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A REVIEW PAPER ON MODELING AND ANALYSIS OF COIL HEAT EXCHANGER

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ABSTRACT
Coil heat exchangers in their various construction modifications are probably the most widespread and commonly used basic heat exchanger configuration in the process industries.
The design of the heat exchanger has done by using the advanced design software CATIA. In this project, the Heat Exchanger is model and assembled with the help of CATIA software and the component is meshed and analysis is done in ANSYS software. Thermal and static behaviour is studied and the results are tabulated. The various stresses acting on the Heat Exchanger under various loading conditions has been studied. In the preset thesis work has been taken up on the following aspects to cover the research gaps and to present the results based on the systematic studies:

- Temperature distribution and heat flow through the Heat Exchanger.
- FEA analysis of the Heat Exchanger to measure temperature at the points where it is not possible to find out practically and to observe the heat flow inside the Heat Exchanger.

INTRODUCTION

A heat exchanger is a device used to transfer heat between a solid object and a fluid, or between two or more fluids. The fluids may be separated by a solid wall to prevent mixing or they may be in direct contact. They are widely used in space heating, refrigeration, air conditioning, power stations, chemical plants, petrochemical plants, petroleum refineries, natural-gas processing, and sewage treatment. The classic example of a heat exchanger is found in an internal combustion engine in which a circulating fluid known as engine coolant flows through radiator coils and air flows past the coils, which cools the coolant and heats the incoming air. Another example is the heat sink, which is a passive heat exchanger that transfers the heat generated by an electronic or a mechanical device to a fluid medium, often air or a liquid coolant.

METHODOLOGY

Definition Of Software:
Feature Based Parametric Bidirectional Associative Software.
It is a advanced designing software compared to AutoCAD, and in AutoCAD we can complete all the tasks in single window, but in this we have different windows those windows we call as modules, the main modules in designing are

1. **Sketcher** (To know about 2d tools only)
2. **Part modelling** (To create any solid models)
3. **Assembly** (In this just we insert the components already created in part)
4. **Drafting** (To generate the views with projections, dimensions, BOM, etc.)
5. **Wireframe and surface designing** (To create the surfaces only without thickness)
   Generative Sheet metal Design (Total design follows the fixed thickness)

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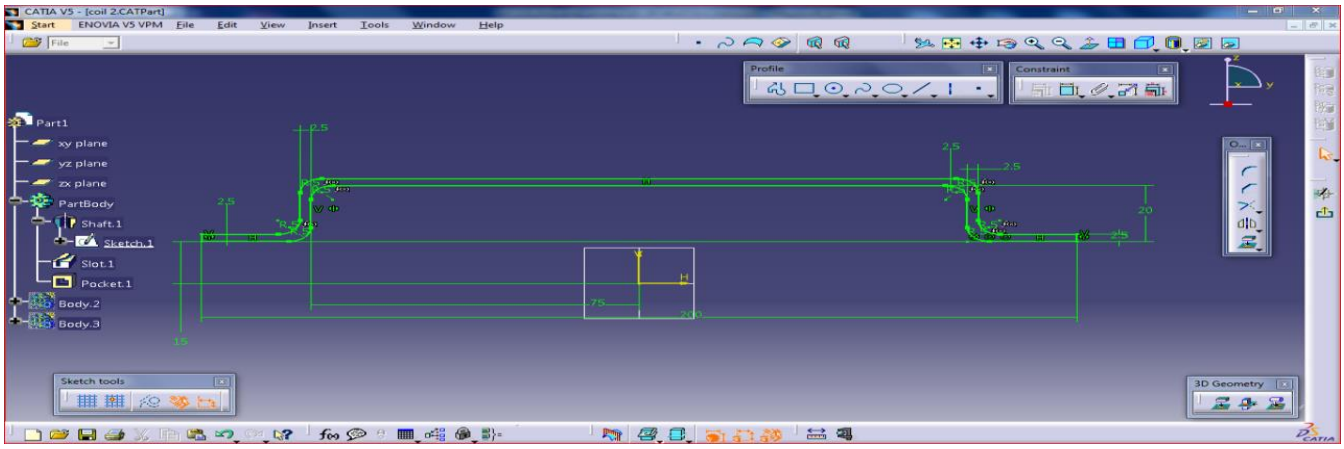
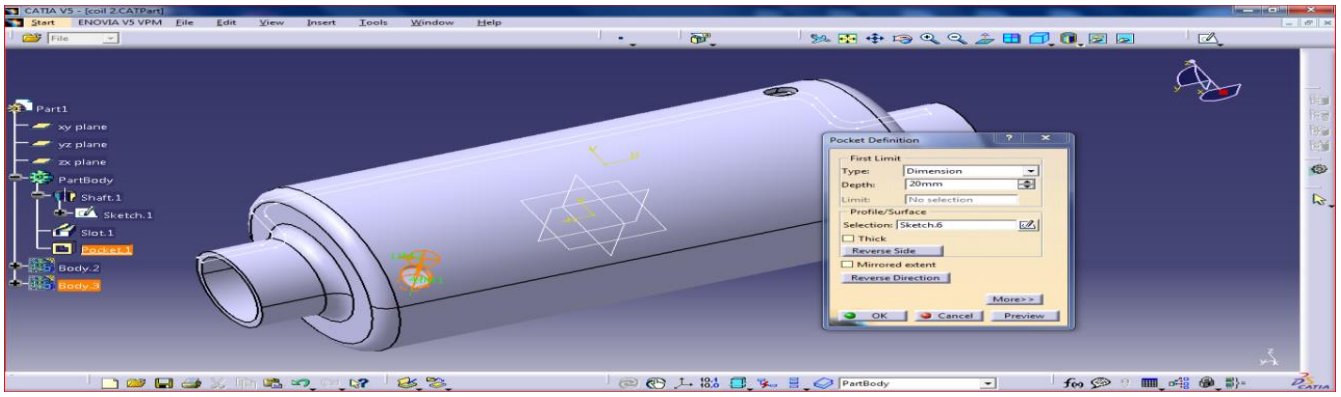
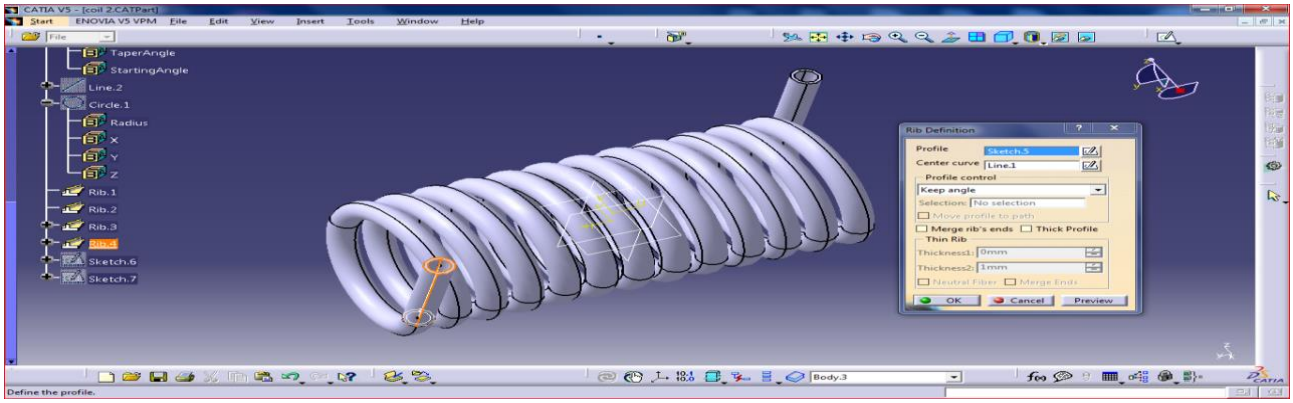
SHELL DESIGNING USING CATIA SOFTWARE



