

economic status. The recruitment and promotion programs adopted by shipping companies take into account the diversity of the characteristics of the workforce provide training for employees who must respect the ethnic, racial and gender differences of colleagues.

Thus, human resources are an important structural element in the planning of activities in the maritime business as a whole, since the competent management of the organization's employees is a key link in the competitiveness of the maritime industry.

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FORMATION OF THE STRESS TRAJECTORY OF NAVIGATIONAL CADETS DURING ECDIS PRACTICING

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During operational training with navigation information systems, such as ECDIS, the cadets of the navigational department are faced with situations that

require high mental effort and quickness of decision-making that is adequate for the navigational situation [1].

An intense mental workload and a high level of responsibility can affect the navigator's work by increasing the risk of errors, impairing concentration and attention, slowing down decision-making, and weakening the ability to adequately assess risks and situations. This, at least, can lead to a decrease in efficiency and an increase in the likelihood of critical situations and accidents in maritime transport [2].

During years of observations in the training center and sea practice of the cadet program, was noted that when working with ECDIS, novice navigators may have such negative behavioral aspects in 7-18% of cases, depending on the complexity of the task:

Frequent mistakes and forgetfulness: Incorrectly entering route data, missing important map updates, or using display layers incorrectly.

Stress: Increased tension related to concerns about skills, responsibility, and the possible consequences of mistakes can cause anxiety, irritability, and impaired concentration.

Fatigue: Physical and mental exhaustion caused by long working hours or unusual working conditions can reduce reaction, attention, and quickness of thought. Chronic fatigue accumulates due to continuous work without effective rest, and can lead to reduced attention, memory impairment, and slower reactions

Lack of experience: Novice navigators may feel insecure about their abilities, not knowing all the procedures and skills, which leads to possible mistakes and wrong decisions.

Low self-esteem: Lack of confidence in own skills and knowledge can increase stress and anxiety, making navigators more prone to errors, lower their performance, and increase difficulty in making decisions.

As a result, we get a number of mistakes when navigation department cadets work with ECDIS:

1. Reduction of work speed and constant switching of tasks: Slow route planning, and distraction by other tasks while working with ECDIS, which reduces efficiency.

2. Decision-making delays: Uncertainty in route selection, hesitation in using navigation systems, and delayed decisions about maneuvers.

3. Inconsistency: Haphazard use of ECDIS, which can lead to missing important details or conflicting actions.

4. Ignoring information: Disregarding warnings, hazard signals, or weather data available in the ECDIS.

5. Difficulties in risk assessment: Underestimation of hazardous areas, shallow waters, or other navigational risks during route planning

6. Incorrect information interpretation: Misunderstanding of navigational symbols, signs, current and tide data or other info that can lead to poor decisions.

7. Simplifying problems: Lack of attention to detail during work with ECDIS, which can lead to unsafe or inefficient route selection.

8. Slow actions execution, and response to a change in the navigation situation that requires a route adjustment in ECDIS.

9. Missing important events, warnings, signals, or map changes that could lead to a dangerous situation.

10. Incorrect time estimation: Incorrect estimation of the time required to perform ECDIS operations, which can cause delays and reduced efficiency

All of the above indicates that the activity of navigation department cadets during operations in ECDIS affects many parameters [3], the combination of which can make it possible to build a model of their stress state.

Most likely, such a model will have the form of a trajectory, where the main spatial axes are: 1 - stage-operation in ECDIS; 2 - level of the integral physiological index (IFP); a linguistic indicator of the time of operation.

For IFP calculation, we use data on heart rate (P), oxygen saturation (SpO₂), and body temperature (T) (1):

$$IFP = w_1 \cdot (P_{norm}) + w_2 \cdot (SpO_2_{norm}) + w_3 \cdot (T_{norm})$$

Where:

$$P_{norm} = \frac{P - P_{min}}{P_{max} - P_{min}}, SpO_2_{norm} = \frac{SpO_2 - SpO_{min}}{SpO_{max} - SpO_{min}}, T_{norm} = \frac{T - T_{min}}{T_{max} - T_{min}}.$$

The IFP scale will have a look: Normal: $IFP \leq 0.4$; Moderate: $0.4 < IFP \leq 0.6$; Elevated: $0.6 < IFP \leq 0.7$; High: $0.7 < IFP \leq 0.8$; Very high: $0.8 < IFP \leq 0.9$; Critical: $IFP > 0.9$.

After modeling a situation consisting of 42 stages when working with ECDIS, a model was obtained - a trajectory in the form of a three-dimensional broken curve (Figure 1). As you can see from the figure, the most dangerous situations are circled in red. In these situations, ECDIS operations have the worst performance on all three scales.

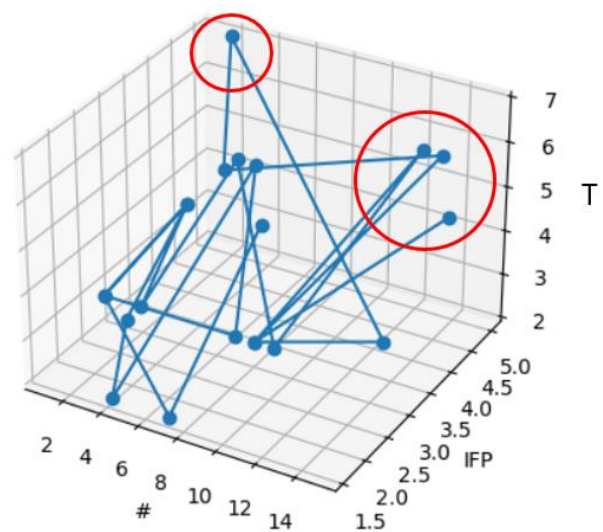


Fig . 1. A model of a stressful state

To quickly identification of the stressful situations and build a model, we developed software that allows us to process a wide range of experimental data.

The proposed approach will allow enhanced feedback and improve the level of didactic solutions in the training of cadets of the navigation department during their work in training centers, particularly when studying "Navigation Information Systems".

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PEDAGOGICAL ASPECTS OF FORMING THE FOREIGN LANGUAGE COMMUNICATIVE COMPETENCE OF FUTURE NAVY SPECIALISTS

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