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Transactions on Maritime Science (ToMS) is a scientific journal with international peer review which publishes scientific papers in the following areas:

~ Marine Engineering,
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~ Transportation and Modes of Transport,
~ Marine Information Systems,
~ Maritime Law,
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The views and opinions expressed in the papers are those of individual authors, and not necessarily those of the ToMS editors. Therefore, each author will take responsibility for his or her contribution as presented in the paper.

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Contents

From Editor-in-Chief

Ivica Kuzmanić

Dear Readers,

You have before you the ninth issue of the internationally reviewed scientific journal *Transactions on Maritime Science*. It is published by the Faculty of Maritime Studies of the University of Split. The Journal is published in both printed and electronic, open access form. Our desire is for our readers to have an easy access at minimum expense.

This issue brings you papers from several scientific areas. In the first paper, which I find rather interesting, an advanced model of guidance to available parking spaces using a cooperative approach is proposed. The simulation model, presenting the advantages of this system compared to the classical approach, which is also highlighted in the paper, is developed. The second paper, pertaining to the same scientific field, deals with the analysis of dynamics of a traffic accident involving two vehicles and having happened at the traffic-lights crossroads in the afternoon hours, when the traffic lights at the crossroads were functioning according to the programmed system and in the second programme mode. In analysing all the possible variants of the participants'motions through the traffic-lights crossroads, the 3D display was also used. The value of energy equivalent speed represents the starting parameter for calculation of the vehicle's speed in the instant of collision.

The third paper summarises the legislative framework and the available technologies for ballast water treatment with regard to the approval process and relevant issues. An increased manufacturer interest in the system's approval or development of new technologies is not expected in the future because the procedure is both time-consuming and expensive.

In the next paper the results of a maritime sector labour market research, conducted to identify key tasks, specific knowledge and skills required for the development of appropriate occupational standards in the field of maritime management, are represented.

In their paper the authors Tomislav Skračić and Petar Kosović discuss the linguistic characteristics of yachting slogans, as well as short messages advertising sail and power boats, boating equipment and services in nautical magazines. The qualitative analysis has enabled a familiarisation with the principles of creating advertising slogans in yachting and their most prominent strengths and weaknesses.

The last two papers pertain to the field of maritime law. The authors of the first paper consider the purpose of their article to be the establishment of a concept of the bareboat charter registry and drawing attention to a few significant international conventions governing certain aspects of the bareboat charter registry. In the second paper the authors explore the role of maritime law in seafarer training pursuant to amendments to the STCW Convention of 2010, which entered into force and effect on 1st January 2012. Member states are required to complete the procedure of a gradual implementation of the new provisions by 31st December 2016, with all seafarers being required to obtain certificates issued in accordance with the amended regulations by 1st January 2017.

The "Contribution" section brings you the news from the International Maritime Organisation from London, reported by our associate Tatjana Krilić. All the news from the past six months has been brought.

In the "Maritime heritage" section we have prepared a new contribution by a renowned journalist and publicist Marijan Žuvić entitled "Story of the biggest shipping company in the Adriatic – Jugolinija – The myth and the truth".

You will also find news from different maritime branches.

We have also remained faithful to another area we wish to promote: the Croatian cultural heritage. Again a poem, this time written by Ana Ivelja, born in Lastovo on the eponymous island, has been chosen. She has dedicated her entire poetic oeuvre to her native island, as well as the sorrowful but glorious history of Croatia, her homeland. The poem hereby translated has been retrieved from the collection entitled "Lira Lastova" ("The Lyre of Lastovo"). The afore-mentioned collection, together with "Hrvatska lira" ("The Croatian Lyre") and "Lira" ("The Lyre"), constitutes the edition appropriately entitled "Hrvatska lira", a testimony to her artistic dedication to her Homeland, expressed in the musicality of her verses. This contribution is presented in a bilingual form with the striking translation by Mirna Čudić.

We always remain in the hope that the papers we publish will encourage your cooperation.

Cooperative Model for Idle Traffic Optimisation

Hrvoje Baričević, Jasmin Ćelić, Siniša Vilke

The growth trend and the trend of population migration into city centres, as well as the continuous increase in the number of motor vehicles cause traffic jams and congestions in most major cities in the world. In order to eliminate the problems caused by the circling in search of available parking space, i.e. by the congestion, different methods and approaches are implemented. First of all, these are the appropriate strategies and policies that are made in order to regulate the existing situation and to demotivate the arrival of part of the population in the city centre, which does not represent a necessity. Another way to eliminate the above problem, which is the most emphasized in this paper, is represented by the intelligent parking systems. Intelligent parking systems are used to guide the driver to the available parking space and to provide information on the characteristics of it. Normally, they are also used for parking reservation and payment, but in most cases they were related exclusively to closed parking lots and garages. With the technological progress and the development of intelligent sensors it has become possible even to control street parking spaces, which is especially emphasized in this paper. Also, an advanced model of guidance to available parking spaces using a cooperative approach is proposed. The simulation model presenting the advantages of this system compared to the classical approach, which are also highlighted in this paper, is developed.

KEY WORDS

~ Intelligent Transportation Systems (ITS)
~ Cooperative approach
~ Advanced Transport Information Systems
~ Guidance and Navigation Systems
~ Routes searching
~ Parking lots in ports

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1. INTRODUCTION

The development of urban centres and the increasing number of vehicles on the roads around the world, and increasing demand for parking spaces in city centres seriously affects the quality of traffic. Searching for free parking places increases the traffic volume which cannot be adequately met by the existing capacity of the transport network. This problem is particularly expressed in large harbours, especially during the tourist season (Baričević, 2001). Consequently, this may affect traffic congestion and thus reduce the demand for travel in the desired area. Elasticity, as one of the characteristics of this approach for resolving city centre congestion, enables precise alignment to the target group of users in relation to space and time. The main goal of the system for information and referral to the parking spaces (Parking Guidance and Information, PGI) is to reduce traffic caused by searching for a suitable free parking space in city centres and large parking area (Krpan et al., 2007). At the entrances and exits of the parking lots or on individual parking spaces sensors or devices for counting vehicles to allow the collection of data on the number of occupied parking spaces are usually installed. Sensors used for this purpose are usually induction loops, infrared, ultrasound and magnetic sensors (Zhou and Li, 2014), laser technology, etc. The development of information and communication technologies and continued efforts to reduce the dimensions of electronic components and circuits enabled the installation of a microcontroller, a wireless transceiver and a power supply, together with certain sensor, in the traffic infrastructure (Jeffrey et al., 2012; Ji et al., 2014; Geng and Cassandras, 2012). These intelligent sensors provide partially or fully processed information to its users in the form of messages which usually, amongst the other data, contain the position of available parking spaces and information about possible transport routes to the same, and may provide other

useful information such as zones, total number of available parking spaces in the parking lot, cost of parking and etc. All of this technology does not provide any guarantee that intelligent parking system will work efficiently in all possible conditions (Zanella et al., 2014).

2. APPLICATION OF ITS FOR LOCATING VEHICLES AND NAVIGATION

One of the basic requirements for quality performance of intelligent parking systems, especially in terms of on-street parking, is the information about the vehicle position. Automatic Vehicle Location (Automatic Vehicle Location, AVL) is a range of technologies that include technology positioning, mapping and communications. AVL technology is rarely used as a standalone application, but is an integral part of many ITS services such as route guides, transit passenger information, fleet management of commercial vehicles, computer-assisted forwarding, congestion detection and return of stolen vehicles. The basic components of the AVL and navigation technologies are:

- location technology and positioning systems,
- maps,
- geographic Information Systems (GIS) and map-matching,
- route guidance and detecting route
- display and distribution of information.

A special approach for determining the position is in the use of mobile devices (Figure 1). The main advantage of this approach is the ability to use the existing infrastructure, which significantly reduces the costs of the establishment of such services. Mobile telephony has already allocated frequency band and a large user base that is required to support such an idea.

Figure 1.
Navigation system NAVIGON on connecting mobile devices.

For the purpose of positioning and navigation different charts are used, usually raster or vector maps. Raster maps are basically images that are suitable for showing details such as height differences using topographical indications. Vector maps are drawings made up of points, lines and polygons stored in the database in the form of x and y coordinates. Vector maps show much less graphic details from the raster map. Raster maps have a number of disadvantages which are, regardless of their benefits, almost useless in most AVL applications. They require far more memory than vector maps; they need much more time for rendering on the device display; and are fixed relative to the orientation because when turned text will rotate and going to be showed upside. Also, regardless of the increase or decrease in the chart it will show the same level of detail, and the parts of the text may become completely illegible.

3. ADVANCED MODEL REFERENCES AVAILABLE ON THE VEHICLE PARKING SPACES

Simulators of traffic are an essential tool for the study and research of traffic. Microsimulation software solutions are able to model the movement of individual vehicles traveling a predetermined road network. Mathematical models are essentially an integral part of simulators, and provide a realistic view of the behaviour of drivers in the road network. Unlike deterministic models, stochastic approach and better resolution of microscopic simulation software solutions provide a better view of the behaviour of drivers and vehicles in the transport network, especially when it comes to complex traffic problems such as the impact of incidents or parking on the traffic entirely. Models of road traffic basically consist of transported entities, road vehicles and the road network. Each of these factors is distinguished by specific characteristics that should be determined as part of the simulation model in order to achieve realistic conditions in which the proposed advanced system should operate. For the purpose of this study a conceptual model of the system that refers to available parking spaces by using a cooperative approach has been made. The proposed system is in contrast to similar existing solutions based primarily on cooperation between on-board unit (OBU) and roadside unit (RSU). The data provided by the Advanced Traveller Information Systems (ATIS) is used only in cases where it is necessary (no vehicles in the communication range, there is no need for historical data, etc.), in order to achieve effective information sharing. Information from the sensors, which are part of the transport infrastructure, are processed on the spot using a microcontroller and forwarded directly to the system in a nearby vehicle, which then forwards the information to other vehicles in the series until it finds a person of interest. So, sensors of the road unit and the vehicle have a direct ability to process the data and sort of intelligence to be considered as microcomputer units. A vehicle equipped with the appropriate equipment on the arrival in the area of communication range of RSU starts receiving the available information and transfers them to other vehicles around it. At the same time this information, depending on the communication capabilities, forwards itself to

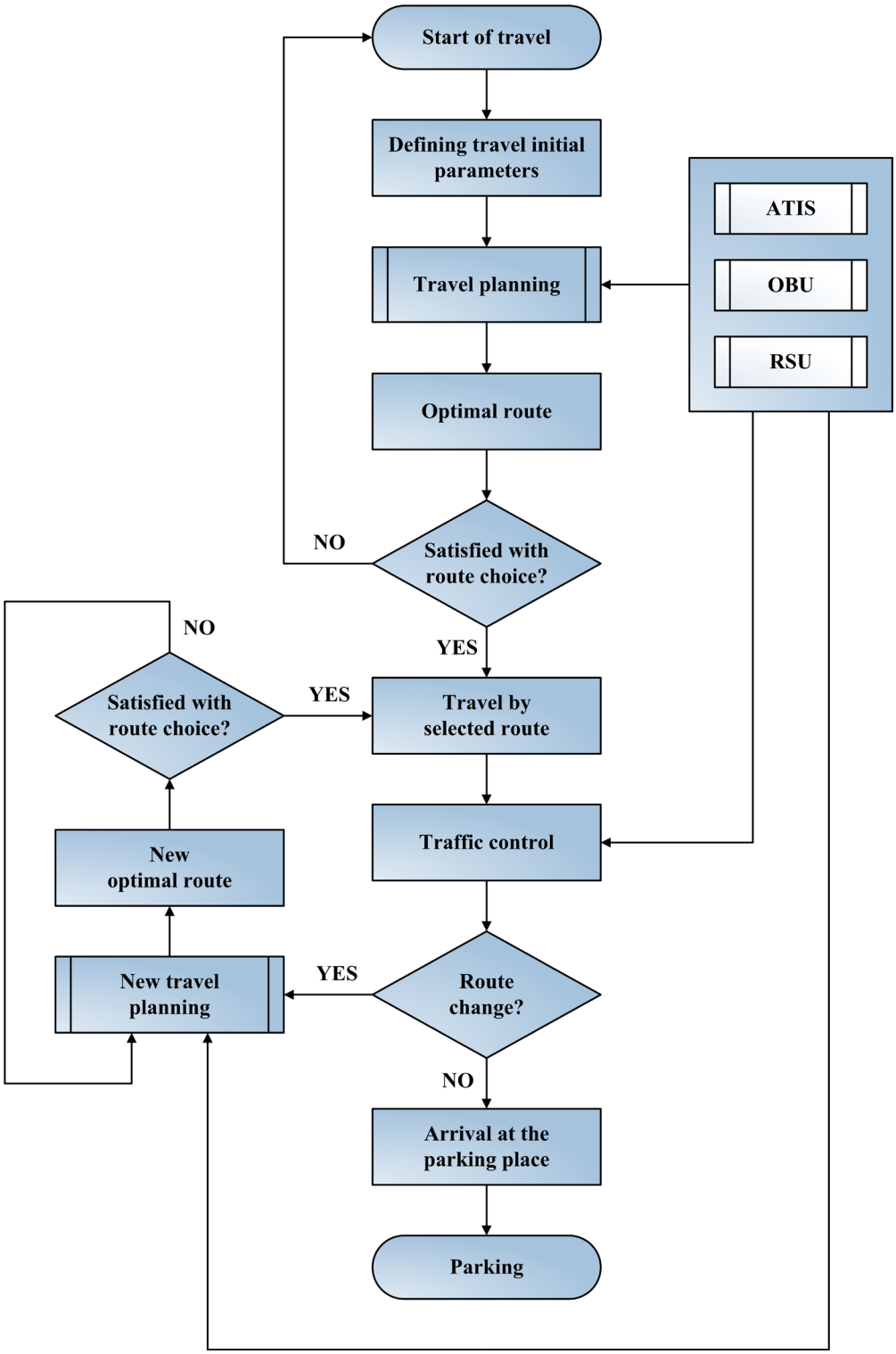

Figure 2.
Flowchart travel, search of available parking space and parking with a cooperative approach.

the ATIS. Based on the above cooperation between vehicles and RSU the information about the availability of parking spaces is transferred. When entering the street or arriving in the port zone where the parking spaces are, vehicles know in advance where to park, thus reducing the need for unnecessary circling in search of available parking space.

3.1. The Calculation of Travel Time and Total Cost

Traffic situation and thus travel times are changing during the period that takes time to assign the parking lot. The total simulation time is divided into smaller intervals to easily evaluate considered travel time. It should not be less than 5 minutes and no more than half the time interval set by the origin-destination (OD) matrix. During the simulation process the travel time for each edge of the network (time between two nodes) is measured separately. Every vehicle after leaving a certain edge reports about time spent, and then calculates the average of all travel time spent at the edge which then presents the resulting travel time. Special attention is given to vehicles that are retained on an edge longer than the duration of the evaluation period because it is a sign of the presence of congestion. This is the report about duration of outages. The measured travel time is not used for the purposes of search and selection of route in the same iteration, but its influence on the next one.

The development of models and simulations was achieved by the usage of the software solution named VISSIM. Namely, simulation program VISSIM allows the use of not only the travel time from the iterations that immediately preceded the current but also all other early iterations, in two ways (PTV VISSIM 6 User Manual, 2014):

1. Exponential smoothing - the user determines the smoothing factor that calculates the impact of previous iterations so that the oldest iteration have the least impact,
2. Method of Successive Averages (MSA) - calculates the arithmetic medium of all iterations, and on the basis that determines the weight factor. The higher the number of iterations that are considered in analysis, the less the influence of each next iteration.

Smoothed travel time is calculated as s result from the set of values, as a weighted sum of the old iteration and current iteration. The results of smoothed value represent travel time which is expected in the next iteration. Travel time for particular edge measured in the time interval of the one iteration is exponentially smoothed before making a decision about selection of the route, in a following way (Barcelo, 2010):

$$T_a^{n,K} = (1 - \alpha) \cdot T_a^{n-1,K} + \alpha \cdot TO_a^{n,K} \quad (1)$$

significance:
K - index of evaluation intervals during the period of simulation,
n - index of iteration allocation
a - edge index
$TO_a^{n,K}$ -measured travel time on the edge a for period k in iteration n
$T_a^{n,K}$ - expected travel time on the edge of a for period k in iteration n
α - smoothing factor.

Estimated travel time using MSA is calculated as follows:

$$T_i^{n,K} = \left(1 - \frac{1}{N+n}\right) \cdot T_i^{n-1,K} + \frac{1}{N+n} \cdot TO_i^{n,K} \quad (2)$$

meaning:
N - user-determined value,
K - index of evaluation of the intervals during the simulation
n - index of iteration allocation
i - edge index
$TO_i^{n,K}$ - measured travel time on the edge i for a period k in the iteration n,
$T_i^{n,K}$ - expected travel time on the edge i and for the period k in the iteration n,
$\frac{1}{n+N}$ - variable factor that depends on smoothing parameter N and iteration allocation.

Travel time is not the only factor for influencing the choice of route. The function of general costs is a linear combination of travel time, travel length and the finances, such as toll payment. Unlike the time needed to travel these factors are independent of the traffic situation and are not determined for the simulation. Components of the cost can be determined separately for each class of vehicle that the user had generated earlier. According to these three factors, the overall cost C for each edge is calculated as a weighted sum of:

$$C = \alpha \cdot t + \beta \cdot s + \gamma \cdot C_f + \sum C_{n2} \quad (3)$$

meaning:
α, β, γ – Factors which may, if necessary, determine the different behaviour of the driver in the choice of routes,
s – determined by the geometry of the link,
C_f – sum of all costs of links that form an edge. Cost of the link is the product
of its length in kilometres and the cost per kilometre length specified in its parameters.

This cost includes the value of the parameter surcharge 1
C_{n2} –additional cost link (surcharge 2) that is not loaded with factor *Y*.

3.2. Search and Selection of Suitable Routes

The route is a series of edges which describes the path through the network. Routes begin and end at the parking spaces. The general cost of the route is determined by the overall cost of its all edges (PTV VISSIM 6 User Manual, 2014):

$$C_R = \sum_{a \in R} C_a \tag{4}$$

meaning:
C – general costs,
R – route.

Between the starting point and the parking lot, there is usually more than one possible path, so simulation program VISSIM's model is used to help the driver in his choice of route. Within the dynamic assignment of VISSIM, it weights the number of available routes and carries out the selection. Route selection is a special case of discrete choice because the probability of selection of alternatives must be calculated for a given set of discrete alternatives. Using the dynamic assignment the set of available routes can be displayed within origin-destination set. There is no efficient algorithm in finding the best of several routes, but there is a possibility of finding the right one (Van der Waerden, 2012). For every OD pair in dynamic iteration the best route is required, which solves the afore mentioned problem, because traffic situations change travel time from iteration to iteration until the certain criteria is satisfied. This will be a way to find a different "best" route that VISSIM will save to a file with .weg extension so that they could be available for future iterations.

The criterion for the selection of the best routes is general expense. Due to the fact that the weighting coefficient overheads depend on vehicle type, different types of paths will be selected for different types of vehicles. In the first iteration, there is no travel time information from previous iterations and, therefore, instead of using the length of travel time, the length of the route in meters is used. A set of known ways will be used more if drivers are somehow encouraged to try new routes. For that purpose, the following iterations of edges, on which the vehicle did not pass, fictitious travel time of 0.1 second will be added in order to increase their attractiveness during searching for a route. However, this process can lead to useless routes joining the group which is generated. Useless routes are those routes that replace any existing route of the known route, with link of much greater length, and they are considered obvious detours. The length of a series link that will be qualified as a bypass is determined by the user. With dynamic assignment drivers are choosing the route at the time of leaving the source parking lot. One of the basic assumptions when choosing the route in VISSIM is that not all drivers use the best route, but will use all known pathways in a way that the larger share of the traffic will be distributed in better way. Quality of route is evaluated by overheads, which are contrary to the utility, which is part of the theory of discrete decision. Therefore, utility is determined as the reciprocal of overheads (PTV VISSIM 6 User Manual, 2014):

$$U_j = \frac{1}{C_j} \tag{5}$$

meaning:
U_j - usefulness of travel time *j*,
C_j - overheads of travel time *j*.

A - function that is most often used for choice of routes is Logit function (Ben-Akiva et al., 1984):

$$p(R_j) = \frac{e^{\mu U_j}}{\sum e^{\mu U_j}} \tag{6}$$

meaning:
U_j – usefulness of route *j*,
p (R_j) – probability of selected route *j*,
μ – parameter of model sensitivity (>0).

A small value of the parameter sensitivity will result with distribution without larger influence of the utility while the greater value will result in fact that almost every driver will choose the best route. If the Logit function, which is translational irreversible, is applied with the previously mentioned cost function, the model will be assigned the same importance with smaller differences between travel time for smaller values as with the relatively large (e.g. a lot of significant differences in the travel times between 11 and 8 minutes will be identified with almost negligible difference trips of 116 and 113 minutes). In order to approximate the actual assessment and distribute traffic demand to all known routes as OD pairs, VISSIM uses Kirchhoff distribution formula (PTV VISSIM 6 User Manual, 2014):

$$p(R_j) = \frac{U^k_j}{\sum_i U^k_i} \quad (7)$$

meaning:
U_j – usefulness of route j,
$p(R_j)$ – probability of choosing the route j,
k – parameter of model.

In this form of the utility the distribution ratio is determined, and it does not represent the absolute difference utility. This means that in the above mentioned case there will be little difference in the allocation of traffic for the paths whose travel times are 116 and 113 minutes, but it will take a lot more traffic to the path whose travel time is 8 minutes compared to the path whose travel time lasts 11 minutes. Kirchhoff distribution formula can be expressed with Logit function if the utility function is displayed in the logarithmic form:

$$p(R_j) = \frac{U^k_j}{\sum_i U^k_i} = \frac{e^{k \cdot \log U_j}}{\sum_i e^{k \cdot \log U_j}} = \frac{e^{-k \cdot \log C_j}}{\sum_i e^{-k \cdot \log C_j}} \quad (8)$$

where C_j is overall cost of the route j.

For the deviation distribution in overlapping route VISSIM offers expansion of route model with factor identity. Based on the current situation in the simulation model and pre-set criteria the parking space for vehicles entering the modelled transport network is dynamically determined. In the case where one of the vehicle without route guidance (RG) occupies a parking place designated for the vehicle with the RG, RG vehicle will select new available parking space and calculate the appropriate route to the same using the same algorithms as in the time of entry into the transportation network simulation model.

4. CONCLUSION

Intelligent parking system includes various subsystems, and thus in its implementation inevitably include knowledge from the domain of ITS. Cooperative approach offers quick access to information for users, where information is given as needed without necessarily direct contact with advanced information systems. Vehicles and sensors in the infrastructure, which now actually represent a sort of microcomputers, are able to analyse and process information and forward them to each other for the purpose of better management. This resulted in the proposition of the advanced model of the system using cooperative approach, with the emphasis on the synergistic effect of the optimal route selection and the corresponding available parking space. The proposed advanced system model which refers to the available parking spaces should also encourage the creation of new strategies and policies for parking, which would reduce the costs for city authorities, entrepreneurs and business companies, developers and users, and improve the quality of parking services and achieve substantial benefits for the whole community. It should speed up the process of development of future systems that use similar technology and provide appropriate information to traffic engineers, designers and planners for finding a parking lot and become a solid support for the development of intelligent cities. This is of particular interest in tourist destinations (passenger harbours) in Croatia, where there is an evident peak traffic demand in the time of tourist season.

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Analysis of Traffic Accident Dynamics at Semaphored Crossroads – a Case Study

Tatjana Stanivuk[a], Mimo Drašković[b], Neven Kralj[c]

The paper deals with the analysis of dynamics of a traffic accident involving two vehicles and having happened at the semaphored crossroads in the afternoon hours i.e. when the traffic lights at the crossroads were functioning according to the programmed system and on the second programme. To prove the causes of the traffic accident, in analysing all the possible variants of the participants' motions through the semaphored crossroads, the 3D display was also used. The value of EES (Energy Equivalent Speed) represents the starting parameter for calculation of vehicle's speed in the instant of crash. Since the dynamics, or better to say motion of the participants in the traffic accident depends on properly working traffic lights, it is of great importance to present the work schedule of the traffic lights of the mentioned intersection, before we analyse the traffic accident itself. The control of all the results gained was carried out using computer programme package PC Crash 9.0 to simulate the crash. Great attention was also paid to the time intervals of vehicles' motions. Also, the possibility of having avoided the accident in question was analysed.

KEY WORDS
~ Dynamics of traffic accident
~ Vehicles
~ Crash simulation
~ Time intervals

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1. INTRODUCTION

The framework of this paper is the analyses of the true facts gathered and noted at the sight of this severe traffic accident. The participants of the accident are two vehicles that crashed at the mentioned intersection equipped with traffic lights.

The traffic accident in question happened at the right angle crossroads of three streets, which in the following text will be referred to as: street X, street Y and street Z, and at which the traffic is regulated with the use of semaphore.

The eastern traffic lane, on the southern direction of the crossroads, along which the vehicle A was moving, has the total width of 9.40 m and is divided into three traffic lanes. The vehicle A was moving along the left traffic lane which is used for the movement of vehicles turning left.

The western traffic lane on the southern direction of the crossroads is intended for the movement of vehicles from the opposite direction and is also divided into three traffic lanes.

The western traffic lane of the street Z is divided into three traffic lanes. The right traffic lane, along which the vehicle B was moving, is intended for the movement of vehicles maintaining the direction of movement or for vehicles turning right; the central lane is intended for vehicles which at the crossroads maintain the direction of movement, while the left lane is for the vehicles turning left at the crossroads.

At the moment of occurrence of the traffic accident the semaphores at the crossroads were functioning according to, i.e. when the traffic lights at the intersection are programmed for working during the afternoon hours.

2. POSITION, TRACES AND DAMAGES TO VEHICLES FOUND ON THE ROADWAY

The northern part of the object on the eastern side of the roadway of the street Z is considered as the fixed point of measurement (in further text: FPM), while the perpendicular drawn from FPM onto the western edge of the roadway is considered to be the initial point of measurement (in further text: IPM).

From IPM at 32.80 m start the traces of vehicle B's braking. The right hand side braking trace is distant from the western edge of the roadway by 0.7 m, and extends linearly up to 52.30 m from IPM, at 0.20 m east of the imaginary line of the western edge of the roadway in street Z.

From IPM 52.30 m, at the end of the right braking trace, chips were found on the roadway (point of vehicles' crash).

From IPM 51.60 m, and 1.0 m to the east the front right part of the vehicle B was found. The rear part was 52.40 m distant, the front left part 53.10 m and 0.40 m to the east. The vehicle B is turned around with the front part toward north-west.

From IPM 48.30 m at the western part of the crossroads in the street Y, 5.20 m to the west from the imaginary line of the western roadway lane of the street Z the front right part of the vehicle A was found, while the rear right part was 50.0 m distant and 9.15 m to the west.

From IPM 46.80 m and 9.0 m to the west, the front left part of the vehicle A was found, and the same vehicle was turned around its front part to the east.

The traces left by the tires of vehicle A are visible at the top of the street island dividing the roadway of the street Y, as well as the arch trace of drifting by the rear wheels of the vehicle A, with the length of 2.80 m, while the top of the above mentioned island is to the west of the imaginary line of the street Z at the distance of 7.90 m. Around the point of crash traces are visible of chips originating from both vehicles (Baker et al., 1990; Čović and Zečević, 1987; Rotim, 1989; Rotim, 1992).

2.1. Damages Suffered by Vehicle A

The damage concentration on the vehicle A is found at the right side of the vehicle (Figures 1 and 2) where the following parts suffered damage: front right door, rear right door, boarding step - right, right threshold, internal part of the right threshold, boarding of the passenger cabin – in the right part, pillar – central right and tire – rear right.

Figure 1.
Damages to vehicle A.

Figure 2.
Damages to the right pillar and threshold of vehicle A.

2.2. Damages Suffered by Vehicle B

The damage concentration on vehicle B was found at the front part of the vehicle, mainly to the right (Figures 3 and 4), where the following parts were found damaged: the front bumper, front right reflector, grill, front lid, front panel, front right wheel casing, front right wheel was pushed to the front right pillar, crack in the windshield in the upper left corner in front of the driver's position, the steering wheel bent to the right while the vehicle's armature was displaced of the base, damage to the central part of the roof indicating deformation of the vehicle body, etc.

Figure 3.
Damages to vehicle B.

Figure 4.
Damages to vehicle B's interior.

3. PLACE OF CRASH

In the relative traffic accident the front part of the vehicle B ran into the right side of the vehicle A.

The crash of the private vehicles will be determined as angular where, taking into consideration the longitudinal axes at the moment of crash, they made the angle of approximately 135°. The exact place of crash is at the crossroads, in the extension of the western roadway and western traffic lane of the street Y, at the distance of 49.00 m from PTM to the south and 7.0 m from the edge of the central island dividing the two roadway lanes of the street Y, also in the southern direction.

The place of the crash was determined by the end of the braking traces produced by the front wheels of the vehicle B and the traces imprinted into the roadway as well as the stopped position of the vehicle B (Coyle, 2008).

Figure 5.
Position of vehicles at the moment of crash.

4. SPEEDS AND TIME INTERVALS OF VEHICLES' MOVEMENTS

4.1. Speeds of Vehicle A and B Movements Using Energy Method

The speed of the vehicles from the place of the crash to the final stopped position is calculated using the following formulae:

$$k_r = \frac{r_i}{L} \tag{1}$$

where:
r_i - radius of rotation [m],
L - distance between axles [m],
k_r - rotation coefficient;

$$\omega = \sqrt{\frac{a \cdot \varphi^2}{\varphi \cdot k_r(1\text{-}D_k) + \frac{s}{1.7}}} \tag{2}$$

$$v_t = 1.7 \cdot \left[\frac{a \cdot \varphi}{\omega} - k_r \cdot \omega \cdot (1\text{-}D_k)\right] \tag{3}$$

where:
a - average deceleration obtained [m/s^2],
φ - vehicle angular motion [rad],
k_r - rotation coefficient,
D_k - coefficient of deceleration force distribution,
s - distance between vehicle's points of gravity in the crash and final positions [m],
ω - angular speed [s^{-1}],
v_t - speed immediately following the crash [m/s] or [km/h].

By inserting the data obtained by measurements in the previously mentioned formulae the following results are obtained:
- From the point of crash to the final stopped position the vehicle A, whose distance between axles (L) is 2.40 m, was moving strongly rotating in the radius of (r_i) 1.57 m, and reached the rotation coefficient of $k_r = 0.65$.
In doing so the vehicle's point of gravity made a longitudinal displacement (s) of 7.5 m, and an angular displacement (φ) of 125° i.e. 2.18 work, in which the realistic deceleration (a) was 5.5 m/s^2 i.e. D_k is 0.55, and the angular velocity was $\omega = 2.28$ s^{-1}.
Thus, the speed of vehicle A immediately after the crash was:

$$v_{t(A)} = 7.81\ m/s \approx 28.12\ km/h$$

- From the point of crash to the final stopped position the vehicle B, whose distance between axles (L) is 2.30 m, was moving with a significant rotation in the radius of (r_i) 1.35 m, and reached the rotation coefficient $k_r = 0.59$.
In doing so the vehicle's point of gravity made a longitudinal displacement (s) of 3.6 m, and angular displacement (φ) of 102° i.e. 1.78 work, in which the realistic deceleration (a) was 5 m/s^2 i.e. D_k was 0.50, and the angular velocity was $\omega = 2{,}45$ s^{-1}.
Thus, the speed of the vehicle B immediately following the crash was:

$$v_{t(B)} = 4.95\ m/s \approx 17.82\ km/h$$

On the basis of damages that the relative vehicles A and B suffered in the crash (Rotim, 1989; Rotim, 1992), and by comparison with Equivalent Energy Speed – EES catalogue (vehicle damage database), the following EES values are stated:

EES for A ~ 8.33 m/s or 30 km/h
EES for B ~ 12.50 m/s or 45 km/h

From the above mentioned the total deformation work in the crash (W) follows:

$$W = \frac{m_A \cdot EES^2{}_A}{2} + \frac{m_B \cdot EES^2{}_B}{2} \tag{4}$$

where mA = 2,300 kg and mB = 875 kg represent the masses of the vehicle A and vehicle B, so that

$$W = 148{,}156.61\ [Nm]$$

The relative speed of the crash was approximately:

$$v_{rel} = \sqrt{2 \cdot \frac{m_A + m_B}{m_A \cdot m_B \cdot (1 - D_K)} \cdot W} = 22.18\ m/s \approx 79.86\ km/h \tag{5}$$

The changes in the speed of the vehicle A(Δv_A) and the vehicle B(Δv_B) amounted about:

$$\Delta v_A = \frac{m_B}{m_A + m_B} \cdot (1 - D_K) \cdot v_{rel} = 5.81\ m/s \approx 20.91\ km/h \tag{6}$$

$$\Delta v_B = \frac{m_A}{m_A + m_B} \cdot (1 - D_K) \cdot v_{rel} = 15.26\ m/s \approx 54.95\ km/h \tag{7}$$

From the above mentioned it follows that at the moment of crash the vehicle A had the moving speed of approximately:

$$v_A = \Delta v_A + \Delta v_{t(A)} = 13.62\ m/s \approx 49.03\ km/h \tag{8}$$

and the vehicle B approximately:

$$v_B = \Delta v_B + \Delta v_{t(B)} = 10.31\ m/s \approx 37.12\ km/h \tag{9}$$

Since at the roadway immediately before the point of crash there are no noticeable traces of braking or drifting by the vehicle A, then the moving speed of the vehicle A immediately preceding the crash as well as the speed in the course of crash were approximately:

$$v_A = 13.62\ m/s \approx 49.03\ km/h$$

The vehicle B, immediately prior to the crash, was moving in the phase of intensive braking in the length of $s^B = 19.5$ m and in doing so, taking into consideration the conditions on the roadway, it could reach deceleration of $a_{max} = 7.00$ m/s^2. Providing that onto the neutralized speed on the above mentioned braking path the speed in the crash is added, v = 10.31 m/s, se the speed of the vehicle B's motion at the moment of the driver's reaction to the brake will be obtained, and it is approximately:

$$v_{B_{new}} = \sqrt{2 \cdot a_{max} \cdot s_B + v^2{}_B} = 19.48\ m/s \approx 70.11\ km/h \tag{10}$$

4.2. Inspection – Result Control

The control of the obtained results of the moving speeds of the vehicles A and B was performed using the computer programme PC Crash 9.0 for the simulation of the crash, with which approximately equal results were obtained (Datentechnik, 2010; Kramer, 2006).

