ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
THE ORGANIZATION OF ISLAMIC COOPRATION (OIC)

بسم الله الرحمن الرحيم

Project name:
Preventive maintenance of automobile

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There is absolutely no doubt that had we not been candidates of sound mind and with good health, we would never have accomplished this demanding task. We, therefore, thank the al-mighty Allah for granting us such success perquisites that cannot be granted by none other than him.

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We would also like to thank our workshop instructures who did a remarkable job.

Maintenance Definition

British Standard Glossary of terms (3811:1993) defined maintenance as:

the combination of all technical and administrative actions, including supervision actions, intended to retain an item in, or restore it to, a state in which it can perform a required function.

Another Defination

Maintenance is a set of organised activities that are carried out in order to keep an item in its best operational condition with minimum cost acquired.

Maintenance Activities:

Activities of maintenance function could be either repair or replacement activities, which are necessary for an item to reach its acceptable productivity condition or these activities, should be carried out with a minimum possible cost.

Maintenance History

1. In the period of pre-World War II, people thought of maintenance as an added cost to The plant which did not increase the value of finished product.

   Therefore, the maintenance at that era was restricted to fixing the unit when it breaks because It was the cheapest alternative

2. During and after World War II at the time when the advances of engineering and scientific technology developed, people developed other types of maintenance,

which were much cheaper such as preventive maintenance.

In addition, people in this era classified Maintenance as a function of the production System.

3. Nowadays, increased awareness of such issues as environment safety, quality of product and services makes maintenance one of the most important functions that contribute to the success of the industry.

World-class companies are in Continuous need of a very well organised maintenance programme to compete world-wide.

