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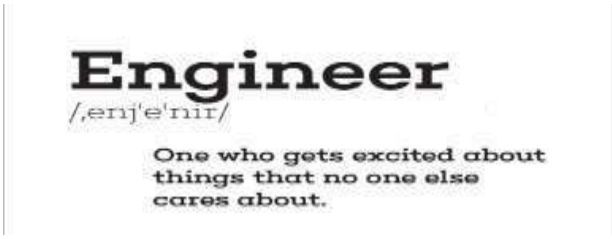
ASHTAG

Applied Science and Humanities Department

VISION

The Department of Applied Science and Humanities is committed to dynamically integrate the components of Science, Humanities and Engineering to groom students to transform them as globally acknowledged professionals.



MISSION

The department is carrying a mission to create and disseminate the knowledge and techniques in intellectual areas of Engineering and other core areas of Applied Science and Humanities for betterment of Eco system.

To inculcate the importance of Applied Science and develop a natural flair for Engineering and Technology which in turn shall mold students into a competent professional.

To be recognized for practicing the best teaching-learning processes to create highly competent, resourceful, and self-motivated young Engineers for the benefit of the society.

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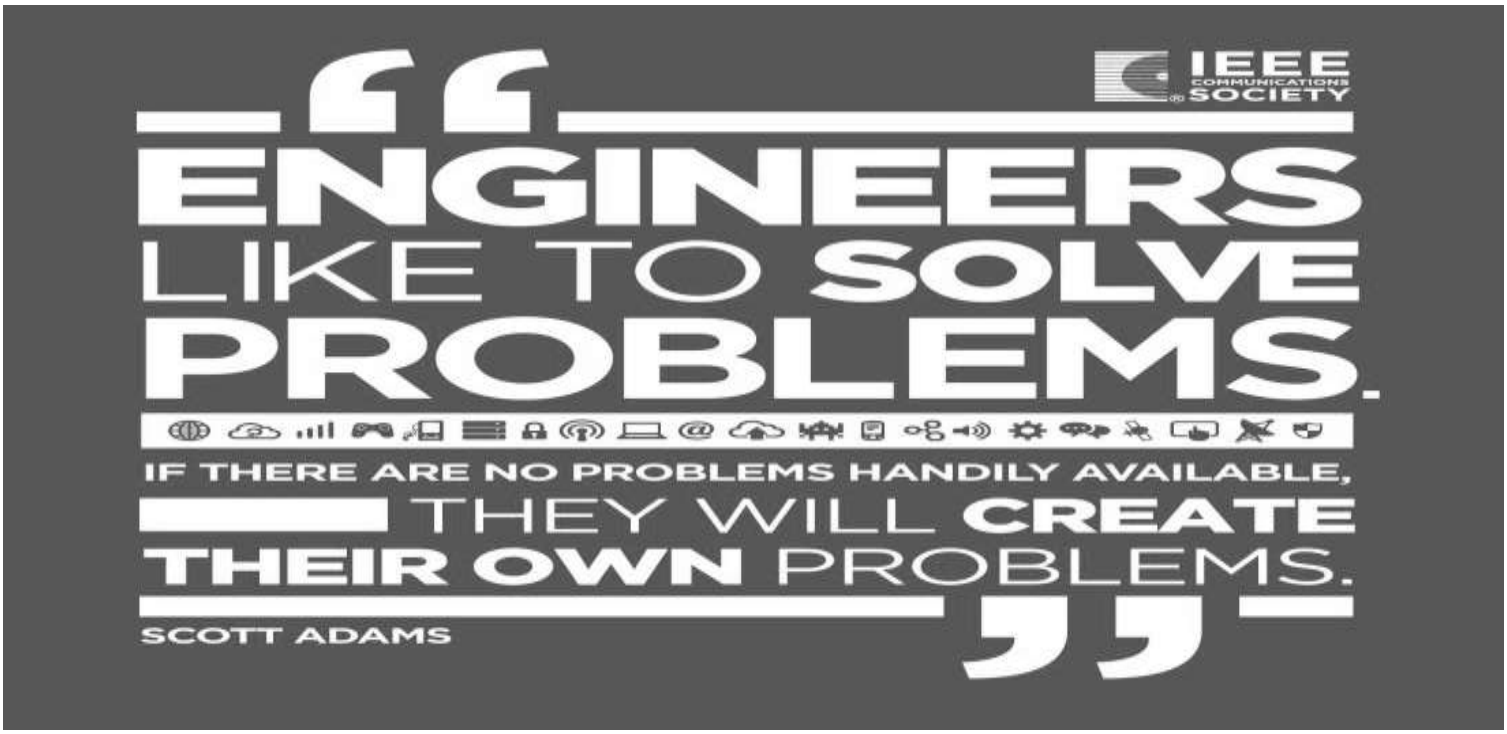