The graphic display of the programme simulation of the relative crash showed that the point of crash as well as the crash speeds were correctly determined. It was based on the facts that the vehicles in the programme simulation in the settling period following the crash process and with the calculated parameters inserted, were brought to the final, or stopped position identical to the one stated by the situational plan of the participants at the point of crash, as well as on the basis of the fact that the vehicles in their post-crash moving followed the roadway traces. The kinematics of the motion of the vehicles in the crash process and the settling period following the crash process is shown in the following Figure 6:

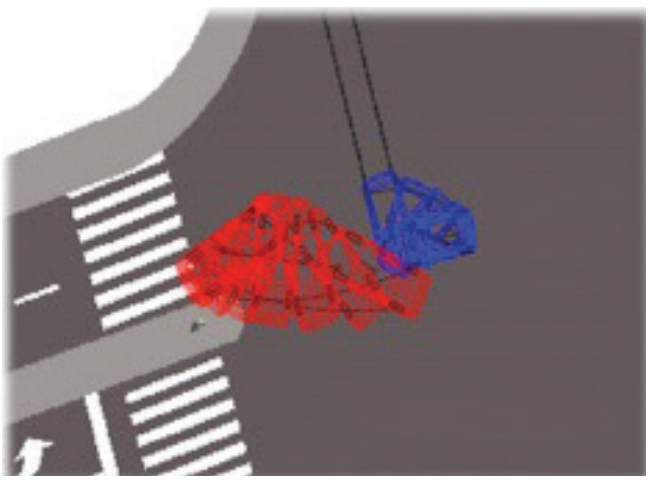

Figure 6.
Simulation of actual crash.

At the instant of rush of the vehicle B with its front part onto the right side part of the vehicle A, the vehicle B according to PC Crash was moving at the speed of approximately 70 km/h, and the vehicle A at the speed of approximately 49 km/h, which is within the permitted tolerance limits.

4.3. Time Intervals of Vehicle Movement

The total deceleration time of the vehicle B from the moment of reaction of the driver to the brake to the moment of crash was:

$$t = t_s + \frac{v_{B_{new}} - v_B}{3.6 \cdot a_{max}} = 2.31\ s \tag{11}$$

The path which the vehicle B traversed from the moment when the driver reacted to the brake to the place of the crash is:

$$s = t_s \cdot \frac{v_{B_{new}}}{3.6} + \frac{v^2_{B_{new}} - v^2_B}{26 \cdot a_{max}} = 2.31\ s \tag{12}$$

The vehicle B was moving along the western roadway and western traffic lane of the street Z from the northern direction southwards at the moving speed of approximately *19.48 m/ s ≈ 70.11 km / h* and approximately 2.31 seconds before the crash it was distant from the point of crash approximately 38.91 m in the northern direction, entirely located on the western traffic lane of the western roadway of the street Z.

In the same time interval the vehicle A was moving along the western traffic lane of the eastern roadway of the street Z from the southern direction northwards at the moving speed of approximately *13.62 m / s ≈ 49.03 km / h* and was distant from the point of crash by approximately 31.46 m in the southern direction, entirely located on the western traffic lane of the eastern roadway of the street Z.

In the following Figure 7 a 3D view of the sequence of the occurrence of the traffic accident in the above mentioned moving intervals is shown (Datentechnik, 2010).

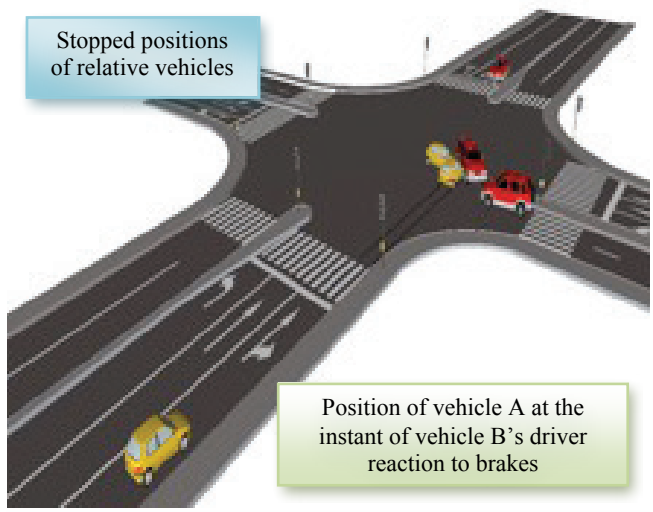

Figure 7.
3D display of the occurrence of traffic accident.

4.4. Possibility of Mutual Sighting

Having taken into consideration all the parameters mentioned up to this point, appearance of the roadway in the form of quad arrow crossroads, the fact that in the course of the occurrence of the crash the weather was fair and sunny, a conclusion can be reached that the drivers of the vehicles A and B were able to sight each other at the distance of at least 100 meters before the place of crash in the direction of the motion of both vehicles (Zovak, 2007).

4.5. Analysis of Light Signalling Operation at the Relative Crossroads

For further analysis it was necessary to obtain data on the traffic lights operation. They were provided by the Traffic control and management center for the purposes of this paper. From the diagram (Figure 8) the traffic lights operational cycle of 75 seconds can be seen, while lights for directional movements of the relative vehicles exchange as shown below.

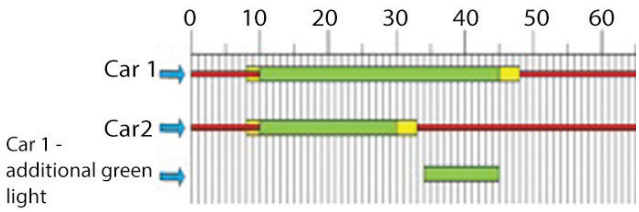

Figure 8.
Traffic lights operation.

5. MODE OF CRASH OCCURRENCE

The relative vehicle crash occurred due to the vehicle B's entering the crossroads in the stage of intensive braking, when its forward, more right-hand part crashed into the right-hand side of the vehicle A, which at that moment was proceeding in turning left and obstructed vehicle B in performing the turn.

The basic question of the relative traffic accident is: "Why did the vehicle B's driver react by intensive braking at the moment when vehicle A had not even reached the pedestrian crossing at the other side of the crossroads?"

By a detailed analysis of the witnesses' statements, photos taken at the place of the accident, inspection of the place of the accident, as well as by the analysis of kinematic magnitudes of the relative traffic accident two possible modes of the occurrence of the relative traffic accident have to be analysed.

5.1. Both Vehicles Pass With Green Light

Concerning the exchange of light signalling at the relative crossroads it is obvious that there is a possibility that the relative traffic accident occurred due to both vehicles entering the crossroads with green light and in that case the vehicle A while turning left crossed the trajectory of vehicle B's movement when the crash occurred of the front part of the vehicle B onto the right hand side part of the vehicle A.

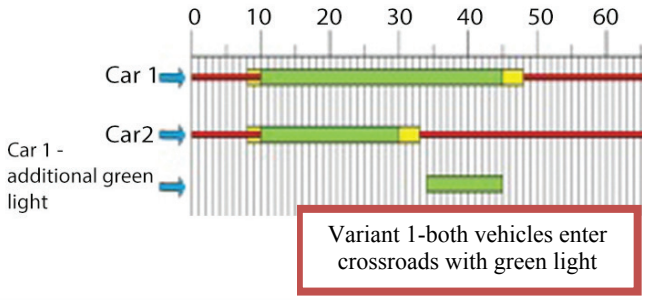

Figure 9.
Both vehicles enter the crossroads with green light.

In case the relative traffic accident occurred in the way described above, the question is why the driver of the vehicle B started intensive braking at the moment while the vehicle A had not even reached the pedestrian crossing on the opposite side of the crossroads, and was in no way threatening the trajectory of vehicle B's movement, so that the vehicle B's driver did not have any reason to react by braking (Baker et al., 1990; Zovak, 2007).

5.2. Vehicle A Passes with Additional Green Light

If the exchange of light signalling at the relative crossroads is taken into consideration, it is visible that there is a possibility that the vehicle A entered the crossroads at the moment when for the movement in its direction there was an additional green arrow lit on the traffic lights, which means that at the same time for the direction of the vehicle B's movement there was the red light lit on the traffic lights.

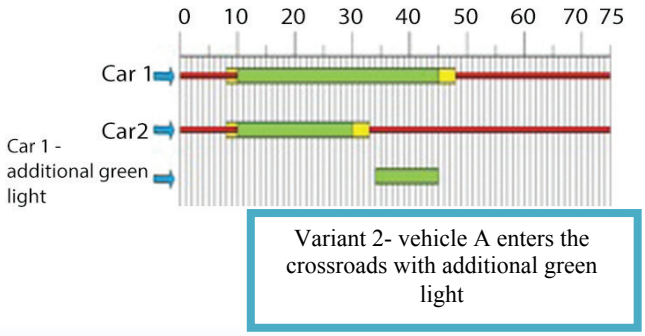

Figure 10.
Vehicle A enters the crossroads with lit additional green arrow.

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In case the relative traffic accident occurred in this way, it is clear that the vehicle B's driver did not undertake the reaction of intensive braking due to the occurrence of vehicle A since he had no reason to do so, since the vehicle A was at that moment entirely located in its traffic lane and had not entered the crossroads (see Fig. 7). Therefore, the only remaining possibility is that the vehicle B's driver, on reaching the point immediately before the crossroads, sighted the yellow light on the traffic lights, and after he had noticed the occurrence of red light on the traffic lights for the movement in its direction, he undertook intensive braking in order to stop the vehicle before the crossroads, which he did not manage to do.

6. POSSIBILITIES OF CRASH AVOIDANCE

The vehicle B's driver had the possibility of avoiding the relative traffic accident in the way that at the moment he undertook intensive braking he was moving at the speed of approximately:

$$V = 3.6 \cdot \sqrt{(a_{max} \cdot t_s)^2 + 2 \cdot a_{max} \cdot s} - 3.6 \cdot a_{max} \cdot t_s = \quad (13)$$
$$= 62.16\ km/h \approx 17.27\ m/s$$

The vehicle A's driver did not have the possibility of avoiding the relative traffic accident since at the moment of his entering the crossroads the additional green arrow was lit for the movement in his direction.

7. CONCLUSIONS

All the parameters of the traffic accident have been established through the dynamic analysis of the accident and the given results offered clear guidelines in how to avoid traffic accidents in the future. This particular case deals with the way both drivers reacted on the alteration of the traffic lights at the intersection.

The relative traffic accident occurred at the right angle crossroads of the three streets called: X, Y i Z, in which the traffic was controlled with the use of traffic lights.

The accident occurred in the way that the vehicle B on entering the crossroads in the phase of intensive braking ran with its forward, mainly right hand side into the right hand side of the vehicle A, which at that moment was turning left and obstructed the vehicle B's path.

The crash of the vehicles is determined as angular in which the longitudinal axes at the moment of crash were closing the angle of approximately 135°.

The exact place of the crash was in the crossroads, in the extension of the western roadway and western traffic lane of the street Y, at the distance of 49.00 m from PTM southwards and 7.0 m from the edge of the central island dividing the two roadway lanes of the street Y southwards.

The place of the crash is determined by ending of braking traces of vehicle B's front wheels, traces of roadway imprint as well as the vehicle B's stopped position.

The vehicle B was moving along the western roadway and the western traffic lane of the street Z from the northern direction southwards at the speed of approximately *19.48 m / s ≈ 70.11 km / h*.

The vehicle A was moving along the western traffic lane of the eastern roadway of the street Z from the southern direction northwards at the speed of approximately *13.62 m / s ≈ 49.03 km / h* and on reaching the crossroads was performing a turn to left onto the roadway of the street Y.

The vehicle B about 2.31 seconds before the crash was distant from the place of crash approximately 38.91 m northwards and entirely located on the western traffic lane of the western roadway of the street Z.

At the same time interval the vehicle A, was distant from the place of accident approximately 31.46 m southwards, entirely located on the western traffic lane of the eastern roadway of the street Z

The drivers of the vehicles A and B had the possibility of mutual sighting at the distance of at least 100 meters before the place of crash having in mind the directions of both vehicles' movements.

The analysis of the two possible modes of the occurrence of the relative traffic accident: case 1 – when both vehicles pass with the green light and case 2 – when the vehicle A passes with the additional green light, excluding case 1. Namely, in case 1 the vehicle B's driver did not have a reason to react on the brake since at the moment of the vehicle B driver's reaction on the brake in the crossroads the vehicle A was entirely located in its own traffic lane.

If the exchange of the light signalling at the relative crossroads is taken into consideration, it is visible that there is the possibility of the occurrence of case 2, i.e. that the vehicle A entered the crossroads at the moment when for its directional movement the additional green arrow was lit on the traffic lights, which means that at the moment for the directional movement of the vehicle B the red light was lit on the traffic lights.

In case the relative traffic accident occurred in this way, then it is clear that the vehicle B's driver did not undertake the intensive braking due to the occurrence of the vehicle A, but due to the attempt to catch the yellow light on reaching the crossroads, and after having noticed that for his directional movement the red light was lit, her undertook intensive braking to stop before the crossroads, which he did not manage to do.

The vehicle B's driver had the possibility of avoiding the relative traffic accident in the way that at the moment of undertaking intensive braking he was moving at the speed of approximately $62.16\ m/s \approx 17.27\ km/h$ or any other lower speed, from which a conclusion can be reached that is he had been moving at the speed of 50 km/h as permitted on the relative section, he would have stopped much before the place of the crash.

Vehicle A's driver did not have a possibility of avoiding the relative traffic accident since at the moment of his entering the crossroads for his direction the additional green arrow was lit.

This paper emphasises the need of introducing cameras to the intersections equipped with traffic lights, so as to completely eliminate the dilemma which one of the traffic accident participants entered the intersection while the red light or the green light was on.

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Shipboard Ballast Water Treatment Systems on Seagoing Ships

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This review paper summarizes the legislative framework and the available technologies for ballast water treatment with regard to the approval process and relevant issues. The International Maritime Organization (IMO) sets the limits of organism concentration in ballast water allowed to be discharged into the sea. The 2004 *International Convention for the Control and Management of Ships Ballast Water and Sediments* is the first international document that introduced obligatory ballast water management and control. Even though ballast water treatment systems are not 100 % effective, they significantly reduce the risk of spreading of invasive species through ballast water exchange. An increased manufacturer interest in the system's approval or development of new technologies is not expected in future because the procedure is time-consuming and expensive. The final choice of optimal ballast water treatment system depends on the ship owner or operator taking into account the price, type of the ship, whether it is a newbuilding or an existing ship, ballast system capacity and the seas where ships ply as well as harbours at which they call.

KEY WORDS
~ Ballast water
~ Treatment systems
~ Ballast Water Convention
~ Marine environment
~ Pollution

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1. INTRODUCTION

In the modern sea traffic ballast water is recognized as a possible source of serious and dangerous ecological, economic and health issues, which can result from the transfer of organisms in ship's ballast water tanks. It has recently been estimated that 4 billion tons of ballast water are used around the world every year (Tsolaki and Diamadopoulos, 2010). The concentration of organisms per liter of ballast water is estimated as follows: 100-102 zooplankton, 103-106 phytoplankton, 108-109 bacteria, and 109-1010 viruses (Ruiz and Reid, 2007).

In 1903 an alga *Biddulphia sinensis* originating from the seas of Asia was discovered, which foreshadowed the effect of organism transportation between different ecosystems. However, it was not until the 1970s that the problem became subject of extensive research. In 1991 **Resolution 50 - *International Guidelines for Preventing the Introduction of Unwanted Organisms and Pathogens from Ships' Ballast Water and Sediment Discharges*** (http://www.imo.org/blast/blastDataHelper.asp?data_id=15624&filename=50(31).pdf) was published by the Marine Environment Protection Committee as the first important document which dealt with the issues of organism transportation in ballast water.

The next important step was to establish the guidelines set on the 20th IMO assembly. The guidelines are described in the **Resolution A.868 - *Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens*** (http://www.imo.org/blast/blastDataHelper.asp?data_id=22649&filename=A868.pdf). According to the guidelines from 1997 all ships that carry ballast water have to have ballast water management plan. The guidelines also contain recommendations for port authorities in order to provide adequate facilities to receive or process ballast water. The receiving ports are also responsible for providing information on their requirements to ships, as well as the information on the availability, capacities and applicable relevant fees of ballast water and sediment reception facilities.

2. INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER

The 2004 *International Convention for the Control and Management of Ships' Ballast Water and Sediments* is the first international document that introduced obligatory ballast water management and control (http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships%27-Ballast-Water-and-Sediments-(BWM).aspx). The legal basis for the Convention is: *the United Nations Convention on the Law of the Sea* (UNCLOS, 1982), *Convention on Biological Diversity* (CBD, 1992), *IMO Convention Resolution IV/5* (COP 4, CBD, 1998), *IMO Convention Resolution VI/23* (COP 6, CBD, 2002), *Rio Declaration on Environment and Development* (IMO assembly Resolution MEPC 67/37, 1995), *IMO assembly Resolution A 774* (1993) and *A 868* (1997) (Briski, 2014).

The Convention consists of two parts: the main part (22 articles) and the rules for the control and management of ships' ballast water and sediments (Sections A-E). The convention includes two attachments: the examples of *Ballast Water Management Certificate and Form of Ballast Water Record Book*.

In Section D of the Convention there are two types of standards for Ballast Water Management: *Ballast Water Performance Standard* D-2 regulation (Table 1), and *Ballast Water Exchange Standard* D-1 regulation.

Table 1.
IMO D-2 Standard for ballast water discharge.

Microorganism category	IMO Standard
>50 µm Zooplankton	< 10 viable cells / m^3
10-50 µm Phytoplankton	< 10 viable cells / ml
Vibrio Cholerae bacterium	< 10 cfu /[1] 100 mL or <1 cfu/1 gram (wet weight) zooplankton samples
E. Coli bacterium	<250 cfu/100 ml
Intestinal enterococci bacterium	<100 cfu/100 ml

Table 2.
Timeframe for introducing the Convention Ballast Water Treatment Standards (modified from: http://www.lr.org/en/marine/consulting/environmental-services/ballastwatermanagement.aspxfrom).

Ballast tanks capacity (m3)	Year of ship construction	First next class review for renewing certificates - a year after ship's delivery								
		2009	2010	2011	2012	2013	2014	2015	2016	2017
< 1500	< 2009	D-1 or D-2								D-2
	in 2009	D-1; D-2 until the second annual class inspection, but not after 31st December 2011, or until the Convention takes effect, whichever comes later								
	> 2009	D-2 (at the time of ships delivery or when the Convention takes effect, whichever comes later)								
≥ 1500 or ≤ 5000	< 2009	D-1 or D-2						D-2		
	in 2009	D-1; D-2 until the second annual class inspection, but not after 31st December 2011, or until the Convention takes effect, whichever comes later								
	> 2009	D-2 (at the time of ships delivery or when the Convention takes effect, whichever comes later)								
≥ 5000	< 2012	D-1 or D-2								D-2
	> 2012	not applicable			D-2 (at the time of ships delivery or when the Convention takes effect, whichever comes later)					

D-1 regulation is applied during a transitional period until adequate conditions for the application of D-2 regulation are created (Table 2). According to D-1 regulation a ship must exchange at least 95 % of ballast water volume. Moreover, the Convention B4 regulation even prescribes the place of the exchange. The place should be at least 200 nautical miles away from the nearest land and at the minimum of 200 m depth. If by any chance these regulations cannot be complied with, the exchange should then take place at a distance of at least 50

1. CFU (Colony-Forming Unit), in microbiology, a number of units that form a colony.

nautical miles away from the nearest land and at the minimum depth of 200 m. It is the master's responsibility to make a decision on ballast water exchange taking into account the safety and stability of the ship and its crew members and/or passengers. The master should also take into consideration weather conditions and possible technical difficulties or extraordinary circumstances.

Marine Environmental Protection Committee (MEPC) is IMO technical body related to marine pollution issues. MEPC is assisted by IMO sub-committee for *Pollution Prevention and Response* (PPR). In order to adopt the Convention MEPC authorized an advisory committee *Group of Experts on the Scientific Aspects of Marine Environmental Protection* GESAMP in 1969. GESAMP provides scientific and technical support to undertake in-depth studies, analyses and reviews of specific topics (http://www.gesamp.org/). The GESAMP Ballast Water Working Group (GESAMP-BWWG) consists of independent experts who review proposals for Ballast Water Management systems. GESAMP-BWWG does not evaluate the operation or design of the systems, or their effectiveness but only environmental and human health risks. They report their reviews to MEPC and propose *Basic* or *Final Approvals* of the BWT system. These proposals are discussed on regular MEPC sessions.

BWT systems are approved in accordance with *Guidelines for Approval of Ballast Water Management Systems* - G8 Guidelines (IMO Resolution MEPC.174(58)) while systems that use active substances are approved in accordance with *Procedure for Approval of Ballast Water Management Systems that make use of Active Substances* - Procedure G9 (IMO Resolution MEPC.169(57)). Active Substance is an inorganic substance or organism that affects aquatic organisms or pathogens.

Methodology for information gathering and the conduct of work of GESAMP-BWWG (BWM.2/Circ.13/Rev.1.) defines *Basic Approval* as an approval of active substances and Ballast Water Management Systems in accordance with regulations of the Convention and it should inform about potential risks regarding the use of active substances. It is highly recommended that the residual toxicity of ballast water is measured in all types of water (sea, fresh water, brackish water) where ships navigate to clearly state the limitations of use. *Final Approval* involves an obtained Basic Approval and an approval of the use of active substances, or a preparation according to IMO Convention. It also gives an assessment of the whole *effluent toxicity* (WET). The testing is conducted as a part of the homologation procedure for granting type approval for a certain system in accordance with the conditions listed in MEPC 174(58). Final Approval is supposed to confirm any Basic Approval findings in all operating conditions within the set limits.

The procedure of obtaining the necessary certificates for built-in ballast water treatment systems that use active substances is carried out in the following steps:

1. In accordance with *Procedure for Approval of Ballast Water Management Systems that make use of Active Substances* (G9) the manufacturer must be granted a recommendation by GESAMP-BWWG following the current BWM.2/Circ.13/Rev.1. Based on that recommendation MEPC grants a basic approval on its next regular session.
2. Type approval is part of the procedure for obtaining final approvals and it needs to be obtained in accordance with *Guidelines for Approval of Ballast Water Management Systems* (G8) and the instructions of the ships Flag Administration.
3. After its installation, system review is carried out by a recognized organization (RO), i.e. by a classification society, following the authorization and instructions of the ship's Flag Administration.

The procedure of obtaining the necessary certificates (Figure 1) for built-in ballast water treatment systems that do not use active substances is carried out in the following steps:

1. Type approval obtained in accordance with *Guidelines for Approval of Ballast Water Management Systems* (G8) and instructions of the ships Flag Administration.
2. System review, after its installation, is carried out by a recognized organization (RO), i.e. by a classification society, following the authorization and instructions of the ships Flag Administration.

IMO also requires the installation of sample collection system in order to verify the effectiveness of the system and its accordance with prescribed values after the installation or while operating. It should be situated as close to the discharge as possible. There are very detailed descriptions of ballast circulation sampling points and equipment allowed to use. The main condition is to disable shear strains or any disturbance in the stream while redirecting sample lines from the main stream. Its goal is to ensure that the samples are representative, i.e. to ensure that the redirection process does not destroy living organisms in the ballast and thus provide a false image of the systems effectiveness.

It is important to note that MEPC/GESAMP-BWWG issues a decision on environmental effect while the ship's Flag Administration assesses systems in accordance with the prescribed standards. A system approved by one state is not automatically approved by other states, which can pose a problem once the Convention officially takes effect. The best way to solve the problem is to fully standardize analysis and evaluation procedures as well as sample collection procedure. Compared with other IMO type testings this is by far the most extensive procedure in term of human resources, time and costs. In accordance with G8 guidelines, homologation testing of Ballast Water Treatment Systems needs to be carried out in a land-based facility and on board ships and it lasts for at least 6 months. Regulations established by the Convention have

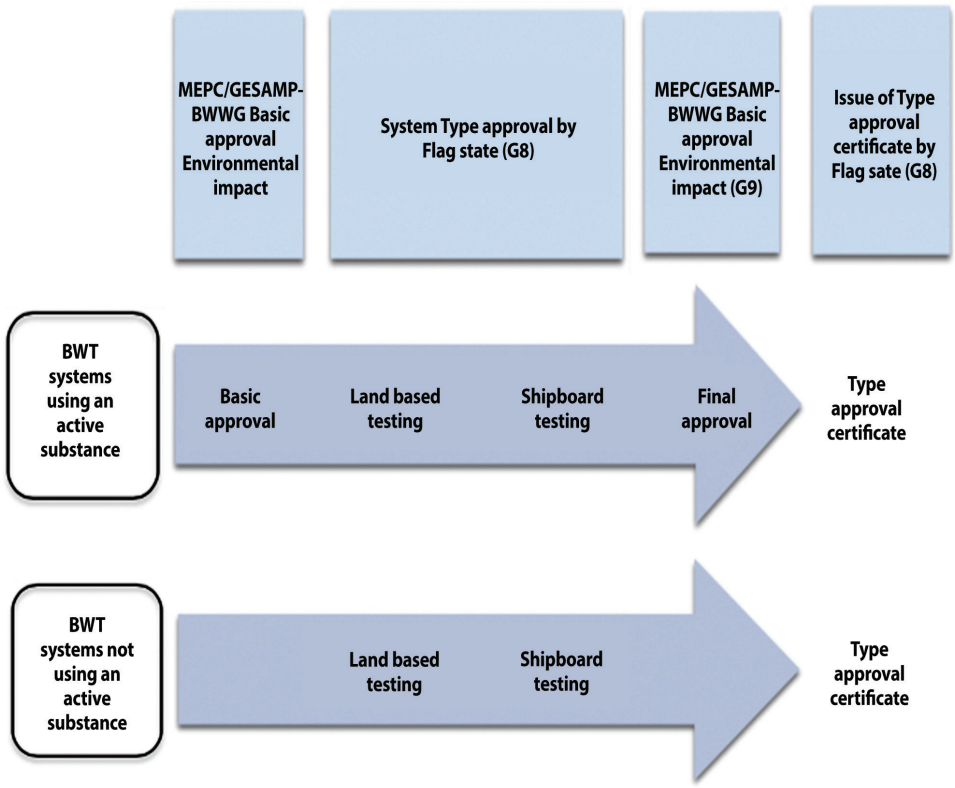

Figure 1.
The procedure of approval of Ballast Water Treatment according to the Convention.

some disadvantages. For instance, the Convention defined a transitional period for the regulation implementation, new ballast water treatment technologies requires considerable financial investments and qualified staff. Those are possible reasons for slow application of standards set by the Convention.

In the past ten years many new systems for ballast water treatment and exchange were introduced on board in order to meet the standards. A small number of newbuildings are equipped with whole-scale ballast water cleaning systems. On most of the newbuildings there are space and electrical power supply planned before installing.

In some states (Argentina, Australia, Canada, New Zealand and the USA) legislature regarding ballast water is more restrictive than the Convention despite the fact that the Convention has not been ratified yet.

3. CRS CIRCULAR

Regardless of the fact that the Convention has not been adopted yet, the Republic of Croatia issued its own ordinance on ballast water management and control requiring the Ballast Water Management Plan and Ballast water reporting form. *Croatian Register of Shipping (CRS) Circular QC-T-189* gives an overview of basic requirements of the Convention. In further editions (1 to 5), it regularly keeps track of any changes and new documents regarding the Convention (http://www.crs.hr/Portals/0/docs/hrv/tehnicke_okruznice/QC-T-189%20rev%205.pdf). *CRS regulations on statutory certification of seagoing ships* will cover the Convention requirements as well as the content of the circulars regarding ships' ballast water and sediments management in Section 9. The ordinance took effect without Section 9 because the Ministry of Maritime Affairs, Transport and Infrastructure requested improvements to be made in the area of navigation III (international navigation in the Adriatic sea). A Committee was formed to find an acceptable solution.

4. BALLAST WATER EXCHANGE AND TECHNOLOGIES FOR BALLAST WATER TREATMENT

Regarding the requirements established in the Convention, all vessels conform to D-1 or D-2 regulation for ballast water management. At this moment, Ballast Water Exchange (BWE) is

Table 3.
Mechanical, physical and chemical methods for BWT.

Name of the system	Operating principle	Disadvantages
Mechanical methods		
Filtration	Porous barriers or small nets stop the particles	• low energy efficiency • dimensions of the system • problem with sediment discharge • problems with smaller particles
Cyclonic separation	Powerful centrifugal force separate heavier particles	• low energy efficiency • dimensions of the system • problem with sediment discharge • problems with smaller particles
Physical disinfection		
Cavitation and ultrasound	High amplitude sound energy and frequency destroys cell membranes	• risks for human health and safety • negative effect on ship hull
Heat treatment	High temperature kills organisms	low energy efficiency unless residual heat is used
Deoxygenation (inertization)	Organisms suffocate due to oxygen deficiency	ineffective in removing anaerobic microorganisms in short-range navigation conditions (less than 4 days)
UV radiation	Ultraviolet radiation kills microorganisms	• ineffective in removing suspension and larger organisms • low energy efficiency • dimensions of systems, • inability to discharge ballast by gravity
Chemical treatments		
Chlorination, chlorine dioxide, electrolysis	Chlorine kills organisms	• ineffective in areas of low salinity ineffective against cysts • produce unwanted chlorinated hydrocarbons and trihalomethane • can increase corrosion • inevitable secondary neutralization of residual hypochlorite during ballast discharge • difficulties with electrode maintenance and replacement • demanding system management
Ozonation	Bromine kills organisms	• low energy efficiency • reduced efficacy with larger particles, difficulties with ozone leakage detection • corrosion of the ballast system • neutralization during de-ballasting process
Peraclean® (peroxyacetic acid, peracetic acid, hydrogen peroxide)	Oxidation kills organisms	• relatively expensive • problem of global availability • necessity of storage space
Seakleen® (vitamin K, menadione)	Vitamin K3 kills organisms	• inevitable secondary neutralization • problem of global availability

the principal method of ballast water management. Regardless of its simplicity, BWE is not effective enough, so certain rules must be followed. Namely, after emptying the ballast tanks, residual sediment is often found, so the procedure needs to be carried out repeatedly for a longer period of time. Since current IMO criteria require the exchange of minimum 95 % of the water, it is necessary to find the best way of emptying the tanks. The tanks are usually emptied using two methods: the pumping-through method (flow-through exchange) and the sequential method. Both methods require the exchange of greater volume of water in the tanks over a longer period of time. There are some disadvantages related to these methods, e.g. increased mechanical strains of the ship's structure, propeller insufficient emergence during the procedures, additional working hours for crew members, increased risk of high pressures of pumped water damaging the tank walls, etc. BWE is sometimes hardly feasible, e.g. in adverse weather conditions. Furthermore, the concentration of coastal plankton organisms will be decreased only by 80-95 % using BWE if carried out by strictly following the guidelines and regulations (Ruiz and Reid, 2007).

5. BALLAST WATER TREATMENT TECHNOLOGIES

Even though ballast water treatment systems are not 100 % effective, they significantly reduce the risk of spreading of invasive species through ballast water exchange. In some states (Argentina, Australia, Canada, New Zealand and the USA) legislature regarding ballast water is more restrictive than the Convention despite the fact that the Convention has not been ratified yet.

The methods of ballast water treatment (Table 3) can be classified as:

- mechanical methods of particle separation (filtration, cyclon separation),
- physical methods of treatment (cavitation, ultrasound, heat treatment, deoxygenation, ultraviolet radiation),
- chemical treatment by active substances (chlorination. electrochlorination, ozonation, treatment with chlorine dioxide, hydrogen peroxide, menadione/vitamin K),
- various combinations of the above mentioned treatments.

Mechanical methods of BWT are filtration and cyclonic separation (hydrocyclones). In ballast water treatment systems, *filtration* is used to remove larger marine organisms and improve the efficacy of secondary treatment (Briski, 2014). By using this ecologically acceptable method of BWT based on the physical separation of solid phase (plankton and sediment) from liquid phase (sea water), the number of different organisms in filtered water significantly decreases, but not to the level required by the IMO standards established in the Convention. This procedure is usually used to remove organism size from 10 to 50 μm, with 91 % efficacy (Parsons, 2003). However, since this method of BWT does not have any by-products such as heat or chemical residue, filtration is found to be one of the ecologically most acceptable methods of water treatment. *Cyclonic separation* is a method similar to filtration regarding cost/benefit ratio. It uses hydrocyclones to create a vortex that drives organisms away in one direction and water in another. This method does not require significant pressure of water pumping like filtration (Tsolaki and Diamadopoulos, 2010). Unlike filtration, which requires regular check and replacement of filters that can be clogged with sediment, cyclone separation devices do not need to be significantly maintained since they do not have mobile parts (Jing et al., 2012). However, cyclone separation is less effective in separating the zooplankton, microalgae and bacteria from the water (Jing et al., 2012).

Physical disinfection. Systems that use *ultrasound* are also effective in organism removal. *Cavitation* is used as an additional treatment method in various systems, but difficulties are possible when water is pumped at a flow rate higher than 5,000 m^3/h. Potential health and safety risks must not be disregarded, as well as the potential effect of repeated exposure of ship hull to high-frequency waves. *Heat treatment* can use ship engines or backup heaters and it does not use any additional energy, which makes it energy efficient, especially in warm waters. Ballast water can also be heated by microwaves but it can significantly increase the temperature in the tanks (Tsolaki and Diamadopoulos, 2010). *Deoxygenation* methods use inert gases or a sudden drop in pressure. Since crude oil and product tankers already have inert gas systems, they can use it for deoxygenation. This method is ineffective in removing anaerobic microorganisms (Tamburri et al., 2002), but it kills about 99 % sea-water zooplankton (Tsolaki and Diamadopoulos, 2010). Oxygen removal from the tanks also prevents corrosion (Tamburri et al., 2002). ***Ultraviolet radiation*** is a very successful method of ballast water treatment (BWT). UVR efficiency depends on the dosage of UVR applied. Without further filtration, UVR is usually combined with mechanical cleaner, which can be separate or integrated in UVR equipment (Albert et al., 2010).

Chemical treatments. Chemical treatment efficiency depends on pH, temperature and types of organisms. Systems that use biocides must be designed to avoid discharging of unwanted concentrations of residual biocide (Albert et al., 2010). Despite low costs, *chlorine* is relatively ineffective against cysts unless it is used at a concentration of at least 2 mg/l. The usage of ozone (Perrins et al., 2006), hydrogen peroxide (Kuzirian et al., 2001) or titanium dioxide (TiO_2) (Wu et al., 2011) is not effective in waters with suspension or larger organisms. *Chlorine dioxide* is normally produced in situ by sulfuric acid (H_2SO_4), or combination of sodium chlorite ($NaClO_2$) and hydrogen peroxide (H_2O_2). The reactants are very dangerous for human health. In *electrochlorination*, chlorine disintegrates into hypochlorite acid and hypochlorite ion is added to ballast water system in order

Table 4.
The list of available ballast water treatment systems.