Maintenance History

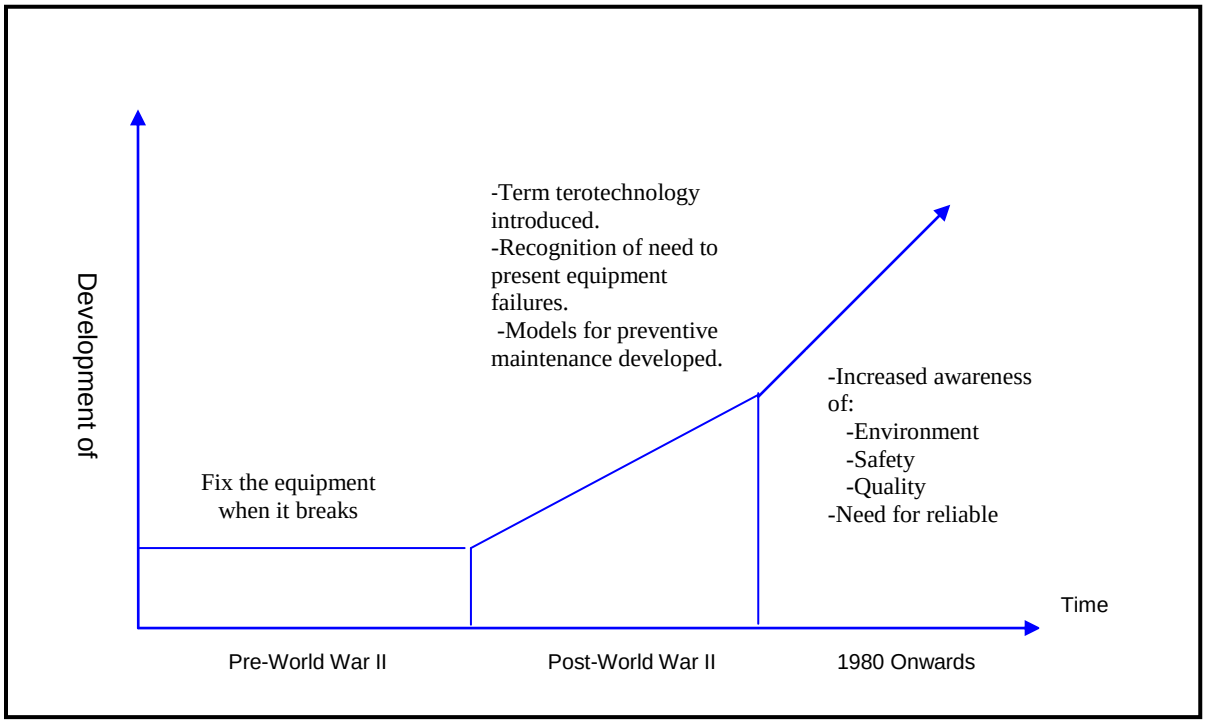


Figure 2.2 Maintenance History
(Adapted From Shenoy, Bhadury 1998)

Types of Maintenance

- Run to Failure Maintenance (RTF)
- Preventive Maintenance (PM
- Corrective Maintenance (CM)
- Improvement Maintenance (IM)
- Predictive Maintenance (PDM)

Preventive Maintenance

Preventive Maintenance (PM) Definition :

British Standard 3811:1993 Glossary of terms defined preventive maintenance as:

the maintenance carried out at predetermined intervals or according to prescribed criteria and intended to reduce the probability of failure or the degradation of the functioning and the effects limited.

ANOTHER DEFINITION:

It is a set of activities that are performed on plant equipment, machinery, and systems before the occurrence of a failure in order to protect them and to prevent or eliminate any degradation in their operating conditions

- *The advantage* of applying preventive maintenance activities is to satisfy most of maintenance objectives.

- *The factors that affect the efficiency* of this type of maintenance:

1. The need for an adequate number of staff in the maintenance department in order to perform this type of maintenance.

2. The right choice of production equipment and machinery that is suitable for the working environment and that can tolerate the workload of this environment.

3. The required staff qualifications and skills, which can be gained through training.

4. The support and commitment from executive management to the PM programme.

5. The proper planning and scheduling of PM programme.

6. The ability to properly apply the PM programme.

Preventive Maintenance (PM)

- Researchers subdivided preventive maintenance into different kinds according to the nature of its activities:

- *Routine maintenance* which includes those maintenance activities that is repetitive and periodic in nature such as lubrication, cleaning, and small adjustment.
- *Running maintenance* which includes those maintenance activities that are carried out while the machine or equipment is running and they represent those activities that are performed before the actual preventive maintenance activities take place.

- *Opportunity maintenance* which is a set of maintenance activities that are performed on a machine or a facility when an unplanned opportunity exists during the period of performing planned maintenance activities to other machines or facilities.
- *Window maintenance* which is a set of activities that are carried out when a machine or equipment is not required for a definite period of time.
- *Shutdown preventive maintenance*, which is a set of preventive maintenance activities that are carried out when the production line is in total stoppage situation

These three forms of maintenance management are compared below. They are listed in order of effectiveness (highest to lowest).

Predictive Maintenance (aka *Condition Monitoring*): most-effective maintenance paradigm

Advantages

- Continuous monitoring detects the onset of component problems in advance.
- Maintenance performed only when needed and may be planned in ahead of time.
- Result: cost savings of another approximately 18% when compared to *preventive* maintenan ce.
- Reduced costs for

machine and process downtime.
- Reduced costs for manpower and replacement parts.

Disadvantages

- High initial costs for standard-monitoring systems and/or contracted services to perform them: e.g., as *thermography* and *vibration analysis*.

Preventive Maintenance: somewhat-effective maintenance paradigm

Advantages

- Reduced machine downtime (failure rate) due to *scheduled* maintenance intervals.
- This can result in cost savings of approximately 12%

Disadvantages

- Time-scheduled based maintenance leads to high labor costs and expensive part replacements since components with *remaining lifetime* might also be

when compared to *reactive* maintenance.

- replaced.
- Unplanned downtime can't be excluded

Value of Preventive Maintenance

There are multiple misconceptions about preventive maintenance. One such misconception is that PM is unduly costly. This logic dictates that it would cost more for regularly scheduled downtime and maintenance than it would normally cost to operate equipment until repair is absolutely necessary. This may be true for some components; however, one should compare not only the costs but the long-term benefits and savings associated with preventive maintenance. Without preventive maintenance, for example, costs for lost production time from unscheduled equipment breakdown will be incurred.

