



# VIRTUAL EXPEDITIONS SIMULATORS

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# What is Simulation & Simulator?

- ▶ A simulation is a method for implementing a model over time.
- ▶ A simulator is a device, computer program, or system that performs simulation.





# Types of Simulation

**Live:** Simulation involving real people operating real systems

- ▶ soldier on a field training mission

**Virtual:** Simulation involving real people operating in a simulated environment

- ▶ a pilot in a flight simulator

**Constructive:** Simulation involving simulated people operating simulated systems.

- ▶ a war game for mission planning

# Uses of simulators

Simulators are used for:

- ▶ Scientific exploration
- ▶ Safety tests
- ▶ Training of pilots
- ▶ Road driving vehicle
- ▶ To create graphics for video games and movies.





# Thrill rides at Science City

- ▶ Flight Simulator
- ▶ Earthquake Simulator



# Flight Simulators

- ▶ A flight simulator is a device that artificially re-creates aircraft flight and the environment in which it flies, for pilot training, design, or other purposes.

**Flight Simulator at Science City makes you tread unknown and unexplored places and generates excitement through virtual expeditions. It is based on hydraulic system.**







# How does hydraulic system works?

- ▶ Hydraulic systems are made up of numerous parts:
- ▶ The **reservoir** holds hydraulic fluid.
- ▶ The **hydraulic pump** moves the liquid through the system and converts mechanical energy and motion into hydraulic fluid power.
- ▶ The **electric motor** powers the hydraulic pump.
- ▶ The **valves** control the flow of the liquid and relieve excessive pressure from the system if needed.
- ▶ The **hydraulic cylinder** converts the hydraulic energy back into mechanical energy.





# Working-Flight simulator

1. Flight Simulator at PGSC is based on hydraulic system
2. A motor & moog valve supported by 3 hydraulic cylinder is attached with capsule.
3. Movement of capsule is controlled by computer program, synchronized with the movement of capsule.
4. Doors of capsule are operated with the help of pneumatic cylinders which in turn are attached with the air compressor.







# Earthquake Simulator

- ▶ Earthquake simulation applies a real or simulated vibrational input to a structure that possesses the essential features of a real seismic event.

**Earthquake simulator at Science City is based on Pneumatic system.**

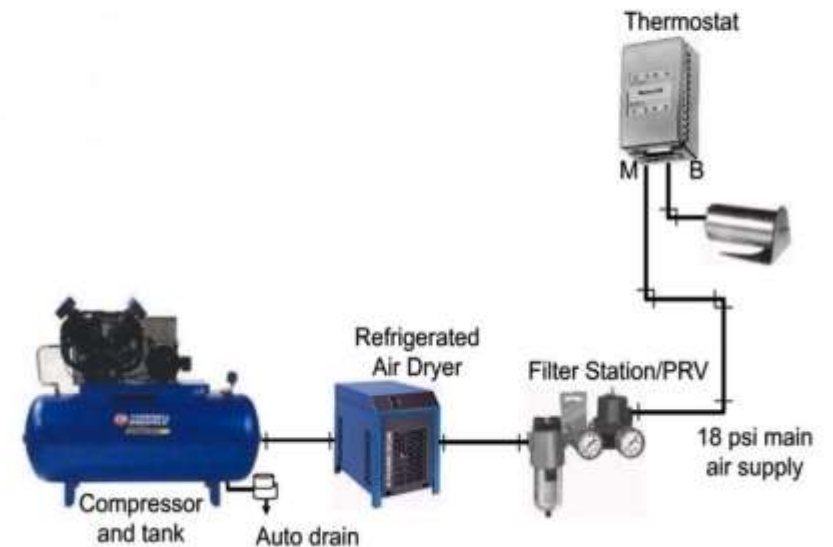




# How does pneumatic system works?

- ▶ The word 'Pneuma' means air.
- ▶ Pneumatics is all about using compressed air to do the work.
- ▶ It captures air, transports it around a circuit, and accomplish designated tasks with the generated energy.
- ▶ These are present in both manual and automated machines, and within the construction or mining industry.
- ▶ In short, pneumatic machines have a vast amount of applications.

## Pneumatic Supply Air Source





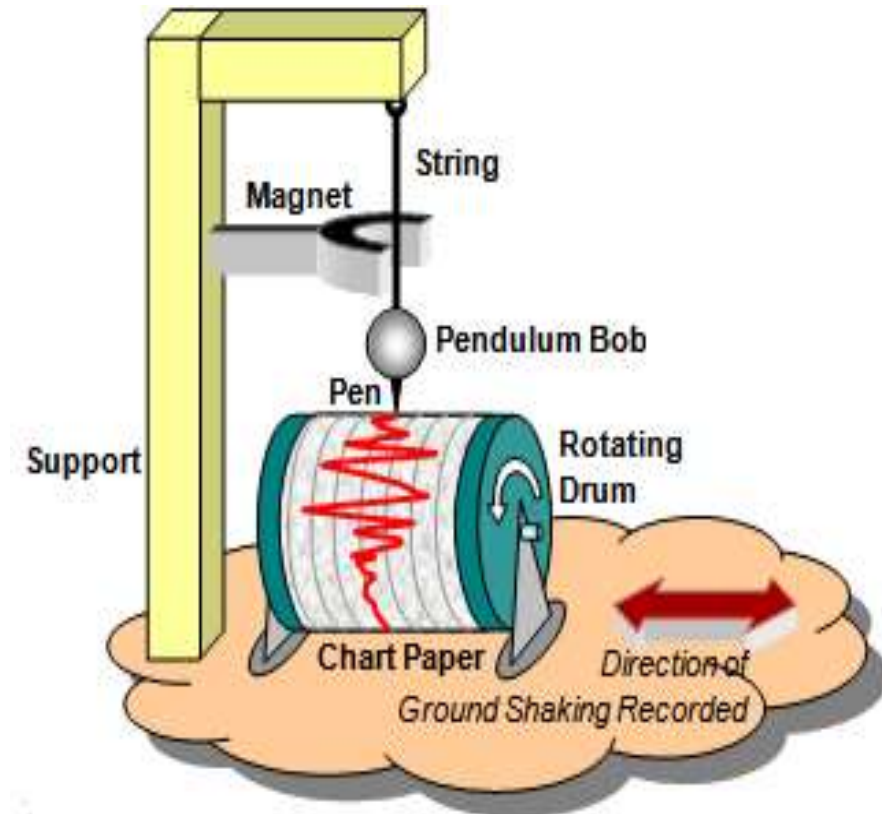
# Working of Earthquake Simulator

1. Simulator provides simultaneous and self-regulating programmable motion in horizontal and vertical direction
2. One can experience an earthquake of up to 6.5 magnitude measuring on Richter scale.
3. A well scripted film synchronized with programmable motion is run on LED screen giving real time feel of an earthquake
4. The film simultaneously educate about earthquakes, its reasons and precautions to be taken during and after one experiences an earthquake



# How Earthquake Measured?

- ▶ The intensity of an earthquake is measured using a **seismometer**.
- ▶ Seismometer detects the vibrations caused by an earthquake.
- ▶ It plots these vibration on a **Seismograph**.
- ▶ The strength of earthquake is measured in **Richter scale**
- ▶ The focus of an earthquake is the point within the earth crust where seismic rupture starts. The **epicenter** is the point directly above this point at the surface of the Earth.



**THANKS**

