ROHINI

COLLEGE OF ENGINEERING & TECHNOLOGY

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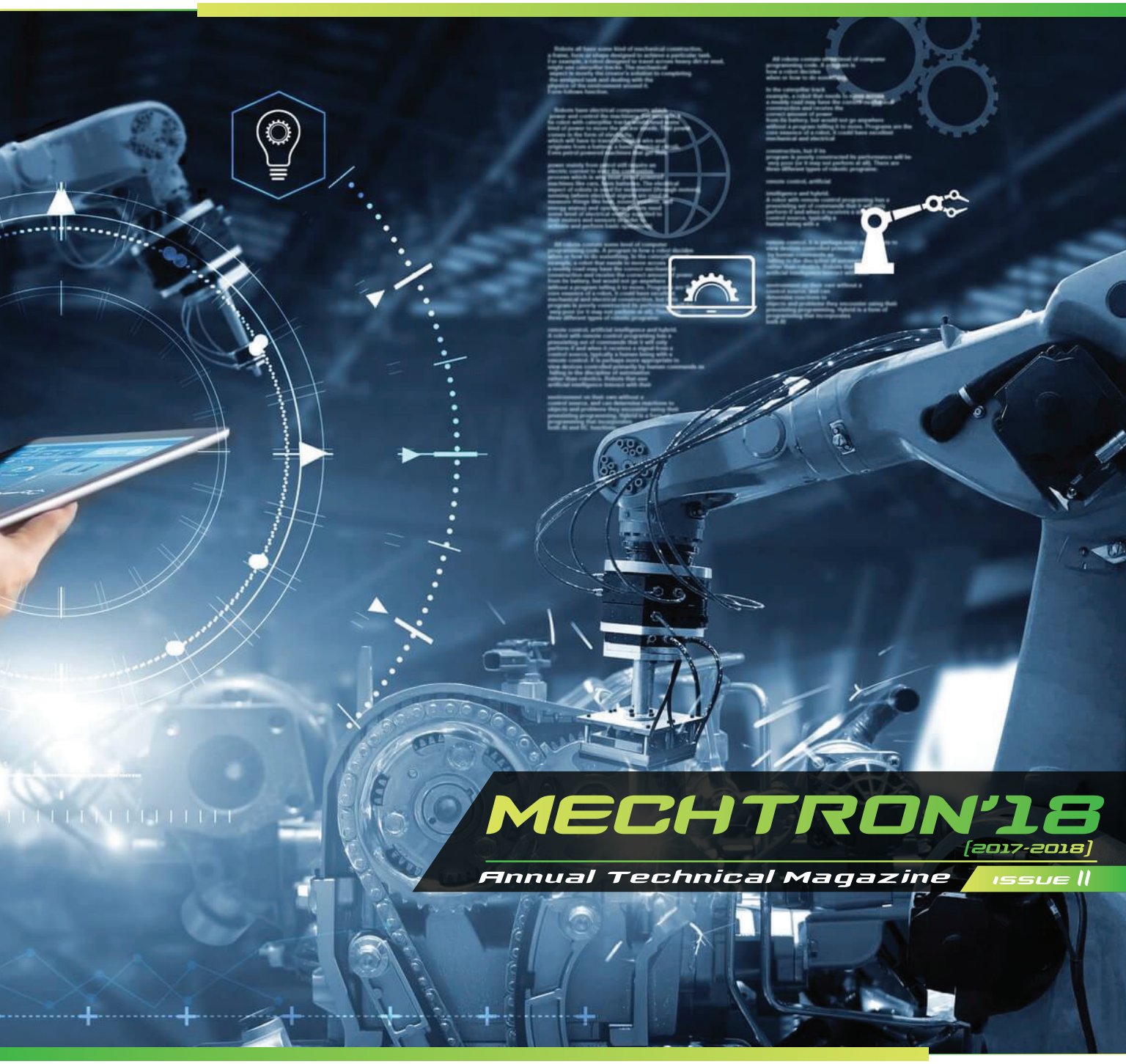

MECHTRON'18

[2017-2018]

Annual Technical Magazine

ISSUE II

DEPARTMENT OF

MECHANICAL ENGINEERING

This magazine is designed by the Department of Mechanical Engineering for developing and cultivating the students in literary and study habits.

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MECHTRON 2018
(2017 - 2018)

ANNUAL TECHNICAL MAGAZINE

DEPARTMENT OF MECHANICAL ENGINEERING

MECHTRON 2018

2017-18

Mechtron 2018 is an annual magazine, brought out by Rohini College of Engineering & Technology, Kanyakumari. The articles published are copy-righted. If you have any queries or feedback, address them to Mechtron2018@gmail.com

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ABOUT DEPARTMENT

- The Department of Mechanical Engineering started in the year 2012 with an initial intake of 60 students to the B.E Program and increased to an intake of 120 students from 2013 and 180 students from 2014. The Department offers ME - Thermal Engineering programme from 2015 with an intake of 24 students. The Department is a recognized research Centre by Anna University Chennai from the year 2019. The department accomplish outcome Based Education which help the students to learn, develop and serve to the society. The Department has experienced and dedicated faculty with a wide range of specialization namely Thermal Engineering, Engineering Design, Manufacturing Engineering, Energy Engineering, CAD/CAM, Industrial Engineering and Mechatronics.

- The faculty members have published more than 100 papers in National/International journals/Conference and had written books, filed patterns during the last 3 years and received many awards. The students were motivated by providing lot of opportunities like technical presentation in Symposium, conferences for skill development. The department provide value added knowledge to under graduates and post graduate students. Apart from curriculum students were motivated to participate in sports. The department has well established laboratory facilities to conduct research work on different specialized areas like Material Science, Renewable Energy, Thermal Science. The students of the department have received external research funding from Tamil Nadu State council for Science and technology in recent years. The students of the departments have joined in reputed industries through placements and some of them are turned to be an entrepreneur. The department has a good network of alumni.