Name	Treatment method	Website
PureBallast 1.0	filtration, UV, advanced oxygenation (TiO_2)	www.alfalaval.com
PureBallast 2.0	filtration, UV, advanced oxygenation (TiO_2)	www.alfalaval.com
PureBallast 3.0	filtration, UV, advanced oxygenation (TiO_2)	www.alfalaval.com
PureBallast 3.1	filtration, UV, advanced oxygenation (TiO_2)	www.alfalaval.com
AquaStar	electrolysis/electrocatalysis, cavitation	www.aquaeng.kr
CrystalBallast	UV	www.auramarine.com
Bawat BWMS	deoxygenation	www.bawat.com
BIO-SEA	filtration, UV	www.ballast-water-treatment.com
Cathelco BWT System	filtration, UV	www.cathelco.com
GLD	deoxygenation, cavitation, ultrasound	www.coldharbourmarine.com
OxyClean BWTS	filtration, ozonation, UV	www.desmioceanguard.com
RayClean BWTS	filtration, UV	www.desmioceanguard.com
Ecochlor	electrolysis/electrocatalysis	www.ecochlor.com
BlueSeas BMWS	filtration, electrolysis/electrocatalysis	www.blueseas.com.sg
Erma First	filtration, hydrocyclones, electrolysis/ electrocatalysis	www.ermafirst.com
AVITALIS BWTS	filtration	www.evonik.com/peraclean-ocean
Seacure	filtration, electrolysis/electrocatalysis	www.evoqua.com/seacure
BallastMaster EcoP	filtration, electrolysis/electrocatalysis	www.westfalia-separator.com
BallastMaster UltraV	filtration	www.westfalia-separator.com
OceanGuard	filtration, electrolysis/electrocatalysis, ultrasound, advanced oxygenation (OH·)	www.headwaytech.com
Hyde GUARDIAN	filtration, UV	www.hydemarine.com
EcoBallast	filtration, UV	www.hhi.co.kr
HiBallast	filtration, electrolysis/electrocatalysis	www.hhi.co.kr
JFE Ballast Ace	filtration, chlorination	www.jfe---eng.co.jp
KBAL	UV, pressure/vacuum	www.knutsenoas.com
MICROFADE	filtration, chlorination	www.kuraray.co.jp
Ocean Protection System (OPS)	filtration, UV	www.mahle-industrialfiltration.com
	deoxygenation, carbonation	www.mhsystemscorp.com www.ballastwatersolution.com
FineBallastMF	filtration	www.mes.co.jp
Fineballast OZ	ozonation, cavitation	www.mes.co.jp
MMC Green Technology BWMS	filtration, UV	www.mmcgt.no
BioVioletTM	filtration, UV	www.kwangsan.com
VOS	deoxygenation, cavitation	www.nei-marine.com

BlueBallast	ozonation	www.nkcf.com
MKII	filtration, electrolysis/electrocatalysis, deoxygenation, cavitation	www.oceansaver.com
Optimarin Ballast System (OBS)	filtration, UV	www.optimarin.com
GloEn-PatrolTM	filtration, UV	www.worldpanasia.com
CleanBallast	electrolysis/electrocatalysis, advanced oxygenation (OH·)	www.rwo.com
Purimar TM	filtration, electrolysis/electrocatalysis	www.shipcs.com/eng
Balpure ®	filtration, electrolysis/electrocatalysis	www.balpure.com
BalClor	filtration, electrolysis/electrocatalysis	www.sunrui.net
Electro-Cleen System	electrolysis/electrocatalysis, advanced oxygenation (OH·)	www.techcross.com
Trojan Marinex	filtration, UV	www.trojanmarinex.com
Aquarius UV	filtration, UV	www.wartsila.com
Aquarius EC	filtration, electrolysis/electrocatalysis	www.wartsila.com
BSKY	hydrocyclones, UV, ultrasound	www.bsky.cn

to prevent growth of aquatic organisms. Free chlorine and its derivatives will kill almost all aquatic organisms and their final concentrations will satisfy IMO D-2 regulation. When discharging ballast the rest of hypochlorite is neutralized by adding a neutralizing chemical that removes all of the remaining oxidants that could be harmful. *Ozone* use involves much less harmful ingredients, mostly bromate. The production equipment is very complex. *Peracetic acid and hydrogen peroxide* (Peraclean) are completely soluble in water. They produce very small amounts of harmful by-products and are relatively stable. *Menadione or vitamin K* is a natural biocide and it is relatively safe to handle.

When using chemicals for ballast water treatment it is necessary to apply a mechanical ballast treatment first in order to remove larger solids and thus reduce expensive chemicals' consumption. In order to remove residual chemical disinfectants (especially chlorine), before unloading into the seawater the discharge needs to be treated with additional chemical reducing agents, sodium sulfite or bisulfite.

Considering the fact that none of BWT methods listed above is efficient, the combination of various methods is necessary. There are currently 46 water treatment systems on the market (Table 4). Most water treatment systems use two or more different treatment methods, e.g. physical separation is followed by the use of biocide or a UVR treatment. In reality, some systems, especially the UVR, work during ballast loading and unloading (Albert et al., 2010).

HiBallast is an example of a system that combines mechanical filtration for removing organisms and particles larger than 50 μm and electrolysis which produces high concentrations of sodium hypochlorite (NaOCl). The disinfectant is added into the ballast during ballast loading, while sodium thiosulfate ($Na_2S_2O_3$) neutralizer is added during ballast discharging. The concentration of the neutralizer is measured by TRO (*Total Residual Oxidant*) sensor and automatically regulated by the control system that includes system vent pipes, electrolysis, neutralization and filter unit. During an electrochemical chlorine generation, explosive hydrogen is released and continuously de-aired (http://www.hyundai-engine.com/).

In systems with active substances various chemicals are added into the ballast water in order to reduce the number of microorganisms below the prescribed limits regardless of their presence. There is no system that can measure the amount of microorganisms and simultaneously regulate the amount of active substance added, nor is there a technology that can measure the number of microorganisms in the ballast water after the process is finished. In the current systems the amount of active substance and neutralization substances can be controlled during ballast discharge. The system efficacy in preventing microorganism transfer has not been tested yet, and it is impossible to guarantee that the sample will pass the port authority testing. This is the reason for some states not to ratify the Convention.

5. SELECTION OF BALLAST WATER TREATMENT SYSTEM

Ship owners are often faced with difficulties in the process of reaching a decision on which ballast water treatment system fits best a certain ship. Several factors have to be taken into account in order to make the right decision. The final choice of optimal ballast water treatment system depends on the ship owner or operator taking into account the price, type of the ship, whether it is a newbuilding or an existing ship, ballast system capacity and seas where ships ply as well as harbours at which they call.

The selection of ballast system depends more on flow-rate capacity of the system and less on the size of the ship. The price of installation is an inevitable factor. Capital investment and operational expenses (OPEX) increase proportionally with the capacity for UVR-based systems, while it is not the case for smaller electrochlorination systems with the ballast capacity lower than 2,000 m^3/h.

Currently, the most common ballast water treatment systems are two-stage electrochlorination for high-capacity systems and UVR systems for low-capacity systems, both combined with mechanical filtration method (filtration or cyclonic separation for the necessary initial treatment) for the removal of organisms and particles bigger than 20 μm. Mechanical filtration uses usually self-cleaning filters. Initial separation of larger organisms and particles significantly improves the treatment efficacy and helps in the system maintenance.

The problem with the current UVR systems is related to the transparent tubes' cleaning in order to keep the transparency of the tubes and radiation intensity and range. While some manufacturers use strong light and high water turbulence, others use wiper that mechanically removes sediment. The cleaning is carried out by ultrasound micro-cavitation or mechanical scraping. The next problem is the efficiency of UVR in turbid water. Some systems adjust radiation intensity based on the measured light that penetrates through turbid water. Light penetration testing continually monitors the emission and it adapts monitoring when necessary making the system energy efficient. The advantages of UVR system are robustness and simplicity of use and maintenance, while power consumption is the main disadvantage, especially if the system is installed on board afterwards. It is often necessary to modify ship power supply and electricity distribution system in order to install an adequate UVR system.

The most significant downsides of UVR systems are low energy efficiency and the system dimensions but they do not require additional space for storing chemicals, do not produce toxic gases or harmful chemical agents, do not depend on seawater salinity and they are simple to use and maintain.

Combined ballast water electrochlorination treatment systems redirects small stream of water on electrolytic cells where sodium hypochlorite is produced and injected into the ballast before entering the tanks. The treatment leaves behind a reserve of sodium hypochlorite in the tanks and thus prevents growing of organisms during navigation. The cleanliness of the tank can be significantly improved by adequate control of sodium hypochlorite. An advantage of electrochlorination over UVR is that only one treatment is sufficient for achieving the satisfactory low number of organisms in the tank. The disadvantages are the complexity and the aggressiveness of sodium hypochlorite. When it is needed to stop operation or during the discharge, those systems use neutralization because sodium hypochlorite is an unwanted substance in clear water. Another disadvantage is the salinity of sea water necessary for producing hypochlorite and sometimes an additional tank is required in order to keep the adequate salinity of seawater.

The re-growth of phytoplankton can indicate the risks of introducing a new species, even after ballast water treatment is completed in accordance with IMO standards. A recent research conducted on six ballast water cleaning systems (3xUV, 2xEC, 1xCD) recorded a re-growth of phytoplankton after each of the six treatments (http://www.hyundai-engine.com/). The three tested UVR systems showed decrease in phytoplankton concentration, but it increased again later. In some systems the concentration of phytoplankton was higher due to the re-growth than in untreated ballast tanks. Re-growth of phytoplankton species differed in UVR and chemical systems, which indicated that none of the plankton species was resistant to all the treatments. All systems showed significant decrease in phytoplankton concentration below the IMO limits, which signified a reduced risk of transferring aquatic species, but it also confirmed the need for a better investigation of phytoplankton re-growth in the ballast water system. From the ship owner perspective, UVR systems have an advantage over EC BWTS systems because they do not use or store dangerous chemical agents. In case of emergency, ballast can be discharged at any time with no harm to the environment, but larger capacity and additional filtration are required for UVR systems (Stehouwer et al., 2015).

6. CONCLUSION

Even though ballast water treatment systems are not 100 % effective, they significantly reduce the risk of spreading of invasive species through ballast water exchange. In some states (Argentina, Australia, Canada, New Zealand and the USA) legislature regarding ballast water is more restrictive than the Convention despite the fact that the Convention has not been ratified yet.

The main problem with the Convention ratification is the inconsistency between the requirements for the system approval and future standards regarding the minimum discharge limits in ports. As regards systems with active substances, there is no

system that can measure the amount of microorganisms and simultaneously regulate the amount of active substance added, nor is there a technology that can measure the number of microorganisms in the ballast water after the process is finished. The system efficacy in preventing microorganism transfer has not been tested yet and it is impossible to guarantee that the sample will pass the port authority testing. This is the reason for some states not to ratify the Convention.

In the past ten years many new systems for ballast water treatment and exchange were introduced on board in order to meet the standards. A small number of the newly built vessels are equipped with whole-scale ballast water cleaning systems. On most of the newly built vessels there are space and electrical power supply planned before installing.

Currently, the most common ballast water treatment system is two-stage electrochlorination for high-capacity systems and UVR systems for low-capacity systems, both combined with filtration or cyclonic separation for the necessary initial treatment. The most significant downsides of UVR systems are low energy efficiency and the system dimensions but as regards the design, they do not require additional space for storing chemicals, do not produce toxic gases or harmful chemical agents, do not depend on seawater salinity and they are simple to use and maintain.

An increased manufacturer interest in the systems' approval or developing new technologies is not expected in future because the procedure is time-consuming and expensive. The final choice of optimal ballast water treatment system depends on the ship owner or operator taking into account the price, the type of the ship, whether it is a newbuilding or an existing ship, ballast system capacity and seas where ships ply as well as harbours at which they call.

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Labor Market Need Analysis as Basis for the Foundedness of Occupational Standards in the Field of Maritime Management

Merica Slišković, Helena Ukić, Eli Marušić

This paper presents the results of a maritime sector labor market research conducted to identify key tasks, specific knowledge and skills required for the development of appropriate occupational standards in the field of maritime management. Data were collected by survey of a sample of potential employers for the professions of "*Manager in Marinas and Nautical Tourism*" and "*Maritime Personnel Training and Education Coordinator*". Research results indicate both professions are recognized by prospective employers and that appropriate standards need to be developed.

KEY WORDS
~ Labor market
~ Maritime sector
~ Key tasks
~ Standard in the field of maritime management

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1. INTRODUCTION

From 19 June 2015 to 18 September 2016, the Faculty of Maritime Studies, the University of Split, will be the holder of a HRK 1,950,924.34 (€ 256 700) worth project "*Maritime Management for the 21st Century - Sustainable and Intelligent Development of the Coastal Area through the Development of Occupational and Qualification Standards in the field of Maritime Management and the Enhancement of Corresponding Graduate University Programs*", in the framework of the European Social Fund grant scheme "Raising the Quality of Higher Education through the Implementation of the Croatian Qualifications Framework". In cooperation with project partners – the Port Authority of the Split-Dalmatia County, Plovput, the Croatian Employers' Association, B4 Association and companies Nautika centar Nava, Marina Kaštela and Bav-Adria Yachting, this project is intended to promote the recognizability of professions and qualifications from the field of maritime management on the labor market. By establishing relations with key partners from the maritime sector and developing the skills of professors from the Faculty of Maritime Studies relevant for the application of the Croatian Qualifications Framework through the development of occupational standards and modernization, the Maritime Management study program will correlate with and become more responsive to the needs of the labor market.

The implementation of the above project is compatible with the goals of the Strategy of Education, Science and Technology of the Republic of Croatia – New Colors of Knowledge, and in this part with Goal 1 – The improvement of study programs through the systematic application of the tenets of the Bologna reform and the redefinition of acquired competences.

The Croatian Qualifications Framework (CQF) is an instrument regulating the Croatian education and lifelong learning system. One of the principal tasks of the CQF is to correlate the needs of the labor market with educational programs at all levels. Occupational and qualification standards are the key tools for achieving such correlation. Learning outcomes are the key link between occupational and qualification standards. They include both knowledge and skills, i.e. competences acquired through learning and proven by appropriate tests, defined on the basis of knowledge and skills determined by the applicable occupational standard. Thus, quality occupational standards containing key information on employers' needs, the content of a profession and workplace specification are the basis of quality educational programs responsive to employers' needs, whereby the employers are given an important role in the creation of educational programs and a direct correlation is established between the educational system and the needs of the labor market.

The occupational standard relevance analysis rests on strategic and analytical basis. The analytical basis for the development of an occupational standard includes the profiling of the sector of the respective profession and labor market research by a survey of potential employers concerning that profession. Owing to the importance of surveys for the labor market in general, they are envisaged by the National Reform Program (3.3.2., pg. 25), and conceived so as to allow standardized gathering of data for a variety of professions from an array of employers.

2. RESEARCH GOAL AND METHOD

2.1. Goal

The goal of this research was to use survey to collect data from employers on key tasks, as well as on the knowledge and skills required for the performance thereof, for the professions of "*Manager in Marinas and Nautical Tourism" (hereinafter: Manager)* and *"Maritime personnel Training and Education Coordinator" (hereinafter: Coordinator)*. Such data, as well as the data collected by additional methods, at the meetings of the Occupational Standard Taskforce, are the grounds for defining occupational standards.

2.2. Research Method

The labor market research process, including the questionnaire used to collect data, was developed by the Ministry of Labor and the Pension System and the Croatian Employment Bureau, while the research was conducted in the framework of the "Maritime Management for the 21st Century" project of the Faculty of Maritime Studies in Split. The research was conducted in the form of an online survey in the period 20 September-15 November 2015. The respondents (N=289) were surveyed by e-mail containing a link to the online questionnaire. The respondents who failed to fill-out the questionnaire within a week were sent an e-mail reminder and those failing to fill it out within two weeks were contacted by phone.

The question *Description of key tasks and specific knowledge and skills*, requiring the employers to indicate 5 key tasks for the proposed occupational standards and rank them by importance, constituted the main part of the questionnaire. Having defined key tasks, the employers were asked to indicate which specific knowledge and skills they considered necessary for the performance of such key tasks. Instructions to employers stressed that the answers would best be provided by a company employee most familiar with the requirements of the workplace in question (e.g. immediate superior, human potentials officer and similar), to ensure that the most knowledgeable reply is obtained.

A separate part of the questionnaire examined key competences for lifelong learning. Generic (transversal, transferrable) skills are those considered necessary in a wide variety of professions, which can therefore be used or "transferred" by an individual across different areas of professional life. They concern the 2006 EU recommendation on competencies for social inclusion, employment, development and lifelong learning. 8 such competences were identified, all of which were examined by the questionnaire.

3. RESEARCH RESULTS

The questionnaire was sent to a total of 289 companies in the Republic of Croatia, with project partners greatly contributing to the selection of key employers to be included in the research. Out of a total of 289 questionnaires sent, 60 were filled-out completely, 27 for the profession *Maritime personnel Training and Education Coordinator* and 33 for the profession *Manager in Marinas and Nautical Tourism*.

3.1. Required Qualification Level

In this set of questions, the employers were also asked to indicate the required level of education, i.e. qualification level they considered most suitable for a particular profession, with 20 (52.6 %) out of 38 replies indicating that the profession of *Manager* necessitated graduate university studies (Level 7). As for the profession of *Coordinator*, 31 employers answered the question, with 12 employers (38.7 %) indicating that Level 6, i.e. undergraduate university studies was required, and 5 (16.1 %) being of the opinion that any undergraduate professional program (Level 6) would be appropriate. The diagram of collective data is provided in Figure 1.

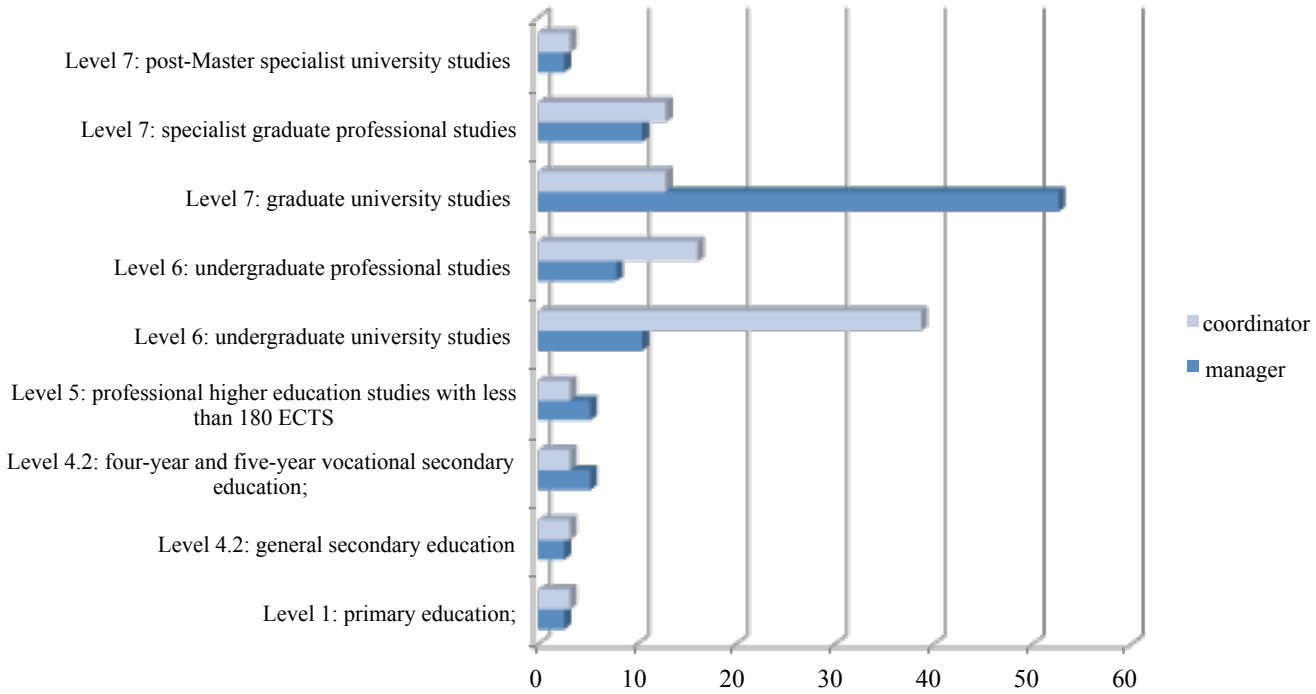

Figure 1.
Diagram of required qualification levels for 2 professions - Manager in Marinas and Nautical Tourism and Maritime personnel Training and Education Coordinator.

3.2. Key Tasks, Specific Skills and Knowledge

The central part of the questionnaire was a set of questions on the key tasks performed by employees at respective workplaces, as well as on the key knowledge and skills required for the successful execution of such tasks. The questionnaire contained a selection of key tasks among which employers were required to indicate those they considered relevant for each workplace. The employers were also asked to rank key tasks by importance. In the same vein, the employers could choose up to 5 skills and knowledges for each task from the selection they believed to be essential for the successful execution of each task.

3.2.1. Key task analysis

A total of 36 employers (N=36) replied to questions on key tasks for the profession of *Manager*. 32 respondents (88.9 %) indicated *communication and coordination with external (partners, guests) and internal (employees) stakeholders* as the most important key task. Other data are illustrated in Figure 2.

27 employers replied to questions on the key tasks for the second profession, that of the *Coordinator*, with 21 (77.8 %) indicating *Coordination and organization of specialized training programs and Cooperation with competent national authorities and international training service providers* as the two most important tasks.

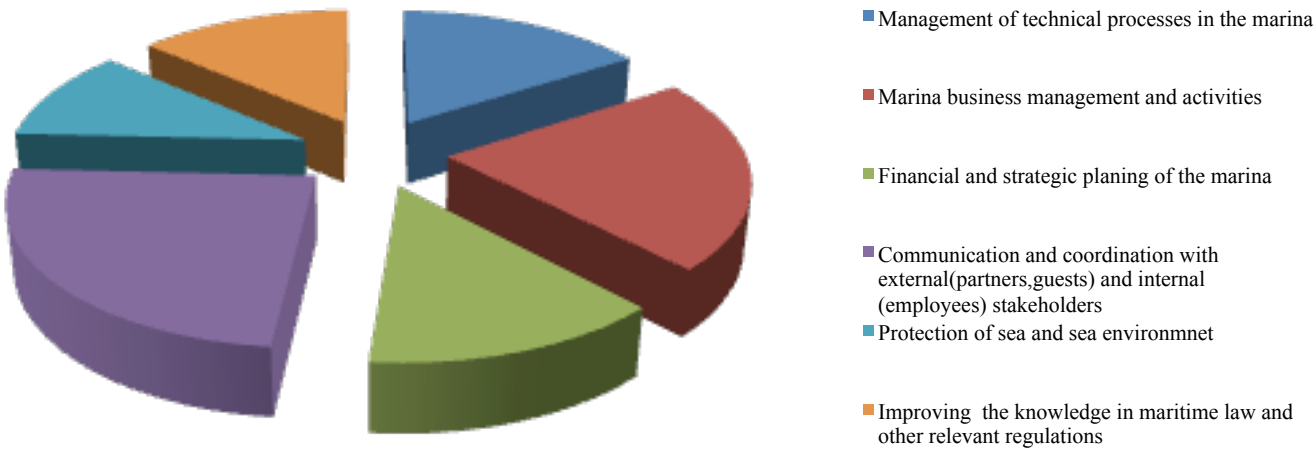

Figure 2.
Key tasks – profession Manager in Marinas and Nautical Tourism.

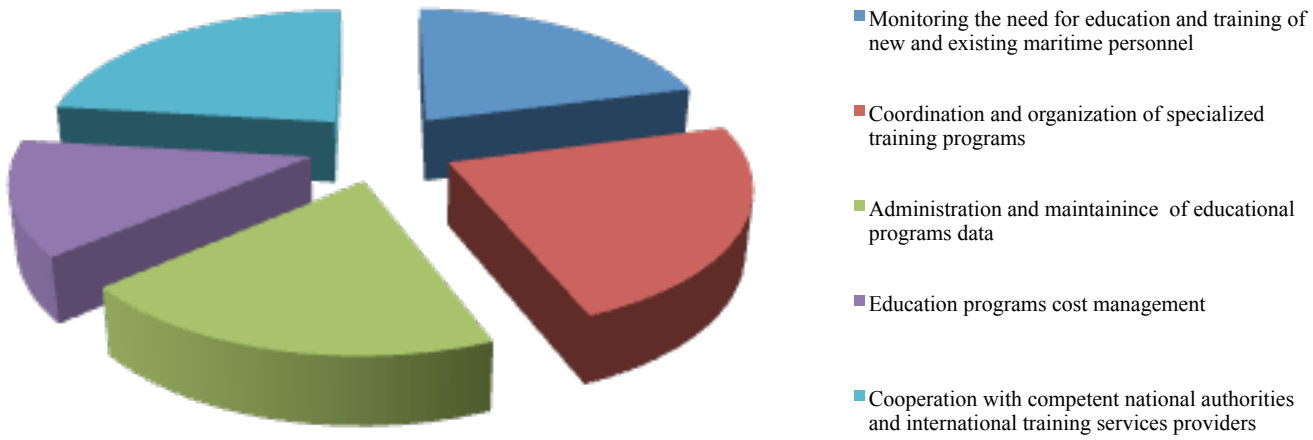

Figure 3.
Key tasks - Maritime personnel Training and Education Coordinator.

3.2.2. Correlation between key tasks and the knowledge and skills for the occupational standard of Manager in Marinas and Nautical Tourism

For the occupational standard of *Manager in Marinas and Nautical Tourism* the employers were asked to rank the key tasks by importance and chronologically link them with the knowledge and skills they considered necessary for the performance of the respective task. Namely, the respondents indicated the knowledge and skills required of employees for each key task, i.e. everything an employee must know and be able to do to successfully perform the task in question. The employers also estimated to what extent the respective skills were taught in the course of formal education and to what extent they were the combination of education and work experience. With the offered knowledge and skills, every employer was able to bring other competences considered relevant for the performance of certain key job. These states are also analyzed and included in the results.

Table 1.
Knowledge and skills for the first key task .

Managment of tehnical processes in the marina	MANNER OF KNOWLEDGE AND SKILL ACQUISITION		
	education	both	work exp.
Planning current and investment maintenance of port operations	50 %	38 %	13 %
Compiling seasonal/annual work plans for port operations	40 %	60 %	0 %
Technical preparation, supervision and maintenance of port operations during / outside the season	71 %	14 %	14 %
Managing port operations employees and their training	64 %	29 %	7 %
Participation in port operations design, construction, reconstruction, equipping and furnishing	40 %	60 %	0 %
Inspection of the safety of vessels and crew in the marina and of vessels' technical documentation	40 %	60 %	0 %
Development and management of vessel and yachtsmen databases	33 %	67 %	0 %
Recognition and resolution of emergency and risky situations	60 %	30 %	10 %
Expert knowledge	40 %	60 %	0 %
Foreign languages	0 %	100 %	0 %
Communication skills	100 %	0 %	0 %
Organizational skills	100 %	0 %	0 %

Table 2.
Knowledge and skills for the second key task.

Marina business management and activities	MANNER OF KNOWLEDGE AND SKILL ACQUISITION		
	education	both	work exp.
Annual business plan compilation	0 %	100 %	0 %
Organizational structure development (organization of work)	0 %	67 %	33 %
Human resources coordination	71 %	0 %	29 %
Knowledge of business economics	9 %	64 %	27 %
Supervision of results of marina operations	63 %	25 %	13 %
Services and competitive price development	50 %	25 %	25 %
Key market and sales management, guest satisfaction survey	100 %	0 %	0 %
Promotional plan development (advertising, PR, sponsorships, sales promotion, marketing)	15 %	62 %	23 %
Marketing strategy proposal, marketing plan development	25 %	50 %	25 %
Participation in marina construction and equipping	0 %	100 %	0 %
Database development	55 %	27 %	18 %
Foreign language	57 %	14 %	29 %

Table 3.
Knowledge and skills for the third key task .

FInancial and strategic planning of the marine	MANNER OF KNOWLEDGE AND SKILL ACQUISITION		
	education	both	work exp.
Analysis, presentation and compilation of financial reports	11 %	89 %	0 %
Allocation of financial and other resources	33 %	67 %	0 %
Liquidity monitoring and cash flow management	22 %	67 %	11 %
Review and compilation of medium-term and long-term financial plans	20 %	80 %	0 %
Medium-term and long-term business performance analysis	0 %	100 %	0 %
Proposing marina strategy and development	43 %	29 %	29 %
Investment plan assessment and compilation, identifying the most favorable sources of funding	25 %	50 %	25 %
Coordination and representation of the marina in front of financial and tax authorities	0 %	0 %	100 %
Controlling	0 %	100 %	0 %
Knowledge of economics	0 %	100 %	0 %

Table 4.
Knowledge and skills for the fourth key task

Communication and coordination with external (partners, guests) and internal (employees) stakeholders	MANNER OF KNOWLEDGE AND SKILL ACQUISITION		
	education	both	work exp.
Knowledge and implementation of ISO[1] standards and norms	11 %	89 %	0 %
Identifying and resolving issues relating to service provision and quality processes	85 %	15 %	0 %
Recognition of the needs of the local population	100 %	0 %	0 %
Recognition of the importance of networking and regional cooperation	60 %	40 %	0 %
Excellent knowledge of English and other foreign languages, communication skills	10 %	90 %	0 %
Organizational skills and ability to manage larger groups	75 %	25 %	0 %
Cooperation with tourist agencies and tourist boards, development of the business partner network (marina networking)	70 %	20 %	10 %
Managing port operations employees and their training	82 %	18 %	0 %
Charter research	100 %	0 %	0 %
Marketing	0 %	100 %	0 %
Sales skills	0 %	100 %	0 %

1. ISO-Interantional Organisation for Standardization.

Table 5.
Knowledge and skills for the fifth key task.

Protection of the sea and the sea environment	MANNER OF KNOWLEDGE AND SKILL ACQUISITION		
	education	both	work exp.
Knowledge and implementation of the MARPOL[2] convention and any amendments thereof	67 %	33 %	0 %
Familiarity with the systematic approach to environmental protection	40 %	60 %	0 %
Knowledge of EU regulations, norms and directives, as well as of the principles of environmental protection	9 %	91 %	0 %
Monitoring of the maritime legislative framework and meeting the requirements relating to the health, safety and protection of the marine environment	20 %	80 %	0 %
Knowledge of regulations pertaining to hazardous materials and hazardous waste disposal in compliance with such regulations	20 %	80 %	0 %
Sustainable development planning and composing future pollution prevention plans	80 %	0 %	20 %
Planning and coordinating concession activities relating to dangerous and hazardous waste disposal	67 %	33 %	0 %

Table 6.
Knowledge and skills for the sixth key task.

Improving the knowledge of maritime law and other relevant regulations	MANNER OF KNOWLEDGE AND SKILL ACQUISITION		
	education	both	work exp.
Implementation and knowledge of the domicile maritime law framework and accompanying international legal and EU regulations	43 %	57 %	0 %
Knowledge and implementation of the Maritime Code, Customs Act and Maritime Domain and Seaports Act	17 %	83 %	0 %
Implementation of commercial law	20 %	80 %	0 %
Knowledge of transport insurance	0 %	50 %	50 %
Recognition and application of classification society requirements	100 %	0 %	0 %
Keeping professional secrecy	50 %	0 %	50 %
Foreign language	0 %	100 %	0 %

2. MARPOL- International Convention for the Prevention of Pollution from Ships.

3.2.3. Correlation between key tasks and the knowledge and skills for the occupational standard of Maritime personnel Training and Education Coordinator

The following tables (7-11) illustrate the knowledge and skills required for the performance of each key task specific to the profession *Maritime personnel Training and Education Coordinator*. Similar as for results relating to the profession of *Manager*, a more detailed analysis of the required knowledge and skills, as well as of the manner of their acquisition are indicated in percentages in each individual table.

Table 7.
Knowledge and skills for the first key task.

Monitoring the need for education and training of new and existing maritime personnel	MANNER OF KNOWLEDGE AND SKILL ACQUISITION		
	education	both	work exp.
Knowledge of the STCW[3] convention and amendments thereof, as well as of the manner of promotion of maritime officers and maritime mechanical engineers	55 %	45 %	0 %
Assesment of shipowners and training program user requirements	90 %	10 %	0 %
Familiarity with the dynamic nature of the maritime market and an understanding of the forces shaping the maritime industry and activities	100 %	0 %	0 %
Analysis of the offer/demand ratio for specific types of maritime personnel on the maritime market	67 %	33 %	0 %
Knowledge of statistical methods used in the long-term planning process	50 %	50 %	0 %
Knowledge and implementation of the SMS[4] ordinance	75 %	25 %	0 %
Risk assessment abilities	75 %	25 %	0 %
Knowledge and implementation of ISO standards and norms	33 %	67 %	0 %
Foreign language knowledge	0 %	100 %	0 %
Expert knowledge	0 %	100 %	0 %
Adjustment	100 %	0 %	0 %
Team work	100 %	0 %	0 %
Transfer of knowledge	100 %	0 %	0 %
MLC[5]	0 %	100 %	0 %

3. STCW-International Convention on Standards of Training, Certification and Watchkeeping for Seafarers.
4. SMS-Safety Management System.
5. MLC- Maritime Labour Convention.

Table 8.
Knowledge and skills for the second key task.

Coordination and organization of specialized training programs	MANNER OF KNOWLEDGE AND SKILL ACQUISITION		
	education	both	work exp.
Exceptional communication skills when acting as an agent between the training center and clients in need of training	100 %	0 %	0 %
Methods of planning and scheduling of educational programs to optimize time utilization	60 %	20 %	20 %
Maritime technical knowledge (ship class, type, intended use)	40 %	40 %	20 %
Ability to assess the relevance and quality of a particular training program	100 %	0 %	0 %
Business skills and ability to work under pressure	0 %	0 %	100 %
Ability to manage large groups and recognize the needs of others	100 %	0 %	0 %
Knowledge and implementation of ISO standards and norms	25 %	50 %	25 %
Identification and resolution of issues relating to training program provision and quality	100 %	0 %	0 %
Knowledge of national and international maritime regulations, conventions and declarations	50 %	13 %	38 %
Resourcefulness	100 %	0 %	0 %
STCW convention requirements	100 %	0 %	0 %
Organizational skills	100 %	0 %	0 %
Marketing knowledge	100 %	0 %	0 %
Foreign languages	100 %	0 %	0 %
Work under pressure	100 %	0 %	0 %

Table 9.
Knowledge and skills for the third key task.

Administration and maintenance of educational programs data	MANNER OF KNOWLEDGE AND SKILL ACQUISITION		
	education	both	work exp.
Familiarity with the provisions of the ILO[6] convention, the Labor Act and trade union demands	25 %	50 %	25 %
Knowledge of the components of the WHO[7] and the IMO[8] relating to the required international certificates	67 %	33 %	0 %
Knowledge and implementation of national legislation regulating the verification of authenticity of accompanying documentation and certificates	50 %	30 %	20 %
Creation of personal student progress portfolios	75 %	25 %	0 %
Computer skills in complex database maintenance, use of maritime computer programs	17 %	83 %	0 %
Knowledge of regulations from the field of adult education	0 %	100 %	0 %
Familiarity with the principles of lifelong learning	50 %	50 %	0 %
Knowledge of the STCW convention, as well as of the manner of promotion of maritime officers and maritime mechanical engineers	44 %	22 %	33 %
Going into details	100 %	0 %	0 %
Orderliness	100 %	0 %	0 %
Business communication	0 %	100 %	0 %
Knowledge of the MLC	0 %	100 %	0 %

Table 10.
Knowledge and skills for the fourth key task.

Education programs cost management	MANNER OF KNOWLEDGE AND SKILL ACQUISITION		
	education	both	work exp.
Basic accounting knowledge	25 %	50 %	25 %
Ability to plan future costs	33 %	17 %	50 %
Ability to allocate and optimize the use of resources	67 %	0 %	33 %
Compilation of a financial plan for a particular period	40 %	20 %	40 %
Planning and anticipating trends on the maritime labor market from the aspect of profitability	75 %	0 %	25 %
Ability to assess risky situations	0 %	50 %	50 %
Negotiation skills when contracting training courses	100 %	0 %	0 %

Table 11.
Knowledge and skills for the fifth key task.

