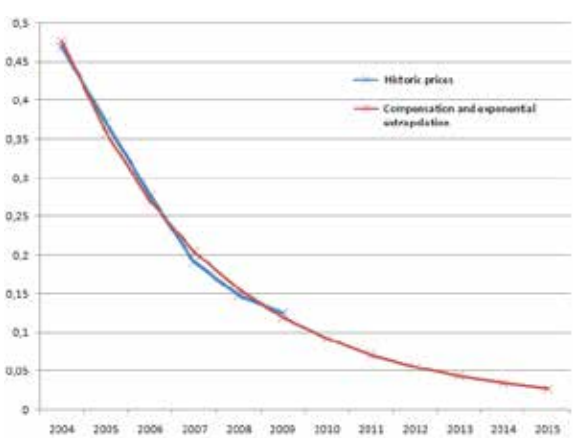
printedfrom the latex-rubber polymers enriched by cotton fibers. Other materials enriched by viscose are also tested).

4 Phenomenon RFID

Forecast can stem from a wide-scale monitoring of the RFID technology conducted between 2006 and 2008 by the BRIDGE project [3], which is rectified by 3 significant marketing studies engaged in prediction of the total RFID sales volume (Gartner Research [4]), geographicalanalysis of the market and implementation of RFID (IDTechEx [7]) and finally also analyses with detail mapping of the split between passive and active RFID tags.

The RFID technology represents the most important economic factor of the near future. The price of RFID passive tags will further decrease thanks to mass production and technology development, it is predicted that between 2012 and 2013 the price of one tag will drop to 5 USD cents and in 2015 these could be made under the price of 3 cents. The price development is shown on graph 6.

Graph 6 Development of passive RFID tags price,



Source: Selected Chapters from New Economics [12]

In the future, the price of RFID will be only fractions of cents with the size smaller than a pollen grain.

This, in connection with distributed artificial intelligence, it willenable:

- fix every human to the megaintegrated

computer system and monitor his health, social position and political views and the computer feudal monarchy will be established

- effective central planning of the whole world economy

- electronic communication with pets, later also with mammals, cetaceans and vegetation, i.e. whole biosphere which will become a new segment of economy and after change of legislation will be integrated into the political and economic system.

5 Conclusion:

As a result of the implementation of new technologies (3D, RFID) for maritime as well as for air transport, the global development will mean the peak of a logistic curve; maritime and air transport will not further develop. "Crystalline center" will probably be at the first stage the US, China, Japan and the EU, wherein the decline in traffic levels will appear and later it will appear in connection with the development of 3D technologies in all other countries. It is very likely that the future development from the systemic perspective, in terms of transport, will copy the sinusoid and not the logistic curve. There will be a decrease the intensity of all kinds of transport services.

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