DEPARTMENT VISION

To inculcate competence in the field of Mechanical Engineering in students by providing quality education and learning opportunities to enable them to become ethically strong engineers for the development of society.

DEPARTMENT MISSSION

To provide fundamentals and technical skills in Mechanical Engineering through effective teaching–learning methodologies.

To provide an ambience for research through collaborations with industry and academia.

To inculcate students with leadership quality and employability skills with ethical

PEOS

PEO 1-

Graduates will apply the knowledge of Mechanical Engineering concepts and innovative methods to solve real world Engineering problems.

PEO 2

Graduates will have the required qualities for a successful carrier in Mechanical Engineering and related fields.

PEO 3

Graduates will exhibit the professional skills with ethical values, Communication skills and team spirit

PSOS

The graduates of the department will attain:

Graduates of the program will achieve optimized design by utilizing their knowledge in thermal engineering, material science, manufacturing, fluid power and computer integrated manufacturing.

Graduates will be able to analyse and interpret by using modern tools and provide solutions to real time mechanical engineering and related problems.

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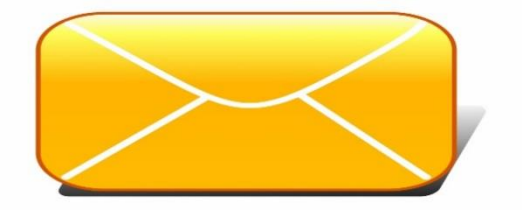
Graduates will learn managerial skills to work effectively in a team and are aware of the impact of professional engineering solutions in human community, environmental context, ethics and be able to communicate effectively



FROM THE DESK OF

It is a matter of pride to pen down the message for the annual college magazine of ROHINI College of Engineering and Technology, department of Mechanical Engineering. My heart fills with immense pleasure as I perceive the progress being made at our college. The seeds of an idea sown in 2011 has quickly come to fruition, and the school is growing into strong sapling. It is the endeavour of the ROHINI Group to make the the academic like, a smooth journey full of joy and discovery. The college magazine is a platform for the students to express their creative pursuit which develops in them originality of thought and perception.The Contents of the magazine reflect the wonderful creativity of thoughts and imagination of our Greenians.I extend my warm wishes to the Staff and Students of Mechanical Engineering department to Continue this journey on the road of excellence.

"May the sapling grow into a study tree and spread its branches"

Cordially,

Shri.K.NEELA MARTHANDAN

Chairman

Rohini Groups.

FROM THE DESK OF

Dear All,

Service to Human being is Service to God. Creating better human beings' is our motto and we can do that when we are able to mold our students to be good human beings with values which are embedded for life. Now our special emphasis is on Outcome Based Education and Experiential Learning. The main focus of our college is to empower students with sound knowledge, wisdom, experience and training both at the academic level of Engineering and in the highly competitive global industrial market.

It is a matter of immense pleasure and pride that Mechanical Engineering department RCET has shown consistent progress, year after year in academic and co-curricular activities. It's high standard in academics and commitment to quality technical education is reflected by the Alumni and the excellent placement records.

The Mechanical Department digital magazine is a platform for sharing educational information, activities and events related to the Mechanical Engineering Department of our college. Introducing the very first issue, I hope that the digital magazine will provide useful and relevant information. I wish the best for all our students, and the members of the department of Mechanical Engineering who reiterate their aims at providing the best in academic and extra-curricular fields. Once again, I wish all our students and faculty a successful and rewarding career.

Best Wishes,

Dr.R.RAJESH, M.E., Ph.D.

Principal

Rohini College of Engineering & Technology

Palkulam, Kanyakumari.

FROM THE DESK OF

Dear All,

Welcome to the Department of Mechanical Engineering at ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY, KANYAKUMARI. We have started our journey in the year of 2012. The primary focus of our department is to impart technical knowledge to students, promote their problem solving and innovative skills in the growing technologies. We have a long history in educating young minds, conducting innovative research, and offering professional services to local and overseas communities. Mechanical engineering is one of the oldest and broadest engineering discipline, and plays a significant role in enhancing safety, economic vitality, enjoyment and overall quality of life throughout the world. A prerequisite for development is growth and that is directly related to production or output of a country. If production is done via a sustainable path it can maintain the sustainability of development.

A warm and Green Greetings from the Department of Mechanical Engineering at RCET. The college has been simply unstoppable in its progress as it has been actively involved in various activities that have brought to light the hidden talents of the college students and staff. Mechanical Engineering is a professional Core engineering discipline that deals with the design, production and maintenance of any produce of any industry.The pride of every student and staff would be in his/her department and college.

Our department has a team of highly qualified and experienced faculty, good infra structure and lab facilities. We are striving hard continuously to improve upon the quality of education and to maintain its position of leadership in engineering and technology. We always work with the motto "Nothing can be achieved without genuine effort." The core values of the department help the students to develop their overall personality and make them worthy to compete and work at global level. Our faculty are continuously attending various training programs, publishing research papers, books and filing patents. Many are pursuing research. Our department has been conducting seminar / conferences to keep the faculty and students abreast with the latest developments in the field of technical education. We are happy to share that many students are pursuing higher studies in leading universities in India and abroad. I am certain that our students will prove to be an invaluable asset to an organization. We, Mechanical engineers to build the nation.

Best Wishes,

Dr. S INDRAN M.E, Ph.D
HOD / Mechanical Engineering / RCET

FROM THE DESK OF EDITOR'S

Mr. R. David, AP/ Mech

It gives us great pleasure to bring you issue of MECHTRON2018 , the Mechanical department technical magazine of Rohini College of Engineering and Technology, Kanyakumari.