Also, preventive maintenance will result in savings due to an increase of effective system service life.

Long-term benefits of preventive maintenance include:

- Improved system reliability.
- Decreased cost of replacement.
- Decreased system downtime.
- Better spares inventory management.

Long-term effects and cost comparisons usually favor preventive maintenance over performing maintenance actions only when the system fails.

Main Parts of Automobile That Needs Preventive Maintenance

#Engine
#cooling system
#Exhaust system
#Suspension system
#Battery system
#Ignition system
#Electronic system
#Fuel system
#steering system
#Transmission
Tire

ENGINE PREVENTIVE MAINTAINANCE

Checking belts

At the front of the engine there will be a series of rubber drive belts that loop around various pulleys, driving everything from the alternator to the a/c compressor. Rubber perishes, more so in extreme conditions like those found in an operating engine bay. Get the timing belt and accessory drive belt checked every 25,000 miles, preferably replacing it every 50,000 miles.

Checking oil level

This is something everyone can do - it's quick and easy and it'll tell you if the engine needs oil. If the oil is too high or too low, it can cause trouble for the engine. To check the oil, park on level ground and wait until the engine has cooled down after driving, then locate the dipstick. Pull it out and wipe it clean, then push it all the way back in until the top of it is seated properly in the dip tube again. Wait a moment then pull it out again. Check the level of the oil. If it's between the high and low marks, it is fine. (If it's too low, add a little.) The high and low marks can be denoted by two dots, an "H" and "L" or a shaded area on the dipstick. The photos below show a Honda dipstick which has the two dots. Why not just read the level first time around? The first time you pull the dipstick out, it will have oil all over it and it will be difficult to tell where the level is. That's why you need to wipe it on a rag to get a clean dipstick, then dip it back into the oil to get a good reading.

Checking the coolant level

Again, something everyone can do. The coolant is the other thing your engine cannot go without. Every engine is different but if you check the handbook you should find where the coolant reservoir is. It will normally be bolted to one side of the engine bay or the other, and be a white semi-transparent bottle. Wait until your engine is cool and take a look at it - the outside should have 'low' and 'high' markings on it and the level of coolant inside should be between the two.

Do not take the radiator cap off to check coolant levels. If the coolant system is still hot then it is still under pressure and the pressure release will burn you.

Hoses

Inspect the hoses and belts monthly. If a hose looks bad, or feels too soft or too hard, it should be replaced.

COOLING SYSTEM PREVENTIVE MAINTAINANCE:

A cars engine generates enough heat to destroy itself. The cooling system protects against damage keeping the engine operating within the correct temperature range. Regular checks and maintenance help assure long life of vulnerable engine parts.

Here's what's involved in proper cooling system maintenance

Check condition of water pump

1. Inspect radiator for leaks, corrosion
2. Be sure you have plenty of coolant. Caution: never open or remove pressure cap when engine is hot
3. Look for leaking hoses and connections tighten loose clamps
4. Check condition of the radiator pressure cap replace if rubber gasket is damaged
5. If the engine runs too cool the thermostat is probably at fault and should be replaced
6. Inspect condition of hoses. Cracked, mushy or otherwise deteriorated hoses should be replaced
7. Heater hoses demand attention, too. Look for

leaks, cracks, rotted rubber. Replace faulty clamps
8. Check belts for wear and tension. Replace when cracked or frayed. Usual life is about 4 years.

