Making Special Tools (SST) Valve Spring Removal on the Komatsu Pc130-7

Ismail Ramli[1] and Hamka Munir[2]

[1] Heavy Vehichle Study Program,
Nunukan State Polytechnic
Nunukan, Indonesia
[2] Heavy Vehichle Study Program,
Nunukan State Polytechnic
Nunukan, Indonesia
Ismailramli001@gmail.com, hamkamunir82@gmail.com

Abstract. In its development, heavy equipment engines produced today have four valves in each cylinder (two intake valves and two exhaust valves). With the increasing number of valves in each cylinder, the process of replacing and compacting the valves will require time and labor. Therefore, we need a tool to facilitate the release process. The formulation of the research problem is how to manufacture and use SST Valve Spring Removal. The purpose of this research is to find out how to manufacture and use SST Valve Spring Removal. The method used in this research is designing, making tools and testing the use of tools. The results of this study are the method of making SST Valve Spring Removal, namely design drawings, tools and materials, measurements, cutting, joining or welding, painting, painting and finishing. The way to use the SST Valve Spring Removal is to turn the screw rod handle so that the screw rod opens according to the size of the cylinder head, insert the tool into the cylinder head, then position the cylinder head with the retaining bolt from the tool. Turn the screw rod handle back so that the washer on the tool presses into the valve retainer position.

Keywords: Komatsu , Tools , SST Valve, Spring, Removal.

1 Introduction

Technological progress has developed rapidly in the last decade, including in the mechanical field. The development of various scientific disciplines in the mechanical field, such as measurements, work equipment (Tools) and so on, has made manufacturers carry out many new innovations. Innovations that are often carried out are in the field of work equipment (Tools) which are a combination of various practical applications of mechanical science disciplines along with other knowledge in the fields of mechanics (machinery), modern automotive and robotics technology. Recently, the need for work equipment to make work easier is very high. By prioritizing work efficiency, both time efficient, energy efficient and work cost efficient.

M. U. H. Al Rasyid and M. R. Mufid (eds.), *Proceedings of the International Conference on Applied Science and Technology on Engineering Science 2023 (iCAST-ES 2023)*, Advances in Engineering Research 230,
https://doi.org/10.2991/978-94-6463-364-1_15

To be time efficient, energy efficient and work cost efficient, one of the tools that is the object of research and attracts a lot of interest is the Special Service Tool (SST). There are many types of SST, one of which is Valve spring removal. This tool functions to open and remove the valve from the cylinder head. For example, engines in excavator units, bulldozers and others. For this reason, it is necessary to dismantle it to separate the valve from the cylinder head by removing the lock (conical) on the valve.

Heavy equipment engines currently produced have four valves in each cylinder (two intake valves and two exhaust valves). With the increasing number of valves in each cylinder, the process of replacing and removing valves will require time and worker energy. Therefore, a tool is needed to make the process of removing and installing easier.

The tools used when conducting research are different in how they are used, require a lot of power, take longer, require a large working space, and from a work safety perspective are considered less safe, and tend to damage the surface of the cylinder head. Therefore, we need a tool that can increase work efficiency, does not require a lot of energy to use the required release time and is relatively faster, and does not require a very large working space so that it does not damage other engine parts.

2 Research Methods

The method used in this research is designing, making tools and testing the use of tools. The equipment manufacturing site is carried out at the Nunukan State Polytechnic Heavy Equipment Engineering Laboratory, and equipment testing is carried out at the Nunukan State Polytechnic.

Making the SST to open the spring valve requires tools and materials, the tools and materials used are a 900 Watt Welding Machine, Drilling Machine, Grinding Machine, Meters, etc., while the materials used are 1 inch galvanized steel pipe, 3 threaded rods /8 inches, Iron plate 5 mm, Bolt 8 mm, 19 mm, Nut 14 mm, 19 mm, and Electrode

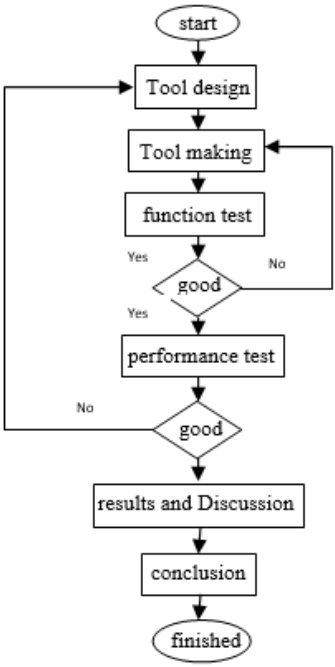

Fig. 1. Research Flow.

