SUMMER 2015

Department of Mechanical Engineering

NEWSLETTER

Shanti Education Society's

A G PATIL POLYTECHNIC INSTITUTE

In this issue

Find us….

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Welcome

It gives me an immense pleasure to present this issue of newsletter of Mechanical Engineering Department.

The newsletter offers a platform for showcasing departmental activities throughout the year and sharing the journey of our department.

I am feeling proud to say that our department has got an "**Excellent**" grade by Maharashtra state Board of Technical Education, Mumbai.

The different activities, Sports and achievements of the department are well reflected in this newsletter along with the project reports and it is great to see the active participation of students and teachers in these activities or events.

I would like to congratulate all the academic rankers and winners of different events.

I look forward to many more upgrading issues of the newsletter in coming future.

My best wishes always!

Mr. N.D. Mundhe.
Head of the Department

Vision

To provide technical knowledge to students in areas of Mechanical Engineering to meet the needs of industry, business and society.

Mission

1.To provide skilled professionals to the global industry

2.To educate and enhance students to be Entrepreneurs and Team leaders in the field of Engineering

3.To motivate students for research and innovation; aimed at well being of society

Program Educational Objectives (PEOs)

1.To develop ability to apply engineering knowledge, techniques and resources to solve Mechanical Engineering problems

2. To present themselves as responsible professionals with ethics

3. To inculcate ability to design and develop mechanical product and processes to meet the desired needs; considering public health, safety, cultural, social and environmental aspects

Academic Performance

High Flyers

Third year

Name of Student	Percentage	Rank
Gaikwad Samadhan Dnyaneshwar	84.41	First
Rathod Yogesh Shankar	84.05	Second
Potabatti Sanjay Mallikarjun	81.49	Third

Second Year

Name of Student	Percentage	Rank
Bhise Shubham Mahadeo	75.37	First
Akalwadi Akash Mahadev	74.52	Second
Rathod Vikas Shubham	74.49	Third

First Year

Name of Student	Percentage	Rank
Kulkarni Samarth Madhukar	90.47	First
Jirage Rushikesh Mallinath	87.29	Second
Shirsikar Ajay Dilip	84.59	Third


SAMADHAN GAIKWAD
First


RATHOD YOGESH
Second


POTABATTI SANJAY
Third


SHUBHAM BHISE
First


AKALWADI AKASH
Second


RATHOD VIKAS
Third


KULKARNI SAMARTH
First


JIRAGE RUSHIKESH
Second


KULKARNI SIDDHI
Third

Co curricular Activities

1. Samarth Kulkarni & Siddhi Kulkarni, won the first prize in National level technical paper presentation (Annum) held at AGPPI, Solapur.
2. Vicky Sable & Rohit Sutar, won the first prize in National level technical paper presentation held at SPM Polytechnic, Kumthe, Solapur.
3. Avinash Zingade & Rohan Yadwad, won the first prize in National level technical paper presentation held at VVP Polytechnic, Solapur.
4. Ramesh Pujari & Amol Kamble, won the second prize in National level technical event held at AGPIT Solapur.

Extracurricular Activities

1. Amol Kamble & Akash Ghate, won second prize in (Weight Lifting) IEDSSA held at SVIT Polytechnic, Solapur.
2. Onkar Maske & Suhel Shaikh, won second prize in (Table Tennis) IEDSSA held at SVIT Polytechnic, Solapur.
3. Amol Kamble, won first prize in (CAD Expert) Accretion .(a technical event)
4. Samarth Kulkarni, won third prize in (CAD Expert) Accretion. (a technical event)
5. Rohit Sutar, Akeeb Nagarwala, Anand Babar, won prizes in (Lathe Mania) Accretion. (a technical event)

Memorandum of Understanding (MoU)

During this academic year department has made three Memorandum of Understanding (MoU) with,

- Hy-tech Educational Equipments Pvt. Ltd, Pune ,
- Accurate group, Pune and
- Global Infinite Green Power, Solapur

This will help our students to improve their practical knowledge by easily visiting these industries.

