SECURITY TO SHIPS AND PORTS OF INLAND NAVIGATION

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1. *Safety,* *2. Terrorism,* *3. Protection,* *4. Waterways*

1. INTRODUCTION

International Maritime Organisation – IMO proposed measures for increasing the security protection of ships and Convention ships ports which are subject to provisions of the SOLAS Convention [11] [4] [9]. Measures for ships and ports designed for the security protection are regulated by the *International Ship and Port Facility Security Code – ISPS*. ISPS code has been adopted as supplementary to the SOLAS (*Safety of Life at Sea*) of 1974 and has become compulsory since 1st July 2004. It does not refer to war ships, government ships and non-commercial government ships. ISPS code is compulsory at ships in international voyages and refers to: passenger ships, fast passenger ships, cargo ships, fast cargo ships above 500 GT and mobile sea platforms [10].

In the last twenty years there has been a growth of traffic of containers, general and liquid cargo in inland waterways [1]. It is estimated that, the same as sea waterways, the areas of inland navigation are also threatened by terrorist attacks. It is assumed that the consequences may also be significant. However, IMO or other relevant international organisations have not yet proposed measures for security protection of ships and ports in inland navigation at rivers, lakes and channels which are used by Convention and Non-Convention inland and maritime navigation. Non-Convention ships are all other ships which are not subject to SOLAS Convention regulations, e.g.: fishing boats, yachts, boats, recreational boats and war ships [4]. In this paper the authors propose measures for security protection of inland waterways and of ships and ports in inland navigation.

2. NAVIGATION ALONG WORLD INLAND WATERWAYS

In the past, inland waterways were used only for the transport of bulk cargo [1]. In the last two centuries, containers, general and liquid cargo was also transported. Navigation density of world inland waterways may be estimated according to the statistical data for:

- Europe,
- USA, and
- Asia.

The number of ships in European inland navigation is over 12,500 ships, which equals to the capacity of, for instance, 440,000 trucks. The transport along inland waterways is more cost-effective in comparison to other kinds of traffic (Table 1) [1].

Table 1 Comparison of transportation costs of various means of transportation

TYPE OF TRANSPORTATION	***PRICE***
Road transport (ton/km)	35.00 €
Rail transport (ton/km)	15.00 €
Inland waterways transport (ton/km)	10.00 €

(Source: *Communication from the Commission on the Promotion of Inland Waterway Transport „NAIDES". (2006).* Commission of the European Communities, Brussels)

Inland navigation waterways in Europe are considered as a force of economical development. They have high rate of traffic safety which is higher than the road transport. The traffic along rivers, lakes and channels is highly increasing also due to the profitability of this type of traffic.

Developed European inland waterways are constantly increasing [3]. They are considered as an impetus of development and a possible traffic solution for continental transport. According to the INE classification (Inland Navigation Europe), European waterways are divided into four corridors: North – South corridor, the Rhine corridor, East – West corridor and South-eastern corridor. The flow of the Danube is included in the South-eastern corridor. The Rhine and South-eastern corridor are connected by the channel Rhine-Maine-Danube, thus creating a functional network of inland waterways which connect the west and the southeast of Europe. Large industrial centres, logistic-distribution centres and intermodal terminals are located within the zone [2]. Navigational waterways of Rhine/Meuse-Maine-Danube connect 10 countries with the North Sea and the Black Sea. This waterway is the mainstay of trade between the eastern and the western part of European Union. From economic and industrial aspect, the Rhone, the Seine and the Scheldt river basin are most developed in the northern European region. Over 60% of commercial traffic between EU and the rest of the world is done through this traffic route [12].

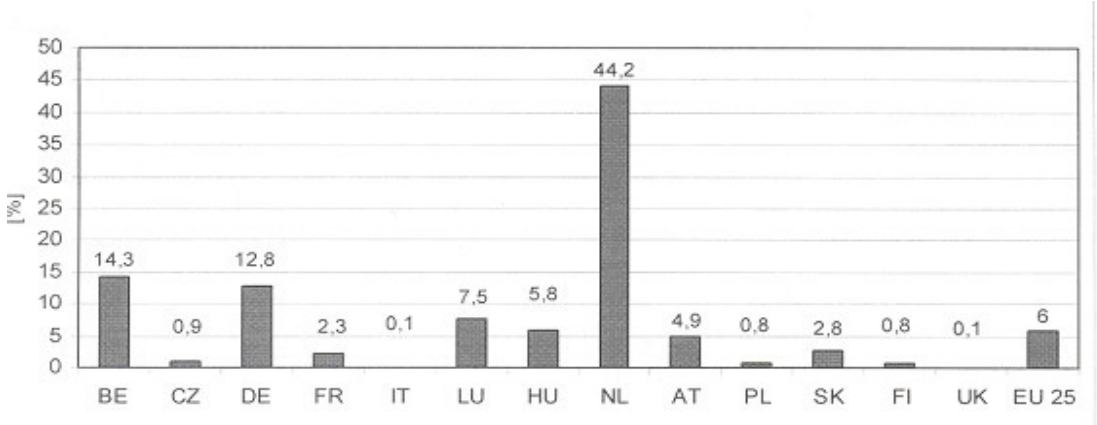

Figure 1 Distribution of international waterways transport (ton/km)

