

The degree of implementation of SPOS on Polish Steamship Company's ships

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Abstract

The article deals with the problem of ship's ocean route programming. For masters during planning the ocean most convenient route lots of factors are very important such as among others: current, forecast weather, criteria and restriction, speed and fuel characteristic of ships on waves and wind and so on. These elements when are properly identify and adopted allow the master for making an effective ship's course and speed decision. The aim of research is to show how the SPOS system is treated during the ocean's ship route. 39 captains of PŻM ships during the year of 2014 answered on 9 questions of questionnaire which were concerned the degree of utilization of SPOS (Ship Performance Optimization System) during the operation of their ships. All the masters confirmed that they use of SPOS system as a browser weather, while only 25.6% of masters confirmed that they also use the SPOS system as a tool in planning the route. They also repeatedly pointed out, however, that SPOS has some of limitations such as not limited information about ice cover or tropical cyclones, etc. In conclusion, it can be assess that the SPOS system is satisfactorily used on ships as a browser forecast, but does not work well in planning the trip by navigators.

Introduction

All vessels of Polish Steamship Company (PŻM) have been equipped with weather maritime navigation support system "Ship Performance Optimisation System" (SPOS) since 2009. In 2012 all ships received their speed characteristics depending on speed and wind direction and wave height and direction to all the vessels [1]. At the turn of 2013/2014, after 5 years of operation of the system SPOS, the captains were asked to express their opinion about the practical usefulness of the system SPOS during the operation of the ship, its advantages and possible disadvantages. They were also asked for comments and suggestions to the published and forwarded to each vessel publication "Problems of integrated planning and programming of routes the ocean vessels by using the system SPOS" publishing by the Maritime University (2012) by the team of Professor Bernard Wisniew-

ski and consulted by the Department of Safety in Polish Steamship Company (*Pol. PŻM*) [2].

Methodology of data collection and the results of study

Masters of vessels as experts in the field of research were asked to complete the questionnaire. Questionnaires publications, materials and cover letter were sent on the vessels. The questionnaires were filled by 39 captains whose were managed the vessels on ocean routes during the period November 2013 – IV 2014. For respondents were formulated about 9 questions and they were asked about any comments.

Question 1: *How many voyages did master use the SPOS?*

- a. as a browser weather, or
- b. as a route planning tool (Fig. 1).

In the first part, all the captains of the 39 vessels answered positively, so the SPOS system were used as a browser weather. In this way, it can be concluded that the SPOS gave for the vessels the access to current and forecast weather information and it can be assumed that the SPOS replaced the facsimile transmission in a very large extent [3]. The second part of the response is negative.

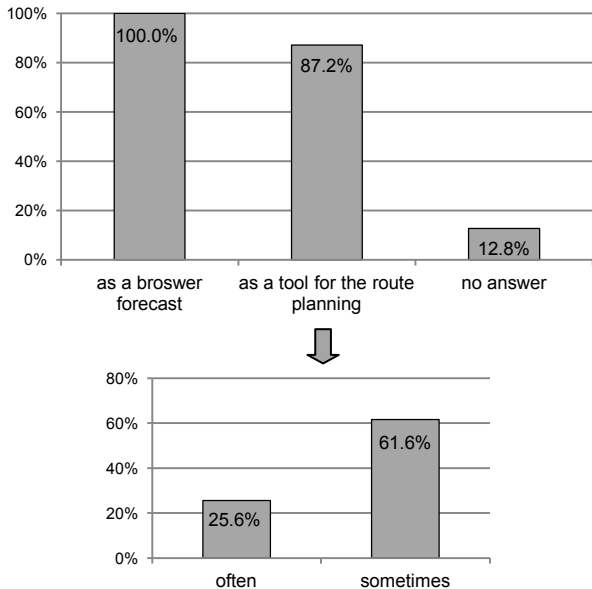


Fig. 1. How many voyages did master use the SPOS?

Five captains didn't use at all the SPOS as a tool for travel planning (12.8%) and exactly 24 captains stated that they occasionally used the function of forecasting routes, for example, like once a year. Only 10 captains (25.6%) strongly confirmed that they use the system functions.

This result shows that the number of 25.6% of the respondents is a reliable answer to the question, how many percent of potential users are prepared for using the advisory function of SPOS in ship's ocean route programming.

Question 2: *How do you assess the limitations presented in the SPOS and take them into account during the calculation of routes and concerning:*

- a. tropical cyclones,
- b. areas of ice cover and the ice border,
- c. currents.

Proposed to assess the visual presentation of SPOS on the maps in a scale of 0 to 5 and 4. As satisfactory accepted the evaluation of 5 and 4 and others as a negative. Response to the first question, i.e. how the above mentioned limitations were presented on the weather maps (Fig. 2).

