CHAPTER 1

INTRODUCTION

1.1 Introduction

The wax deposition problem has occurred in the oil and gas industry for decade. It gives problem during transportation route because of the shrinking flow area when the deposited waxes become thicker and thicker. It results in the plugging of flow strings, formation damage, loss of hydrocarbons, and increased the production cost (Fadairo Adesina, 2010). An analogy to this is accumulation of cholesterol in the human blood vessel that leads to the obstruction of blood flow through the body from the heart (O.Bidmus, 2010).

1.2 Motivation and statement of problem

The earlier the problem is diagnosed in the life of a reservoir, the easier it will design a preventive or control management plan that will reduce or eliminate some of the technical and economic problem associated with the wax deposition. The technical issue that associated with the wax deposition include:

1) Reduction in the interior diameter of the pipelines and plugging of production and flow channels.
2) Change in the reservoir fluid composition and fluid rheology due to the phase separation as wax solid precipitates.
3) Additional strain on pumping equipment owing to increase pressure drop along the flow channel consequent to rheological changes as wax begins to crystallize.
4) Limiting influence on the operating capacity of the entire production system.

The critical role of economics in the oil production make wax deposition a significant economic concern to the industry due to following:

- Investment and operating cost of the oil and gas industry is expensive so when the blockage due to the wax deposition happen, it used a lot of money to repair the damage.
- It also lead to the lost production.
Flow rate is considered an important factor affecting the wax deposition process. The deposit mass decreases as the flow rate of oil is increased whether it is laminar or turbulent flow.

1.3 Objectives

The following are the objectives of this research:

- To study the effect of rotation speed on the wax deposition using two types of chemical inhibitor.
- To study the solubility of the paraffin wax at different temperature.

1.4 Scope of this research

The following are the scope of this research:

i) Characterization of the Malaysian crude oil for SARA analysis using Test Column Chromatography and wax content.

ii) The effect of rotation speed was run at speed range of 0 rpm to 600 rpm using cyclohexane and toluene as chemical inhibitor on wax deposition.

iii) The solubility of the paraffin wax in toluene at four different temperature at range 30°C to 60°C.

1.5 Main contribution of this work

The following are the contributions:

- Contribution was prior to my supervisor’s guidance in determining the correct properties and method to be performed.

1.6 Organisation of this thesis

The structure of the reminder of the thesis is outlined as follow:

Chapter 2 provides an overview about wax deposition from crude oil. In this chapter also discuss about mechanism of wax deposition, factors affecting the deposition process. This chapter also provides a brief review on the previous research done about the wax deposition.
Chapter 3 gives a complete description of the experimental apparatus and method applied in the various parts of this study. There are of set of experiments carried out in this study are discussed. The materials used, sample preparation methods, analyses method and experimental procedures and design are described in this chapter.

Chapter 4 covers about result and detail discussion about the experiments are presented.

Finally, Chapter 5 summarizes the important conclusions of this study and some specific recommendations for future work in this area of research are presented.