(Source: *Communication from the Commission on the Promotion of Inland Waterway Transport „NAIDES“,* (2006). Commission of the European Communities, Brussels)

According to the data, the highest profit from internal waterways transport has been achieved in the USA [11]. The USA has 41,000 km of inland waterways, consisting of coastal areas connected through rivers, lakes and channels to the inland areas. The majority of the system refers to the Mississippi river and its tributary rivers which connect large industrial cities and centres like Mobile, New Orleans, Houston, Corpus Christi, Baton Rouge with inland ports of Memphis, St. Louis, Chicago, Minneapolis, Cincinnati and Pittsburgh. In the north-western part the network of the river Columbia Snake enables the navigation to Lewiston, Idaho. Financial means for the development and maintenance of inland waterways are collected through fuel tax. Out of each gallon of fuel consumed in inland waterways traffic, 20-50 cents are invested in further modernisation and maintenance of waterways [11].

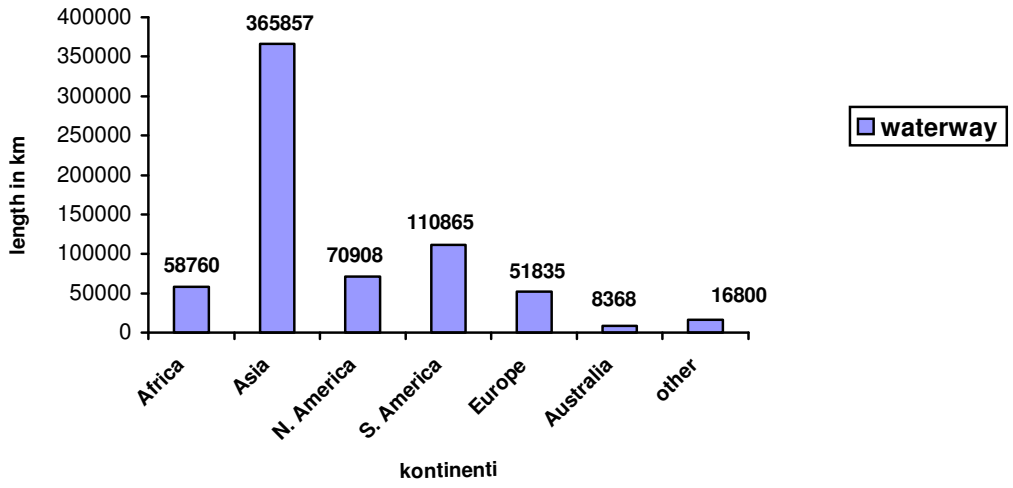

Figure 2 Distribution of inland waterways at continents

(Source: www.theodora.com)

Asia is a continent with a lot of rivers. Asian waterways are the rivers of Ayeyarwady, Ganges, Jamuna-Brahmaputra, Lancang-Mekong, Volga and Yangtze. They

contributed to fast development of the surrounding areas. Chinese inland waterways include approximately 119,000 km of 5,600 navigable rivers. The river Yangtze is navigable for about 58,000 km and allows for the navigation of the ships above 1,000 DWT. China has 2,000 inland waterway ports. It invests annually significant amount of money for extending channels and constructing water gates (e.g. 747 million US$ for the construction of 5 water gates). India uses only 37% of its waterways due to poor maintenance and variable hydrographic properties. The situation is similar in Indonesia and Bangladesh [10].

3. THREATS AND PROPOSAL OF PROTECTIVE MEASURES

Because of various kinds of threats in inland waterways navigation it is proposed to develop the ISPS code suited to such navigation. Therefore the working title of the document is proposed as *International Ship and Port Facility Security Code in Inland Waterways-ISPSIW*". Upon imposing the ISPSIW code for Convention and Non-Convention ships, it is proposed to divide it to basic levels:

1) Convention and Non-Convention inland navigation ships,
2) Organisation,
3) Ports, and
4) Other.

