Safety assessment and technique of pressure sealing, application in pressured pipeline petrochemical leakage

Avoce Honga Abdoul Nasser
China University of Petroleum, China

Abstract

The emergence of pressurized sealing technology has played a major role in eliminating the hidden dangers of running, emitting, dripping, and leaking in production equipment in the process industry, and has produced huge economic and social benefits. This article briefly introduces the definition, characteristics and relevant national standards, industry standards, laws and regulations of pressurized sealing technology. At the same time, from the technical perspectives of stress analysis, safety assessment, and safety structure, the pressure pipeline leaking and sealing process under pressure was deeply discussed, and the theoretical basis, evaluation criteria and practical methods to ensure construction safety were put forward.

Pipelines are widely used for the transportation of hydrocarbon fluids over millions of miles all over the world. The structures of the pipelines are designed to withstand several environmental loading conditions to ensure safe and reliable distribution from point of production to the shore or distribution depot. However, leaks in pipeline networks are one of the major causes of innumerable losses in pipeline operators and nature. Incidents of pipeline failure can result in serious ecological disasters, human casualties and financial loss. In order to avoid such menace and maintain safe and reliable pipeline infrastructure, substantial research efforts have been devoted to implementing pipeline leak detection and localisation using different approaches.

This paper discusses pipeline leakage detection technologies and summarises the state-of-the-art achievements. Different leakage detection and localisation in pipeline systems are reviewed and their strengths and weaknesses are highlighted. Comparative performance analysis is performed to provide a guide in determining which leak detection method is appropriate for particular operating settings. In addition, research gaps and open issues for development of reliable pipeline leakage detection systems are discussed.
Kalamazoo River with estimated cost of $800 million. The causes of pipeline damage vary. Shows a pie chart that illustrates statistics of the major causes of pipelines failure which include pipeline corrosion, human negligence, defects during the process of installation and erection work, and flaws occurring during the manufacturing process and external factors. Hence, it is possible to reduce the loss rate, injuries and other serious societal and environmental consequences due to the pipeline failures.