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Sundaram Industry is a notebook producing plant with around 240 varieties of products, the industrial plant is located in Palghar District. We had a field visit to this plant on 23 April 2022, and the valuable information from the field visit is mentioned in this file.

This is what we learned about how the industries function:

Reel Collection:

As it is a book manufacturing industry it takes at least 80 tons of raw material such as paper reels from its vendors across India from locations like Andhra Pradesh, Tamil Nadu, Vapi and Gujrat. A single reel consists of around 21 thousand paper capacity. These Reels are rigid and strong and are low maintenance, these reels are then bought into further different processes to make notebooks of different page capacities.

Lining and Printing (Fully Automatic):

Paper reels are used to make pages and then lines get printed on the pages using lining and printing machines. Around 8 reels are used to print lines on the pages in a single day. The ink used has low lead content, so it is eco-friendly and water-based. The lining and printing machine also cut the paper sheet as per the required length.

Page counting (Completely Manual):

After the paper sheets are collected from lining and printing machine, it is shifted to the page counting section where pages are counted completely manually, the reason behind this is that pages are counted faster manually than automatic. Around 8 to 9 highly experienced employees work here to count pages and count around 1.25-1.5 lakhs of sheets daily.

Line-O-Matic (Semi-Automatic Paper producing machine):

Paper sheets collected from reels are combined with outer cover with manual labour and then attached to Pinning Mechanisms with hands. The speciality of this machine is that the pinning work can be done automatically as well as manually using buttons. This machine can produce around 3-4 thousand books. It is used to produce 100 pages' notebooks.

Pinning Machine (Semi-Automatic):

This machine is used to pin the outer cover with paper sheets to make a notebook. The pins are made out of steel so that it doesn't rust and be durable as well as recyclable. Around 3-4 thousand books are produced in a day. It produces a notebook of 150 pages.

Twin Corner Cutting Machine (Semi-automatic):

This machine is used for cutting notebooks with round edges. Sheets of paper are aligned in the machine using manual labour and the sheets are given shapes with round corners. This machine can produce around 5-6 thousand sheets per day.

Cutting Machine (Semi-automatic):

This machine is used for notebooks with high precision so that no errors of extra sheets occur. The specified length is set onto the machine and then 12 sets of book sheets are aligned in the machine using manual labour. The machine cuts the books with high precision and pressure, as a safety concern, sensors and cameras are attached to the machine which detects hand moments so that no harm to human life occurs.

Motorized Punching Machine (Semi-Automatic):

It is used to create holes in paper sheets with more capacity. The speciality of this machine is it can create more holes than a normal punching machine as it is motorized and can apply more pressure than manual work. However, manual labour is required to align the sheets into the machine.

Spiral Assembly (Completely Manual):

Paper sheets punched with motorized punching machines are shifted here to do spiral binding on them. This work is done completely manual. Not only notebooks but also drawing books as well as A6 size sketchbooks are spirally joined here. This work is completely manual and all women employees work here 8 hours a shift. Approximately, around 4-5 thousand books are spirally joined here daily.

Pasting (Semi-automatic)

A thin plastic film is stuck to the outer cover to increase the durability using this machine. The speciality of this machine is that it can produce around 50k books per day at its maximum. But manual labour is required for aligning the outer cover. Stitching Work (Semi-automatic):

While the outer cover and paper sheets are attached using a pinning machine. Some other books are stitched via a stitching machine using manual labour, this is to ensure more durability and strength to the notebook. This work is usually done in children’s notebooks.