COOLING SYSTEM CHECK:

Unfortunately, many motorists wait until the first severe cold snap or the hottest day of the year before paying attention to their cars' cooling system. This often results in "crisis repairs" rather than preventive maintenance. The following tips from Automotive Cooling System Institute help avoid car trouble.
Cooling System "Tune-Up" Checklist

• Flush dirt, bugs and leaves from front of radiator with a brush and garden hose
• Inspect the radiator cap. Replace it if the rubber gasket is broken, dried out, or missing
• Check the condition and level of coolant. If it is rusty, clean the system and replace with a 50/50 mixture of water and ethylene glycol anti-freeze
• Inspect radiator and radiator hoses for leaks, cracks or soft, mushy condition. Tighten all clamps. Replace hoses as needed
• Look for the heater hose running from the engine,

through the fire wall, to the heater core under the dash. Replace swollen or cracked hoses. To check the hoses, start the engine and turn on the heater. If after ten minutes the hoses are cool, they could be clogged

• Inspect all engine belts for wear and cracks. Replace if worn, cracked or glazed. Adjust loose belts. Note: Some engines have a V-ribbed belt that drives some or all of the accessories. If the belt grooves show excessive cracks or "chunking", replace the belt

• Check the thermostat operation by running the engine for 10-15 minutes. Generally, it's OK if you can feel warm coolant surging through the upper hose. Beware of an engine that runs too hot or too cool. Tighten loose bolts on the thermostat housing at the engine

• Clean the engine exterior. Excessive oil and dirt will hide leaks, or insulate the engine, causing it to run hot

The National Automotive Radiator Service Association (NARSA) recommends that motorists have a seven-point preventative cooling system maintenance check at least once every two years. The seven-point program is designed to identify any areas that need attention. It consists of:

1. a radiator pressure cap test to check for the recommended system pressure level
2. a thermostat check for proper opening and closing
3. a pressure test to identify any external leaks to the cooling system parts; including the radiator, water pump, engine coolant passages, radiator and heater hoses and heater core
4. an internal leak test to check for combustion gas leakage into the cooling system
5. a visual inspection of all cooling system components, including belts and hoses
6. a system power flush and refill with car manufacturer's recommended concentration of coolant
7. an engine fan test for proper operation

By performing regular checks, NARSA radiator and cooling system specialists can help motorists prevent problems, emergency repairs and/or replacements, effectively saving the consumer time, trouble and money.

Preventive maintenance of exhaust system

What is the exhaust system?

The engine is connected to a system of long metal tubes and other parts that work together to reduce the noise and the by-products created in the gasoline combustion process and carry them from the engine through the tailpipe and safely away from the vehicle.

The exhaust system has a few essential parts; each plays a vital role in the process:

Catalytic Converter: This sends the gases through a final “burn” to remove leftover exhaust gases not burned by the engine and exhaust manifold.

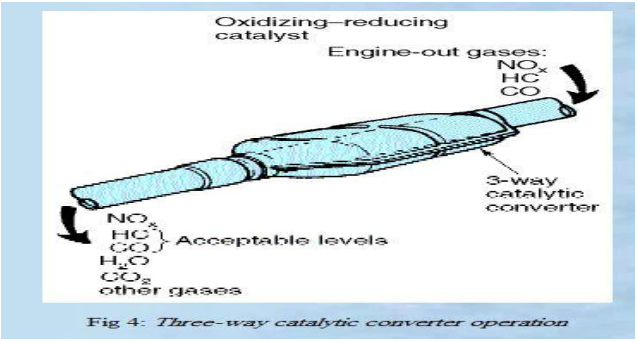


Fig 4: *Three-way catalytic converter operation*

Muffler: Muffles the sounds of the gases as they are transported through the system.

Tailpipe: The tailpipe carries the air and water vapor away from the vehicle.

Why it is important?

When the exhaust operates properly, the gases created during the fuel combustion process are

carried safely away from the vehicle through the muffler and tailpipe.

Motor vehicle exhaust gas contains carbon monoxide, a toxic gas which can cause headache, nausea, dizziness, and general disorientation in humans. Leaks in the system can allow these dangerous exhaust fumes to leak into the passenger area causing discomfort and possible illness to people riding in the vehicle.

Check your exhaust system frequently, if you notice that your car seems to sound different, loud, or suddenly makes a deep rumbling sound when it’s running, this may be a sign of a hole or leak in the exhaust.