Master Talks (Expert Lectures)

1. " Present Scenario and Opportunities for Entrepreneurs " by Mr. Ravindra Adage for second and third year students.
2. " Support and Financial Assistance for SSI " by Ms. Moin Deepa Chattargee for second and third year students.
3. " How to start SSI Unit " by Mr. Thobade S.E. for second and third year students
4. " Recent Trends in CAD CAM " by Dr. S. A. Patil for second year students.
5. " Industrial Labor Laws " by Mr. Hrushikesh Kulkarni for second year students.
6. " Introduction to Apprenticeship Training Scheme " by Mr. Gund N.A. for third year students.
7. " Modern Techniques in Production Management " by Mr. V. V. Mahajan for third year students.

Industrial Visits

Third year students visited to the following industries during their academic year.

1. Chavan Motors, Akkalkot Road, Solapur
2. Baba Ice Factory, Industrial Estate, Hotgi Road, Solapur
3. Laxmi Hydraulics and Pumps (LHP) Ltd., Chincholi MIDC, Solapur

While visits for **second year students** were carried out to following industries.

1. Kothari Pipes Ltd, Mohol, Solapur
2. Leena Engineering Works, Hotgi Road, Solapur
3. Gangji Plastic Industries, Hotgi Road, Solapur
4. Rohit Engineering Works, Solapur
5. Lokmangal Sugar Factory, Pune Road, Solapur

Faculty Achievements

Workshops/Training Attended

1. Mr. Motgi R. S. & Mr. Ambigar V. G. attended a Workshop on Solid Modeling at Pimpri Chincwad Polytechnic, Pune.
2. Mr. Pinjar J. P. & Mr. Mulla J. G. attended 3 days industrial training at m/s NRB Bearing Ltd., Aurangabad.
3. Mr. Kulkarni G.M. participated in half day workshop on Spoken Tutorial Project at Orchid College of Engineering, Solapur.
4. Mr Bartakke A. G. attended one day workshop on NDT awareness at Mangalvedhekar Institute, Solapur.
5. Mr. Balsure N. R. attended one day workshop on Per-

Other Achievements

1. Mr. Mundhe N.D. arranged First year student welcome function.
2. Mr. Mohite S.K. worked as "Convener" for Annum.
3. Mr. Mundhe N.D. worked as "Chief-Coordinator "for Annum.
4. Mr. Rathod S.B. worked as an "Academic Coordinator" for the institute.
5. Mr. Mohite S.K. worked as an "Exam Controller" for MSBTE Winter Exam at VVP Polytechnic, Solapur.
6. Mr. Rathod S.B. worked as an "Exam Controller" for MSBTE Winter Exam at BIT, Barshi, Solapur
7. Mr. Rathod S.B. worked as "internal judge" for technical paper presentation – Annum.
8. Mr. Kulkarni G.M. worked as a Coordinator for Entrepreneur Awareness Camp
9. Mr. Dhalait J.G. worked as a Coordinator for Almanac.
10. Mr. Mundhe N.D. worked as a Stationery In-charge for college.
11. Mr. Motgi R.S. worked as a coordinator for Annum.
12. Mr. Motgi R.S. worked as Convener for Accretion.
13. Mr. Dawankar S.R., Mr. Balsure N.R., Mr. Pinjar J.P., and Mr. Ambigar V.G., worked as Coordinators for Accretion.
14. Ms. Balgar S.M., deputed for her post graduation studies.

Study of Coolant for VMC

Milling is the machining process of using rotary cutters to remove material from a work piece by advancing (or *feeding*) in a direction at an angle with the axis of the tool. Milling machine consisting of automatic tool changers, tool magazine, CNC control and coolant system are called machining centers. These are Vertical and Horizontal machining centers.

Milling machines can perform a vast number of operations, from simple (e.g. slot and key way cutting, planning and drilling) to complex (e.g. contouring , die-sinking). Cutting fluid is often pumped to the cutting site to cool and lubricate the cut and to wash away the resulting metal chips. Cooling of the work-piece and tool is necessary to eliminate the unwanted effects of heat on both the work-piece and tool. Lubrication is needed to reduce friction between the tool and work-piece and protect the work-piece from corrosion.

Cutting fluid is a type of coolant and lubricant designed specifically for metal working and machining processes. There are various kinds of cutting fluids which includes oil, oil-water emulsion, pastes, gels, aerosols (mists), air or other gases. Most metal working and machining processes can benefit from the use of cutting fluid, depending on the work-piece material. Common exception to this are, machining cast iron and brass which are machined dry. Therefore a coolant is a liquid which flows through device to prevent the overheating

There are many types of metalworking fluids (coolants) which are used while machining on vertical milling centers. These are as follows.

