



**SANDIP**  
FOUNDATION

2021



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AICTE Sponsored

# INTERNATIONAL E-CONFERENCE

ON MECHANICAL AND MATERIAL SCIENCE  
ENGINEERING: INNOVATION AND RESEARCH  
(ICMMSE: IR 2021)

**17<sup>th</sup> -18<sup>th</sup> Sept. 2021**

## ORGANIZED BY

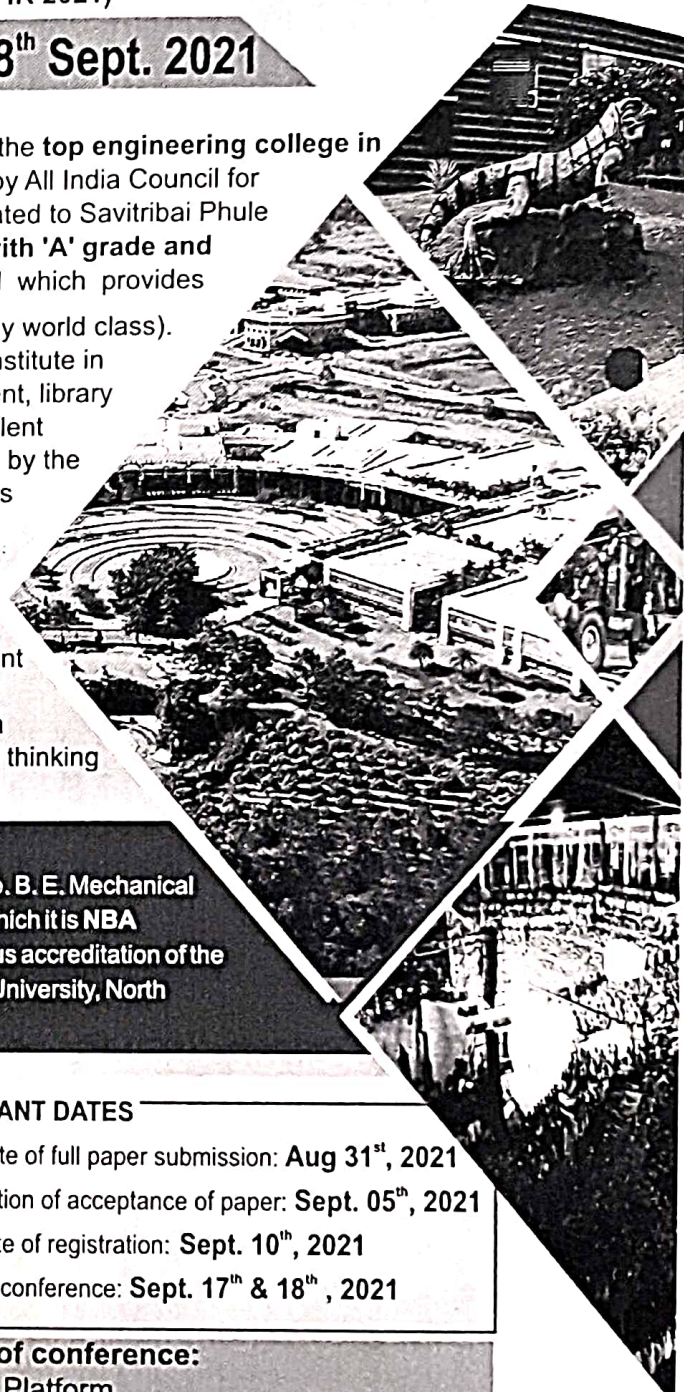
**DEPARTMENT OF MECHANICAL ENGINEERING  
SANDIP INSTITUTE OF TECHNOLOGY  
& RESEARCH CENTRE, NASHIK (MS)**

## ABOUT SITRC

Sandip Institute of Technology and Research Center (SITRC), the top engineering college in Nashik, Maharashtra is established in 2008 and is approved by All India Council for Technical Education, New Delhi Government of India and affiliated to Savitribai Phule Pune University, Pune. The Institute is accredited by NAAC with 'A' grade and comprehensive score of 3.11, an ISO 9001:2008 certified which provides

uncompromising quality infrastructure (Faculty & facilities simply world class).

This commitment is reflected in the investments made by the Institute in providing facilities to students in terms of laboratories, equipment, library sports, transportation and everything it takes to create an excellent environment for learning. On visiting the Campus, one is struck by the aesthetic and elegant buildings, splendid lawns, spacious sports grounds and lush green environment conducive for teaching-learning process. The Campus boasts of in-house facilities like state-of-the-art labs, spacious classrooms (with Audio-Video teaching aids), mess with hygienic food, college canteen, health care centre, gym etc. to cater all necessities of the student and the staff, ultramodern hostel facilities with beautiful surroundings. 250+ acres of Campus is about 12 km away from Nashik city. SITRC has an ambiance that stimulates intellectual thinking and academic proceedings (Teaching and Learning Process).



