DESIGN OF JIG USED TO HOLD BALL VALVES FOR SURFACE POLISHING

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ABSTRACT

Tanjung Maintenance Sdn Bhd is one of the native companies that produced maintenance service for heavy industry equipment. Among maintenance services in Tanjung Maintenance Sdn Bhd are ball valve polishing, valve seat lapping process, hydro test and many more. Tanjung maintenance firm they were still using traditional method for polishing process. The old method is risky to the workers and it limited to certain ball, which are not suitable for large and too small ball. The old method using expelled steel to grip the ball and the lathe machines as the medium rotation of the ball. Since from the problem, a recommendation had been made to design s special jig that flexible to grip a different sizes of ball and construct the technique more users friendly to the human resources especially workers. A detail revision and analysis on traditional technique has been done. .It is important to develop an assistive jig, which is that have fully criterion to work out the problem. Hopefully the concepts that have been generated can diminish an accident to the workers and can reduce the cost of polishing process..

ABSTRAK

Tanjung Maintenance Sdn Bhd merupakan salah satu syarikat bumiputera yang memberikan perkhidmatan penyelenggaraan alatan industri berat. Antara perkhidmatan selenggraan yang ada di Tanjung Maintenance ialah proses mengilap bola injap, mengilap injap duduk ,ujian kebocoran dan pelbagai perkhidmatan penyelenggaraan . Kaedah menggilap bola injap yang dilakukan di Tanjung Maintenance masih menggunakan kaedah yang lama. Ia menggunakan batang besi terbuang untuk memegang bola dan menggunakan mesin pelarik sebagai medium untuk memegang dan memutarkan bola. Kaedah ini adalah berisiko tinggi kepada pekerja dan ia terhad untuk saiz-saiz bola yang tertentu sahaja. Dalam menyelesaikan masalah ini ,satu cadangan telah diusulkan untuk mereka satu alat yang yang lebih selamat semasa melakukan proses mengilap bola ini .Alat yang direka bentuk akan menekankan aspek dari segi keanjalan alat ini untuk memegang pelbagai saiz injap dan dari aspek keselamatan. Kajian terperinci dan analisis akan dijalankan dalam usaha membangunkan alat ini demi memastikan konsep yang dipilih adalah tepat. Ini penting dalam memastikan alat yang direka mempunyai ciri-ciri yang dapat mengurangkan risiko kemalangan semasa dan secara tidak langsung dapat mengurangkan kos proses mengilap injap bola.

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SYMBOL	DESCRIPTION
σ	The average stress,
F	Force acting over the area A.
M	The moment at the neutral axis
Y	The perpendicular distance to the neutral axis
I_x	The area moment of inertia about the neutral axis x
B	The width of the section being analyzed
H	The depth of the section being analyzed

LIST OF ABREVIATION

SUBSCRIPT	DEFINITION
CAD	Computer Aided Design
OSHA	Occupational Safety and Health Act(s)
AT	Assistive Technology
ASTM	American Steel Test Material

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CHAPTER I

INTRODUCTIONS

Oil and gas are considered among the world's most important resources. The oil and gas industry plays a critical role in driving the global economy. The processes and systems involved in producing and distributing oil and gas are highly complex, and require state-of-the-art technology.

ISO 9001:2000 certified worldwide manufacturer of severe service valves. A wide range of custom-engineered valves for high & medium pressure applications are available. Valves are designed to handle high pressure, corrosive, high temperature & erosive applications .Types of valves include pressurize safety & relief, turbine bypass, chemical, isolation, high temperature, choke, control, high pressure, safety, oil & steam valves. Applications includes oil & gas, fossil, nuclear, wellhead pressure control, firewater pump discharge, methanol injection, high-pressure letdown, boiler feed water regulators, and oil compressor for LNG fuel.

A large variety of valves is available and has many applications with sizes ranging from tiny to huge. The cost of valves ranges from very cheap simple disposable valves, and the value are very expensive especially for specialized applications. Often not realized by some, small valves are even inside some common household items including mini-pump dispenser spigots, spray devices, and some rubber bulbs for pumping air.

