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Thermal Transient Analysis of Wet Multi Plate Clutch With Different Material By Using Fem

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Abstract- *In this present paper, we design Wet clutch by Computational Modeling and 2-D drawings are designed for multi plate clutch from computational calculations. 3D model model will be created in the Solid Edge modeling software for Honda CB 125 cc bike. FEM analysis by varying friction materials with some non metals and composite materials we are going to find out which material is best suited for the lining of friction surfaces. Thermal transient investigation has done on the wet clutch plates to check the quality. Modeling of Multi-plate clutch is done by using Solid edge Software and then the model is imported into ANSYS Software for Thermal analysis on the Multi plates to check the quality and temperature circulation of distinctive friction materials such When find out temperature results with all materials are respectively three different material likes Cast iron, Kevlar fiber and Carbon fiber multi plates materials used and used ANSYS software based transient thermal analysis has performed then find out results temperature and heat flux. When find out temperature results with all materials are respectively likes Cast iron, Kevlar fiber and Carbon fiber 138.17 ^{0}C, 143.71 ^{0}C and 135.56 ^{0} C. When find out heat flux results with all materials are respectively likes Cast iron, Kevlar fiber and Carbon fiber 1.29 w/mm^2 , 1.45 w/mm^2 and 2.9 w/mm^2 .*

Keywords:- ANSYS, CATIA, Wet-Clutch plate, Thermal stress, Total Deformation, heat flux.

I. Introduction

The grip is a gadget for quick and effective connecting devices or blocking several coaxial shaft shafts. It is usually inserted between the drive engine and the information shaft in the machine, allowing the car to start in a blank setting. One plate, dry catch is among the most well-known types of catch used (Lee and Cho 2006). Machine capture falls into two basic categories namely true commitment and strong commitment (Garret et. Al. 2001).

It is a turn-by-turn tool, which can be secured and reversed. Handles are essential for cross-linking with two turning pins. In these cases, one post is usually addressed by a car or a pulley, with another shaft. It drives another blocking object. Let us take an event where one half is driven by a car and the rotation drives a drill hurl. A concrete partner with two posts to get started together and turn in the same direction (attraction), or split and turn in different steps

1.1.1 Conflicts Around:

Grinding a grinding contact is a basic piece of any car mechanic. It is an assembly in the structure of the engine and transmission that connects the power, in the form of torque, from the engine to the assembly machine assembly Currently the car is started from the end of the handle is safe to

trade torque to the transmission; and when the car is on the finish line it is first disconnected from the drive to think about equipment warranty and then re-associated with the successful control of the vehicle.

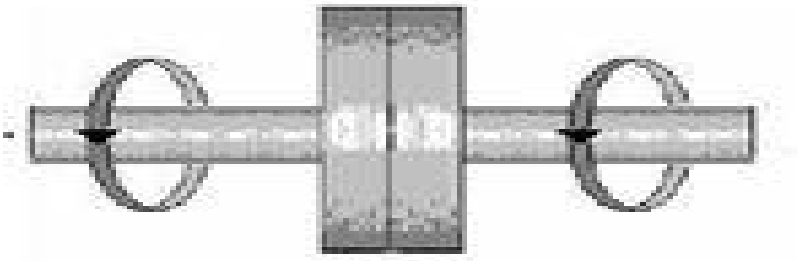

Fig. 1.1: Engaged position of Wet-Clutch Plate1.1.2 Separation of Friction Waste.

By looking at the use of erosion in any vehicle or machine they can be divided into different categories. The collection of grinding finishes is completed with the system, tool of operation and the state of the mating sites.

- ❖ Flat Plate Friction Clutch
- ❖ Round Friction Clutch

1.1.3 Desirable Properties For Contact Materials / Touch Lines

• Contacts should have a high coefficient of soil erosion.
• Contact items must be compatible with the effects of dress, for example, annoyance, goal scoring and deletion.
• Above the range of temperatures and weights the grating value should be stable.
• Building materials should have very warm surfaces, good performance, high temperature limit, high temperature resistance.
• Building materials must be protected for use and adequate land

1.2 Common Clutch Types

Types of catches can be ordered depending on a variety of work strategies. In line with these lines, this plan paper is made according to the strategies shown:
Torque transmission method: configured.
Technique Control process: edited.
Technique The process of making energy on a pressure plate: Catching the spring.
State Contact Status: Disk.
Quantity The size of the plate operated: Multiple plate holdings (most used for scheduled delivery)

