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Transformation of pneumatic tire towards modular airless wheel system

The fact of pneumatic tire loses about 15 kPa of pressure every month regardless of brand and price are not realised by many of us. Incorrect pressure often leads to catastrophic tire failure which causes major road accidents and loss of lives. Many of us overlook that a correct tire pressure can actually save fuel up to 10%, increase 30% of braking performance, and increase 9 months of tire life span besides able to reduce exhaust gas emission to the environment. Therefore, researchers worldwide are moving towards developing solutions to sustain tire pressure where, the endurance of it is airless tires/wheel. To date, there yet to be a fully commercialized of such technology due to major challenges of the intermediary structure which connects outer ring and central hub. On the other hand, repairing of the damaged sub-structure which reacts as a tire is also seen as one of the major defying matter. Universiti Teknikal Malaysia Melaka (UTeM) with the expertise in tire technology, has embarked toward developing advanced tire pressure sustaining technology as shown in Figure 1 where, few solutions were successfully developed and commercialised to date. Started with Automatic Tire Pressure Controller (ATPC) in 2004 and through various phases and designs, we have now conceptualized a novel Modular Airless Wheel System (MAWS) which is seen potential to be a new technology towards next generation wheel. The system which is expected to play a perfect role as a pneumatic tire, comes with outer padding which can be replaced should there be wear and tear or damage. The research is also looking into the possibilities where the pads can be designed to replace according to road conditions. The MAWS is expected to go through few collaboration work with industries and Universities to further enhance and develop a holistic total solution for safe driving.

Biography

Sivarao Subramonian is an Inaugural Director for Commercialization Centre at Universiti Teknikal Malaysia Melaka, who is responsible in churning high impact innovation, Intellectual properties & Commercialization from R&D activities. He is serving industry and academic since year 1989, completed his BE, ME, PhD and professional engineer certification in the field of Mechanical Engineering. To date, he has filed 17 patents besides winning more than 30 prestigious innovation awards globally and locally including, Malaysia Best Innovation award, University Best Research award, University Best Innovation & Commercialization award, while having three of his own technologies been successfully commercialised. He has published more than 150 articles in indexed journals, proceedings and books. He is the Editorial Board Member and Reviewer for more than 20 reputable international journals and conferences. His area of interest is Innovative Engineering.

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