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Collar Manufacturing Process With Turret Machine

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Abstract. *The turret machine is one type of lathe that has The main characteristic is that the tool for sequential operations can be set in readiness for use in the appropriate sequence. This turret machine is intended for cutting, drilling and smoothing work pieces. The process of making this collar aims to find out what material is used and the function of the collar. In the process, the iron is clamped with a chuck then the drill which is located on the loose head is brought close to the workpiece then the chuck rotates so that the workpiece has a hole with an inner diameter of 11.2 mm, after that the workpiece is sprayed with bromus liquid to ensure that the workpiece does not rust easily and does not experience excessive heat which can damage the workpiece. Entering the next stage, the workpiece is cut to a length of 9 mm, and the next process is that the workpiece is placed in a jumper. The cumper process functions to smooth the workpiece so that it is not rough before entering quality control. After that, the object enters quality control. In quality control, the work object is measured using a jig measuring tool to determine whether the work object is OK or NG. The aim of this process is to make quality spare parts that are safe to use. The disadvantage of the turret machine is that it is a manual process that requires hand speed and expertise in operating the turret machine..*

Keywords: *Machine flush, Collar, Spare part*

1. INTRODUCTION

The manufacturing industry is a very important industry in industrial Indonesia processing raw materials into finished materials, so that existing natural resources can be utilized. It is hoped that the excellent development of the manufacturing industry will be able to support the Indonesian economy. This technology involves many things, one of which is non-destructive testing (inspection) to produce quality products. Based on this description, information is needed from the experience the author gained while carrying out practical work at CV. LARIS JAYA MOTOR, in the lathe workshop during the manufacturing process collar in the manufacture of spare parts.

2. LITERATURE REVIEW

The turning process is a machining process to produce cylindrical machine parts which are machined using a lathe. The basic principle can be defined as the process of machining the outer surface of a cylindrical object or a flat lathe with a rotating workpiece with a single cutting edge tool (with a single-point cutting tool) with the movement of the chisel parallel to the axis of the workpiece at a certain distance so as to remove the outer surface of the workpiece.

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Turning is done using a lathe. Lathes, including machine tools with rotating main motion. This is called the main rotational motion, because when operating, the workpiece is rotating. The function of a lathe is to cut or remove part of a workpiece with a rotating motion, so that in the end it becomes an object or product that can be used according to its function. The types of activities that can be carried out on a lathe are straight turning, tapered or conical turning, groove turning, thread making, carteling, reaming, tapping, planing and grinding.

3. METHODS

Collar

Collar is is a seat fixed sheave, sliding sheave dan cam on Honda motorbike CVTs, a complementary ring from a CVT, so that the CVT can run smoothly without any shortcomings in the spare part motor. Collar This has advantages including being more efficient in use when compared to materials made from iron or aluminum. Each collar is made from soft iron that can withstand rotation and pressure fixed sheave, sliding shave dan cam , then that's why the components are made from materials steel software is widely used today.

Material Selection

Material selection or what is usually referred to as determining the main raw material used to make a collar product, which is divided into several types, namely SS-400. In this process, the material is very important in making the product Collar, Because the materials used are very influential during the process of making a product. Every product Collar This uses soft materials, because the product Collar This doesn't use any ingredients other than steel, so only using material SS-400 only as the main raw material.

Figure 1. Materials Collar

Cutting

Cutting is a process of cutting material with a size of 20 mm with a tolerance of -0.4. The initial length of the material is 1 meter and then deep turret engine spin and cut into using a cutting knife on turret engine to a size of 20 mm. In the cutting process, the material is sprayed

with bromus water or cutting coolant to make the material SS-400 The material used does not rust or become deformed due to cuts during the cutting process, because if it is not sprayed with bromus water, the material will easily rust and cannot be used, resulting in product defects. and When the material is cut the bromus water continues to flow. The material undergoes a cooling process using bromus water, Namely by flowing water throughout the material by using the bromus water contained in the section turret engine. The value of cutting time or cutting speed is known through the following equation:

