

IAQ QUALITY SUSTAINABILITY AWARD 2022 ONE-PAGE SUMMARY

The One-Page Summary should be in English and submitted as Appendix 1 to your application. It will also be published on the IAQ Quality Sustainability Award Homepage; <http://iaqaward.com> . The length of this document must not exceed 1 page.

Project and contact details

The name of the quality sustainability project (max. 100 characters):		
Novel and Sustainable Material Development for Tractor / Automotive Powertrain application		
Contact Person G Magendran	Telephone + 91 9962585551	Email g.magendran@mahindra.com
Organisation(s), country, where the project-members are working, including Web-page links:		
Mahindra & Mahindra Ltd (Mahindra Research Valley-R&D). India https://www.mahindra.com/		

Project description

A Tractor is specifically designed to deliver a high tractive effort at slow speeds. Hydraulic system is a key feature which controls the position and draft of the implement.

Currently Tractor industry trend are moving towards High Lift capacity, Light weight and Fuel Efficiency.

In a tractor weight, cast iron material contributes 30-40% of weight. Higher the Lift capacity - Better the versatility of Tractor and enables to handle more complex applications.



These features raise material cost thus it was necessary to develop new cast iron grade to meet both design optimization and low cost. As a result, novel material, properties and its microstructure are developed successfully first time in the industry and implemented.

The Taguchi – Design of Experiments (DOE) method are used to finalise best combination of material chemistry and properties.

Three casting trials were conducted for proto part development and final sample for validation purpose. The expected results are closely monitored for a year.

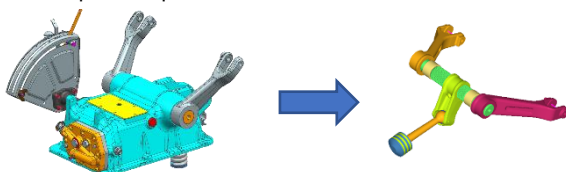
Results Achieved:

- ✓ **1 - Patent** filing is completed – for novel material composition.
- ✓ **3 - Technical papers** are published in in SIAT 2021, SAE international and AFS symposium (internal).
- ✓ Co2 Emission Avoided: **206.770 Tons Per annum**
- ✓ 1 ton of CO2 emission is equivalent to Planting 6 trees. So approximately the above Co2 emission avoidance is equivalent of **planting 1241 Trees in one year**
- ✓ **Cost saving: 2.14 Crores** per Annum.

Project completion: Feb 2021

Project leverage potential

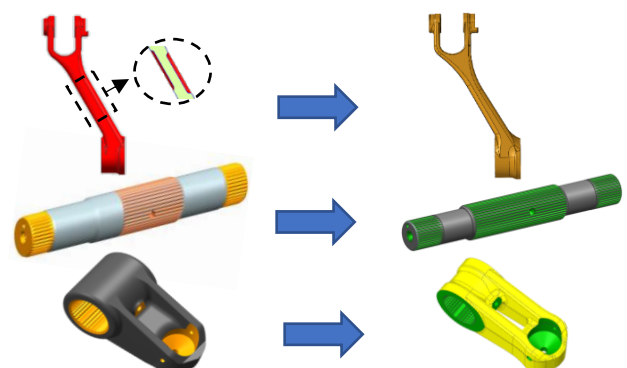
This project and the process methodology adopted to get the sustainable benefit can be utilised by many industries like Auto industries, farm equipment industries, railways industries, construction industries etc., where Cast iron and steel is being used majorly. There is a wide scope in Indian foundries to reduce the material consumption and providing better fuel economy, better performance makes farmers happy and reducing the power consumption helps to make Green India.



Picture/Image describing the project

Current design

Optimized design



Note. More information about the award and how to apply can be found on the [IAQ Quality Award homepage](http://iaqaward.com)