Cooperation with competent national authorities and international training service providers	MANNER OF KNOWLEDGE AND SKILL ACQUISITION		
	education	both	work exp.
Knowledge and implementation of national legislation	64 %	18 %	18 %
Recognition of importance of networking and cooperation	40 %	60 %	0 %
Monitoring of the latest trends on the maritime market and identification of potential partners	88 %	0 %	13 %
Excellent communication and negotiation skills	71 %	14 %	14 %
Cooperation with shipping companies, business partner network development	100 %	0 %	0 %
Excellent English speaking and writing skills	22 %	56 %	22 %
Establishing and maintaining relations with foreign shipping companies	100 %	0 %	0 %
Familiarity with international legislation	100 %	0 %	0 %
Professional qualifications	100 %	0 %	0 %

6. International Labour Organisation.
7. WHO- World Health Organisation.
8. IMO- International Maritime Organisation.

3.3. Key Competences for Lifelong Learning

Key competences for lifelong learning are a part of generic skills considered necessary in a variety of different professions, defined in 2006 by the EU as competencies required for social inclusion, employment and lifelong learning. The last part of the questionnaire examined the extent to which work at the respective workplace required developed key competences for lifelong learning.

Apart from key competences for lifelong learning, the survey also examined other generic skills. The results (for both professions) indicate that the employers generally consider all such skills necessary.

Responsibility and focus on clients' needs are considered the most important for the profession of *Manager* (M=4.64, SD=0.68), with compassion (M=3.89, SD=0.74) getting the lowest average rating. Responsibility at the workplace (M=4.48, SD=0.58) is considered the most important for the profession of *Coordinator*, with awareness of environmental protection getting the lowest average rating 3.54 (SD = 1.10).

4. CONCLUSION

The implementation of the described project is compatible with the goals of the Strategy of Education, Science and Technology of the Republic of Croatia and the Croatian Qualifications Framework intended to establish a correlation between the labor market and educational programs at all levels. By establishing relations with key partners from the maritime sector, the Maritime Management study program will correlate with and become more responsive to the needs of the labor market through the development of occupational and qualification standards.

It should be noted that this is the first labor market research to deal with the needs of the employers, contents of a profession and workplace specification. The research results indicate that, in spite of the novelty of the professions, they have both been recognized by employers.

The research results indicate that the employers believe that the profession of *Manager* necessitates graduate university studies (Level 7), while the profession of *Coordinator* required undergraduate studies (Level 6).

The employers recognized the importance of generic skills, i.e. key competences for lifelong learning, stressing the focus on clients' needs as the most important competence for the profession of *Manager*, and responsibility at the workplace as the most important competence for the profession of *Coordinator*.

Well-conceived occupational and qualification standards are connected by learning outcomes. Qualification standards are defined on the basis of the knowledge and skills established by the applicable occupational standard, i.e. learning outcomes are defined as competences acquired through learning and proven by appropriate tests. The employers are thus also given an important role in the creation of educational programs, whereby a direct correlation is established between the educational system and the needs of the labor market.

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Linguistic Analysis of English Advertising Slogans in Yachting

Tomislav Skračić, Petar Kosović

The paper discusses the linguistic characteristics of yachting slogans, short messages that advertise sail and power boats, boating equipment and services in nautical magazines. The objective of the paper has been to identify and describe the language features of yachting slogans at phonological, lexical, syntactic and semantic level, with due attention drawn to the functionality of these messages in comparison with the messages relayed by slogans in other trades. The study has revealed that, due to the specific market niche, most yachting slogans tend to use specific language devices and discourse. The qualitative analysis has enabled familiarisation with the principles of creating advertising slogans in yachting and their most prominent strengths and weaknesses. Hence professionals involved in designing and releasing advertising slogans may also find the results of the study useful.

KEY WORDS
~ Advertising
~ Slogan
~ Yachting
~ Linguistics
~ Analysis

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1. INTRODUCTION

Advertising slogans are simple and memorable phrases that are designed to capture the essence of a product or a service and to efficiently relay the essential message a company (or country, city, destination...) wants its audience to remember. This paper discusses the language features and the function of slogans advertising sail and power yachts and boating equipment and services, hereafter referred to as "yachting slogans". The corpus consists of slogans that appeared on the pages of four nautical magazines, in their issues that came out over a one year period.[1] Other "non-yachting" slogans, used for illustration and comparison with yachting slogans, have been borrowed from the works cited in the list of references. Like all advertising messages, yachting slogans are designed to attract attention of the target population, to create desire and drive to action. The objective of the paper has been to identify and analyse specific features of yachting slogans at phonological, lexical, syntactic and semantic levels, with due attention drawn to their functionality in comparison with the messages relayed by slogans in other trades. The descriptive method has been applied to define and explain the meaning and purpose of the slogans. The stylistic analysis has been used to identify the tools that make yachting slogans original, functional and able to deliver specific messages to a specific consumer niche. The study has revealed that these messages have their intrinsic discourse and a recognisable "personality" of their own. The study has also enabled familiarisation with the principles and techniques of creating advertising slogans. The presented analysis of features, specific potentials and constraints of these short phrases provides

1. More, 2010, Frabra press d.o.o., Croatia; Nautica, 2009, Profectus media d.o.o. (Croatian edition); Yachts Croatia, 2013, D. Š. Savjetovanje d.o.o.; Val navtika, 2013, Val navtika d.o.o., Slovenia.

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slogan designers with certain guidelines so that they too may find the results of the study useful.

2. MISSION OF THE ADVERTISING SLOGAN

An advertising slogan is an important element in brand building. Along with other advertising elements (text, specification, image, logo, video, music, jingle…), an advertising slogan helps develop a recognisable image for the product, service or cause it is representing (Ke and Wang, 2013; Conley, 2010). For example, the slogan *Washing machines live longer with Calgon* suggests that Calgon dishwasher tablets are smart technology-friendly products. This inevitably enhances their competitiveness among the products featuring similar quality and price. Combined with a catchy jingle, the slogan may remain in consumer's memory forever. Nike's simple logo and equally simple slogan *Just do it* – a piece of advice saying "do not stall, do not procrastinate" – encouraged thousands of people across the world to get off the couch and "do it", i.e. go outdoors, start exercising and start buying Nike products.

2.1. Brand Slogans and Business Slogans

In the advertising business there are two basic types of slogans: brand slogans and business (or corporate) slogans. According to O'Guinn, Allen and Semenik, brand advertising communicates the specific characteristics, values, and benefits of a particular brand, affecting the way consumers view the brand (i.e. product / service / cause / destination…) compared to others.[2] Famous brand slogans include *It gives you wings* (Red Bull), *Melts in your mouth, not in your hands* (M&Ms), *It keeps going, and going, and going* (Energizer Batteries), etc. *Just do it* may be considered as a brand slogan but it can be as well considered as a business (or corporate) slogan since it does not advertise just one product but an entire array of Nike products. Indeed, the slogan helped establish Nike as a recognisable brand worldwide, becoming part of the company's identity and reputation (Ke and Wang, 2013). Corporate slogans are designed to generate favourable attitude towards a company as a whole. Well-known users of corporate advertising include General Electric (*Imagination at Work*), L'Oréal (*Because you're worth it.*), Sea Ray (*Launch into living*) etc. While the business / corporate slogan "affects the company's image and reputation, the brand slogan affects the viewer's immediate reaction" (Solomon, 2015). However, both types of slogans are designed to attract attention, enter consumers' memory, affect emotions and motivate, i.e. influence the way consumers behave. They have similar mission, similar structure, and similar poetics. Therefore, for the purpose of this paper, brand slogans and business slogans are jointly referred to as "advertising slogans".

2.2. Common Characteristics of Advertising Slogans

In order to perform the above mentioned tasks, advertising slogans have to meet at least some of the essential requirements. Firstly, a slogan should emphasise the key benefit of a brand, and help differentiate the brand, i.e. make it recognisable on the market. For example, there are many vacuum cleaners with similar value-for-money on the market, but a consumer might pick an Electrolux because of the humorous and resolute message (*Nothing sucks like an Electrolux*). Similarly, if a consumer needs a sailboat of a specific size, there is a wide range of vessels that match both his/her preferences and budget. Marketing techniques and slogans are here to drive consumers towards a decision, suggesting that the brand they support is special, unique, better or *Different… Like you* (Saltus brokerage & charter). Furthermore, the slogan should make the consumer feel "good". The message should not be negative. *Life is good* (LG), *Beautiful. Colorful. You.* (Bonne Bell makeup), *The perfect moment between past and future* (Rochas watches), *Great ideas for small rooms* (Ikea), *You're in good hands* (Allstate Insurance), *My Goodness. My Guinness.* (Guinness), *Impossible is nothing* (Adidas), *Diamonds Are Forever* (De Beers) are examples of slogans that are positive, appealing and original.[3] Advertising messages are not supposed to be complicated or clumsy. The slogan *Get everything. Power, space and style. Live Itama.* (Itama yachts) is way too descriptive and hard to memorise. In addition, an average boater may find it difficult to understand what "Live Itama" might imply. Simplicity is crucial. The length may vary: there are very short messages: *Think different.* (Apple), *I ♥ NY* (State of New York), *Diversity is beautiful* (Kvarner region), *Connecting people* (Nokia). On the other hand, MasterCard's lengthy message *There are some things money can't buy. For everything else, there's MasterCard* is extraordinarily simple and memorable. It is not short but, as Stephen J. Conley puts it, it aims well at consumers' perception of values such as health, family, love etc. that "money can't buy", and at the feeling of insecurity that vanishes, as suggested, when having a MasterCard (Conley, 2010).

Most importantly, an advertising slogan should be memorable. It has to find its way into consumer's memory and stay there, in order for a consumer to associate the slogan with the product it is representing, and make the consumer feel a desire or need. Memorability may depend on how often and how long the slogan has been used in advertising.[4] It may also depend

2. More about the typology in: Thomas C. O'Guinn; Chris T. Allen; Richard J. Semenik, Advertising and integrated brand promotion, 6th ed., Mason, OH: South-Western, Cengage Learning, 2012, p. 33.

3. See the list of slogan's desirable characteristics in Stephen J. Conley, (2010), pp. 3-6.

4. The famous De Beers company slogan A Diamond Is Forever / Diamonds Are Forever, one of the long-lasting slogans, was created in 1948 by Frances Gerety, a copywriter who worked for N. W. Ayer & Sons, Inc.

on how efficiently the slogan is tied to a jingle (e.g. Calgon) and other audio and video material. Yet, the crucial factor that makes a slogan memorable is its own "personality", i.e. the language features and the message it conveys.

3. LINGUISTIC FEATURES OF SLOGANS IN YACHTING ADVERTISMENTS

The language used in advertising slogans is essential to the message they want to convey. Given their delicate mission, many yachting slogans make use of rhetoric devices, figures of speech and other tools which can be examined and discussed at phonological, morphological, lexical, syntactic and semantic levels.

3.1. Phonological Aspect

Mnemonic devices that help advertising slogans to be remembered by their targeted audience include sound techniques such as alliteration, assonance, rhythm, and rhyme. The latter is a very frequent phenomenon in advertising, commonly used in jingles, slogans and headlines. English is particularly suitable for creating rhymes due to a large number of one-syllable words. While the rhyme is quite common in slogans advertising children products and mass-consumption products (*Go well. Go Shell. – Shell; The best a man can get* – Gillette; *Do you … Yahoo!?* – Yahoo!), it is not very frequent in yachting advertisements, as they address a limited upscale clientele. Still, rhyme is not entirely banished: *Innovation, performance &* ***luxury****. Be the part of Sunseeker* ***family****.* (Sunseeker charter); *Safe. Strong.* ***Fast****. Built to* ***last****.* (Tailored marine, Queensland); *S****ea*** *Sympho****ny*** (Elan 400).

The latter example provides the assonance – another sound [i] in the second syllable, and the alliteration (repetition of similar vowel sounds). This combination is a dominant sound technique that ensures a remarkable euphonic effect (in the following examples the assonance is underlined whereas the alliteration is marked in boldface type): *The* ***s****unny* ***s****ide of* ***l****ife* (Monachus power boats); *Queen of the* ***seas since*** *1968* (Ferretti Yachts); ***Mo****tion and* ***Mo****bili****t****y* (ZF Transmissions); ***Set sail for success*** (Sealease service); ***A Riva is a Riva****. Always.* (Riva yachts – Ferretti Group). Assonance and alliteration can help the slogans to achieve a strong rhythm "needed to make it a repeatable sentence […] easily remembered by the audience" (Thi and Thuy, 2010). It is a very effective device which contributes to remembering both the acoustic and visual forms of a slogan.

Admen pay particular attention to graphics – colour, type and size of the script. It is not possible here to engage in a detailed analysis of graphic features of yachting slogans, but it is only fair to draw attention to the most frequent technique – capitalisation. Barbora Machynková distinguishes two types. The *initial* capitalization has an emphatic effect because the advertising message looks like a headline, like in Sea Ray's *Where Land Ends, Life Begins*. As a result, the meaning of each word is pointed out. It is typical for English language (Machynková, 2009). Full capitalisation is used in advertising slogans for similar reason: in Heesen Yachts' *Passion, Performance, Perfection*, words are written in small capital letters whereas the initials are normally capitalised, thus graphically reinforcing a strong alliteration of three P's and creating a beating effect – the rhythm.

Rhythm is often used in language of advertising as it has a powerful emotional and mnemonic effect that makes an advertisement or a slogan more memorable. The listener or reader may perceive it subconsciously without even noticing the effect. In literature, rhythm can be achieved by an extensive use of euphonic tools such as assonance, alliteration and rhyme as well as by the alteration of stressed and unstressed syllables. The repetition of similar or identical patterns of strong and weak stresses in lines of poetry is called metre. Yachting slogans almost always feature a regular metre (in the following examples the stressed syllables are marked in boldface type), such as an iamb, an unstressed syllable followed by a stressed syllable (*Be****come*** *u****nique*** – Velvet 115); a trochee, a stressed syllable followed by an unstressed one (***Powe****ring* ***bus****iness* ***world****wide* – Eaton powerware); a spondee, consisting of two stressed syllables (***Your turn****!* – Lagoon 52); a cretic, having an unstressed syllable between two stressed ones (***Brea****king* ***rules****.* ***Set****ting* ***trends*** – Hanse yachts), etc.

3.2. Lexical and Morphological Aspect

Given the targeted population of well-to-do consumers who can afford to own or rent a boat, slogans that advertise boating brands have specific qualities at the lexical level. Unlike words that are commonly used to direct the consumer preference towards mass-consumption products (*good, better, best, beautiful, real, great, pure, perfect…*), the selection of nouns and adjectives used in yachting slogans reveals the values that are advertised as essential in boating (and living). According to a number of the above-quoted messages, being at sea means being alive again: *Launch into living* (Sea Ray), *Start living* (Boot-Düsseldorf boat show). Sailing awakens emotions, imagination and dreams (*Your Ultimate Wave Dreams* – Brioni 44; *Dare to dream* – Princess 58; *Own the dream* – Vicem yachts). Furthermore, being at sea means to be free and independent (*The power to be independent* – Mastervolt electric equipment). Boating implies the absence of everyday limits (*No limits* – Mira, Alena & Fashion Yachts), it is associated with sophisticated life-style and elegance (*Simplicity with style* – Monachus power boats), and it ensures luxuries such as solitude and tranquillity (*The value of the tranquillity* –Lexsia yachts). Even the slogans that advertise pumps and marine toilets make use of the same word corpus, as in the lengthy and

alliteration-loaded *Powerful, efficient flush. Luxurious comfort* (4800 Series VacuFlush Toilets – Dometic Sealand Group).

Excessive exploitation of certain motives (*living, dream, style, emotion, performance, perfection*…) may reduce the strength of the desired effect and, even worse, lead to confusion. It is not surprising that a designer unintentionally creates a slogan that already exists: for example *PASSION, PERFORMANCE, PERFECTION* is used by Dutch yacht builder Heesen Yachts while *Passion, performance and perfection* is used by Focus, German company that produces bicycles and cycling products. As it was pointed out, one of the crucial tasks of a slogan is to help differentiate the brand. In this particular case, both slogans failed, not only because they are identical, but also because in all sorts of trade there are a number of other slogans which use the same word corpus. The saturation of messages may lead to a glut of generic, hollow statements that "simply generate noise in today's marketplace" (Conley, 2010).

Yachting slogans seldom contain numerals. When they do, numerals usually evoke a tradition that guarantees the brand's quality: *Yachts built on family bonds since 1875* (Lürssen), *125 years of heartfelt dedication* (Dräger gas detecting equipment), *Celebrating Adventure for 30 Years* (Adriatic Croatia International Club).

Generally speaking, the choice of verbs is very careful in advertising. Although the ultimate purpose of advertising is selling and making profit, advertisements seldom use the word "buy". Instead, the most frequently used verbs and phrasal verbs include *try, ask, get, take, let, send for, use, call, make, come on, hurry, see, give, come, remember, discover, serve, introduce, choose, and look for* (Thi and Thuy, 2010). Yachting slogans largely follow the rules, avoiding any associations with buying or spending money. Instead, they make use of common alternatives such as *take, get* or *discover*, but also introduce specific verbs that are related to the above mentioned values: *dare, capture, start, launch, sail, keep, feel, imagine, dream*… The most frequent modal verb is "can": *No storm can stop us* (Aicon yachts), *An idea can take you anywhere* (Pershing power boats), *Control Solutions You Can Trust* (Dynagen Controller). These examples also contain possessive and personal pronouns (you, us…) that tend to shorten the distance between producers and consumers and are therefore used in advertising discourse more often than in other discourses. The most powerful ones are pronouns *you* and *your* because they suggest personal relationship: ***Our*** *technology,* ***your*** *emotion* (Sacs S680).

Other lexical features include building new words (*Solutioneering Together – Yanmar*), collocations (*Breaking rules. Setting trends* – Hanse*; So worth it* – Bayliner), and intertextuality, i.e. the way one text echoes or refers to another text, a phenomenon sometimes difficult to recognize. Intertextuality can be inter-generic, e.g. *Evolution of the species* (Azimut 54), referring to Charles Darwin's theory of evolution, or intra-generic, meaning that one slogan refers to another one. The above quoted Dometic Sealand Group's slogan echoes in a series of messages supporting similar products (parallelisms are underlined or marked in boldface type or upper case):

Powerful, ***efficient flush****. Luxurious COMFORT.*
Inspired by COMFORT.
Powerful performance. Premium COMFORT.
Compact Design. Powerful, ***efficient flush****.*

3.3. Syntactic Level

The syntax of the slogans promoting boats and boating equipment and services may include various sentence types, everyday phrases, ellipsis, parallelism, repetition, idioms and, to a certain extent, other rhetorical devices. In general, noun phrases in advertisements are far more frequent than verb phrases.[5] Often, the advertising text does not contain any verb; it consists only of noun phrases, as in *Support without limits* (BluePoint Yachting) or *The Heart of the Yacht* (Volvo Penta). Adjectives are combined with nouns: *Unbeatable for Quality and Performance* (Gianneschi pumps and blowers) or used independently, usually in clusters, as in *Reliable, Clean, Quiet – and Powerful* (Cummins marine engines). If verbs are used, the phrase may be exclamative (*Your imagination is the limit!* – Vanga 44; *What a yacht* – Bavaria; *Way of life!* – Suzuki outboard engines), but most frequently imperative: *Capture the dream* (Azimut 58); *Join the movement* (Garmin GPSMAP 720s); *Keep Sailing* (Hempel). Along with imperative, the prevailing verb forms include the present simple tense, usually in the third person singular (*feels / is / ends / begins*…), and gerunds: *Meeting regulations, protecting lives, lowering costs* (McMurdo safety equipment).[6]

Parallelisms are seldom used, but when they are, they contribute to building the rhythm that has already been developed at the phonological or lexical level (*Explore* ***your*** *world without leaving* ***your*** *home* – Bandido 75; *A small* ***family*** *business for big* ***family*** *fun!* – Splendor power catamarans). Anaphora is a rhetorical device repeating the same word or group of words at the beginning of successive clauses or verses to emphasize an image or a concept, as in ***Feels*** *like home.* ***Feelin'*** *alive* (Bond Alena 48). It inevitably includes alliteration, in this particular case: [f-l // f-l]. Unlike advertisements of mass-consumption products, which abound with epiphoras (repeating the same lexical material at

5. More about sentence types and patterns in: Jana Lapšanská, (2006), The language of advertising with the focus on the linguistic means and the analysis of advertising slogans, Comenius University in Bratislava.
6. See also the above examples of slogans containing: solutioneering, celebrating, powering, breaking, setting…

the end of successive clauses or lines), the corpus of the observed yachting slogans does not include a single example.[7]

On the other hand, they teem with elliptical structures. Phrases often lack essential elements such as nouns (subjects, objects), verbs, conjunctions… In the tour-de-force slogans ISAKINDOFMAGIC and ISACHOICE, it is clear that something is missing but it is not clear whether it is a noun, i.e. the boat Isa 120, or the verb IS and the indefinite article A – in case the capitals ISA are taken as the acronym of the Italian boatbuilder. According to Jana Lapšanská, the reader of the advertisement "turns to the visual layout, which provides him/her many clues to correct interpretation, so the explicit structure of the sentence is not so important" (Lapšanská, 2006). In *Shuts down outboard thieves*, it is not necessary to insist on the agent, as the name and image of the agent (Y-COP security system) appear in the photograph. *The sunny side of life* is an unpretentious phrase that sounds like a promise. As it is accompanied by an image of a Monachus power boat, it would be redundant and potentially counter-productive to avoid the ellipsis and say "Monachus power boats take you to *the sunny side of life* / enable you to experience *the sunny side of life*."

3.4. Semantic Level (Figurative Language)

Slogans that appear in boating magazines feature a variety of tropes, i.e. words or phrases that are "used in a way that is different from its usual meaning in order to create a particular mental image or effect" (Oxford Advanced Learner's Dictionary, 2001). Figurative language of yachting slogans includes metaphor, personification, metonymy, hyperbole, antithesis and, less frequently, pun (word play), symbol or paradox.

Dubovičienė and Skorupa point out that metaphor contributes to the aesthetics of the message and emphasizes the main idea, "describing one object in terms of another, usually by means of implicit comparison", listing a number of famous slogans: *Bounty - the taste of paradise* (Bounty candy bar), *Put a tiger in your tank* (Esso), *It gives you wings* (Red Bull) (Dubovičienė and Skorupa, 2014). Correspondingly, metaphor is an efficient tool in yachting advertisements. Here are some of the slogans that have already been discussed: *Sea Symphony, Queen of the seas since 1968, The Heart of the Yacht*.

Metonymy uses a single characteristic of a person, product, system or phenomenon to identify the entire entity. The association is always logical.[8] In *Simplicity with style*, metonymy is used to underline one of the recognisable features (simplicity) of a complex and therefore complicated product such as a cruising power yacht, namely Monachus lobster. There is also a noticeable effect of antithesis (simplicity / complexity). Antithesis is a figure of speech which expresses two opposite ideas in order to emphasise the meaning and the contrast: *A **small** family business for **big** family fun!* (Splendor power catamarans); ***Perfect** Epoxy for an **imperfect** world* (WEST System Epoxy). Hyperbole, a deliberate use of overstatement or exaggeration to achieve emphasis, is also frequent in yachting slogans: *For Emperors and Princesses* (Brioni 44); *No storm can stop us* (Aicon yachts); *Making progress possible* (Caterpillar marine engines). Other forms of figurative language in yachting slogans include personification, attribution of human qualities to inanimate objects (*Yachts with Ambition* – Steeler Yachts), and synaesthesia, blending of different sense modalities (*Blue Power* – Victron Energy electric products). These tropes represent a potential goldmine: they are not overexploited and are consequently "fresher" and more efficient.

The same goes for all the other underused language tools at the phonological, lexical, syntactic and semantic levels, i.e. transliteration (transformation of foreign words into English), pun (word play), symbol, paradox, polysemy, etc. It might be a sound business decision to make more use of them, instead of insisting on the overexploited language resources that have become hollow and inefficient.

4. CONCLUSION

Unlike every-day marketing discourse or any other discourse associated with boating (specification, reviews, tests of vessels and equipment, articles…), yachting slogans abound in linguistic techniques and figures of speech which have been discussed here at phonological, lexical, syntactic and semantic levels. It has been found out that, although yachting slogans comply with the general advertising rules, tending to be simple, euphonic, mnemonic, etc., they often adopt a distinct "personality" of their own.

At the phonological level, specific mnemonic devices have been observed. While rhymes – often associated with mass production – are rather rare, yachting slogans abound in alliteration, assonance and other tools that create euphony and rhythm. The latter is further reinforced by using regular metres, i.e. alteration of similar or identical patterns of strong and weak stresses.

Given the targeted market niche, yachting slogans have certain specific qualities at the lexical level as well. The dominant word forms are not adjectives but nouns – usually referring to a limited group of motives associated with living,

7. See epiphoras in these examples (marked in boldface type): If anyone **can**, Canon **can** (Canon), Buy **it**. Sell **it**. Love **it** (Ebay), Heavy **industries**. Happy **industries** (Hyundai), See **new**. Hear **new**. Feel **new** (Nokia). (T. Dubovičienė and P. Skorupa, (2014), The Analysis of some Stylistic Features of English Advertising Slogans, Man and the Word / Foreign Languages, Vol. 16, No. 3, pp. 61-75, Lithuanian University of Educational Sciences.
8. For example, the British monarchy is often referred to as the "Crown".

style, elegance, emotions, imagination, dreams, independence, exploration, solitude, harmony, perfection. Slogans often refer to a boatbuilding tradition as a guarantee of quality. The corpus of the observed slogans has revealed an excessive exploitation of certain motives (*living, dream, style, perfection*…). Such slogans fail to carry out their principal task – to differentiate the brand. Overused words become trite, vacuous phrases to an average consumer. This may result in undesired effects and should be evaded in advertisement designing. Like slogans in other trades, yachting slogans avoid associations with buying or spending money by using verbs like *take, get* or *discover*, but they also use specific verbs such as *dare, capture, launch, sail, imagine*, often in the form of imperatives or gerunds. Pronouns like *you, we, us, our, your*… are essential in suggesting personal relationship between producers and consumers.

The syntax of yachting slogans does not include all sentence types. Elliptical structures and noun phrases, with or without adjectives, are dominant. Yachting slogans never use questions, rhetorical questions that assume one possible answer, presuppositions, or comparisons. Parallelisms like anaphoras are sometimes used to reinforce the rhythm that has already been developed at the phonological or lexical level.

Finally, at the semantic level, slogans that appear in boating magazines frequently use figurative language, especially metaphor, metonymy, hyperbole and antithesis. Unlike advertising messages in other trades, yachting slogans seldom use synaesthesia, personification, pun, symbol, polysemy, or paradox. The low frequency of these tropes is potentially a great opportunity: from the business standpoint, it might be sound to use them more frequently, instead of insisting on the overexploited language resources that do not appeal to the targeted consumers efficiently any more.

Table 1.
List of the Advertising Slogans in Yachting Examined in this Paper (in Order of Appearance).

Imagination at Work	(General Electric)
Launch into living	(Sea Ray)
Different… Like you	(Saltus brokerage & charter)
Get everything. Power, space and style. Live Itama.	(Itama yachts)
Diversity is beautiful	(Kvarner region)
Innovation, performance & luxury. Be the part of Sunseeker family.	(Sunseeker charter)
Safe. Strong. Fast. Built to last.	(Tailored marine, Queensland)
Sea Symphony	(Elan 400)
The sunny side of life	(Monachus power boats)
Queen of the seas since 1968	(Ferretti Yachts)
Motion and Mobility	(ZF Transmissions)
Set sail for success	(Sealease service)
A Riva is a Riva. Always.	(Riva yachts – Ferretti Group)
Where Land Ends, Life Begins.	(Sea Ray)
Passion, Performance, Perfection	(Heesen Yachts)
Become unique	(Velvet 115)
Powering business worldwide	(Eaton powerware)
Your turn!	(Lagoon 52)
Breaking rules. Setting trends.	(Hanse yachts)
Start living	(Boot-Düsseldorf boat show)
Your Ultimate Wave Dreams	(Brioni 44)
Dare to dream	(Princess 58)

Own the dream	(Vicem yachts)
The power to be independent	(Mastervolt electric equipment)
No limits	(Mira, Alena & Fashion Yachts)
Simplicity with style	(Monachus power boats)
The value of the tranquillity	(Lexsia yachts)
Powerful, efficient flush. Luxurious comfort	(VacuFlush Toilets – Dometic Sealand Group)
Yachts built on family bonds since 1875	(Lürssen)
125 years of heartfelt dedication	(Dräger gas detecting equipment)
Celebrating Adventure for 30 Years	(Adriatic Croatia International Club)
No storm can stop us	(Aicon yachts)
An idea can take you anywhere	(Pershing power boats)
Control Solutions You Can Trust	(Dynagen Controller)
Our technology, your emotion	(Sacs S680)
Solutioneering Together	(Yanmar)
So worth it	(Bayliner)
Evolution of the species	(Azimut 54)
Inspired by comfort.	(Dometic Sealand Group)
Powerful performance. Premium comfort.	(Dometic Sealand Group)
Compact Design. Powerful, efficient flush.	(Dometic Sealand Group)
Support without limits	(BluePoint Yachting)
The Heart of the Yacht	(Volvo Penta)
Unbeatable for Quality and Performance	(Gianneschi pumps and blowers)
Reliable, Clean, Quiet – and Powerful	(Cummins marine engines)
Your imagination is the limit!	(Vanga 44)
What a yacht	(Bavaria)
Way of life!	(Suzuki outboard engines)
Capture the dream	(Azimut 58)
Join the movement	(Garmin GPSMAP 720s)
Keep Sailing	(Hempel)
Meeting regulations, protecting lives, lowering costs	(McMurdo safety equipment)
Explore your world without leaving your home	(Bandido 75)
A small family business for big family fun!	(Splendor power catamarans)
Feels like home. Feelin' alive	(Bond Alena 48)
ISAKINDOFMAGIC	(ISA Yachts)
ISACHOICE	(ISA Yachts)
Shuts down outboard thieves	(Y-COP security system)
Perfect Epoxy for an imperfect world	(WEST System Epoxy)
For Emperors and Princesses	(Brioni 44)
Making progress possible	(Caterpillar marine engines)
Yachts with Ambition	(Steeler Yachts)
Blue Power	(Victron Energy electric products)

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Bareboat Charter Registry

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The purpose of this article is to establish the concept of the bareboat charter registry and draw attention to a few significant international conventions that govern certain aspects of the bareboat charter registry. Also, the purpose is to present models which various countries apply to regulate the registration of vessels during the bareboat charter and analyse the contents of the provisions of the bareboat charter that regulate the relations between the contracting parties who wish to have the vessel registered in the bareboat charter registry. BIMCO's Standard Bareboat Charter, also known under the code name BARECON 2001, will be used to lay out the provisions applicable to vessels registered in the bareboat charter registry.

KEY WORDS
~ Bareboat charter
~ Bareboat charter registry
~ BARECON 2001

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1. INTRODUCTION

When discussing the distinctive features of a bareboat charter which warrant its separation from other modes of use of maritime vessels, among other things to be listed one certainly must mention the bareboat charter register. The bareboat charter register is a particularly significant phenomenon in maritime law, primarily when it comes to regulations on the registration of vessels. However, it does suffer from a lack of certainty when it comes to its legal nature and interpretation.

Bearing that in mind, this paper (which is first and foremost descriptive) aims at establishing the legal nature of the concept of bareboat charter register. For that purpose, this paper will outline the provisions of several maritime conventions that govern certain aspects of the registers in question, describe the models that various countries use to regulate the registration of chartered vessels in the bareboat charter register, and ultimately analyse the bareboat charter provisions which regulate the relations between the contracting parties at the registration of the vessel in the bareboat charter register. That part starts with the practice and "unique" use of standard contract forms that facilitate legal transactions between contracting parties. One such form is the Standard Bareboat Charter, known under the code name BARECON 2001,[1] issued by Baltic and International Maritime Council (BIMCO). Part V of the said form contains provisions under the heading Provisions to apply for vessels registered in a bareboat charter registry, which we will analyse in full in order to determine whether they meet the needs of the contracting parties who wish to regulate their relations. However, the complex matter of bareboat charter register can be grasped

1. BARECON 2001 is available in its entirety on BIMCO web site: https://www.bimco.org/~/media/Chartering/Document_Samples/Sundry_Other_Forms/Sample_Copy_BARECON_2001.ashx [accessed 10 January 2016].

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only if one determines the fundamental elements of a bareboat charter, which we will do below.

2. MAIN FEATURES OF THE BAREBOAT CHARTER

The bareboat charter can appear as a simple contractual relation: the owner gives a vessel to the charterer to use for the performance of sea-going activity, and the charterer pays hire to the owner in consideration of the performance of the same activity. However, this contractual relation is far from simple. The complexity of this contract can be seen in the complex system of relations that arises from the provisions of the vessel for use. As we are talking about the bareboat charter, two important facts should be pointed out. First, by concluding the contract, the owner gives the vessel for use to the charterer, i.e. delivers the vessel into possession, so the charterer can use it as agreed. Second, by concluding the bareboat charter contract, the property transfers from the owner to the charterer, whereby the charterer becomes the shipoperator or, as it is called in legal literature, becomes the "maritime owner" (Brajković, 1951), i.e. "owner pro hac vice" (Tetley, 2001).

It is necessary to emphasize that it is the transfer of the possession right and the function of the operator from one contracting party to the other which forms the essence of this complex legal matter, thus increasing the importance of the bareboat charter contract as the operator is considered a complex function in the maritime law.

Standard Bareboat Charter, code name BARECON 2001, the last bareboat charter form by the international maritime association Baltic and International Maritime Council (BIMCO), which we used as the example of the bareboat charter contract, follows in its entirety the stated main features of the contractual relation of the bareboat charter. The form BARECON 2001 contains many provisions which are used for regulation of the parties' rights and obligations. The usual provisions that regulate the relations between the parties to the bareboat charter (e.g. charter period, delivery, time for delivery, cancelling clause, hire, mortgage, insurance and repairs, etc.) are accompanied by several optional BARECON 2001 provisions: provisions to apply for newbuilding vessels only (Part III), hire/purchase agreement (Part IV) and provisions to apply for vessels registered in the bareboat charter registry (Part V). It is these special provisions that regulate the relations between the parties to the bareboat charter which we will be dealing with when outlining the concept of the bareboat charter register.