- **Straight Metal Working Oils:**

These fluids are mineral oil based. They contain no water. Metalworking functionality of straight oils may be improved by various additives: fatty oils for better wet ability; sulfur, chlorine or phosphorous for extra pressure conditions (EP) and better lubrication. Advantages of straight oils: excellent lubrication , good corrosion protection, easy maintenance. Disadvantages of straight oils: poor heat removal, toxic mist, high viscosity, flammable, expensive. Straight oils are used in low speed applications, for metalworking Stainless steels and other poorly machinable metals and in the operations, in which good lubrication is necessary (honing, deep drilling etc.)

- **Emulsifiable metalworking oils:**

Emulsifiable oils are also referred to as water -soluble oils, which is not correct, since oils do not form true water solutions. Emulsifiable oils are mineral oil based and contain emulsifiers, EP and other additives. Emulsifiers reduce interfacial tension between oil droplets and water, providing stable finely dispersed oil emulsion in water. Emulsifiable oils are mixed with water in a concentration 2-10%. Advantages of emulsions: good lubrication, good cooling capability, some corrosion protection, low cost, non-flammable. Disadvantages of emulsions: anti -bacteria additives and maintenance are needed, toxic mist, susceptible to hard water.

- **Semi-synthetic metalworking fluids:**

Semi-synthetic fluids are water based mixture (solution and emulsion) of synthetic lubricants, additives, emulsifiers and some amount (2%-30%) of mineral oil. Semi-synthetic fluids combine advantages of mineral emulsions and synthetic fluids: They Possess better corrosion protection than synthetic fluids and better cooling and wetting capabilities, easier handling and maintenance than mineral emulsions. Disadvantages of semi-synthetic fluids: misting, relatively poor stability in hard water, contaminated by foreign oils, some toxicity.

- **Synthetic metalworking fluids.**

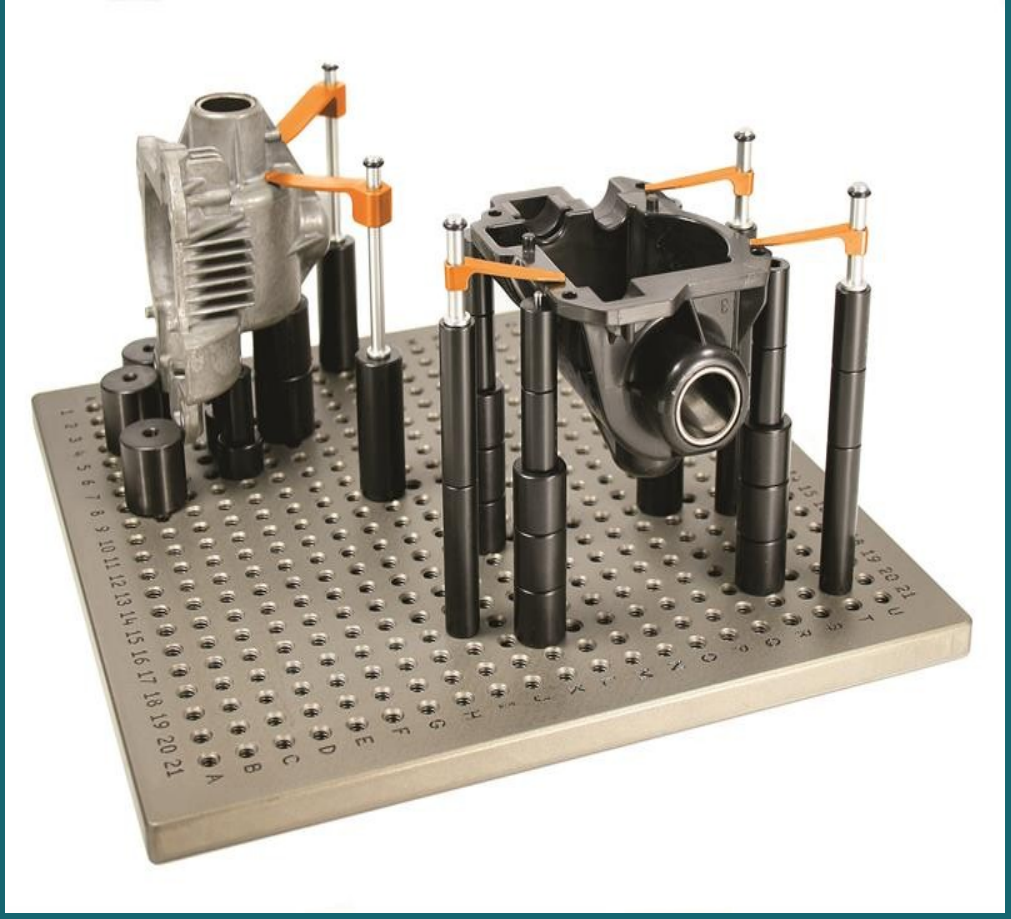
Synthetic metalworking fluids are water based solutions (or emulsions) of synthetic lubricants (soaps and other wetting agents), corrosion inhibitors, water softeners, EP, anti-bacteria additives (biocides), glycols and other additives. Synthetic fluids are supplied in form of concentrates, which are mixed with water before use. Advantages of synthetic fluids: very good cooling capability, good lubrication properties, good stability in hard water, good corrosion protection, low mist, easy handling, cleaning and maintenance. Disadvantages of synthetic fluids: some toxicity, easily contaminated by foreign oils, relatively high cost. Synthetic fluids are used in a wide variety of metalworking operations including poorly machinable alloys, heavy duty grinding, high speed cutting.