The objective of the magazine is to mainly focus on Achievement of the students from the Mechanical Engineering department in the Co-curricular and Extra-Curricular Activities

The name and fame of an institute depends on the caliber and achievements of the students and teachers. The role of a teacher is to be a facilitator in nurturing the skills and talents of students. This magazine is a platform to exhibit the literary skills and innovative ideas of teachers and students MECHTRON2018 presents the skills and innovative thinking of students and contributions of teachers.

We are also thankful to our Management and Principal for their support and encouragement.. Last but not the least we are thankful to all the authors who have sent their articles. We truly hope that the pages that follow will make an interesting read.

Rohini College of Engineering and Technology- a temple of learning, is an ISO certified institution was founded by the great Industrialist and Philanthropist, Shri. K.Neela Marthandan. The main objective of our college is to advance the knowledge base of the engineering professions and to influence the future directions of engineering education and practice.

RCET - Best Engineering College in Nagercoil, Kanyakumari District.We believe not only in educating the students, but also in grooming characters, with moral and ethical values to build the nation. Since the beginning, the college has been providing world-class facilities & infrastructure in education and learning. The emphasis is on transformational leadership rather than directional leadership. We aim to establish new trends, introduce innovative training methodologies, and thus guide students towards the road to success.

VISION

To be an academic institute of continuous excellence towards education, research in rural regime, and provide service to nation in terms of nurturing potentially higher social, ethical and engineering companion graduands.

MISSION

To faster and promote technically competent graduands by imparting the state of art engineering education in rural regime.

To enunciate research assisted scientific learning by dissemination of knowledge towards science, agriculture, industry and national security.

FACULTY ARTICLES

CLIMATE IMPACT OF HYDRO – POWER

Currently, hydropower contributes two-thirds of the electricity generated from renewable sources worldwide, according to the International Energy Association, with thousands of new hydroelectric facilities either planned or under construction across the globe. This popularity stems partly from the perception that hydropower is an environmentally friendly alternative to fossil fuels. It is commonly thought that the greenhouse gas emissions from hydropower plants are similar to those of wind-generated power facilities. However, most studies of hydropower's climate impact have neglected certain factors, such as changes in carbon dioxide emissions that occur when natural landscapes are flooded to create reservoirs for hydropower plants, as well as the near-term warming from associated methane emissions. Ilissa Ocko and Steven Hamburg wanted to conduct a more comprehensive analysis of the climate impacts of hydropower facilities over time.

The researchers analyzed the climate impacts over time of carbon dioxide and methane emissions from a dataset of 1,473 hydroelectric facilities in 104 countries. They also estimated emissions caused by flooding the reservoir. The team found that hydropower emissions on average were far greater and thus worse for the climate than emissions from nuclear, solar and wind power installations, but better for the climate than emissions from coal and natural gas utilities. However, some individual hydropower facilities were worse for the climate than coal and natural gas plants both in the near- and long-term. The climate benefits of using hydropower instead of fossil fuel-generated power were much smaller in the near-term than the long-term because of the large impact that methane emissions have on warming, Ocko says. The analysis also indicated that emissions varied by region: New hydropower facilities in Western Europe were estimated to have near-zero climate impacts, whereas those in Western Africa yielded climate impacts greater than coal and natural gas plants over all timescales. These results should be considered when designing and constructing new hydropower plants, the researchers say.

Mr. ARJUN
Assistant Professor/MECH

impact on These technologies are having a disruptive the factories of the future

As new technologies start to pervade all areas of our lives, we are beginning to see their application in the manufacturing industry. The German government coined the term ‘Industry 4.0’ which refers to this revolution of manufacturing through technology. While there is certainly some debate around the use of this term – the integration of production methods with the latest developments in computers certainly has the potential to make manufacturing autonomous, cheaper and more efficient.

1) Ultrafast 3D printing

Up until now, 3D printing has had limited applications in the manufacture of plastics. Making plastic layer by layer is a time consuming and expensive process compared to traditional techniques like injection moulding. However, Neil Hopkinson of the University of Sheffield has been working on a 3D printing technique which will make it economically viable to mass print plastic objects on a huge scale. The technology, known as high speed sintering, uses an ink jet head to deliver material, which it then fuses together with an infrared lamp. The process is up to 100 times faster than current 3D printing technique for plastics. Crucially, it is also cost effective when compared to injection moulding. Hopkinson’s high speed sintering design has been leased out to German 3D printing company Voxeljet. Competitors Hewlett Packard are also developing their own version: Multi Jet Fusion.

2) Light based manufacture

Why use expensive robots to assemble something when you could use light? An international team of researchers has recently come up with a light based manipulation platform, which could one day be used to manufacture electronic components for use in our smartphones and computers. The light based method relies on optical traps: devices which use light to manipulate small objects in liquid. With the potential to mass produce electronic parts cheaply and quickly, it could overhaul the way we manufacture items such as circuit boards. Currently, costly robots are required to place and solder minute parts of circuitry into place. As electronic components get smaller and smaller, this has become a difficult and time consuming process. Micromanipulation techniques such as light based manufacture could provide a cheap and simple alternative.

3) Embedded metrology

Quality control in a traditional factory is a lengthy and expensive process. Machine made parts have to be randomly selected, removed from the production line and individually tested to see if they’re up to scratch. If a part passes the test, then its whole batch is validated. This method is extremely time consuming and somewhat unreliable:

what if a faulty part in the batch slips through the net? Embedded metrology – the measurement of parts within the production process – is a quick and convenient solution. It is more accurate and requires far less human interference in the line of production. Whilst embedded metrology is in use to some degree today, factory workers still have to physically move the measurement tech into place. Fully automated, fully integrated measuring and monitoring technology has the potential to bring point-of-manufacture quality control to the factory of the future. This will make manufacturing quicker, cheaper and more efficient.