The first level refers to Convention and Non-Convention inland navigation ships. The main references of ISPS Code should be observed, but additional attention should be given to the issues relating to inland waterways. Navigation along dark sides of rivers and lakes, passages under bridges etc. are immediate hazard for forced entry of terrorists and explosives. It is, therefore, proposed to install *Automatic Identification System-AIS* and *Ship Security Alert System-SSAS*. The ships need to be adequately lit and areas of limited access

marked. It is also proposed to implement *Ship Security Plan-SSP* and appoint a *Ship Security Officer-SSO*. Military and public ships can be considered as well-protected ships. It is assumed that tourist ships, sport and recreation ships, ferries and fishing ships are not adequately equipped with navigational and protection equipment. It may also be assumed that the crew aboard such ships is not sufficiently trained for conducting those ships. Such ships are more frequent than Convention ships and are more difficult to control [5]. A proposal for the protection of Non-Convention ships in sea areas and nautical tourism ports should be considered [5]. There are differences in skills, required competences and state control which vary from country to country. It is, therefore, proposed the following: to standardise educational programmes for training crews of inland navigation ships and Non-Convention ships and to conform at international level official forms of various permissions and control system.

In the second level of ISPSIW Code development various forms of organisations, legal forms of the companies at inland waterways need to be determined. For instance, the majority of Non-Convention ships in inland navigation are sports and recreational ships. The owners of such ships are generally physical persons, but also legal persons. It is proposed to organise them into sports associations, companies, charter companies, various sports clubs, etc.

The third level refers to ports, shelters and winter harbours. Shelters and winter harbours are places suitable for accommodating ships, accommodation and dispatch of cargo and passengers. Ports and winter harbours are usually located in larger industrial centres and towns. They are protected from various hydrographic and climatic influences. River ports are most often the ports of large cities, situated by the cities or city centres. The security of such ports is important from the aspect of inhabitants and safety of navigation. The approach to ports from the coast is not controlled or is not controlled sufficiently. For instance, it is possible to enter a port in a smaller vessel without being controlled. Hence, the arrivals of

ships into ports have to be systematically announced, and the sojourn in the port, entrance and exit of people and cargo need to be constantly controlled. Like sea ports open for international traffic, inland traffic ports should have security standards as well. It is proposed to install the following equipment in inland waterways ports: port radars, AIS system, video surveillance, system for indirect detecting container content etc. It is proposed to train the teams for various forms of safety protection. It is also proposed to appoint a *Company Security Officer-CSO*.

The fourth level refers to the protection of other relevant elements, primarily to various control and management systems. Control and management of river navigation is not equally performed in various countries. Some countries do not keep adequate records about transit of ships, river navigation is done without announcement and without information about destination, kind of voyage and kind of cargo. The countries which have their jurisdiction over inland waterways should have a full control of the navigation. For instance, besides coast and port radars, *River Information System – RIS should be established.*

It may be concluded that inland navigation waterways positively affect the increasing development of economy in the fields of metallurgy, oil derivates refineries, power stations etc. Inland waterways navigation is constantly increasing. Inland waterways ports contain various infrastructure objects, like: terminals for oil, liquefied gas, chemicals, ore and various hazardous cargo. The approach to such ports is relatively easy, which additionally increases the risk factor and potential threats. Therefore, the system of protection in inland navigation waterways should be developed and implemented through international organisations, like *United Nations-UN* or IMO. It is assumed that the organisation and implementation procedure of ISPSIW is very complex. Hence, it is recommended to use the algorithm of ISPSIW development according to the suggested levels (Figure 4).

