



GLOBALIZATION OF MARINE PEOPLE RESOURCES

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ABSTRACT

The issues of improvement of quality of maritime training under the conditions of increasing sea traffic become more and more urgent. STCW has to a certain degree ordered requirements to the level of training and allows to develop criteria for the assessment of the level. However, national peculiarities in considering these requirements and subsequent special features of service on board vessels requires agreed program of training marine specialists at maritime universities. The present paper is devoted to certain aspects of the above problem, regarding training navigators. The ways of cooperation between maritime universities are suggested herein.

NOMENCLATURE

Hereinafter otherwise other stipulated we use terms common to the international maritime practice.

1. TASKS AND SPECIAL FEATURES OF NAVIGATIONAL TRAINING

Globalization of marine people resources presents the task of adaptation during the training process to maritime educational establishments, namely:

- to navigational and technological devices and systems which may occur on the employee's vessel;

- to professional training of crew of the vessel;

- to national content of the crew, especially among chief officers.

Currently vessels are equipped by different producers and sailors have to get used to their special features. The whole process of marine specialists training should be based on minimization of adaptation time. This is provided first of all by organization of training process and by development of corresponding simulation equipment.

On the stage of theoretical training the material for special training is formed with due regard to fundamental principles of marine devices' structure and functioning. Discussion and exchange of the curricula on this stage should help to develop basic criteria of assessment of theoretical knowledge level of marine specialists. In order to assess the qualification level of specialists various tests are being used. Development and implementation of the programs is potential field of cooperation between maritime universities.

Guideline on organization of navigational service on board vessel prescribes main operations of navigators under different conditions of sailing. But it does not exclude and limit any measures and actions which may be effective under these sailing conditions.

Obviously, graduates of maritime institutions can not immediately become high qualified specialists ready to act effectively on the bridge while keeping watch. As experience shows, the graduates have sound knowledge and skills for solving simple navigational tasks, for example:

- dead reckoning under simple sailing conditions;
- taking readings of navigational devices and mapping observations during coastal sailing;
- taking readings of indicators of satellite radar navigational systems (SRNS) and their mapping, etc.

However while solving such navigational tasks as taking into account corrections to calculations of radar navigational systems (RNS), analyses of accuracy of ship's position determination, dead reckoning with regard to influence of external factors etc., sometimes difficulties arise which can lead to errors endangering safety of vessel, cargo and crew. In order to avoid these errors it is necessary to develop methods of control over watch officers actions by captain. We can give here one of variants of recommendations for control over navigational safety of vessel with regard to different qualification of navigators. We mean not only control over wrong operations or errors, but also assistance to navigators in improvement of their professional skills provided by captain.

2. CONTROL OVER QUALITY OF NAVIGATOR'S WORK

The most important element of control over navigator's work is regular personal determination of ship's position by captain. This would allow to be aware of navigational conditions, to effectively control navigators' work creating the atmosphere of requirements, to find rough errors in plotting, and to reduce and exclude probability of emergency.

Currently vessels widely use indicators of SRNS of GPS Navstar type. This led to the fact

that navigators determine ship's position using this system only both at coastal sailing and in the open sea. This is first of all caused by simplicity of exploitation, high accuracy of determination of ship's position and non-continuous observation. Such practice leads to loss of practical skill of using other methods of determination of ship's position. However, alternative method of control, especially at coastal sailing, is occasional use of radar station (RS) and observation by visible shore reference points.

Therefore in order to control navigational plotting at coastal sailing captain can choose any other method of observation, suitable for given sailing conditions, especially if watch officer used the same method of observation for several times. This can be for example the following observation:

- by RS;
- by visible shore reference points;
- by Navstar etc.

The usage of observation methods differing from the ones used by watch officer, excludes the possibility of rough errors (system and occasional). Errors may appear as a result of wrong operations of navigators, break down of technical and radio devices, as well as result of incorrect interpretation of RNS readings, technical navigational devices (TND) or errors in recognition of navigational reference points.

