Alexander Nikonov is a graduate and professor of Moscow Institute of Fine Chemical Technology. He has also worked for the Academy of Sciences of the USSR. Alexander has headed up a number of commercial firms dealing in engineering, industrial safety, ecology and conservation and was elected Vice-President of the Ecological Union of the USSR. He is currently Deputy Chairman, Senior Vice-President and Executive Director of ROMAN CAPITAL Ltd. Alexander is also a member of Scientific Advisory Council of the Civic Chamber of the Russian Federation.

AN INNOVATIVE APPROACH TO OIL PRODUCTION EFFICIENCY ENHANCEMENT

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SCIENTIFIC BASIS FOR REDUCING REGULATED ICE LOAD ON FIXED PLATFORMS AND ICE-GOING VESSELS

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ABSTRACT

The scientific basis of the existing regulations on the ice loads assignment was formed a few decades ago. Modern technology and new scientific discoveries assist to reduce estimated value of the ice loads. Based on experimental studies of mechanics of deformation and cracking of ice, breaking the ice crushing numerical model has been developed. This model allows physically reliable reproducing of the «ice-structure» interaction process and provides distribution diagrams of the ice pressures, which correspond to the experimental observations. The proposed model expands the possibilities of the ice model basin from the point of view of local ice pressures forecast. The Russian Maritime Register of Shipping in the form of the corresponding methodology approved the use of the integrated approach, which combines the physical model experiment and computer simulation. The obtained semi-empirical estimate of the ice pressures reduces the specific content of metal of the ice belt up to 15%.

The developed methodology focuses on the design of ice-resistant fixed platforms for the development of continental shelf resources. It can be also extended to the design of ice-going vessels.

ABSTRACT

The complex application of new technologies helps to reduce production costs of oil production in the conditions of crisis. The research is aimed at creation and introduction in practice of a number of technological solutions under the concept of integrated engineering services for improving the efficiency of field development. The concept includes the use of new technologies of mechanized extraction (gerotor and vibroseismic pumps), wave action on the reservoir, proposed innovative solutions to improve the efficiency of pumps – deparafinization, filters). The use of container equipment for obtaining of high-quality fuel for local use in remote areas also is promising. New catalytic system, based on the results of experimental tests, will allow to create compact equipment for the production of valuable petrochemical products in the conditions of the oil deposit. Integrated use of the above technologies provides the basis for effective development of hard-to-reach areas.