

## **ANALYSIS OF HYDROGEN INDUCED FAILURE BY HYDROGEN INJECTION METHOD IN MICRO-ALLOYED STEELS**

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When hydrogen injected to the steel, it can cause various material defects such as hydrogen induced cracking or hydrogen embrittlement which depend on the environment in which the steel is used. There are various hydrogen evaluation methods to evaluate the hydrogen susceptibility to explain hydrogen degradation phenomena. For example, H<sub>2</sub>S which contained in crude oil can cause cracks inside the wall of line-pipe steel, which is called Hydrogen Induced Cracking phenomena. The phenomenon of hydrogen embrittlement in martensitic steel can be explained by HEDE or HELP theory. The principles and theories that cause the invasion, aggregation of hydrogen, and destruction by hydrogen need to be clarified.

In this study, the tendency of hydrogen embrittlement and fracture appearance of micro-alloyed steels are compared with hydrogen exposure environments such as hydrogen sulfide aqueous solution, electrochemical injection, and high-pressure gas atmosphere in ferritic steels.