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Roofed-Motorcycle: How Relevant is the Concept for Malaysia's Climate?

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By the end of the first quarter of 2020, almost every nation across the globe is shocked by the transmission of COVID 19 virus. The uncertainty around the mutation of new variants in the ensuing months has affected both the economy and general health of the public. Despite the scare and negative economic effects, demand for food delivery has emerged to be a preferred method for the people to continue with "eating out experience" whilst minimising human interaction. In Malaysia, the most common mode of food transportation is by using motorcycles, as it's the most economical and efficient means. However, as the number of motorists increases it is reported that more than half of the total number of road accidents are associated with motoriders. Both riding attitudes and uncertain weather conditions contribute to the factors attributing the statistics. Nevertheless, to fulfil customer satisfaction and maintain the hygiene of the ordered food, the riders usually continue delivering regardless of the weather.

Nowadays, some automotive industries are attempting to challenge the issue by creating a motorcycle with a roof. However, in Malaysia, the use of roofs is unacceptable, possibly due to a lack of attractiveness, instability, unavailability in the market, and unaffordable cost, although it could benefit both the customer and riders by reducing the time taken to deliver food during bad weather. As a result, an effort has been initiated by the SUPREME research group of FTKMA to explore the possibility of developing roofed motorcycles.

A feasibility survey is conducted around Pekan and Kuantan districts encompassing a total of 98 respondents, including riders and customers. Based on the study, 52% of the total riders stated that bad weather, such as hot and rain conditions affect the food delivery effectiveness. About 59.6% of riders get summoned during bad weather. At the same time, approximately 53.8% of riders were looking for shelter while raining. Thus, installing a roof shelter on a motorcycle could resolve the issue. According to the survey's findings, 78.6 % of riders lack confidence in the available commercial roof products. They claimed that there are many disadvantages, including less stability, minor convertible, and the potential of consuming more fuel.

To regain confidence among riders, the roof design must be rigid, stable, and user-friendly. The other important factor is that the plan has no significant effect on overall fuel consumption. In that case, Computational Fluid Dynamics (CFD) which is a typical technique for investigating aerodynamics performances has been performed by the SUPREME focus group to investigate the aerodynamics performance of motorcycles with a roof that could be explicitly related to the fuel consumption. Three cases, motorcycle, motorcycle with a rider, and motorcycle with a roof (see Figure 1), have been modelled and analysed. It is discovered that with proper roof design, better aerodynamics performance can be achieved compared to the original motorcycle with the rider. In conclusion, a bike equipped with a roof can facilitate the food delivery process during hot and rainy weather, particularly in countries like Malaysia.

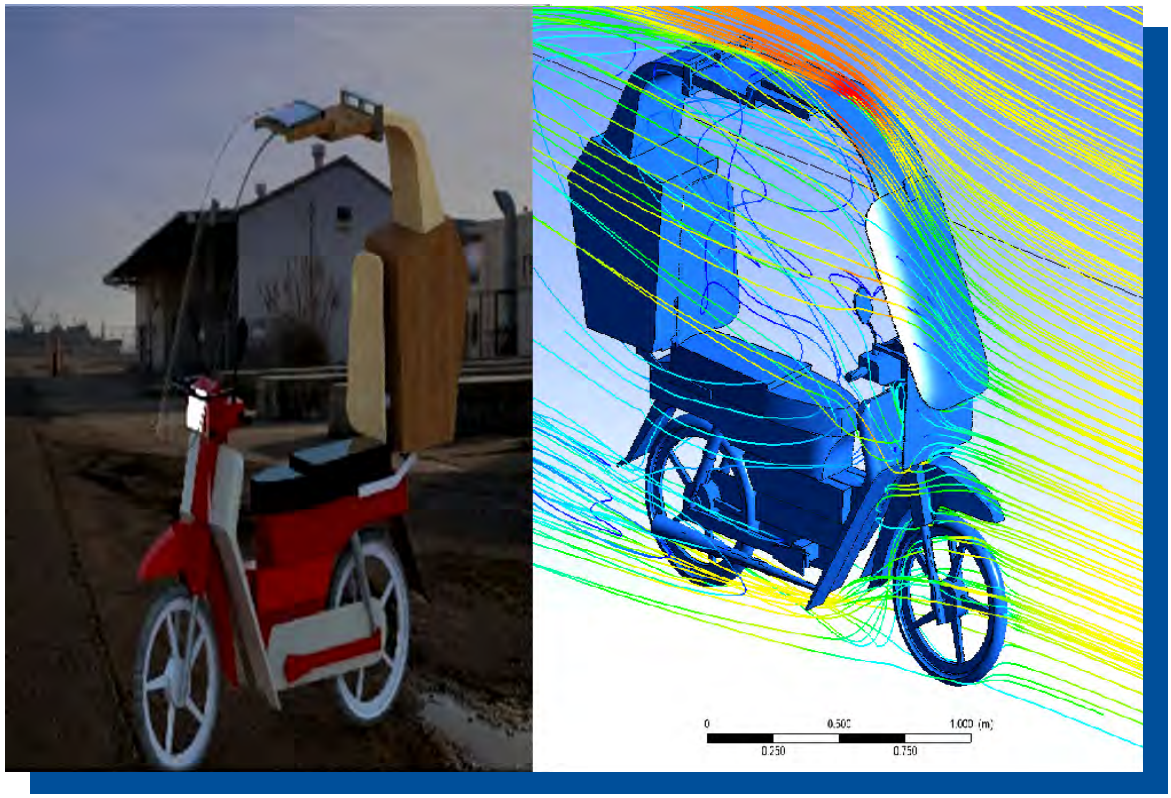

Figure 4. Air-flow pattern on motorcycle with roof