

Spark Plug Condition May be A Clue to Engine Problems

A series of international fuel economy tests conducted by Champion Spark Plug Company sought to determine how much the condition of the plugs affects gasoline consumption. Results showed that approximately two-thirds of the total fuel economy improvement gained from an engine tune-up was attributable to the installation of a set of new spark plugs.

The tests estimated that new spark plugs can save about one gallon of gasoline per 18-to-20 gallon tankful compared to plugs needing replacement. The reason plugs have such a critical bearing on gasoline consumption is not hard to understand when the role of the plug in the ignition system is examined.

The spark plug must conduct a high ignition voltage to the combustion chamber to ignite the air-fuel mixture. It must do so in all types of weather and in all sorts of operating conditions. If the spark plug fails to deliver the high voltage, the fuel is either burned incompletely or not burned at all. Thus the wasted fuel.

While spark plugs themselves are normally trouble-free during their recommended service life, they often are indicators of gas-wasting malfunctions in the engine.

Champion cites six typical examples of how a close examination of spark plugs can help diagnose engine problems. To make such an examination meaningful, it is important that the plugs be arranged in order according to their cylinder location.

Figure 1 shows two adjacent fouled plugs in a 6-cylinder engine. There's a good chance that this may be due to a blown head gasket between the two cylinders.

Figure 2 illustrates the two center plugs as fouled. This may suggest that raw fuel is being "boiled" out of the carburetor into the intake manifold after the engine is shut off. If the engine is used for stop-start, short-trip service, the two center plugs may foul due to the overly "rich" diet. Proper float level, good needle and seat seal, and, in some cases, installation of an insulating spacer between the carburetor and intake manifold can help relieve this problem.

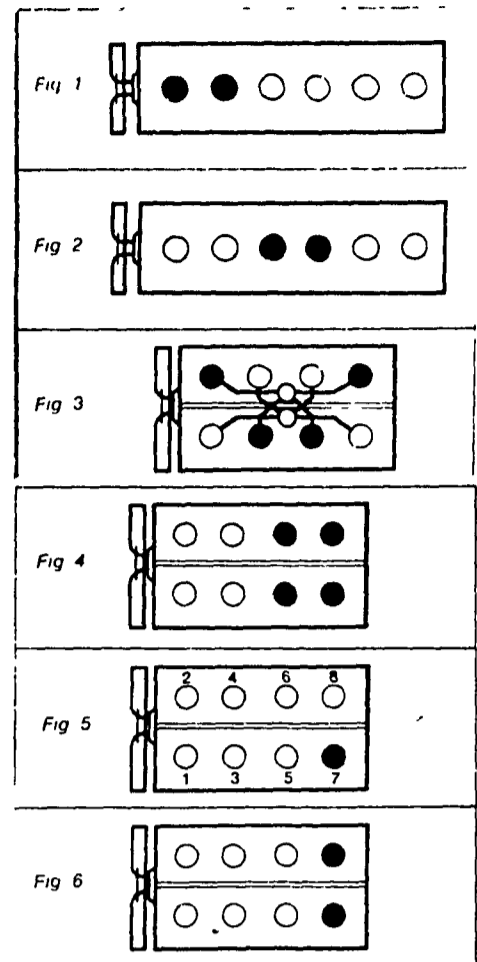
An unbalanced carburetor may produce fouled plugs in an 8-cylinder engine as illustrated in Figure 3. Take a good look at the fuel flow on this particular design of intake manifold. If the right barrel happened to be running rich, there is a possibility that the four plugs in the cylinders it supplies would tend to foul. The four remaining would be normal.

Finding the back four plugs overheated, as shown in Figure 4, may indicate possible cooling system problems. There's a good chance that a thorough cleaning of the cooling system would restore coolant circulation to the rear of the engine and cure the problem.

Finding only one plug overheated may indicate an intake manifold leak near the location of that particular cylinder. Also, check the firing order. If the overheated plug is the second of two adjacent, consecutively firing plugs like Figure 5 illustrates, you could be looking at the result of cross fire. Separating the leads going to those two plugs will eliminate the possibility of cross fire by induced voltage.

Figure 6 illustrates a condition that may be seen occasionally, especially in larger V-8 engines used in light service... the two rear spark plugs are oil fouled.

If the oil drain holes in the rear of the cylinder head are plugged up due to excessive sludge, oil may be "pulled" in around the intake valve stems. This will probably be noticed



in the two rear holes first, since the engine slants in that direction. High oil consumption and a smoky exhaust may also accompany this condition.



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Commercial Vegetable Soils Contain Fertilizer Reserves

Possible shortages of fertilizer, and accompanying high prices, should create no serious problem for most commercial vegetable growers of Pennsylvania, a plant scientist announced during the annual Vegetable Conference held recently at The Pennsylvania State University.

Such farmers should obtain good results in 1974 by spending no more for fertilizer than they paid out in 1973, stated Dr. Cyril B. Smith, professor of plant nutrition at Penn State. Dr. Smith said commercial

vegetable growers of Pennsylvania have a "soil bank" rich in plant foods, to supply a high percentage of needed nutrients.

"There probably never was a better time to use some of the fertilizer reserves existing in the soils of most Pennsylvania vegetable farms," he affirmed.

What is often needed is not a whole range of plant nutrients in large amounts but small quantities of certain nutrients to balance out the needs of a crop, he pointed out. For several

years Dr. Smith and associates have carried out extensive experiments with various fertilizer treatments, especially on snap beans and sweet corn.

For instance, in eight snap bean experiments in 1973, the best overall response came from applications of 25 pounds of nitrogen and 60 pounds of phosphate per acre. Dr. Smith said long-range studies indicated adequate levels of potash for 1974 vegetable crops.

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