Development of an Expert System forCorrosion Diagnosis of Pressure Vessels

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ABSTRACT

In the petrochemical industry, many pressure vessels are often used for fluid conduction and storage. If corrosion and deterioration appear and are not effectively treated after the facilities are used for a few years, it will easily cause a potential high risk. Since anticorrosive technology and corrosion judgment need to be provided by experts with professional knowledge, just a few corporations are able to obtain related specialists. Moreover, the cost of anticorrosion is quite expensive. If anticorrosion is not implemented appropriately, the result will not only meet the expectation, but also cause tremendous waste of funds. Due to the shortage of manpower and professional knowledge, using anticorrosion expert system to manage numerous facilities has been on oncoming trend. The purpose of this thesis is to test the feasibility of anticorrosion expert system via setting up forecast modes of pressure vessels corrosion, utilizing anticorrosion expert system as a substitute for manpower with professional knowledge to accomplish corrosion diagnosis. Also, the reliability of computers may prevent excessive misjudgment caused by human factors and reduce worker exposure in hazardous environment as well. First of all, this study includes the summarization of common deterioration situations, corrosion mechanism and corrosion database by collecting documented domestic and international corrosion literature, experience laws, invalid cases and related standard. The characteristics establish organized and regular diagnosis modes to forecast possibility of facilities deterioration through the analysis theory of program and knowledge, and are able to execute tests with actual cases to determine feasibility and applicable range. Simulation function of anticorrosion expert system includes corrosion diagnosis, corrosion ratio calculating, elaboration of corrosion cases and video display, and utilizes valid feedback to establish precautions. Furthermore, all cases in the database can be subsumed/improve in training courses for maintenance workers in order to cultivate specialists and upgrade precautions.

Keywords : Pressure Vessels、Corrosion Diagnosis、Expert System

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