

ESSENTIAL DIESEL ENGINE MAINTENANCE TIPS

Master Degree Student – Senkovets A.A., TSF

Scientific supervisor – Rylo T.V., senior teacher

*EI "Belarusian State Agrarian Technical University",
Minsk, the Republic of Belarus*

Abstract. The article describes the typical operations of diesel engines maintenance. It highlights important characteristics of diesel fuels, air filters, the cooling system, engine lubricating oils.

Keywords: maintenance, fuel filter, cooling system, lubrication.

Diesel engines are the workhorses of the engine world. They are durable, economical and reliable. Over the years, contemporary diesel engines have advanced to include many unparalleled mechanical advantages.

Diesel engines' fuel economy has never been more efficient. Diesel is one of the most energy-dense fuel options on today's market, offering excellent mileage and vehicle fuel economy.

In fact, the average diesel engine operates with 25 to 30 percent more fuel economy than a comparable gasoline engine. This fuel-economy advantage leads straight into another diesel benefit: overall superior fuel efficiency. Since diesel engines have direct energy conversion capabilities, their engines are more apt to run longer, stronger and sturdier. They're also engineered to handle rigid compressions more smoothly alongside overall engine wear and tear. Diesel machines are both reliable and have a more robust lifespan, which means better resale or trade for vehicle owners. Advances in technology, coupled with tighter emission policies, have radically increased the sustainability of diesel engines allowing these machines to run a little gentler. Most modern diesel engines have catalytic converters, enhanced, multi-layered filters and innovative mechanical features cutting down on emissions. What's more, diesel itself has undergone chemical manipulations into today's biodiesel forms, reducing sulfur amounts and other noxious discharge. With proper fluid additions and engine-moisture maintenance, diesel machines provide rugged power generation primed for winter.

Other important characteristics of all diesel fuels are cloud point, pour point, water content.

Cloud point is the temperature at which a cloud or haze appears in the fuel. This is caused by solidification of paraffin in the fuel, and these solids can cause fuel filter plugging. Engine operation at or below the cloud point may be

seriously affected by inadequate fuel flow because of filter blockage. If such operation is anticipated, fuel heaters should be installed. If the fuel's cloud point is at least 10° F below the ambient temperature, engine performance will generally be satisfactory. Grade 2D, has a cloud point of 10°F (-12°C), while the lighter grade 1D has a cloud point of -20°F.

Reliable operation of diesel engines requires a pour point at or below ambient. Dilution of the fuel with kerosene or addition of a flow improving additive can also help. The pour point averages about 10° F lower than the cloud point.

Water content excess of 5 percent by volume is a contaminant in diesel fuel. Water separation by sedimentation or by a coalescing filter must be adequate to remove water from the fuel before it reaches the fuel injection pump. Water concentrations in excess of 5% by volume will cause damage to the fuel injection system. The presence of water in the diesel fuel can also promote bacterial growth, which is a serious hazard to the fuel filtration system. It is recommended that all diesel fuel be treated with a biocide.

Diesel fuel is more prone to oxidation than gasoline. It must never be kept in storage for more than 12 months. Arrangements should be in place to either consume the fuel or rotate it to oil burner stock.

Low cetane number fuels will suffer from delayed ignition, increased exhaust emissions, and can cause starting difficulty and engine knock. Engine damage can result. White smoke and odor during cold weather starts indicate low cetane fuel. A guideline for minimum cetane index is 40 for all engines. Although some pre-combustion chamber engines will run on cetane index 35 fuel, a cetane index of greater than 40 is a good rule to observe for any diesel engine.

Air filters are equally important to the longevity of an engine. They serve to trap abrasives before they can enter the engine combustion chambers. Lack of proper air filtration will cause rapid wear of rings, pistons, and liners. If unusually dusty conditions prevail, air filters may require more frequent replacement or cleaning.

The cooling system of a diesel engine must be capable of continuously removing about 30% of the heat released by combustion of its fuel without overheating. Assuming a reasonably clean cooling system is usually not a problem. In addition to coolant level, there are several items which should be checked: coolant level, coolant composition, recommended additives and inhibitors, cooling system integrity.

Engine lubrication is perhaps the single most important element of a good maintenance program. Engine oil lubricates moving parts, provides corrosion protection, absorbs and neutralizes contaminants, and serves as a coolant and a sealant. Through regular oil and filter changes the oil removes foreign matter from the engine, contributing to internal cleanliness and minimizing engine wear.

Engine lubricating oils are prepared from either petroleum or synthetic stocks, and are formulated with a number of additives which provide or modify certain characteristics of the base oil stock. Among these are detergents, alka-

linity agents, oxidation inhibitors, dispersants, and anti-wear agents. These additives give the engine oil its desirable qualities.

The best way to keep overall diesel engine maintenance costs low is to get regular servicing. A certified technician has to run numerous tests on diesel engine, ensuring quality fuel efficiency, mileage, part integrity and durability. It's not a complicated equation: Taking care of your diesel engine means it will take care of you and your time.

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MAINTANENCE ON MODERN FARMS: INNOVATIVE EQUIPMENT

Students – Belaya K.Y., 22 mo, 3^d year, TSF;

Doroshenko M.V., 19 rpt, 1st year, TSF

Scientific supervisor – Misiuk S.V., senior teacher

*EI «Belarusian State Agrarian Technical University»,
Minsk, the Republic of Belarus*

Abstract. Smart farming and precision agriculture involve the integration of advanced technologies into existing farming practices in order to increase production efficiency and the quality of agricultural products. They also improve the quality of life for farm workers by reducing heavy labor and tedious tasks.

Keywords: automation, agricultural robot, smart equipment, autonomous tractor, technological advancement, precision seeding equipment, smart factory, drone.

Every aspect of farming can benefit from technological advancements – from planting and watering to crop health and harvesting. Most of the current and impending agricultural technologies fall into three categories that are expected to become the pillars of the smart farm: autonomous robots, drones or UAVs, and sensors and the Internet of Things (IoT).

Replacing human labor with automation is a growing trend across multiple industries, and agriculture is no exception. Most aspects of farming are exceptionally labor-intensive, with much of that labor comprised of repetitive and standardized tasks – an ideal niche for robotics and automation.