4) Simulation

Earlier this month ANSYS – a creator of engineering simulation software – announced that it had acquired 3D printing simulation company 3DSIM. The consequences of this deal could help to revolutionize industrial additive manufacturing. The ability to simulate the manufacture of a part from its design process to its final production will significantly reduce the current problems surrounding 3D printing in manufacture. At the moment, additive manufacturing has mostly been based around trial and error. This can result in a costly development process as companies must tweak the system until they get it right. With simulation, accurate predictions of how parts will behave will reduce errors and cut costs. Integrating simulation into manufacture from start to finish will therefore help to unleash the full potential of 3D printing in the manufacturing industry.

5) The smart factory

There's one thing we can be sure of about the factory of the future: it will be smart. Moving beyond the basic automation of the factories of the past, the smart factory will integrate technology into every part of the manufacturing process. Fully connected, flexible and hyper efficient, the new manufacturing model will make use of technologies like artificial intelligence, virtual and augmented reality and the internet of things. It's a development we are already beginning to see in action. This year Adidas opened its first Speed factory in Germany.

The integration of new technologies within the factory heralds a new age of manufacturing. With decreased labour costs, increased efficiency and reduced waste, the factory of the future will be cheaper and more environmentally friendly. Improved quality control will also ensure that superior items come off the production line. This will benefit both consumers who require cheap and reliable products, and the companies which aim to supply them.

Mr.Chanjith Charles
AP/ Mech

IMPORTANCE OF ELECTRONIC BRAKE DISTRIBUTION

It's important for driving safety to maintain the friction between the tire and the road, yet there are a number of conditions under which this friction can be lost. One is acceleration on icy roads, as mentioned above, but friction can also be lost if you brake too hard. The forward momentum of the car can keep it moving at a speed significantly greater than the speed at which the tires are spinning. This is called **wheel lock** and it's a common cause of driving accidents. Once it happens, the tires no longer grip the pavement and the car continues to travel in the direction it was heading when the skid started.

The key to avoiding a skid is the **slip ratio**, the difference between the speed at which the car is moving and the speed at which the tire is rotating. Antilock braking systems (ABS) can sense the slip ratio of the individual tires and modulate the brake force applied to each tire so that the slip ratio remains within a safe range, thereby avoiding a skid.

When a car slows down, its weight shifts forward. In a front-engine car, the extra weight up front increases the grip of the front tires while it reduces the grip of the rear tires. This makes the rear tires more likely to lock up during braking. When the rear wheels slip, the car can begin to fishtail or even go into a spin. Traditionally, braking systems included a proportioning valve to allocate the correct amount of brake force to the front and rear tires. However, with ABS the proportioning valve no longer provides an ideal solution to the problem.

This is where electronic brake force distribution (EBD) comes in. With EBD, a computer called an electronic control unit (ECU) determines the slip ratio of each of the tires individually. If the ECU notices that the rear wheels are in danger of slipping, it applies less force to them while maintaining (or, if necessary, increasing) the force applied to the front wheels. EBD is also useful when the car is braking while driving around a corner. While turning, the outer wheels of the car rotate more quickly than the inside wheels. If too much brake force is applied to the inner wheels they can lock, causing the car to oversteer and go out of control. EBD can sense the slippage of the inner wheels and reduce the brake force on those wheels without reducing the force on the outer wheels.

Mr. M.Stanly Selva Kumar
Assistant Professor/ MECH

POWDER METALLURGY PROCESSES….

Powder metallurgy is a metal-forming process performed by heating compacted metal powders to just below their melting points. Although the process has existed for more than 100 years, over the past quarter century it has become widely recognized as a superior way of producing high-quality parts for a variety of important applications. This success is due to the advantages the process offers over other metal forming technologies such as forging and metal casting, advantages in material utilization, shape complexity, near-net-shape dimensional control, among others. These, in turn, contribute to sustainability, making powder metallurgy a recognized green technology.

Preparation of powders: very fine powders are obtained using various techniques.

Blending of powders: The fine powders are mixed along with a lubricant. The lubricant helps in imparting good fluidity to the powders.

Compacting: The blended powder is compacted in a mold or die.

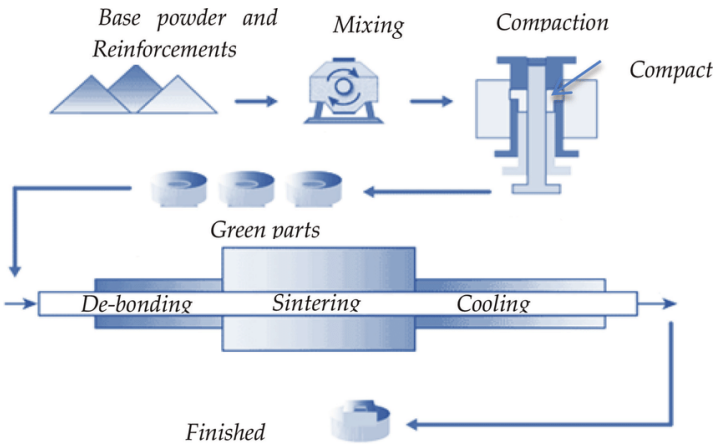
Sintering: The compacted mass is sintered at a high temperature in a furnace in a controlled atmosphere.

Sizing: The sintered component is passed in a mold or dies to trim the component and achieve high dimensional accuracy.

Machining: If required final machining is done on some specific locations including drilling very small holes.

Treatment: Parts are subjected to deburring and tumbling to remove any small projections and other treatments like oil impregnation tec., are given.

Inspection: Finally parts are inspected to check the quality .



Mr.Kailainathan, AP/Mech

Facets of Medical Device Design

Broadly speaking, the aspects of medical device design can be broken down into three categories: mechanical, electrical, and software. Some devices will not need all three aspects. Many surgical instruments - such as scalpels, clamps, and retractors - are purely mechanical. Others include both electric and mechanical components but do not need software to operate. Examples of this include blood pressure monitors and electric bone saws. Given the complex functions needed to be performed by most modern medical devices, however, most require mechanical, electrical, and software features to be designed.