How to keep it in good shape?

Keeping the exhaust system in good shape means thwarting its worst enemy is rust.

Rust or corrosion can occur when the metal parts of the exhaust system are exposed to moisture from outside elements like rain and snow, or from the water vapors that are created as a natural part of the combustion process.

If you live in a colder climate and your vehicle is exposed to road salt, have the undercarriage rinsed every few weeks. Salt contributes to corrosion of the metal parts of your car, so removing it regularly will extend the life of your exhaust.

Understanding how the vehicle’s exhaust system operates and investing in a little preventative maintenance can go a long way toward minimizing problems down the road.

Suspension system preventive maintenance

- A car's suspension system has many parts that can wear over time, including the shock absorbers. If the suspension feels springy, the shocks may need to be replaced. Worn shock absorbers can lead to irregular tire wear and wheel alignment problems. Unless you are experienced with the components of vehicle's suspension system, you should leave the testing and repairs to a licensed mechanic.

Figure 1. The torque rod assemblies for 2-1/2 and 5 ton 6x6's are very similar. Some of the rods are round from eye to eye (as above) and on some, the shaft between the eyes has an "I-beam" cross section.

Figure 2. The rod end is a ball joint encased in rubber with a steel outer sleeve. The rod end is pressed into the eye of the rod. The photos above are of a new rod end.

