

## **cylinder block**

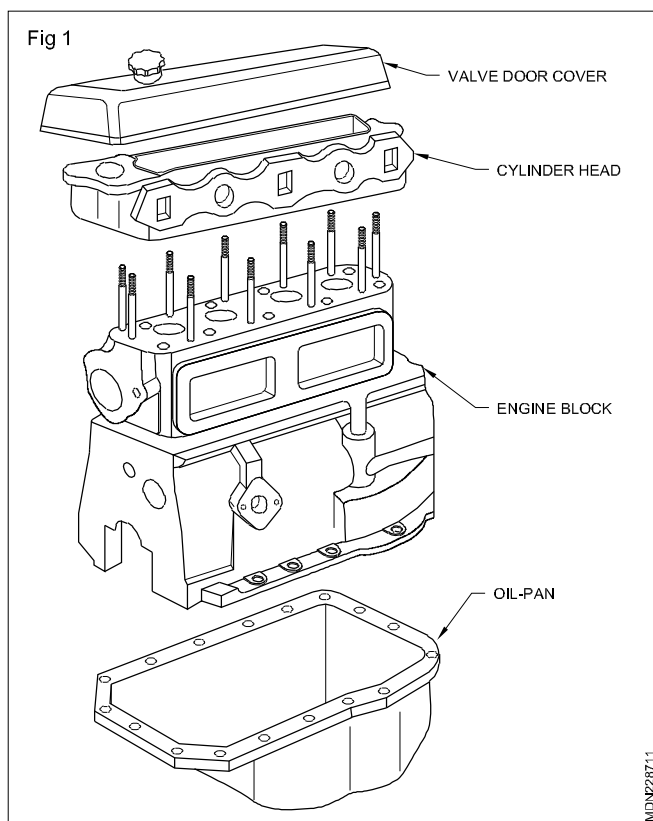
**Objectives:** At the end of this lesson you shall be able to

- describe the function of the cylinder block
- state the constructional features of the cylinder block
- state the function of crankcase
- state the function of the cylinder liner
- list out the various types of cylinder liners
- list the material of cylinder liners.

**Cylinder block:** It forms the base of the engine. Two types of cylinder blocks are used in vehicles.

### **Cylinder block construction**

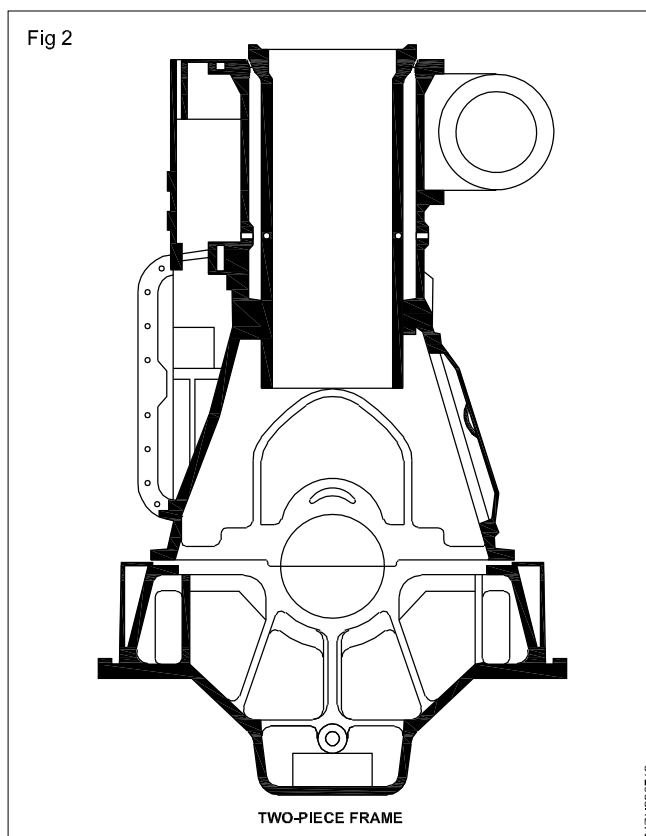
**Single piece casting:** In this the type cylinder block and crankcase are cast as one piece. It gives better rigidity and it is easy to cast, which reduces the cost of manufacturing. (Fig 1)



**Two-piece casting (Fig 2):** In this type the cylinder block and crankcase are cast separately. The crankcase is bolted to the cylinder block. It reduces the problem of lifting the cylinder block from crankcase, during repairing or overhauling. This type of casting is used in heavy generating sets.

The cylinder block is made of cast iron or aluminium alloy. Inside the cylinder block, water jacket passages for the coolant and lubricating oil are provided. The cylinder head along with the valve assembly is fitted on the top of the

cylinder block by nuts and bolts. The oil sump is bolted to the cylinder block /crankcase from the bottom. The crankshaft is supported on split type bearings. The half bearing is fixed on the web which is cast with the cylinder block, the other half bearing is fixed in the bearing cap. The bearing cap is fastened with the web by nuts and studs. This portion where the crankshaft is fixed is known as the crankcase. In the cylinder block passages are provided for the camshaft and camshaft bearing, push rods, tappets etc.



### **Crankcase**

Crankcase is attached to the bottom space of the cylinder block. It acts as the base of the engine and supports the crankshaft oil pan and also provides the arms for supporting the engine of the frame. The oil pan and the lower part of the cylinder block together are called the crank case.

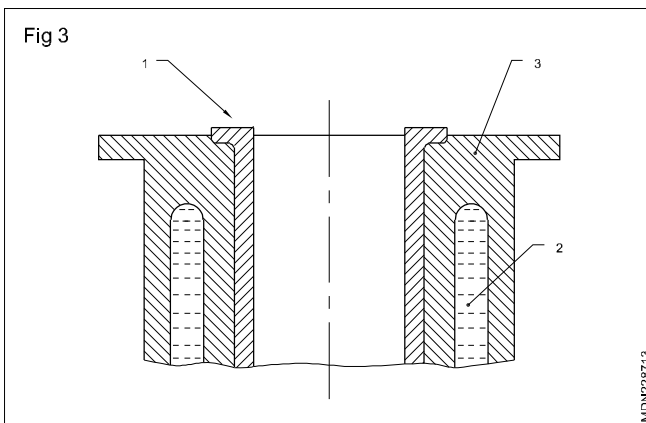
## Crank case material

The cylinder block and upper half of the crankcase usually made of a ferrous alloy or semi steel to provide a stronger and harder casting. The use of stringer and together materials permits timer casting walls, thus saving weight and improving of cooling effect and good thermal conductivity.

**Liners:** A liner is a thin cast iron circular shell which is centrifugally cast. It contains chromium for hardness. It protects the cylinder block from rapid wear and damage due to combustion. The life of the cylinder block is increased by using a liner, since the block does not bear combustion pressure and temperature directly.

## Dry type

In the dry type liner (1) the cooling water (2) of the engine does not come in direct contact with the liner. These liners have an interference fit with a cylinder block (3). In the dry type liner a special process is required to insert them into the bores, and to remove them from the bore. (Fig 3)



## Wet type

In a wet type liner (1), the liners are in direct contact with the cooling water. (Fig 4)

Wet type liners are loose in the cylinder block (2) and these are supported between a recess in the block and the cylinder head. Gaskets or sealing 'O' rings (3) are used in liner grooves to seal against gas, oil and water leakage. Removal and fitment of these liners is easier than it is in the case of dry type liner.

## Materials

Materials used for liners are nitrided steel, nitrided cast iron, chromium-coated alloy steel. Liners are harder than the cylinder blocks.

