Proceedings of Krylov Shipbuilding Research Institute

41(325)

This article presents calculation analysis of the external forces that govern the hull strength developed basing on new method for calculation of the force effects on high-speed ship structures. Calculation studies are carried out considering presence of the small extension hydrofoils on the ship hull and hydrodynamic damping of the vibrations. Nature of the effects of the ship speed, wave intensity and ship design features (relative width of the waterline at transom end, fullness ratio of the design waterline, dimensions and location of the bilge keels) on the hydrodynamic forces that impose dynamic hull bending and decaying of the bending vibrations. Also the authors provide calculation results that illustrate nature of the passive motion stabiliser effect on bending moments in the hull amidship cross-section during transition regime.

A.P. Anosov, A.I. Mamontov. **Design of quadrate two-layer plate. Influence of edge effects on stressed state of two-layer quadrate plate in elastic stage.** Pp. 129–141.

This methodology is being developed through series of numerical experiments. One of the goals of these experiments is determining value of the acting load, at which at least in one of the calculation model components the stresses of the fibre yield appear. Methodology for designing the plate with step-variable thickness is applied to determine optimal dimensions of the overlapping section in accordance with criterion of the limiting load and criterion of the failure mechanism generation. As most dangerous mechanisms could be considered those, where line of transition of the overlapping section into the plate section coincide with forming of the plastic hinge.

E.P. Bourakovskiy, V.A. Dmitrovskiy, Z.G. Kontsedaeva, V.P. Prohnich. **Probability model in predicting residual buckles under goffering.** Pp. 142–156.

The article examines new approaches in predicting parameters of the developing defects, in particular, in case of goffering. It is assumed that rise of buckles under goffering is not only result of multiple applications of the load with the same intensity but also effect of the loads with greater intensity, as well as degrading of the brace characteristics due to the interdependence of the defect parameters. A probability mathematical model is developed that relates accidental flow of the loads on the floor with parameters of the defects imposed by them. Proposed model allows reducing scopes of the repair due to accounting the strength reserves, use individual approach in determining the scopes of the repairs, promptly consider changing operation conditions. This model could be also applied to determine values of the external loads with respect to the residual deformations.

P.E. Bourakovskiy. **Accounting plating stiffness in case of deformation of ship board floors, which receive intense local loads.** Pp. 157–170.

An improved methodology for estimation of the lifting capacity of the locally loaded board floors components is developed. It is demonstrated that accounting of the plating plate stiffness changes both nature of the line deformation and quantitative characteristics of the lifting capacity of the board floor lines as well.

A.V. Gladilin, V.M. Baronkin. **The efficiency of matched Green's function passive detection algorithms**. Pp. 171–183.

The problem of matched processing algorithm's sensitivity to a priori data uncertainties is analyzed. The effect of incorrect Green's function description on locally-optimal detection algorithm efficiency (in terms SNR) is investigated. The examples of the efficiency evaluation for shallow water are considered.

A.V. Gladilin, V.M. Baronkin. **The efficiency of matched noise covariance matrix passive detection algorithms**. Pp. 184–197.

The impact of incorrect noise covariance matrix description on locally-optimal detection algorithm efficiency (in terms of SNR) is analyzed. This analysis allows to justify the necessity of «learning» for noise parameter estimation or/and using adaptive algorithms. Two examples are considered. The first example concerns array functioning in waveguide. The second example – linear array functioning under structural interferences presence.

V.M. Baronkin, A.V. Gladilin. **Estimation of covariance matrix parameters of structural interferences.** Pp. 198–204.

In certain cases the presence of structural noise must be taken into account under space-time processing algorithms construction. To construct optimal and suboptimal detection, localization and classification algorithms (including the adaptive ones), a need arises for effective methods to estimate parameters of structural interferences. Our purpose here is to consider some aspects to solving this problem.

B.M. Baronkin, A.V. Gladilin. **Evaluation of threshold SNR for track detection algorithm**. Pp. 205–218.

One way of increasing the efficiency of detection algorithms track detection of motion signal sources. In the paper the relation of threshold SNR and entropy of trajectories sources is found.