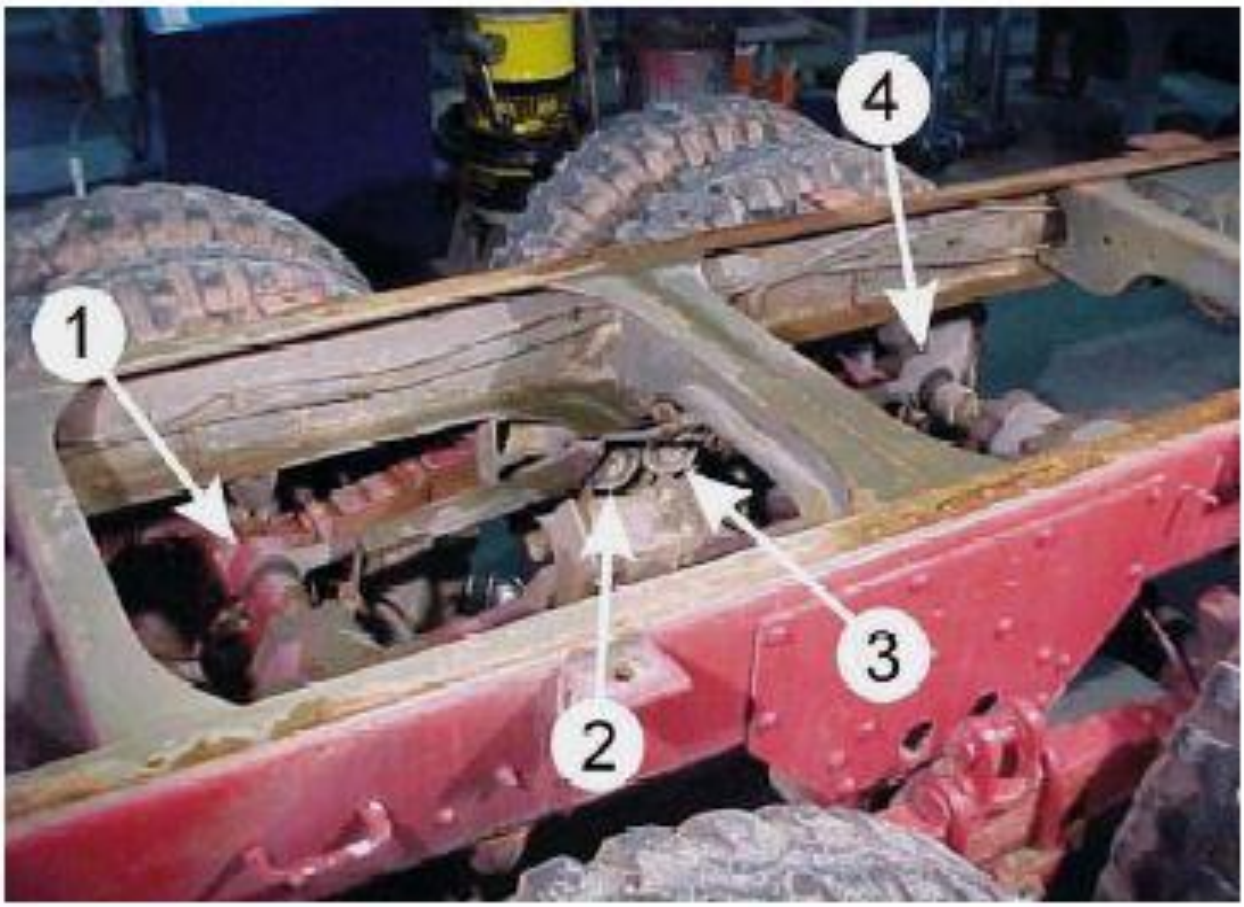


Figure 3. The two upper torque rod assemblies (four rod ends) may be inspected from below the unit. However, for photographic purposes, the water tank was removed from this unit.

Figure 4. Two lower torque rod assemblies are located on each side of the vehicle. Four rod ends on each side should be inspected.

Figure 5. The center two lower rod ends may be easily seen by standing next to the unit and looking between the rear duals.

Figure 6. These rod ends have been in service for five to six years. The rubber is still in excellent condition.

Figure 7. When you inspect the rod ends, always check both the outer and inner sides of them. The rubber of this rod end shows signs of weathering, but no separation from the metal sleeve or ball joint.

