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DESIGN OF CLOTHES HANGERS AND MATHEMATICAL MODELING OF CLOTHES LOAD ON HANGERS

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Abstract

In making clothes hangers, you need galvanized iron with a diameter of 1 inch, a thickness of 1 mm and a length of 4.5 m. The inequality formed in this mathematical modeling is $6(a + b) + 9c < 40300$ where a, b and c are the number of hems, shirts and trousers respectively. The ability of a clothes hanger not to break is triangle O – 4477 – 6716.
Keywords: Clothes hanger, Mathematical Modeling, Triangle O – 4477 – 6716.

1. INTRODUCTION

Clothes hanger is one of the household appliances for hanging clothes, pants, jackets and other clothes. Clothes hangers are usually used after washing clothes or for drying clothes. There are various clothes hangers, some are attached to the wardrobe and some are separate.

2. CLOTHING HANGER DESIGN

In designing this clothes hanger using galvanized iron with a diameter of 26 mm ≈ 1 inch and a thickness of 1 mm with a length of 6 m. The price per galvanized iron rod is Rp 74,000. This 1-inch galvanized iron has a tension of 40.3 Mpa (Emon, et. al., 2017). This clothes hanger is 1.5 m high and 1 m long. Figure 1 shows the initial design of the hanger.

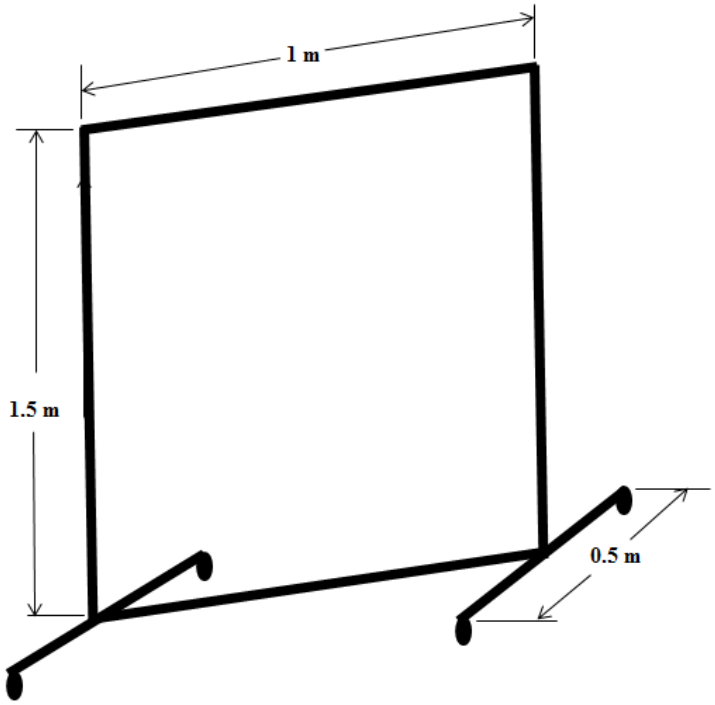

Figure 1. Clothes Hanger Design

Figure 2. Hangers Without Clothes

Figure 3. Hanger with Clothes

3. MATHEMATICAL MODELING OF LOADS ON CLOTHING HANGERS

Mathematical modeling is only influenced by the number of clothes hung on the hanger. Mathematical modeling is assumed on very good welded joints. Mathematical Modeling is

$$f = \sum_{i=0}^{n} m_i g \quad (1)$$

where f : amount of clothing load and f < 40.3 Mpa = 40300 pa, so that the clothes hanger is not damaged; m_i : mass of wet clothes; g : gravity. The selection of clothes that are still wet is to keep the clothing safe from overloading. Each suit has a different mass. In this study, three types of clothing were taken, namely trousers, shirts and shirts. The weight of the wet hem, wet shirt and wet trousers were 0.60 kg, 0.60 kg and 0.90 kg respectively. From Equation (1) is obtained

$$f = ahg + bkg + cpg < 40{,}300\ Pa \quad (2)$$

where a : number of hems, b : number of shirts, c : number of trousers; h : wet hem weight = 0.60 kg, k : wet t-shirt weight = 0.60 kg, p : wet trousers = 0.90 kg, dan g : gravity = 10 m/s^2. Since the weight of the wet hem and the wet t-shirt are the same, then$h = k$ and Equation (2) becomes

$$f = \big((a+b)h + cp\big)g < 40{,}300 \quad (3)$$

If the weight of the wet hem, wet shirt and wet pants is entered into Equation (3), then it is obtained

$$f = 6(a+b) + 9c < 40300 \quad (4)$$

From Equation (4), for a wet hem or shirt and without wet trousers we can hang 6716 hems. From Equation (4), for wet trousers without hems or wet shirts, we can hang 4477 trousers. We can graph the inequality (Figure 4). From Figure 4, we get a yellow triangle (O – 4477 – 6716) the number of clothes hangers in the triangle makes the hanger not damaged and vice versa if outside the triangle makes the clothes hanger damaged.

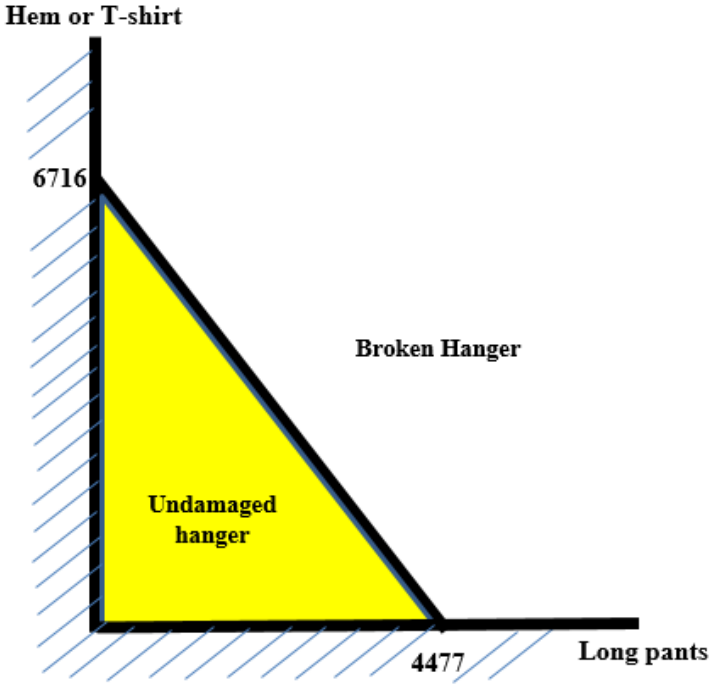

Figure 4. Graph of Inequality of Damaged or Undamaged Hangers

4. CONCLUSION

Design and manufacture of clothes hangers used galvanized iron with a diameter of 1 inch, 1 mm thick and 4.5 m long. Inequality in mathematical modeling is $6(a+b) + 9c <$ 40300. The hanger safety triangle so that it is not damaged is O – 4477 – 6716 where 4477 represents the number of trousers and 6716 the number of hem or the number of shirts.

4. REFERENCES

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