Pravin Mote Shankar Rathod

Saudagar Jadhav Amar Patted

Mr. A.G. Bartakke

Design and Development of Fixture for End Cover of Pump



Fixtures play an important role within many manufacturing processes. They accurately locate and secure a work piece during machining such that the part can be manufactured to design specifications. Fixture have direct effect on machining quality, productivity and cost of the product.

The fixture is a special tool for holding a work piece in proper position during manufacturing operation. For supporting and clamping the work piece, device is provided. Frequent checking, positioning, individual marking and non uniform quality in manufacturing process are eliminated by fixture. This increases productivity and reduce operation time. Fixture is widely used in the industry practical production because of feature and advantages. To locate and immobilize work pieces for machining, inspection, assembly and other operations fixtures are used. A fixture consists of a set of locators and clamps. Locators are used to determine the position and orientation of a work piece, whereas clamps exert clamping forces so that the work piece is pressed firmly against locators. Clamping has to be appropriately planned at the stage of machining fixture design. Fixture design plays an important role during the setup phase. Proper fixture design is required for developing product quality in different terms of accuracy, surface finish and precision of the machined parts. Same existing old cover fixture is modified with new one by making slight changes to it, so the main aim of this project is to minimize the loading and unloading time for the job and to increase the production rate by modifying the existing fixture for end cover of pump.

Fixtures must always be designed with economics in mind; the purpose of these devices is to reduce costs, and so they must be designed in such a way that the cost reduction outweighs the cost of implementing the fixture. It is usually better, from an economic standpoint, for a fixture to result in a small cost reduction for a process in constant use, than for a large cost reduction for a process used only occasionally.

Most fixtures have a solid component, affixed to the floor or to the body of the machine and considered immovable relative to the motion of the machining bit, and one or more movable components known as clamps. These clamps (which may be operated by many different mechanical means) allow work pieces to be easily placed in the machine or removed, and yet stay secure during operation. Many are also adjustable, allowing for work pieces of different sizes to be used for different operations. Fixtures must be designed such that the pressure or motion of the machining operation (usually known as the feed) is directed primarily against the solid component of the fixture. This reduces the likelihood that the fixture will fail, interrupting the operation and potentially causing damage to infrastructure, components, or operators.

Design of fixture whether it is manual or hydraulic is the same. Any work holding fixture must fulfill three basic functions. 1) Position the component accurately. 2) Support the component accurately. 3) Clamp the component accurately. The structure of the fixture must be sufficiently rigid and heavy to avoid deformities and vibrations due to machine movements and clamping forces. For designing fixture it is necessary to study component details which include part geometry, machining process, design and interpretation rules for the machining fixture. Part drawing study is required to decide locating surface, clamping surface and resting surface where process plan study is required to calculate cutting forces.

