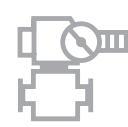


# TECHNOLOGIES FOR CONSTRUCTION AND REPAIR OF VESSELS, WARSHIPS AND OFFSHORE FLOATING STRUCTURES



## DEVELOPMENT OF TECHNOLOGIES FOR CONSTRUCTION AND REPAIR OF VESSELS, WARSHIPS AND OFFSHORE FLOATING STRUCTURES

Over 75 years the Shipbuilding & Shiprepair Technology Center has been developing technologies for construction of vessels, warships and floating structures including drilling platforms and floating nuclear power plants, as well as ship repair technologies for both Russian and foreign partners.

JSC SSTC has developed and mastered the fundamentally new processes for drastic change of conditions and nature of shipbuilding production, and higher labor efficiency at the yards.

SSTC is projecting establishing and modernization of shipbuilding and shiprepair yards including schematic process flows throughout whole ship construction cycle.

## BASIC TECHNOLOGIES FOR CONSTRUCTION OF SHIPS AND OFFSHORE INFRASTRUCTURE FACILITIES



Till the year 2020 about 1400 state-of-art vessels shall be constructed in Russia, including river and river-marine vessels, technical vessels, research vessels, fishing vessels, icebreakers (auxiliary and harbor icebreakers with capacity of 4–25 mW as well as atomic icebreakers with capacity of 110 mW), offshore infrastructure facilities, tankers, bulkers, multipurpose vessels, seagoing ferries, gas ice-class carriers, floating atomic power plants for northern regions, as well as surface ships and submarines for Russian NAVY and for foreign customers.

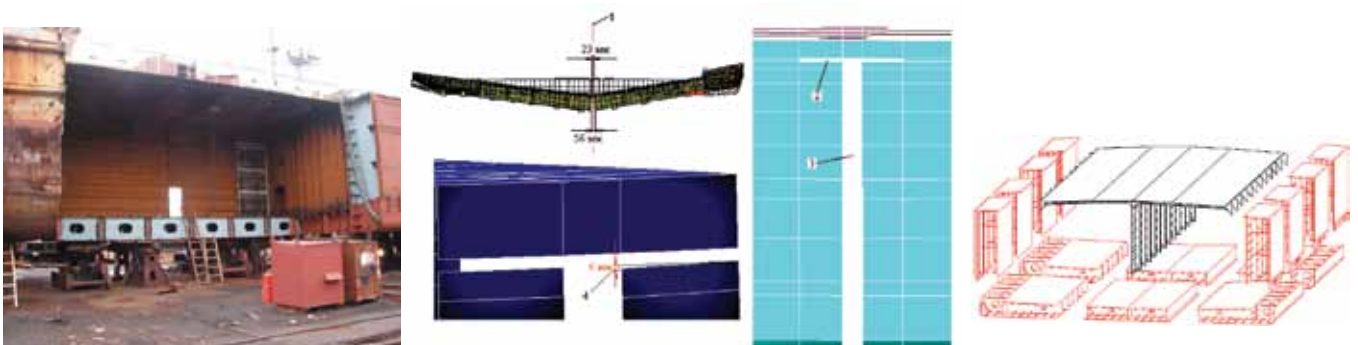


For this purpose JSC SSTC develops basic shipbuilding technologies, considering features of new and modernized shipyards. In recent years, JSC SSTC developed basic shipbuilding technologies for JSC Admiralty Shipyards, LLC Baltiysky Zavod – Sudostroenie, JSC Severnaya Verf, JSC Far Eastern Shipyard Zvezda, Shiprepair yard Krasnaya Kuznitsa (branch of JSC Shipbuilding Center Zvyozdochka in Arkhangelsk), JSC Sredne-Nevsky Shipyard, perspective shipyard on the island of Kotlin, etc.

