



## Why Won't This #@%&\*@ Engine Start?

Hard starting problems of newly overhauled diesel engines are time consuming and frustrating. We have observed that the majority of these "hard start" engines are 400 Series models equipped with rotary distributor fuel injection pumps. Specifically the 6-404 and 6-466.

Observations from the field indicate two prevailing reasons:

- A. Final/actual compression ratio after overhaul.
- B. Electrical deficiency resulting in poor starter performance.

The first has to do with piston protrusion and to some extent the valve face/head position in the head. The position of the piston at top dead center (TDC) is critical to the compression ratio and subsequently the creation of sufficient heat to reach the flash point of diesel fuel.

Secondly, electrical power deterioration due to poor contacts, insufficient cable size, distance from the power source, and poor batteries, results in low cranking speed.

Other factors include:

1. Quantity of fuel – Regulated by the fuel injection system.
2. Quality of fuel – Self-explanatory. Injection quality of fuel should not be a problem, but....? The higher the cetane number (index), the better the ignition.
3. Vaporizing of fuel with air is dependent on condition of injectors, fuel pressure at nozzle, and availability of air.
4. Timing of fuel injection in accordance with factory instructions. Number of degrees below top dead center (BTDC).
5. Heat – The result of compressing the proper quantity of air relative to fuel at the proper piston speed to create heat.