Thanks to the active shaft-to-hull short-circuiting device providing a reliable coupling under any conditions of ship operations, the low-frequency electromagnetic field is reduced. Complete corrosion protection of propellers improves the surface roughness thus reducing the level of underwater noise induced by the ship and improving propulsive performances of the propellers.
The applied advanced solutions have enabled to:

- improve the system reliability and efficiency;
- reduce weight and dimensions of equipment and to exclude the least technological component, i.e. magnetic modulation converter thus simplifying technology of installation and improving reliability.

The modern methods of computer modeling were used for optimum arrangement of anodes and reference electrodes of the "Kaskad" system.

MINE-HUNTING SONAR DOME

The Krylov Institute has developed, manufactured and tested a dome in the form of horizontal foil to ensure efficient operation of mine-detecting sonar of original design. The dome is made of glass-reinforced plastic by contact mold method. It consists of two halves mounted on the load-carrying bracket. The thickness of the forward dome sound-transparent part within operational array viewing angle range is 5 mm. The requirements of the carrier ship designer with respect to limitations of the dome dimensions in the horizontal plane have been fully satisfied. The hydrodynamic and acoustic tests of the dome prototype have been conducted in the model tanks of the Krylov Institute to check the compliance of acoustic, hydrodynamic and strength characteristics to the requirements of technical assignment and specifications.

The test results have demonstrated the following:

- steady hydrodynamic forces and moments acting on the dome correspond to the design values, used at the stages of FEED, technical and working design for development of the dome structure. The same values were used for calculation of strength characteristics at the motion of carrier within the speed range of up to 12 knots with dome turning angles being 45 with respect to direction of motion;
- coefficient of sound transmission through the forward (working) section of the dome within the working range of frequencies and viewing angles of the array corresponds to requirements of the technical assignment;
- within the accuracy of acoustic measurements the dome has no effect on the width of the principal maximum of the array beam pattern and on relative level of the first side maximum. Presence of dome has no effect on the relative level of array side field averaged in the angle range.

Sonar dome prototype in the form of horizontal foil

R&D ASSISTANCE TO DESIGN, CONSTRUCTION & OPERATION FOR NAVAL SHIPS, COMMERCIAL VESSELS & OCEAN ENGINEERING STRUCTURES

SIGNATURE CONTROL

UNDER BULB SONAR DOME FOR ADVANCED SURFACE SHIPS

The Krylov Institute has developed a new option for mine hunting sonar arrangement, where the sonar is relocated to the lower bulb portion where it is covered by a special under bulb dome, smoothly aligned with the bulb shapes.
This option of array arrangement is for the first time implemented in the domestic shipbuilding and it has a number of advantages as compared to traditional array placement in the under keel dome, namely:

- provision of maximum possible "comfortable" conditions for sonar operation, including the maximum possible distance from interference sources and free water surface;
- provision of maximum possible array viewing angle range both in horizontal and vertical planes;
- possibility of array delivery as a separate module without a need for special dome ensuring the best acoustic conditions for the array operation.

The mockup of proposed dome was equipped with miniature pressure fluctuations sensors and drain holes for measurement of hydrodynamic pressure distribution along its surface.

Model of sonar dome

The performed research work has resulted in:

- mockup dome tests in the low-noise wind tunnel of the Krylov Institute;
- experimental validation of the interference levels for the sonar in operation that are within the acceptable limits;
- no cavitation at operating modes.