

## **Computational fluid dynamics analysis on single leak and double leaks subsea pipeline leakage**

### **ABSTRACT**

This paper describes the numerical investigation on single leak and double leaks subsea pipeline leakage using ANSYS FLUENT based on standard k- $\epsilon$  model under steady-state condition. The simulation is done to investigate the effect of fluid velocity and emergence of second leak on the leak flow rate, pressure distribution and turbulence kinetic energy at near leak region and compare those flow parameters between single leak and double leaks subsea pipeline models. The simulation results show that the change of pipeline fluid velocity only has little impact on the flow behavior at leak region. The emergence of second leak does not cause much effect on the flow behavior at first leak. When both models are compared, the leak flow rate at first leak is always higher than that of the second leak. Pressure distribution disturbance due to leak is much more significant at second leak as compared to first leak while vice versa for turbulence kinetic energy along the subsea pipeline.

**Keyword:** Computational fluid dynamics; Subsea pipeline; Pipeline leakage