POWER SUPPLY SYSTEM FOR LOAD TRUCKS

The problem this project holds is the high budget used for the supply of fuel for load trucks in a sugarcane company. Trucks yield 3.4km/gal for cane transport. A power supply system is proposed as a solution, where the power is supplied via an overhead contact line. Trucks drain energy from the line while they are on their track of operation. They are required to be electric vehicles which must be able to connect to the overhead line via pantograph.

The line takes energy from an existing network through a rectifier substation that delivers a voltage of 750Vdc. The line is classified as simple by its composition as mentioned in [1]. The system has support structures and self-tensioning equipment that maintains a correct layout of the airline. This equipment and design meets with the requirements of Colombian electrical regulations (NTC 2050 and RETIE) and European standards listed in [2]. A limitation of the project is the large initial investment, value that lies between 1 and 1.5 billion pesos. This value is then restored with the profit of electricity replacing the fuel, where expenses are reduced by half in means of operation, which gives savings of 1162.94 $/km. The design was verified in simulation software. The electrical simulation was performed in the ETAP 12.6 software and the mechanical simulation was performed in PLS-CADD software. A maximum of 3.53% was the result given in electrical voltage drop and a sag value of 13cm in the mechanical tensioning of the cable at 20% of its breaking capacity. This is an acceptable behavior. A recommendation to the project is to integrate renewable energies to the system.

[1] ADIF. Fichas de actualidad. 2013. Disponible en (consultado 09 Nov 2016) http://www.adif.es/es_ES/comunicacion_y_prensa/fichas_de_actualidad/ficha_actualidad_00070.shtml
[2] Siemens. Product Catalog. Contact line equipment for mass transit and main-line railways. 2012.