THE CALCULATION OF THE STATIC STRENGTH OF THE FRAME CONNECTION OF THE COOLING TUBING IN THE MAIN CIRCULATING PIPELINE OF REACTOR VVER-1000

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More than half of the reactor plants operating in the Russian Federation are VVER-1000 reactor plants. The design life of this unit is 30 years. Most of them have already worked this time. To extend the service life it is necessary to carry out calculations on the justification of the extension of service life.

The purpose of this work is to calculate the static strength of the insert of the cooling pipeline branch pipe into the main circulation pipeline for justification in further operation.

The calculation of stresses at the location of tie-in pipe pipeline were carried out using the software ANSYS [1]. In the process of calculation, a finite-elementary model was developed. The design of the considered unit takes into account the peculiarities of geometric parameters.
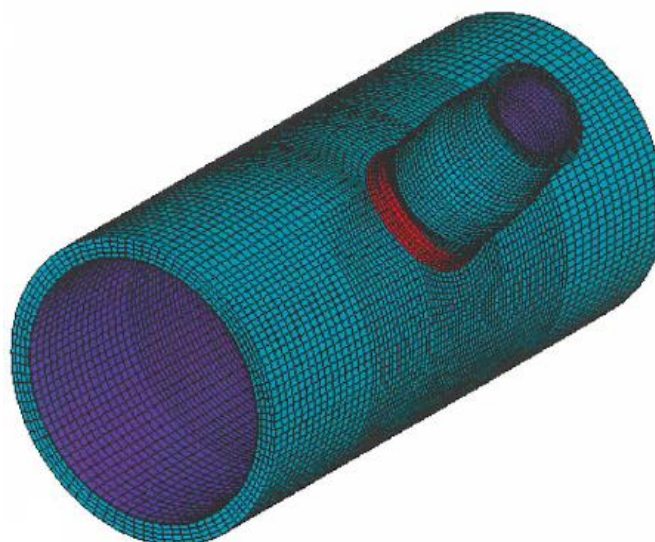

Fig. 1. Petruk duct cooling in the main circulating pipeline

During the calculation, the performance of the strength conditions in relation to the considered nodes is checked. The voltages must not exceed the respective permissible values [2].

As a result of the calculation of the tie-in of the cooling pipe, it was determined that the voltages do not exceed the permissible values. Further operation of the cooling pipe is considered possible.

REFERENCES

1.   Software package for PC. Software package for solving thermomechanical problems by finite element method, ANSYS Mechanical, V. 14.5, ANSYS, Inc., 2013.

2.   Reactor upper block. Initial data on materials properties of reactor upper block and reactor head for strength calculations. Podolsk 2015.