3. THE CONCEPT OF THE BAREBOAT CHARTER REGISTRY

When all the characteristics of a bareboat charter are taken into account, it is obvious that, upon the conclusion of this contract, the ownership of the vessel is reduced to a matter of marginal importance, whereas its economic exploitation becomes increasingly relevant.[2] The State which keeps the original register of vessels and issues title certificates has little control over the chartered vessel or no interest in it. In such cases, the vessel's link with the charterer's State becomes more relevant than the vessel's link with the owner's State. That is particularly evident in cases in which the charterer's State is ready, willing and able to exercise jurisdiction over such vessels. In the eyes of the law, the charterer's position has been regarded as important to such extent that the term *charterer's nationality* has been gaining ground as a counterbalance to the term *owner's nationality* (Tomljenović, 1998). Consequently, the distinction and the difference between the flag and the nationality of the vessel have been more pronounced lately, reinforcing the position that the vessel need not navigate under the flag of the State of registration, but is rather granted a temporary authorisation to fly the flag of the charterer's State (Tomljenović, 2005). The right of the vessel to navigate under the charterer's flag can be exercised upon the vessel's registration in the bareboat charter register.

In the context of legal developments regarding the registration of vessels, the concept of a bareboat charter register, also known as a *parallel* or *dual* register (Coles and Watt, 2002; Ademuni, 2005, 1997; Currie, 1989; Casino, 1989), is both significant and controversial (Tomljenović, 2005). Some countries responded to the chartered vessel phenomenon by amending their legislation to allow the vessel to fly the *ad hoc* flag of the charterer's State (Tomljenović, 2000). The vessel remains registered in the underlying register, but is flying the flag of the charterer (the disponent owner), based on the entry in the bareboat charter register (Tetley, 1994, p. 217; Ademuni, 1998). The vessel that is registered in the bareboat charter register is not removed from the underlying register, but temporarily "frozen", and the legal effect of the registration in the underlying registry is fully reinstated once the charter is terminated. At this point it should be noted that the vessel registered in the bareboat charter registry is not stripped of its nationality during that period. However, in terms of documents and events on board the vessel, it is subject to the State that keeps the bareboat charter registry.

The literature uses the terms *parallel* or *dual* to describe the bareboat charter register, and some authors think that this is the very reason why the legal nature of registration of the vessel in the bareboat charter register might seem confusing. What is more, the terms *parallel* and *dual* might imply that the vessel is subject to two separate jurisdictions and that it holds more than one nationality. Some authors go so far as to state that the term

2. Introducing the distinction between property rights and the rights to use and operate the vessel resulted in a separation between the regulations on the rights in rem and the regulations on the use of vessel, whereby the vessel's elements are qualified either as "static" (rights in rem pertaining to the vessel) or "dynamic" (operation of the vessel) (Tomljenović, 1998, p. 251).

dual should not be used at all in reference to the register. They believe that this term means that the vessel has a number of rights and obligations in both countries and that it entitles the charterer to choose at will which flag to fly (Argüello, 2011).

The bareboat charter register is certainly not meant to "duplicate" the vessel's registration because that would violate the international regulations (Argüello, 2011). Namely, Article 6 of the Convention on the High Seas of 1958 and Article 92 of the United Nations Convention on the Law of the Sea of 1982 stipulate that a vessel which sails under the flags of two or more States may be assimilated to a ship without nationality.[3]

Certain aspects of the bareboat charter register were supposed to be regulated by the United Nations Convention on Conditions for Registration of Ships.[4] However, that document never came into force.[5] Under Article 12(1) of the Convention of 1986, a State may grant registration and the right to fly its flag to a ship bareboat chartered-in by a charterer in that State, for the period of that charter.

The International Convention on Maritime Liens and Mortgages of 1993 bears greater relevance for the bareboat charter register; its Article 16 contains provisions on the temporary change of flag, the consequences it produces and the changes in mortgages and other registered charges.

A reference to "the State in which the vessel is registered" or to the "State of registration" found in the International Convention on Maritime Liens and Mortgages of 1993 signifies the State in which the vessel was registered immediately prior to the change of flag (Art. 16(a) of the Convention of 1993). This Convention is important in the part where it stipulates that the State of registration, or more precisely *the law of the State of registration*, is determinative for the purpose of recognition of registered mortgages and charges (Art 16(b) of the Convention of 1993). In other words, the law of the State of bareboat charter registration, i.e. the State whose flag the vessel is flying during the charter period, is not determinative for the purpose of recognition of registered mortgages, "hypothèques" and charges.

The State of registration shall require a cross-reference entry in its register specifying the State whose flag the vessel is permitted to fly temporarily; likewise, the State whose flag the vessel is permitted to fly temporarily shall require that a cross-reference specifying the State of registration be entered in its register (Art. 16(c) of the Convention of 1993). Under Article 16(d) of the said Convention, no State Party shall permit a vessel registered in that State to fly temporarily the flag of another State unless all registered mortgages or charges on that vessel have been previously satisfied or the written consent of the holders of all such mortgages, "hypothèques" or charges has been obtained.

The concept of the bareboat charter registry has been embraced by both the ship operators (because it brings down the crew costs in the developed countries) and many governments which, upon introduction of the bareboat charter register, reap the benefits in the form of employment of local seamen, inflow of foreign currency and the strengthening of the national fleet. Once in place, the charter register reduces the outflow of funds which otherwise would have occurred due to a shrinking national fleet (Ademuni, 1998). Numerous legal systems allow both foreign vessels to be registered in the national charter registers (known as bareboat charter-in) and national ships to be temporarily registered in foreign charter registers (known as bareboat charter-out) (Tomljenović, 1998).

4. BAREBOAT CHARTER REGISTRY ACROSS LEGISLATION

Italian legislation provides a model for bareboat charter-in and bareboat charter-out. Namely, Italy amended the Maritime Code of 1942 (Act 234 of 14 June 1989), and thereby established a special register for chartered vessels (*registro speciale*). Its purpose is the registration of the vessels that have previously been registered in foreign registers (*registro sostanziale*). For such registration one needs, among other things, a certificate issued by the State of original registration; once the vessel is registered in the Italian special register, the chartered vessel will temporarily be deprived of the right to fly the flag of the State of original registration. The registration in the Italian special register entitles the vessel to temporarily fly the Italian flag, but the vessel retains the nationality of the State that keeps the original register (*registro sostanziale*).

The English law provides for a bareboat charter register in its Merchant Shipping Act of 1995.[6] The English law differs from the Italian insofar as it only allows bareboat charter-in, and not bareboat charter-out. Article 17, bearing the heading *Ships bareboat chartered in by British charterers*, is important because it grants the right of registration in the bareboat charter register to the vessel chartered by the English charterer and also grants the right to fly the English flag to the vessel that is registered in the national charter register (Davis, 2005). The English law explicitly stipulates that the law of the country of original registration governs the property law relations pertaining to the chartered vessel (e.g. title, mortgage, etc.) (Art. 17(7) of the *Merchant Shipping Act* of 1995).

3. For the Convention on the High Seas refer to *Narodne novine [official gazette of the Republic of Croatia] – Međunarodni ugovori*, 12/94; for the United Nations Convention on the Law of the Sea refer to *Narodne novine – Međunarodni ugovori*, 9/00.
4. The Convention is available on: http://unctad.org/en/PublicationsLibrary/tdrsconf23_en.pdf [accessed 23 February 2016].
5. It has been stated that the Convention remained "a dead letter" (Kološ, 2010, p. 54-55).
6. Merchant Shipping Act is available on: http://www.legislation.gov.uk/ukpga/1995/21/contents [accessed 15 January 2016].

Some legal systems, such as French and Norwegian, neither prohibit nor specifically regulate the temporary suspension of vessels from the national register in case a foreign charterer is a party to the bareboat charter. Likewise, they neither prohibit nor specifically regulate the registration of a foreign vessel in the special national register in case a French/Norwegian charterer is a party to the bareboat charter (Ademuni, 1998).

5. REGISTRATION OF VESSELS IN THE BAREBOAT CHARTER REGISTER UNDER BARECON 2001

In view of the concept of the bareboat charter register, we will now specify the BARECON 2001 provisions that apply to the registration of vessels in the special national bareboat charter.

Part V of BARECON 2001 form, titled *Provisions to apply for Vessels registered in a Bareboat charter registry*, contains only three sections: *Definitions, Mortgage* and *Termination of Charter* by Default.

For the purposes of the application of the provisions of Part V of BARECON 2001, Article 1 defines the terms *Bareboat Charter Registry* and *Underlying Registry*. Bareboat Charter Registry means the registry of the State whose flag the vessel will fly and in which the charterer is registered as the bareboat charterer during the period of the bareboat charter. *Underlying Registry* means the registry of the state in which the owners of the vessel are registered as owners and to which jurisdiction and control the vessel will revert upon termination of the bareboat charter registration (BARECON 2001, Part V, Art. 1).

This part of BARECON 2001 also provides for mortgages. Namely, Article 2 of Part V refers to the application of Article 12(b) of Part II, which governs the legal relations of the contracting parties where there is a mortgage registered on the vessel. Under Article 12(b) of Part II, the owner warrants to the charterer that they have not effected any mortgage(s) other than stated in the charter in the box in Part I of the form. The provision of Article 12(b) of Part II states that the owners will not effect any mortgage(s) without the prior consent of the charterers, which must not be unreasonably withheld.

If the owner defaults in the payment of any amounts due under the mortgage(s), under BARECON 2001, the charterer may deregister the vessel from the bareboat charter register and terminate the charter without prejudice to any other claim that he may have against the owner (BARECON 2001, Part V, Art. 3).

6. CONCLUSIONS

The right of the vessel to navigate under the charterer's flag can be exercised upon the vessel's registration in the special national bareboat charter register. In other words, the chartered vessel will not fly its national flag, but the flag it is authorised to fly temporarily, i.e. the flag of the State of the charterer who is the disponent owner of the chartered vessel. It is important to note that the vessel remains registered in the original, underlying register, which means that it is not deregistered from the underlying register, but rather temporarily suspended, and will remain so for as long as it is registered in the bareboat charter register of the charterer's State.

Furthermore, the vessel registered in the bareboat charter register is not stripped of its nationality during that period. However, in terms of documents and events on board the vessel, it is subject to the State that keeps the bareboat charter register.

This specific concept of maritime law is in some aspects governed by the International Convention on Maritime Liens and Mortgages. Namely, when it comes to the recognition of registered mortgages and charges on the chartered vessel, the provisions of the said Convention explicitly stipulate that it is the law of the State of original registration, not the State of the charter registration, that is determinative for the purpose of recognition of registered mortgages, "hypothèques" and charges. International convention that was supposed to regulate the most important aspects of the bareboat charter registers never came into force. Now, there is a marked absence of a unifying instrument that would regulate the said concept comprehensively and at international level.

On the other hand, a mention should be made of the Italian and English law and their respective maritime codes which establish and regulate the concept of a bareboat charter register. The Italian law is particularly interesting because it provides both for bareboat charter – in and bareboat charter – out models, unlike the English law that only provides for bareboat charter – out model.

Finally, BARECON 2001 has been selected to outline the provisions governing the relations between contracting parties who wish to have the vessel registered in the bareboat charter register. In that respect, we can state that BARECON 2001 template pays special attention to the mortgages on the vessel. It stipulates, *inter alia*, that if the owner defaults in the payment of any amounts due under the mortgage(s), the charterer may deregister the vessel from the bareboat charter register and terminate the charter without prejudice to any other claim that he may have against the owner. Even though there are not many BARECON 2001 provisions that regulate the relations between the contracting parties who wish to register the vessel in the bareboat charter register, we should have no cause for dissatisfaction. The provisions available in the template are sufficient for the regulation of the relations between the contracting parties who wish to have the vessel registered in the bareboat charter register, and we therefore find them useful.

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The Importance of Maritime Law in Seafarer Training Pursuant to Amendments to the STCW Convention

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This paper explores the role of maritime law in seafarer training pursuant to amendments to the STCW Convention of 2010. The basic intention of the STCW Convention adopted in 1978 was to harmonize national regulations, seafarer training and training programs, as well as the conditions and manner of seafarer certification to raise general qualification levels of seagoing vessel crews. The STCW Convention is occasionally amended to allow legislation to take into account and stay abreast of the changing technical standards in shipping. The latest amendments to the STCW Convention were adopted at the Manila Diplomatic Conference in 2010, and entered into force and effect on 1 January 2012. Member states are required to complete the procedure of gradual implementation of the new provisions by 31 December 2016, with all seafarers being required to obtain certificates issued in accordance with the amended regulations by 1 January 2017. Although ship navigation during sailing has been significantly facilitated by the development of technics and technology, seafarers are now required to be well-versed in an increasing number of maritime law regulations and procedures promoting the safety of life and property at sea and the protection of the marine environment, while simultaneously ensuring unobstructed exploitation of ships. The latest amendments to the STCW Convention in this sense, in Model Course 7.01., impose additional seafarer training requirements, *inter alia*, broadening the scope of mandatory contents to be covered by maritime law courses required for the obtainment of the professional title of ship officer. The paper pays especially close attention to the newly adopted amendments and the conformity of national legislation proscribing seafarer training standards. However, it is exactly in the domain of seafarer training in maritime law that harmonization may be said to be incomplete.

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~ Seafarer training
~ STCW Convention
~ Model Course 7.01.
~ Ordinance on Vocations and Certificates of Competencies for Seafarers

1. INTRODUCTION

A person responsible for the safety of the vessel, persons and cargo must, by the nature of things, be present on board of every ship. This person must, given his functions, have the authority to issue commands. Such knowledge and skills are vested in the person of the Master. The Master is personally responsible for the safety, i.e. seaworthiness of the ship. The Master, i.e. Deck Officer on duty controlling ship operation must take any measures necessary to ensure the safety of the ship and the safety of navigation. The Master is likewise required to personally navigate the ship when required to ensure its safety. The Master and Deck Officers must execute their work tasks on the ship in keeping with their duties proscribed by the law, other regulations and rules of navigation, without jeopardizing the safety of life, property and the marine environment. However, these are not the only obligations of the Master. Apart from ensuring the safety of the ship and navigation, the Master also acts as the legal representative of the ship owner, authorized to conduct certain legal transactions on the behalf and for the account of the ship owner.

An increasing number of duties of the Master and Deck Officer in modern marine navigation concern the execution of special procedures proscribed by international conventions and national legislation. Apart from discharging his nautical and commercial duties, the Master is also required to perform tasks relating to certain legal procedures. It is therefore important for Masters to acquire, in the course of their training and prior to

earning their professional title at management level, *inter alia*, the legal know-how necessary for the overall ship management process, and especially required to ensure the safety of navigation and the protection of the marine environment. By knowing the norms of maritime law the Master secures his, and therefore his ship owner's position.

Inter alia, the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (the STCW Convention) proscribes seafarer training requirements. Model Course 7.01, adopted on the basis of the STCW Convention, proscribes contents every trainee is required to adopt in order to take the Master or Deck Officer exam. Knowledge of maritime law is a precondition for the obtainment of the highest professional titles at management level.

The paper analyses the relevance of maritime law in seafarer training, with special emphasis on the novelties introduced into Model Course 7.01., supplementing and expanding the knowledge base required to be adopted to earn professional titles at the management level. This primarily pertains to: United Nations Convention on the Law of the Sea, Maritime Labour Convention, salvage, marine insurance, stowaways, shipping agents and agencies, places of refuge, Master - pilot relationship, the International Convention for the Control and Management of Ships Ballast Water and Sediments, port state supervision and national legislation.

2. INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING, CERTIFICATION AND WATCHKEEPING FOR SEAFARERS (STCW CONVENTION)

The STCW Convention was adopted on 7 July 1978 and entered into force on 28 April 1984.[1] Amendments to the Convention were adopted at the 1995 Diplomatic Conference in London, which entered into force on 1 February 1997 and the 2010 Diplomatic Conference in Manila, which entered into force on 1 January 2012. It was the first convention to proscribe basic requirements for the training, certification and watchkeeping for seafarers at the international level. The STCW Convention sets minimum requirements binding on signatory countries and harmonizes national regulations on the training of seafarers to raise the general qualification level of seagoing vessel crews, which is simultaneously the purpose of the adoption of the STCW Convention, given that the so called human factor is the most frequent cause of maritime accidents. The STCW Convention is rightly considered one of the most important international instruments for the safety of navigation and the protection of the marine environment ever adopted under the auspices of the International Maritime Organization (IMO).

1. According to the data of the International Maritime Organization available on 21 January 2016, the STCW Convention was ratified by 160 states, representing 98,55% of the global merchant navy gross tonnage.

The STCW Convention is organized under the following eight chapters:
Chapter I: General provisions,
Chapter II: Master and Deck Officers,
Chapter III: Engine room department,
Chapter IV: Radio communications and the radio department,
Chapter V: Special training requirements for the crews of particular vessel types,
Chapter VI: Emergencies, safety-at-work, healthcare and survival,
Chapter VII: Alternative certificates,
Chapter VIII: Watchkeeping.

A number of supporting resolutions were also passed at the STCW Convention. The 23 resolutions are conceived as recommendations rather than having a compulsory character and regulate the issues from the Convention in more detail. Resolutions especially regulate specialized know-how required for certain ship types and parts and the performance of work tasks on board.

Amendments to the STCW Convention adopted at the 1995 Diplomatic Conference, together with amendments to the Annex to the Convention and the adoption of the so called STCW Ordinance significantly altered the Convention, making its provisions stricter, more precise and binding. The STCW Convention and the STCW Ordinance constitute a unique whole in which the rules stipulated in the Annex to the Convention are elaborated in Chapters of the Ordinance. The Ordinance consists of two parts – Part A is compulsory in nature[2], while Part B has the character of a recommendation.

The STCW Convention differentiates between three levels of responsibility - management, operational and support. The management level of responsibility applies to: (a) the Master, Chief Officer, Chief Engineer or Second Engineer Officer on a seagoing vessel or (b) i. e. to the assumption of overall responsibility for the proper performance of all or particular activities on a seagoing vessel. The operational level of responsibility applies to: (a) officers responsible for navigational watchkeeping or engine room watchkeeping or engineers allocated to the engine room which is occasionally left unmanned and radio operators on board seagoing vessels, i. e. (b) immediate responsibility for a particular activity. The support level of responsibility concerns assistance with navigational or engine room watch, watchkeeping in ports or cargo handling or transshipment operations on board a seagoing vessel.

The STCW Convention pays special attention to quality standard assurance at all levels. Every member state is required

2. Part A of the Ordinance contains mandatory provisions especially referred to in the Annex to the Convention, establishing in detail minimum standards member states (signatories) are required to implement for the Convention to have full and comprehensive effect. It also contains standards of competencies trainees must prove to possess to be certified or for their certificate of competency to be renewed pursuant to Convention provisions.

to ensure the identification of clear-cut education and training objectives and the standard of competencies to be realized, while simultaneously proscribing the levels of know-how, comprehension and skills suitable for testing and grading in compliance with the provisions of the Convention.

The signatories of the STCW Convention are required to submit to the IMO detailed information on all elements relevant for Convention implementation. This obligation includes having to notify the IMO of training programs, manner of examination, certification, system for monitoring the actual status of issued certificates, as well as of the staffing and the level of technical equipment at the disposal of authorized seafarer training and certification organizations and institutions.

The Republic of Croatia is required to ensure the systematic application of the provisions of the STCW Convention by establishing working cooperation between the competent state bodies, scientific and educational institutions, in order to raise the safety of navigation standards and enable Croatian seafarers to continue their successful navigation of the world's seas.

3. MODEL COURSE 7.01 (MASTER AND CHIEF OFFICER)

The Model Course program evolved from the numerous proposals of International Maritime Committee member state governments, following the adoption of the STCW Convention. Due to their contribution, the IMO published a number of courses assisting with the implementation of the STCW Convention, to facilitate access to the knowledge and skills rendered necessary by the increasingly sophisticated maritime technologies. The courses are flexible in application and may be used to assist maritime training institutions and their teaching staff with the introduction and organization of new training courses and to enhance, update or supplement existing training material. Every model course consists of the framework (scope, goal, entry level standards and other information on the course), course plan, detailed syllabus (including learning outcomes intended to be achieved after course completion), guidelines for educators and a grading summary.

Model Course 7.01. builds up the knowledge and skills of Deck Officers, improving their ability to ensure safety-at-work on board a ship and the protection of the marine environment. The content of Model Course 7.01. was revised following the 2010 amendments to the STCW Convention.

The 2014 version of Model Course 7.01., section 3.2. Monitoring and Control of Compliance with Legislative Requirements, proscribes mandatory content from the domain of maritime law. The nine sub-sections regulate:

1.1 Certificates and other documents required to be carried on-board ships by international conventions,

1.2 Responsibilities under the relevant requirements of the International Convention on Load Lines,

1.3 Responsibilities under the relevant requirements of the International Convention on Safety of Life at Sea (SOLAS),

1.4 Responsibilities under the International Convention for the Prevention of Pollution from Ships (MARPOL),

1.5 Maritime declarations of health and the requirements of the International Health Regulations (incoming documents and procedures, plague, cholera, yellow fever, documents),

1.6 Responsibilities proscribed by other international maritime law embodied in international agreements and conventions affecting the role of management level Deck Officers:

1.6.1 Convention on Facilitation of International Maritime Traffic (FAL),

1.6.2 United Nations Convention on the Law of the Sea (UNCLOS),

1.6.3 Maritime Labour Convention (MLC),

1.6.4 Collision,

1.6.5 Rescue and salvage,

1.6.6 Convention on Limitation of Liability for Maritime Claims,

1.6.7 Classification of companies,

1.6.8 Cargo (Hague-Visby Rules, Accident Investigation Ordinance, Charter parties, the Hamburg Rules),

1.6.9 Common average and marine insurance,

1.6.10 Marine insurance and liability (protest statement and lodging, protest letter),

1.6.11 Stowaways

1.6.12 Shipping agents and agencies,

1.6.13 Procedures in places of refuge,

1.6.14 Master-pilot relationship,

1.7 Responsibilities under international instruments affecting the safety of the ship, passengers, crew and cargo,

1.8 Methods and aids to prevent pollution of the marine environment by ships,

1.9 National legislation implementing international agreements and conventions.

In comparison with the previous version, new Model Course 7.01. introduces certain novelties in the domain of maritime law. The key and most important novelty is that the minimum number of hours dedicated to maritime law increased from 36 to 54. The new content required to be taught to and adopted by seafarers deals with: UNCLOS, MLC, salvage, marine insurance and liability, stowaways, shipping agents and agencies, places of refuge, Master/pilot relationship and national legislation. The above new contents and their relevance for the Master of a ship in international navigation will be examined and explained in further text.

3.1. United Nations Convention on the Law of the Sea (UNCLOS)

International relations relating to the sea and maritime activity must be regulated by international law, which, owing to its long history, developed as common law. In the 20th ct., attempts were made to codify the international law of the sea by the adoption of international conventions, which proved to be an exceptionally difficult task due to the sensitivity of the subject matter. Partial success was achieved in Geneva in 1958, when four international conventions were adopted: Convention on the Territorial Sea and the Contiguous Zone, Convention on the High Seas, Convention on Fishing and Conservation of the Living Resources of the High Seas and Convention on the Continental Shelf. Only a couple of years after entry into force of the Geneva conventions, the discussion on new regulation of maritime legal relations commenced, since the Geneva conventions were only relatively successful. For example, they failed to set the width of the territorial sea. The Third United Nations Convention on the Law of the Sea convened in 1973. After lengthy discussion and a number of sessions, the UNCLOS was ceremoniously signed in Montego Bay (Jamaica), on 10 December 1982. The convention, which entered into force on 16 November 1994, is considered one of the most important multilateral agreements in the international community, second only to the United Nations Charter.

The UNCLOS is a comprehensive codification document constituting the greater part of the international legal order. It balances out, on the one hand, the need to maintain the freedom of navigation (and other freedoms of the high seas) and, on the other, the need to meet the interests of coastal states in sufficiently large expanses of the sea in front of their shores (expansion of the epicontinental belt, establishment of economic belt and the institute of archipelagic waters of archipelagic states).

Seafarers are constantly in touch with the institutes of the international law of the sea. Their navigation most frequently begins in the internal waters of their own or another state, continues through the territorial waters, the economic belt and the high seas, only to end in internal waters (ports) again. They also have to deal with the issue of the freedom of the high seas, and especially the freedom of navigation guaranteed not only at high seas, but also in areas over which coastal states have sovereignty.

The UNCLOS envisages eight distinct legal regimes, each applying to a different part of the sea, the seabed and the underground, as well as the aerial space above the sea. The determination of the legal regime to be applied depends on the rights to certain uses of the sea like: navigation, fishing, pipeline and cable laying, aircraft overflight, scientific research of the sea and construction of artificial islands and devices within the confines of the respective space, which uses constitute exclusive rights of coastal states or freedoms (rights) benefiting all states, coastal and landlocked alike, as well as physical and legal persons worldwide. At high seas, all the above uses are freedoms belonging to all states. By contrast, in internal waters, archipelagic waters and even territorial sea, the majority of such uses are interpreted as exclusive coastal state rights. Apart from uses of the sea, owing to the increasing risk of pollution, coastal states are granted additional important jurisdictions relating to the protection and preservation of the marine environment. This issue is regulated by a separate part of the XII. Convention titled Protection and Preservation of the Marine Environment, containing norms of crucial importance not only for coastal, but for landlocked states and the future and fate of the humankind in general.

The UNCLOS consists of 17 parts covering all institutes of the international law of the sea like: the territorial sea and the contiguous zone, straits used in international navigation, archipelagic states, exclusive economic belt, epicontinental belt, high seas, island regime, closed or semi-closed seas, right of access of landlocked states to and from the sea and freedom of transit, protection and preservation of the marine environment, the Zone, scientific research of the sea, development and transfer of maritime technologies.

3.2. Maritime Labour Convention (MLC)

The MLC was adopted at the 94th session of the International Labour Organization (ILO) held in Geneva in February 2006, as a tripartite agreement between the governments, seafarer unions and ship owner's representatives.[3] Its intention is to further improve the status, i.e. working, living and social rights of seafarers, of whom there are 1,5 million worldwide and approx. 27 thousand in Croatia alone. Given its exceptional importance to seafarers, the MLC came to be known as the fourth pillar of quality shipping, supplementing the most important instruments of the IMO: SOLAS, MARPOL and STCW conventions. It is also known as the Maritime Labour Charter.

The MLC entered into force in August 2013, a year after being ratified by 30 ILO member states accounting for a total of 33 % of the world's tonnage. It has been ratified by 70 states accounting for 87 % of the world's total gross tonnage[4], including most of EU member states.

The MLC consolidates and modernizes standards set forth in 68 existing conventions and recommendations adopted by the ILO since 1920. Without imposing significantly different requirements, but still proscribing the obligations of the flag states and the obligation of port state inspection, the MLC

3. The delegates of 104 ILO member states participated at the Conference, including the delegation of the Republic of Croatia.
4. Data available on 26 January 2016.

ensures a more efficient application of the proscribed standards than the preceding ILO conventions.

Apart from the preamble, the MLC consists of Articles, Regulations and the Code. Articles and Regulations set out the basic rights and principles, as well as the basic obligations of member states of the Convention, while the Code focuses on particularities concerning the application of the Regulations. Part A of the Code (Standards) is binding, while Part B (Guidelines) contains recommendations to be taken into account by member states when adopting national legislation implementing the MLC. The Regulations and the Code are divided into five titles.

Title one: Minimum requirements for seafarers to work on a ship, contains provisions on minimum age required to work on a ship, medical certificates, seafarer qualifications, recruitment and placement. Title two: Conditions of employment, proscribes the requirements relating to seafarers employment agreements, wages, hours of work and hours of rest, entitlement to leave, repatriation, seafarer compensation in case of the ship's loss or foundering, minimum number of crew members, career development and professional advancement opportunities. Title three: Accommodation, recreational facilities, food and catering, contains detailed requirements for accommodation and recreational facilities on a ship (ventilation, heating, lighting, dormitories, dinging rooms, toilet facilities, medical care facilities, recreational facilities, ship visits and similar), as well as food and catering requirements. Title four: Health protection, medical care, social protection and safety, proscribes norms for health protection and medical care on board a ship and ashore, ship owners' liability for consequences of illness or accidents at work, accident prevention and social protection. The last title: Compliance and enforcement, contains regulations on flag state responsibilities, port state responsibilities and the responsibilities of states of seafarer residence or citizenship.

The Convention introduces a major novelty in comparison with the extant ILO conventions, i.e. mandatory ship certification under ILO standards. Convention provisions apply to ships having 500 gross tonnage or above, engaged in international voyages, required under the Convention to carry a declaration of maritime labour compliance issued by the ship's flag state on board. The flag state is required to perform supervision of ships sailing under its flag, while port state has the right to conduct inspection supervision by verifying whether a ship has the required declaration and whether the conditions on board the ship are compliant with the Convention. If a ship fails to meet the above requirements, the port state has the right to bring the ship to a stop. Member state bodies may also inspect the working conditions on the ships of non-ratifying states, which certainly contributed to the relatively rapid entry of the Convention into force.

The Convention stipulates that every seafarer has the right to a harmless and safe workplace compliant with safety standards, to fair employment conditions, worthy working and living conditions on board a ship, health protection, medical care, measures improving the living and working conditions and other forms of social protection.

Among other things, the great importance of the MLC also rests in the fact that it provides for a seafarer protection system to be realized through the institute of financial security (insurance), putting at the disposal of seafarers the most efficient manner of realization of their rights. Amendments to the MLC, anticipated to enter into force by early 2017, were adopted at the 103rd ILO international conference in June 2014 to improve and expand the scope of the financial security provisions.

3.3. Salvage

Salvage means any necessary and useful service and assistance rendered to property and persons finding themselves in peril at sea. Salvage operations aim to preserve and protect vessels, cargo and persons on board a ship from perils of the sea which might otherwise result in the loss of life or cargo.

During a salvage operation, the Master may find himself either in the role of the Master of the ship in peril or Master of the ship providing assistance. His rights and duties are dependent upon that role.

The salvor has the right to an equitable reward for every successful salvage of a vessel or other property. The value of the salved property is the upper limit of the salvor's reward, i.e. the salvor does not have the right to a reward if he fails to salve at least a part of the property, regardless of the effort and financial assets expended in the salvage operation. The "no cure - no pay" principle was adopted as the basic principle of the institute of salvage.

The objects of salvage at sea are human lives (persons) and property (vessels and cargo) in peril at sea. Although the salvage of persons is inseparable from the salvage of property, from the legal standpoint, there are significant distinctions between the two. Since the salvage of persons falls into the category of mandatory salvage, which is a personal obligation of the ship Master, in general, no rewards are given for the salvage of persons. On the other hand, in principle, since the salvor is not required to salvage property (except in case of ship collision) he has the right to a reward for salvage with useful outcome.

Apart from the property rights relations formed, every salvage operation is also a matter of public interest, primarily due to the protection of human life at sea and the protection of the marine environment. As a hugely important institute of maritime law, salvage was regulated at the international level as early as in 1910, by the International Convention for the Unification of Certain Rules of Law respecting Assistance and Salvage at Sea, Brussels (revised by Protocol in 1967), substituted by the International Salvage Convention, London. The main changes

introduced by the Convention of 1989 are that salvors are encouraged to protect and prevent the pollution of the marine environment.

While the salvage of human life is mandatory, the salvage of property is not. The salvage of property may be spontaneous or contracted. Spontaneous salvage is the voluntary salvage of property effected without a pre-concluded salvage contract, while contracted salvage is effected on the basis of a contract between the salvor and the owner of property in peril. Salvage contract is an informal legal transaction since for it to be considered concluded and valid it need not be concluded in any pre-defined form. Regardless of the freedom of contract conclusion, salvage contracts are, as a rule, concluded in written form. English Lloyd's Standard Form of Salvage Agreement (abbreviated to Lloyd's Open Form - LOF) is most frequently used for international contracts. LOF 1995 and LOF 2000 are currently in use, with the latest revision made in 2011.

Regardless of whether salvage is spontaneous or contracted, the salvor is entitled to a reward for any successfully salvaged property. Salvage contract may stipulate the amount of the salvage reward in advance or the manner of its subsequent establishment, although reward is seldom contracted in advance in contemporary practice. The latest versions of the LOF do not even contain the field for entry of reward amount, but define the criteria for its establishment instead.

Salvage reward may not exceed the value of the salvaged property determined at the place and time of salvage completion pursuant to the Salvage Convention (Article 13.) and the LOF. The following criteria are used to determine the amount of the salvage reward: value of the salvaged vessel and other property, skill and effort invested by the salvor to prevent or minimize environmental damage, level of success, nature and level of danger, skill and effort of the salvor invested to save human lives, the vessel and other property, time spent, expenses and losses suffered by the salvor, liability risk and other risks salvors or their equipment were exposed to, the speed of service provision, availability and utilization of ships and other equipment during the salvage operation, as well as the level of readiness, efficiency and value of the salvor's equipment. The order in which the criteria for the determination of the amount of the salvage reward were listed is irrelevant for the application thereof.

The Salvage Convention of 1989 introduced a special reward to encourage the salvors to prevent the pollution of the marine environment during salvage operations. A salvor is entitled to the special reward only if he participated in pollution prevention, but failed to realize the right to the salvage reward. These two preconditions (a vessel jeopardizing the marine environment and the salvor who did not realize the right to the reward) for the realization of the right to the special reward are required to be met cumulatively. When determining the amount of the special reward, the Salvage Convention of 1989 distinguishes between two situations. If a salvage operation failed to prevent or minimize environmental damage, a salvor who did not realize the salvage reward is entitled to the special reward, but only in the amount equal to the actual salvage expenses. If, on the other hand, the salvage operation manages to successfully prevent or minimize environmental damage, the competent court may increase the actual expenses of the salvor by 30 % and in some cases by the maximum 100 % when establishing the amount of the special reward. If a salvor realized the right to the salvage reward due to having fully or partially salvaged the vessel and cargo while preventing pollution, the salvor is not entitled to the special reward.

Contractual form LOF 2000 is the tenth version of the form since its establishment. In practice, the relative unsuccessfulness of the convention solution to encourage the salvors to protect the marine environment by proscribing the special compensation, induced professional salvors and P&I Clubs (as insurers against liability disbursing the special compensation) to conceive and offer to business practice a special tariff system for the determination of the amount of the reward, called SCOPIC (Special Compensation of Protecting and Indemnity Clause). This clause was added to LOF 2000 by having the contracting of the SCOPIC listed as an option which may but is not required to be used with the LOF. The salvors' security in reward realization is greater with the SCOPIC than with the special compensation, and P&I Clubs have the opportunity to supervise salvage operations.

The clause proscribes the establishment of the compensation in accordance with the pre-determined and contracted criteria, providing that the contracting of the SCOPIC excludes the application of Article 14. (special reward) of the Salvage Convention. Salvors may invoke SCOPIC in any stage of the salvage operation, providing certain requirements are met, regardless of whether the marine environment is endangered or not.

Regardless of the contracting of the SCOPIC, the salvage reward is determined in keeping with the criteria defined in Article 13. of the Salvage Convention, with the compensation under SCOPIC being disbursed only if it exceeds the salvage reward. If the compensation is lower, the salvage reward is reduced by 25 % of the difference between the salvage reward and the compensation calculated in keeping with the SCOPIC. A salvor may stop providing salvage services if his expenses exceed the value of the salvageable property and any amounts he is entitled to under the SCOPIC.

As discernible from its characteristics, the SCOPIC enabled the salvors to collect the salvage reward faster and safer, but failed to sufficiently contribute to the protection of the marine environment, leaving the public-legal issues stemming from the Salvage Convention unresolved.

