

# **Burst pressure prediction method for thin-walled API 5L X grades pipelines with dent**

DOHAN OH(76dohan@gmail.com)

University of Strathclyde

## **Abstract**

During the pipeline installation and operation, already existing rocks and/or the operation mistake of excavator might result in mechanical damages such as dent and gouge. In particular, the dent damage can have harmful and negative effects on pipeline structural integrity, and this flaw may lead to severe consequences like a burst of pipeline and/or the leak of oil and gas. Even, these serious consequences bring on the human and economic risks, in the form of personnel and material loss, respectively. Thus, a practical method, that can predict the burst pressure precisely for the pipeline that has mechanical dent damages, is necessary to prevent serious consequences. For this reason, many researchers keep studying the effects of oil and gas pipeline defects on pipeline safety. Nevertheless, there is no practical method so far which can be used by the field engineers to make decisions quickly and accurately whether the dented pipeline should be repaired, replaced and/or run. In this study, the assessment of structural integrity for a pipeline with the dent is carried out by the direct calculation with Finite Element Analysis (FEA) method verified through comparison with pipeline burst test results and the nonlinear FEA is considered. In addition, this nonlinear FEA takes into account the geometrical and material nonlinearity. In this paper, an empirical equation that can predict the burst pressure of the pipeline with the dent is proposed based on the nonlinear FEA results.

**Keywords:** *Oil & Gas, pipeline, API 5L, structural integrity, dent, finite element analysis (FEA), burst test, nonlinear*

## **Biography**

Dohan Oh is a PhD researcher at the University of Strathclyde, and he worked in the industry for 15 years, in Submarine structural design for 13 years and latterly in special ship overseas marketing for 2 years for Daewoo Shipbuilding & Marine Engineering (DSME). Currently, he is a finance director of the Europe-Korea Marine and Ocean Engineers Association (EKMOA) as well as the leader of special interest group on the marine & ocean (SIG-MO) at the Korean Scientists and Engineers Association in