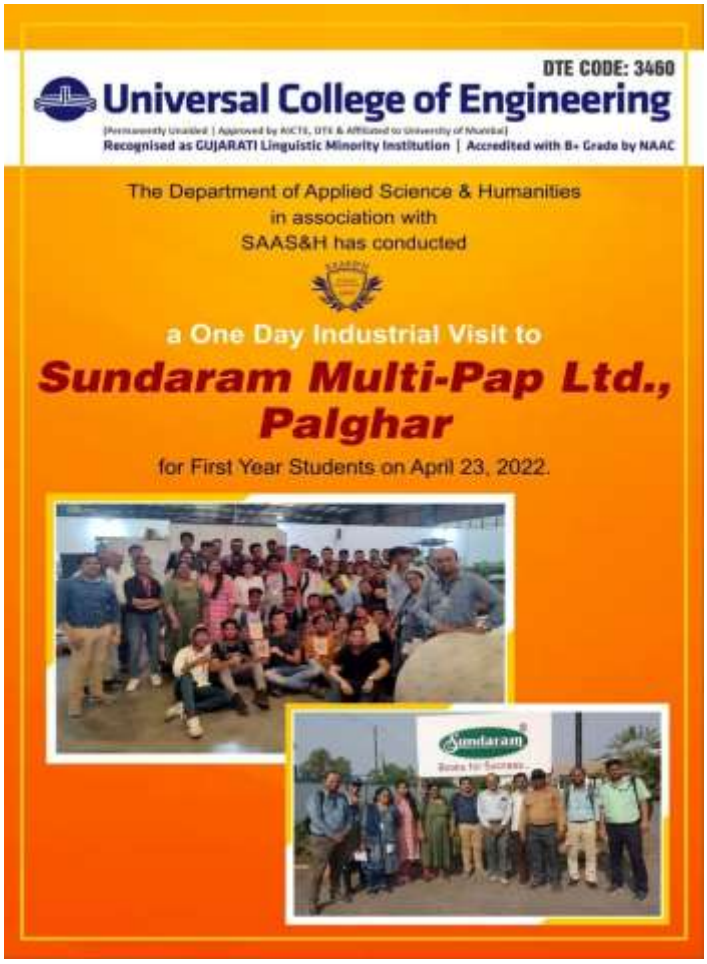
Prize Sticking (Completely Manual):

This work is only done when new products are launched but the price tag is not printed on them.

So the prize is stuck on it using manual work. Around 5-6 thousand are stuck with the price tag daily.

Sealing and Packaging (Semi-Automatic):

Notebooks are that completely produced are bought into this section so that they can be packed and sent to a storage facility where they can be further sent to distributors. The notebooks are wrapped with plastic sheets for extra care and then packed into carton boxes. Around 3 to 4 plastic sheets are used per day. It may vary according to the amount of order that is received.