3.4. Marine Insurance

As a rule, ships and their cargo are insured. These interests and the liability of the ship owner are covered by marine insurance. Marine insurance is provided by insurance companies doing business on the principle of premium-based policies and mutual insurance companies - P&I Clubs (charging contributions). Marine insurance rests on the principle of voluntarism. The law exceptionally proscribes cases for which insurance coverage is mandatory, e.g. some forms of third party liability insurance (ship or yacht owner third party liability insurance, tanker owner pollution liability insurance, nuclear vessel operator's liability insurance, ship owner's motor fuel pollution liability insurance, ship owner's wreck removal liability).

Marine insurance is contract-based. Masters are required to be familiar with both the content of the ship insurance contract and the content of the liability insurance contract provided by P&I Clubs.

Marine insurance contract is an informal contractual transaction. Therefore, for it to be considered concluded and valid it need not be concluded in any pre-set form. The contract is valid if the contracting parties agree on the key elements, namely on: the insured object, insured risk, insurance premium or contribution and insurance compensation. Still, it is an established years-long practice to issue an insurance document (written cover note) certifying that an insurance contract was concluded, for legal security purposes. Insurance policy, issued by the insurer to the policyholder upon contract conclusion or thereafter, is the most important document proving the conclusion of an insurance contract.

The marine policy is the most frequently used insurance policy in marine insurance. Policy insuring goods is called cargo policy and policy providing coverage for vessels is known as the hull and machinery policy. The so called new marine policy form, in circulation since 1983, is currently in use.

Insured loss means the loss of or damage to an insured object, as well as any other covered loss or expense caused by an insured risk. The occurrence of an insured risk may result in the total or partial loss of or damage to an insured object and give rise to a variety of expenses and obligations of the insured towards third parties. Premium policy does not cover (contractual or extra-contractual) liability of the insured for damage inflicted on third parties. Liability insurance requires special contractual arrangements. It is common for ship owners to insure their liability with special organizations, the so called P&I Clubs.

Excluded losses are a special loss category in marine insurance, which may be proscribed and contracted. Losses directly or indirectly arising from the willful misconduct of the insured may not be insured even by direct contractual provisions. The second group of excluded losses are losses insurable by special contractual provisions (e.g. war and political risks).

Contracted conditions of insurance constitute an integral part of the contract. Institute clauses are the best known ship insurance conditions. All risks are divided into marine, war and political risks. There are special conditions of insurance against marine, and special conditions of insurance against war and political risks. The conditions of insurance against marine risks expressly exclude war and political risks from coverage.

Ship insurance institute clauses are sets of clauses regulating the most important issues from the contractual relationship. Institute time clauses – hulls are the basic conditions of ship insurance. Institute clauses published in 1983 and 1995, including the latest international hull clauses, are used exclusively in conjunction with the new marine policy form - form MAR). There are several institute clauses regulating insurance against marine risks mutually distinguishable by the scope of coverage. Institute time clauses – hulls (insurance of ships against particular weather) and institute voyage clauses – hulls (ship voyage insurance) provide the broadest coverage.

Ship insurance covers the hull, machinery, devices and equipment, regular fuel, lubricant and other ship's material stocks, as well as food and beverage stocks for the crew's use. Institute time clauses - hulls (full coverage) deal with insured risks in two clauses: perils clause and pollution clause. It is common for the institute clauses to contain special ship class and navigating limit clauses. Ship insurance contracts require ships to be classified, while the classification clause of the 1995 institute clauses requires the insured to obtain the class from the classification society approved by the insurer. Ship insurance automatically ceases to be valid in case of class change, suspension, cessation, cancellation or expiry, as well as in the event of substitution of the class allocated by a classification society for the class of another classification society.

Limited term ship insurance regularly contractually limits the area of navigation. Navigating limits are contracted by using geographical criteria to define areas in which a ship is allowed to navigate (institute warranty clauses).

Since standard ship insurance does not cover the majority of possible aspects of ship owner's liability, special mutual ship insurance organizations - protection and indemnity associations (P&I Clubs) were established. P&I Clubs are insurance organizations joined by ship owners to insure against risks uninsurable with insurers doing business on the principle of premium policies. Those are primarily different aspects of liability, as well as other expenses ship owners are exposed to. P&I Clubs issue a document similar to insurance policy for each joining vessel, known as the Certificate of Entry. One of the major differences between premium and mutual insurance is that no fixed premium, i.e. contribution is paid for P&I coverage. The majority of P&I Clubs were founded and do business in England. They associated into International Group of P&I Clubs. Contemporary P&I Clubs cover the liability of their members for: bodily injury, illness or loss of life

of crew members, dock workers, passengers and other persons; loss of personal items; saving human life; collision liability (if not covered by premium insurance); pollution liability; contractual liability; wreck obligations; cargo liability; certain expenses and legal expenses.

Familiarity with the structure of P&I insurance and the relationship of that insurance with hull and machinery insurance (premium insurance) is of great importance for Masters. Their duties in concrete situations depend on the content of these insurances.

3.5. Stowaways

A stowaway is a person who is on board a ship for transportation purposes, who did not conclude a transportation contract with the shipper or his representative and is secreted on the ship without his consent. The position of stowaways is not regulated by any international convention (the International Convention on Stowaways was adopted in Brussels in 1957, but never entered into force). National legislations have different solutions for this issue, causing significant difficulty in practice.

The shipper and the Master are required to cooperate with the port authorities and state administration to the greatest extent possible if any stowaways are detected on board a ship. Stowaways must be treated humanely, giving due consideration to the operational safety of the ship and the well-being of the stowaway. Every effort must be taken to avoid the lingering of stowaways on ships for an indefinite period, for which purpose state administrations should cooperate with the shipper to organize the return of the stowaways to the relevant state (the state of port of first embarkation of the stowaway).

IMO has introduced various guidelines on stowaway matters, the latest being Resolution A.871(20), adopted on 27 November 1997, and its Annex - Guidelines on the Allocation of Responsibilities to seek the Successful Resolution of Stowaway Cases. Special emphasis is placed on the prevention of illegal embarkation and the distribution of duties between the Master, ship owner or operator, port of stowaway disembarkation, port of stowaway embarkation, state which stowaway is a national of, ship flag state and every transit state during repatriation.

3.6. Shipping Agents and Agencies

Shipping agent is a special institute in maritime law and economy. The activity of shipping agents is of exceptional importance in contemporary marine transportation and marine transactions not involving shipping agents are almost non-existent. A shipping agent is a professional without whose services contemporary marine traffic and economic exploitation of seagoing vessels would be unimaginable. The performance of an entire array of tasks during the stay of a ship in a port or relating to marine agency and conclusion of marine contracts is inconceivable without shipping agents. A shipping agent assists the ship owner, i.e. Master in all tasks concerning cargo procurement or ship dispatching, while simultaneously helping cargo owners to find a ship, connecting them with the ship owner or assisting with the conclusion of shipping contracts. Owing to his expert execution of the above transactions, knowledge of the local situation, regulations, language and customs, a shipping agent is best suited to resolve different issues relating to the ship or the cargo it carries, while simultaneously safeguarding the interests of his principal. The development of communication systems enabled the shipping agents to remain in constant contact with their clients and thus expand their services to include the execution of shipping contracts.

A shipping agent may be defined as a legal or physical person performing the jobs of representation, agency and assistance with marine transactions on the behalf and for the account of a principal on the basis of a general or special power of attorney, with the principal in return being required to pay a fee and compensate the shipping agent for any expenses. Jobs of representation means representation during ship arrival and dispatch, representation of the ship owner before port authorities and in relations with other persons. Jobs of agency means mediation with the conclusion of contracts of exploitation of seagoing vessels, mediation with ship purchase, building and overhaul, mediation with the insurance of a maritime undertaking and mediation with crew recruitment. Assistance means providing assistance to the Master, crew members and passengers.

The business activity of marine agency is not regulated by any international convention. The UNCTAD Minimum Standards for Shipping Agents were adopted at the United Nations Conference on Trade and Development on 7 September 1988. The UNCTAD Minimum Standards for Shipping agents lay down the definition of a shipping agent, define the list of tasks, authorities of the shipping agent, shipping agent and shipping agency types, obligations of the agent towards the principal and shipping agent appointment.

Seafarers, especially Masters, are required to have knowledge of the basic principles of shipping agency. Masters are in almost continuous contact with shipping agents to ensure unobstructed navigation, i.e. entry of their ship into port, performance of all ship and cargo manipulations and departure of the ship from port. Some marine transactions are carried out partially by the shipping agent and partially by the Master. In case of dispute, Master has precedence. Master is an employee of the ship owner who is, pursuant to the regulations of the majority of countries, considered to be a legal representative of the ship owner, performing nautical, commercial and public-legal functions on and for the ship. A shipping agent is a person offering his services to the ship owner on the basis of a shipping

agency agreement. The Master is therefore considered to be the main, and the shipping agent a lower ranking representative of the ship owner. The Master should also be noted to be an employee of the owner, while the shipping agent is not.

3.7. Places of Refuge

Place of refuge is a protected place in the vicinity of the shore in which a ship in need of assistance may, if needed, eliminate possible cause of an accident and minimize the danger the ship would otherwise pose to the safety of navigation and the marine environment. The idea of places of refuge for ships in need of assistance dates back to the late 1980s, when the Salvage Convention was drafted. Maritime accidents of tankers Erika, Castor and Prestige, as well as other accidents, occasioned the adoption of IMO guidelines on places of refuge:

– Resolution A. 949 (23) - Guidelines on places of refuge for ships in need of assistance - is applied when a ship is in need of assistance, but human lives are not in danger.

– Resolution A. 950 (23) - Maritime assistance service – recommends coastal states to establish a maritime assistance service.

The first Resolution is applied when a ship is in need of assistance, but human lives are not in danger. When human lives are in danger, the provisions of the SAR Convention apply. Guidelines of Resolution A 949 (23) of the IMO stipulate that when a ship suffers a maritime accident causing its progressive deterioration, the best way to prevent damage or pollution is to remove its cargo or bunker to allow the damage to be repaired. This procedure is best conducted in a place of refuge.

The second Resolution A. 950 (23) recommends all coastal states to establish a maritime assistance service (MAS). The service is primarily intended to receive various reports, advice and notifications proscribed by different IMO instruments; to supervise a ship's condition if the relevant report indicates that an accident could cause the ship to be in need of assistance; to serve as a data collection centre if the condition of the ship is neither worrying nor dangerous, but still requires information exchange between the ship and the coastal state (in case the condition of the endangered ship deteriorates); and to serve as the centre for communication with salvors participating in the salvage of the endangered ship, if the respective coastal state requires all stages of the salvage operation to be supervised.

After the environmental disasters of tankers Erika and Prestige, the European Union adopted Directive 2002/59/EC establishing a vessel traffic monitoring and information system on 27 June 2002 (entered into force in February 2005) requiring member states to devise a detailed plan of action for ships in need of assistance and submit a list of places of refuge allowing easier salvage of ships in need of assistance and a more efficient prevention of pollution of the marine environment.

In 2008, Croatia adopted the Ordinance on Places of Refuge proscribing in detail the procedure of selection and approval of places of refuge for ships in need of assistance, competent bodies and persons responsible for the selection and approval of such places, conditions to be met by places of refuge, manner of use of places of refuge and mandatory insurance, i.e. other financial security for any damage and expenses relating to the sheltering of ships in places of refuge. The Ordinance also establishes the obligation of adoption and prompt maintenance of the plan for sheltering ships in need of assistance, as an essential execution document which, in compliance with Resolution A.949 (23), contains all data required for the selection of places of refuge. The Ordinance does not expressly mention any concrete port or place of refuge, but rather stipulates that such place is to be selected depending on the situation. Data on possible places of refuge have been uploaded into the GIS application, as a decision making support system containing possible places of refuge and other related information.

The plan for sheltering ships in need of assistance, as an essential execution document, contains a variety of data required for successful sheltering of a ship in danger in a place of shelter. The plan elaborates the stages of selection of a place of refuge proscribed by the Ordinance on Places of Refuge (request for approval and allocation of place of refuge, assessment of justifiability of approval of place of refuge, allocation of place of refuge and provision of assistance at place of refuge). The request of the Master of a ship in need of assistance for the approval and allocation of a place of refuge, containing all data necessary for the assessment of the ship's situation, is considered the beginning of the process of allocation of a place of refuge.

3.8. Master/Pilot Relationship

Pilotage is the navigation of a vessel by professionals (pilots) giving expert advice to Masters to ensure safe navigation in ports, through straits and other areas within internal waters and territorial sea. Pilots are required to:

– refuse pilotage if a ship's draft is incompatible with sea depth at the place the ship is expected to moor or anchor at, i.e. if safe mooring conditions have not been ensured at the place of mooring, if a ship is not seaworthy, or if it failed to obtain the port authority's approval to enter or leave the port and if the Master of the ship in need of pilotage refuses advice regarding pending pilotage,

– in the course of pilotage give expert navigation advice to the Master, warn him of navigating conditions and indicate applicable local regulations ,

– following the completion of pilotage, inform the port authority by radio of pilotage commencement and completion and in some cases, inform the port authority thereof in writing.

Vessel pilotage does not release the Master of the ship using

pilotage services from the obligation and responsibility for vessel navigation and maneuvering. A pilot, being well-acquainted with the local maritime-nautical situation, merely performs the function of advisor to the Master. The Master always has the final say on any maneuver to be taken and retains full nautical control of the ship. In principle, the ship, i.e. the ship owner is always liable for any damage caused to third parties through the fault of the pilot, regardless of whether pilotage was compulsory or voluntary.

In 2003 the IMO adopted Resolution A.960 (23) regulating training, certification and operational procedures for maritime pilots. Appendix 1 to the Resolution titled: Recommendations regulating training and certification of maritime pilots, with the exception of deep sea pilots, proscribes: the field of application, competent body for pilotage, pilotage certificate or license, medical fitness, training and certification or licensing standards, syllabus for pilot certification or licensing. Appendix 2 to the Resolution titled: Recommendations for the operational procedures of maritime pilots, with the exception of deep sea pilots, proscribes: the duties of the Master, Deck Officer and pilot, pilot embarkation point, procedure for requesting a pilot, information exchange between the Master and the pilot, language of communication, reporting on incidents and accidents, refusing pilotage and competence for the execution of this function.

3.9. International Convention for the Control and Management of Ships Ballast Water and Sediments (BWC)

Ballast waters are one of the most dangerous polluters in existence, frequently polluting the marine environment. Ballast water is water containing substances, loaded to control the ship's trim, incline, draft, stability and stress. The resolution of this issue at the international level was given special consideration over a decade ago.

The BWC was adopted on 13 February 2004, and will enter into force twelve months after being ratified by 30 states accounting for 35 % of the world fleet[5].

The Convention aims to prevent, reduce and finally eliminate the spread of harmful aquatic organisms and pathogens by managing and controlling ballast waters and sediments in keeping with the principles of international law. Member states are required to ensure that ballast waters do not damage the environment, human health, property and resources of their own or any other state. The Convention regulates the issue of ballast water reception, research and supervision matters and proscribes investigation, certification, inspection and technical assistance procedures. Apart from general provisions, Annexes to the Convention also stipulate the manner of management and supervision of ship compliance, additional measures and ballast water management standards, especially ballast water replacement standards. They also deal with the prototypes of required technologies and manner of standard modification.

To the extent allowed by the safety of navigation and protection of the marine environment requirements, Masters are required to avoid or limit ballast water loading in areas known to be inhabited by harmful microorganisms, known to serve as factory discharges, in which underwater trenching is performed, characterized by an exceptionally large tidal range, high level of murkiness due to the operation of ship propellers (shallow ports, estuaries, anchorage), fish spawning and current convergence. With regard to ballast water management measures, the crew are required to be familiar with their ship-specific duties and, depending on their function, with the ship's ballast water management plan.

3.10. Port State Supervision

Port state may inspect any foreign ship entering its port. In this respect, port state inspection and supervision should be noted to be more efficient if conducted systematically, consistently and in a coordinated manner. To that end, within the framework of the jurisdiction provisions of the MARPOL Convention and the UNCLOS, western European countries adopted a Memorandum of Understanding (the Paris Memorandum) in Paris, in 1982. The Memorandum was adopted by 14 European countries, subsequently joined by additional 13, totaling to 27 member states.[6]

The Paris Memorandum is a document of exceptional importance, aiming to achieve the uniformity and coordinate the inspection procedures in the ports of member states. There are currently eight different memorandums of understanding on port state supervision in existence worldwide. Signatory countries are required to organize an efficient and networked foreign ship control system to comply with the safety at sea and protection of the marine environment standards and improve the working and living conditions of the crew. Signatories are required to seek each other's advice, cooperate and exchange information.

Rather than setting up new standards, the memorandum aims to establish a system of supervision of standards proscribed by international conventions adopted within the framework of IMO and ILO which are already in application. During an inspection of a foreign ship, the competent inspectors verify

5. According to the data of the International Maritime Organization available on 11 February 2016. The BWC has been ratified by 47 states accounting for 34,35% of the world fleet.

6. They are: Belgium, Bulgaria, Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Island, Ireland, Italy, Canada, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovenia, Spain, Sweden, United Kingdom.

whether the ship has valid documentation compliant with the provisions of international conventions.

All Memorandum signatories are required to maintain an efficient system of supervision of control of ships entering their ports to ensure that all ships, without exception, comply with the standards of the applicable international conventions.

During inspection, an inspector aims to determine whether a ship carries on board the required certificates, poses a threat for the safety, health or the marine environment, has security protection and whether the crew have the satisfactory level of knowledge required for the safe navigation of the ship. If a ship is found to be non-compliant with the proscribed standards, she will be forbidden to leave the port until made capable for continued navigation without danger to human life or the marine environment.

As of 1 January 2011, a new inspection regime entered into force at the level of Paris Memorandum member states, aiming to eliminate sub-standard ships by introducing stricter criteria for ships and companies failing to meet the requirements of international maritime conventions. One of such new measures introduced by the new inspection regime is the permanent expulsion of sub-standard ships from Paris Memorandum ports.

3.11. National Legislation

Finally, having described all contents, the process of ratification and implementation of international agreements and conventions into national legislation needs to be examined.

The ratification procedure in the Republic of Croatia is similar to the procedure used in the Croatian Parliament to adopt laws and regulations . Pursuant to the Constitution of the Republic of Croatia, as a country's most important piece of legislation, international agreements in force and effect, concluded, ratified in compliance with the Constitution and published, are a part of the internal legal system of the Republic of Croatia and are by their legal force above the law. Their provisions may be amended or cancelled only under the conditions and in the manner stipulated in such agreements or in keeping with the general rules of international law.

The Maritime Code was adopted and entered into force in December 2004, and amended in 2007, 2008, 2011, 2013 and 2015. The Croatian Maritime Law rests on the provisions of the 2004 Maritime Code. The Maritime Code is divided into twelve parts and 1032 articles. It regulates all major public-legal and property rights relations relating to the sea, maritime navigation and seagoing vessels. A number of legal and sub-legal regulations dealing with certain elements of the subject matter in more detail were adopted on the basis of the Maritime Code.

With the adoption of the 2004 Maritime Code, the Croatian maritime legislation became compliant with the contemporary and generally established solutions of international unification instruments ratified by the Republic of Croatia. By adopting international maritime standards, the Republic of Croatia largely conformed its internal maritime legislation with contemporary, generally established solutions proscribed by international instruments and EU regulations from this area, and the Maritime Code is now considered one of the most modern maritime codes in the world.

4. AMENDMENTS TO THE 2013 ORDINANCE ON VOCATIONS AND CERTIFICATES OF COMPETENCIES FOR SEAFARERS

The new Ordinance on Vocations and Certificates of Competencies for Seafarers was adopted in 2013[7] and amended in 2014[8], thereby implementing the amendments to the 2010 STCW Convention into national legislation. The Ordinance is also compliant with the provisions of Directive 2008/106/EC on the minimum level of training of seafarers and provisions of Directive 2012/35/EC amending Directive 2008/106/EC on the minimum level of training of seafarers. The Ordinance of 2007 ceased to apply upon entry into force of the Ordinance of 2013.

Annex C to the Ordinance proscribes exam programs and enumerates, under C7, the courses a trainee is required to pass to obtain the title of Chief Officer on vessels of 3000 BT or more and Master on vessels of 3000 BT or more, namely: Navigation and planning (oral and written); Cargo handling and ship stability (oral, written and practical); Ship maneuvering and avoiding collisions at sea (oral and practical); Safety at sea (oral and practical); Ship maintenance (oral); Meteorology with oceanography (oral); Maritime law (oral); English language (oral and written).

The maritime law exam is taken in compliance with the training program referred to in Annex A2 of the Ordinance – activity: Controlling the operation of the ship and care for persons on board at the management level; Monitoring and controlling compliance with legislation and measures aiming to ensure the safety of life at sea and protect the marine environment - Knowledge of international maritime law contained in international agreements and conventions.

The Ordinance of 2007 was better at elaborating the subject matter of maritime law - although not well laid-out, it dealt with the overall subject matter in a more detailed manner. Annex A to the Ordinance of 2013 does not proscribe the minimum number of hours for any course content, including maritime law. The Ordinance should, apart from requirements set by international regulations, also contain national legislation required to be taught at a certain level of training.

Annex B to the Ordinance proscribes a special training program, enumerating under item B1 courses of the special

7. Official Gazette no. 130/13.
8. Official Gazette no. 54/14.

training program a trainee is required to pass to earn the title of Chief Officer on vessels of 3000 BT or more, held at maritime faculties and departments. To enter the special training program, trainees are required to have a minimum of 36 months of seagoing service in the capacity of officers of navigational watch on vessels of 500 BT or more. 45 hours of lectures from maritime law are proscribed in the special training program for the obtainment of the title of Chief Officer on vessels of 3000 BT or more, held at faculties and departments of maritime studies. Since new Model Course 7.01 proscribes 54 hours of lessons from maritime law, the Ordinance needs to be correspondingly modified. Course content is compatible with new Model Course 7.01. In spite of the insufficient number of hours, special training program (Annex B) is elaborated better than the program used in the framework of regular classes at maritime faculties and departments (Annex A).

5. CONCLUSIONS

Although ship navigation during sailing has been significantly facilitated by the development of technics and technology, seafarers are now required to be well-versed in an increasing number of maritime law regulations and procedures promoting the safety of life and property at sea and the protection of the marine environment, while simultaneously ensuring unobstructed exploitation of ships. That especially goes for the Master, as the person with the highest responsibility on board a ship. The STCW Convention standardizes the training of seafarers at international level. The amendments of 2010 ensure better supervision of implementation of the STCW Convention and practice in certain states.

The Republic of Croatia is required to ensure consistent application of the provisions of the STCW Convention to raise the safety of navigation standard by establishing a working cooperation between competent state administration bodies and scientific and educational institutions. The latest amendments to the STCW Convention in this sense, in Model Course 7.01., impose additional seafarer training requirements, inter alia, broadening the scope of mandatory contents to be covered by maritime law programs required for the obtainment of professional title of ship officer. Furthermore, the total number of hours of maritime law courses was increased.

Since Model Course 7.01 is only concerned with the part of the program covering international maritime law, its content needs to be supplemented to include national regulations governing each individual institute. Other Maritime Code content unregulated by international legislation also needs to be covered, including the ship's legal status, marine and submarine areas of the Republic of Croatia, organization of the safety of navigation service in the Republic of Croatia and the legal status of maritime demesne and ports.

At the national level, there is a discernible lack of uniformity of national regulations intended to proscribe programs taught at maritime faculties and departments in more detail. Namely, the Ordinance on Vocations and Certificates of Competencies for Seafarers of 2013 is not fully compatible with new Model Course 7.01 in the area of seafarer training in maritime law. Syllabus needs to be elaborated in more detail, including by proscribing minimum hours for each subject matter taught, and in case of the special training program, by increasing the total hours of training in maritime law, as stipulated in Model Course 7.01.

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CONTRIBUTION

News from IMO
Maritime Heritage
News
Pjesma / Poem
Guidelines

CONTRIBUTION

News from IMO

Tatjana Krilić

This contribution presents a compilation of information on current work of selected IMO bodies in the period preceding the publication of this issue of ToMs. The outcome of IMO bodies responsible for safety and environment protection has been covered, aiming at informing readers on the decisions taken, as well as on the IMO instruments and/or their amendments that have entered into force.

KEY WORDS
~ IMO
~ Safety
~ Environment protection

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INTRODUCTION

The beginning of 2016 marked the change at the helm of IMO - Mr. Kitack Lim (Republic of Korea) started his four-year tenure as the new Secretary-General of the Organization. Mr. Kitack Lim is the eighth elected Secretary-General of IMO.

The World Maritime Day theme for 2016 is "Shipping: indispensable to the world". The theme was chosen to focus on the critical link between shipping and global society and to raise awareness of the relevance of the role of IMO as the global regulatory body for international shipping. The importance of shipping to support and sustain today's global society gives IMO's work a significance that reaches far beyond the industry itself.

The 29th session of the IMO Assembly met in London at the IMO Headquarters from 23 November to 2 December 2015. Selected decisions and outcome of discussions of the Assembly have been presented in this review, along with a number of amendments to the mandatory IMO instruments that entered into force since the last issue of ToMS.

Whilst news presented in this contribution only highlight the selected topics, complete information on the outcome of various IMO bodies is available in their reports, which can be found on the Organization's IMODOCS website (http://docs.imo.org/). More information and highlights on the work of the Organization can be found on its public website (http://www.imo.org), including press briefings and meeting summaries available in "Media Centre" area. In addition, most of the Organization's technical and operational data, some of which is available to the public, is stored in the Global Integrated Shipping Information System (GISIS), which is also accessible via a public website (https://gisis.imo.org).

29th session of the IMO Assembly (A 29)

Fishing vessel safety

The resolution on entry into force and implementation of the 2012 Cape Town Agreement calls for the early acceptance of the treaty, as a means to address the alarmingly high number of fishermen's lives and of fishing vessels lost every year.

It is thought that as many as 24,000 lives are lost annually in the fishing sector worldwide.

The entry into force of an internationally binding agreement for the safety of fishing vessels is predicted to have a positive impact on safety in the sector as a whole, as flag and port State Administrations would be required to develop legal and administrative frameworks, as well as processes, for the implementation of provisions related to survey and certification, casualty investigation and port State control.

The Cape Town Agreement aims to implement the provisions of the 1993 Protocol relating to the Torremolinos International Convention for the Safety of Fishing Vessels, 1977. In ratifying the 2012 Agreement, Parties agree to amendments to the provisions of the 1993 Protocol, so that they can come into force as soon as possible thereafter.

The Cape Town Agreement of 2012 will enter into force 12 months after the date on which not less than 22 States the aggregate number of whose fishing vessels of 24 m in length and over operating on the high seas is not less than 3,600 have expressed their consent to be bound by it. To date, only five countries have accepted the agreement.

Recognition for merchant vessels involved in rescuing mixed migrants at sea

The Assembly commended all merchant vessels and their crew participating in the rescue of mixed migrants at sea for their bravery, professionalism and compassion, upholding the highest traditions of the sea. It requested the Secretary-General to issue special certificates, retroactively from 1 January 2014, to any merchant vessel and its crew participating in the rescue of mixed migrants at sea, recognizing the risks involved to both rescuers and the rescued, in particular in those cases involving multiple survivors.

From January 2014 to December 2015, in the Mediterranean Sea alone, more than 1,200 merchant vessels were diverted from their intended voyage to rescue more than 50,000 mixed migrants in danger of being lost at sea, a number unprecedented in history.

The resolution expressed grave concern about the current worldwide crisis of migration, involving the greatest movement of displaced persons in nearly 70 years. The transport of mixed migrants by sea in grossly overloaded, unsafe vessels has resulted in the loss of thousands of lives.

Other resolutions

A number of other resolutions were adopted, including several aimed at updating various guidance documents, inter alia:

- resolution A.1104(29) on Survey Guidelines under the Harmonized System of Survey and Certification (HSSC), 2015;
- resolution A.1105(29) 2015 Non-exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code;
- resolution A.1106(29) on revised guidelines for the onboard operational use of shipborne automatic identification systems (AIS); and
- resolution A.1108(29) on amendments to the Recommendations on pilot transfer arrangements (A.1045(27)).

Amendments to mandatory IMO instruments that entered into force

Audits under the IMO Member State Audit Scheme became mandatory

Amendments to a number of treaties covering safety, training, prevention of pollution, load lines, tonnage measurement and collision prevention make the audits under the IMO Member State Audit Scheme mandatory for all IMO Member States from 1 January 2016.

Up to 25 Member State audits per year are expected under the audit scheme, which aims to provide a mechanism by which Member States can be assessed, in order to determine to what extent they are implementing and enforcing the applicable IMO instruments by identifying areas in need of improvement, as well as areas of good practices.

The idea behind the Scheme is to support the enhanced implementation of IMO instruments, as the Scheme will provide Member States with an overview of how well they are carrying out their duties as flag, coastal and port States, under the relevant IMO treaties. The process will also feed into IMO's extensive technical cooperation programme, to provide targeted assistance and capacity-building to States, as well as to the Organization's regulatory process.

The treaties amended are:

- SOLAS 1974;
- STCW 1978 and STCW Code;
- MARPOL annexes I through to VI;
- Protocol of 1988 relating to the International Convention on Load Lines, 1966 (LL PROT 1988);
- International Convention on Load Lines, 1966 (LL 1966);
- International Convention on Tonnage Measurement of Ships, 1969 (TONNAGE 1969);
- Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREG 1972).

Other SOLAS amendments

Other SOLAS amendments that entered into force on 1 January 2016 include:

- amendments to SOLAS regulations II-2/1, II-2/3, II-2/4, II-2/9.7 and II-2/16.3.3, to introduce mandatory requirements for inert gas systems on board new oil and chemical tankers of 8,000 dwt and above, and for ventilation systems on board new ships; plus related amendments to chapter 15 of the International Code for Fire Safety Systems (FSS Code) on inert gas systems.
- amendments to SOLAS regulation II-1/29 on steering gear, to update the requirements relating to sea trials.
- amendments to SOLAS regulation II-2/10, concerning fire protection requirements for new ships designed to carry containers on or above the weather deck.
- amendments to SOLAS regulation II-2/13.4, mandating additional means of escape from machinery spaces.
- new SOLAS regulation II-2/20-1, which provides additional safety measures for vehicle carriers with vehicle and ro-ro spaces intended for carriage of motor vehicles with compressed hydrogen or compressed natural gas in their tanks for their own propulsion as cargo.

Amendment 37-14 to the International Maritime Dangerous Goods (IMDG) Code

The amendments to the IMDG Code became mandatory from 1 January 2016. They include updates to the provisions for radioactive material, reflecting the latest (2012) provisions from the International Atomic Energy Agency (IAEA), new marking requirements for "overpack" and "salvage" and updates to various individual packing requirements.

Carriage of stability instruments mandatory for tankers

Mandatory carriage requirements for a stability instrument for oil tankers and chemical tankers entered into force on 1 January 2016, under amendments to MARPOL Annex I, the Code for the Construction and Equipment of Ships carrying. Dangerous Chemicals in Bulk (BCH Code), the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) and the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code).

LSA Code lifejacket testing

The amendments to the International Life-Saving Appliance (LSA) Code relate to the testing of lifejackets. The requirements for testing adult lifejackets are updated and new paragraphs are added relating to the testing of infant lifejackets, including the possibility to substitute manikins for human test subjects.

Revised IGC Code

The completely revised and updated International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) entered into force on 1 January 2016, with an implementation/application date of 1 July 2016. The amendments were developed following a comprehensive five-year review and are intended to take into account the latest advances in science and technology.

Other MARPOL amendments

2014 amendments to MARPOL Annex I on mandatory carriage requirements for a stability instrument entered into force on 1 January 2016.

The following MARPOL amendments entered into force on 1 March 2016:

- 2014 amendment to MARPOL Annex I, regulation 43;
- 2014 amendment to MARPOL Annex III, Appendix – Criteria for the identification of harmful substances in packaged form; and
- 2014 amendments to MARPOL Annex VI, regulations 2 and 13 and the Supplement to the IAPP certificate.

"Jugolinija": The Myth and the Truth

Marijan Žuvić

To generations of people inhabiting the eastern shores of the Adriatic Sea the name Jugolinija was and remains a symbol of a large and prestigious fleet ruling the ocean lanes. One could say: more than a symbol, almost a myth. In fact, Jugolinija was one of the largest liner shipping companies in the world, which ordered nearly one hundred brand new ships for its fleet between 1949 and 1989. Really impressive figures!

But it's also a fact that this giant disappeared from the high seas in a matter of only a couple of years. Since in the story of Jugolinija reality lies somewhere in the middle, between the myth and the truth, this middle is certainly worth exploring. A detailed chronicle of Jugolinija would require an entire book and this paper only aims to provide a short history of the biggest shipping enterprise.

Officially, the story begins at Sušak (now a part of Rijeka), on January 20, 1947 when the Yugoslav Federal Government established an enterprise called Jugoslavenska Linijska Plovidba, popularly known as Jugolinija. If we are to gain an understanding

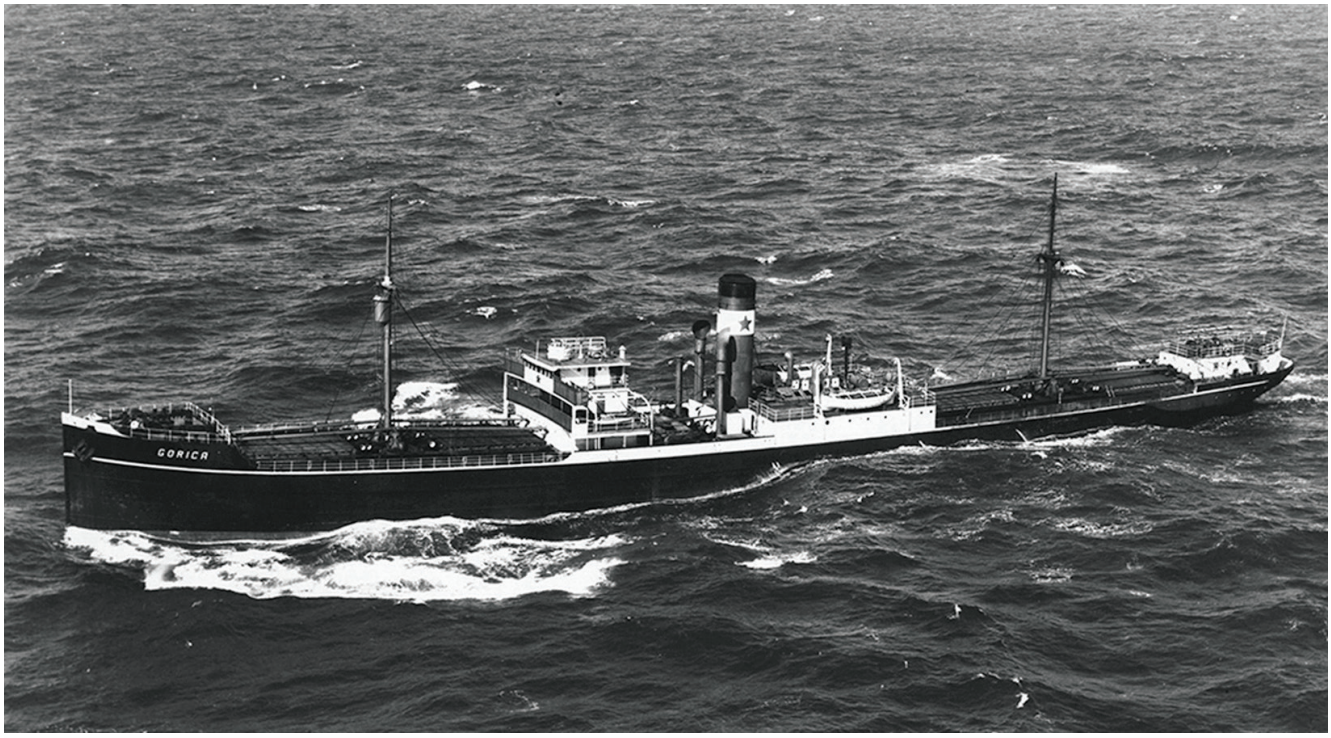

Figure 1.
'Gorica' – one of the WWII survivors.

