

# Architectural engineering

Adapted from Wikipedia, the free encyclopedia

**Architectural engineering**, also known as **Building engineering**, is the application of engineering principles and technology to building design and construction. Definitions of an **architectural engineer** may refer to:

- An engineer in the structural, mechanical, electrical, construction or other engineering fields of building design and construction.
- A licensed engineering professional in parts of the United States.
- In informal contexts, and formally in some places, a professional synonymous with or similar to an architect. In some languages, "architect" is literally translated as "architectural engineer".

## Engineering for building

### Structural Engineering

Structural engineering involves the analysis and design of physical objects such as buildings, bridges, equipment supports, towers and walls. Those concentrating on buildings are responsible for the structural performance of a large part of the built environment and are, sometimes, informally referred to as "building engineers". Structural engineers require expertise in strength of materials and in the seismic design of structures covered by earthquake engineering. Architectural Engineers sometimes practice structural as one aspect of their designs; the structural discipline when practiced as a specialty works closely with architects and other engineering specialists.

### Mechanical, Electrical and Plumbing (MEP)

Mechanical and electrical engineers are specialists, commonly referred to as "MEP" (mechanical, electrical and plumbing) when engaged in the building design fields. Also known as "Building services engineering" in the United Kingdom, Canada and Australia. Mechanical engineers design and oversee the heating ventilation and air conditioning (HVAC), plumbing, and rain gutter systems. Plumbing designers often include design specifications for simple active fire protection systems, but for more complicated projects, fire protection engineers are often separately retained. Electrical engineers are responsible for the building's power distribution, telecommunication, fire alarm, signalization, lightning protection and control systems, as well as lighting systems.

## The Architectural engineer (PE) in the United States

In many jurisdictions of the United States, the architectural engineer is a licensed engineering professional, usually a graduate of an architectural engineering university program preparing students to perform whole-building design in competition with architect-engineer teams; or for practice in one of structural, mechanical or electrical fields of building design, but with an appreciation of integrated architectural requirements.

Formal architectural engineering education, following the engineering model of earlier disciplines, developed in the late 19th century, and became widespread in the United States by the mid-20th century. With the establishment of a specific "architectural engineering" NCEES Professional Engineering registration examination in the 1990s, and first offering in April 2003, architectural engineering became recognized as a distinct engineering discipline in the United States. Architectural engineers are not entitled to practice architecture unless they are also licensed as architects.

## **The Architect as Architectural Engineer**

In some countries architecture, as a profession providing architectural services, is sometimes referred to as "architectural engineering". In others, such as in Japan, the terms "architecture" and "building engineering" are used synonymously. The practice of architecture includes the planning, designing and overseeing the building's construction.

In some languages, such as Korean and Arabic, "architect" is literally translated as "architectural engineer". In some countries, an "architectural engineer" (such as the *ingegnere edile* in Italy) is entitled to practice architecture and is often referred to as an architect. These individuals are often also structural engineers. In other countries, such as Germany, Austria and most of the Arabic countries, architecture graduates receive an engineering degree (*Dipl.-Ing. - Diplom-Ingenieur*).

## **Education**

The architectural, structural, mechanical and electrical engineering branches each have well established educational requirements that are usually fulfilled by completion of a university program.

### **Architectural Engineering as a single integrated field of study**

What differentiates Architectural Engineering as a separate and single, integrated field of study, compared to other engineering disciplines, is its multi-disciplined engineering approach. Through training in and appreciation of architecture, the field seeks integration of building systems within its overall building design. Architectural Engineering includes the design of building systems including Heating, ventilation and air conditioning (HVAC), plumbing, fire protection, electrical, lighting, transportation, and structural systems. In some university programs, students are required to concentrate on one of the systems; in others, they can receive a generalist Architectural or Building Engineering degree.