

# **DESIGN AND DEVELOPMENT OF A FIXTURE FOR KELLY BAR MOUNTING**

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## DECLARATION

This report does not contain any material which has been accepted for the award of any other degree or diploma in any University or equivalent institution in Sri Lanka or abroad, and that to the best of my knowledge and belief, contains no material previously published or written by any other person, except where due reference is made in the text of this report.

I carried out the work described in this report under the supervision of Dr. N.D. Jayaweera, and Dr. H.K.G Punchihewa.

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## **Abstract**

The Kelly bar is a bulky, long and heavy device that is used in piling. The Kelly bar surface is not smooth and contains ribs and grooves. The Drilling process makes many damages to the Kelly bar. These damages are required to be repaired in a workshop. Therefore, the gap of this research was the difficulty and the high cost associated with Kelly bar maintenance. The aim was to design a suitable fixture. The Objectives were to study the process and then create a new fixture and implement it in the workshop. In the methodology, the development process of the fixture and testing was explained. The research focused on the design and the development of the Kelly bar mount. The Kelly bar mount was required to do sliding and rotation both. This mount was required to be designed so as to prevent injuries to workers and damage to the environment, with low energy consumption. A Literature review was done. Thus, the main areas of the report were to identify a suitable fixture, to design and produce the mount and then test the mount. Next, a Project plan was developed and a project path was identified. Then a free hand sketch was identified. Then the optimal solution by design tree was shown and the conceptual design was obtained. Next, calculations for engineering strength were carried out. The material requirement plans and machine requirement plans were prepared. Afterwards, the model was designed, and carried out. So, the actual model was made. Based on this, the cost of production was analyzed. The investment and the cost saving points were discussed. After which the production was carried out. Next, testing was done. Then it was implemented in the workshop. Finally it was painted. For this research, the cost of production and opportunity cost were calculated. Based on this, a simple payback period as 29 days was calculated. Based on these results, finally, it was concluded that, implementing this fixture reduced the cost of operation massively in the workshop.

**Key words:** Kelly bar mount, Energy saving, Kelly bar project, Optimised Design, investment, safety and ergonomics.

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Every effort has been made to trace all the publications, but if any have been inadvertently overlooked the publishers will be pleased to make the necessary arrangement at the first opportunity.

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