

What is the role of engineering science in solving engineering problems?

[Science](#)



Engineering is about ensuring the health, happiness and safety of our planet's future. Engineers are at the centre of inventing creative solutions to address these challenges head-on. Now and in the future, engineers will play a vital role in finding solutions to many of the important issues facing us today, such as global warming, energy supplies, clean water, food shortages, transport, obesity, healthcare and the ageing population.

Although engineers use science and math to design or create solutions to real world problems, engineering is not really considered a science. Science is about discovering and understanding the natural, whereas engineering is about inventing, designing and implementing the artificial. Engineering is based principally on physics, chemistry, and mathematics and their extensions into materials science, solid and fluid mechanics, thermodynamics, transfer and rate processes, and systems analysis. Engineers employ two types of natural resources, materials and energy.

Materials acquire uses that reflect their properties: their strength, ease of fabrication, lightness, or durability; their ability to insulate or conduct; and their chemical, electrical, or acoustical properties. Important sources of energy include fossil fuels (coal, petroleum, gas), wind, sunlight, falling water, and nuclear fission. Let us take a moment to think about some things we use in our everyday life: Buildings, bridges, roads, highways and traffic lights, vehicles (buses, cars, planes and water ferries), computers and other electronic devices, none of them came into existence without engineers.

We wouldn't have been able to drive to work, check our facebook status or even use the elevators at our work places. Engineering science is used to

solve problems and improve our world Problems like making your alarm go off on time or making sure your toothpaste has just the right amount of chemicals to give you that perfect smile or even ensure the right input to make angry birds an addictive game. Now let us look at an aeroplane, they provide a lot of examples of the importance of engineering science.

Every bit of a plane has been touched by a whole team of engineers, a mechanical engineer designing engine, a mechatronic engineer designs the controls, the fuel extracted by mining engineers and refined by chemical engineers, the navigation system electrical and software engineer created those. From the Wright brothers first 12th sec flight in 1903 to the invention of the jet engine, improvements in the mechanism of control in air frame construction have continued through the 20th century.

Now with computers in the cockpit engaged in every aspect, flight electronics are sure to lead innovation in the future of aviation. The automobile change the way we travel but it remains an engineering work in progress so with the advancement of fuel cells and electric powered engines automobiles are certain to maintain their position at the front of technology well into the future. High performance materials have made possible some of the century most dazzling technological achievements like aero planes, microchips and lasers.

In materials engineering atomic and molecular materials and the nano products they produce may very well make the 21st century the nano age. In the area of household appliances two major engineering innovations, resistance heating and small efficient motors lead to advancements like electric stoves, vacuum cleaners, washers, dish washers that drastically

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reduce the domestic workloads. A century worth of progress suggest that more innovations in advancement lie ahead. The Burj Khalifa, it is the world's tallest building at 829. 8m high, it's also in the world's hottest environment reaching up to 50 degrees in summer.

One of the problems in building the Burj was trying to figure out how to set 45000 cubic meters of reinforced concrete in such extreme weather. The solution was a clever method of pumping iced liquid concrete into the 55000 ton steel frame during the night. The result is a building that is vertically over 800 m high rather than horizontally all over the ground. On Saturday March 1932 the Sydney Harbour Bridge was commissioned.

The bridge was a marvel of civil engineering and since 1815 people had been talking of building a bridge to connect the two sides of the harbour. The problem was that the harbour was so incredibly wide and how could a bridge p such a width and support its own weight. The solution was the idea the Romans used in the past. The arched bridge works by transferring the weight into horizontal forces embracing them at the ends of the arch. Thanks to 20th century civil engineers the driving public can travel coast to coast by way of the interstate highway system.

As traffic grows engineering is working to improve pavements, crash barriers and other design elements and would use new technology to improve traffic flow and safety. As the population of cities grew in the 20th century the challenge of clean accessible water was met by civil engineers who created systems for water treatment and distribution leading to vast improvement in public health. As the need for clean water increases successors in water

management will serve to inspire future engineers to face the challenge of improving water supply and distribution in all areas of the world.

Chemical engineering and chemistry advanced in the 19th century. Through the development of electrochemistry and spectroscopy many more chemical elements could be discovered. Mendeleev and Meyer independently developed the chemical law that states that the properties of all the elements are periodic functions of their atomic weights. In 1869 Mendeleev proposed the Periodic Table of Elements that classifies the chemical elements corresponding to their atomic weights. Based on this table subsequent discoveries of new elements were made which led to the completion of the table.

In the 19th century chemical engineering witnessed an enormous advance in polymer technology and in the 20th century the mass production of polymers became economically feasible. These advances led to the introduction of new material, such as, plastics and fibers. As the demand grew for gasoline chemical engineers discovered a host of useful byproducts of crude oil and the petrochemical industry was born. Throughout the middle of the 20th century petroleum processing technologies allowed petrochemicals to replace environmentally harmful coal tar chemistry but environmental issues may change the outlook of this industry in the 21st century.

Scientists and Engineers learned how to make a transistor, shrink it to a microscopic size and harness it for once unimaginable powers of digital computing, control, communication, detection and display. Today engineers are exploring new architectures for these circuits and experimenting with <https://assignbuster.com/what-is-the-role-of-engineering-science-in-solving-engineering-problems/>

mysterious quantum effects that might be harnessed for computation. At the dawn of the 20th century the electric power capacity expanded rapidly while continuous innovation improves the system. As demand for the benefits of electrification continues to grow around the globe, resourcefulness remains a prime virtue.

Large scale power grids are being supplemented by decentralized systems in which consumers produce some of their own power through renewable resources such as wind and solar power. The first electronic computers introduced in the late 1930s were the size of large room and capable of the most basic tasks. Today PCs, Macs and laptops, I pads and smart phones are such prominent fixtures in our technologically advanced society that it is hard to imagine a future where computers don't continue to have an increased role in almost everything we do.

Beginning as a tool for academia and government and evolving rapidly into the World Wide Web open to anyone with a computer and a telephone connection, the internet has transformed the way we conduct research, communicate and purchase items. The internet has now been such an integral part of our daily lives that the future could only bring more opportunity for us to connect with the world around us and do business.

But what about the future, what problems will the engineers solve next, will we finally have affordable solar power or robots that can perform life saving surgery or a building so tall that your view is of out of space or finally engineering a working hover board. Engineering is solving problems by taking ideas out there and making them possible and when shared with the world it serves to make all of our lives better. In summary we can see that <https://assignbuster.com/what-is-the-role-of-engineering-science-in-solving-engineering-problems/>

throughout history engineers have taken ideas and change them into innovation.