## SHIP RENOVATION PROJECT

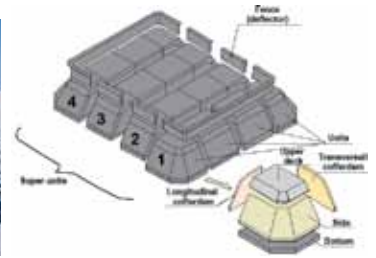
In 2002 JSC SSTC participated in development of the Volgoneft tanker (pr. 1577) renovation project; the goal was to replace bottom and sides in the area of the cargo tanks. In 2003-2009 ca. 30 ships were renovated at several Volga region yards (the primary were Rybinsk Shipyard and Nefteflot, Samara).

SSTC has developed a method to restore the general residual longitudinal distortion of the hulls (the Russian Federation patent No.2264948). Application of the method eliminated the residual distortion of ship hulls (pr. 1577) in the course of renovation.



## SAMPLES OF TECHNOLOGIES, DEVELOPED BY JSC SSTC

**Technology for afloat joining of super-units of the caisson of the Pirazlomnaya offshore ice-resistant stationary platform.** There was determined the sequence of activities, and technology for super-units installation, pre-ballasting, bracing, fit-up/welding of the above-water portion of the erection joint, as well as tightening and drainage of the mounting space and fit-up/welding of the underwater portion of the erection joint.



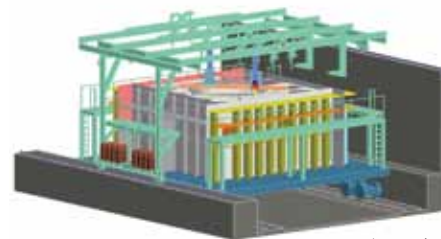
**Technology for installation of the MOSS floating drilling platform base.** The base consists of the upper deck, two pontoons, six columns, four horizontal cross-ties, four horizontal diagonal ties, and twelve vertical diagonal ties. The base afloat sequential erection technology was developed: joining of the left and the right pontoons, extension of the columns, installation of diagonals, and construction of the deck.

**Technology for modernization of the Vikramaditya aircraft carrier for the Indian Navy.** The new sections were fitted and welded into the carrier's hull at the great part of her length; the takeoff deck breadth was extended through replacement of sponson sections, the ski-ramp and the now fairing were reshaped, transom sections were replaced. Due to remarkable scope of welding and thereupon risk of significant bending of the hull, the primary concern was to ensure minimum longitudinal distortion of the hull and development of appropriate precautions.



**Procedure for cold bending of plates by local deforming on press and bending equipment, developed by JSC SSTC,** is implemented on JSC PO Sevmash and used for shaping thick-walled parts (up to 100 mm) of torospheric bulkheads of Borey-A and Yasen-M – class submarines, which are manufactured from high-resistance steel and special alloys.

**In 2013–2014 JSC SSTC developed for LLC Baltiysky Zavod – Sudostroenie basic technology for shaping tank of metal-water protection system (MWPS) of P-22220 icebreaker.** Developed technology determines common sequence of works when shaping tank of MWPS, including also measures for reduction and compensation of welding deformations, developed basing on expected deformations estimation. This deformation was carried out using finite elements method.



Perspective technology for shaping tanks of MWPS with use of automatic welding machines and robots.



**Project of the fit-up/welding efforts for the type 24000 floating dam for the S-1 ship passage of the Saint-Petersburg flood control complex.** The optimum sequence of fabrication of the sophisticated curved structure was determined for precise fit-up and minimal welding distortions.



- Development of ship construction and repair technologies
- Projecting and designing of re-outfitting, reconstruction and establishing of new shipbuilding and ship repair yards
- Development of technologies for parts manufacturing and hulls construction
- Computer-aided development and optimization of technologies for fabrication of sophisticated 3D structures
- Development of technologies for construction of ships and fabrication of items of composite materials
- Development of tightness test procedures for structures of ships and environmentally hazardous facilities
- Research in air noise sources in industry and transport. Development of integrated air noise and vibration protection systems
- Development of technologies for application/removal of acoustic, decorative and protective coatings
- Development of technologies for fabrication, assembling, mounting/demounting of piping systems
- Development of technologies for mounting/demounting of power units, machinery and systems