Therefore above consideration are taken into account while designing the fixture for end cover of pump.

Shivshankar Guddewadi
Rupesh Varganti
Gaurav Harke
Akash Shinde

Mr. J.G. Mulla

SOLAR WATER PURIFIER

Carbon filter is used for initial filtration. Water is then passed through tubes where energy of sunlight is focused through solar thermal collectors.

More than a billion people currently lack access to clean drinking water. One result of this is the deaths of many children from preventable diarrheal diseases and intestinal parasites. It is estimated that more than 1.8 million people die each year from illnesses caused by contaminated drinking water.

Of course there are many different methods to clean drinking water, but most of them are based on large-scale plants and access to electricity.

Therefore solar water purifier makes it possible to purify impure water with the help of solar energy, requiring no electricity from mains or batteries. Along with this there are many other advantages of this solar water purifier over other filtration methods such as there are no moving parts, therefore it is reliable and maintenance free. Also water colour and taste to be claimed better

This method is also simple, can be made portable and inexpensive. It can make around 6 liters of drinkable water per day in summer but amount decreases in winter.

Distillation is one of many processes available for water purification, and sunlight is one of several forms of heat energy that can be used to power that process. Sunlight has the advantage of zero fuel cost but it requires more space (for its collection) and generally more costly equipment.

For people concerned about the quality of their municipally-supplied drinking water and unhappy with other methods of additional purification available to them, solar distillation of tap water can be a pleasant, energy-efficient option.

In this paper, two aspects are included first aspect is initial filtration using carbon filter where a bed of activated carbon is used to remove contaminants and impurities using chemical absorption. This method also removes bad taste and odour from water. In the second aspect water is passed through tubes for remaining filtration. Here a solar thermal collector is used. Then the energy of sunlight which enters into the solar collectors is focused along the tube. Because of concentration of more thermal radiation tube will absorb heat and will transmit it to water inside the tube. This raises its temperature to around 80°C to kill bacteria, viruses and other microorganisms that can cause diseases. This method is used since these microorganisms shown resistance to chemical disinfection and cannot be removed by microfiltration.

Thus during second stage the increased temperature of water kills the commonly waterborne bacteria and viruses at a temperature between 65°C to 75°C, making water drinkable. In the long run this method of using two stages is less costly as compared to other filtration processes available in the market. Also it is environmental friendly with less maintenance.

Here the main aim is to use solar thermal energy for water pasteurization and filtration. This will help to filter water without any renewable source. So the objective is to remove sediments and particulate matter from water and kill the disease making microorganisms to make water drinkable.

This solar water purifier consist of carbon filter and solar water heater as shown in the fig **1.** The main components of this solar water purifier are solar thermal collector, tube, metal construction, manifold and carbon filter. The solar thermal collector collets the solar energy which is used to focus on the tubes.

Here if we use vacuum around the tubes then the heat loss due to radiation will get reduce significantly but cost also increases. The construction of ribs is to hold the solar collectors and stand is made using steel to hold the manifold and tank. Carbon filter has generally 3 parts which are sediments removal, pre-carbon and post-carbon filters. In first part sediments and other contaminants are removed and colour and odour are controlled by second and third part of the carbon filter. These carbon filters are very effective at removing chlorine, benzene, radon, solvents like trihalomethane compounds, volatile organic chemicals such as pesticides and herbicides and hundreds of other man-made chemicals that may come into contact with tap water as it proceeds through the system. In addition, filters remove bad tastes and odours also.

Process of removing or killing waterborne microorganisms to make water drinkable is called water pasteurization. Here unlike other methods, pasteurization aims to reduce only number of disease making pathogens so they are unlikely to cause disease.

Solar Water Purifier

Ajay Nichre
Sagar Kodam
Akshay Kedar
Punit Sonawane
Mr. S.B. Rathod

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COURSES OFFERED IN DIPLOMA ENGINEERING

Discipline	Intake Capacity	Duration of Course
Mechanical Engineering	180	3 years
Electronics and Telecom. Engineering	60	3 years
Civil Engineering	60	3 years
Computer Engineering	60	3 years
Information Technology	60	3 years
Total Intake	420