What is Engineering?

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Abstract

This paper collects online research to attain a basic understanding of the field of engineering. Though engineering is a fairly broad field, this paper will state the basic principles of the field and take into account the different types of engineering and, more importantly, what they have in common. Several sources will be used and content will be quoted directly to give an overview of the field and is intended for readers that have never heard of, or have never been introduced to engineering.

What is Engineering?

Albert Einstein, one of the world’s greatest scientists, hit the nail right on the head when he pondered the question ‘what is engineering?’. In simple terms, engineers identify a problem, and come up with a solution – often creating something completely new in the process. Traditionally, engineering is about infrastructure. Engineers were known to create bridges and vehicles that got us from A to B faster more efficiently. Now engineering is acknowledged as a discipline that opens up opportunities and creates technology and products that help make our lives easier. Engineers are shaping the future by applying their skills to almost everything you can think of, from medicine to renewable energy, food technologies to sustainable mining. There really is no limit to what engineers can do.

People generally have a reasonable idea of what a dentist, a lawyer or a teacher does. However, the scope of the activities covered by the term ‘engineer’ is more difficult to summarize. In today’s world, engineers are mainly concerned with maintaining and improving living standards and quality of life in a society. Almost every aspect in our lives has somehow been influenced by engineers – the water we drink; the buildings we live in, learn in and work in; the products created in factories; the computers we surf the net on; medical services and technologies we rely on; the appliances and vehicles that make our lives more efficient and comfortable. To ‘engineer’ literally means to “make things happen”. Engineering is about the design and production of useful products and services. Engineering know-how converts scientific knowledge into technology and then technology into successful innovation! Many seemingly simple aspects of our daily lives have been thoroughly designed or controlled by an engineer.

The primary types of engineering are chemical, civil, electrical, industrial, and mechanical.

Chemical engineering deals with the design, construction, and operation of plants and machinery for making such products as acids, dyes, drugs, plastics, and synthetic rubber by adapting the chemical reactions discovered by the laboratory chemist to large-scale production. The chemical engineer must be familiar with both chemistry and mechanical engineering.

Civil engineering includes the planning, designing, construction, and maintenance of structures and altering geography to suit human needs. Some of the numerous subdivisions are transportation (e.g., railroad facilities and highways); hydraulics (e.g., river control, irrigation, swamp draining, water supply, and sewage disposal); and structures (e.g., buildings, bridges, and tunnels).

Electrical engineering encompasses all aspects of electricity from power engineering, the development of the devices for the generation and transmission of electrical power, to electronics. Electronics is a branch of electrical engineering that deals with devices that use electricity for control of processes. Subspecialties of electronics include computer engineering, microwave engineering, communications, and digital signal processing. It is the engineering specialty that has grown the most in recent decades.

Industrial engineering, or management engineering, is concerned with efficient production. The industrial engineer designs methods, not machinery. Jobs include plant layout, analysis and planning of workers' jobs, economical handling of raw materials, their flow through the production process, and the efficient control of the inventory of finished products.

Mechanical engineering is concerned with the design, construction, and operation of power plants, engines, and machines. It deals mostly with things that move. One common way of dividing mechanical engineering is into heat utilization and machine design. The generation, distribution, and use of heat is applied in boilers, heat engines, air conditioning, and refrigeration. Machine design is concerned with hardware, including that making use of heat processes.

Aeronautical engineering is applied in the designing of aircraft and missiles and in directing the technical phases of their manufacture and operation. Mineral engineering includes mining, metallurgical, and petroleum engineering, which are concerned with extracting minerals from the ground and converting them to pure forms. Other important branches of engineering are agricultural engineering, engineering physics, geological engineering, naval architecture and marine engineering, and nuclear engineering.

Another way of dividing engineering is by function. Among the top functional divisions are design, operation, management, development, and construction; development engineering is concerned with converting an idea into a practical product.

Works Cited

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