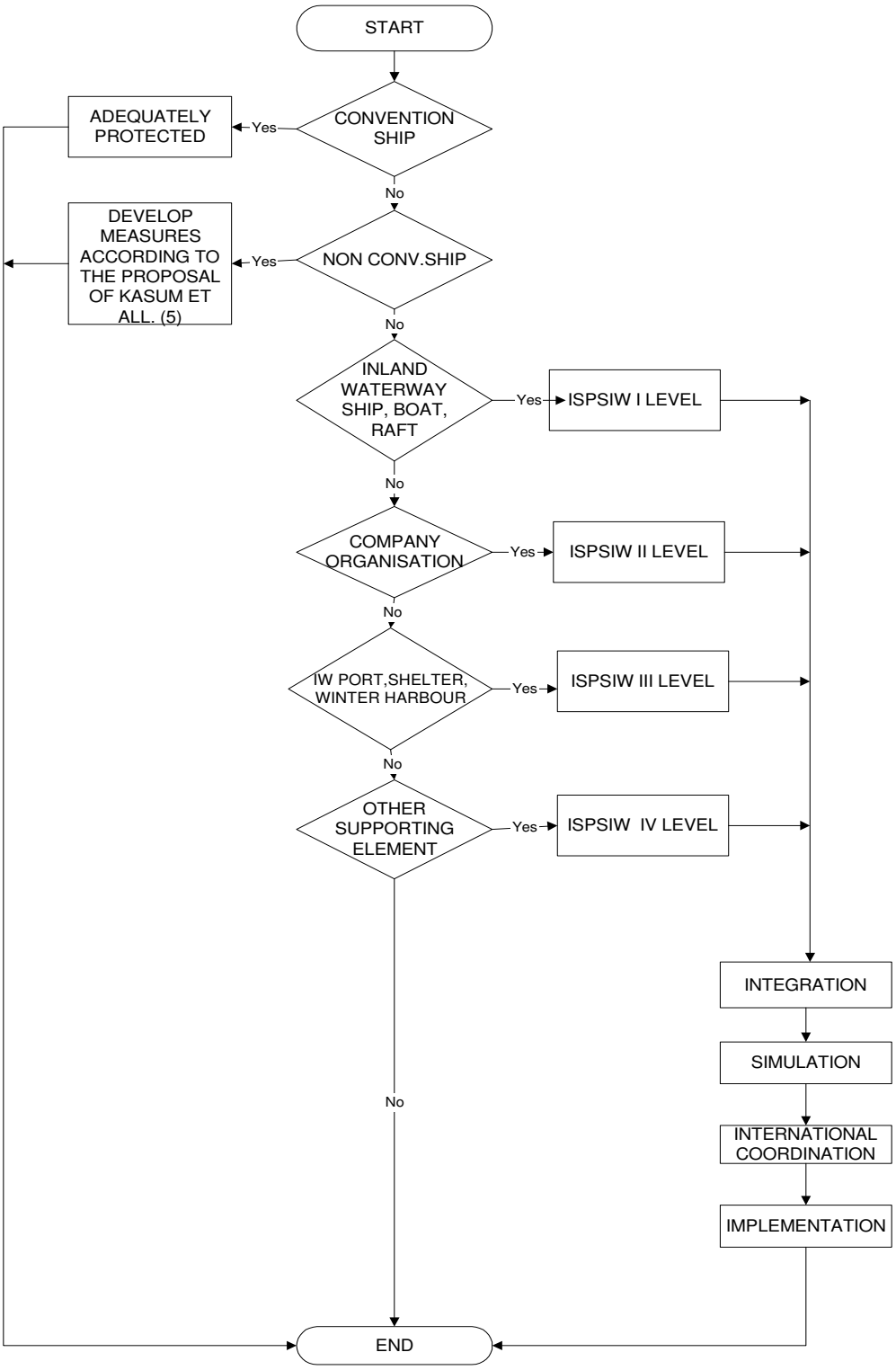

Figure 4 General algorithm of the development of ISPSIW

4. CONCLUSION

Inland waterways are being increasingly used in the world transport. They are considered to be the most profitable continental transport method. Low transportation price at inland navigation waterways has caused the rapid increase of traffic, development of new technologies in inland traffic and the development of industrial plants located along inland waterways. The technology of traffic in inland navigation waterways follows the technological development of maritime traffic, e.g.: containerisation, multimodal transport etc. However, it has to be noted that towns, ships, hazardous cargo and infrastructure objects of inland navigation waterways are exposed to various threats. It is, therefore, proposed to implement protection measures with the working title ISPSIW. It is expected that the implementation of measures would reduce the possibility of threats of lives and goods in inland navigation waterways. Such set of measures should be developed according to the algorithm (Figure 4), sponsored by international organisations.

REFERENCES:

[1] Communication from the Commission on the Promotion of Inland Waterway Transport „NAIDES“, Commission of the European Communities, (2006), Brussels, 12-13, Available at: http://ec.europa.eu/transport/iw/doc/2006_01_17_naiades_staff_working_en.pdf, accessed on 11 February 2008

[2] **Jolić, N.** : *Luke i ITS*. Fakultet prometnih znanosti. Zagreb, Croatia, 2006

[3] **Kasum, J.** : Updating Sea Charts and Navigational Publications, The Journal of Navigation, **56,** 497-507.

[4] **Kasum, J., et all**: Application of Internet for automatic reambulation. *Proceedings of the IEEE-MELECON,* Dubrovnik, 2004

[5] **Kasum, J., Marusic, E., Grzetic Z.**: Security of Non-Convention ships and Nautical Tourism Ports. *Proceedings of the TIEMS*, Seoul, S. Korea, 2006

[6] **Kasum, J., Vidan P., Baljak K.**: Act About Safety Protection of Merchant Ships and Ports Open to International Traffic and its Implementation. Proceedings of the ICTS, Portoroz, Slowenia, 2006

[7] **Kasum,J., Vidan, P., Baljak K.**: Navigation along the Adriatic Coastal Area, Proceedings of the POWA, Vukovar, Croatia, 2007

[8] *www.CorpsResults.us*

[9] *www.dpc.belgrade.co.yu.project_mutand.htm*

[10] *www.imo.org*

[11] *www.theodora.com*

[12] *www.2.mvr.usace.army.mil*