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## **Thickening and Simultaneous Edge Preparation of Pup Joints for Their Welding into the Pipelines**

**Abstract:** When building the pipeline structures operating under the repeated static loads, the most difficult task is to ensure the strength and reliability of the pipeline branches and tie-ins. This is due to the high stress concentration  $\alpha\sigma \geq 3$  in the above mentioned areas; and the residual welding stresses that reach the yield strength of the material. The stress-strain state of the pipeline has been studied. The welded pup joint design has been proposed, which ensures the strength parameters for trouble-free operation of the pipelines and increases durability of the pipelines operating under internal pressure, due to reducing the stress-strain state in the areas of welding the tie-ins into the main pipe. To ensure the strength parameters of the pipelines in the areas of welding the tie-ins and other elements as recommended by GOST 32569-2013, it is advisable to use the pup-joints thickened by hot deformation. The pup joint design enabling reinforcement of its thickness only in the areas of welded tee exposure to maximum stresses has been proposed. Such pup joints are more technologically advanced, because when welding the reinforced thickness pup joints, machining or edge preparation thereof are not required. Therefore, the proposed design of a pup joint is cost- efficient compared to the existing methods of reinforcement of such areas. Finite-element method (FEM) calculations showed that strengthening the holes using the connecting branches thickened by the proposed method ensures the strength parameters.