The presentation of cyclones considered as satisfactory by 89.0% of respondents, and only 7 captains (18% of the population) considered this

information as unsatisfactory [4]. The information about iced areas and the limits of occurrences of the ice cover presented in SPOS system were a negatively assessed by the captains (negative assessment of 55% of the respondents – Fig. 2b). The second part of the question – how these limitations are included in the calculation, partially negative answers were provided by those captains who declared that the use of the function of the SPOS system as a tool for planning the rout and performed calculations (10 captains).

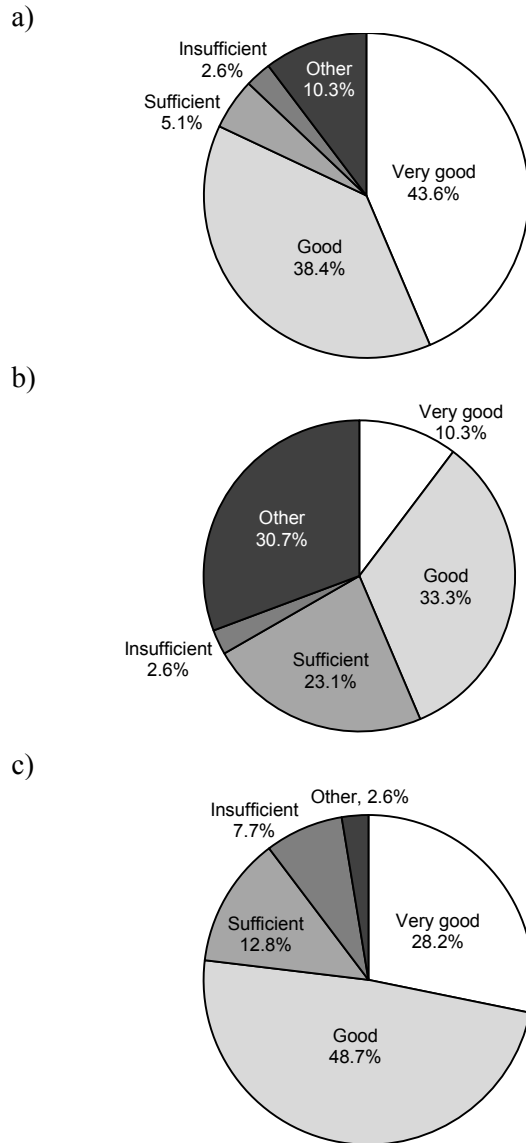


Fig. 2. How do you assess the limitations presented in the SPOS and take them into account during the calculation of routes and concerning: a) tropical cyclones, b) areas of ice cover and the ice border, c) currents

Question 3: *How do you assess the process of forecast weather ordering and its update?* This question specifies if there were any problems with the procedure of analysis ordering and the weather forecasts from the SPOS terrestrial center.

The procedure of ordering forecasts is assessed good or very good by 97.4% of respondents (Fig. 3). This has been confirmed by 38 captains, and only one person has not complied with the questionnaire question.

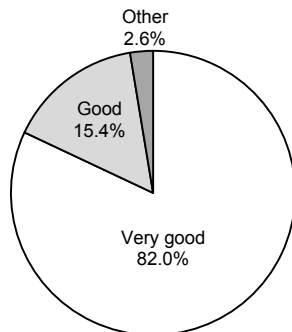


Fig. 3. How do you assess the process of forecast weather ordering and its update?

Question 4: *How often did captain order the weather forecasts and for what reason?*

In response to this question is suggested: one per day or twice a day the weatherpack was extracted. The cost of acquiring each package is the financial costs. Therefore, is possibility to assess how reasonably the finances are managed by the captains. Is enough to take daily the analysis and the forecasts weather in advance at 12, 24, 36, 48, 72, 96 and 120 hours, that is, the interval 5 days forward. For the Atlantic water area, map should relate to hours. 12.00 UTC, 00.00 UTC the Pacific to the Indian Ocean are most conveniently 06.00 UTC, i.e. afternoon sunlight for the central part of the Ocean [1].

Seven respondents (18%) stated that they always take the packets weather twice a day, but without specifying for which the split of forecasts. 82% of respondents rightly declared that they took the package weather once a day and only in special cases in the short term twice a day.

Next questions number 5 and 6 concern the testing route, and the choose of the vessel route on the Ocean, or level of use of the other important features of the SPOS as a tool for forecasting the route with relating to the conditions of current and forecasted weather.

