

REPORT ON
“3D PRINTING: HANDS-ON- Experience”
(Skill Development Program)
23rd-24th October 2017

A skill development program on “**3D printing: Hands-on Training**” was conducted in the department of Mechanical Engineering on 23rd and 24th of October 2017. The programme aimed to introduce the concepts of additive manufacturing for the students of Mechanical Engineering. Also a hands-on-training session was organized in the CAM lab. Mr. Ravi Kumar, Engineer, Think 3D systems, Chennai, addressed the programme.

In the first session, Dr.K.C.Varaprasad, H.O.D, Department of Mechanical Engineering, who himself having an expertise in the domain of Additive Manufacturing, has shared his valuable knowledge with the students. He introduced the concept of additive manufacturing with very illustrative examples. The history of manufacturing was discussed in brief and then gave the valid reasons behind the introduction of the term Additive Manufacturing.

Key points from his lecture are:

1. Lot of material wastage happening in the conventional manufacturing leads to increase in the cost of the product. In the global world, with huge competition around, an industry cannot overlook the wastage. Also one cannot waste the resources available.
2. To overcome the above issues, a new idea of additive manufacturing evolved, wherein a 3D object is built by **adding** layer-upon-layer on

the material, whether the material is plastic, metal, concrete or one day.....human tissue.



Dr

.K.C.Varaprasad, sharing his knowledge with the students

3. The term "3D printing" is increasingly used as a synonym for Additive Manufacturing. However, the later is more accurate, in that it describes a professional production technique which is clearly distinguished from conventional methods of material removal. Instead of milling a workpiece from solid block, for example, Additive Manufacturing builds up components layer by layer using materials which are available in fine powder form. A range of different metals, plastics and composite materials may be used.

After giving some examples, the session was handed over to Mr. Ravi of Chennai.

In the second session, Mr. Ravi introduced himself and then started the things by explaining the concept of 3D printing. He gave many Industrial applications and current scenario of 3D printing. 3D printed objects were

demonstrated practically. The advantages and disadvantages of going for 3D printing were discussed in detail. Students also shared their views on the current manufacturing trends.

Mr. Ravi discussed the 3D printing process in detail. The key points from his lecture are:

1. Common to AM technologies is the use of a computer, 3D modeling software (Computer Aided Design or CAD), machine equipment and layering material. Once a CAD sketch is produced, the AM equipment reads in data from the CAD file and lays down or adds successive layers of liquid, powder, sheet material or other, in a layer-upon-layer fashion to fabricate a 3D object.
2. Functional Principle: The system starts by applying a thin layer of the powder material to the building platform. A powerful laser beam then fuses the powder at exactly the points defined by the computer-generated component design data. The platform is then lowered and another layer of powder is applied. Once again the material is fused so as to bond with the layer below at the predefined points. Depending on the material used, components can be manufactured using stereolithography, laser sintering or 3D printing.
3. The speaker has emphasized that 3d printing will be the future of manufacturing and encouraged all the students to work in that field. He also motivated them to start their research work in the area of additive manufacturing.

Finally, the speaker has showcased some of the 3D products to the students and asked them to identify the differences from the conventional products.

So, by the end of day 1, students interacted with the resource person enthusiastically and clarified their doubts.



Student's participation in the programme

The day 2 of the program was completely dedicated for hands on training on 3D printer. Mr.Ravi has trained the students on Flash Forge 3D printer machine. The machine parts, working procedure, machine operation and precautions to be followed were discussed practically.



Mr. Ravi, demonstrating the 3D printer

Then the simulation softwares "Flash print" and "Cura" were also taught to the students. The students were made into groups and each group has designed and simulated one component by their own. The students gained a thorough knowledge on 3D printing and thanked the speaker for sharing valuable information with them.

During the valedictory function, K.C.Varaprasad HOD, thanked the speaker Mr. Ravi for enriching the students of Mechanical Engineering, with his vast experience. He also thanked all the participants and coordinators for making the workshop a grand success. Dr. Sree Sabari and Mr.Reddy Prasad, the coordinators of the program, distributed the soft copy of the material to the students.

Coordinators

Dr.Sree Sabari

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Mr.G.V.V.S.Reddy Prasad