Crankshaft and Bearings

The crankshaft is the major rotating part in the engine. Crankshafts and bearings are used in areas of the engine that demand close fits. However, some clearance must be allowed for part expansion due to high temperatures. **Clearance** is the space allowed between two parts, such as between a journal and a bearing.

The **connecting rod** attaches the piston to the crankshaft. The upper end of the connecting rod has a hole through which the piston pin is passed. The lower end contains a large bearing that fits around the crankshaft journal.

The lower end of the crankshaft is usually split when friction bearings are used. **Friction bearings** use smooth sliding surfaces to reduce friction between moving parts. The place at which the halves separate is called the parting line.

There are three types of friction bearings commonly used in the big end of connecting rods:

- Rod Metal (used when rod is made of aluminum alloy)
- Bearing Bronze (cast into rod end, bored, and finished)
- Removable Precision Insert Bearings (steel shells lined with various materials)

The connecting rod on the small engine we use in the shop uses a **Rod Metal bearing**.

The crankshaft converts the reciprocating motion of the piston into rotary motion. The crankshaft must turn 2 revolutions to complete all four strokes in a four-stroke cycle engine. To help offset the unbalanced condition created by the force of reciprocating mass, counterweights are added to the crankshaft. The crankshaft is supported by one or more main bearings. Crankcase seals prevent leakage of oil from areas where the crankshaft and crankcase come together.
A journal is the part of a shaft or crank which rotates inside the bearing.

3 major parts of the crankshaft are: **Throw, Counterweight and PTO.**
- **Throw** is the distance from the center of the main bearing journal to the center of the connecting rod journal.
- Counterweights balance the forces from the reciprocating piston and reduces the load on the crankshaft bearing journals.
- **PTO** stands for **Power Take Off.** A PTO is a device that transfers mechanical power from an engine to another piece of equipment, such as a lawnmower blade.

The crankgear interlocks with the cam gear to turn the camshaft. The cam gear is 2 times larger than the crankshaft gear.