CHAPTER 13

Design of Motor Bikes Slider

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Abstract

The study aims to design and produce a super bike portable parking device which are lightweight, easy to use and easy to store. The purpose of this super bike portable parking device is to be used to facilitate the parking process of a super bike to park easily especially at small and narrow spaces. Through observation, the available super bike portable parking device nowadays are difficult to be adjusted, and stored to be carried everywhere because of its large size and its design that cannot be adjusted. The super bike parking device produced has a feature that allows it to be folded into a smaller size without changing the weight and strength of the structure. This super bike portable parking device using hollow mild steel type material with a size of 20 mm x 20 mm and a thickness of 3.0 mm. The maximum load that can be supported by this super bike portable parking device is 300 kg in which the whole parts of super bike are accommodated. Additionally, this device is equipped with safety feature such as alarm. Therefore, the project or study has achieved its goal, namely to increase the safety of super bike as well as to facilitate users to use and store the super bike portable parking device, thus saving space.

Introduction

Nowadays, various type of motor bike had been introduced around the world. These motor bikes have difference in size and weight. Low-powered motor bikes is smaller in

size and lighter in weight than the high-powered motor bike. We have been facing a lot of problems caused by the large motor bike because it was heavy. There are a lot of problem discovered when we done this research. The main problem that we found was the limited space when we wanted to park a large motor bike.

The motor bike slider is designed to support a heavy motor bike with the average weight of 180 kg to 220 kg. The standard dimensions of the existing motor bike slider are 63 mm to 64 mm in height, 1200 mm to 1500 mm in length, and 200 mm to 250 mm in width. The motor bike slider is commonly used to park the heavy motor bike easily into small spaces. It can also be used to move the heavy motor bike from one places to another places without any difficulties.

Methodology

Many methodology or findings from this field mainly generated into journal for others to take advantages and improve as upcoming studies. The method is use to achieve the objective of the project that will accomplish a perfect result. In order to evaluate this project, the methodology based on System Development Life Cycle (SDLC), generally involving four major step, which is planning, designing, implementing and analysis.

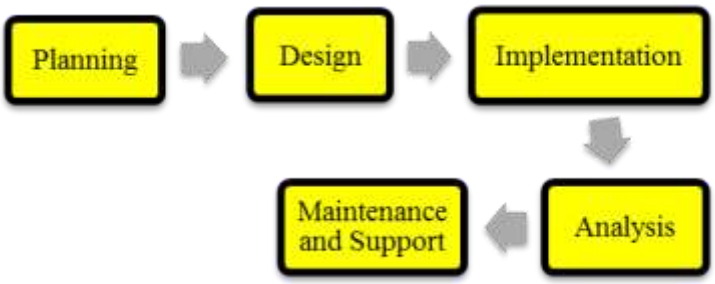

Fig. 1 System Development Life Cycle (SDLC)

a. Design

The design process of this final project was executed by a series of brainstorming and discussion sessions to collect all of the suitable and appropriate data regarding the details of the design for Motor Bike Slider. Three conceptual design have been produced by drawing and sketching to illustrate the designs. The conceptual designs are produced to make comparison between them and the existing product, and to make selection of the design that meets all of the objectives of this final project. The design selection are done through the implementation of the **PUGH Matrix Method.**

Table 1
PUGH Matrix Method for design selection

Design Parameter	Existing Paddock Stand	Concept 1	Concept 2	Concept 3
Usability		=	=	+
Overall size		-	=	=
Cost per Unit		-	-	-
Design Effectiveness		+	=	=
Weight		-	-	-
Ease of Transportation		+	+	+
Ease of Handling		+	-	+
Ease of Storage		+	+	+
	Σ+ (Superior than datum)	4	2	5
	Σ-(Less than datum)	3	3	2
	Σ=(Same as datum)	1	3	1

b. Structural Analysis and Design Optimization

i. Stress Analysis

The observation in this stress analysis is that the stresses caused by a 300 kg load that have been distributed to the three points on the Motor Bike Slider (kickstand, front tyre, and rear tyre) is between 7.232×10^7 Pa and 8.265×10^7 Pa, which is under the maximum stress that can be accommodated by the mild steel material that we used, which is 1.033×10^8 Pa.