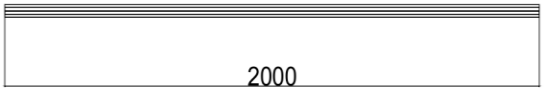

Figure 2. SS400 material before cutting (Cutting) 2D

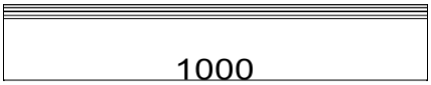

Figure 3. SS400 material after processing Cut (Cutting) 2D

Figure 4. SS40 material before cutting (Cutting) 3D

Figure 5. SS400 material after cutting (Cutting) 3D

Cutting Speed (CS) $= \frac{p.n.d}{1000}$

Known:

Diameter (d) = 20 mm

Rpm (n) = 400 rpm

Contant (p) = 3,14

Answer :

Cutting Speed (CS) $= \frac{p.n.d}{1000}$

Cutting Speed (CS) = (3,14 .400 .20 mm)/1000

Cutting Speed (CS) = 25.12 mm/minute

There is is a process where the material is drilled to a diameter of 11.2 mm. The material that rotates on the fixed head of the turret machine is brought close to the drill bit on the loose

head, after which the drill bit works to push in and make a hole with an inner diameter of 11.2 + 0.5 mm and a depth of 20 mm. In the drilling process, the SS-400 material is sprayed with bromus water to prevent excessive heat which can damage the material and cause the product to fail. After drilling, the material is cut again with a cutting knife on the turret machine with a size of 20 mm. The value of drilling time is known through the following equation:

$$\text{Drilling time} = \frac{drilling\ length\ (L)\ mm}{Feed\ (F)\ mm/min} = 1000\text{mm}$$

Known:

Total drilling length (L) = 20 + (0.5 x 12) = 26 mm

Feed (F) = F = t x n

= 0, 04 mm x 400 rpm

= 16 mm/min

Answer : Drilling time = $\frac{26\ mm}{16\ mm/min}$ = 1.63 minutes

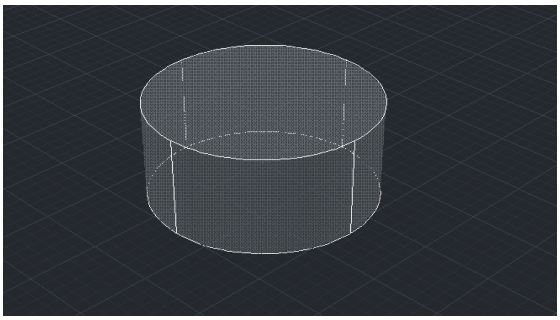

Figure 6. SS400 material before installation Bor 2D

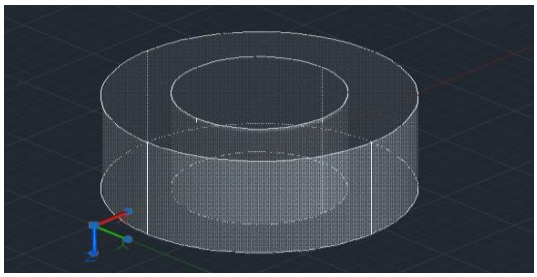

Figure 7. SS400 material after In 2D Drill

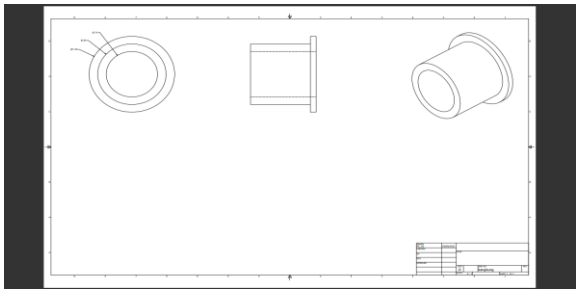

Figure 8. 2D Drill

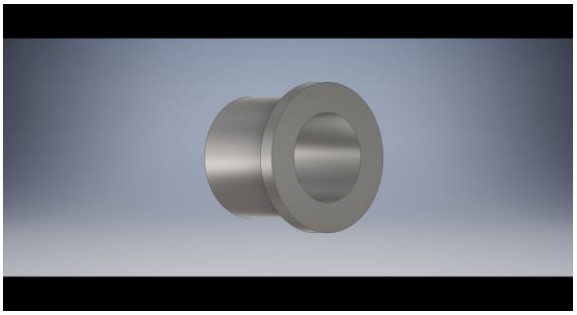

Figure 9. 3D Drill

Figure 10. Process *Drilling*

Chamfer

Function Chamfer is to smooth the sharp surface of the material using a machine flush. The material is inserted into the fixed head and locked, after which the cutting knife will smooth the material and this process also uses bromus water so that the material does not rust and experiences excessive heat.

