

**Секція: СУЧАСНІ ТЕХНОЛГІЇ НА ТРАНСПОРТІ**

**УДК 656.621/.626**

**О. Л. Drozhzhyn**

Odesa National Maritime University, Ukraine

**CONTAINER ON BARGE TECHNOLOGY: A CASE STUDY OF LOWER DANUBE**

**О. Л. Дрожжин**

**ТЕХНОЛОГІЯ ПЕРЕВЕЗЕННЯ КОНТЕЙНЕРІВ НА БАРЖІ (СОВ):  
ДОСЛІДЖЕННЯ НИЖНЬОГО ДУНАЮ**

It is well known that the longest waterway network belongs to China (160,000 km), the US (152,000 km) and Russian Federation (145,000 kilometers), followed by those in Ukraine, the Netherlands, Belgium, France and Germany. (*Modiga, 2015*).

The Danube River has 34 navigable tributaries; the total length of the Danube basin is more than 5,000 km. Over time, the two sides of the river have grown and prospered on over 90 ports. This data gives a great importance to the international Danube economics. Expanding the transport on the Danube being favored by the achievement of large projects, such as creating navigable channel Danube-Oder-Elbe, with a length of 550 km, linking the industrial areas of Hungary, Czechoslovakia, Poland and Germany; the Sava-Danube Canal, which facilitates traffic between FR Yugoslavia and it allows greater use of the Danube-Tisa-Danube Canal; Rhine-Main-Danube Canal with a length of 677 km (*Modiga, 2015*).

Expanding container shipping on the Danube River is hardly the top priority for European government officials these days. Experts says, that the plan to spur container shipping, to be unveiled this summer, would harness one of Europe's great rivers in the struggle to ease congestion on the continent's clogged highways and open its backward south eastern region to the lucrative markets of the 15-nation EU. Container-on-barge is a form of intermodal freight transport where containers are stacked on a barge and towed to a destination on the inland waterway. Therefore, container-on-barge transport is becoming even more competitive than its alternative mode, i.e. road transport for specific kind of transport activities. Following these trends, significant efforts have also been done in promoting barge transport of containers on the Danube and region of Southeast Europe. (*Maraš V., et al., 2013*). Scientists in their papers prove the effectiveness of such shipments: “Tariffs of the direct container line from the Danube ports in Austria to Hamburg and Rotterdam are 10-20 % lower than in the case of railway transportation”(Radmilović, and Maraš, 2011).

At present, container transport on the Danube is realized by convoys with pushing barges. Pushboat technology was introduced on the Danube in 1961 (on the Rhine, 1955) and was copied from the Mississippi River. There are two barge train types: push- boat & barges; motorship & barge.

Danube-Sea barges are 38.25 meters long, so that two-coupled corresponding barges to one standard Danube barge of 76.5 meters (B=11 m, H=3.9 m, T = 3.3, corresponding to DWT-1070 mt with lightship weight of 240 mt).

Romanian Nord Marine SRL has experience of organizing COB (container-on-barge system) for containers shipped by SB-type barges with capacity 80 TEU's each one. The transit time from Constanta to Belgrade is 7 days, the transit time from Belgrade to Constanta is 5 days, round trip voyage – 14 days. “Ukrainian Danube Shipping Company” (hereinafter referred to as the PJSC UDP) also has great experience of container transportation on the Danube (ports: Regensburg, Germany – Vienna, Austria – Linz, Austria, - Izmail, Ukraine, – Trabzon, Turkey. The similar experience has Romanian SRL “Mainrom Line”, which organized domestic container service Constanta - Giurgiu - Constanta. Austrian GmbH “Helogistics Holding” has organized an experimental container line Budapest, Hungary – Belgrade, Serbia – Smederevo, Serbia – Constanta, Romania (*Drozhzhyn, 2012*).

The additional features for the Black-Sea/Danube container transportation open with the new ferry service. On October 16, 2014, the ferry service connecting the port of Constanta (Romania), Batumi (Georgia) and Ilichivsk (Ukraine) was launched. The weekly line is operated by a private Ukrainian ferry that accommodates 85, 17-m long, containers, trucks and up to 150 passengers. A trip

from Constanta to Batumi via Ilichivsk takes about 48 hours, being shorter than the terrestrial route through Bulgaria and Turkey, around the Black Sea (Dumitrescu, 2015).