The mechanical aspects of medical device design must take a number of factors into account. One is the required strength of the device, including its ability to withstand tension and torque. This will impact choices such as construction material and bond types. The material will also need to conform to the biomechanical requirements of the product, particularly in those devices that come into contact with patients. The expected lifetime of the device will also need to be considered. Single-use devices will not have the same mechanical requirements as devices meant to last for years of continuous use.

Medical device design also encompasses electrical engineering. Engineering components can take multiple forms. Some are involved in powering mechanical movements, such as the pump in a drug delivery device. Others are sensors designed to acquire physiological data about the patient (e.g., EKGs) or monitor aspects of the device itself (e.g., RPM, temperature, torque). The delivery of an electrical current can also be the primary function of the instrument, as in the case of defibrillators, electrocautery instruments, and iontophoretic drug delivery devices. Devices may also need to communicate unilaterally or bilaterally with a network or other devices, either wirelessly or via data ports. Electrical engineering must ensure the electric components of the device will not only perform as needed but do so consistently and reliably.

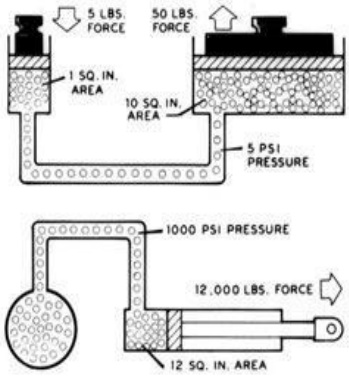
Mr. Jebin Sundararaj P.G
(AP/MECH)

STUDENTS PAGE

HYDRAULIC POWER…

The basis for all hydraulic systems is expressed by Pascal's law which states that the pressure exerted anywhere upon an enclosed liquid is transmitted undiminished, in all directions, to the interior of the container. This principle allows large forces to be generated with relatively little effort. As illustrated, a 5-pound force exerted against a 1 inch square area creates an internal pressure of 5 psi. This pressure, acting against the 10 square inch area develops 50 pounds of force.

In a basic hydraulic circuit, the force exerted by a cylinder is dependent upon the cylinder bore size and the pump pressure. (There is no force generated unless there is resistance to the movement of the piston). With 1000 psi pump pressure exerted against a 12 square inch piston area (approximately 4" dia.), a force of 12,000 pounds is developed by the cylinder. The speed at which the piston will move is dependent upon the flow rate (gpm) from the pump and the cylinder area. Hence, if pump delivery is 1 gallon per minute (231 cu.in./min.) the cylinder piston will move at the rate of 20 in./min. (231cu.in. ÷ 12cu.in./min.).



ABIN

III YR/Mech

HEALTH TIPS…

- **Eat a variety of foods**
- **Base your diet on plenty of foods rich in carbohydrates**
- **Replace saturated with unsaturated fat**
- **Enjoy plenty of fruits and vegetables**
- **Reduce salt and sugar intake**
- **Eat regularly, control the portion size**
- **Drink plenty of fluids**
- **Maintain a healthy body weight**
- **Get on the move, make it a habit!**
- **Start now! And keep changing gradually..**

BABIN

II Yr/ MECH

“Beauty is power; a smile is its sword.”

Ratheesh

(III Yr/MECH)

BE PEACEFUL…..

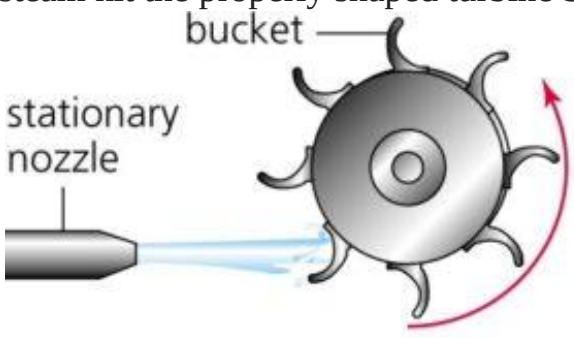
- **DECIDE WHAT IS IMPORTANT.**
- **EXAMINE YOUR COMMITMENTS.**
- **DO LESS EACH DAY.**
- **LEAVE TIME BETWEEN TASKS OR APPOINTMENTS.**
- **SLOW DOWN AND ENJOY EVERY TASK.**
- **SINGLE-TASK; DON'T MULTI-TASK.**
- **DON'T LET TECHNOLOGY TAKE OVER YOUR LIFE.**
- **DO NOTHING AND CREATE TIME FOR SOLITUDE.**
- **LIVE IN THE MOMENT.**

ASWIN
II YR MECH

TURBINE PRINCIPLE….

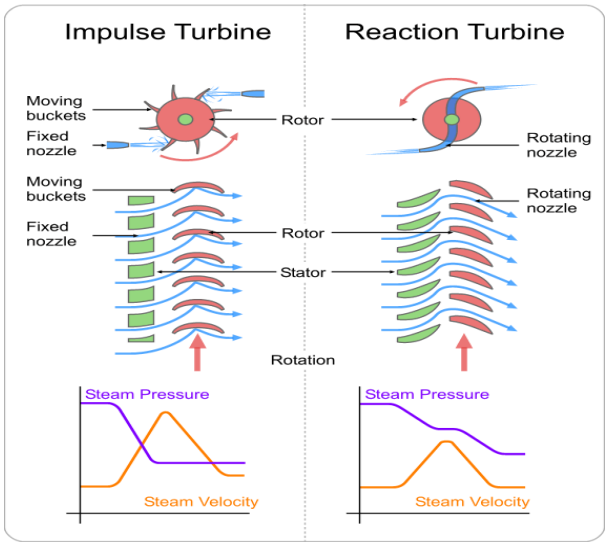
Impulse Principle

The steam at high pressure enters through a stationary nozzle of a steam turbine, as a result the pressure of the steam is decrease and an increase in steam velocity. As a result of increased steam velocity steam pass through the nozzle in the form of a high-speed jet. This high-velocity steam hit the properly shaped turbine blade, as a result, the steam flow direction is changed. The effect of this change in direction of the steam flow will produce an impulse force. This force cause the blade move, thereby the rotor will start to rotate.



