UNIVERSITI TEKNOLOGI MARA

ANALYSIS OF WALL THICKNESS CALCULATION FOR RIGID PIPELINE BY USING CARBON STEEL FOR OFFSHORE.

NUR AZERAH BINTI AZEEB

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ABSTRACT

This project presents an analysis of pipeline on existing field by calculating new wall thickness and choose best material grade of Carbon Steel selection using Mathcad software. Offshore pipeline wall thickness is discussed by checking the wall thickness against few design criteria such as pressure containment due to hoop stress, buckle initiation, buckle propagation and collapse pressure due to external pressure based on preferred standard such as API 5L Specification and ASME B31.8 as the pipeline is transporting a natural gas. These project encompass the majority issues regarding offshore pipeline design which may serve as reference and guide to the offshore pipeline engineer during the design process. Also, to check whether the new proposed wall thickness and material grade selection can really increase the productivity and design life of the pipeline than previously. Lastly, to use thinner pipe wall thickness with better strength of weldability and great capabilities even at slightly higher cost.

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CHAPTER ONE
INTRODUCTION

In this final year project are to propose a new design of gas pipeline as backup for future use for Pandora field condition where are going to analyse on same field by using different material such as Grade X65 Carbon Steel and Grade X60 Carbon Steel. As an engineer, basically will check for both material based on their strength and calculate the new pipeline wall thickness. Next, the same step will be taken where the wall thickness will be check for their burst, collapse and buckle. By comparing these another two grade of carbon steel which are X65 and X60 for designing pipeline, the best where offers the best trade-off in strength, weight, cost, weldability, durability and its usage records will be selected.

1.1 RESEARCH BACKGROUND

The first pipeline was built in the United States in 1859 to transport crude oil (Wolbert, 1952). Through the one-and-a-half century of pipeline operating practice, the petroleum industry been proven that pipelines so far are the most economical means of large-scale overland transportation for crude oil, natural gas and their beneficial products, and it is clearly superior to rail and truck transportation over competing routes, given large quantities to be moved on a regular basis. Transporting petroleum fluids with pipelines is a continuous and consistent operation. Other than that, pipelines have long-established an ability to adapt to a wide variety of environments including remote areas and unfriendly environments. Because of their superior flexibility to the alternatives with very minor exceptions which is largely due to local peculiarities, most refineries are served by one or more pipelines.(States & Barbara, 2005)

Offshore pipelines are used primarily to carry and transport oil, gas or water. A distinction is sometimes made between a flowline and a pipeline. It is important to distinguish between flowlines and pipelines since the required design code to make it is different.