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Variability of Energy Efficiency with the Application of Technologies Embedded in Locomotives of a Heavy Haul Railway: Case Study of Vitoria Minas Railway, Brazil

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Abstract : In the transportation sector in Brazil, there is a great challenge that is the maintenance of profit in the face of the great variation in the price of diesel. This directly affects the variable cost of transport companies. Within the railways, part of the great challenges is to overcome the annual budget, cargo and ore transported, thus reducing costs compared to previous years, becoming more efficient each year. Within this scenario, the railway companies are looking for effective measures, aiming at reducing the ratio of liter of diesel consumed by KTKB (Kilometer Gross Ton multiplied by thousand). This ratio represents the indicator of energy efficiency of some railroads in Brazil and in other countries. In this study, we sought to analyze the behavior of the energy efficiency indicator on two parts: The first, with the application of technologies used in locomotives, such as the start-stop system of the diesel engine and the system of tracking and monitoring of fuel. The second, evaluation of the behavior of the variation of the type of cargo transported (loading mix). The study focused on locomotive technology will be carried out using statistical analysis, behavioral evaluation in different operating conditions, such as maneuvers for trains, service trains and freight trains. The analysis will also cover the evaluation of the loading mix made using statistical analysis of the existing railroad database, comparing the energy efficiency per loading mine and type of product. With the completion of this study, the railway undertakings should be able to better target decision-making in order to achieve substantial reductions in transport costs.

Keywords : railway transport, energy efficiency, railway technology, fuel consumption
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