The force applied to the blade is developed by causing the steam to change the direction of flow (Newton's 2nd Law – change of momentum). The change of momentum produces the impulse force.

Reaction Principle



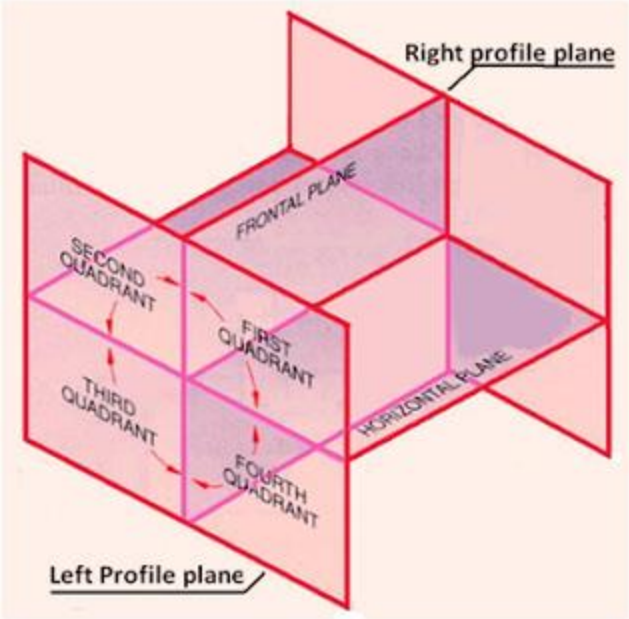
In the case of reaction turbine, the moving blades of a turbine are shaped in such a way that the steam expands and drops in pressure as it passes through them. As a result of pressure decrease in the moving blade, a reaction force will be produced. This force will make the blades to rotate.

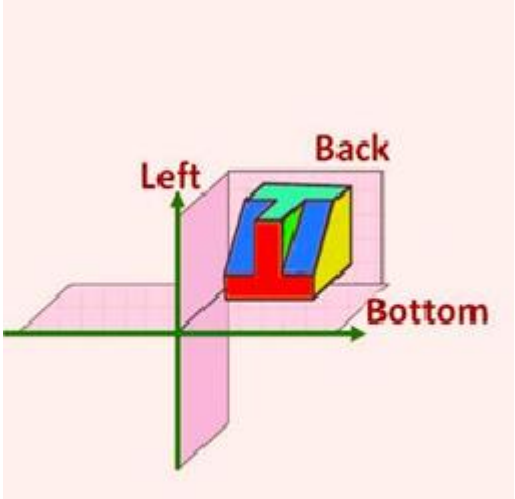
Arjun S
IV Yr/ Mech

PROJECTION OF PLANES

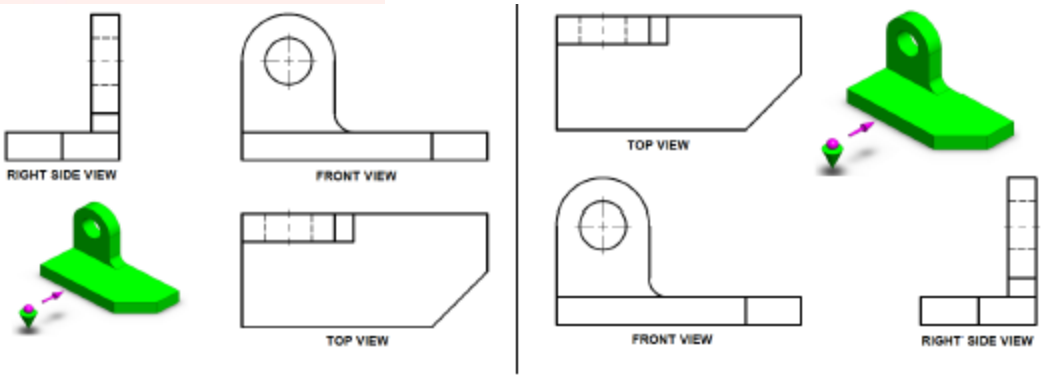
We essentially have two main types of projection techniques, the First angle projection, and the Third angle projection. Both of them do the same job, but there are differences in the way we get the results.

Divide the plane into four quadrants. For the first angle projection, place the object in the first quadrant and in the third quadrant for the third angle projection.





The object is placed between the plane of projection and observer for the first angle projection and between the object and observer for the third angle projection.



First Angle Projection Third Angle Projection

Ramji

IV yr /Mech

“There is something of the marvelous in all things of nature.”

