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Occupational Profile

 Mechanical Engineer

 Mechanical engineering is a field of engineering in which you can design and build machines, structures, and vehicles of all sizes. Mechanical engineering requires a wide variety of core concepts such as; mechanics, kinematics, and thermodynamics. They also use tools such as computer-aided engineering and product lifecycle management to design machines and analyze how they run and what they need to fix when it breaks.

 For example, when you are studying mechanics you will study forces and their effect on matter. Engineering mechanics is usually used to study car crashes. It is used to analyze and predict the acceleration and deformation of objects under unknown forces. The unknown forces in this case would be the force of one car hitting the other car.

This area of study is used from the start to the finish of every single car made. I know that statics is the study of non-moving bodies under weights that are known. Statics are most often used at the first stages of testing a car’s frame. What they do is put a bunch of weight onto a nonmoving frame to test the frame to see where the stresses will be most intense. While statics looks at the framework of the vehicle kinematics. Kinematics is the study of the motion of bodies and systems while ignoring the forces that cause the motion (McNeill). When mechanical engineers are designing the engine for the car they use kinematics to evaluate the forces in the pistons and cams as the engine is running.

Kinetics is sometimes referred to as dynamics and it is the study of how forces affect moving parts. It studies the changes made when the part is in movement. They use this to see what will probably happen to a motor over time and the reasoning behind the changes that were made. The laws used to check this process are Newton’s first three laws. The first law states that an object in motion will stay in motion unless force is applied to slow it down. The second law says that force quantity is equal to mass multiplied by the acceleration. And finally the third law says that for every reaction, there is an equal but opposite reaction.

Thermodynamics is simply defined as the study of energy and its use and transformation through a system. Cars use this in their fuel combustion chamber. It starts with the gasoline going into the cylinder and making a spark and causes heat and then heat is used to make the car accelerate. Mechanical engineers also use thermo dynamics to design steam power plants. They make a heat engine that transfers thermal energy into rotational energy, and then it makes power.

Recently, mechanical engineers have started using computer-aided engineering or CAE programs into their existing design and analysis processes. CAE offers many new and better things to the designing of products such as; easier and better visualization of products, the creation of virtual assemblies of parts, and the easiness the program allows you to design the product.

One other tool that mechanical engineers use is product lifecycle management or PLM. PLM tools are used to perform complex and difficult simulations. This tool is used to determine the natural wear and tear on a vehicle throughout its entire life. It uses conception of the design and the manufacture of the vehicle to determine the natural wear and tear of the vehicle and eventually the disposal of the vehicle.

To become a mechanical engineer you need to go to school for approximately four to five years. Some of the degrees you need to have are; Bachelor of Science, Bachelor of Science Engineering, Bachelor of Engineering, or a Bachelor of Applied Science. Most of the mechanical engineering undergraduate programs are accredited by the Accreditation Board for Engineering and Technology or ABET (University). The reason they follow ABET is so that all mechanical engineering programs across the United States use similar course requirements and standards.

In 2009 the number of mechanical engineering jobs was projected to grow six percent over the next decade, with average starting salaries being $58,800 with a bachelor’s degree. The median annual income of mechanical engineers in the Unites States work force was $74,900 (Occupational). The rate of pay is reflected off your time of employment at the company. Most mechanical engineering jobs provide some benefits such as; dental insurance, health insurance, vacation days, and some companies offer stock at the time of employment.

According to the United States Department of Labor, through the year 2014 employment of mechanical engineers should increase as the demand for improved machinery and machine tools grows and as industrial machinery and processes become even more complex than before. Additional opportunities for mechanical engineers will arise because the skills acquired through earning a degree in mechanical engineering often can be applied to other engineering technologies (career outlook).

One cool aspect of mechanical engineering is the field of nanotechnology. Nanotechnology or Nanotech, is the study of manipulation matter on an atomic scale and molecular scale. Nanotechnology may be able to create many new materials and devices with a vast range of applications, such as in medicine, electronics, biomaterials and energy production. The idea of nanotechnology is to make things really small that work the same or even better than something much larger.

Another invention called Friction Stir Welding, also called the solid-state process, was made in 1991 by Wayne Thomas at The Welding Institute (Kallee). Mechanical engineers will now be able to weld together metals that were until recently unable to be welded. The main metal that this machine welds together is aluminum. This technology is projected to possibly replace the use of rivets on aircraft and spacecraft carriers.

This machine works by frictional heat that is generated between the wear resistant welding tool shoulder and the tip that is called the nib, and the materials of the work piece. This heat and the heat made by the mechanical mixing process cause the stirred materials to soften without reaching the melting point (Ding). This allows the traversing of the tool along the weld line in a plasticized tubular shaft of metal.