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Figure 2.
'Bosna' – the first real liner.

of the circumstances of its foundation we have to return to the summer of 1945, to the first months of peace. Relieved of duty after years of perilous sailing for the Allies, mainly chartered by the British Ministry of War Transport, Yugoslav ships started coming back to their homeland.

However, the homeland these rare survivors returned to was a quite different Yugoslavia, now under Communist rule. The first step of the new rulers was to change the ships' names, but the real challenge came in November 1946 when all shipping companies were nationalized. Four state enterprises were established in January 1947 to operate Yugoslav ships. All ocean-going vessels were divided between Jugoslavenska Linijska Plovidba or Yugoslav Liner Shipping and Jugoslavenska Slobodna Plovidba or Yugoslav Tramp Shipping, although the fleets of both enterprises consisted entirely of trampers. There was not a single liner or a single line to be maintained.

The Decree of January 20, 1947 allocated sixteen steamships to Jugolinija. In reality, that fleet existed only on paper! Cargo ship 'Šolta' and tanker 'Pulj' were in such a derelict condition and beyond repair that they never entered the fleet. Steamer 'Lošinj', former German 'Sardinien', allocated to Yugoslavia by the Inter-Allied Reparation Agency (IARA)was also on the list, but undergoing extensive repairs at Hamburg not to be completed until late November.

Thus, Jugolinija's fleet consisted of only 13 ships of an average age of 35.5 years! The oldest in this 'League of veterans' was the 19th century 'Tara', built in 1896, and the youngest the 1928-built 'Livno'. Steamships 'Prozor', built in 1902, and 'Šibenik', built in 1900, were so worn out by sailing in Allied convoys that they were transferred to the coastal shipping enterprise Jadranska Slobodna Plovidba in a matter of months. By late 1947, six ships joined Jugolinija's fleet, now comprising 17 ships of all types, shapes and sizes! Italy returned tiny coastal steamer 'Hercegovina', seized in 1941. With the length of 58.8 meters and cargo capacity of 990 tons she became the smallest ship in Jugolinija's history. 'Šabac', the former 'Marie Leonhardt',arrived with 'Lošinj' as part of German war reparations and Jugolinija made its first purchase.

There hasn't been a single commercial tanker in the eastern Adriatic since the era of the Austro-Hungarian Empire and the famous 'Etelka'! 'Jajce' of 9.599 tons and 124.3 meters, thus became the forerunner of Yugoslav tanker shipping. She was built under the name 'Kim' by Armstrong, Whitworth & Co. at Walker-on-Tyne in 1930 for a Norwegian ship-owner Sverre Sturlung. Five years

Figure 3.
'Partizanka' – festive arrival to Dubrovnik.

later, she became 'James Hawson'. Jugolinija purchased her from Eyvind Matheson of Oslo.

However, the most interesting newcomers were American-built steamers 'Radnik' and 'Partizanka'. 'Partizanka' was recognised as the symbol of Jugolinija for decades even though she sailed under its colours for only three years! Not surprising if we know she was purchased for a single purpose: to carry immigrants of Yugoslav origin from all around the world to the 'new Yugoslavia, a country of peoples' freedom and happiness'! She was a star of Communist newsreels and newspapers. Being unaware of festive welcomes organized for 'Partizanka' in Adriatic ports was virtually impossible.

Thousands of immigrants arrived from the United States, Australia, New Zealand, Argentina, Brazil, Uruguay and other countries. And 'Partizanka' was the right ship for them. She was built at Newport News, Virginia in 1927 as liner 'Shawnee' for New York & Miami Steamship Corp. Being 120 meters in length, she was powered by four steam turbines capable of the speed of 20

knots. She was luxurious and had state-of-the-art navigation equipment. During the war, she served as an US Army troopship and was sold to Portugal in 1947. Having sailed as the 'City of Lisbon' for only a couple of months, she became 'Partizanka'. Her role of an immigrant ship came to an end in Rijeka in May 1949. She was sent to Split for repairs, but was destroyed by an unexplained fire in August 1949.

'Radnik' was nowhere near as famous and prestigious. She was also built at Newport News, but back in 1908. Originally, she was liner 'Lurline' of Matson Navigation Co., sold to Alaska Packers Association of San Francisco in 1928. She was rebuilt as 'Chirikof' for a unique purpose. In the spring, she sailed to the north with hundreds of workers hired for packing salmon in Alaskan factories to return in the autumn fully loaded with canned salmon. In 1947, immigrants replaced the salmon packers. 'Radnik' mostly sailed to Australian ports and was sent to the scrapyard in 1952.

In 1948, further three German war reparations vessels entered the fleet. They were the little 'Vis' (former 'Malaga'), 'Topusko' (former 'Mina Horn') and the giant 'Bosna'. She was formerly known as 'Schwaben' of Norddeutscher Lloyd, built by Bremer Vulkan shipyard in 1926. With the length of 156 meters and cargo capacity of 12.200 tons, 'Bosna' remained the largest vessel in Jugolinija's fleet for nearly a decade. These were the first genuine liners in the fleet.

They were soon followed by the first new liners. In 1948, Jugolinija ordered four ships for its pioneering Adriatic – Cyprus – Egypt line. The first, named 'Zagreb', was delivered in June 1949 and her sisters followed in an unusually quick succession. 'Skopje' was delivered in October, 'Sarajevo' in December and 'Titograd' in January 1950. There is an anecdote concerning the reaction of longshoremen in Alexandria to this quick succession of new liners. They were confident that Jugolinija operated only one new

Figure 4.
Tiny veteran steamer 'Solin'.

ship and painted a different name on the bow for every voyage just to make an impression!

In the very eventful year of 1949, the fleet was enhanced by two much larger newcomers: 'Hrvatska' and 'Srbija'. The first arrived just by chance! She was former 'St. Lawrence Victory', built in March 1945 by Permanente Metals Corp. at Richmond, California. A standard 'Victory' type ship of 10.430 tons deadweight, she was powered by a pair of steam turbines, boasting with the speed of 16 knots.

Exactly two years after delivery, she was sailing in the Adriatic, carrying the valuable cargo of potatoes for the war-torn Yugoslavia. In the vicinity of Dubrovnik she ran into a minefield and was beached to prevent sinking. She was abandoned to the salvors and towed to Split for repairs. After the completion of repairs in late 1949, 'Hrvatska' was a real liner with accommodation for 60 passengers, ready to inaugurate the Adriatic – North America line.

'Srbija' was also a large ship, with the cargo capacity of nearly 12.000 tons and accommodation for 50 passengers. She was built under the name of 'Crostafels' in occupied Rotterdam in 1944, and towed to Germany for completion. However, 1947 found her still incomplete at Bremerhaven. Sold to Yugoslavia at auction, she was towed back to Holland and finished in August 1949. Following her delivery, Jugolinija ordered two similar ships from Amsterdam. The sister ships 'Crna Gora' and 'Slovenija' were completed in 1951.

In 1950, the Dutch shipyards in Rotterdam, Alblasserdam and Hardinxveld delivered three identical medium-sized liners for the Adriatic – UK & Continent service. 'Pula', 'Rijeka' and 'Zadar' were praised not only for their high quality but for their unparalleled elegance as well.

And then, in the middle of its strife to modernize its fleet and focus on liner shipping, Jugolinija was flooded with steam trampers: 14 newcomers with the combined age of 374 years! The

Figure 5.
'Jajce' – the forerunner of tanker shipping.

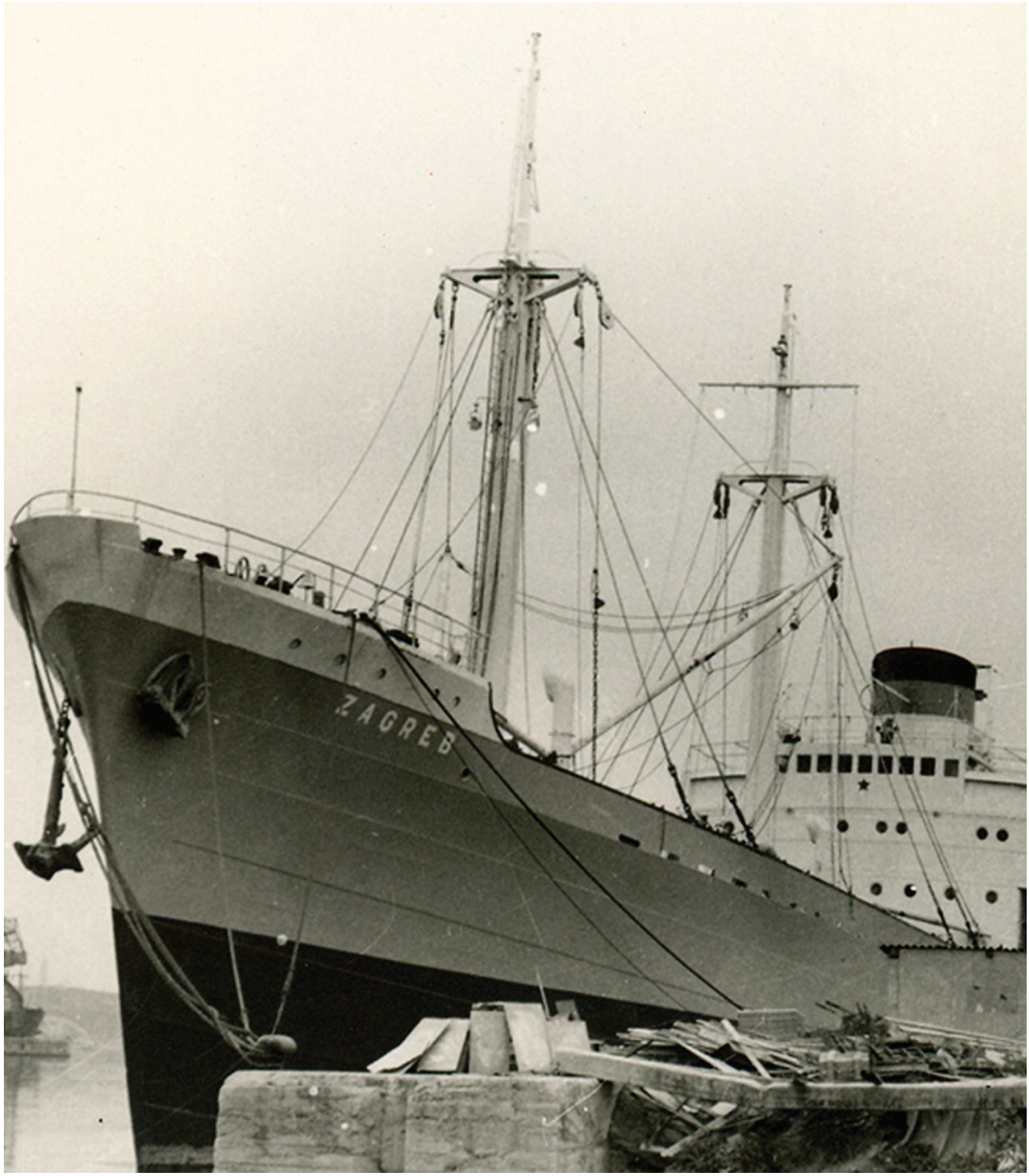

Figure 6.
The first newbuild – 'Zagreb'.

Figure 7.
Handsome 'Rijeka'.

entire fleet of Jugoslavenska Slobodna Plovidba was transferred to Jugolinija in 1949 and a year later, the two enterprises formally merged. The new old company was titled Jugoslavenska Linijska Plovidba and its abbreviation, Jugolinija, became its official name.

In late 1950, Jugolinija's fleet consisted of 43 vessels. Only four years later, there were 54 names on the fleet's list. This tremendous increase gave birth to the myth of the mighty Jugolinija. And it will persist for years to come. Much later, in the mere six years between 1972 and 1977, 23 newbuilds entered the fleet, with only two sold.

After the episode with ships built in Holland, Jugolinija completely turned to Adriatic shipyards. 'Učka', delivered by the Rijeka shipyard '3. maj' in 1951, was the first to come, although she wasn't really a newbuild. She was originally built in 1944 by the same shipyard, at the time called Cantiere Navale del Quarnaro, as 'Vittorio Locchi'. She was the seventh of the 'Poet' class ships built after 1942 for Italian company 'Tirrenia'. Sunk in the shipyard by Allied air attacks at the end of WWII, she was later raised and repaired. Her blueprints were reused and her three sister ships– 'Avala', 'Romanija' and 'Dinara'- built in 1952/1953. In 1954 three additional, only slightly modified, ships entered the fleet – 'Lovćen', 'Triglav' and 'Velebit'.

Than came the turbulent year of 1955. The fact that all overseas shipping activities in Yugoslavia were concentrated in only one enterprise caused widespread displeasure along the Adriatic, giving rise to demands for the dispossession of Jugolinija and the establishment of new shipping companies. As expected, Jugolinija strongly opposed such ideas. To calm down inflamed passions and mitigate any political damage, the Federal Government forced Jugolinija to consent to the decentralization of its fleet. In late 1955, nineteen trampers were allocated to the newly established enterprises in Dubrovnik, Kotor and Piran, while tankers 'Jajce' and 'Lendava' became cornerstones of the new tanker company in Zadar.

Although no newcomers made it into the fleet in 1955, the years that followed were marked by a tidal wave of ships from domestic yards. Unfortunately, the very first step forward proved to be a disappointment! Jugolinija ordered four turbine powered liners of 10.500 tons, three from Rijeka and one from the Split shipyard. 'Drvar' and 'Radnik' were delivered in 1956 and 'Marjan' and 'Šibenik' in 1957. Ships were powered by a pair of steam turbines with a total output of 4600 HP, which proved too weak for such ships. To make things worse, since the turbines were built by the inexperienced Karlovac plant 'Jugoturbina', engine breakdowns and costly repairs were frequent.

But, the consolation was soon to come. In 1957, shipyards in Rijeka, Pula and Split delivered four identical liners ('Lika', 'Nikola Tesla', 'Treći Maj' and 'Uljanik'). Sturdy vessels of 12.980 tons were a good choice for maintaining the Adriatic-Middle & Far East line. The fifth sister ship, 'Trepča', entered into service in 1958.

Figure 8.
'Marjan' – troubled turbine liner.

1957 became important to Jugolinija for one more reason: the establishment of Kvarnerska Plovidba. Although formally independent, the new shipping company served as Jugolinija's reserve fleet. Nine vintage steamers averaging 39 years of age and, unsurprisingly, two brand new turbine liners of dubious quality - 'Marjan' and 'Šibenik' were transferred to Kvarnerska Plovidba.

After this 'cleaning' operation, Jugolinija's fleet consisted mainly of newbuilds. And a whole new flotilla was ordered. In 1958, the '3. maj' shipyard delivered three sister ships for the Adriatic – UK & Continent line. Named 'Bratstvo', 'Sloboda' and 'Pobjeda', these liners proved to be yet another complete failure! Being 95 meters in length, they had more than a modest cargo capacity of 2350 tons. Even so, the trio kept sailing for Jugolinija until 1971!

In 1959, the first, and for a very long time, the only, Japanese-built ship entered the fleet. She was 'Kosovo', a fine ship of 16.000 tons, built by Hakodate Dock Co. Her sister ship 'Piran' was built for Splošna Plovba of Piran. This was a unique deal, since the ships were partly paid with Yugoslav steamers sold for scrap in Japan.

The next year saw the arrival of liners 'Jesenice' and 'Trebinje', the first two of the quartet generally considered as the best ever built for Jugolinija. 'Primorje' arrived in 1961 and 'Kostrena' was delivered in 1963. All were built by '3. maj'. They were 155 meters in length, with the cargo capacity of 13.650 tons. Powered by CRDA-Sulzer engines of 10.400 HP they sailed at the impressive speed of 18.5 knots. These prestigious ships navigated on the Adriatic – US North of Hatteras regular service, and later ran the Far East line.

The early sixties were marked by a stream of new ships. Three sister ships of 3.150 tons ('Frano Supilo', Matko Laginja' and 'Ivan Mažuranić') were built at Kraljevica for the Adriatic-UK & Continent line. Another trio of 6.950 tons ('Baška', 'Drežnica' and

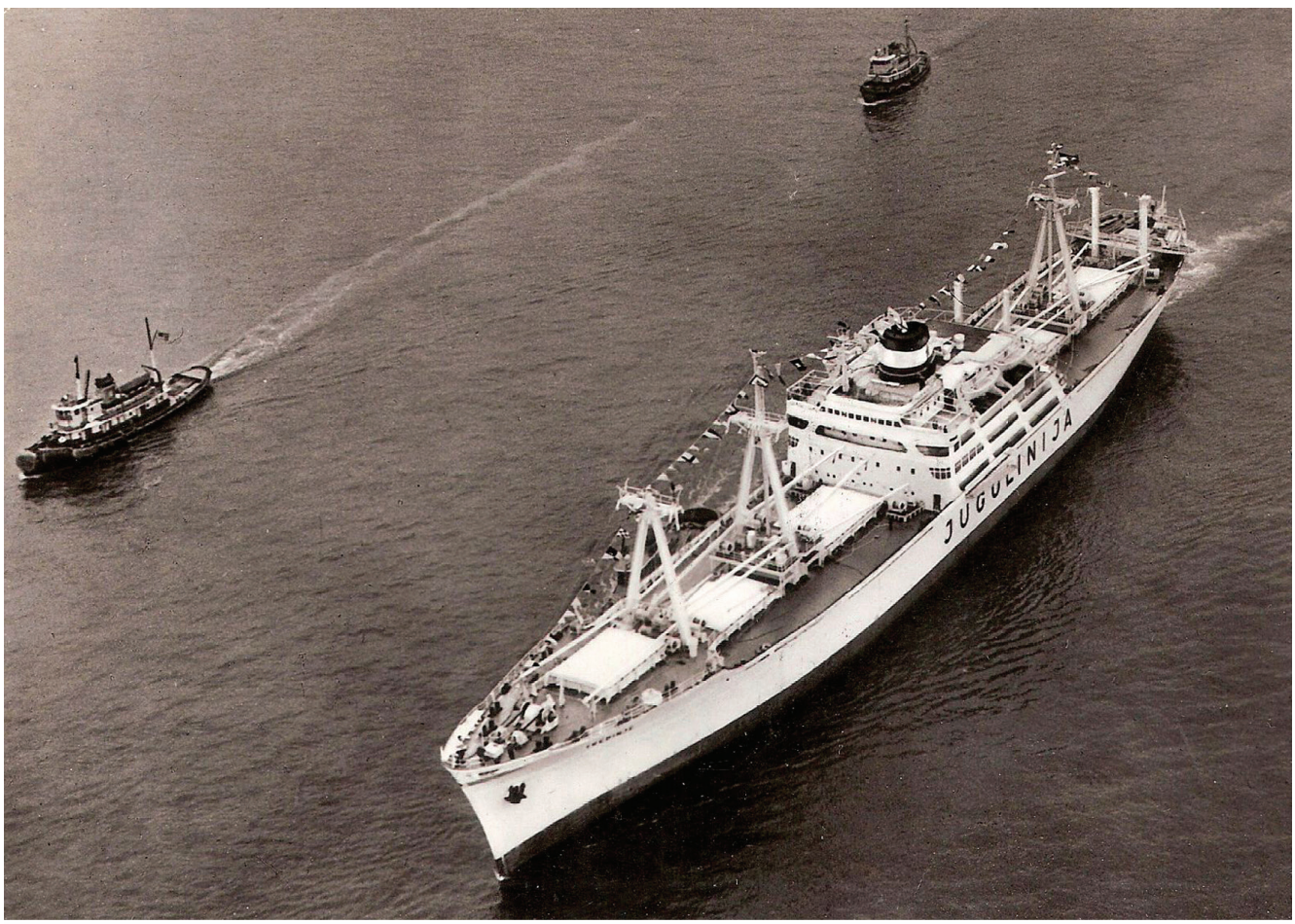

Figure 9.
New York welcomes the prestigious 'Trebinje'.

Figure 10.
A rare containership – 'Koper Express'.

'Grobnik')delivered by the Split shipyard was intended for the Adriatic-South America service.

And then came an unpleasant surprise! Kvarnerska Plovidba ceased to exist and in January 1963 its fleet of 12 antiquated ships became part of Jugolinija. It was several years before these unwanted and useless veterans were deleted from the fleet list crowded with newbuilds.

The sheer number of new ships is astonishing! In only six years between 1965 and 1969, the '3. maj' shipyard alone delivered 15 liners: four sister ships of 'Viševica' class, a trio of 'August Cesarec' class, sister ships 'Trsat' and 'Nehaj', another pair of sister ships 'Bosna' and 'Hrvatska' and four ships of 'Arcturus' class. Furthermore, four ships of 'Kraljevica' class were built by Italcantieri at Monfalcone and vessel 'Pag' came from the Spanish yard at El Ferrol during that same period.

And the fleet continued its relentless growth without pause! 19 additional newbuilds were delivered between 1972 and 1977, adding to the myth of Jugolinija. The 74 ships it boasted in late 1977 were the strongest proof of its mightiness. However, maritime experts were fully aware of the company's weakness. The giant fleet was hopelessly outdated!

It may sound incredible, but the entire fleet of 74 ships had at its disposal only three container ships, three tiny ro-ro vessels and seven liners with container carrying capacity ranging from 116 to 303 TEUs! Six liners built in 1949, four from 1950, three from 1954 and four built in 1957 were still in service. The inevitable question was: what would it cost to maintain lines around the globe with such an antiquated fleet?

A detailed explanation would take pages and pages, but to cut the story short, economic principles might be said not to have been the only decisive factor in Jugolinija's operation. The network of lines was an important political issue. From the mid 1950s Yugoslavia, together with Egypt and India, was the leader of the Non-Aligned Movement and regular lines running from the Adriatic to numerous African and Asian ports served as a visible connecting factor. Likewise, profitability was not a priority in Yugoslav socialist economy. The fact that hard currency income was additionally subsidized was hugely important for Jugolinija.

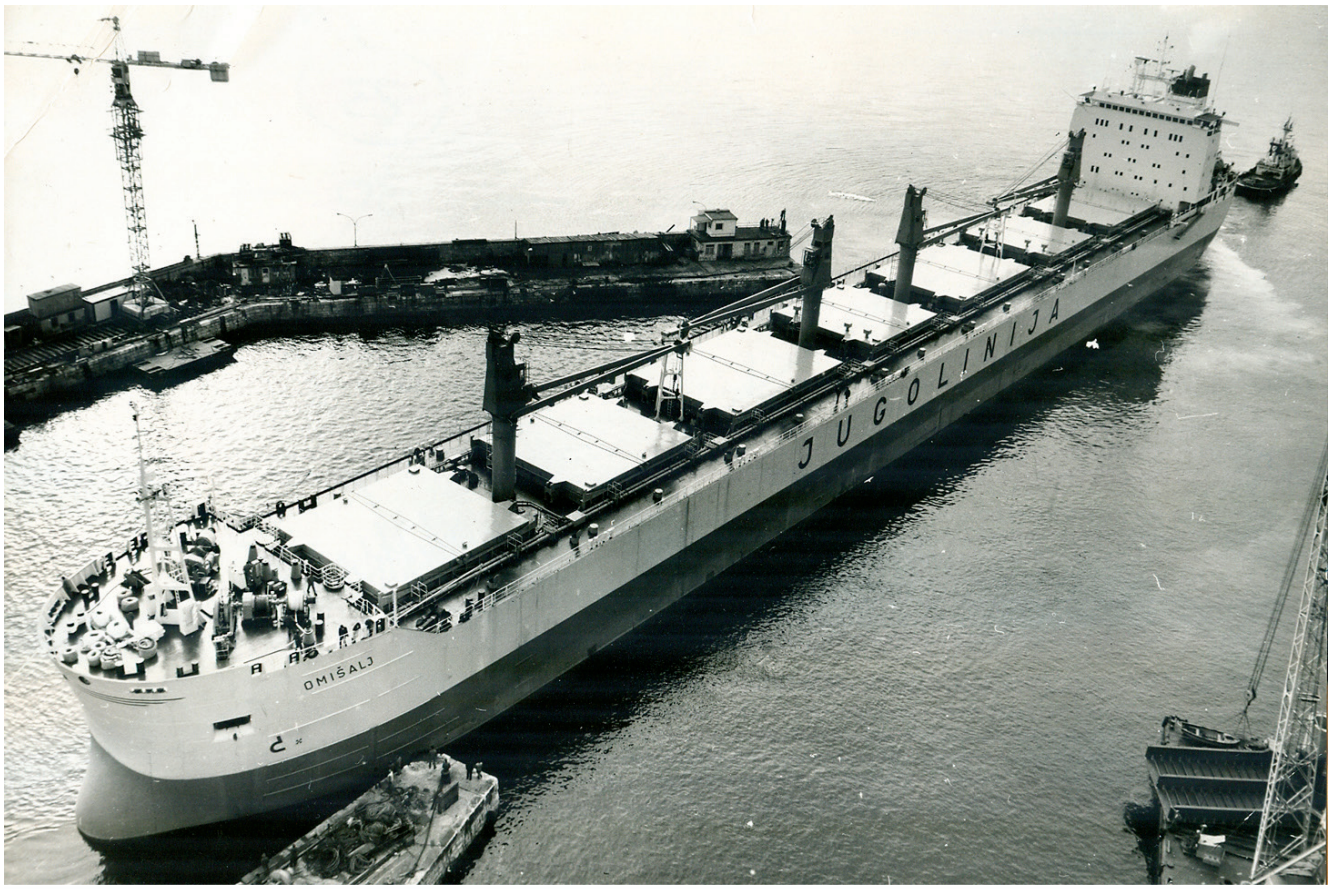

Figure 11.
'Omišalj' – custom-made for the Great Lakes.

The best example of the direct influence of politics on Jugolinija is the establishment of Rashid Shipping Co. in 1981. This Egyptian-Yugoslav joint venture managed to stay afloat for less than three years before winding up in bankruptcy. The politicians intended Jugolinija to provide the ships, and the Egyptians cargoes, believing everything would be fine. But experts could clearly see this venture was doomed to failure.

Four of Jugolinija's ships – 'Viševica', 'Klek', 'Tuhobić' and 'Zvir' - were ordered to sail under Egyptian flag. The quartet was built by the '3.maj' shipyard for Adriatic-North America line as classic liners of a humble cargo capacity, capable of accommodating 50 passengers. Being nearly 20 years old, the ships could hardly be expected to make a profit. As early as in the summer of 1982, the ships were laid up in Alexandria and were soon to be arrested for numerous debts. In 1983, Jugolinija withdrew from the joint venture as losses came to be counted in tens of millions of dollars and ships were sold at auctions.

Clearly, profitability and staying abreast of trends in shipping technology were not issues of primary importance. Unsurprisingly, the first response to the new winds on the market came too late. In early 1973, Jugolinija chartered a German ship 'Ede Sottorf' to navigate the Adriatic-US North of Hatteras line. This semi-container vessel capable of carrying 258 TEUs, was built by the Unterweser shipyard in Bremerhaven for a Hamburg owner, Erich Drescher, in 1969. Sailing mainly to New York, she remained under charter until April 1975.

In July 1974, Jugolinija's first very own container ship entered the fleet. Aptly named 'Pionir', she was built a year earlier by the German Schürenstedt yard in Bardenfleth as 'Maritime Champ' and purchased from the London investors. 118.7 meters in length, she had the capacity of 297 TEUs. She was immediately engaged on the North American route. In 1977, she was joined by two much larger vessels, 'Sušak' and 'Hreljin'. The pair, built by the renowned Sietas shipyard in Neuenfelde, had the capacity of 574 TEUs and sailed at the speed of 18.5 knots.

If anyone expected continued rapid containerisation of Jugolinija he was certainly disappointed. It was five years before the next vessel entered the fleet. It was 'Jadran Express' of 926

Figure 12.
The biggest ever – 'Kostrena'.

TEUs, built by the Japanese shipyard Ishikawajima Harima in Aioi in 1978. A similar vessel, Polish-built 'Rijeka Express' of 934 TEUs, followed in January 1986.

Finally, the first container newbuild was delivered to Jugolinija by a domestic shipyard in May 1987. It was called 'Sarajevo Express', a fine ship with the capacity of 1762 TEUs, capable of the speed of 18 knots. Intended for the North American service, she was built by 'Uljanik' shipyard in Pula. Her sister ship, 'Koper Express', was delivered as early as in September. The third vessel, 'Zagreb Express', with a slightly greater capacity of 1916 TEUs, followed in December 1987.

It was over five years before the fourth and the final sister ship, 'Croatia Express', was delivered. What this implies is that in the entire history of the liner company, among the amazing number of 164 vessels, there were only nine container ships!?

Between 1974 and 1981, the East German shipyard Warnowwerft from Warnemünde built nine liners of the 'Ozean' and 'Meridian' type for Jugolinija, with the modest container capacity ranging from 116 to 356 TEUs. In the early 1980s, 'Uljanik' shipyard built two pairs of semi-containers: 'Rijeka' and 'Tuhobić' of 566 TEUs and 'Triglav' and 'Velebit' of 454 TEUs. In 1985, three sister ships with the capacity of 752 TEUs, built in 1978/1979, were purchased from the Danish Det Østasiatiske Kompagni.

In 1987, the fleet was enriched with sister ships 'Omišalj' and 'Malinska'. These bulk carriers of 34.976 tons were custom-made by the '3.maj' shipyard for the Adriatic - Great Lakes service and the requirements of the St. Lawrence Seaway. Generally considered some of the best ships ever to navigate this route, they are sailing even today under the Canadian ensign.

In the summer of 1987, Jugolinija purchased its biggest ship so far, the bulk carrier 'Kvarner' of 64.063 tons, intended to carry coal for a coking plant in Bakar. She was built in 1973 by the Belgian Cockerill yard in Hoboken. Two years later, a brand new bulker 'Kostrena' of 69.345 tons was delivered by the Japanese builders from Todotsu. She was simultaneously the largest and the very last vessel to enter Jugolinija's fleet.

In the late 1980s, it became apparent that the era of socialist economy and reliance on state subsidies had passed.

Before anything major could be done, the name Jugolinija was relegated to the dustbin of history together with the war-torn state of Yugoslavia. Now operating in the independent Republic of Croatia, she became Croatia Line. A new name and old problems. The first was the enormous number of obsolete liner ships. 'Cleaning' started in 1991 and in three years time ten ships were sent to scrapyards.

From the very beginning, Croatia Line encountered another serious problem. The war disrupted the economy, there were no cargos and no need for liner shipping. Furthermore, the inherited debts of Jugolinija and annual loan repayments were daunting. To keep operating, the company was forced to sell ships. Croatia Line reached the point of no return in 1997.

Unpaid debts for all kinds of supplies and services led to seizures of ships all around the world. In 1997 alone, various ships spent a total of 511 days under arrest. In that year, the proud 'Malinska' and 'Omišalj' were sold to obtain the desperately needed cash, only to be followed by the company's flagship 'Kostrena' in 1998. But in vain! In 1999, creditors lost their patience and the ships were arrested from Durban, Panama, Valletta and Singapore to Hong Kong and Valparaiso. By late 1999, 13 ships were sold at auctions.

Croatia Line officially declared bankruptcy in May 2000. The very last ship on the fleet's list, 'Buzet', was sold in December 2002. But the myth of Jugolinija lives on...

Figure 13.
The end of the line – 'Slovenija' in the scrapyard.

News

1. TECHNOLOGY AND CONSEQUENCES

The Earth's resources are highly limited and human civilization is forced to look for necessary raw materials even in oceans. Great effort is invested in the exploration and utilization of ocean resources, as exemplified by a new robot underwater vehicle intended to dig for gold on the ocean floor (for more information see: spectrum.ieee.org/robotics/industrial-robots/seabedmining-robots-will-dig-for-gold-in-hydrothermal-vents). These machines, scheduled for testing sometime in 2016, are manufactured for Toronto-based mining company: Nautilus Minerals (http://www.nautilusminerals.com/IRM/content/default.aspx).

Technological development opens new possibilities and opportunities. For instance, although having completely automatized vehicles (planes, ships, cars) is now possible, their use in practice would raise a number of questions, like the question of legal liability for traffic accidents in the absence of a human operator (driver, pilot or other). For more details regarding automated cars see IEEE spectrum (N. A. Greenblatt, Self-driving cars and the law, IEEE Spectrum, February 2016, pp. 43-46) or link: http://spectrum.ieee.org/transportation/advanced-cars/selfdriving-cars-will-be-ready-before-our-laws-are.

Although legal issues concerning airspace use by flying drones are described in a number of reports, as yet, none are mentioned in connection with underwater drones, autonomous robotic underwater vehicles and possible sea-surface autonomous vehicles.

2. WEATHER AND CLIMATE CHANGE

The following article is reprinted with consent. The original is available at: http://www.dryadmaritime.com/ever-changing-weather-patterns-for-mariners. It was selected to raise consciousness on climate change and its effect on everyday business and life.

Figure 1.
Ever Changing Weather Patterns For Mariners.
Source: http://www.dryadmaritime.com/ever-changing-weather-patterns-for-mariners

January 2016 has started with two significant and rare tropical storms both of which are out of season. These developments provide a clear indication of the need to keep an ever watchful eye on meteorological conditions, especially in terms of safe and optimum weather routing of voyages.

Hurricane Alex

On 14 January, the North Atlantic saw the first hurricane to form in January since 1938, hurricane Alex. In calendar terms, Alex is one of the earliest tropical systems to form in the Atlantic Hurricane Basin since records began, and it also formed very rapidly.