II. Methodology

ANSYS is extensively helpful restricted part assessment (FEA) programming group. Restricted Element Analysis is a numerical procedure for deconstructing an erratic structure into small amounts (of customer relegated size) called parts. The item completes conditions that manage the lead of these segments and lights up them all; making an exhaustive explanation of how the structure goes about by and large. These results by then can be presented in arranged, or graphical structures. This sort of examination is conventionally used for the structure and improvement of a system unnecessarily complex to separate by hand. Systems that may fit

into this arrangement are unnecessarily awesome in light of their math, scale, or directing conditions. ANSYS is the standard FEA demonstrating gadget inside the Mechanical Engineering Department at various schools. ANSYS is moreover used in Civil and Electrical Engineering, similarly as the Physics and Chemistry workplaces. ANSYS gives a viable strategy to explore the display of things or strategies in a virtual circumstance. This sort of thing progression is named virtual prototyping. With virtual prototyping strategies, customers can rehash various circumstances to improve the thing some time before the amassing is started. This engages a reduction in the level of danger, and in the cost of insufficient plans. The multifaceted thought of ANSYS moreover gives an approach to ensure that customers can see the effect of an arrangement with everything taken into account lead of the thing, be it electromagnetic, warm, mechanical, etc.

III. Modeling of Clutch

Fig. 3.1: Clutch plate dimensions.

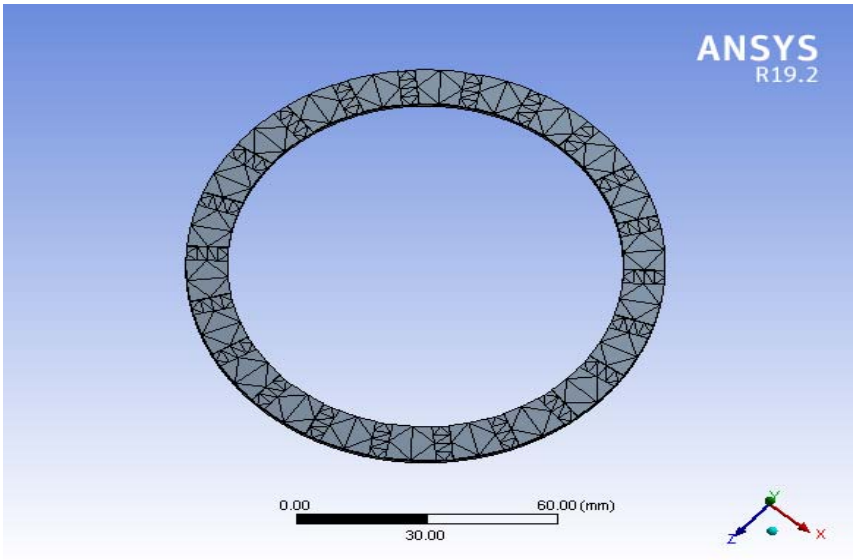

Fig. 3.2: Meshing on ANSYS Clutch plate model.

