

## Prediction Study of a Corroded Pressure Vessel Using Evaluation Measurements and Finite Element Analysis

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**Abstract :** The steel structures of the Oyu-Tolgoi mining Concentrator plant are corroded during operation, which raises doubts about the continued use of some important structures of the plant, which is one of the problems facing the plant's regular operation. As a part of the main operation of the plant, the bottom part of the pressure vessel, which plays an important role in the reliable operation of the concentrate filter-drying unit, was heavily corroded, so it was necessary to study by engineering calculations, modeling, and simulation using modern advanced engineering programs and methods. The purpose of this research is to investigate whether the corroded part of the pressure vessel can be used normally in the future using advanced engineering software and to predetermine the remaining life of the time of the pressure vessel based on engineering calculations. When the thickness of the bottom part of the pressure vessel was thinned by 0.5mm due to corrosion detected by non-destructive testing, finite element analysis using ANSYS WorkBench software was used to determine the mechanical stress, strain and safety factor in the wall and bottom of the pressure vessel operating under 2.2 MPa working pressure, made conclusions on whether it can be used in the future. According to the recommendations, by using sand-blast cleaning and anti-corrosion paint, the normal, continuous and reliable operation of the Concentrator plant can be ensured, such as ordering new pressure vessels and reducing the installation period. By completing this research work, it will be used as a benchmark for assessing the corrosion condition of steel parts of pressure vessels and other metallic and non-metallic structures operating under severe conditions of corrosion, static and dynamic loads, and other deformed steels to make analysis of the structures and make it possible to evaluate and control the integrity and reliable operation of the structures.

**Keywords :** corrosion, non-destructive testing, finite element analysis, safety factor, structural reliability

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