Application of FMEA Analysis to Choose Corrosion Protection Method for Oil and Gas Equipment

A.F. Dresvyannikov[1], FSBEI HE Kazan National Research Technological University (FSBEI HE KNRTU), Prof. Dr. (Chem.), a.dresvyannikov@mail.ru
S.M. Goryunova[2], FSBEI HE KNRTU, PhD (Chem.), svetlanagoryunova@yandex.ru

[1] Head of Department, Kazan, Republic of Tatarstan, Russia
[2] Associate Professor of Department, Kazan, Republic of Tatarstan, Russia

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key words

FMEA analysis, corrosion protection, oil and gas equipment

In the given article we have described the problems of corrosion protection of oil and gas equipment during operation in countries with a tropical climate. A comparative analysis of the electrochemical methods of pipeline corrosion protection when transporting oil is carried out on the example of Congo-Brazzaville. In this country, these mainly include methods of cathodic (impressed current) protection and sacrificial (galvanic) protection, the experience of which has shown both positive and negative aspects of their use. Therefore, enterprises realizing such methods need a reasoned choice to implement one of these corrosion protection methods in their practice.

The first step is analysis of the implementation quality of technological systems, the universal quantitative indicator of which can be a risk indicator, since the technology of electrochemical corrosion protection of pipelines, like any other system, is a subject to certain risks. Identification of risks is possible using approaches used in quality management. The use of complex and expensive calculations often gives the value of risk, the accuracy of which is low for complex technological systems. Therefore, we took as a basis for our research high-quality, engineering methods of risk analysis, based on a sound procedure, special aids (forms, detailed methodological manuals) and practical experience of performers. Also, all possible stages of the process, its complexity, analysis objectives, nature of the hazard, experience and qualification of performers, the availability of necessary information and other factors were taken into account. Such an analysis made it possible to make decision on the use of several methods for assessing risks: analysis of the types, consequences and criticality of failures, a failure tree, and a cause-and-effect diagram.

In the course of the work done, weaknesses in the implementation of sacrificial protection and cathodic protection of oil and gas equipment, the most important microprocesses that have a significant impact on the quality of corrosion protection, were identified. Application of the FMEA analysis methodology has demonstrated the priority in choosing of the sacrificial corrosion protection method for equipment in humid tropical climates.

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