Question 5: *Do you test the route?*

Question 6: *How many stages of testing usually performs captain during testing oceanic route?*

The answers to the question No. 5 are very reliable and correspond with earlier questions No. 1 and 2. Only 18% of captains performs the route planning. It can be assumed that in addition of 5–10% of the respondents executing though fragments of testing procedures. In a questionnaire they con-

firmed that they performed test in fragmentarily and exceptionally. The answer to this question was the most difficult for respondents. With a large variety of answers reliable number can be 23.1% of the respondents who have done three stages of testing (comparing the results of the travel time of the ship, the great circle, rhumb line, his own planned route before going to sea, the route specified by the SPOS as the most convenient” and so on). Other data percentages obtained from the answers are incorrect, for example: if about 25% of the respondents undertook testing, so other reasons for the lack of testing should be about 75%. From the previous consultation with the captains also not encountered (outside the questionnaire) responses, which indicate that the captain tested the route in 5 or more stages [5].

The last three questions concerned on the publication “Problems of integrated planning and ships’ ocean route programming using the SPOS system” by Scientific Publishing House of the Maritime University in 2012 (referred to in the content and the drawings as a publication) [2, 5, 6]. The publication was purchased by the PŻM (Polish Steamship Company) and sent to the vessels, together with this questionnaire. The publication is designed to facilitate the use of the possibility of testing the route and allows you to select the most favorable travel routes by using the weather conditions, vessel speed characteristics on wave and wind and procedures that allows SPOS. Thus, questions 7, 8, 9 relate to procedures for the use of SPOS system. It is also the possibility to express an opinion on the usefulness of such aid as a tool for the ships’ ocean route programming.

Question 7: *Is there a need to make a table “Dataset travel” for pages 74–76 of the publication?*

Question 8: *How do you assess a checklist presented on page 50 of publication?*

Question 9: *How clear and complete are the examples of procedures and analysis of travel in accordance with Annex No. 2 of publication?*

In general, respondents’ answers are positive about the role played by the publication of “Problems of integrated planning and ships’ ocean route programming using the SPOS system”.

Question No. 7, 53.3% of respondents answered that it is not necessary to fill in a table with other data. 64.1% captains answered positively for a proposed control list (question 8), and the question 9 about the legibility and completeness of explanations procedures positive assessment (very good, good) answered 26 captains (66.7%).

Worrisome is the fact that a high percentage of respondents did not answer the questions (18.0–23.1%).

Conclusions

Based on a questionnaire filled in by 39 captains of PŻM (Polish Steamship Company), who were in charge for the ships on the routes of ocean in the season autumn-winter 2013/2014 determined that the degree of implementation of SPOS is at 50%. All the captains declared that they used the SPOS system as a browser weather. The vast majority of captains can interpret the weather information for the purposes of the ship, but it is a part of the respondents who have difficulty in the analysis of mutual interaction and dependencies pressure field, wind, waves, ice, etc. boundary changes. In response to the first questions of questionnaire captains stated that in 75% the role of SPOS system is not used as a planning tool oceanic routes for ships. On this basis, the system SPOS is implemented partially and needs to provide training for beginners captains (Polish Steamship Company security department or SDKO Maritime University).

Analysis of 39 questionnaires with answers or no answers to nine fundamental questions allows us to formulate the following specific proposals:

- SPOS system on board is treated as a browser current and forecast weather conditions (100%) and in 25.6% of cases as a tool for planning and programming the route vessel on the ships' ocean route;
- captains are an undemanding and uncritical of each relevant weather information for navigation, such as tropical cyclones, areas of ice cover and ice boundaries, currents. The captains are satisfied form the scope and manner of presenting them in SPOS (43.6–82.0%). Captains who have not performed the test they did not notice that there is no such data, as the forward speed of cyclones (V_c) and routs (KDC), the extent of storm winds (≥ 34 knots). In the SPOS is characterized a very high instability of speed and directions of currents, variability of ice border and lack of information about the types of ice cover and their impact on shipping. These and other data captains must sought from other sources. It is necessary to implement of the e.g. system "Cyclone" in order to avoid cyclones and possibly proper weathering in a cyclone;
- from the center of SPOS the forecast ordering takes place without reservation and without delay according to the opinion of captains (82%) (Fig. 3);
- according to the declaration of 18% of the captains that they get the standard packages weather twice a day. It is unnecessary and increases costs (Fig. 4). If the captain has doubts about the reliability of the forecasts, it is preferable to supplement or compare data from the SPOS with data from other sources, e.g. receipt of facsimile maps of the world's renowned centers, e.g. Bracknell (heave and pressure), Norfolk USA (synoptic maps). The principle of good testing oceanic routes is to get the data once a day, including map analysis and forecasts in advance for 12, 24, 36, 48, 72, 96, 120 hours for the entire water area of the port of departure to port of destination. This is provided by SPOS system. Other details of the safety of navigation and weather programming routes using weather information are contained in the publications (1–6);
- only 18% of the captains actually tested the oceanic route (Fig. 5). In the lack of formulate additional questions, it is uncertain if it has correctly filled in the input data, for example, velocity characteristics of the vessel and sequence of procedures. Probably only a few percent of the respondents has attempted the test (Fig. 6);
- the publication, which was recommended for a master "Problems of integrated planning and ships' ocean route programming using the SPOS

