RECENT TRENDS IN MECHANICAL ENGINEERING

RANJAN K. BEHERA

Metallurgical and Materials engineering Department, N.I.T., Rourkela.

Looking towards the new era in technology MECHANICAL ENGINEERING offers addition of new subjects and new versions of old subjects. At present, Design, Analysis and Piping fall under the part of new subjects. Also Nanotechnology, Clean Technology and many other fields are being introduced in scientific and industrial area. Designing, analyzing, using small concepts to create small, but wide range of applications can be seen near future.

Design has made its entry a decade back into the core part of Mechanical Engineering and got itself manipulated in different forms, for eg Computer Aided Design (CAD) is one of the most familiar Technology these days. Solid modeling using CAD tool interface made concepts easier to visualize, as well as analyzing functioning of mechanisms in a better way. The designing helps in improving:

- Accelerate new product development
- Switch to alternate or cheaper material
- Reduce Prototyping costs
- Improve product quality and performance
- Enhance reliability

Not only design, but analysis also plays an important role in finding & solving problems of different working conditions & materials being used for different industrial application. Mechanical Design Services offer Conceptual engineering / Product design services to serve various parameters. With the help of advance 3D AutoCAD tools such as Solid Works, 3D max you can realize benefits of better product design. Beginning with preliminary design based upon the factors to prepare an integrated 3D model of the entire product. The model contains complete set of component designs for evaluating product dimensions, shapes and sizes. However, the designer can develop each component separately with the resulting detailed design being automatically integrated into the central 3D model for sharing it with other project trades. 3D CAD modeling apparently simplifies the whole quality check process and reduces the occurrence of design errors that remained unnoticed until they reach the shop or production floor. The field of Mechanical engineering covers the design and analysis of all kinds of systems and technologies with mechanical components, and has applications in energy production, environmental systems, materials, composites, transportation, robotics, manufacturing, machine design, and many more areas. Several key emerging technologies fall fundamentally within the domain of mechanical engineering expertise. Among these technologies are micro- and nano-scale fabrication processes, energy, and the environment. Modern mechanical engineers can navigate virtual design environments and are adept in computing so they play a significant role in the future development of information technology.

Few days back world’s leading automobile company Ford Motor Co. recently became
the first automaker to use a material made from recycled plastic bottles in a car’s seat fabric. The material, called Repreve, is a polyester fiber made from a blend of recycled materials. Manufactured by Unifi, Inc., the fiber derives from used plastic water bottles and other post-consumer waste, as well as post-industrial manufacturing waste, such as nylon. The bottle-based fibers were incorporated to help reduce wear and improve sustainability. Yes, it is about recycling waste products for a useful work. Various types of waste can be used and recycled or reused to produce useful energy for household use and also industrial product.

The nanotechnology is a huge development obtained in the field of science & technology. The field of nanofabrics is incredibly large with many different flavors and forms. One type of nanofabric is formed by applying commercially available nano-engineered finishing treatments to ordinary textiles and the variety is wide, from carpet and clothing to medical fabrics and mosquito netting. The finishing treatments have elements sized in the 1-100 nanometer scale and are assembled in an orderly fashion, creating novel properties that differ from the bulk material, and are considered nanotechnology. Repellency, stain-release, odor elimination, moisture elimination, anti-static, and wrinkle-free are some of the properties implemented using nanotechnology and engineering in these coating agents or finishing processes. Although these properties are not new, nanofabric finishes offer improvements over conventional finishes, which exhibit random orientation after they are applied. In conventional finishes, only a small percentage of coating materials touch the fibers, and most of it is bonded to itself, resulting in lost effectiveness as the coating wears away with time. Nanofabric coatings create fabrics whose fibers have better durability and wearability, and less coating material is needed compared to conventional finishes due to the ordered structure. Most importantly, the technology becomes part of the fabric itself, so the effect is more permanent. Concurrent Design approaches Nanotechnology Tool Design from the Nanoscale Definition of Nanotech. (100nm and smaller) as opposed to Feynmen / Drexler Nanotechnology (assembly of atomically precise structures).

Looking forward Mechanical Engineering developments don’t limited to these areas only, rather it has gone far away with renewable sources of energy, like solar energy. Concurrent Design provides Solar Energy Engineering, Design and Build Services. Solar Energy Product Development expertise spans Semiconductor Process Tools through Solar Product Manufacturing and Solar Systems Integration. Solar Energy Process Tools may include experience with front end tools, deposition tools and back end packaging equipment. In forthcoming years, solar technology will see a dramatic increase in demand and usage. The transportation of sensitive photovoltaic components, solar cells, and solar panels can only be successfully conducted with specialized technologies.

Development in Mechanical engineering don’t stop here, researches are going on various fields including new and old. Old techniques are improved to new and modifying technology.

**Acoustics and Noise Control**

**Bioengineering**

**Combustion**
Innovative Experiments in Physics

Combustion research concerns the physics of fuel sprays and droplets and their combustion, computational combustion modeling, and the formation and evaluation of super-critical sprays.

Design
Fluid Mechanics and Propulsion
Heat Transfer

Heat transfer research focuses on understanding, measuring and simulating thermal phenomena, exploiting these phenomena to design and manufacture efficient devices and systems and limiting the deleterious effects of high or low temperatures on system performance.

Heating, Ventilation, Air Conditioning and Refrigeration
Manufacturing and Materials Processing

Current MMP research involves laser-based manufacturing, high speed machining and grinding processes, micromechanics of materials, intelligent manufacturing, and thermal management of microelectronic components.

Mechanics and Vibration
Nanotechnology

Nanotechnology is a dynamic and expanding research area in the School of Mechanical Engineering, Purdue University. The research activities are built upon traditional mechanical engineering disciplines, but extended into the nanoscale science and technology with the use of modern experimental and computational tools. Current research activities include nanoscale heat transfer, fluidics, manufacturing, optics, nano- and micro-scale electro-mechanical devices (NEMS and MEMS). The field of mechanical engineering is going on developing it will go further as we can take it.