INSULATIONS OF A CYLINDRICAL TANK FOR TEMPORARY HOUSING OF THE SOYA BEAN OIL IN WINTER

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ABSTRACT

This project is about constructing a 15m radius and 30m high cylindrical storage tank located at ShangHai, China. The cylindrical storage is designed to keep warm of soya bean oil in winter time so that the oil will not coagulate due to low temperature. The contents of the project are mainly on analyzing insulation part of the container.

Literature review is the first thing to do before get into calculation. The study of heat transfer of conduction, convection and radiation is the key to solve the problem. Heat transfer through convection is faster than conduction. Heat of radiation can occur without transfer medium. Understanding the working principle of heat transfer benefit the engineer more clear about the question. The equations in the same heat transfer mode are different according to the shape. Forced convection required to consider the value of Prandt number, Reynold number and Nusselt number.

A Matlab programming makes the calculation easier. It measure the thermal resistance of the materials, rate of heat transfer through every layers, amount of steam need to supply to the container and cost of electricity per month. The results show that aluminum, steel and red brick are not suitable to use as insulation as they dissipate heat very fast. Rock wool, fiberglass and polystyrene are the appropriate material to build the insulation layer. A few graphs are used as references for the company to choose which material is more favorable.