

DEPARTMENT OF MECHANICAL

ENGINEERING



TECHYUGA

TECHNICALMAGAZINE

(2023-2024)



ABOUT THE COLLEGE

Tulsiramji Gaikwad-Patil College of Engineering and Technology (TGPCET) was established in the year 2007 by Vidarbha Bahu-uddeshiya Shikshan Sanstha (VBSS), a registered society. It is a self-financed Private Engineering College, which is affiliated to Rashtrasant Tukadoji Maharaj Nagpur University (RTMNU) Nagpur and is approved by All India Council for Technical Education, New Delhi. Also college is approved by Directorate of Technical Education (DTE), Mumbai, Maharashtra State. The Institute is Accredited with A+ (3.32 CGPA) by NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL (NAAC). An Autonomous Institute affiliated to RTM Nagpur University, Nagpur.

VISION OF THE INSTITUTE

To emerge as a learning Center of Excellence in the National Ethos in domains of Science, Technology and Management

MISSION OF THE INSTITUTE

- ❖ To strive for rearing standard and stature of the students by practicing high standards of professional ethics, transparency and accountability.
- ❖ To provide facilities and services to meet the challenges of Industry and Society.
- ❖ To facilitate socially responsive research, innovation and entrepreneurship.
- ❖ To ascertain holistic development of the students and staff members by inculcating knowledge and profession as work practices.

ABOUTTHEDEPARTMENT

Department of Mechanical Engineering was established in 2011 and a B.E. degree course Mechanical Engineering started with an intake of 60 and further it increases to 120 with the objective of imparting quality education in the field of Mechanical Engineering.

The focus of the department is towards research and training activity based on advanced manufacturing processes and production, in the field of mechanical designing software, computational fluid dynamics, etc.

The Department has its own departmental Library with a rich collection of books to serve as a ready source of information. With a team of experienced & well-qualified faculty members, the department moulds its students according to the present industrial requirements in various domains such as production, material science, design, ergonomics, so as to provide better employment opportunities. The department of Mechanical Engineering in TGPCET possesses a faculty team of experienced & well-qualified professors, well acquainted with deep subject knowledge, commitment to teach.

VISIONOFTHE DEPARTMENT

To Emerge as a Premier Centre in the Field of Mechanical Engineering Education and Produce Competent Engineers

MISSIONOFTHEDEPARTMENT

- ❖ To Impart Quality Technical Education Through Effective Teaching-Learning Process.
- ❖ To Provide a Better Environment to Encourage Innovation and Entrepreneurship.
- ❖ To Strengthen Industry Institute Interaction to Meet the Challenges of Industry and Society Environment.
- ❖ To Ensure Overall Development of Students and Staff Members by Inculcating Knowledge and Professional Ethics.

HODMESSAGE



Dr. Vijay Talodhikar
HOD, ME

It gives me immense pleasure to lead the department of ME. Our College is one of the premier institutions, unique like a prism reflecting the manifold shades of learning and co- curricular activities. The very motto of our department is to provide quality education. The process of learning is extremely important in life. What you learn, how you learn and where you learn play a crucial role in developing one's intellectual capability, besides career. Hence on behalf of our Mechanical Engineering Department, I welcome you all to ME Department, TGPCET. Along with academic knowledge Mechanical Engineering also trains its Engineers to face the challenges in life by providing many value added courses to enhance their career prospects. The excellent infrastructure, teaching faculty of the best kind ensuring quality education such as interaction among students, parents and staff, along with a Training and Placement Cell ensures a bright future to its students. Thus, we are confident that our Engineers will emerge as assets not only to this institution and to the organization they belong, but also to the Society.

CHIEF EDITOR MESSAGE



Mr. Anuj Muley
Chief Editor

It brings me immense joy & pleasure to introduce the Fourth edition of the departmental technical Magazine 'YANTRIK' All the creative energies that came on to this platform in the form of faculty experts & students are finally presenting replica of their enthusiastic hard work through this extravaganza that has come out so organically. Technical & Arts every section shines out differently in its true sense. All the events conducted throughout the year were perfectly planned & executed & the overwhelming response it received said it all! This piece of art would not have been complete without the sheer determination & perseverance of all the students who pushed their limits every time to bring out this artistic reality. Their efforts coupled with immense support from the faculties truly have done justice to carry on the legacy. I am grateful for all the support YANTRIK has received throughout the year in every possible way from the faculties & Students. I hope the readers of the technical Magazine have a wonderful reading experience & wish this year's edition too receives your love & support like it has always received till date.



