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ANALYSIS OF BIKE REAR SHOCK BREAKER FAULTS MOTOR ON THE UNDER BRACKET

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ABSTRACT
The purpose of this study was to conduct a study related to what factors caused the occurrence of a broken motorcycle rear shock breaker at the under bracket. Shock breaker is a very important component as a damper from shock loads and shocks experienced by the vehicle under various loading conditions and the road surface traversed. This study is a follow-up to the cases the team found in the field. The next research step, begins with a literature review, determining the test flow based on the hypothesis, conducting tests on the samples obtained, analyzing the test data and finally making research conclusions. This research method was carried out sequentially from beginning to end. This can have an impact on consumer confidence in motorcycle related products, 27% for FOB incoterms, 23% for delivery services using CIF incoterms, 12% for EXW incoterms and 8% for DPU incoterms.

Keywords**:** fractography; metallography; motorcycle; shock breaker; transportation

INTRODUCTION
According to Oktaviastuti and Wijaya (2017) concluded that vehicles in Indonesia are as of July 2016 it reached 125 million units with a contribution of 10-15%. cars, the largest remaining are motorbikes and others. According to BPS (2019) at Indonesia in 2019 motorcycle type vehicles are the type of vehicle with the highest number, amounting to 112,771,136 units, followed by passenger cars as much as 15,592,419 units, then goods cars with 5,021,888 units and buses with 231,569 units. Based on the above data, motorbikes are a very popular mode of personal transportation the most favorite used by the people of Indonesia. This is due to excellence the motorcycle itself in terms of maintenance costs, fuel costs, travel time, and its ability to break through congestion (Setiawan, 2013). Besides motorbikes has an economical price compared to a car, considering the people of Indonesia have middle to lower economic ability. Apart from the advantages mentioned above, motorbikes have the most fatal minus points, which are related to problems safety.

Quoting information from Korlantas Polri in October to December of the year In 2016, there were 5,563 accidents involving motorcycles and victims died out of 25,434 total incidents. Certainly an extraordinary number for a span of time just two months. If examined more deeply, there are three main causes of these accidents namely in terms of drivers, in terms of vehicles and in terms of infrastructure (Nugroho, 2020). In terms of vehicles, there are several technical matters that are of concern, one of which is motorcycle shock breaker. To reduce vibration and shock, the motorcycle must be equipped with shock absorbers. This tool is used to reduce the effect of surface roughness road (Hadi, 2015). In addition, the shock breaker is used to support the bicycle motorcycle. If a broken shock breaker occurs, a fatal accident can be dangerous motorcyclists themselves and other road users. In order to reduce the number of accidents due to cases of broken shock breaker, it is necessary to do research with the title "Analysis of the Occurrence of Motorcycle Rear Shock Breaker Broken In the Under Bracket section"

METHODS
The steps for collecting research data, the authors refer to the opinion of Rafiek (2013), which modified namely, (1) Library and field studies, (2) Data collection, (3) Analyzing data, (4) Making research conclusions. In the literature study, a literature study was carried out about field of research to be faced. The field of research that will be faced is regarding motorcycle

shock absorbers. The steps for collecting data for test specimens are taken macro and micro, on a macro basis with fractography to find out the initial possibilities as well crack propagation while on a micro basis through metallography to find out more clearly the initial cause of the crack. The fractography process is carried out using a camera with magnification optics sufficient to see the possibility of the initial area of the crack as well as the mode of crack propagation. Then proceed with the metallographic process carried out to find out more about it

microstructure in the initial crack area. Based on the results of fractography and metallography, further analysis was carried out. A number of important parameters in the macro test, namely the appearance of specific morphology as a feature from the start cracks and their propagation. Whereas in the micro test the things that underlie the possibility of occurrence crack is the presence or absence of a brittle phase, inclusions, porosity and others. These data can used as a strong basis in making research conclusions. In the final stage will be arranged research conclusions based on the results of data analysis. As well as suggestions for improvement this research in the future, so that it can be developed and more useful

RESULTS

Testing the shock breaker samples in this study used the fractographic test method and metallography. Sample of a broken shock breaker at the location of the connection with the piston rod. Please note that the shock breaker breaks suddenly with use normally around six months. we can see in Figure 1

Figure 1. Shock breaker samples

Fractography test data collection is carried out to determine the beginning of cracks and their propagation. The results of the factography can be shown in Figure 2 and Fig 3.

