CASE STUDY

MODULAR MINING

LOCATION
Minas Gerais, Brazil

OBJECTIVE
Improve the utilization and performance of their haul trucks through the reduction of tire related issues.

OUTCOME
Increased production resulting in an estimated additional revenue of USD3.4M per annum

Large Brazilian Iron Ore mine reduces unplanned maintenance hours with DISPATCH® Active Tire Management deployment

Background

The large, fully integrated export iron ore operation, operating in the Brazilian state of Minas Gerais, comprises of a mine, beneficiation plant, a 529km slurry pipeline and dedicated export facility at the port of Açu. The iron ore mine has been a customer of Modular Mining since 2013, utilizing DISPATCH 6, Provision 3 and MineCare 2.

Challenge

Utilizing the MineCare machine health solution, the mine reported a high quantity of truck maintenance hours between November-2019 and February-2020 due to tire issues which related to tire temperature increase and pressure variation during truck haul cycles. This equated to 161 unproductive hours or $USD 2M over 4 months. Tire temperature and pressure variation can commonly occur during dry seasons when road conditions are rough and there is a high ambient temperature.

The mine sought to improve the utilization and performance of their haul trucks through the reduction of tire related issues. Modular Mining's MPC consulting team was contacted to assist the mine in maximizing equipment utilization while reducing tire maintenance.

MPC Consulting Services
Modular Mining has a suite of MPC Consulting Service to assist customers in optimizing their mining processes by leveraging technology to harness and deliver additional value. Services include mine plan execution, reconciliation, operational accuracy, assisted operations and ore control. Regardless of the mines process challenges, Modular Mining has local, dedicated and expert-based team to help enable mines to sustainably improve their processes.

Solution

To overcome this challenge, the Performance Assurance (PA) and MPC consultancy teams analyzed the data from the PA reports and recommended that the mine implement DISPATCH® Active Tire Management (ATM) Module to reduce truck unproductive hours. The solution would improve truck utilization and overall optimization and production.

After collaboration with the mine's maintenance and dispatch teams, it was decided that the ATM module would be configured to action only shorter haulage paths. The DISPATCH® ATM would assign trucks to shorter road segments to mitigate tire temperature and pressure variations as key indicators to predict tire issues.

Modular Mining's Technical Support Services team with assistance from the Performance Assurance team activated and configured the Active Tire Management Module in 2021 and was deployed in February 2021 with the assistance of the mine's maintenance and dispatch teams.

DISPATCH ATM Module

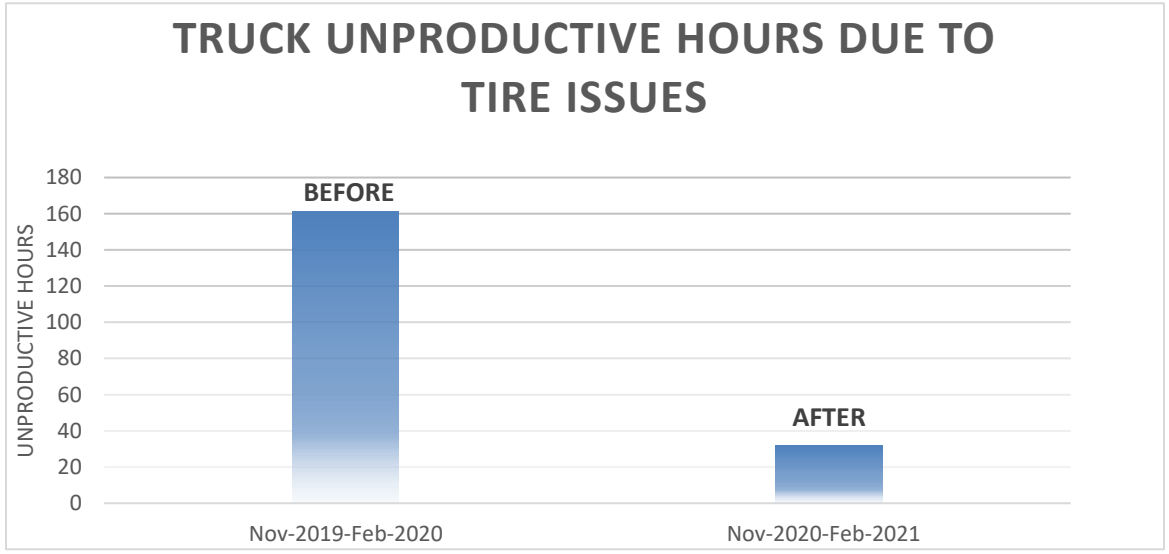
The DISPATCH FMS integrates and interfaces with third party tire monitoring systems, such as the Michelin® Earthmover Maintenance System (MEMS) and utilizes the acquired data from DISPATCH to mitigate premature tire failure.

The DISPATCH optimization algorithm includes tire control actions as part of its real-time decision-making logic. These actions include the allocation of trucks to tire shops, assignment to shorter haulage paths, and emergency tire exceptions.

To ensure tire sensors data integrity, MineCare continuously monitors the truck tires vital signs data from MEMS through trend graphs in real-time. The mine's maintenance team also developed a MineCare report for checking tire sensor data accuracy.

Results

After the ATM DISPATCH module activation, the mine site realized a significant decrease in truck unproductive hours, due to tire issues, from 161 hours to 129 hours over the first 4 months. Once a truck hit a user-defined tier temperature or pressure threshold, DISPATCH automatically reassigned these trucks to shorter haul routes in the shift. As a result, the tire temperatures were stabilized or lowered, and the mine experienced a reduction in unproductive truck hours, as well as an increase in truck productivity.



Graph 1 – Nov-Feb2020 & Nov-Feb2021 unproductive hour comparison

The mine was able to move an additional 115tph of iron ore, which over the course of 6 months would see an estimated additional revenue of USD3.4M per annum[1].

As part of Modular Mining's MPC Consulting Services, Modular Mining will continue to work with the mine to implement additional initiatives to improve their operations across the mine.

[1] Calculations based of 115 tph x 32,25 h x 6 months where iron ore prices are : USD 108,485 per ton (average 2020 price)

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Modular Mining Systems, Inc.
3289 E. Hemisphere Loop
Tucson, AZ 85706-5028 | USA
Phone: (520) 746-9127 | Fax: (520) 889-5790
www.modularmining.com