Fluid

Name

Professor

Institutional Affiliation

Course

Date

A fluid is a state of matter that yields to sideways or shearing forces. Liquids and gases are both Fluids. Fluids statics is the physics of stationary Fluids. Fluid statics is the branch of fluid mechanics that studies incompressible Fluids at rest. It encompasses the study of the conditions under which Fluids are rest in stable equilibrium as opposed to fluid dynamics, the study of fluid in motion.

Variation of pressure with depth in a fluid. Pressure is weight of the fluid/(mg\) divided by the area/(A\) support it(the area of the bottom of the container container) :P=d fra(MG) (A)

Pascal principle pressure is a force per unit area. A change in pressure applied to an enclosed fluid is transmitted undiminished to all portions of the fluid and to the wall of its container.

There are several advantages of fluid statics. It allows for the analysis of fluids at rest, which can be useful in situations where the fluid is not in motion or where the motion is slow or steady. It can be used to predict the behavior of fluids in a wide range of situations, including Fluids flows through pipes, Fluids movement in container and forces exerted by Fluids on objects. Fluids statics principles can be used to design and analyze systems that involve force and energy transmission using fluid power. It can be used to study the movement of fluids in the environment such as flow of water in rivers and transport of pollutants in the air

Some of the disadvantages of fluid statics are, it only deal with Fluids at rest so it cannot be used to analyze Fluids behavior in motion or predict the forces acting on Fluids under dynamic condition. Fluids statics assumes that the fluid in incompressible,, so it's density remains constant. This is not always the case, especially for gases and assumption of fluid static may not be accurate

Fluid kinematics is one of the branches of fluid mechanics in which we study the different parameters. Fluid kinematics analyzes the fluid particles motion without analyzing the motion-causing forces.

Fluid flows can be classified into different categories based on various parameters. These types of fluid flow are done on parameters consisting of the nature of the flow. Fluid flow may be classified under steady and unsteady flow , uniform and non-uniform flow and laminar and turbulent flow

Three fluid element trajectories are defined streamlines, pathlines and streak lines. These flow pattern depends on the fluid particles motion and are a special part of the Gate syllabus

The velocity of a fluid particle is the distance moved by the fluid particle in unit of time. The velocity of the fluid flow can be different in all directions

The acceleration of a fluid particle is the change of velocity of the fluid particle with respect of time. Acceleration can be classified into temporal acceleration and convective acceleration.

The stream function is a valid mathematical function used to describe the fluid flow in the two dimensions flow. The partial derivative of stream function to any direction gives the velocity component at right angles to the direction

The velocity potential function is a mathematical expression used to represent the flow Characteristics of the fluid. It can represent the flow characteristics of a 3D flow. It is a scalar function of space and time such that it's negative derivative to any direction gives the fluid velocity in that direction.

The stream function and velocity potential function are the mathematical functions in fluid kinematics. These terms are used to explain the different flow characteristics. Stream function represent the two-dimensional flow, and the velocity potential function can also be used in the three dimensions flow

**References**

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