Mr. Pratik Taiwade
Student Content Editor
Student, Final Year, ME

There is no denying that one day my memory of words will turn vague but every page of this Technical Magazine will open a box of memory so vivid! Filled with hard work, dedication & limitless time put in making this one book that I will always be grateful to "YANTRIK" will make you fall in love with drawings again! It gives me immense pleasure to bring to you an extraordinary & masterly collection of the events, activities, achievements, highlights at the college presented in the Seventh Annual departmental technical Magazine "YANTRIK 2024". The technical Magazine reflects the identity of TGPCET as well as gives the students & teachers a platform to explore their creativity & imagination. This work is a result of the various phases from planning to data collection to segregation to organization to proofreading to designing. I take this opportunity to express my gratitude to our HOD Dr. Vijay Talodhikar & Mr. Anuj Muley. Rode for their constant assistance & guidance.

DEPARTMENT TOPPERS

ACADEMIC YEAR (2023-24)

III -SEM AUTONOMOUS TOPPERS

Rank	Name of Student	Marks	Percentage%
I	Vaibhav Chaudhari	548/650	84.30 %
II	Aishwarya Sahare	543/650	83.53 %
III	Shruti Bawane	532/650	81.84 %

V -SEM AUTONOMOUS TOPPERS

Rank	Name of Student	Marks	Percentage%
I	YASH VINOD BUTKE	587/700	83.85%
II	PRATIK NARENDRA TAYWADE	576/700	82.28%
III	TANAY JITENDRA SINGH	479/700	68.42%

VII -SEM RTMNU TOPPERS

Rank	Name of Student	Marks	Percentage%
I	Jyotish Ramesh Mohitkar	535/600	89.16%
II	Piyush Pramod Khadgi	473/600	78.83%
III	Dikshit Choplal Rahangdale	465/600	77.50%

IV -SEM AUTONOMOUS TOPPERS

Rank	Name of Student	Marks	Percentage%
I	VAIBHAV YUVRAJ CHOUDHARI	649	10.00
II	RAMESH CHANDRA SAHOO	632	9.74
III	SHRUTI NAMDEO BAWANE	630	9.91

VI -SEM AUTONOMOUS TOPPERS

Rank	Name of Student	Marks	Percentage%
I	PRATIK NARENDRA TAIWADE	549	8.57 %
II	YASH VINOD BUTKE	547	8.76 %
III	ANIKET DILIP SINGH	497	8.14 %

VIII -SEM RTMNU TOPPERS

Rank	Name of Student	Marks	Percentage %
I	JYOTISH RAMESH MOHITKAR	494	76.00 %
II	PIYUSH PRAMOD KHADGI	493	75.84 %
III	ANKIT DAYARAM CHAURIYA	490	75.38 %

ARTICLES

“DESIGN & FABRICATION OF AN AUTOMATIC PNEUMATIC PAPER CUTTING MACHINE”

Prof. Anuj Muley

Abstract: The paper cutting process stands as a cornerstone in various industries, including printing, packaging, and stationery. Traditional manual methods, while functional, often suffer from inherent limitations such as imprecise cuts, time inefficiency, and material wastage due to human error. In light of these challenges, the imperative for an innovative solution led to the conceptualization and development of the Automatic Pneumatic Paper Cutting Machine. This cutting-edge machine emerges as a response to the industry's pressing need for enhanced precision, increased operational speed, and minimized waste in the paper cutting process.

Introduction: This project represents an amalgamation of innovative engineering, operational efficiency, and cost-effectiveness. The subsequent sections will delve deeper into the technical aspects, design considerations, fabrication methodologies, and operational functionalities of this Automatic Pneumatic Paper Cutting Machine. The realm of paper cutting within industries encompassing printing, packaging, and stationery remains foundational, dictating the precision and efficiency of various downstream processes. However, the prevalent manual methods for paper cutting are fraught with inefficiencies, often leading to imprecise cuts, time-consuming operations, and consequential material wastage due to human error.

