

The Hydraulic JCB

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Introduction

“JCB” stands for Joseph Cyril Bamford. It's company that makes construction and agriculture machines.

JCB machines are used in industrial application, in constructional purposes, and in mining applications. It may be fitted to top of the floor and is used to lift the heavy loads from one location to another locations in industries. The system of hydraulic cylinder arrangement has high strength than pneumatic arrangement. It is the world's third largest manufacturer of construction equipment. It produces over 300 of machines like diggers, tractors, excavators and diesel engines, etc.

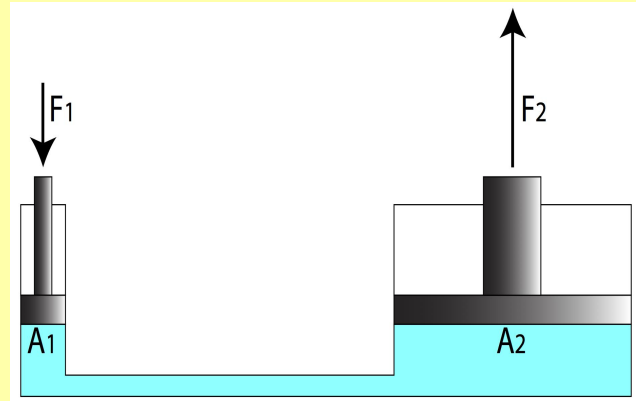
Hypothesis

Question- How does the Hydraulic JCB work?

We think that the Hydraulic JCB uses the fluid. Well, hydraulic means that it uses water and the fluid is kind of like water. The syringes might be the pump that gives the pressure. Also, the silicone pipes mabey the pipes that the fluid passes through.

Pascal's Law

Pascal's law, a fundamental principle in fluid mechanics, states that a pressure change in a confined incompressible fluid is transmitted throughout the fluid. Hydraulic brakes in automobiles follow this principle by transmitting pressure from the brake pedal through brake fluid to brake pads.



Hydraulic Cylinders

Hydraulic cylinder arrangement is known for its higher strength when compared to pneumatic arrangement. The hydraulic cylinder is capable of converting energy back into mechanical energy, functioning as a linear hydraulic motor that provides a unidirectional force through a unidirectional stroke. This mechanism finds numerous applications, particularly in construction equipment (engineering vehicles), manufacturing machinery, elevators, and civil engineering.



Purpose

Hydraulic JCB machines are used in industrial application and also in constructional purposes. It may be fitted to top of the floor and is used to lift the heavy loads from one location to another location in industries. This system of hydraulic cylinder arrangement has high strength than pneumatic arrangement.



Fluid

Pascal's Principle, the backbone of fluid - mechanics was discovered in 1663 and published by Blaise Pascal. According to it, if the pressure changes at any point in the Hydraulic fluid, the energy will be transmitted equally in all directions. When you apply pressure on the fluid, it be distributed equally undiminished. The fluid pressure will be equal in all the parts of container.

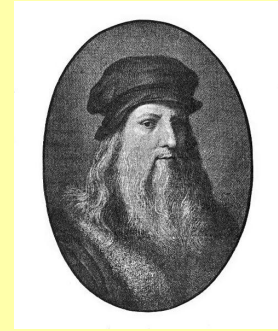


How Does The Hydraulic JCB System Work

The hydraulic system consists of five elements: the driver, the pump, the control valves, the motor, and the load. The engine may be an electric motor or an engine of any type. The pump acts mainly to increase pressure. Hydraulic systems consist of numerous parts. The electric motor powers the hydraulic pump. The reservoir holds hydraulic fluid. The hydraulic pump pushes the fluid through the system and converts mechanical energy into hydraulic fluid power. The valves control the flow of the liquid and relieve excessive pressure from the system if needed. The hydraulic cylinder converts energy back into mechanical energy.

Who invented the Hydraulic JCB?

It's hard to determine who exactly invented the Hydraulic systems. Hydraulic systems have been created from the work of great minds like Leonardo da Vinci, Galileo Galilei, Blaise Pascal, and Joseph Bramah, to name a few. Hydraulics found its place in the modern world during the industrial revolution offering wide - reaching and effective applications.



Advantages

1. The hydraulic system uses incompressible fluid which results in higher efficiency.
2. It delivers consistent power output which is difficult in pneumatic or mechanical drive systems.
3. Hydraulic systems employ high density incompressible fluid. Possibility of leakage is less in hydraulic system as compared to that in pneumatic system. The maintenance cost is less.
4. These systems perform well in hot environment conditions.
5. The system is often lighter in weight than a mechanical system and have a low installation space requirement.

Disadvantages

1. The oil temperature is greatly affected by the ambient temperature, and the change of oil temperature causes the change of oil viscosity, which affects the operation.
2. Troublesome piping, easy leakage.
3. It is not suitable for generating various operations on the signal (such as signal amplification, memory, logical judgment and other operations).
4. Sensitive to temperature changes.

The future of Hydraulic Equipment

Hydraulic machinery is renowned for its capacity to execute high-power tasks through the force generated by its components. Hydraulic industries its future holds potential for leveraging electronics to enhance hydraulic power control.

The integration of electronics with hydraulic systems is revolutionising the market.



Conclusion

As you can see in the demonstration the incompressibility of liquids which enables greater power transfer with increased efficiency in powerful machines like cranes , forklifts that are used for a wide range of applications. When compared to mechanical compression machines, hydraulics takes less space.

Materials

- Ruler
- Cardboard
- Glue Gun
- Toothpicks
- Super Glue
 - Pliers
 - Syringes
- Silicone Pipes
- 4 Different Colours of Food Colouring
 - Popsicle Sticks
 - Water
 - Battery



