UNIVERSITI TEKNOLOGI MARA

EFFECT OF PH VALUE ON THE RATE OF CORROSION IN PIPELINE

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ABSTRACT

The advanced oil and gas transportations have improves the quality of the lives. The pipeline transportation had widely used to transfer across the globe. However, the pipeline needs regularly inspection due to avoid any great consequences. Failure in controlling the corrosion pipeline will causes major incidents such as blowout or explosion. It is about 31.3% of incidents happened due to the corrosion problem. The corrosion happens due to several variables such as temperature, concentration, oxygen content and pH value. The main target of this experiment was to investigate the effect of pH value on the corrosion rate in pipeline. This experiment was carried out by leave the metal in 5 conical flasks with different pH value of solutions for three days. The control variables were pH 3, pH 5 pH 7, pH 9 and pH 11 with constant temperature of 80°C and at atmospheric pressure 1 bar. The 80°C was common temperature of pipeline by using the water bath. In this experiment, the metals sample will measure their weight before and after the experiment. The weight loss of the metals will be calculated to the get the corrosion rate of each metal. The result showed that, when the pH value of the solution was increasing, the corrosion rate became decreased. This was possibly due to the corrosion reaction with the oxygen. In order to improve the result of the experiment a few recommendations were mentioned such as by using the Linear Polarization Resistant equipment to get more accurate reading of corrosion rate and Scanning Electron Microscope (SEM) to get the pattern of the corrosion.

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INTRODUCTION

1.1 RESEARCH BACKGROUND

The consequences of corrosion in the oil and gas industry have been approach as affection in both expenditure and safety. Many experiments and engineering has been conducted to decrease the cost of the expenditure by the impacts of the corrosion. It is about 25% of frustration experienced of corrosion- related failures in oil and gas industry (Kermani & Harrop, 1996). In US industries alone has estimated $170 billion a year of corrosion costs. For oil industry is about an average of these costs (Brondel, et al., 1994).

Many unfortunate events had occurred due to corrosion impact that has been reported. Some of the oil companies states that their pipeline corroded and oil spillage experiences turn out a big environmental pollution. Due to this pollution, a lot of assets are expend for the cleaning up progress of the environmental pollution. This also led to huge ecological harm from the corrosion impacts. Currently, a lot of oil and gas equipment based on the carbon steel-based alloys. So in order to beneficial select materials and to build and utilize metal structure and equipment, all about corrosion need to be understand (Papoola, et al., 2013).

A lot of money and work had been used by the oil and gas industry in order to minimize the corrosion of metals. Besides corrosion records itself, all the records of economics that involves with the corrosion also necessary because the finance will analysis comparison of the effectiveness corrosion (Villagrana & Messick, 1949). The corrosion affect the loss of production for a week will cause loss of the revenue from a few hundred barrels of oil. The corrosion factors had been measure in order to put a stop on the corrosion impacts which are external corrosion factors and internal corrosion factors (Landers, 1963).