

Test Bed Design for Reefer Van Insulation

Status:	Available
Group Members:	TBD
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Project Description

Refrigerated transportation industry, is a growing industry due to increasing demands on providing healthy foods all over the world. Over 90% of the food transportation in North America is done by diesel power service vehicles (mainly the long-haul trucks, and refrigerated trucks and vans). For most products, the food temperature should be kept within ± 0.5 °C of the set point inside the refrigerated compartment. There are certain complexities for thermal management of these vehicles to reduce energy loss. The better the thermal management, the less would be the energy loss, fuel consumption, and greenhouse gas emissions.

The goal of this project is to develop a new insulation technology for refrigerated compartments to reduce and maintain thermal losses over the life of these vehicles. Any improvements in the design of insulation for the refrigerated compartments could decrease the effective thermal conductivity of the system and finally the energy loss. Moreover, in the current insulation technology, there is no possibility of repairing in case of accidents. Hence, a new insulation panel assembly is to be devised to provide time-efficient installation and repair. It is worth to mention that the project is being executed in close collaboration with an industrial partner.

The main task of this project is to design and build a test bed to test the insulation effectiveness. The test bed consists of walls covered with insulation panels. The design is supposed to allow the test of different insulation materials.

A secondary task of the project is the design of another test bed that is to be used for testing both, the water adsorption rate of insulation materials and the effects of water content on thermal conductivity. Time wise, this design is subsequent to the first one and students can decide upon the time distribution between the two parts of the project.