IJFEAT

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TITLE: ENHANCEMENT OF HEAT TRANSFER THROUGH DIFFERENT TYPES OF FINS

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Abstract

Natural convection heat transfer in a fluid layer confined in a closed enclosure with partitions like fins is encountered in a wide variety of engineering applications. Such as in industrial sectors where heat exchangers, economizers used to heat the feed water to boiler and the activities like cooling of internal combustion engine, also removal of heat from integrated circuits in the electronic circuits or exchange of heat between two fluids as in nuclear power plants, passive cooling of electronic equipment such as compact power supplies, portable computers and telecommunications enclosures. In hydraulic system there is need of heat exchanger for maintaining a specific oil temperature limitation is necessary to stabilize oil viscosity. Cycle dwell time is a major portion of the total duty cycle, especially in systems with fixed-displacement pumps. Many researchers have been mentioned through their literature, heat transfer rate is increased by increasing heat transfer coefficient or by heat transfer area. In case of natural convection there is only scope for increasing heat transfer area by providing finned surfaces. The enhancement ratio of heat transfer depends on the fins orientations and the geometric parameters of fin arrays. The most common configurations of using fin arrays in heat sinks involve horizontal or vertical surface plate to which fin arrays are attached.

Index Terms: *Shell and tube Heat Exchanger, Heat Transfer, Various Types of Fins.*

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INTRODUCTION

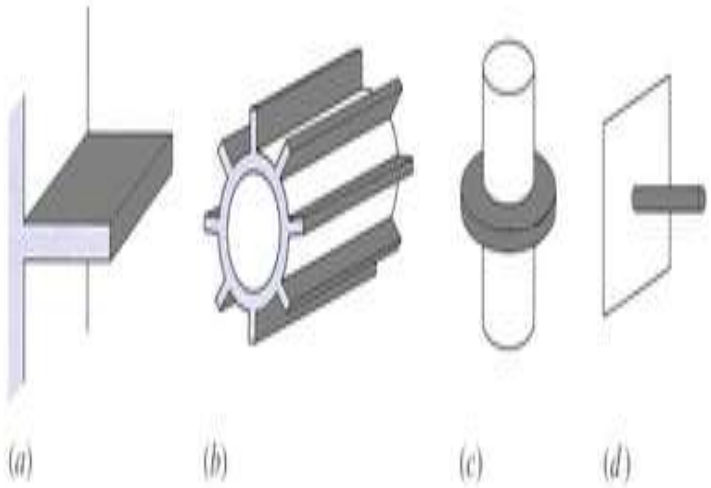
Heat exchangers are specialized devices which accelerate heat transfer and are of great importance in industrial applications. Various types of heat exchangers are used in refineries, chemical industries, food industries, and so forth. Heat load can vary according to their different applications from less than 1 W to more than 1000 kW. This extensive range of heat load in heat exchangers has caused them to be designed and manufactured in various shapes and sizes. Shell-and-Tube Heat Exchangers (STHXs) are one of the mostly used types of heat exchangers in industry with numerous applications in power plants, oil refineries, food industries, and so forth. More than 35–40% of the heat exchangers worldwide are STHX which are simply maintained and upgraded considering their robust geometry construction. Therefore, it is of great significance to improve their thermal–hydraulic performance and reduce their cost as much as possible. Baffles are important shell-side components of STHXs which conduct the shell-side flow perpendicular to the tubes in addition to supporting the tubes bundle. Most commonly used baffles in STHXs are segmental ones which force the shell-side flow to move along a zigzag pattern and improve heat transfer.

Objective

1. Understand the meaning of extend surface or fin.
2. Familiarize him or her with the types of fin in common use.
3. Analyze the heat transfer through fins of uniform cross section.
4. Predict the temperature distribution and heat transfer through a fin of finite length with insulated end.
5. Calculate the temperature distribution and rate of heat transfer through a fin of finite length with heat losses through the end.
6. Define and calculate fin efficiency .

Methedology:

Different Types of Fins



1. By increasing the surface area in contact with air or providing fins.
2. By increasing the heat transfer coefficient for the surface.
3. By increasing the temp of the hot surface or by increasing the temperature difference between hot and cold bodies.

Working Models:

