UNIVERSITI TEKNOLOGI MARA

SUGARCANE BAGASSE AS LOST CIRCULATION MATERIAL (LCM) IN SYNTHETIC-BASED MUD

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ABSTRACT

Drilling fluid losses are one of the most severe problems encountered in drilling. This is commonly known as lost circulation. Lost circulation occurs when drilling fluids flows into pores or fractures of formation during drilling process. The objective of this report is to investigate the performance of sugarcane bagasse, a fibrous material, as an alternative lost circulation material in the synthetic based drilling fluids. Sugarcane bagasse was selected as a lost circulation additive because of its fibrous characteristic that aided in drilling fluids loss prevention, inexpensive and biodegradable. The sugarcane bagasse performance was also compared to industrial lost circulation additive product. The sugarcane bagasse was prepared into three different ranges of particle sizes which are fine, medium and coarse. The experimental works covered consists of rheological properties and bridging performance analysis. Sugarcane bagasse showed insignificant changes to the rheology reading before and after hot-rolling process. The increased in sugarcane bagasse concentration, however, increased the rheology reading. Based on the results achieved, 8 gram of 200 micron of sugarcane bagasse gave a less penetration of drilling fluids into sand bed other than particles sizes during the bridging performance test conducted. As for conclusion, the sugarcane bagasse can be produced commercially as the next LCM to replace the existing industrial LCM products. This is because of its availability, cost effective, environmentally friendly and effective in combating loss circulation problem.

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CHAPTER ONE

INTRODUCTION

1.1 RESEARCH BACKGROUND

Drilling a well is the most well-known approach to get to oil and gas resources. Throughout drilling, the drilling fluid is circulated in the well. The drilling fluid or otherwise called drilling mud is a combination of water or oil, clays and chemicals that has been used during the drilling operation. Drilling fluid is identified as one of the key factors in the success or failure in constructing well. The costs of drilling operations can be more expensive than expected costs if the drilling fluid is not well designed and the properties of it are not well controlled according to their precise range. Drilling fluids can be categorized into four (4) types which are water-based mud, oil-based mud, synthetics-based mud and air-gas fluids. Water-based mud is widely used in drilling operation because it is cheaper and less difficult to maintain than oil-based mud while air-gas fluid are only used in very specific formation such as formation with little or no permeability to water.

The designation and formulation of drilling fluid are to perform three prime functions which are to control formation pressure, to keep up stable wellbore and to transport rock cuttings Darley (1988). In order to control formation pressure and keeping the wellbore stable, the drilling fluid should be added with the weighting additive to increase its density. This reason is to enable the drilling fluid to balance the hydrostatic pressure inside the wellbore. Hydrostatic pressure can be denoted as the pressure exerted by a fluid column and is dependent by the drilling fluid density and the true vertical depth (TVD). As rock cuttings are created by the penetration of drill bit, it must be removed from the wellbore. The drilling fluid is circulated down the drill string from the surface to downhole wellbore and through the bit, transporting the rock cuttings up the annulus to the surface. The drilling fluid does not only bring rock