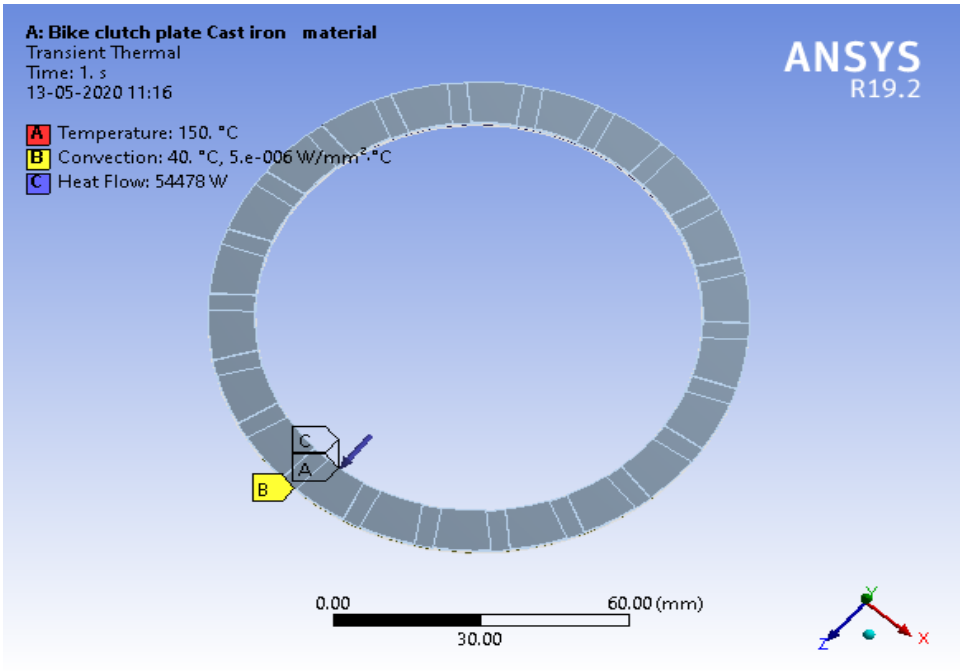

Fig. 3.3: Cast Iron Clutch plate thermal boundary boundary condition.

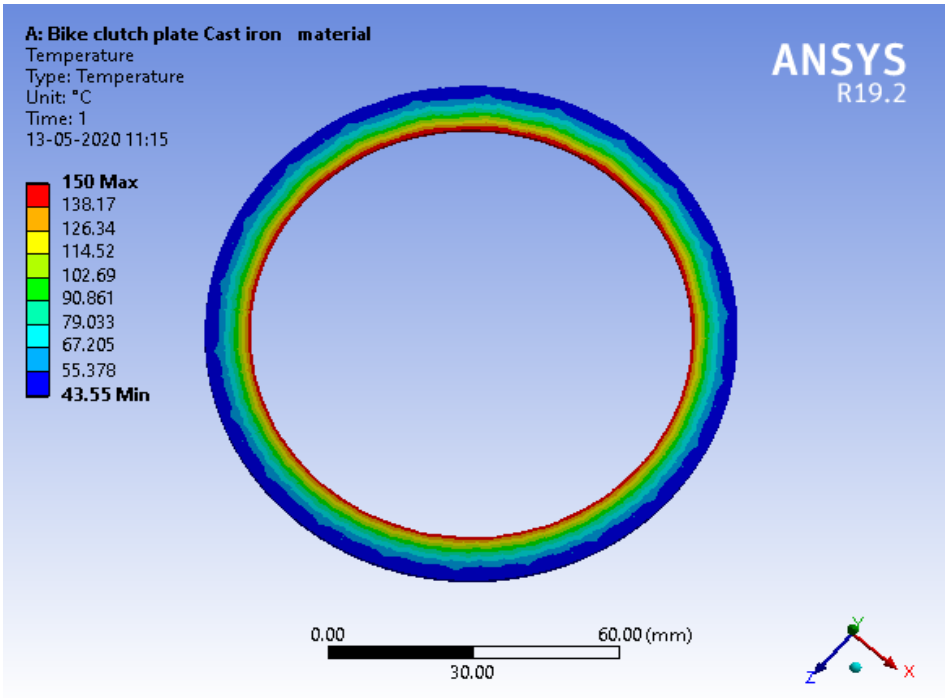

Fig. 3.4: Cast Iron Clutch plate temperature results.

