

LABORATORY MANUAL
ON
STUDY OF STEAM ENGINES

Prepared
By
Prof. (Dr.) M. K. Roul
Professor and Principal,



**Gandhi Institute for Technological Advancement
(GITA), Bhubaneswar – 752054**

June 2014

AIM OF THE EXPERIMENT: -

To Study about Steam Engine.

APPARATUS REQUIRED: -

SL.NO	NAME OF THE APPARATUS	SPECIFICATION	QUANTITY
01	Steam engine	Model	01

THEORY: -

- In a reciprocating steam engine, as the heat energy in the steam is converted into mechanical work by the reciprocating motion of the piston, it is also known as reciprocating steam engine
- The superheated steam at a high pressure from the boiler is entered into the steam chest.
- After that the steam makes its way into the cylinder through any inlet ports depending upon the position of the D-slide valve.
- When port A is open, the steam rushes into the left side of the piston and forces it to the right side. At this stage the slide valve covers the exhaust port and another steam port.
- Since the pressure of the steam is greater on the left side thus the piston moves to the right side.

- When the piston reaches near the end of the cylinder, the D-slide valve closes the exhaust port and the steam port A. The steam port B is now open and the steam rushes to the right side of the piston.
- This forces the piston to the left at the same time the exhaust steam goes out through the exhaust pipe and thus complete the cycle of operation.

IMPORTANT PARTS OF STEAM ENGINE: -

FRAME: -

It is a heavy cast iron part which supports all the stationary as well as moving parts and holds them in proper position. It generally, rests on engine foundations.

CYLINDER: -

It is also a cast iron cylindrical hollow vessel in which the piston reciprocates under the steam pressure both ends of the cylinder are closed and made steam tight.

STEAM CHEST:

It is an integral part of the cylinder, it supplies steam to the cylinder with the movement of D-slide valve.

D-SLIDE VALVE: -

It moves in the steam chest with simple harmonic motion. Its function is to exhaust steam from the cylinder with proper movement.

INLET AND EXHAUST PORT: -

These are holes provided in the body of the cylinder for the movement of steam the steam is admitted from the steam chest alternatively to either sides of the cylinder through the inlet ports. The steam ,after doing its work in the cylinder, is exhausted through the exhaust port.

PISTON: -

- Its function is to convert heat energy of the steam into mechanical work.
- Piston rings are fitted in the grooves of the piston. Their purpose is to prevent the leakage of steam.

PISTON ROD: -

It is a circular rod, which is connected to the piston on one side and cross head to the other. Its main function is to transfer motion to the cross head.

CROSS-HEAD: -

It is a link between the piston rod and connecting rod. Its function is to guide motion of the piston rod and to prevent it from bending.

CONNECTING ROD: -

It is made of forged steel, whose one end is connected to the cross head and the other to the crank. Its function is to convert reciprocating motion of the piston into rotary motion of the crank.

CRANK SHAFT: -

It is the main shaft of the engine having a crank. The crank works on the lever principle and produces rotary motion of the shaft. The crank shaft is supported on main bearing of the engine.

ECCENTRIC: -

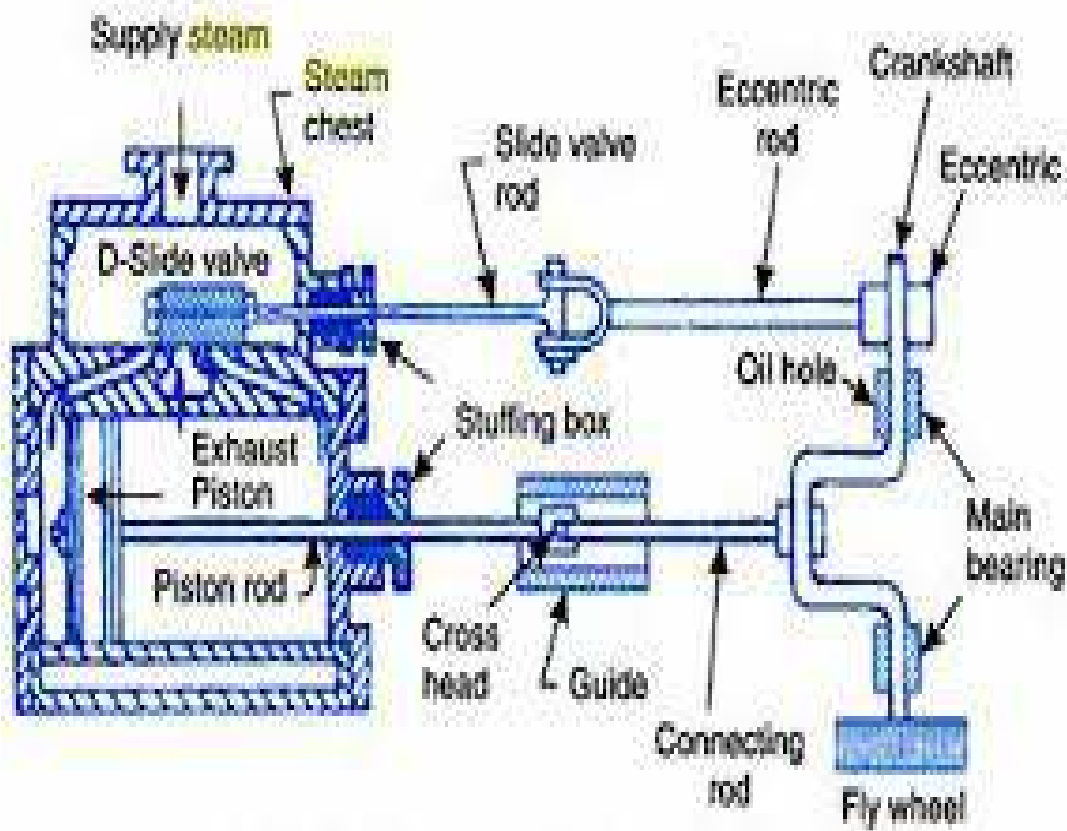
It is generally made up cast iron and is fitted to the crank shaft. Its function is to provide reciprocating motion to the D-slide valve.

FLY WHEEL: -

It is a heavy cast iron wheel, mounted on the crank shaft. Its function is to prevent the fluctuation of engine. It also prevents the jerks to the crank shaft.

ECCENTRIC ROD AND VALVE ROD: -

The eccentric rod is made of forged steel, whose one end is fixed to the eccentric and other to the valve rod. Its function is to convert rotary motion of the crank shaft into to and fro motion of the valve rod. The valve rod connects the eccentric and the D-slide valve. Its function is to provide simple harmonic motion to the D-slide valve.



STEAM ENGINE

CONCLUSION: -

From the above experiment we have successfully studied about steam engines.

GITA BHUBANESWAR