

**SIMULATION ANALYSIS OF STRUCTURAL STRENGTH
AND THERMAL RELEASE OF DISC BRAKES
USING FINITE ELEMENT METHOD**

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ABSTRACT

Technological developments in the automotive field, particularly in terms of braking systems, have had a significant impact on driving safety. One of the most important innovations is in the development of brake discs. The use of design-based simulation applications and simulation analysis helps to design and simulate brake disc models easily and efficiently. Ansys Student 2024 R1 was chosen to analyze the structural strength and heat release of the brake disc model by varying the vent hole diameters of 8mm, 9mm and 10mm using the finite element method. In this study, the process of making a 3D design of the brake disc using the Solid Works 2012 application, the brake disc geometry model adheres to the shape of the front brake disc of the Vario Tekno 125 motorcycle with gray cast iron metal as the choice of brake disc model material. The analysis shows that the brake disc model 3 with 10mm air hole variation has the ability to release good heat energy where the maximum temperature value is 44.105°C and the maximum heat flux value is 0.085903 W/mm² and good structural capabilities with a maximum total deformation value of 0.015528 mm and a maximum stress value (von misses) of 57.913 Mpa.

*Keywords: Brake Disc Model Variation, Ansys, Finite Element Method
Deformation, Stress, temperature.*