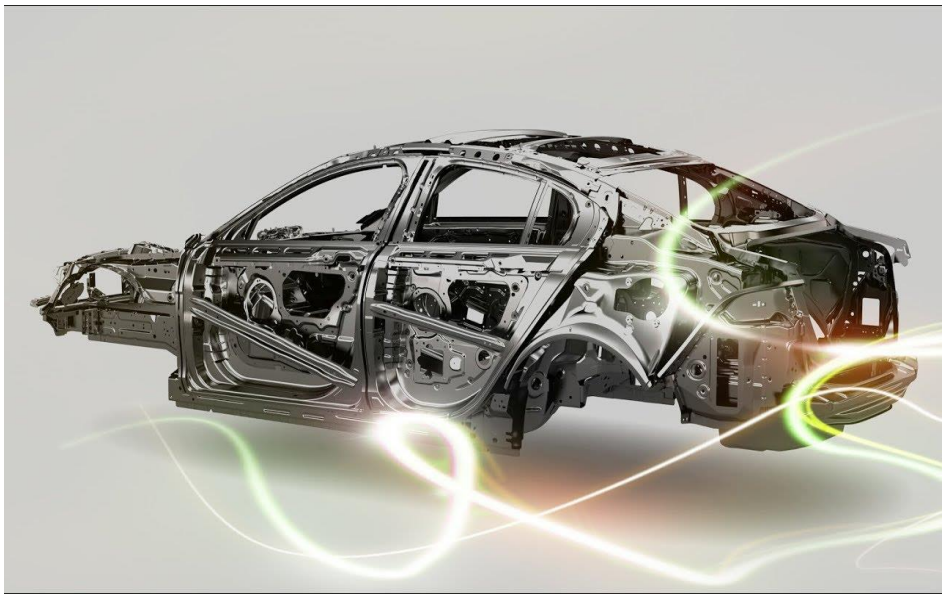
Antony George

II Yr / MECH

Frameless construction

In cabinetmaking refers to the construction of cabinets using flat panels of engineered wood — usually particle board, plywood or medium-density fiberboard — rather than the traditional frame and panel construction.

A common construction method for frameless cabinets originated in Europe after World War II and is known as the 32-mm system or European system. This nomenclature is derived from the 32-millimetre spacing between the system holes used for construction and installation of hardware typically used for doors, drawers and shelves. There are numerous 32mm based cabinet systems, one such system is Hettich's System 32. In North America it is also often referred to as "European Cabinetry" popular due to its simplicity of construction, clean lines and low cost.



With frameless (AKA full access) cabinets, thicker sides (boxes) keep the cabinet much more stable and avoids the use of a front frame, such as found in face-frame cabinets. Frameless cabinets are usually edge banded to finish the front faces. By eliminating the front frame, you can have more room to get large objects inside with more usable space.

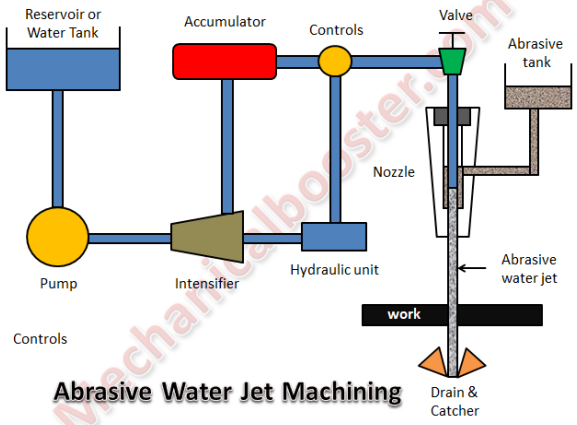
Paul Livingston

III Yr/ Mech

WATER JET CUTTING

In water jet cutting, workpieces are separated from each other by a high-pressure water jet. For this purpose, either specially treated water or an abrasive agent is used.

Water jet cutting came into being at the end of the 19th and beginning of the 20th century. Initially, the process was used to remove clay and gravel deposits. A little later, water jet cutting was used in the US American gold mines to remove stones and earth from the gold veins. In the 1930s, American and Russian engineers used the process to clean castings. The pressure used for water jet cutting was only 100 bar at that time. Norman Franz, professor at the University of British Columbia, secured the first patent for a machine used for water jet cutting at a pressure of 700 bar.



Abrasive Water Jet Machining

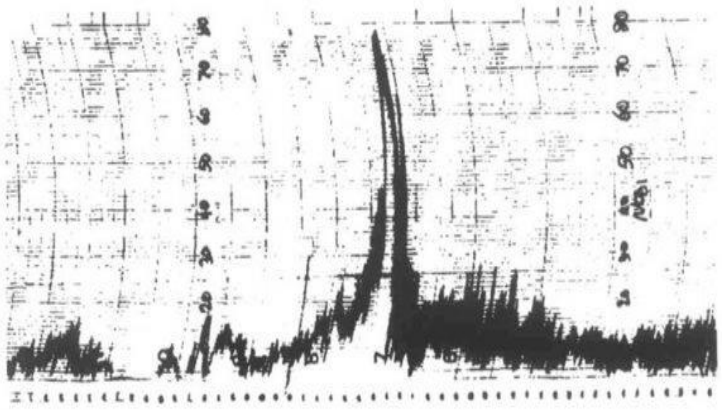
In the 1960s, the aircraft manufacturer Boeing became aware of water jet cutting because it promised optimum processing of the new composite materials introduced at the time. McCartney Manufacturing, an Ingersoll-Rand subsidiary, began using water jet cutting commercially in 1971 to process paper tubes. At that time, the company worked exclusively with pure water jet cutting, preferring materials for the aerospace industry as well as paper diapers. Ingersoll-Rand's high-pressure pumps managed to build up a pressure of up to 3800 bar for water jet cutting. Their subsidiary Bestmatik from Sweden designed a special cutting table to process wooden puzzles precisely using water jet cutting.

It quickly turned out that although pure water jet cutting is ideal for soft materials with a maximum of medium hardness, materials such as steel, ceramics, glass and stone are left out. Attempts to improve water jet cutting with an abrasive were finally crowned with success in the early 1980s. Ingersoll-Rand added **abrasive water jet cutting** to its product range in 1984. At the end of the 1990s, the manufacturer Flow optimised the process again. The so-called Dynamic water jet offers even higher precision and the possibility of cutting even very thick workpieces.

Mr.Justin Leo, AP/Mech

Hybrid simulation of thunderstorm outflows and wind excited response of structures

In this simulation analysis, some parameters such as aerodynamic damping and transient aerodynamic effects were neglected. The obtained results also helped in getting the information about classic analysis. This was done about synoptic stationary cyclones. It was however observed that thunderstorms out flows often induce a major structural response as compared to synoptic stationary cyclones.



