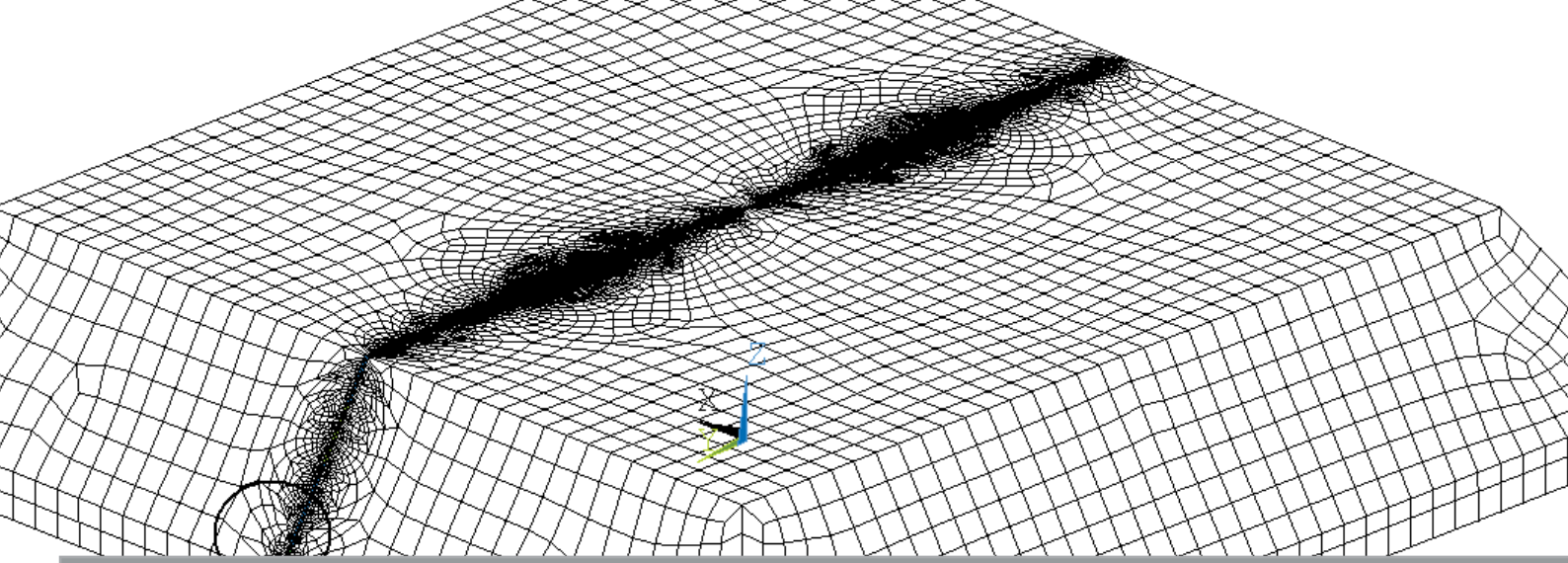


OPTIMIZATION OF ASSEMBLY AND WELDING TECHNOLOGY BY MEANS OF WELDING DEFORMATIONS MODELING

JOINT STOCK CORPORATION
SHIPBUILDING & SHIPREPAIR
TECHNOLOGY CENTER

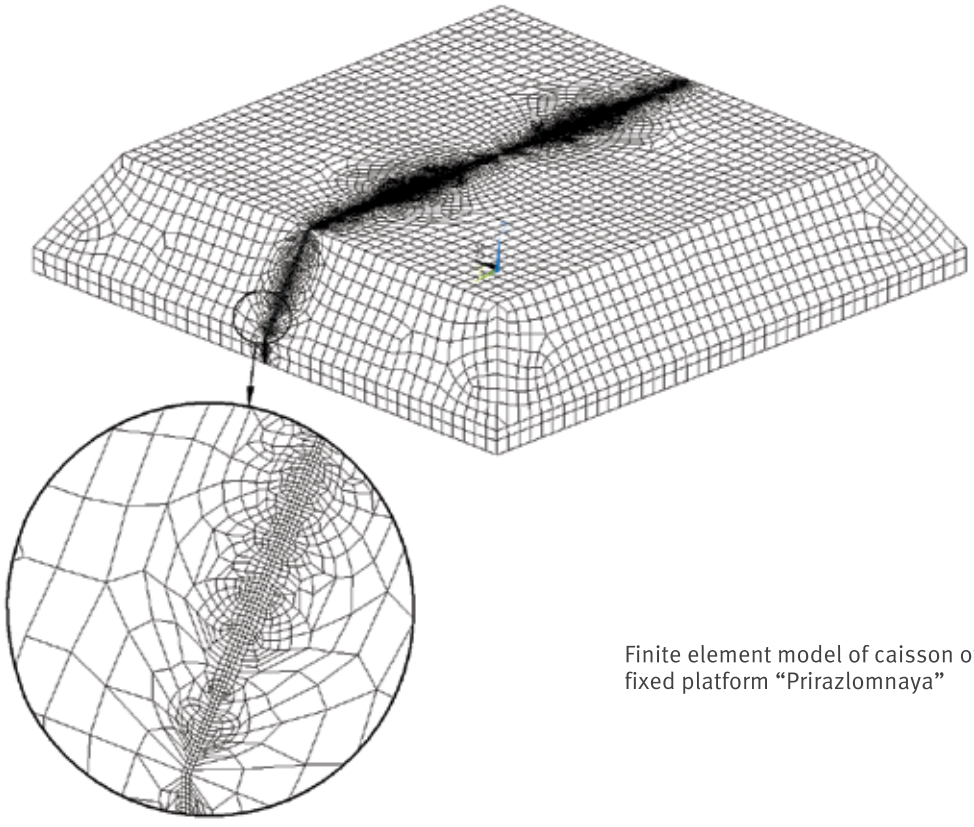
One of major issues arising upon fabrication of welded structures is appearance of residual welding deformations, altering structure shape and dimensions and decreasing fabrication accuracy thereof.