A valve is a device that regulates the flow of substances (gases, fluidized solids, slurries, or liquids) by opening, closing, or partially obstructing various passageways.

Valves are used in of applications including industrial, military, commercial, residential, transportation. Plumbing valves are the most obvious in everyday life.The typical problem of the ball valve is leakage. The leakage occurred because of those scratches on the ball surfaces and the scratches due to the pressure of flow or installations process. When the problems occur, the ball valves should go polishing process.

Tanjung maintenance services are one of the companies that carry out work on oil and gas industry services. At Tanjung Maintenance they have 4 sections of department which is mechanical department, fabrication department, diesel department and valves departments. Valve department is carry out work on valve maintenances witch are includes polishing process of ball valves, lapping process ,hydro test and many oil and gas industry maintenance process.

1.1 Problem Statement

Leakage can be described as an unwanted loss, or leak, of something which escapes from its proper location. The leaking can be gas, liquid, or even a solid such as a powdered or granular solid. The regular problem happens to the ball valves are the leakage inside of the ball. The leakage gave an impact to the performances of system and also gives damage to the valves and increasing maintenance cost of month.

At Tanjung Maintenance, the polishing process was conducted in a traditional way. The polishing process is done by using a special shaft to hold the ball at the lathe machines. The ball then will be tightening at chuck of the lathe machines. Once the ball has been rotated the workers will polish the ball valve by using the sand paper, which is hold by their naked hand. These procedures will continuously execute until all the scratches on the ball surface are fully disappeared.

1.2 Objective of Study

The objective of this project is to design a jig that used to hold a valve that will undergo polishing process. The jig has ability to hold the ball with different size and weight. The characteristics of the jig should have higher level of safety

1.3 Scopes

- Do some literature review and study on the valve application and their functions
- Design a jig that will attach to the turning machine
- Do some structural analysis on the design
- Come out with the design of the jig that uses to hold the ball of the valve when polishing process.
- Conduct with the design structural analysis to the jig by using COSMOS.

CHAPTER II

LITERATURE REVIEW

In order to have better understanding of this project, literature reviews have been made on several topics. The purpose of this chapter is to provide the brief of the literature review on design for safety. The first part of this chapter will be discussed on what are the valves and its definition. More over the literature study contents the characteristic of the successful products development. Structural design analysis using Cosmos .Literature study was done by using three main sources as an input to the project research which is internet, books and journal

2.1 Valves Definition

A valve is a device that regulates the flow of substances (gases, fluidized solids, slurries, or liquids) by opening, closing, or partially obstructing various passageways. Valves are technically pipe fittings, but usually are discussed separately. Valves are used in a variety of applications including industrial, military, commercial, residential, transportation. Plumbing valves are the most obvious in everyday life, but many more are used. Some valves are driven by pressure only which are mainly used for safety purposes in steam engines and domestic heating or cooking appliances. Others are used in a controlled way, like in Otto cycle engines driven by a camshaft, where they play a major role in engine cycle control.

2.2 Valve parts

The majority of the valve consists of the valve body, including most of the exterior. The valve body is the vessel or casing that holds the fluid going through inside the valve. Valve bodies are most commonly made of various metals or plastics, although valve bodies fused with glass laboratory items in one piece are also made of glass.

2.2.1 Ports

The body consists of two or more openings, called ports from which movement occurs from one opening to the next. These ports are controlled by a valve. Valves with two or three ports are the most common, while valves consisting of four or more ports are not as frequently used. Extra ports that are not needed can be closed off by the valve. Manufacturing of valves often occurs with the intent that they will be connected with another specific object. These objects can vary, but generally these include some type of piping, tubing, or pump head.

Combined with a valve, ports have the ability to act as faucets, taps, or spigots, all while one or more of its remaining ports are left unconnected. Most valves are built with some means of connection at the ports. This includes threads, compression fittings, glue or cement application (especially for plastic), flanges, or welding (for metals).