Figure 2. Lower and Upper Faults

When the shock breaker fracture sample is enlarged again, the beginning of the crack propagation will begin to be seen. Can be seen more clearly in Fig. 3 and Fig 4.

Figure 3. Enlargement on the Internal Thread

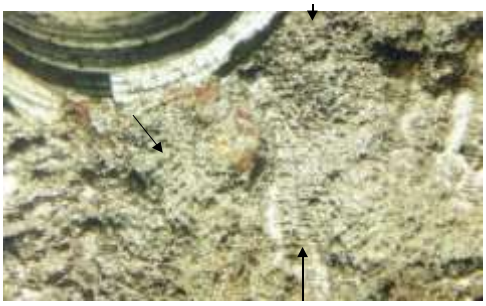

Figure 4. Enlargement at the Beginning of the Crack Propagation

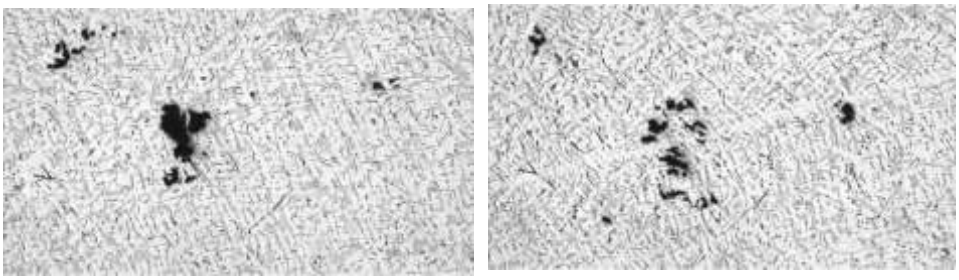

Figure 5. Under Bracket Microstructure (70 times magnification)

After the metallographic process with etching and electron microscopy with 70 times magnification, we can see the porosity along the crack propagation in the sample. After that we zoom in again with a magnification of 550 times it will look like in Figure 6 as follows.

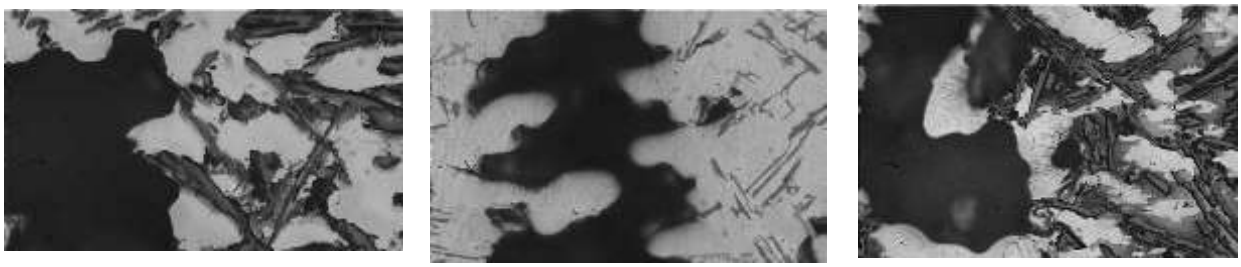

Figure 6. Under Bracket Microstructure (550 times magnification)

DISCUSSION

From the picture above it can be seen that the crack extends from the screw head along the length of the piston rod. We can know this because after the factographic process, the crack propagation is clearly visible because the texture is different from the others. After knowing the propagation of the crack using the fractographic test above, it is continued with the metallographic test to find out the cause of the crack. Metallographic test data collection is carried out on a sample of the initial area of the crack. With a magnificatio of 550 times, it becomes clearer that there are air-filled porosities along the cracks in the sample body. From this we can conclude that the cause of the fracture of the sample shock breaker is this porosity

which makes the structure of the shock breaker weak in that part which eventually cracks, propagates and finally breaks.

CONCLUSION

From the fractography test, it was obtained that the initial area of the crack in the sample was located on the elongated screw head on the piston rod. This can happen because after metallography it turns out that in the initial area of the crack there are several porosities so that in that part it becomes the weak point of the shock breaker which triggers the stress intensity to be high when receiving normal loads.

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