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Design and Analysis of Disc Brake

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ABSTRACT: Each system has been studied and developed in order to meet safety requirements. There is one most critical system in vehicle which is brake system. Without brake the passenger will put a unsafe condition. In this paper carbon reinforced , cast iron, aluminium disc brake materials use to calculate different types of forces and also brake distance of disc brake. It is done by using ANSYS software to calculate heat flux and temperature deflections.

I. INTRODUCTION

In automotive industries to achieve reduced fuel consumption as well as green house emission is a current issue of utmost importance. To improve fuel efficiency the auto industry has dramatically increased the use of aluminium to light vehicles in recent years. The disc brake which slows down the rotation of the wheel which is due to the friction caused by pushing the brake pads against brake disc with a calliper set. The brake disc made up of cast iron but in some cases composites also used.

II. OBJECTIVES

Disc are made up of mainly gray cast iron,so disc are damaged in three ways: scarring ,cracking ,warping or excessive rusting which leads to changing the disc entirely. They are much more prone to noise and creates squeals and squeaks which were very annoying.

III. WORKING PRINCIPLE

The disc brake is the wheel brake which slows down the rotation of the wheel by friction caused by pushing brake pads against a brake disc with a set of callipers. The brake have callipers which squeezes the brake pads against the wheel. In disc brake the brake Pad squeezes the rotor instead of the wheel the force is transmitted hydraulically instead of through a cable.

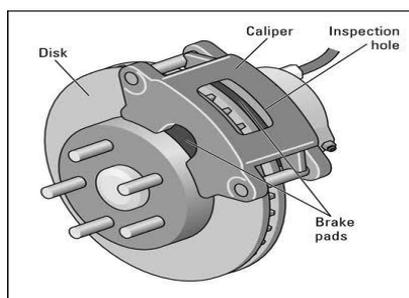


Figure 1. design of disc brake

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IV. MATERIALS USED

S.NO	MATERIALS	SPECIFICATION	COLOUR	TEMPERATURE
1	Cast iron	Hardness, ductility	Grey ,white	816-954 ⁰ C
2	Nickel chrome steel	Oxidation resistant	Silver-grey	
3	Aluminum alloy	Corrosion resistance	Silver-white	570-640 ⁰ C
4	Carbon reinforced polymer	Light weight and high fatigue strength	Black, grey	405 ⁰ C

V. PROPERTIES OF PROPOSED MATERIAL

The reinforcement of the material provided by carbon fibres ,silicon carbide, the main matrix component governs great hardness for the composite material. These fibres having high mechanical strength and provide fracture toughness. The resulting quasiductile property of the ceramic composite material ensure its resistance to high thermal and mechanical load. Particularly the low weight , the hardness , the stable characteristic also in case of high temperature and pressure, the resistance to thermal shock and provide long live time of the brake.

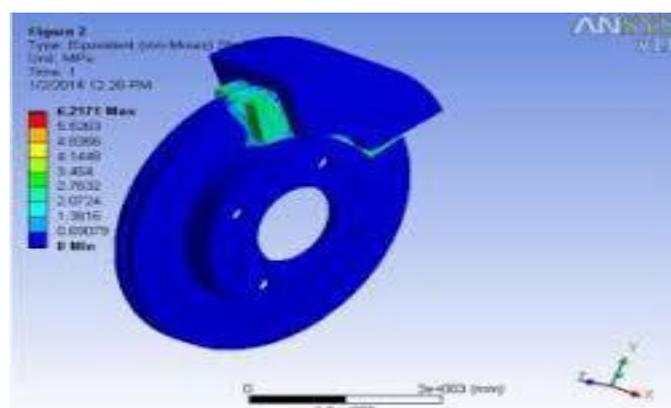


FIG 2: ANSYS model

VI. CONCLUSION

According to this analysis result the best model for disc brake is kidney shaped model which is better than conventional aluminium , cast iron , nickel chromium. The best material is cast iron which has best stress and deformation and also used for heavy range vehicles. For low range vehicle nickel chromium be the best for usage.



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REFERENCES

- [1] A. Belhocine, M. Bouchetra "temperature and thermal stresses of vehicles gray cast iron brake "university of science and technology of Oran 2016
- [2] Bai ,Y; Keller ,T .Modeling of mechanical response of FRP composites in fire .part A Appl.sci.manuf.2009,40,731-738.
- [2] Saaf, M. Effect of fire on FRP reinforced concrete members.compos.struct.2002,58,11-20
- [3] Chen ,Y ;Guo, Y;Dai, Y. Polymer Matrix composites ;chemical industry press; Beijing, china ,2010;p.15
- [4] Vishlwath raju,;Ms. G. Pranathi,M.Tdech, tudi ram teddy institute of technology and science.