By Yash Ganar

Compiled by: Yash Gupta

Hologram

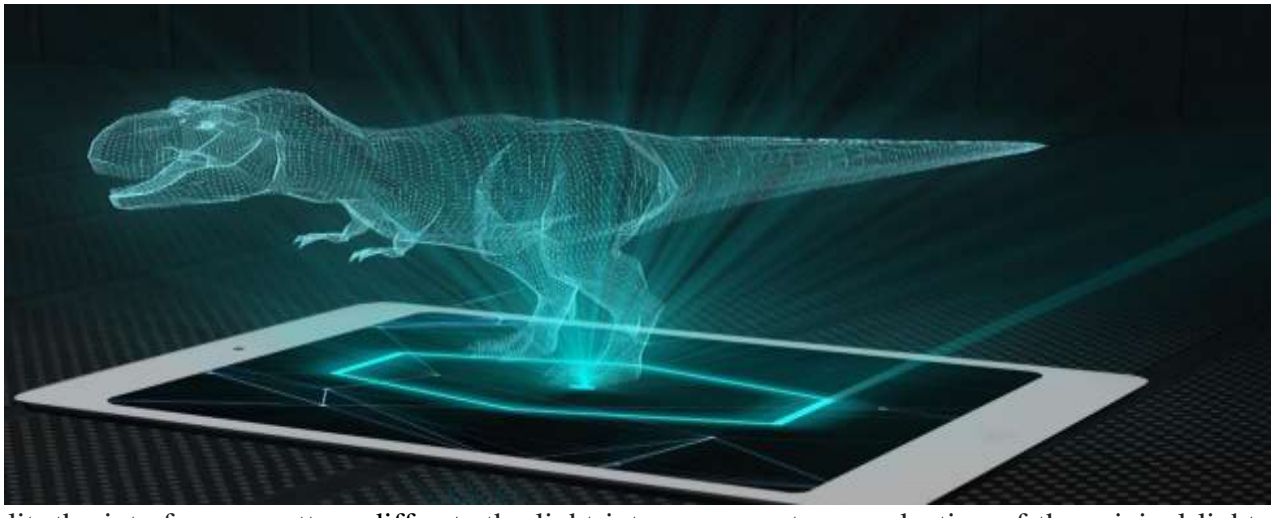
Holography is a technique that enables a wavefront to be recorded and later reconstructed. Holography is best known as a method of generating three-dimensional images, but it also has a wide range of other applications. In principle, it is possible to make a hologram for any type of wave.

A hologram is made by superimposing a second wavefront (normally called the reference beam) on the wavefront of interest, thereby generating an interference pattern which is recorded on a physical medium. When only the second wavefront illuminates the interference pattern, it is diffracted to recreate the original wavefront. Holograms can also be computer-generated by modelling the two wavefronts and adding them together digitally. The resulting digital image is

then printed onto a suitable mask or film and illuminated by a suitable source to reconstruct the wavefront of interest. The Hungarian -British physicist Dennis Gabor (in Hungarian: *Gábor Dénes*) was awarded the Nobel Prize in Physics in 1971 "for his invention and development of the holographic method".

His work, done in the late 1940s, was built on pioneering work in the field of X-ray microscopy by other scientists including in 1920 and William Lawrence Bragg in 1939. This discovery was an unexpected result of research into improving electron microscopes at the British Thomson-Huston Company (BTH) in Rugby, England, and the company filed a patent in December 1947 (patent GB685286). The technique as originally invented is still used in electron microscopy, which it is known as electron holography, but optical holography did not really advance until the development of the laser in 1960. The word *holography* comes from the Greek words (*holos*; "whole").

A hologram is a recording of an interference pattern which can reproduce a 3D light field using diffraction. The reproduced light field can generate an image which still has the depth, parallax, and other properties of the original scene. A hologram is a photographic recording of a light field, rather than an image formed by a lens. The holographic medium, for example the object produced by a holographic process (which may be referred to as a hologram) is usually unintelligible when viewed under diffuse ambient light. It is an encoding of the light field as an interference pattern of variations in the opacity, density, or surface profile of the photographic medium. When suitably



lit, the interference pattern diffracts the light into an accurate reproduction of the original light field, and the objects that were in it exhibit visual depth cues such as parallax and perspective that change realistically with the different angles of viewing. That is, the view of the image from different angles represents the subject viewed from similar angles. In this sense, holograms do not have just the illusion of depth but are truly three-dimensional images.

The development of the laser enabled the first practical optical holograms that recorded 3D objects to be made in 1962 by Yuri Denisyuk in the Soviet Union and by Emmett Leith and Juris Upatnieks at the University of Michigan, USA Early holograms used silver halide photographic emulsions as the recording medium. They were not very efficient as the produced grating absorbed much of the incident light. Various methods of converting the variation in transmission to a variation in refractive index (known as "bleaching") were developed which enabled much more efficient holograms to be produced.