However, both synoptic and thunderstorms events experience similar qualitative responses as far as the dynamic response and wind loading on the structures are concerned. The same similarities for the two cases are too witnessed with the aerodynamic admittance. Structural components such as buildings, bridges, and tunnels are often affected by actions of winds and thunderstorms outflows.

The need to control their effects on structures has resulted in numerous researchers in the wind engineering field. The study by Professor Giovanni Solari and his team will help in gathering different data involving such structures which will thus be analyzed to produce robust results that may be further used in understanding other effects such as those resulting from aerodynamic damping.

Abilesh

Assistant Professor/ MECH

HISTORY OF STEAM ENGINE TRAIN….

A **steam locomotive** is a type of railway locomotive that produces its pulling power through a steam engine. These locomotives are fueled by burning combustible material – usually coal, wood, or oil – to produce steam in a boiler. The steam moves reciprocating pistons which are mechanically connected to the locomotive's main wheels (drivers). Both fuel and water supplies are carried with the locomotive, either on the locomotive itself or in wagons (tenders) pulled behind.

Steam locomotives were first developed in the United Kingdom during the early 19th century and used for railway transport until the middle of the 20th century. Richard Trevithick built the first steam locomotive in 1802. The first commercially successful steam locomotive was built in 1812–13 by John Blenkinsop., the Salamanca (locomotive), the Locomotion No. 1, built by George Stephenson and his son Robert's company Robert Stephenson and Company, was the first steam locomotive to haul passengers on a public railway, the Stockton and Darlington Railway in 1825. In 1830, George Stephenson opened the first public inter-city railway, the Liverpool and Manchester Railway. Robert Stephenson and Company was the pre-eminent builder of steam locomotives for railways in the United Kingdom, the United States, and much of Europe in the first decades of steam.

In the 20th century, Chief Mechanical Engineer of the London and North Eastern Railway (LNER) Nigel Gresley designed some of the most famous locomotives, including the Flying Scotsman, the first steam locomotive officially recorded over 100 mph in passenger service, and a LNER Class A4, 4468 Mallard, which still holds the record for being the fastest steam locomotive in the world (126 mph).

From the early 1900s, steam locomotives were gradually superseded by electric and diesel locomotives, with railways fully converting to electric and diesel power beginning in the late 1930s. The majority of steam locomotives were retired from regular service by the 1980s, although several continue to run on tourist and heritage lines.

Abinesh S

III yr/ MECH

BE A LEADER…

Herin

II Yr/ Mech

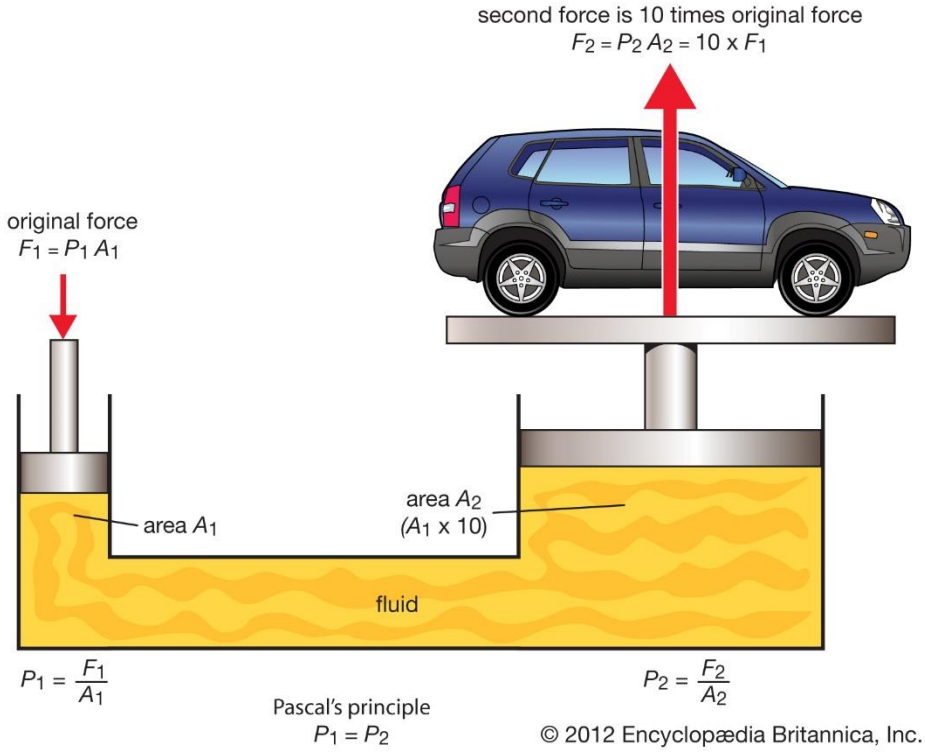
PASCAL'S PRINCIPLE

A change in pressure at any point in an enclosed fluid at rest is transmitted undiminished to all points in the fluid.

Pressure exerted on a fluid in an enclosed container is transmitted equally and undiminished to all parts of the container and acts at right angle to the enclosing walls.

Alternate definition: The pressure applied to any part of the enclosed liquid will be transmitted equally in all directions through the liquid.

The intuitive explanation of this formula is that the change in pressure between two elevations is due to the weight of the fluid between the elevations. Alternatively, the result can be interpreted as a pressure change caused by the change of potential energy per unit volume of the liquid due to the existence of the gravitational field. Note that the variation with height does not depend on any additional pressures. Therefore, Pascal's law can be interpreted as saying that any change in pressure applied at any given point of the fluid is transmitted undiminished throughout the fluid.



Vishnu

II Yr/ MECH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