

Automobile Tyres: Sustainability through Fuel Efficiency

CEAT Ltd, India



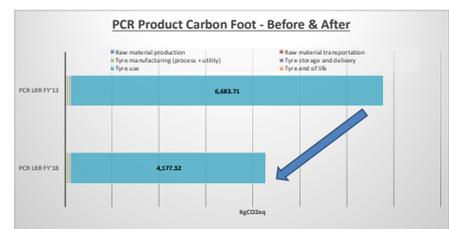
Automobile Tyre manufacturing Process and Customer usage directly impacts fossil energy sources which are non-renewable resources. Carbon Footprint measurement [PAS2050 estimation] on product life cycle identified usage phase in vehicle contributing to 98% of total emissions. Tyre Rolling resistance which is a measure of energy consumed by the tyre while vehicle motion identified as the technical KPI directly related to sustainability.

CEAT won Deming prize in 2017 and one of the major changes in R&D approach during Deming Journey was creating and following strong technology rolling roadmaps and Tyre rolling resistance became major focussed technology area.

This Project is taken up in Passenger Car Radial [PCR] tyres with the objective of reducing Tyre rolling resistance year on year and achieve 35% reduction in a typical tyre size by FY'2018 taking FY'2013 best values as reference.

Based on Tyre rolling resistance reduction roadmap, various technology developments were initiated – both generic technologies like material, design development and supporting technologies like Computer aided simulation, Testing. These yearly technical targets were given Policy project status and ensured effective running of projects by cross functional teams. Projects mainly followed Task Achieving QC Story methodology for achieving the yearly targets. Technical know-how and joint developments with suppliers and universities paved the way for generating alternatives. Statistical tools like Analytical Hierarchy Process [AHP], Design of experiments, Hypothesis testing, Computer simulation extensively used for validating and optimizing the factors. Computer simulation, Lab and factory prototypes were prepared based on the optimised factors and tyres were validated for Rolling resistance and other customer requirements like grip and life properties. Final design undergoes a rigorous process and product validation system before market release. Manufacturing Process improvements for Rolling resistance consistency implemented by Cross Functional Teams through kaizens and Quick wins made sure the improvements are consistently delivered to customers. Learnings from all of these technology development projects were documented in respective department learning sheets and design standards. Failure Mode and Effects analysis [FMEA] for Design and Process were revised with more parameters affecting Tyre rolling resistance

Lowest Rolling resistance for the PCR tyres released in the market in FY'2018 under CEAT brand met 7.5RRC values against the targeted 7.8RRC – 38% reduction from FY'2013 against 35% target. Product Carbon footprint measured in KgCO₂eq for the PCR product reduced by 37% owing mainly due to the reduction in usage phase emissions due to low Rolling resistance and marginally contributed with the higher usage of silica filler [earthen] in place of carbon black filler [Petroleum based].



UN Sustainability Development Goal:

Goal-11, 12 and 13 are impacted with reduced Carbon footprint, Air pollution, Emissions and increased usage of Fossil free materials.

