Fluid mechanics and fluid power engineering are the foundation of both engineering design and scientific experimentation. If you take a look at flowing water or gas, you will observe that it obeys the first law of thermodynamics: heat must always flow from a warmer object to a cooler object. This is coherent with Newton's second law of motion: force equals mass times acceleration. Thermodynamic principles also describe the movement of heat as take up or release, through transfer or diffusion, across boundaries such as walls and chemical reactions such as combustion. Fluid mechanics and fluid power engineering are the foundation of both engineering design and scientific experimentation. If you take a look at flowing water or gas, you will observe that it obeys the first law of thermodynamics: heat must always flow from a warmer object to a cooler object. This is coherent with Newton's second law of motion: force equals mass times acceleration. Thermodynamic principles also describe the movement of heat as take up or release, through transfer or diffusion, across boundaries such as walls and chemical reactions such as combustion. Fluid mechanics is about the study of how fluids flow around different objects, move through pipes, and maneuver in space. Fluid power is concerned with how mechanical energy is converted into fluid energy. Fluid mechanics is concerned with the theory of how fluids flow and also with the governing equations that describe fluid motion. The governing equations are called the Navier-Stokes equations and they include components of momentum, mass, and energy. Fluid mechanics has been applied to a wide range of engineering disciplines, including energy generation and transportation systems, air and spacecraft propulsion systems, medical imaging techniques such as magnetic resonance imaging (MRI) and computed tomography (CT), pharmacy practice in drug formulation, the design of pipelines for transporting fluids such as oil or natural gas, and even sports such as swimming. Fluid power is concerned with the conversion of mechanical energy into fluid energy or vice versa. Systems such as turbines, pumps and gas engines convert energy from one form to another. The terms "fluid mechanics" and "fluid power" are often used interchangeably. Often, they are differentiated by the type of fluid they deal with, but this is not always the case. F systems may be applicable to all fluids and P systems can be applied to an entire group of fluids, such as gas and steam. For example, a fluid system may include a turbine that works best with water but is also capable of working with other fluids – such as steam – that do not flow well through pipe fittings or pumps. Therefore, fluid mechanics or fluid power may be considered in applications other than the type of fluid used. Fluid mechanics have been applied to a wide range of engineering disciplines. Fluid power is used in all kinds of systems ranging from tiny microfluidic chips that are used for sensing biological substances to the large steam turbines that drive electric generators that supply electricity to entire cities. Some examples of applications are:

Bibliography

Articles & Chapters

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Notes & References

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