To increase structure fabrication accuracy when developing assembly and welding technology therefor, one must select optimal work execution sequence to minimize welding deformations and to develop special design and process solutions. To solve these tasks, one must precisely calculate expected welding deformations at the stage of designing the structure and developing welding and assembly technology therefor.

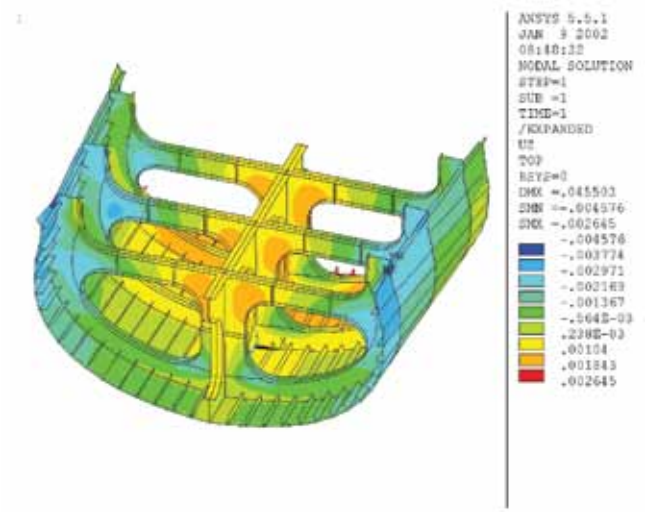
For many years, JSC SSTC has been developing methods to forecast residual welding deformations of ship hull structures. Currently, the most progressive calculation-based method to define expected welding deformations is finite element method. This method allows to render calculations for structures of any complexity, including 3D-sections and curved blocks being integral part of any ship hull.

Application of finite elements method allows to define expected welding deformations for various assembly and welding procedures, to define production pattern ensuring minimum deformations thus optimizing structure fabrication technology. Calculation results can be used as a basis to develop solutions aimed to reduce and compensate welding deformations, exceeding maximum tolerance even with optimized operation sequence.

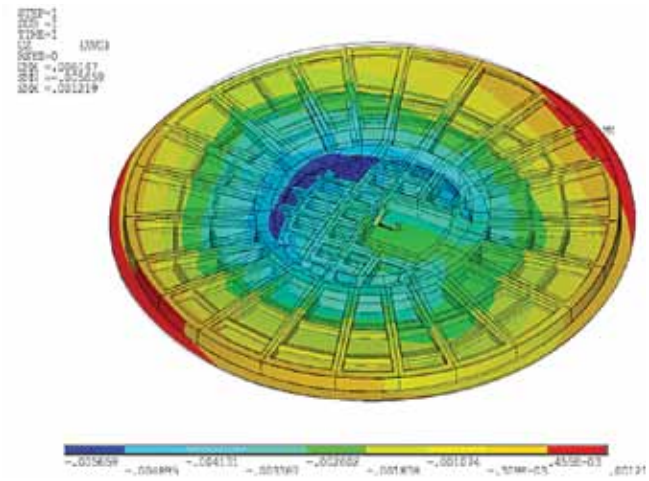
JSC SSTC rendered large scope of works aimed to optimize assembly and welding technology based on calculation of expected welding deformations and using finite elements method for civil vessels, surface ships, submarines and offshore rigs.