The drop of container shipping transportation on the Danube is primarily related to insufficient volume of cargoes that can be obtained from the Far East for delivery to the EU.

Unlike the Rhine and other inland waterways of Western Europe, this type of transport on the Danube is as yet inadequately developed for the following reasons:

– long distances and difficult direct connections between the freight centers for containers arriving from international sea routes (e.g. from the Port of Constanta) and the most important distribution centers on the Danube (Belgrade, Budapest, Bratislava, Vienna, Enns). – the length of time it takes to transport containers to the distribution centers on the Danube owing to navigation conditions, in particular the underdeveloped infrastructure. At the same time the obvious advantages of this form of transport, especially in terms of cost, had already resulted in the commencement of scheduled services. With appropriate navigation infrastructure, enabling container ships to achieve significantly higher speeds (motor freighters and pusher vessels with barges), one can anticipate a significant increase in container traffic by redirecting the flow of goods from other means of transport onto the Danube. But, it should be noted the reasons for which volumes figures on the Ukrainian section of the Danube can be underestimated:

- as it's well known, the greatest traffic on the Danube fixed at the Northern sector (Germany, Austria, Slovakia and Hungary), while the lowest values were fixed in Romania and Ukraine. It is easy to explain: taking into account Romania and Ukraine as well countries that have at their disposal 40 % of the total Danube fleet, these results point to the fact that heavy load only travels through these countries but does not stop in their ports. This situation opens the possibility for additional engagement of Ukrainian and Romanian harbors as a place for loading the goods produced in these countries. For the moment Danube in Romania and Ukraine has only a transition character (Mihic, Mihajlovic, 2012).

- lack of information about the Ukrainian Danube sector due to little statistics “could be obtained from some Danube countries (e.g. Moldova, Ukraine), there might be an underestimation in the number of Danube related research activities in these regions” (Feldbacher, 2016).

#### **References**

1. E. Feldbacher et al. *Twenty years of research on water management issues in the Danube Macro-region - past developments and future directions*. Science of the Total Environment (2016).
2. G. C. Dumitrescu, (2015). *Central and Eastern European Countries Focus on the Silk Road Economic Belt*. Global Economic Observer, 3(1), 144.
3. G. Modiga, Georgeta. *The Marketing of River Forwarding and Freight Services*. Journal of Danubian Studies and Research 5.1 (2015).
4. O. Drozhzhyn, 丝路发展与治理创新：“一带一路”沿线国家社会发展国际学术会议论丛. *Danube transit opportunities for container transportation in New Silk Road” experiment*. [Silk Road Development and Governance Innovation. Social Development International Symposium in “The belt and road” along countries]. Beijing: Social Science Academic Press (China) 224-232. ISBN 978-7-5201-0668-9, (2017)
5. O. Drozhzhyn. *Present condition and problems in development of container transportation on the Danube*. Visnik of the Volodymir Dahl East Ukrainian National University, #6 177 (2012).
6. P. Suvorov. *Container transportation development by PJSC “Ukrainian Danube Shipping Company” fleet*. Ports of Ukraine (2006).
7. S. Mihic, M.Mihajlovic, &I. Skiljaica, (2012). *European policy for the promotion of inland waterway transport: A case study of the Danube River*. African Journal of Business Management, 6(7), 2498.
8. S. Šoškiü, Z. Ćekiü , &M. Kresojeviü. *Analysis of River–Sea Transport in the Direction of the Danube–Black Sea and the Danube–Rhine River–River Main*. Marine Navigation and Safety of Sea Transportation: Navigational Problems, 199. (2013).
9. V. Morozova, L. Suvorova. *Perspectives of Ukrainian Fleet in transportation on inland waterways in Europe*. Odessa, Odessa National Maritime University, 2005.
10. V.Maraš et al. *Routing of barge container ships by mixed-integer programming heuristics*. Applied Soft Computing, 2013, 13.8: 3515-3528.
11. Y. Kichuk, O. Rubel, (2013). *Problems and Ways of Implementation of the EU Strategy for the Danube Region for Ukraine*. Journal of Danubian Studies and Research, 3 (1).