INVESTIGATION THE EFFECT OF EROSION GEOMETRY ON CASING RESISTANCE IN COLLAPSE AND BURSTING PHENOMENA USING NUMERICAL SIMULATION

E.F. Salih¹, E. Moosavi^{1, 2, *}

¹ Department of Petroleum and Mining Engineering, South Tehran Branch, Islamic Azad University, Tehran, Iran ² Research Center for Modeling and Optimization in Science and Engineering, South Tehran Branch, Islamic Azad University, Tehran, Iran (*Companyed again)

(*Corresponding Author: <u>Se.Moosavi@yahoo.com</u>; <u>Se_Moosavi@azad.ac.ir</u>)

ABSTRACT

Due to economic issues and ensuring safety during drilling operations, casing erosion has been considered in the oil and gas industry. Because the erosion caused by the reduction of the collapse and burst casing pressure limit has a significant impact on the future drilling plans, including; well completion, oil extraction and well life span. In this study, the effect of casing erosion at different depths and geometries has been simulated using a 3D model in ABAQUS software to check the limit of collapse and burst pressure. The results show that reduction in the external and internal casing pressure limits by increasing the amount of crescent-shaped erosion to 40%, respectively; It is equal to 2521 psi and 2547 psi. Therefore, increasing the load further will cause damage caused by casing burst and collapse. In wedge erosion models, with increasing erosion depth, the maximum external pressure in the collapse and the maximum internal pressure in the burst phenomenon show a downward trend. Wedge-shaped erosion with a width of 0.2 causes the minimum collapse pressure limit compared to other erosion geometries.

Keywords: Numerical simulation, casing collapse, casing burst, erosion, ABAQUS software