Figure 11. Process *Chamfer*

4. RESULTS

From misses is a collection of several forces on the surface of an object. The narrower the surface area but the force is constant, the greater the tension. Von misses states that yielding will occur when the stress exceeds the yield point. In other words, yielding will occur when the shear strain energy of the material reaches a certain critical value so that a change in shape occurs in the material. The following are the von misses values on the collar:

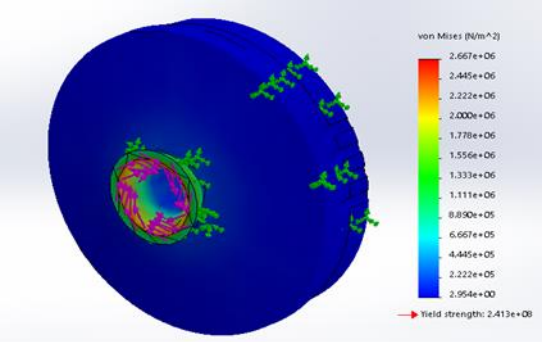

Figure 12. Results From Misses On Collar

In figure 3.7 the largest von misses value is shown in the reddest color gradient, namely 2.667 N/m^2, while the smallest is blue, namely 2,954 N/m^2. Meanwhile, areas with moderate tension can be shown with gradients of yellow, green and light blue.

Product Collar

Product failure is a term usually used to explain the lack of quality of a product, both in terms of appearance and strength of the product. The following are some defects that occur in the product Collar. Excessive length can make the product NG or rejected because the size does not match what was made, so any length that is less or more than that size is declared NG.

Figure 13. NG Collar Products

5. DISCUSSION

Safety Factor

To avoid failure of the structure, the material strength value must be greater than the stress value received. The strength value of the material divided by the stress value received is called the safety factor. If the safety factor value is below 1 then the material is a structural failure (defect). The final unit of safety factor is ul (Upper limit), In determining the safety factor, it is determined using the following equation:

Known:

Actual Strength = 2667 N/m^2

That power

Needed = 2413 N/m^2

Answer :

$$\text{Safety Factor} = \frac{\text{Actual Strength}}{\text{Required strength}}$$

$$\text{Safety Factor} = \frac{2667\ \text{N/m2}}{2413\ \text{N/m2}}$$

Safety Factor = 1,10 ul (Upper limit)

When calculating the safety factor value for the collar product, it is found to be 1.10 ul, so this means that the value of 1.10 is considered safe for the collar product. If the safety factor value obtained is less than 1 then the product is said to be defective or unsafe to use. , if the value obtained is above 1 or more than 1 then the product is safe to use. The greater the safety factor value obtained, the better the safety factor of the product.

Results become products

Product Collar who have graduated from quality control declared finished and the results are as shown in Figure 3.9 below.

Figure 14. Product Finish Collar

6. CONCLUSION

From the results of the discussion previously explained, conclusions can be drawn, including:

1. In the manufacturing process Collar This uses materials SS 40 Steel, which corresponds to the characteristics of the material. Under construction Collar using a drill and cumper process using a lathe flush and JIG as a measuring tool to determine whether the product being made is feasible or not. In the making Collar There are several parts that play a very important role in forming the material, namely Cutting, There is, I buy And Bromus Water. After the process is complete then end with measurements.
2. In the manufacturing process Collar There are some Troublshouting or lack of turret engine, every part of the machine flush that happened troubleshouting There are different ways to repair it, including repairing or replacing the part with a new one according to the condition of the part and following standard parameter data procedures. turret engine.
3. The advantage of this turret machine is that the operation of the machine is easy for the operator to understand because it is generally widely used in the manufacturing industry and the tool use system for sequential operations can be set in readiness for use in the appropriate sequence.
4. To get a product that meets standards, the product must go through a process quality control who performs some tests on the product Collar such as: checking the size on Collar such as diameter and length, items that fail are called NG

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