

**EXTENSION AND TESTING OF MOTORCYCLE SPEEDOMETER ACCURACY  
USING PORTABLE SPEEDOMETER TESTER TESTING EQUIPMENT BASED ON  
ARDUINO TO IMPROVE DRIVING SAFETY IN BALI AT SMA NEGERI 1  
TABANAN**

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**ABSTRACT**

The average age range for motorcycle users is the age range of 17 to 25 years, where this age is included in the productive age. The negative impact caused by this is an increase in the number of traffic accidents, according to data from the Directorate General of Land Transportation of the Ministry of Transportation, in 2020 when viewed from the profile of traffic accident victims based on education level, the biggest victims are students with a high school education level as much as 80,641 people. The background of the importance of the speedometer in vehicles is the safety factor, because a good driver always pays attention to the comparison of the speed of the vehicle he is driving with the condition of the road or terrain traversed. With a good and correct speedometer, the driver can calculate the speed that is adjusted to the existing situation and conditions. The purpose of this PKM activity is to provide information and understanding of the importance of the speedometer function on a motorcycle as a means of controlling speed while driving which later is expected to make students able to drive safely and safely while at the same time reducing the rate of traffic accidents, especially the productive age range (17 to 25). year). The method used is to conduct socialization and practice in the field. During the PKM activity until the end, the students were very enthusiastic about participating in the entire series of activities and hoped that these activities could be carried out regularly every year. Hopefully what has been given can have a positive and useful impact.

Keywords: accident; arduino; community service; portable speedometer tester

**INTRODUCTION**

Currently, the use of motorcycles, especially on the island of Bali, has experienced a significant increase every year, according to data from the Central Statistics Agency for the Province of Bali regarding the number of motorcycles by regencies/cities in Bali Province (units) in 2019 to 2021 according to table 1. an increase of 97.93%. The average age range for motorcycle users is the age range of 17 to 25 years, where this age is included in the productive age. The negative impact caused by this is an increase in the number of traffic accidents, according to data from the Directorate General of Land Transportation of the Ministry of Transportation, in 2020 when viewed from the profile of traffic accident victims based on education level, the biggest victims are students with a high school education level 80,641 people. This is something that is very detrimental because the category of accident victims is the category of productive age. One way to reduce the number of accidents by motorcycle users is to socialize the improvement of driving safety, especially by emphasizing the maximum speed that can be reached when driving by utilizing the speedometer function on a motorcycle.

Table 1.  
Number of Motorcycles by Regency/City in Bali Province (Unit)

Banyaknya Sepeda Motor Menurut Kabupaten/Kota di Provinsi Bali (Unit)			
Kabupaten/Kota	2019	2020	2021
Kab. Jembrana	191.665	197.148	201.486
Kab. Tabanan	372.297	381.547	387.740
Kab. Badung	760.808	780.630	793.885
Kab. Gianyar	400.424	410.553	416.902
Kab. Klungkung	120.634	123.979	126.236
Kab. Bangli	104.972	108.383	110.761
Kab. Karangasem	181.836	187.976	192.256
Kab. Buleleng	410.279	421.426	429.917
Kota Denpasar	1.175.721	1.200.315	1.218.412
Provinsi Bali	3.718.636	3.811.957	3.877.595

Source: Badan Pusat Statistik Provinsi Bali

The background of the importance of the speedometer in vehicles is the safety factor, because a good driver always pays attention to the comparison of the speed of the vehicle he is driving with the condition of the road or terrain traversed. With a good and correct speedometer, the driver can calculate the speed that is adjusted to the existing situation and conditions. If the speedometer on the vehicle cannot provide accurate data about the speed of the vehicle being driven, then the driver cannot make the right decision. Referring to the above, a dangerous situation will arise if the vehicle is driven at low speed (less than 40 kilometers per hour) on the road. where other vehicles are traveling at high speeds (above 80 kilometers per hour). And vice versa, driving at high speed, where other vehicles are traveling at low speed. Therefore, if you want to be safe, the vehicle must be run according to the allowed speed limit. Speedometer testing is used to check the state or condition of the speed indicating device contained in a motor vehicle, whether the existing speed indicating device is still in a permitted condition or not. Inspection of the motor vehicle speedometer is carried out with a speedometer tester (speedometer test instrument), where deviations in the speedometer tester are allowed at a limit of -10% to +15% with the condition that the measurement is carried out at a speed of 40 kilometers per hour. To provide information to the public, especially high school/high school students regarding the function of the speedometer and to reduce the accident rate in productive ages, we carried out Community Service activities in the form of Counseling and Testing the Accuracy of Motorcycle Speedometers Using an Arduino-Based Portable Speedometer Tester to Improve Driving Safety in Bali. SMA Negeri 1 Tabanan.

## METHOD

The implementation of this Community Service activity begins with a collaboration between the Bali Land Transportation Polytechnic and SMA Negeri 1 Tabanan which will carry out socialization of motorcycle riding safety and is related to the socialization of the Automotive Technology Study Program. Preparations began with the activities of Lecturers and Teaching Staff of the Automotive Technology D-III Study Program conducting a survey on Tuesday, October 4, 2022 and holding an internal meeting to form a committee and all sections related to the division of tasks later at the location. This Community Service activity is carried out using socialization methods and practice in the field.