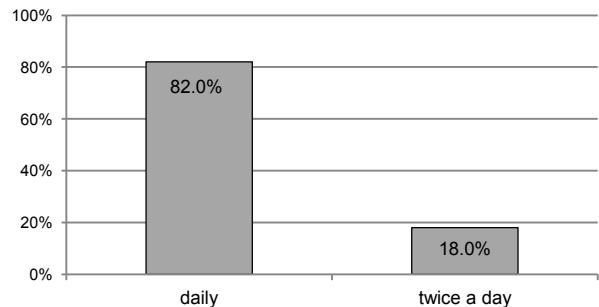


Fig. 4. How often did captain order the weather forecasts and for what reason?

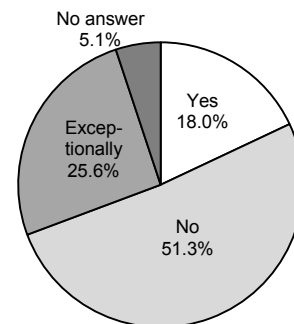


Fig. 5. Do you test the route?

system (Ship Performance Optimisation System)” (Figs 7, 8, 9) has been adopted very positively. This publication can be the basis of the training program for masters in PŻM (Polish Steamship Company);

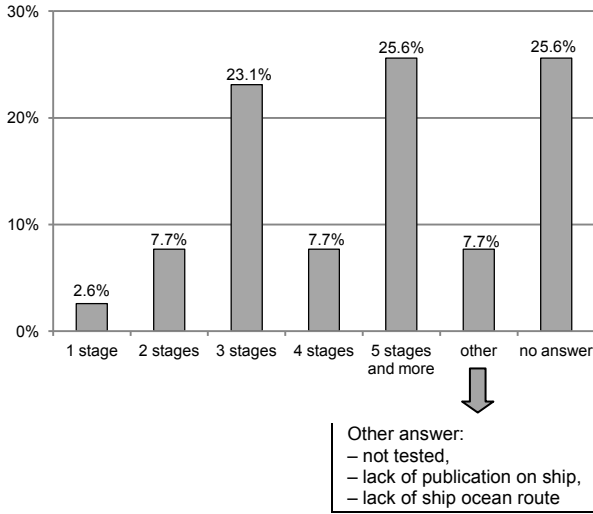


Fig. 6. How many stages of testing usually performs captain during testing oceanic route?

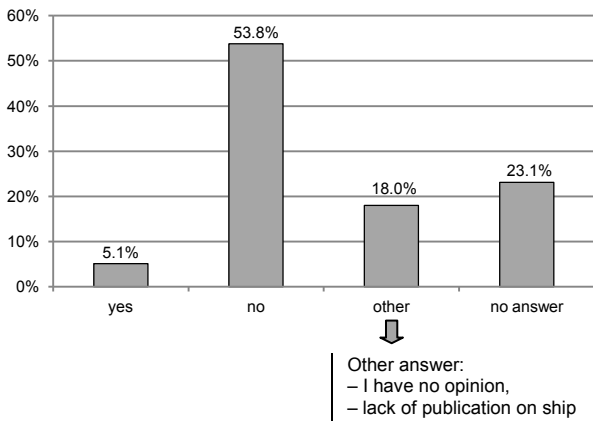


Fig. 7. Is there a need to make a table “Dataset travel” for pages 74–76 of the publication?

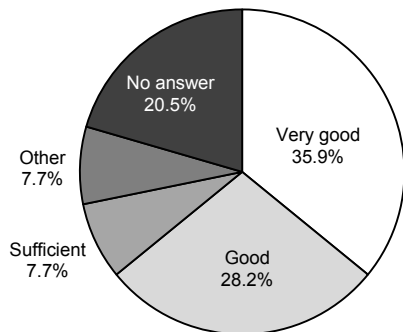


Fig. 8. How do you assess a checklist presented on page 50 of publication?

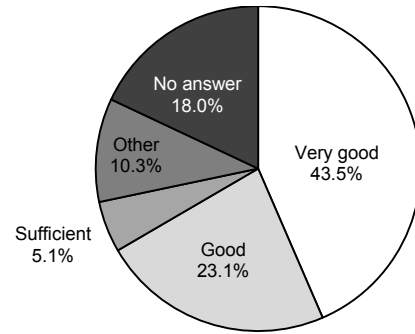


Fig. 9. How clear and complete are the examples of procedures and analysis of travel in accordance with Annex No. 2 of publication?

- the worrying thing is that there is a big lack of response to specific questions – up to 25% of respondents. Information was obtained about the lack of access to mentioned publication on some PŻM ships. It follows that there isn't exist some kind of ship's library even though all publications should have every captain.

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