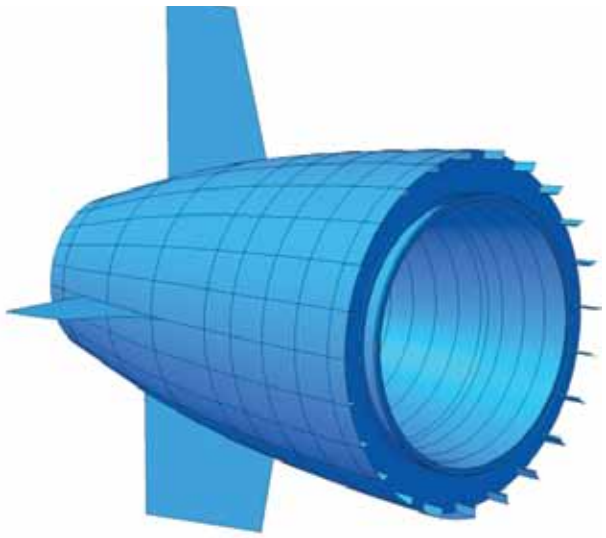
Finite element model of caisson of offshore ice-resistance fixed platform “Prirazlomnaya”

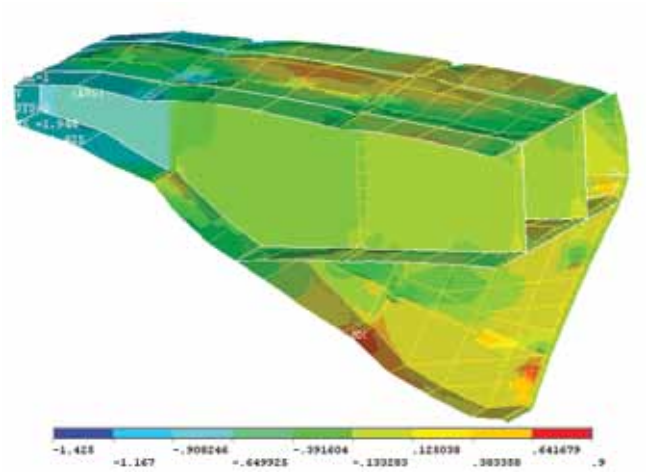


Deformation of bottom section of twin-hull craft

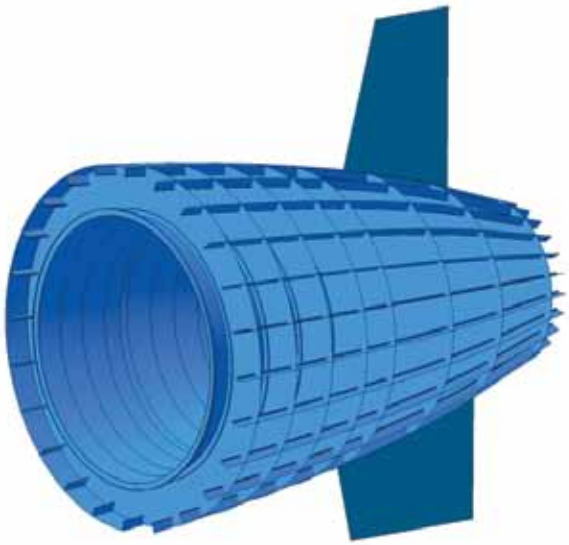


Deformation of flat bulkhead of new structure

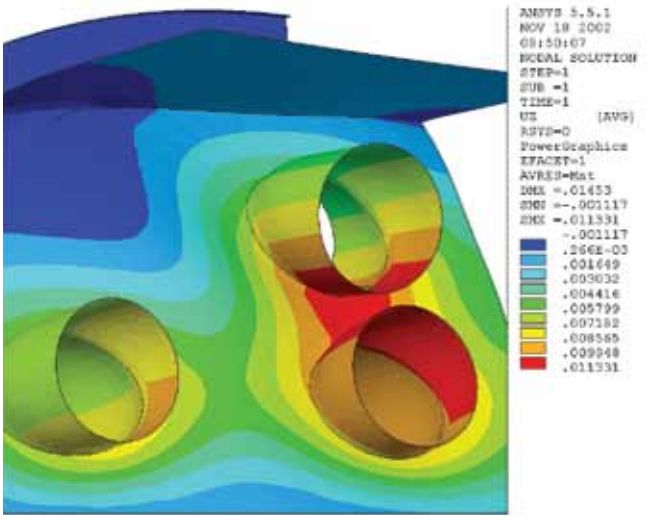




Deformation of launching pad of aircraft-carrying heavy cruiser



Model of submarine aft end



Welding of cylinder-shaped large-dimensioned items into domed bulkhead

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