3 Results And Discussion

3.1 Desain SST Valve Spring Removal

Before the process of making the SST Valve Spring Removal, planning is required in the form of a drawing made in AutoCad as a guide in the process of making the SST Valve Spring Removal. A two-dimensional design plan is shown in the figure below:

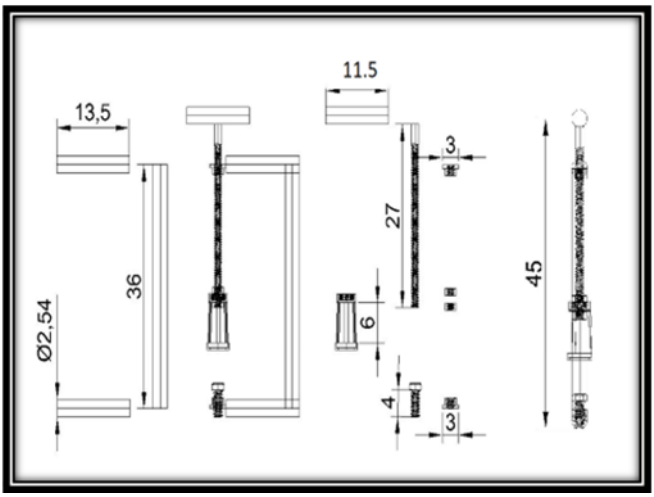

Fig. 2. CAD 2D Design

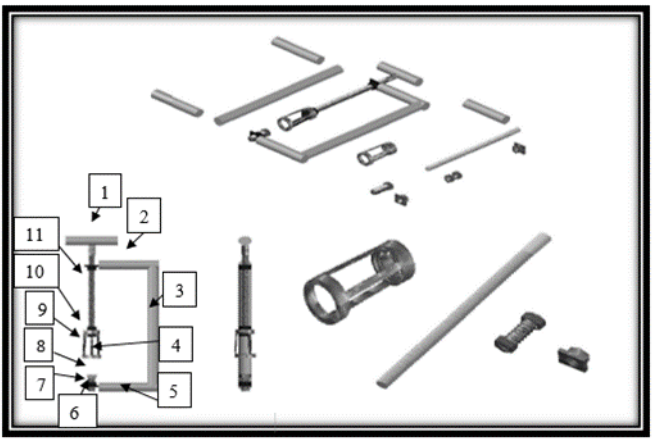

Fig. 3. CAD 3D Design

Information :

1. Turning Lever
2. Upper Elbo
3. Holder Rod
4. Washer
5. Lower Elbow
6. Plate
7. Nut
8. Bolt
9. Bolt
10. Bearing
11. Threaded Rod

3.2 Component Manufacturing

The steps in making SST Valve Spring Removal are as follows:

a. The 1 inch galvanized steel pipe is cut into three parts, with two sizes
b. Then the steel pipe that has been cut is welded using an electric welding machine using the spot method so that it sticks together to form the tool
c. Then drill both plates in the middle of the plate.
d. Next, cut the 5 mm plate into 2 parts of the same size as shown in the image above
e. Then the two plates that have been cut are welded to the ends of the galvanized steel pipe
f. Cut the threaded rod to the size
g. After the threaded rod is cut according to the design size, weld the 8 mm bolt for the bearing and washer.
h. After that, weld the lower and upper ends of the threaded rod to support the bearing so that it does not rise or fall.
i. Cut the steel for the handle according to the size shown in the design drawing
j. eNext, re-weld each part that has been spot welded
k. Finishing

3.3 Calculation of Material Strength

Calculating the strength of the material with the aim of finding a match between the weight of the component and the thickness of the iron plate material used as the basic material for making special tools based on the strength of the material

3.4 Performance Test

In the performance test, there are two ways, namely opening and removing the spring from the Cylinder Head.

1. Valve spring opening test
   From the results of the spring valve opening test, data was obtained that the opening of the spring valve was as follows:

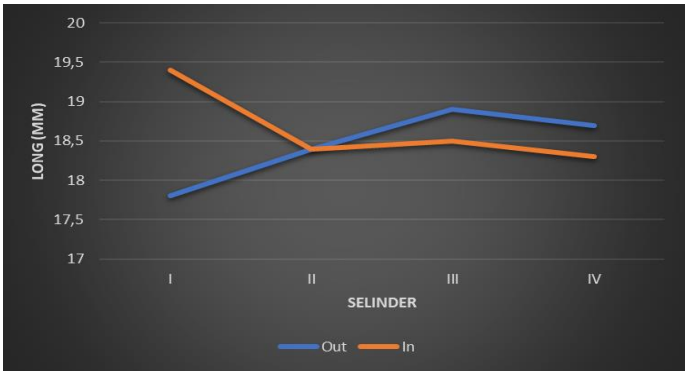

Fig. 4. Testing Opening Spring Valve

This test lasted 5 minutes, the tool being tested functioned well

Fig. 5. Spring Valve Opening

2. Testing the spring valve installation

From the results of the spring valve installation test, data was obtained that the opening of the spring valve was as follows:

Fig. 6. Spring Valve Installation Testing

This test lasted 5 minutes, the tool being tested functioned well.

Fig. 7. Spring Valve Installation

4 Conclusion

Based on the research carried out, the conclusion is that making SST Valve Spring Removal is designing drawings of tools, preparing tools and materials, measuring, cutting, connecting or welding, grinding, painting and finishing. Testing tool works well.

Acknowledgement

There are many obstacles in completing this research, and this work would not have been possible without the support of several parties.

For that, I would like to thank all parties who have been willing to work so far and other related writings. Director of the Nunukan State Polytechnic who has provided support to me in completing this research.

I also want to thank my family and friends who have always supported me in completing this research.

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