

### Design of a digital twin for prognostics health management of an O&G asset

The use of digital twin has been pointed as one of the most important breakthroughs in the predictive maintenance and performance monitoring. This is particularly critical for high-cost industry, such as the O&G exploration fields. For the oil well permanent installed equipment, the PHM becomes essential, given the difficult of maintenance and the productive losses caused by equipment failure. In this context, the present work showcases the implementation of a digital twin for the interval control valves (ICVs) responsible for switching productive zones. The digital twin is implemented in the MATLAB/Simulink environment, and artificial intelligence algorithms are used to adjust model parameters. After validation with field data, deep learning methods are used to construct a health indicator (HI) and to predict the ICVs useful life, based on the digital twin output for a pre-defined operational profile.