Optical holography needs a laser light to record the light field. In its early days, holography required high-power and expensive lasers, but currently, mass-produced low-cost laser diodes, such as those found on DVD recorders and used in other common applications, can be used to make holograms and have made holography much more accessible to low-budget researchers, artists and dedicated hobbyists. A microscopic level of detail throughout the recorded scene can be reproduced. The 3D image can, however, be viewed with non-laser light. In common practice, however, major image quality compromises are made to remove the need for laser illumination to view the hologram, and in some cases, to make it. Holographic portraiture often resorts to a non-holographic intermediate imaging procedure, to avoid the dangerous high-powered pulsed lasers which would be needed to optically "freeze" moving subjects as perfectly as the extremely motion-intolerant holographic recording process requires. Holograms can now also be entirely computer-generated to show objects or scenes that never existed. Most holograms produced are of static objects but systems for displaying changing scenes on a holographic volumetric display are now being developed.

Holography is distinct from lenticular and other earlier autostereoscopic 3D display technologies, which can produce superficially similar results but are based on conventional lens imaging. Images requiring the aid of special glasses or other intermediate optics, stage illusions such as Pepper's Ghost and other unusual, baffling, or seemingly magical images are often incorrectly called holograms.

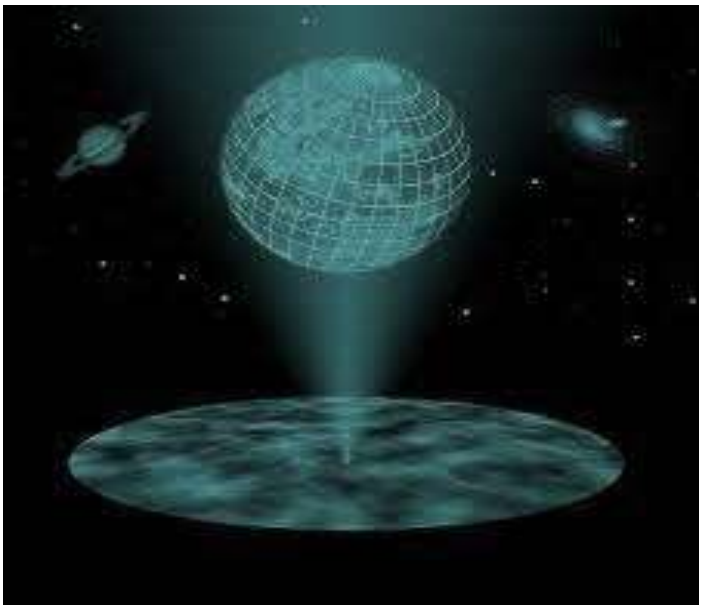
It is also distinct from specular holography which is a technique for making three-dimensional images by controlling the motion of secularities on a two-dimensional surface It works by reflectively or retroactively manipulating bundles of light rays, not by using interference and diffraction.

Holography is also used with many other types of waves.

During the 1980s, many artists who worked with holography helped the diffusion of this so-called "new medium" in the art world, such as Harriet Casdin-Silver of the United States, Dieter Jung of Germany, and Moysés Baumstein of Brazil, each one searching for a proper "language" to use with the three-dimensional work, avoiding the simple holographic reproduction of a sculpture or object. For instance, in Brazil, many concrete poets (Augusto de Campos, Décio Pignatari, Julio Plaza and José Wagner Garcia, associated with Moysés Baumstein) found in holography a way to express themselves and to renew Concrete Poetry.

A small but active group of artists still integrate holographic elements into their work Some are associated with novel holographic techniques; for example, artist Matt Brand employed computational mirror design to eliminate image distortion from specular holography.

The MIT Museum and Jonathan Ross both have extensive collections of holography and online catalogues of art holograms.



Holographic data storage is a technique that can store information at a high density inside crystals or photopolymers. The ability to store large amounts of information in some kind of medium is of great importance, as many electronic products incorporate storage devices. As current storage techniques such as Blu-ray Disc reach the limit of possible data density (due to the diffraction-limited size of the writing beams), holographic storage has the potential to become the next.

Source: *https://en.wikipedia.org/wiki/Holography*

Compiled by: Jimit Mehta