

## **REHABILITATION OF METALLIC BODIES OF CYLINDRICAL TANKS WITH EXTERNAL FRP REINFORCEMENT**

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The complex of problems to be solved when extending the effective operation of metal tank bodies includes the reinstatement of the lost bearing capacity of their walls. Rehabilitation of the walls of metal cylindrical tanks with the high-strength external transverse directed FRP provides comprehensive reinforcement of the structures.

The developed procedure of calculating metal cylindrical shells reinforced with external transverse FRP elements for the determination of the necessary parameters of their stress state when performing the installation during the operation of the structures and during the installation of reinforcement elements with prestressing, as well as under changing of temperature conditions of operation [1].

Mandatory factors to be calculated when determining the parameters of the stress state of the complex shell structures are the temperature deformations of the materials used, as well as the longitudinal deformations of their metal components.

The factors that determine the effectiveness of the obtained solutions include the remaining strength of the material of the metal shells of the tanks, as well as the modulus of elasticity of the used FRP. Lowering the operating temperatures of complex structures of the metallic walls of cylindrical tanks, reinforced with external transverse FRP reinforcement, leads to a significant increase in stresses in their metal components and requires the use of increased reinforcement coefficients.

The expediency of effective use of low-modulus FRP reinforcement is confirmed for structures with high strength of metal bases, and high-modulus – for metal shells, which are characterized by significant restrictions of the level of permissible stresses.

The proposed calculation procedure is confirmed by the results of experimental studies of models of the corresponding structures reinforced with normal- and high-modulus carbon fiber reinforced plastics placed in one and several layers.

### *Література*

1. Дзюба С.В., Михайлов А.А. Проблемы усиления корпусов металлических цилиндрических резервуаров фибропластиковыми материалами // Сучасні будівельні конструкції з металу, деревини та пластмас / Зб. Наук. пр. ОДАБА. – Одеса: ОДАБА, 2017. – С. 40-48.