Title Based on the new coating technology as a pipeline corrosion protection layer Study on resistance to cathode stripping

Author name[1], Author name[2], (The name of the presenter should be bolded and underlined)

Zu Yue[1],Zhang Yunchao[1],Mei An[1],Huo Junming[1],Zhou Yongtao[1],Liu Gang[1],Chen Zhen[2]

(1. Pipe China Beijing Pipeline Co. Ltd., Beijing, 100101,China; 2. Beijing Anko Science and Technology Group Co. Ltd, Beijing, 102209, China)

chenzh@ankogroup.com.cn

Abstract Energy transport safety has always been the focus of China. Among them, the study of buried pipeline integrity is an important branch of the security field. Therefore, coating and cathodic protection as two major barriers to protect buried pipelines has been studied extensively. Considering that mechanical damage may occur to the pipeline during transportation and installation, the performance of coating against cathodic peeling becomes particularly important. At present, the commonly used materials such as 3PE, FBE and 3LPP in long-distance pipelines have different degrees of problems. Therefore, the emergence of a new type of solvent-free epoxy glass reinforced plastic provides a feasible potential option to solve this problem. In this paper, the cathodic peeling resistance of the new coating was tested, and it was found that it fully met the requirements of SY/T 5918-2017 standard on the cathodic peeling resistance of solvent-free liquid epoxy materials. At the same time, we modeled the cathodic peeling degree and time, and found that they basically showed the form of a parabola equation (x=c*ta), the index a was close to 0.5, and the peeling rate should be controlled by ion migration. At the same time, the impact of hydrogen evolution reaction occurring in the cathode was also analyzed. In summary, this paper demonstrates the cathodic peeling resistance of a new type of material, and demonstrates its positive impact on pipeline integrity. This new coating technology and service evaluation will be further innovated and improved, which will promote the development of coatings towards a more intelligent and environmentally friendly direction, in order to adapt to the changing application scenarios and market environment.

Keywords

cathode stripping; pipe coating; solvent-free epoxy glass-reinforced plastics; corrosion and corrosion protection; pipe integrity

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