On Friday, October 7, 2022, the Extension and Testing of the Accuracy of Motorcycle Speedometers Using an Arduino-Based Portable Speedometer Tester to Improve Driving Safety was carried out. The activity began with the opening by the Head of SMA Negeri 1 Tabanan Mr. Nyoman Surjana, S.pd., M.pd. followed by remarks by the Director of the Bali Land Transportation Polytechnic who on this occasion was represented by the Head of the Center for Research and Community Service (P3M) Mr. Aris Budi Sulisty, S.T., M.T. The next agenda is the activity of exposing the material on Technical Aspects on Motorcycles, Safety Riding and Counseling and Testing the Accuracy of Motorcycle Speedometers Using an Arduino-Based Portable Speedometer Tester to Improve Driving Safety by Lecturers of the D-III Automotive Technology Study Program.

## **RESULTS AND DISCUSSION**

This Community Service Activity is the role and contribution of Lecturers and Cadets of the D-III Automotive Technology Study Program at the Bali Land Transportation Polytechnic in order to reduce the number of accidents on motorbikes and provide knowledge about the importance of understanding the function of the speedometer related to speed when riding a motorbike. Accident data in Bali Province is quite high, it can be seen in table 2 data from the Central Statistics Agency for Bali Province regarding the number of traffic accidents in 2019-2021.

Table 2.  
Number of Traffic Accidents in Bali Province  
Number of Traffic Accidents in Bali Province

Traffic accident	2019	2020	2021
Incident	2462	1787	1984
Die	420	405	318
Serious Injury	261	55	56
Minor injuries	3341	2560	2851

Source: Central Bureau of Statistics of Bali Province

This Community Service activity can be measured in terms of the level of achievement through the success of the program, supporting factors and inhibiting factors during the activity until it is completed

### **a. Program Success**

The benchmark for the success of the program is the start of the preparation stage, namely conducting surveys and coordination meetings between the Bali Land Transportation Polytechnic and SMA Negeri 1 Tabanan. All parties are very committed to the successful implementation of this service. The participants, in this case the students of SMA Negeri 1 Tabanan, were very enthusiastic in following the stages of each material session, during the discussion and question and answer session almost all students asked because the material presented was very interesting for them, so the purpose of implementing community service This can be achieved by providing an understanding of the function of the motorcycle speedometer and resulting in a decrease in the number of traffic accidents, especially in the productive age.

### **b. Supporting factors**

The supporting factor of this community service activity is the granting of an implementation permit by SMAN 1 Tabanan which is the place for carrying out the activity and getting a very

good response from students, this PKM activity also collaborates with an electric motorbike conversion workshop, namely Electro Wheel to test the speedometer on electric motorcycle. This is important considering the development and growth of electric motorcycles which are increasingly in demand by the public.

#### c. Obstacle factor

The implementation of PKM activities from the beginning to the end did not find any inhibiting factors or obstacles, because the preparation stages were very good and the target object did not feel disturbed by the socialization method and practice in the field. The total participants who attended were 150 students with enthusiastic responses and attitudes and at the end of the session the students greatly appreciated the Lecturers regarding the Accuracy of Motorcycle Speedometers Using an Arduino-Based Portable Speedometer Tester to Improve Driving Safety.

#### d. Activity Implementation

The implementation of the initial activity begins with an understanding of the function of the speedometer on a motorcycle. The function of the speedometer is as a measuring tool to control the speed of a motorcycle when it is used, and is used as a measure to regulate speed in areas or roads where the maximum vehicle speed or minimum vehicle speed is limited.



Figure 1. Presentation of Material by Lecturer

After the material presentation was carried out, it was followed by a discussion and question and answer session by the students of SMA Negeri 1 Tabanan.



Figure 2. Discussion and Question and Answer Sessions and Giving Prizes to Participants



Figure 3. Discussion and Question and Answer Sessions and Giving Prizes to Participants

Furthermore, the provision of additional material regarding Convertible Electric Motorcycles by I Gusti Ngurah Putra Darmagitha, ST as the management of Electro Wheel.



Figure 4. Presentation of Materials on Electric Motorbike Conversion

The final session was continued by testing the Accuracy of the Motorcycle Speedometer Using an Arduino-Based Portable Speedometer Tester to Improve Driving Safety.



Figure 5. Testing the Accuracy of Motorcycle Speedometers Using an Arduino-Based Portable Speedometer Tester to Improve Driving Safety Samples with Converted Electric Motorcycles

## **CONCLUSION**

The conclusion of the Community Service (PKM) activities carried out by Lecturers and Taruna / i Diploma III Automotive Technology Bali Land Transportation Polytechnic in synergy with SMA Negeri 1 Tabanan in the form of Counseling and Testing Motorcycle Speedometer Accuracy Using Arduino-Based Portable Speedometer Tester Test Equipment To Improve Driving Safety in Bali at SMA Negeri 1 Tabanan. The purpose of this PKM activity is to provide information and understanding of the importance of the speedometer function on a motorcycle as a means of controlling speed while driving which later is expected to make students able to drive safely and safely while at the same time reducing the rate of traffic accidents, especially the productive age range (17 to 25). year). During the PKM activity until the end, the students were very enthusiastic about participating in the entire series of activities and hoped that these activities could be carried out regularly every year. Hopefully what has been given can have a positive and useful impact.

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