Probability of rough errors in interpretation and processing of impulse phase RNS is quite high: $P=0.1$ to 0.2 and in some cases even more, if the main source of errors in influence of space radio waves. Therefore we can conclude, that in average every tenth or fifth observation made with the help of these devices contains rough error. We should also take into consideration that probability of error at manual calculation is high due to psychological features of a person. If for example solving the task suppose 10-12 elementary operations, probability of error is $P=0.1$ to 0.083 . That is why using information from shore RNS can not be main but only additional one.

Thus, rough abnormal errors are quite often in the practice of navigational calculations, which reflects the influence of obvious factors. Undoubtedly, not every error may lead to emergency, but the task of modern determination and exception of rough errors requires from captain usage of methods and ways of observation which differ from ones currently used by watch officer.

After mapping captain can analyze divergence between observation of watch officer and his own one. The easiest method of analysis is comparison of divergence (C) to double radial average square errors of the compared points.

If $C > 2 (M_1 + M_2)$, one of the points contains rough error with probability of $P = 0.95$. In case a rough error is found the measures are taken to evaluate the conditions especially at sailing close to navigational dangers.

To quickly calculate values of radial average square error the following simplified calculation method can be used:

1. at determination of positions by two visual bearings: $M = 0.03 D_{av}$

$$D_{av} = \frac{D_1 + D_2}{2} \text{ - average distance to ref. points}$$

D_1, D_2 - distance to reference points.

2. at determination by bearing and distance:

$M = 0.014 D_{sc}$, where D_{sc} is value of distance scale

3. at determination by bearing and distance:
 $M = 0.025 D_{sc}$
 where D_{sc} - value of distance scale.

To calculate radial average square error of reckoned point we use the following formula:

$$M_0 = \sqrt{M_0^2 + M_{sc}^2}$$

where M_0 is radial average square error of the recent observation, $M_{sc} = 0.7 K_{ct}$ at dead reckoning after observation till 24; $M_{sc} = K_c \sqrt{t}$ at $t > 24$; K_c - coefficient of accuracy of dead reckoning. Coefficient of accuracy of dead reckoning can be found through statistical processing if observed divergences in dead reckoning in a given area at different duration of sailing. $K_c \approx 0.7 - 1.0$, if observations are taken by Navstar RNS, ≈ 1.5 in other cases.

The suggested method of control confirmed its effectiveness and can be recommended to implementation on fleet vessels. Development and examination of the methods might become a subject to joint investigation of maritime institutions.

Adaptation to devices and systems should be carried out on the final stage of training specialists. In order to enlighten this process it is necessary to give the material regarding main theoretical statements and notions of possible variants of their technical realization in updated devices. Lacking possibility to accumulate necessary simulation facilities in the university, which would contain all the possible devices makes us to limit practical studies to typical devices. The main core of training should be carried out using up-dated electronic simulators. The task of IAMU is to formulate main requirements to certification of graduates of maritime institutions; the ways of their achievement are the task for national schools. Development of common standards for equipment, unification of managing bodies and their functions would certainly improve quality of training. It should be mentioned that level of training influences effectiveness of transporting and fishing. What is more important, correct work of navigators results is safety both for crew and environment. That is why strong attention should be given to improvement of professional and environmental training of navigators.

Currently navigators fulfil duties of GMDSS operators. Correspondent training is

carried out on special simulators. However, range of GMDSS operator's duties is not determined. The things are still worse with training navigators for ECDIS operation which is obligatory on board vessels since 2002. Various types of ECDIS and charts do not contribute much to increasing marine safety. Development of common criteria for evaluation of system quality and development of simulation training programs for ECDIS operators should be held through joint efforts of maritime institutions world-wide. Far Eastern State Technical Fisheries University trains specialists for fishing fleet vessels and puts its best efforts to improve quality of training. We believe that one of the potential fields is training specialists with higher qualification in two and more specialties. For instance beginning this year the University trains fishing navigators, the first graduates will leave university in 2001. Development of new bran-

ches of training of officers seems urgent under the conditions of increasing level of automation in operation all the processes and reduction of crew number.

Improvement of distant training system can be enhanced by inter-university computer net or Internet. Dalrybvtuz is greatly interested in development of such net.

Training officers for work in multinational and multitrained crew can be promoted by collaboration between maritime institutions, specialists and students exchange, as well as curricula and teaching programs exchange.

Activity in this field will certainly contribute to better understanding among crew members trained at different institutions and having national peculiarities.