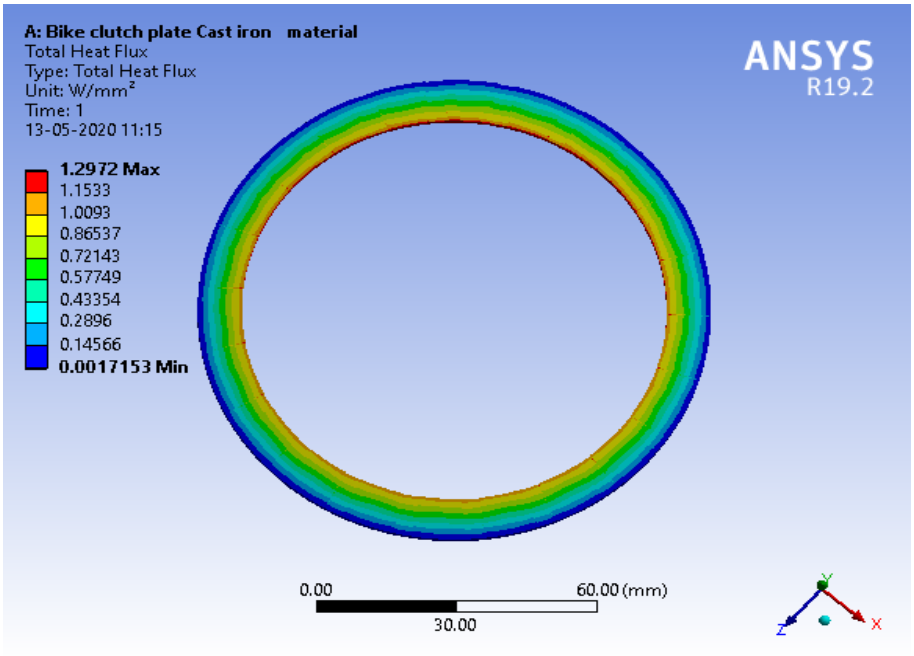

Fig. 3.5: Cast Iron Clutch plate heat flux results.

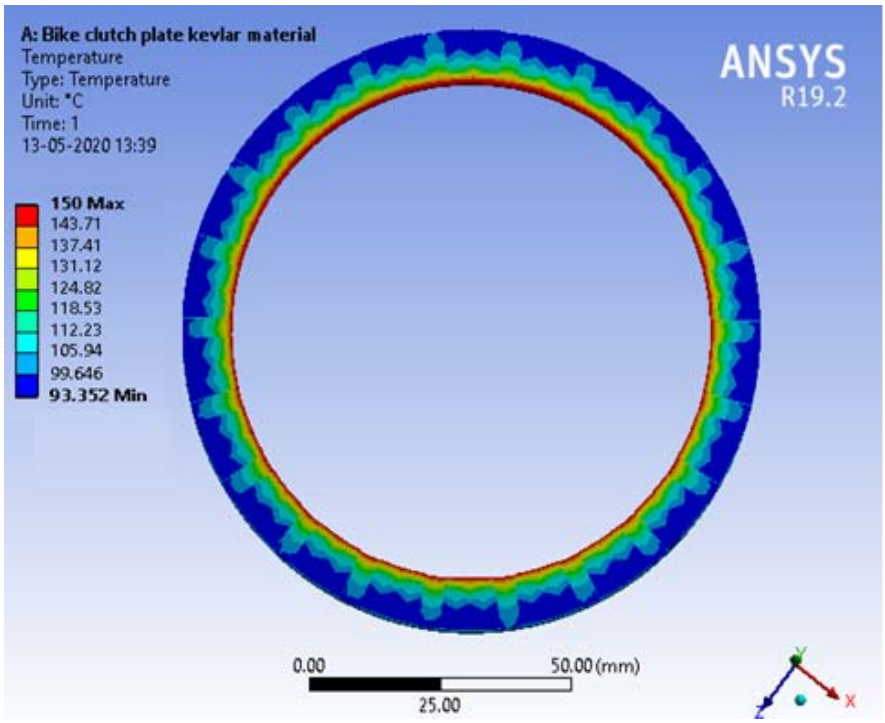

Fig. 3.6: Kevlar Clutch plate temperature results.