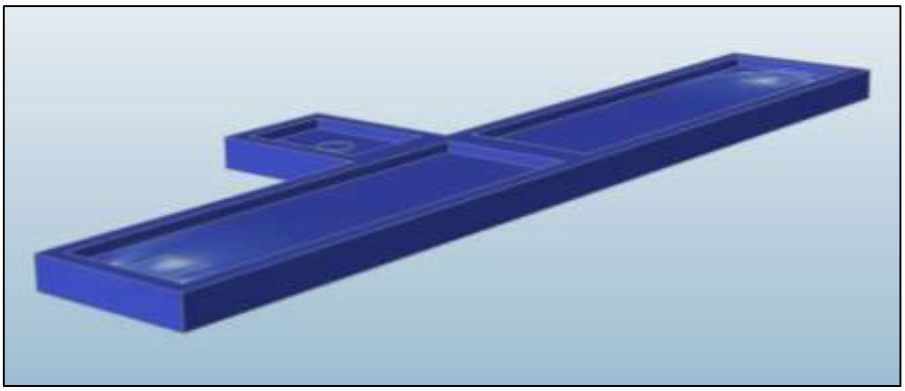

Fig. 2 Stress Analysis

ii. Displacement Analysis

The displacement analysis shows the maximum displacement that will be inflicted by a 300 kg load distributed on the Motor Bike Slider. The observation in the image below, the areas that are mostly affected are around the placement of the front tyre and the rear tyre. Both areas shows

a maximum displacement of 3.287×10^{-4} m on the centre of the placements. A displacement is inevitable in the area where loads and pressures are involved. What we can do is to minimize the displacement caused by the loads and pressures.

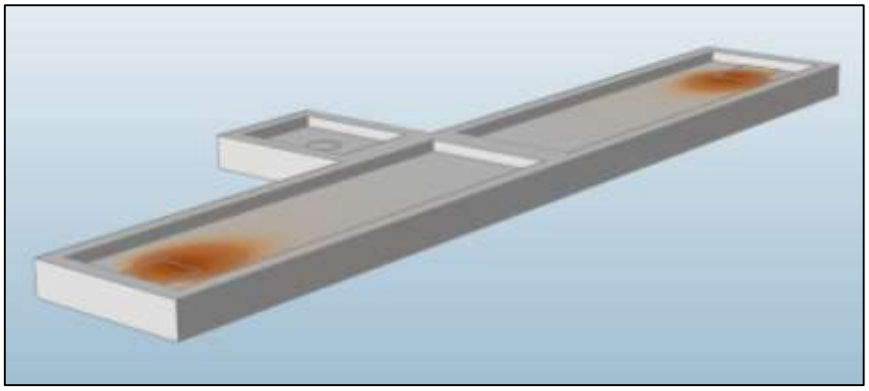

Fig. 3 Displacement Analysis

iii. Design Optimization

The objective of the design optimization is to produce a design of the frame for this Motor Bike Slider in which will remove all of the unnecessary and excessive materials from the initial design. The design optimization shows only the important parts of the design after being applied to a load of 300 kg. This design optimization shows us a clear image of the suitable frame structure for this Motor Bike Slider that are able to accommodate the motor bike with a capacity of 1000cc and lower.Below are the result of the design optimization of this Motor Bike Slider:

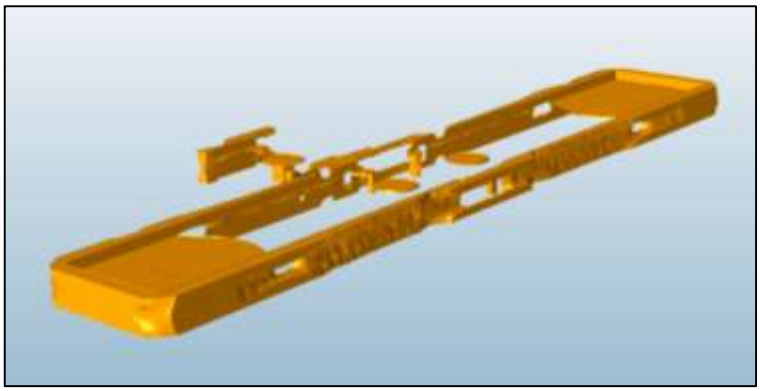

Fig. 4 The result of design optimization

Conclusion

In conclusion, although there are many flaws in this study of the motor bike slider such as difficulty to obtain more detailed data on the mechanical properties of the structural design of the motor bike slider that will be produced, this initial study will be able to be continued to further studies in the future about the potential of the motor bike slider that are designed for the domestic market. Such studies are necessarily required a long time and multiple iteration steps, especially for getting the best method of improving the mechanical properties of the existing structure while reducing its weight.

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