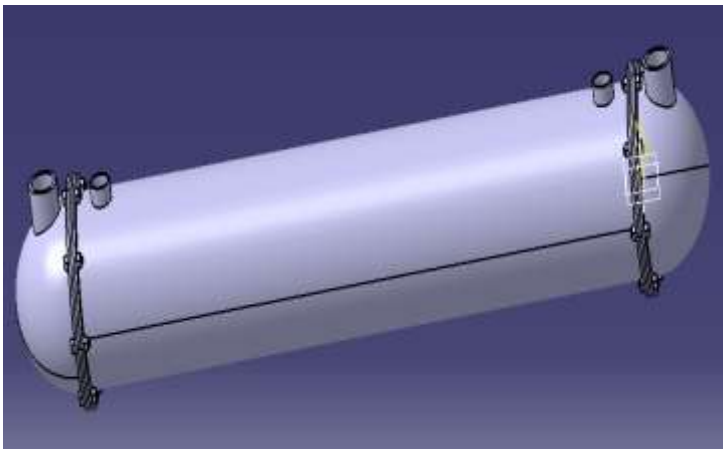


Fig: Shell and Tube Heat Exchanger

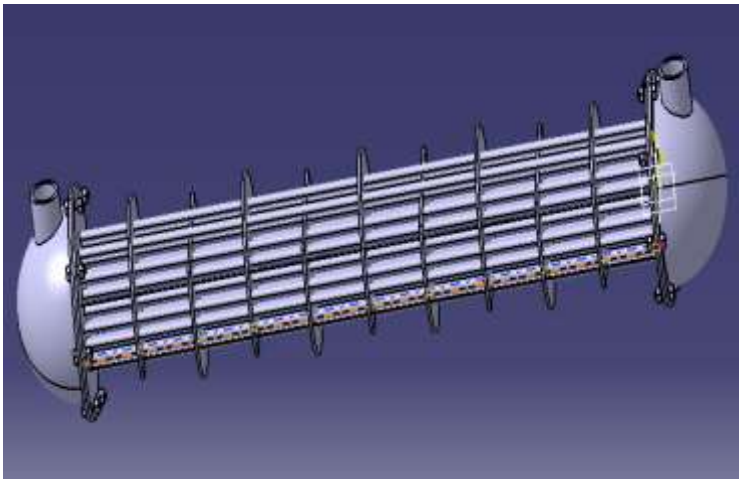


Fig: Plain Tubes

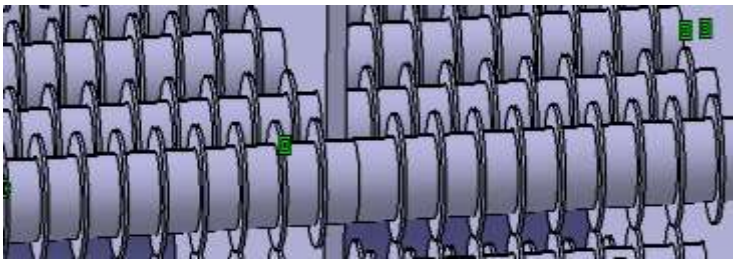


Fig: Tubes with Annular Fins

Reports:

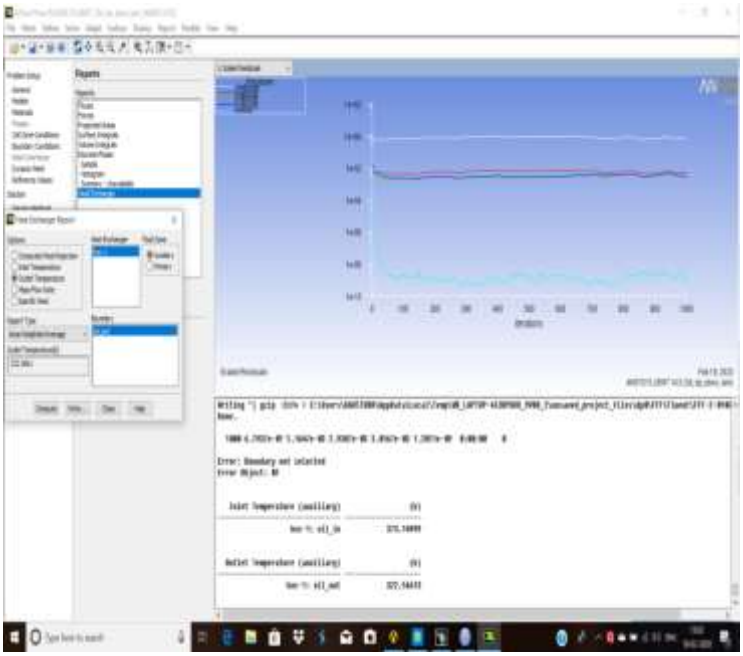


Fig. Report of Plain Tube

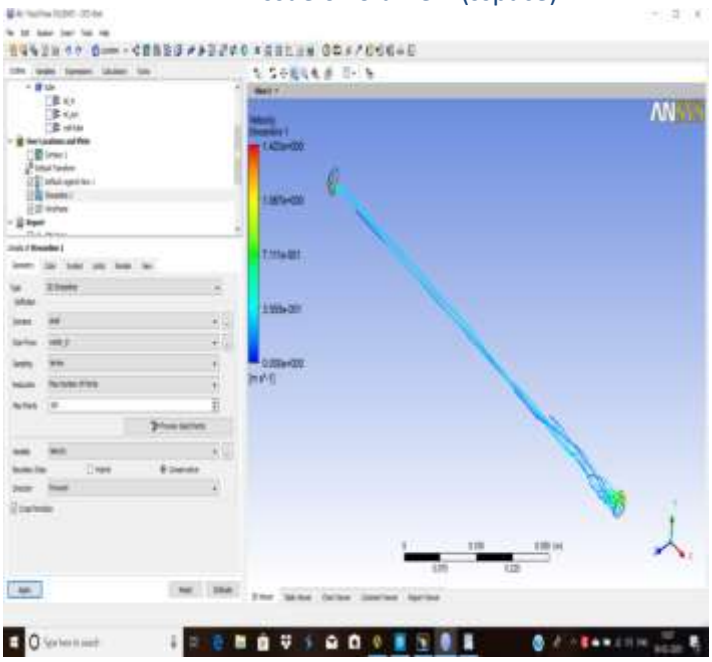


Fig. Flow of Water in Heat Exchanger

CONCLUSION

1. From the project we formulated that the heat exchange rate of a heat exchanger can get increased by increasing the surface area contact of fluids.
2. Heat exchange rate can easily be changed by changing the types of fins mounted on tube, at what angle it is placed and number of fins mounted on the tube. All these formulations can affect the heat exchange rate of heat exchanger.

REFERENCES

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