SHAFT AND POCKET DEFINITION



RIB TOOL



FINAL ASSEMBLY

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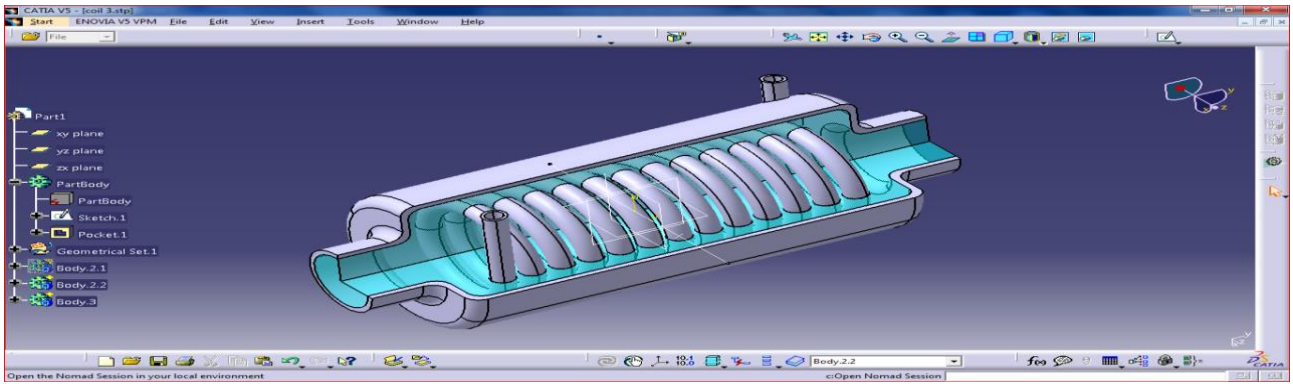

RESULTS

		Shell			Tube		
Type	Units	Aluminum Alloy	Cast Iron	Copper	Aluminum Alloy	Cast Iron	Copper
Total Deformation	Mm	1.57e-03	1.30e-03	9.56e-04	1.31e-03	1.08e-03	8.00e-04
Equivalent Stress	Mpa	9.9733	12.691	9.4254	8.5049	11.482	7.8651
Frictional Stress	Mpa	24.428	30.053	23.241			
Pressure	Mpa	4.1266	5.1426	3.919			

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LITERATURE SURVEY

Analysis of Heat Exchangers

Several different approaches have been devised to the study heat exchangers. Early attempts include analytical solutions of the Nusselt number for a large collection of duct shapes under laminar flow (Shah and London, 1978), with either constant wall temperature or constant wall heat flux boundary conditions, using different techniques such as conformal mapping (Sastry 1964, 1965) or Galerkin integral methods (Haji-heikh et al 1983).

Compact Heat Exchangers

Different types of compact surfaces were extensively studied and book "Compact Heat Exchangers", containing all the basic datas and the characteristics of more than 90 surfaces were published by Kay's and London (1984).

CONCLUSION

In this project COIL exchanger has model with the help of CATIA software and the component is meshed and analysis is done in ANSYS software. The various materials like Cast Iron, Aluminium Alloy and Copper Alloys acting on the COIL under various actual temperature conditions have been studied.

The COIL of an air condition is usually built up from an inner and an outer atmospherically temperature surrounding the inner chamber to foam an intermediate or annular space. Particularly after the COILS FLOW has been shut down, temperature difference appears on the room and between surrounding can be differences can be more than 50^0 C. The static, Model and thermal analysis have studied and found the stresses, deformations, heat flux and convection properties have been studied.

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