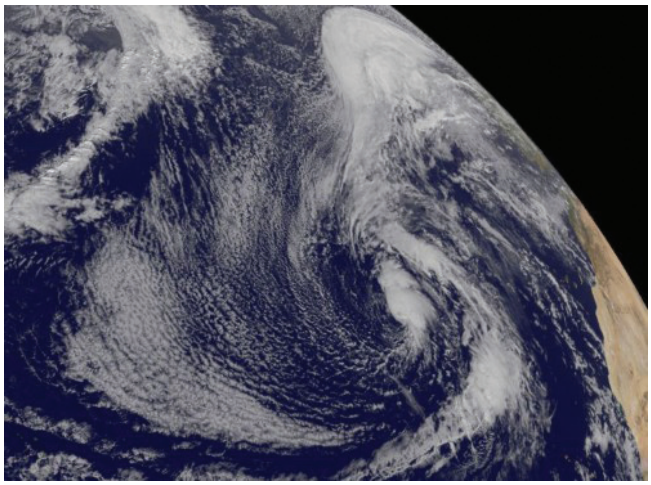

Figure 2.
Hurricane Alex, 2016.
Source: NOAA-NASA GOES Project

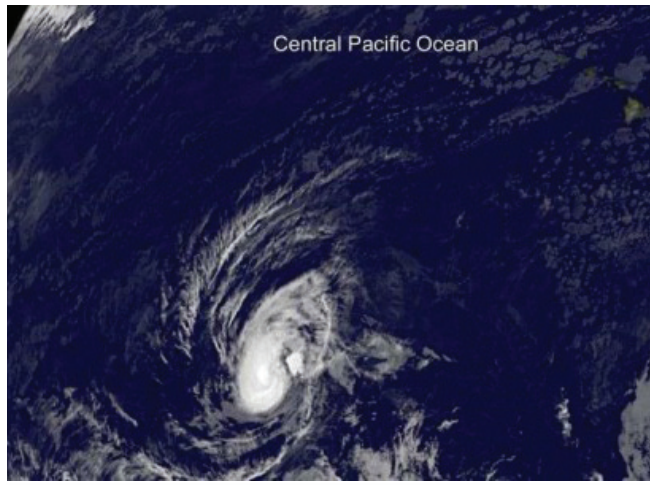

Figure 3.
Hurricane Pali.
Source: NOAA-NASA GOES Project

The US National Hurricane Centre in Miami reports that there haven't been any hurricanes in January since 1955, when Alice formed in late December 1954. Alex maintained hurricane status until 15 January and transitioned into an extra-tropical storm by 16 January as it hit the Azores Islands. Alex's formation is more closely associated with global warming than the 2015's El Niño and formed in waters 1-2 degrees Celsius warmer than usual. This temperature is still barely warm enough for the formation of a storm, but the process was fueled by colder than usual air above, which helped create greater instability than usual.

Hurricane Pali

Meanwhile in the Pacific Ocean, tropical storm Pali formed on 31 Dec 2015, some 30 days after the official end of the Central Pacific Hurricane Season. Scientists believe the reason this storm formed out of season is a combination of high sea surface temperatures attributable to global warming, and higher sea surface temperatures caused by El Niño.

While tropical storms have been known to occur out of season in one ocean or another, it is significant that two tropical storms have never been recorded to simultaneously occur out of season in the same or different oceans. The key question here is whether early 2016 is indicative of what will be considered normal in the future, in which higher temperatures will coincide with the El Niño years, or whether this is only the beginning of what global warming threatens to deliver?

Irrespective of why these two extraordinary storms formed, mariners have great cause for concern. If even the most predictable of weather patterns is capable of creating such anomalies, the development of real time weather routing is clearly more important than previously believed.

El Niño

El Niño is a naturally occurring weather episode, repeating in two- to seven- year cycles when the warm waters of the Central Pacific expand eastwards towards North and South America. This periodic event, with its the tendency to raise global temperatures and disturb global weather patterns, has helped 2015 make it into the record books as the warmest year ever. The current El Nino episode is the strongest since 1998, and is expected to be among the three most powerful ever recorded. According to the World Meteorological Organisation (WMO), the peak three month average water surface temperatures in the tropical Pacific are expected to exceed 2 degrees Celsius above normal.

El Niño is set to exacerbate droughts in some areas, while increasing flooding in others. Elsewhere, it may translate into colder winters in Europe (i.e. greater Baltic Sea freezing), stronger typhoons in the Pacific and more hurricanes in the Atlantic. El Niño is often followed by La Niña, when the cooling of the ocean occurs, which can have opposite but similarly dramatic effects.

Weather Forecasting

Irrespective of why these two extraordinary storms formed, mariners have great cause for concern. Safe weather routing of vessels across the world's oceans partly relies on using historical weather patterns to predict future developments. If even the most predictable of weather patterns is capable of creating

such anomalies, the development of real time weather routing is clearly more important than previously believed. Just as geopolitical unrest and maritime crime arise without warning, so too can the threats posed by the untamable elements that surround us.

3. MARITIME LOGISTICS

The following article is reprinted with consent. The original is available at: http://www.dryadmaritime.com/maritime-supply-chain-security/.

Figure 4.
Maritime Supply Chain Security.
Source: http://www.dryadmaritime.com/maritime-supply-chain-security/.

Maritime Supply Chain Security

Foreword by Ian Millen, Chief Operating Officer – Dryad Maritime

I would like to highlight the below article, a good piece of analysis looking at the vulnerability of global sea supply chains and the measures that can be adopted to ensure that these are as robust as possible through compliance with the International Ship and Port Security (ISPS) code.

Around 80 % of the volume of international trade in goods is carried by sea, so global trade is naturally dependent upon shipping and seafarers. As equally important as global commercial activity is the vital humanitarian role that shipping plays when crisis befalls a nation. Just last month the US Ambassador to the United Nations highlighted the need to increase UN-led humanitarian efforts in Yemen, a war-torn country that is heavily dependent on imported food.

To say the world is reliant on shipping is no exaggeration, and this article does a great job in highlighting why the maritime supply chain sector is so vitally important and what steps can be taken to protect it, as well as highlighting the steps to take in preparing to deal with crises when they occur; particularly through the use of well-organised, structured exercises and lessons.

The author makes a particularly strong point on the need to engage all relevant stakeholders in exercise activity and not just to leave this to the security officer and a close circle of associates. Those of you who have dealt with crisis situations will know that real incidents generate stakeholders with a multitude of opinions and perspectives, so valuable exercise activity must do this too.

In sum, the article is an excellent piece of analysis written by an expert in the field, who has a very clear understanding of how to effectively protect against numerous forms of terrorist activity. The article's value goes far beyond the maritime domain, but for anyone with responsibility for the protection of maritime supply chains, especially Port Facility Security Officers (PFSO), it's a must read.

My thanks to Simon Grantham of Praeparare for authoring this excellent analysis and to Emily Hough, the editor of Crisis Response Journal, for her kind permission for publication on our website.

The original article can be accessed from here.

Maritime Supply Chain Security by Simon Grantham, Praeparare

A few news stories have caught my eye recently that made me wonder what could be done to improve the resilience of our just-enough, just-in-time global supply chains. The first related to the civil strife that has plagued the people of Yemen for so many years. Living with such circumstances must have been bad enough, but there was more to come: Yemeni people are also heavily dependent on imported food, most of which – like much of the world's trade – is delivered by sea. After the rebels made some very significant advances, the Yemeni government, supported by Saudi Arabian forces, created a blockade to prevent rebels being resupplied with munitions.

To some it might seem unlikely that the delivery of much-needed foodstuffs would be affected: after all, how could food be confused with munitions? But such events are not so uncommon and, as if to serve as a case in point, just a few weeks earlier, officials at the Colombian port of Cartagena had discovered 100 tonnes of arms and explosives on a cargo ship documented to be carrying grain.

When the blockade around Yemen's ports was first implemented, several ships laden with food supplies were left stranded for many days awaiting inspection and escort into port. A few weeks later the situation is still very challenging for the shipping industry and food remains in short supply for the people of Yemen.

One of the other stories that gripped my attention concerned America's response to the crisis in Libya and consequential lack of controls at its seaports. In addition to the loss of migrants' lives in people traffickers' vessels, exploiting those

security vulnerabilities raised concerns about risk to the US and its citizens. Those concerns probably had more to do with impact than likelihood. As maritime security Wise Pen Team noted, the main characteristic of maritime transport is: "Its ability to carry very large amounts of cargo in a single voyage to large centres of population." Reaching back into national memory, the Wise Pen Team's description will resonate with the American experience of the Texas City disaster when the SS Grandcamp and the SS High Flyer, both loaded with ammonium nitrate, exploded, killing over 500 people, wounding 2,000 more and levelling around a thousand homes and businesses. Consequently, vessels visiting America that have called at Libyan ports within their last five ports have to comply with a stringent set of security standards.

US maritime supply chain concerns have been voiced before, such as when Harvard political scientist Graham T Allison suggested that a nuclear attack was much more likely to land on American soil via a container ship than on the tip of a missile. Certainly, in the early 2000s, it seemed as if the maritime sector was going to be a prominent feature of the jihadist target set.

Indeed, after al-Qaeda's attack on the oil tanker Limburg, bin Laden released a statement about 'cutting the crusader's umbilical cord'. A raft of maritime terrorist plots stretching across the globe were identified and documentation outlining al-Qaeda's maritime strategy had also been discovered.

To say the global response was impressive is something of an understatement. In November 2001, the International Maritime Organisation (IMO) adopted a resolution entitled Review of Measures and Procedures to Prevent Acts of Terrorism Which Threaten the Security of Passengers and Crews and the Safety of Ships. In an incredibly rapid, co-operative global response, the International Ship and Port Facility Security (ISPS) Code was adopted by 137 contracting governments in December the following year. A remarkable achievement – more of which later.

But the reason the Libyan ports story stood out was because it came hard on the heels of an essay written by a so called Islamic State (IS) ideologue, suggesting that now IS had a presence in Libya, pandemonium could be brought by sea to southern Europe and the shipping lanes closed: "Because of the targeting of Crusader ships and tankers." Maybe this is just rhetoric but, in the context of up-skilled jihadists acutely aware of the importance of supply lines, the statement seems worthy of further consideration.

So what might be an appropriate means of ensuring our supply chains are sufficiently robust? To go back to the ISPS Code, this required relevant ports to develop security plans and exercise them on an annual basis. Becoming ISPS compliant for international ports was a no brainer – nobody wanted to be left out of the opportunity to trade internationally by sea. So security plans were developed and signed off.

Granted, in some ports security plans were more credible than in others, but they were at least a start. As time went by, however, the specter of maritime terrorism did not manifest itself as had been feared. The likelihood of maritime terrorism became seen as low and, in an economic downturn, there were savings to be made regarding these plans. Von Moltke the Elder asserted that: "No plan survives contact with the enemy." Given the changing nature of the threat, now would seem a good time to exercise those plans and make sure they are fit for the purpose.

Exercises do not need to try and emulate those like the Rim of the Pacific Exercise (RIMPAC), the world's largest international maritime warfare exercise series that involves several nations, thousands of players, dozens of vessels and hundreds of other live assets. A huge amount of learning can be obtained from a simple table-top; the IMO recently ran such an exercise with a group in Mauritania to great acclaim. The point is that, properly structured, all exercise types will deliver appropriate learning.

There are a few key considerations to constructing a good exercise and the text below will be expanded on in a series of blogs over the next few weeks.

First of all, an exercise should be driven by its objectives. It may sound obvious, but committing time and effort to be really clear about what you want the exercise to deliver is absolutely key. There is a school of thought that says it is better at this level to think about the consequences you may be faced with rather than the specifics of the type of attack. The logic is that wider business benefits will flow from taking such an approach, for example media handling and managing competing multi-agency needs are aspects that are relevant across a range of scenarios much more likely to be encountered than a terrorist attack.

You should set multi-agency objectives. Seaports are occupied by so many organisations, all with their own needs and priorities, so make sure partners are included in the objective setting – think broadly about who it is sensible to include. Generally speaking, if someone would have a locus in resolving an incident in the real world, then his or her views need to be heard during the exercise.

When dealing with a real-life incident that mirrored a recently run exercise one operations director asked why a particular decision was taking so long when, during the exercise, the course of action had been determined in a matter of minutes. "Ah," came the reply, "But now the lawyers are saying…" Such people need not necessarily be full players – there are a myriad of ways to ensure their contribution keeps responses real – but their input does need to be included.

Furthermore, all exercises have to be kept relevant, realistic and appropriate to current conditions. The last thing you want is someone saying: "In the real world I would have done things differently," because, if true, that would undermine any associated learning. It is therefore vital to get the buy-in of all players, and to achieve this, the theme needs to be relevant and realistic.

Make sure the exercise reflects current terrorist modus operandi and is appropriate to the port involved. The ISPS Code lists a number of scenarios and Exercitium, the European handbook of maritime security exercise and drills, does too – together with some really sound broader advice. Terrorists crave success so they will often resort to tried and tested methods of attack.

But, with so many active jihadist conflicts – Afghanistan, the Caucasus, Iraq, Libya, Nigeria, Somalia, Syria, Yemen and so on – it is also critical to keep abreast of developing trends.

Do not neglect pre-exercise preparation. Exercises are challenging events for key individuals. Leaders do not want to look foolish in front of their subordinates and team players want to be able to demonstrate a masterful knowledge of their disciplines. So it is worth making sure people have the opportunity to prepare themselves accordingly. For a table-top, this could involve ensuring everyone knows the latest policies and procedures (and brings such documents to the event); for the live play, it might be that they have been involved in recent multi-disciplinary table-top exercises.

The preparation should generally not extend to players familiar with the scenario – that will often undermine the validity of any learning, although there might be a benefit in some key individuals being allowed insight into the broader storyline – they can then be approached to help put things back on track if the unexpected happens. People who are prepared are much more likely to enjoy the experience and that will make for a far more valuable exercise.

Capturing Lessons

Working out how you will identify and capture the lessons is key. Observers or umpires who are competent, current and, most of all credible, can be of particular value where the learning objectives are strategic in nature. Where objectives are more operationally focused, self-reporting by the players themselves – for example through structured debriefing – can be a cost-effective approach, depending on the pace of the exercise and organisational culture.

The use of third party subject matter experts has a real value here: it is easier for an outsider to tell the truth to people in power. An outsider has no loyalty to internal politics, will not be constrained by internal thinking and will very likely bring new ideas.

The process of articulating the learning clearly requires very precise language, but even more fundamental is the requirement to validate the issue in question. There is no point in developing a solution to an artificiality that only arose because of the circumstances of the exercise. This normally requires recursive dialogue between relevant exercise participants, planners and those involved in managing the learning.

Finally, do not neglect implementation, the hardy perennial of exercising! Once the lessons have been signed off as valid and the wording agreed, they need to be logged, risk assessed, assigned an owner and reviewed by senior management until they have been absorbed into practice. Testing them then needs to be included as a future exercise objective.

Exercising in seaports is not just about gaining an ISPS compliance check – properly constructed exercises can provide a range of business benefit: validating plans; developing personnel; embedding policies and procedures; and building relationships. They can expose gaps in existing plans and allow you to plug them before they cause harm. And they give people an opportunity to gain a sound understanding of their role in times of crisis.

As Sun Tzu said: "Without constant practice, the officers will be nervous and undecided when mustering for battle: without constant practice the general will be wavering and irresolute when the crisis is at hand."

This article was first published in the Crisis Response Journal.

Svjetionik s Lastova

Ana Ivelja

Svjetionik s Lastova,
kamena, stamena Struga.
postojan galeb na stijeni,
čuvar Juga.

Prkosno s litice, visoko,
smiješi se pučini.
Svjetlost moru dariva
sunce noći u pomrčini.

Hrvatskoj pozdrave šalje
preko mora i oceana
do Amerike, Islanda,
Australije, Zelanda...

Budno, vjerno, danonoćno,
na braniku Domovine,
od Jadrana do Podunavlja,
svijetli s Juga,

stražar s Lastova – Struga.

The Lighthouse of Lastovo

trans. by Mirna Čudić

The lighthouse of Lastovo,
the craggy, stout Struga,
a steadfast seagull upon a cliff,
the guardian of the South.

High up from the cliff, defiant,
smiling at the open sea,
it bestows light upon the sea
and sunshine upon the eclipsed night.

It sends greetings to Croatia
over seas and oceans,
stretching to America, Iceland,
Australia, New Zealand...

Vigilant, faithful
standing day and night in the defence of the Homeland
from the Adriatic to the Danube Valley,
it shines from the South,

the watchman of Lastovo – Struga.

About ToMS: Ethics, Conflict of Interest, License and Guides for Authors

The Journal is published in English as an open access journal, and as a classic paper journal (limited edition).

ToMS aims at presenting the best maritime research primarily, but not exclusively, from Southeast Europe, particularly the Mediterranean area. Papers will be double-blind reviewed by 3 reviewers. With the intention of providing an international perspective at least one of the reviewers will be from abroad. ToMS also promotes scientific collaboration with students and has a section entitled Students' ToMS. These articles also undergo strict peer reviews. Furthermore, the Journal publishes short reviews on significant papers, books and workshops in the fields of maritime science.

Our interest lies in general fields of maritime science (transport, engineering, maritime law, maritime economy) and the psychosocial and legal aspects of long-term work aboard.

1. PUBLICATION ETHICS

Ethical Policies of ToMS

Plagiarism is arguably the most complicated ethical issue. Our policies define plagiarism as "taking material from another's work and submitting it as one's own." ToMS *holds authors — not the Publisher or its editors and reviewers — responsible* for ensuring that all the ideas and findings included in a manuscript are attributed to the proper source. We also refer to our role as steward of what constitutes ethical conduct. Ethical misconduct is the reason for our commitment to continue to strive to educate all the parties in the publishing process how to handle this matter. As a member of Crossref, ToMS has a powerful weapon – iThenticate system, which is not perfect.

"Even if there were reliable and sensitive plagiarism detection software, many issues would remain to be addressed.

For example, how much copying is legitimate? Clearly, the reuse of large amounts of others' text constitutes plagiarism. But what should one think about copying short passages from the author's own earlier work, such as commonly occurs in the Methods section? In the Nature article it is suggested that some journals set a quantitative limit whereby the amount of text that can be reused is limited to about 30 percent. This may be utilitarian, but it seems curious and arbitrary that 25 percent of copied text might be deemed acceptable whereas 30 percent might not. Indeed, two authors who copied the same number of words could find themselves on opposite sides of that border if one author simply was more verbose and thus diluted their plagiarized content below the threshold! No, this is not a simple issue at all." [cited from: http://newsletter.aspb.org/ethics.cfm]

Expectations for publishing in ToMS

Faculty of Maritime Studies expects authors submitting to and publishing in its journals to adhere to ethical standards to ensure that the work they submit to or publish in the journal is free of scientific misconduct. Authors must:

- Take credit only for work that they have produced.
- Properly cite the work of others as well as their own related work.
- Submit only original work to the journal.
- Determine whether the disclosure of content requires the prior consent of other parties and, if so, obtain that consent prior to submission.
- Maintain access to original research results; primary data should remain in the laboratory and should be preserved for a minimum of five years or for as long as there may be reasonable need to refer to them. All authors of articles submitted for

publication assume full responsibility, within the limits of their professional competence, for the accuracy of their paper. Instances of possible scientific misconduct related to papers submitted to or published in the ToMS will be addressed by following the procedure outlined below.

2. CONFLICT OF INTEREST

The authors, reviewers and other participant are obligated to clearly state possible conflict of interest. Editor-in-chief, senior editor and/or executive editors board decide on actions based on conflict of interest (COI).

Editors' Duty

Disclosure and Conflicts of Interest: The editor cannot use unpublished materials, disclosed in submitted manuscript for his/her own research, without prior written consent of the author(s).

If author(s) of submitted paper is a member of editorial board or editor-in-chief, the submission, review and decision process is carried by the highest ranking editor who is not the author.

Reviewers' Duty

All reviewers should have no conflict of interest with respect to the research, the authors and/or the funding bodies.

3. MALPRACTICE

Procedure for addressing allegations of scientific misconduct or other ethical violations

Scientific misconduct in publishing includes but is not limited to:

- Fraud: fabricating a report of research or suppressing or altering data;
- Duplicate publication;
- Plagiarism and
- Self-plagiarism.

Procedure for handling allegations of misconduct

- All allegations of scientific misconduct or ethical violation will be referred to the editor for research integrity or to the editor-in-chief. All allegations should be made in writing.
- Editor for research integrity will report the case in the meeting of the Editorial board and recommend the actions in 30 days.
- Except redraw of the paper, punishment could be inclusion in the black list of the journal and prohibition of further publishing in ToMS.

Submission declaration

Submission of an article implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis or as an electronic preprint), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere including electronically in the same form, in English or in any other language, without the written consent of the copyright-holder.

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5. PUBLICATION ETHICS AND MALPRACTICE STATEMENT

Unethical behavior is unacceptable and Transactions on Maritime Science does not tolerate plagiarism in any form. Authors who submit articles affirm that manuscript contents are original. Furthermore, authors' submission also implies that the manuscript has not been published previously in any language, either fully or partly, and is not currently submitted for publication elsewhere. Editors, authors, and reviewers, within the Transactions on Maritime Science are to be fully committed to good publication practice and accept the responsibility for fulfilling the following duties and responsibilities, as set by the COPE Code of Conduct for Journal Editors (http://publicationethics.org/resources/guidelines).

5.1. Duties of the Authors

Reporting Standards: Authors should accurately present their original research, as well as objectively discuss its significance. Manuscripts are to be edited in accordance to the submission guidelines of the proceedings.

Originality: Authors must ensure that their work is entirely original.

Multiple, Redundant, or Concurrent Publications: Authors should not concurrently submit the same manuscript for publishing to other journals, or conference proceedings. It is also expected that the author(s) will not publish redundant manuscripts, or manuscripts describing the sameresearch in several publishing venues, after the initial manuscript has been accepted for publication.

Acknowledgement of Sources: Author(s) should acknowledge all sources of data used in the research and cite publications that have influenced their research.

Authorship of the Paper: Authorship should be limited only to those who have made a significant contribution to conceiving, designing, executing and/or interpreting the submitted study. All those who have significantly contributed to the study should be listed as co-authors. The corresponding author should also ensure that all the authors and co-authors have seen and approved the final submitted version of the manuscript and their inclusion as co-authors.

Data Access and Retention: Authors should retain raw data related to their submitted paper, and must provide it for editorial review, upon request of the editor.

Disclosure of Financial Support: All sources of financial support, if any, should be disclosed.

Fundamental errors in published works: When an author discovers a significant error or inaccuracy in his/her submitted manuscript, the author must immediately notify the editor.

5.2. Duties of Reviewers

Confidentiality: Manuscript reviewers, the editor and the editorial staff must not disclose any information regarding submitted manuscripts. All submitted manuscripts are to be treated as privileged information.

Acknowledgement of Sources: Reviewers of manuscripts must ensure that authors have acknowledged all sources of data used in the research. Any similarity or overlap between the considered manuscripts, or with any other published paper, which is in personal knowledge of reviewer, must be immediately brought to the editor's notice.

Standards of Objectivity: Review of submitted manuscripts will be conducted objectively. The reviewers shall express their views clearly, with supporting arguments.

Promptness: If a reviewer believes it is not possible for him/her to review the research reported in a manuscript within the designated guidelines, or within stipulated time, he/she should notify the editor, so that the accurate and timely review can be ensured...

Conflict of Interest: All reviewers should have no conflict of interest with respect to the research, the authors and/or the funding bodies.

5.3. Duties of the Editor

Publication Decisions: Based on the editorial board's review, the editor can accept or reject the manuscript or can send it for modifications.

Review of Manuscripts: The editor ensures that each manuscript is initially evaluated by the editor, who may make use of appropriate means, to examine the originality of the contents of the manuscript. After the manuscript passes this test, it is forwarded to two reviewers for double-blind peer review, and each of whom will make a recommendation to publish the manuscript in its present form or to modify or to reject it. The review period will be no more than30 days.

Fair Review: The editor ensures that each manuscript received is evaluated on its intellectual content without regard to authors' sex, gender, race, religion, citizenship, etc.

Confidentiality: The editor must ensure that information regarding manuscripts submitted by the authors is kept confidential.

Disclosure and Conflicts of Interest: The editor cannot use unpublished materials, disclosed in submitted manuscript for his/her own research, without prior written consent of the author(s).

6. GUIDELINES FOR AUTHORS

The Journal is published in English as an open access journal, and as a classic paper journal (limited edition).

ToMS aims at presenting the best maritime research primarily, but not exclusively, from Southeast Europe, particularly the Mediterranean area. Papers will be double-blind reviewed by 3 reviewers. With the intention of providing an international perspective at least one of the reviewers will be from abroad. ToMS also promotes scientific collaboration with students and has a section entitled Students'ToMS. These articles also undergo strict peer reviews. Furthermore, the Journal publishes short reviews on significant papers, books and workshops in the fields of maritime science.

Our interest lies in general fields of maritime science (transport, engineering, maritime law, maritime economy) and the psychosocial and legal aspects of long-term work aboard.

6.1. Before you Begin

6.1.1. Ethics in publishing

For information on Ethics in publishing and Ethical guidelines for journal publication see Publication Ethics

6.1.2. Conflict of interest

All authors are requested to disclose any actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations within three years of beginning the submitted work that could inappropriately influence, or be perceived to influence, their work.

6.1.3. Submission declaration

Submission of an article implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis or as an electronic preprint), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere including electronically in the same form, in English or in any other language, without the written consent of the copyright-holder.

6.1.4. Changes to authorship

This policy concerns the addition, deletion, or rearrangement of author names in the authorship of accepted manuscripts:

Before the accepted manuscript is published in an online issue: Requests to add or remove an author, or to rearrange the author names, must be sent to the Journal Manager from the corresponding author of the accepted manuscript and must include:

a. the reason the name should be added or removed, or the author names rearranged and
b. written confirmation (e-mail, fax, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed. Requests that are not sent by the corresponding author will be forwarded to the Journal Editors and to the corresponding author, who must follow the procedure as described above.

Note that:
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After the accepted manuscript is published in an online issue:

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You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. If the funding source(s) had no such involvement then this should be stated.

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6.2. Guidelines for Authors: Manuscript Preparation and Submission

6.2.1. Organization of the manuscript

First (title) page

The first page should carry:

a. the paper title;
b. full names (first name, middle – name initials, if applicable), and last names of all authors;
c. names of the department(s) and institution(s) to which the work should be attributed. If authors belong to several different institutions, superscript digits should be used to relate the authors' names to respective institutions. Identical number(s) in superscripts should follow the authors names and precede the institution names;
d. the name, mailing address and e-mail of the corresponding authors;
e. source(s) of research support in the form of financial support, grants, equipment or all of these.

Last page

The last page should carry:

a. ethical approval, if required;

b. authors' declarations on their contributions to the work described in the manuscript, their potential competing interests, and any other disclosures. Authors should disclose any commercial affiliations as well as consultancies, stock or equity interests, which could be considered a conflict of interest. The details of such disclosures will be kept confidential but ToMS urges the authors to make general statements in the Acknowledgement section of the manuscript.

c. a list of abbreviations used in the paper (if necessary);

Other pages

Each manuscript should follow this sequence:

- title page;
- abstract;
- text (Introduction, Methods, Results, Conclusions/ Discussion);
- acknowledgments;
- references;
- tables (each table complete with title and footnotes on a separate page);
- figures and figure legends, and the last page.

6.2.2. Text organization and style

6.2.2.1. Abstract

The second page should contain the Abstract. ToMS requires that the authors prepare a structured abstract of not more than 250 words. The abstract should include (at least) four sections: Aims, Methods, Results, and Conclusion, not necessarily separated.

Aim. State explicitly and specifically the purpose of the study.

Methods. Concisely and systematically list the basic procedures, selection of study participants or laboratory/ experimental/simulation setup, methods of observation (if applicable) and analysis.

Results. List your primary results without any introduction. Only essential statistical significances should be added in brackets. Draw no conclusions as yet: they belong in to the next section.

Conclusion. List your conclusions in a short, clear and simple manner. State only those conclusions that stem directly from the results shown in the paper. Rather than summarizing the data, conclude from them.

6.2.2.2. Main text

Do not use any styles or automatic formatting. All superscripts or subscripts, symbols and math relations should be written in MathType or Equation editor.

Introduction

The author should briefly introduce the problem, particularly emphasizing the level of knowledge about the problem at the beginning of the investigation. Continue logically, and end with a short description of the aim of the study, the hypothesis and specific protocol objectives. Finish the section stating in one sentence the main result of the study.

Results

Key rules for writing the Results section are:

a. the text should be understandable without referring to the respective tables and figures, and vice versa;

b. however, the text should not simply repeat the data contained in the tables and figures; and

c. the text and data in tables and figures should be related to the statements in the text by means of reference marks.

Thus, it is best to describe the main findings in the text, and refer the reader to the tables and figures, implying that details are shown there. The formulations such as "It is shown in Table 1 that the outcome of Group A was better than that of Group B" should be replaced by "The outcome of Group A was better than that of Group B (Table 1)."

The need for brevity should not clash with the requirement that all results should be clearly presented.

Discussion/Conclusions

The discussion section should include interpretation of study findings in the context of other studies reported in the literature. This section has three main functions:

a. assessment of the results for their validity with respect to the hypothesis, relevance of methods, and significance of differences observed;

b. comparison with the other findings presented in the relevant literature; and

c. assessment of the outcome's significance for further research.

Do not recapitulate your results, discuss them!

6.2.2.3. Tables

Information on significance and other statistical data should preferably be given in the tables and figures. Tables should not contain only statistical test results. Statistical significances should be shown along with the data in the text, as well as in tables and figures.

Tables should bear Arabic numerals. Each table should be put on a separate page. Each table should be self-explanatory, with an adequate title (clearly suggesting the contents), and logical presentation of data. The title should preferably include

the main results shown in the table. Use tables in order to present the exact values of the data that cannot be summarized in a few sentences in the text.

Avoid repetitive words in the columns: these should be abbreviated, and their explanations given in the footnotes. Present data either in a table or a figure.

Each column heading for numerical data given should include the unit of measurement applied to all the data under the heading. Choose suitable SI units.

Place explanatory matter in footnotes, not in the heading.

Explain in footnotes all nonstandard abbreviations that are used in each table.

6.2.2.4. Figures

Figures should be numbered in sequence with Arabic numerals. Legends to figures should be listed on a separate page, in consecutive order. Minimum resolution for all types of graphics is 300 dpi and 600 dpi is recommended. The legend of a figure should contain the following information:

a. the word "Figure", followed by its respective number;
b. figure title containing major finding (e.g. Manuscripts which follow Guidelines for Authors had higher acceptance rate, and not Relationship with manuscripts style and their acceptance rate).

Use simple symbols, like closed and open circles, triangles and squares. Different types of connecting lines can be used. The meanings of symbols and lines should be defined in the legend.

Each axis should be labeled with a description of the variable it represents.

Only the first letter of the first word should be capitalized. The labeling should be parallel with the respective axis. All units should be expressed in SI units and parenthesized. Make liberal use of scale markings.

Graphs, charts, titles, and legends in accepted manuscripts will be edited according to ToMS style and standards prior to publication.

Preferred format for graphs or charts is xls. Graphs and charts saved as image (raster) files such as JPG, TIF, or GIF and imported or copied/pasted into Word or Power Point are not acceptable.

The resolution for photographic images should be at least 300 dpi, and minimum image width should be 6 cm. Please submit files in RGB format. For published manuscripts, image files will be posted online in their original RGB format, maintaining the full color of your original files. Note that we will still need to convert all RGB files to CMYK for printing on paper and color shifts may occur in conversion. You will not receive a CMYK proof. You can view an approximation of print results by converting to CMYK in Adobe® Photoshop® or Adobe® Illustrator®.

6.2.2.5. Authorship statement

All contributing authors must fill out and sign these statements and submit them to the Editorial Office. Accepted manuscripts will not be published until signed statements from all authors have been received.

6.2.2.6. Acknowledgments

Technical help, critical reviews of the manuscript and financial or other sponsorship may be acknowledged. Do not acknowledge paid services, e.g. professional translations into English.

6.2.2.7. References

References cited in the manuscript are listed in a separate section immediately following the text. The authors should verify all references. Usage of DOIs is encouraged.

Examples of citation in text:

It is well known fact (Strang and Nquyen, 1997; Antoniou, 2006) that FT is not an appropriate tool for analyzing nonstationary signals since it loses information about time domain.

First group of authors (Vetterli and Gall, 1989) proposed Multiresolution Signal Analysis (MRA) technique or pyramidal algorithm. Second group (Crochiere et al., 1975; Crochiere and Sambur, 1977) proposed subband coding algorithm. Legal acts are cited as in example: The Constitution of the Republic of Croatia (Constitution of the Republic of Croatia, 2010) is the main legal source for this subject matter, as well as any other subject matter relating to the Croatian legal system. References from the Web are cited in the text as (Author(s) last name, year of origin if known (year of accessed in other cases). If the author is unknown, such as in case of company web page, instead of author's name, title of the web page is used.

Examples for reference section:

Journals

Petrinović, R., Wolff, V. S., Mandić, N. and Plančić, B., (2013), International Convention on the Removal of Wrecks, 2007. – a New Contribution to the Safety of Navigation and Marine Environment Protection, Transaction on Maritime Science, 2(1), pp. 49-55., http://dx.doi.org/10.7225/toms.v02.n01.007

Pennec, E. and Mallat, S., (2005), Sparse Geometric Image Representations with Bandelets, IEEE Transactions on Image Processing, 14(4), pp. 423 – 438., http://dx.doi.org/10.1109/TIP.2005.843753

Web links

Donoho, D., Duncan, M. R., Huo, X. and Levi, O., (1999), Wavelab, available at: http://www.stat.stanford.edu /_wavelab/, [accessed 12 August 2011.].

Unknown, Wavelab, available at: http://www.stat.stanford.edu /_wavelab/, [accessed 12 August 2011.].

ToMS home page, available at: http://www.toms.com.hr, [accessed 12 July 2012.].

Books

Mallat, S., (2009), A Wavelet Tour of Signal Processing, 3rd Edition, New York: Academic Press.

Conference proceedings

Łutowicz, M. and Lus , T., (2013), Effect of Loss of Cylinder Pressure Indicating Channel Patency on Parameters Values Obtained from Indicating Graph, Proc. 5th International Maritime Science Conference, Solin, Croatia, April 22 – 23, pp. 382-389., available at: http://www.pfst.hr/imsc/archive/2013/IMSC2013_proceedings.pdf

Kingsbury, N.G. and Magarey, J.F.A., (1997), Wavelet Transforms in Image Processing. Proc. First European Conference on Signal Analysis and Prediction, Prague, Czech Republic, June 24 – 27, Birkhauser, pp. 23 – 24., available at: http://www.sigproc.eng.cam.ac.uk/~ngk/publications/ngk97b.zip, [accessed 12 August 2011.].

Regulations, standards or legal acts:

Constitution of the Republic of Croatia, (2010), Narodne novine, 2010(76), pp. (if known).

6.2.2.8. Supplementary materials

Supplementary materials are optional. Authors can submit different types of materials which will be available on-line.

6.2.2.9. Language

Authors may use standard British or American spelling, but they must be consistent. The Editors retain the customary right to style and, if necessary, shorten texts accepted for publication.

This does not mean that we prefer short articles – actually, we do not limit their size - but rather a resection of the obviously redundant material.

The past tense is recommended in the Results Section.

Avoid using Latin terms; if necessary, they should be added in parentheses after the English terms. Real names rather than "levels" or "values" should refer to parameters with concrete units (e.g. concentration).

6.2.2.10. Abbreviations

Only standard abbreviations and symbols may be used without definition and may be used in the title or the page-heading title.

Non-standard abbreviations should not be used in the title or page-heading title. They must be explained in the text in the following way: the term should be written in full when it appears in the text for the first time, followed by the abbreviation in parentheses; from then on, only abbreviation is used in the text. This applies separately to the Abstract and the rest of the text.

6.2.3. Submission of manuscripts

Paper submission via Open journal system.

Manuscripts can also be submitted to:

Editorial office
Transactions on Maritime Science,
Faculty of Maritime Studies,
Ruđera Boškovića 37,
21000 Split, Croatia
www.toms.com.hr | office@toms.com.hr