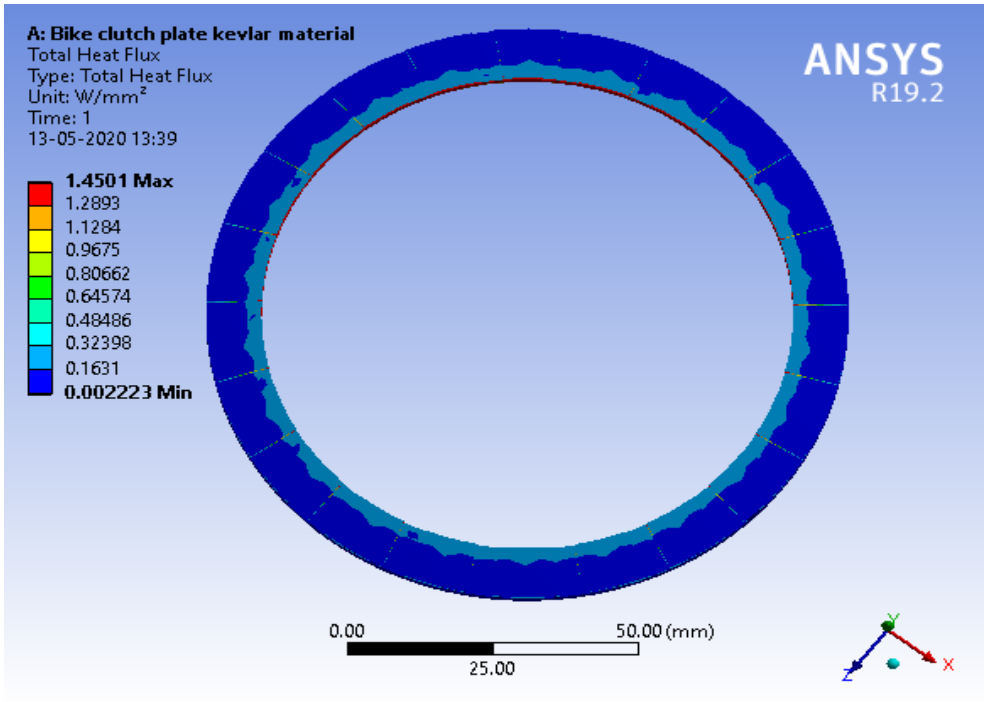

Fig. 3.7: Kevlar Clutch plate heat flux results.

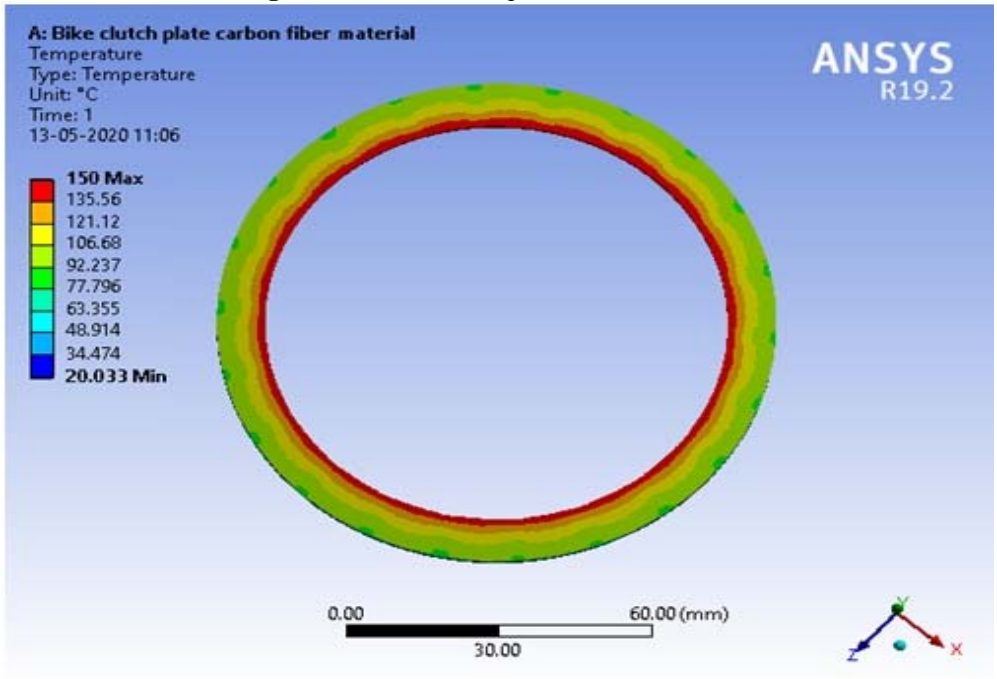

Fig. 3.8: Carbon fiber Clutch plate temperature results.

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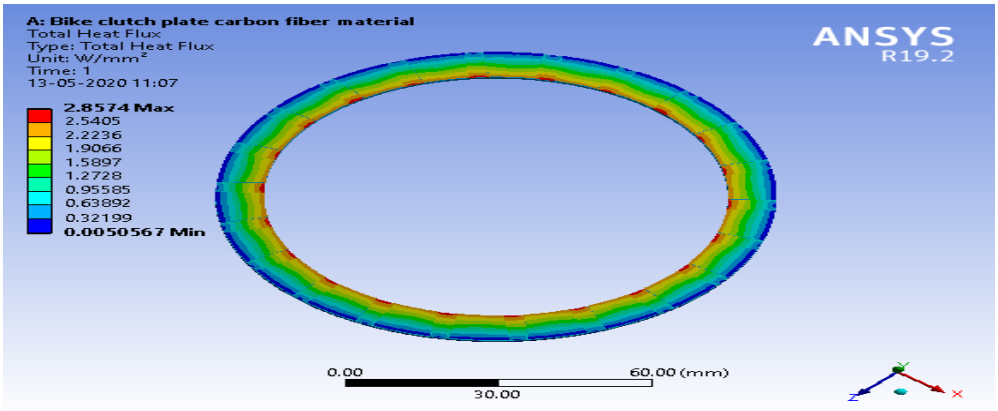

Fig. 3.9: Carbon fiber Clutch plate heat flux results.