## DEPARTMENT OF MECHANICAL ENGINEERING

Department of Mechanical Engineering offers undergraduate program i.e. B. E. Mechanical Engineering course and practices OBE (outcome based education) for which it is NBA accredited from 2020 – 21 to 2022 – 23. This is the highest and prestigious accreditation of the nation acquired as on date by only few programs in the jurisdiction of the University, North Maharashtra region as well as the nation.

## WHO SHOULD ATTEND?

The conference is relevant to UG/PG students, Ph. D scholars, Researchers/Engineers, Academicians & Industrialist the field of Mechanical and Materials Science.

Paper Submission process and Conference update, please visit our website  
<https://www.sandipfoundation.org/icmmseir>

## CONFERENCE HIGHLIGHTS

- \* Publication of all peer reviewed and accepted papers in referred and Scopus/WoS Indexed Journal.
- \* Presentation & Attendee certificates.

## IMPORTANT DATES

- Last date of full paper submission: **Aug 31<sup>st</sup>, 2021**
- Notification of acceptance of paper: **Sept. 05<sup>th</sup>, 2021**
- Last date of registration: **Sept. 10<sup>th</sup>, 2021**
- Date of conference: **Sept. 17<sup>th</sup> & 18<sup>th</sup>, 2021**

**Mode of conference:**  
Online Platform

## Registration Fee:

- No registration charges for conference participation.
- Additional charges for publication in Scopus/WoS Indexed Journal.

## PUBLICATION:

All papers submitted to the conference will be peer reviewed and evaluated for originality, technical contents and relevance to the conference. Peer reviewed papers will be published in *Savitribai Phule Pune University Journal of Mechanical Engineering*.

**HEAD**  
Dept. of Mechanical Engg.  
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# DESIGN AND ANALYSIS OF BRAKE ROTOR AND PEDAL FOR HYDRAULIC BRAKES

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## ABSTRACT

In modern automobile technology, with every step of advancement, there is an increase in speed and performance of the vehicle. Thus simultaneously stopping of the vehicle or deceleration of the vehicle also becomes an equally important factor. The main function of the braking system is to inhibit the motion of the vehicle by absorbing the kinetic energy. The braking system should be sustainable enough to stop the vehicle in different terrain conditions, critical or even panic braking. Efficient braking is achieved with the help of different braking components with brake pedal brake disc and brake caliper being the most important. All the different components have to undergo different types of forces and stresses. This paper presents material selection, methodology and various design considerations made. Design validation is done with the help of calculations , structural and steady-state thermal analysis of the components on ansys version 18.1.

**KEYWORDS:** Disc, Pedal ratio, Braking force, Pedal, Deformation, Stress, Strain.

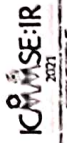
## INTRODUCTION

The braking system is the heart of every vehicle. It not only retards the vehicle or slows down, but also helps in navigating the vehicle according to the driver (2).

The Braking System comprises of various components like brake pedal, brake disc, brake pads, brake caliper and master cylinder. In Hydraulic braking, the fluid from the master cylinder is pressurized with the help of the force applied by the driver's foot further this pressurized fluid is taken to the caliper piston with the help of fluid lines. The the fluid in the caliper Piston generates pressure on the brake pads and pushes it forward causing the clamping force action onto the brake disc. This process is based on the principle of pascals law. Where fluid pressure is transmitted through the brake fluid without being distributed.

Hydraulic brakes are in two forms drum brakes and disc brakes. Disc brakes have more advantages over the drum brakes. Custom-designed brake rotors calipers and pedals help in the reduction of the weight, enhancement Mechanical and thermal properties by selection of appropriate materials, increased weight to strength ratio and selection of suitable manufacturing method.

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# CERTIFICATE

----- OF PRESENTATION -----

AICTE Sponsored International E-Conference on Mechanical and Material Science Engineering: Innovation and Research (ICMSE:IR 2021)

17<sup>th</sup> - 18<sup>th</sup> September 2021. | SITRC, Nashik

This is Certified that **Prof. GANESH WAHILE** of **Vidyavardhini's College Of Engineering And Technology** presented his research paper titled **Design And Analysis Of Brake Rotor And Pedal For Hydraulic Brakes** in the AICTE Sponsored International E-Conference on Mechanical and Material Science Engineering: Innovation and Research (ICMSE : IR 2021) Organized by Department of Mechanical Engineering, Sandip Institute of Technology & Research Centre, Nashik (MS) on 17<sup>th</sup> - 18<sup>th</sup> September 2021.

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