

O12-8**COMBINATION OF METHODS AND TECHNICAL MEANS IN CARRYING OUT ENGINEERING-GEOLOGICAL STUDIES ON SITES FOR INSTALLATION OF FLOATING DRILLING RIGS (FDR) ON CONTINENTAL SHELF**

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Combinations of methods and technical means has been tested by NPO 'Yuzhmorgeologiya' when conducting engineering-geodetic and engineering geophysical works on the sites for installation of floating drilling rigs on the shelves of the Caspian Sea, the Black Sea and Sea of Marmara under contracts with oil companies of Russia, Turkey and Bulgaria.

The combination of methods allows to solve the following tasks:

1) Depth measurements and detection of local objects dangerous for installation of floating drilling rigs on the sea bottom and anchoring of auxiliary vessels;

2) Study of a geological structure of the region of installation of the floating drilling rigs hydrology of water stratum, determination of their peculiarities (the presence of gas pockets undercurrents, lens of loose ground etc.). Technical characteristics of the equipment used and navigational equipment, most of which have been developed at NPO 'Yuzhmorgeologiya', allow to solve the above mentioned tasks at a 1:10 000 scale, and directly on the sites of installation of the floating drilling rigs at a 1:1 000 scale.

For solving the first task a technologically compatible combination of methods is used: echo sounding, side scan hydrolocation and differential magnetometry with digital data recording on personal computer. Profile networks - 200x100 m, on the sites of installation of floating drilling rigs - 50x25 m, provide the required accuracy and details of the measurements as well as detection by a side scan locator and magnetometer of isolated local objects 1-2 m in size and linear forms 1--2 m wide. Range of coverage of the applied side scan hydrolocator "Katran 1-M" is about 200 m for each side depending on a depth of water areas. This provides triple coverage of interprofile space and the possibility of studying detected local objects from different sides.

Objects dangerous for drilling or engineering constructions detected on the site are examined by a telecontrollable underwater apparatus RTM-500 developed at NIPI OKEANGEOFIZIKA.

This second task can be solved using three types of seismic profiling which differ in depth and details of differentiation of a geological section.

To study the upper part of the section to a depth of penetration of the support columns a seismic profiling with the use of high-frequency electric-dynamical energy source "BOOMER" is used. This provides the differentiation of a geological section with the resolution not less than 0.5 m.

For investigation of the middle part of the section to a depth of sphere of interaction of the support columns with ground and to a depth of penetration of the guide columns of the wells (to 60-80 m) the required resolution should be not worse than 2m. In this case a seismic acoustic profiling with the use of electric-spark energy source like "SPARKER" is applied. Both types of seismic acoustic profiling are combined into a single two-frequency complex and carried out simultaneously.

In order to outline gas pockets and zones of fractures within a depth interval of about 1000 m, seismic exploration works using a CDP reflection method with increased resolution are conducted on the network of more widely spaced lines. In this case a high-frequency air gun sources are applied. The achieved resolution of the section (not less than 5 m. to a depth of 500 m. and not less than 10 m. below to a depth of 1000 m.) permits to outline gas pockets and zones of fracturing.

In order to study undercurrents, indepented digital flow meters "Potok-2M" are installed within the sites. They are used by ones or by horizontal garlands.

The combination of engineering-geodetic survey and engineering-geophysical works has shown in practice its reliability and informative value.