Application:

1. Education Sector: Educational institutions and print shops use automatic pneumatic paper cutting machines for cutting paper for educational materials, worksheets, posters, and other teaching aids. These machines facilitate the efficient production of teaching materials in bulk.
2. Printing Industry: Automatic pneumatic paper cutting machines are extensively used in the printing industry for cutting paper to size before printing.
3. They help in manufacturing boxes, cartons, labels, and other packaging products efficiently and consistently.
4. Spring testing machine is used in garages also for checking suspension of various automobile.

Future scope:

- 1.Spring is an important component in engineering so it is obvious its testing is as much important.
2. This device is less expensive than other similar devices present in the market.
3. It can be combined with the production line and the springs can be tested as soon as they are produced increasing efficiency and quality of the production line.

Conclusion:

It is observed that, the length reduction of 250 ml cans size after crushing is obtained by 66%, 75% and 82% using compressed air pressure at 3 bar, 4 bar, and 5 bar respectively. Similarly, for 500ml cans, the length reduction by 61%, 72%, and 79% is obtained at the same air pressure at 5 bar air pressure, the better crushing is obtained for both the sizes of cans.

The number of cans crushed per minute obtained is more at 5 air bar pressure. The number of cans crush per minute obtained are 27 and 23 at 5 bar air pressure during crushing of 250 ml and 500 ml sizes cans.



Fig: Working model of an Automatic Pneumatic Paper Cutting Machine

“DESIGN & FABRICATION OF HYDRAULIC SPRING STIFFNESS TESTING MACHINE”

Prof. Gaurav Nagdeve

Abstract:

Using the principle pressure applied at any point on any confined liquid is transmitted equally to all other points. We have designed our testing machine. It consists of a hydraulic jack or similar device, a frame with a sliding mechanism, a mounting table to mount the spring that is to be tested and a display unit that'll give us the required output result. When the pressure is applied through the hydraulic jack or compressor (according to the compressive strength of the spring that is to be tested) the spring that is mounted on the testing table is compressed. The spring will oppose the pressure of the fluid and calculating or recording this resistance of the spring will in turn give us its stiffness.

Introduction:

A spring is an elastic mechanical element that deforms under the influence of a load and returns to its original shape when the load is removed. Rigidity and spring index are the main parameters of spring design. Spring stiffness is the force per unit deflection. The stiffness of the spring means the load required to deflect the unit. Also called the spring index, it is an important parameter for specifying a spring. Spring designs and manufactures include compression coil springs, extension coil springs, and leaf springs of various sizes and shapes. But without such a machine, it is very difficult to check the stiffness.

Application:

1. The spring stiffness testing machine is used for measuring stiffness of different spring.
2. Spring testing machine used in spring manufacturing industries in quality control department.
3. It is used in educational institute to compare the theoretical design and practical spring stiffness.
4. Spring testing machine is used in garages also for checking suspension of various automobile.

Future scope:

1. Spring is an important component in engineering so it is obvious its testing is as much important.
2. This device is less expensive than other similar devices present in the market.
3. It can be combined with the production line and the springs can be tested as soon as they are produced increasing efficiency and quality of the production line
4. The design of this machine can be modified to test a wider range of components such as steel columns, shafts etc.
5. The hydraulic spring testing machine can be modified and be automated by implementing.

Conclusion:

As compare to digital stiffness testing machine hydraulic spring stiffness testing machine is cheap. Hence this machine we can use in garages and small industries, also we can use in collages for practical purpose. Hydraulic spring stiffness testing machine is easily manufacture in workshop.

The spring stiffness testing machine is designed and developed by using hydraulic principle. It consists mainly large cylinder, small cylinder, deflection scale and bourdon tube gauge. On the spring stiffness testing machine, we can test spring having diameter range of 40 mm to 70 mm. The results have been verified with the calibrated digital stiffness testing machine.



Fig. Fabricated Model of Hydraulic Spring Stiffness Testing Machine