IV. Results & Discussion

4.1: Overall results summary tables.

S. No,	Materials	Temperature	Heat flux(w/mm^2)
1	Cast Iron	138.17	1.29
2	Kevlar	143.71	1.45
3	Carbon Fiber	135.56	2.9

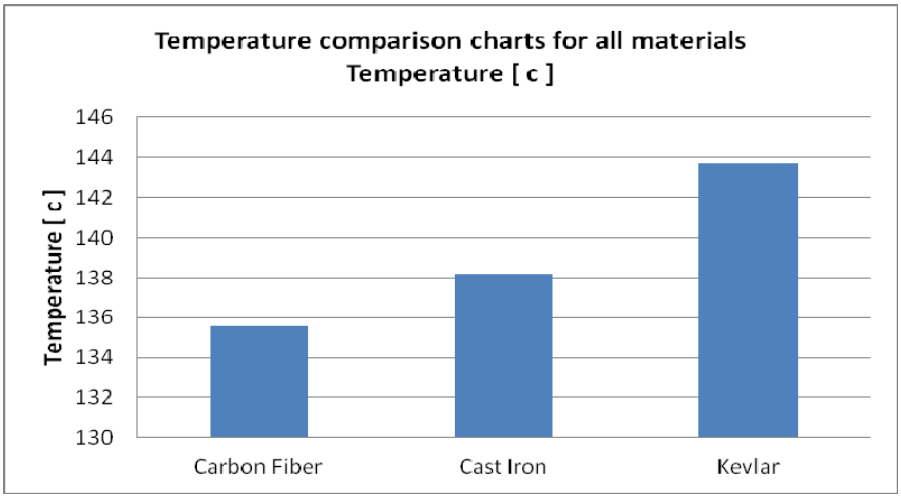

Fig. 4.1: Temperature comparison charts for all materials.

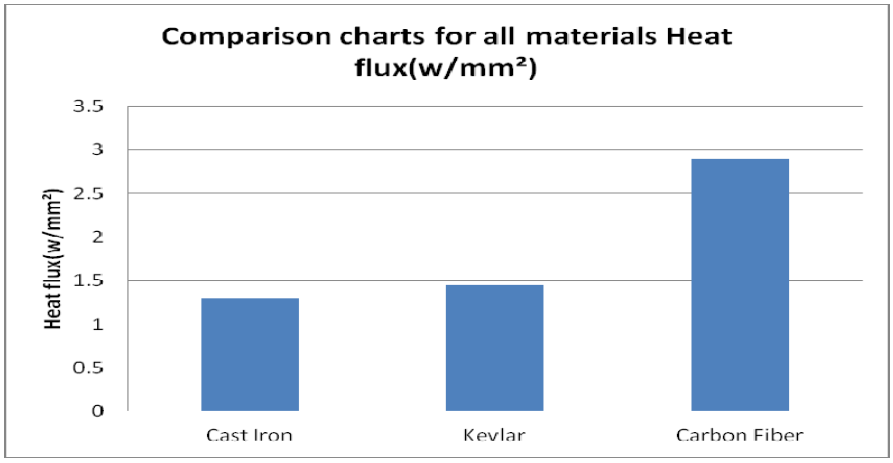

Fig. 4.2: Comparison charts for all materials Heat flux(w/mm²**).**

Here find out results are temperature and heat flux. Here using Three different material likes Cast iron, Kevlar fiber and Carbon fiber for multi plates clutch used and computational testing performed by ANSYS software based on transient thermal analysis and then find out results of temperature and heat flux. When find out temperature results with all materials are respectively likes that Cast iron, Kevlar fiber and Carbon fiber 138.17^{0}C, 143.71 ^{0}C and 135.56 ^{0}C. When find out heat flux results with all materials are respectively likes that Cast iron, Kevlar fiber and Carbon fiber 1.29 w/mm^2, 1.45 w/mm^2 and 2.9 w/mm^2.

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