# Demonstrating Pascal's Law with the Help of Hydraulic Lift Experimental Model

Introduction:

- The report, written by Supratim Roy during an internship at IIT Guwahati under Prof. Uday Shanker Dixit, aims to demonstrate Pascal's Law using a hydraulic lift experimental model.

- Pascal's Law states that any force applied to a confined fluid is transmitted uniformly in all directions throughout the fluid.

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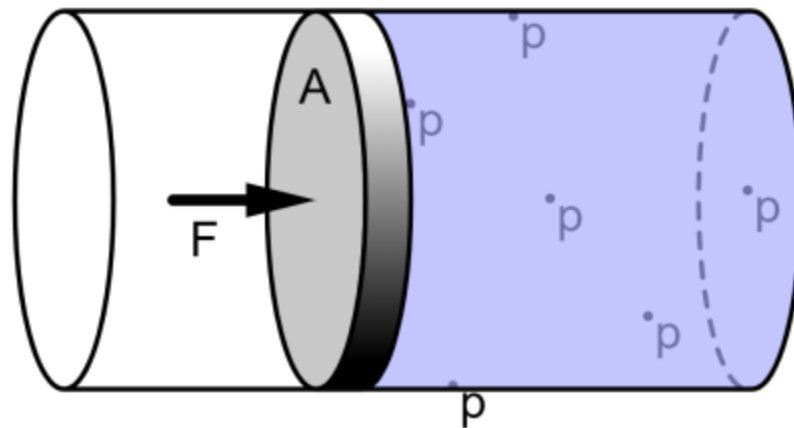
Fig 1.1 Pressurized Fluid

Pedagogy:

- Emphasizes the importance of pedagogy in education, highlighting improved quality of education, team learning, non-monotonous learning, convenience for special students, and enhanced student-teacher communication.

Pascal's Law and Applications:

- Pascal's Law is explained with practical applications such as hydraulic lifts, hydraulic jacks, and hydraulic presses.

- The history of Pascal's Law is briefly discussed, noting its application in ancient Mauryan fountain structures and other water lifting devices.
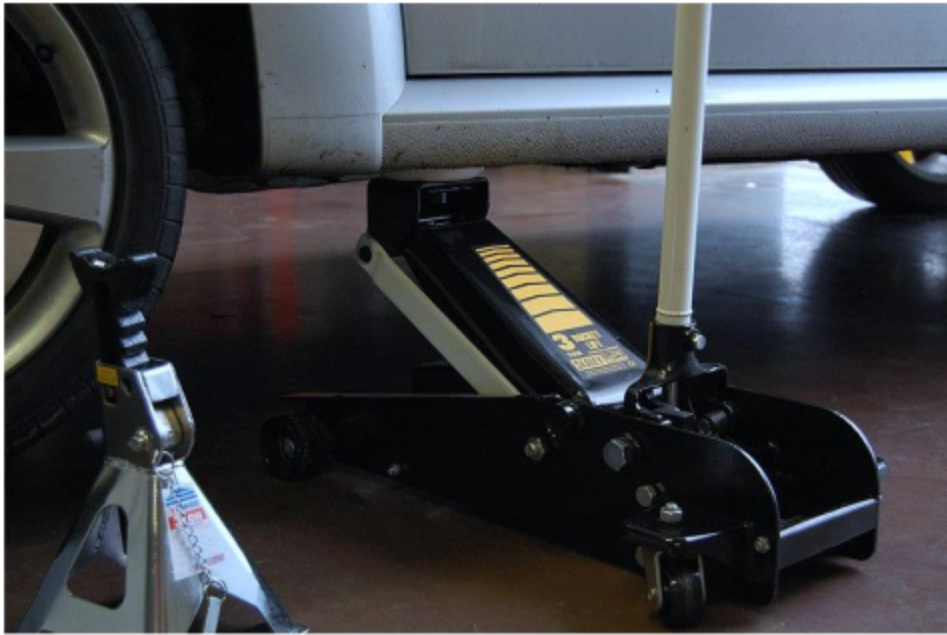
Hydraulic Lift:

- Defined as a device that uses force created by pressure on a liquid inside a cylinder to move a piston upward.

Hydraulic Lift: Hydraulic lift in a car maintenance shop is shown in Fig 1.2.

Fig 1.2 Hydraulic Lift

Hydraulic Jack: Hydraulic Jack is shown in Fig 1.3.

Fig 1.3 : Hydraulic Jack

- The methodology behind hydraulic lifts is based on Pascal's Law, demonstrating how a small force applied at one end can lift a larger weight at the other end.

Hydraulic Press: Hydraulic Press is shown in Fig 1.4.

Fig 1.4: Hydraulic Press

Experimental Model:

- The hydraulic lift model was designed in Siemens NX CAD and assembled using various materials including acrylic sheets, foam pads, a water bottle, a weight box, colored water, a transparent ruler, double-sided tape, and epoxy resin.

- The experimental trial involved using syringes to demonstrate the mechanism, showing how a small displacement at one end results in a larger displacement at the other end.

Calculations and Results:

- Detailed calculations were performed to determine the lift and force applied, demonstrating the principles of Pascal's Law in a practical setting.

- The model successfully demonstrated the law, showing that a small force applied at the piston end could lift a larger weight at the ram end.

Fig 2.3(a): Experimental Apparatus

Fig 2.3(b): Initial Position
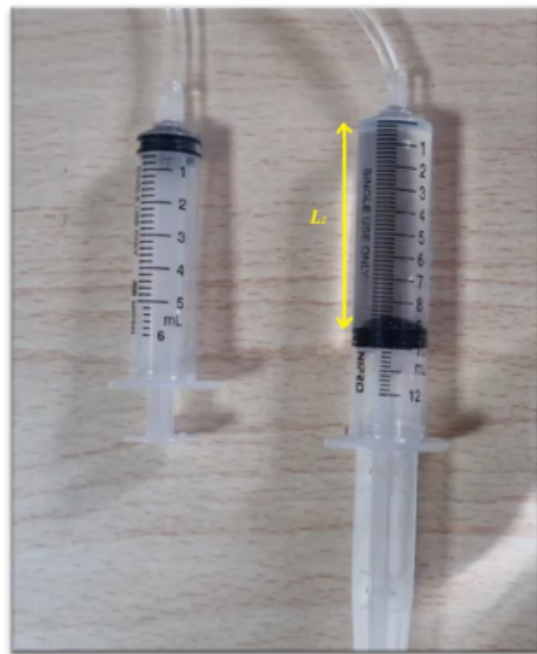
Fig 2.3(c): Initial Position

Conclusion:

- The hydraulic lift model serves as an effective educational tool for demonstrating Pascal's Law, enhancing the understanding of fluid dynamics.

- The report provides valuable insights for educators, researchers, and enthusiasts interested in the practical applications of Pascal's Law.