

The Development of Traffic Devices Using Natural Rubber in Thailand

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Abstract : Natural rubber used for traffic devices in Thailand has been developed and researched for several years. When compared with Dry Rubber Content (DRC), the quality of Rib Smoked Sheet (RSS) is better. However, the cost of admixtures, especially CaCO₃ and sulphur, is higher than the cost of RSS itself. In this research, Flexible Guideposts and Rubber Fender Barriers (RFB) are taken into consideration. In case of flexible guideposts, the materials used are both RSS and DRC60%, but for RFB, only RSS is used due to the controlled performance tests. The objective of flexible guideposts and RFB is to decrease a number of accidents, fatal rates, and serious injuries. Functions of both devices are to save road users and vehicles as well as to absorb impact forces from vehicles so as to decrease of serious road accidents. This leads to the mitigation methods to remedy the injury of motorists, from severity to moderate one. The solution is to find the best practice of traffic devices using natural rubber under the engineering concepts. In addition, the performances of materials, such as tensile strength and durability, are calculated for the modulus of elasticity and properties. In the laboratory, the simulation of crashes, finite element of materials, LRFD, and concrete technology methods are taken into account. After calculation, the trials' compositions of materials are mixed and tested in the laboratory. The tensile test, compressive test, and weathering or durability test are followed and based on ASTM. Furthermore, the Cycle-Repetition Test of Flexible Guideposts will be taken into consideration. The final decision is to fabricate all materials and have a real test section in the field. In RFB test, there will be 13 crash tests, 7 Pickup Truck tests, and 6 Motorcycle Tests. The test of vehicular crashes happens for the first time in Thailand, applying the trial and error methods; for example, the road crash test under the standard of NCHRP-TL3 (100 kph) is changed to the MASH 2016. This is owing to the fact that MASH 2016 is better than NCHRP in terms of speed, types, and weight of vehicles and the angle of crash. In the processes of MASH, Test Level 6 (TL-6), which is composed of 2,270 kg Pickup Truck, 100 kph, and 25 degree of crash-angle is selected. The final test for real crash will be done, and the whole system will be evaluated again in Korea. The researchers hope that the number of road accidents will decrease, and Thailand will be no more in the top tenth ranking of road accidents in the world.

Keywords : LRFD, load and resistance factor design, ASTM, american society for testing and materials, NCHRP, national cooperation highway research program, MASH, manual for assessing safety hardware

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