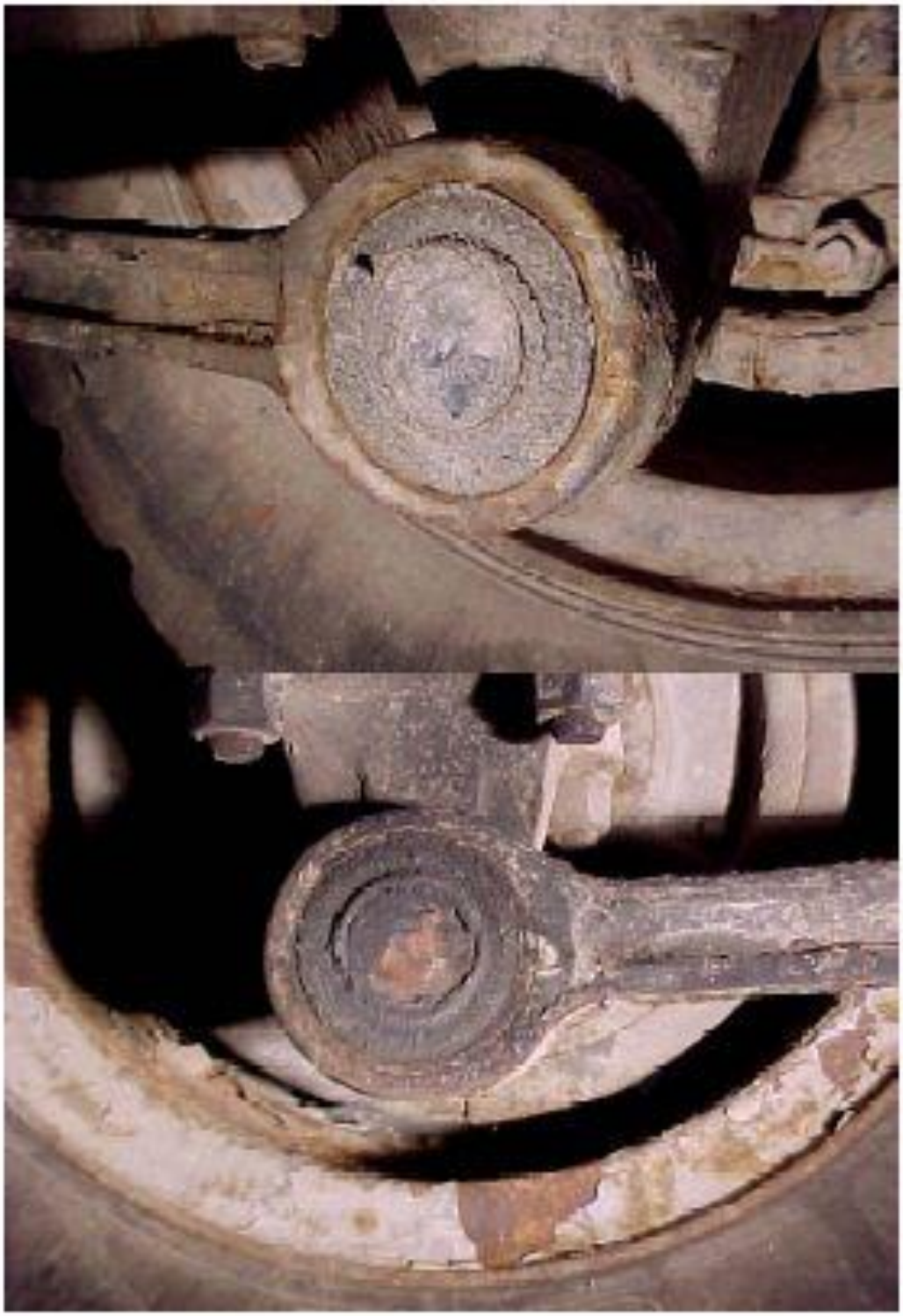


Figure 8. The above photos show rod ends that are starting to show some signs of deterioration. However, they would still be considered to be in usable condition. Notice the rubber pealing off the end of the inner ball joint. This is not an indication of a major problem.

Figure 9. The outer metal sleeve has completely separated from the rubber on both of the above rod ends, allowing the torque rods to slide against the frame.

Figure 10. The rubber on the above rod end is beginning to separate from the ball joint. These rod ends should be replaced.

Figure 11. This is an example of the rubber separating from the outer metal sleeve of the ball joint. This rod end should be replaced.

Preventive Maintenance of Batteries

Before installing the battery system check for physical damage, electrolyte level, state of charge, etc..

Ensure that the battery compartment is well vented and will prevent the entrance of water, dirt, etc.. Believe it or not one of the most severe abuses that a deep cycle battery will receive is cleanliness, or lack of it. Dirt, corrosion, water and acid will rob a battery of a full life. A clean well-kept battery will extend the useful life of the battery. Remove dirt and dust accumulations from the top of the battery. Wash the top of the battery with clean water and soda solution to neutralize any acid accumulation. Approximately 100 grams to a liter of water is sufficient. Baking soda used in the home is satisfactory. Rinse with clean water

and dry. Ensure vent caps are in place and no soda solutions enters the battery.

Before installing the batteries, clean the contact surfaces of the lead terminal post and battery terminals with a wire brush. Apply a thin coat of Vaseline to all contact points and connector bolts. After all connections have been securely tightened, they should be gone over and tightened a second time.

Check the height of the electrolyte twice a month. If necessary replace with approved water only. Many times domestic water is satisfactory. Water with a high mineral content is not satisfactory

Never fill the cells above the bottom of the vent well (must be at least 1 inch below the top of the vent opening). Over filling will cause loss of electrolyte and reduce the battery capacity. Never add acid to the battery.

Avoid over discharging of the battery as the useful life will be reduced. The rule of thumb is not to exceed 80 percent of the capacity of the battery. On a 12 volt system this would be approximately 11 volts. Remember over discharging or low voltage will also reduce the life of most electrical equipment.

Battery capacity is based on each cell having an electrolyte temperature of 77°F (25° C). Temperatures below 77° F reduce the battery's effective capacity and lengthen the time to restore to full capacity. Temperatures above 77°

F will slightly increase capacity, but will also increase self-discharge and shorten battery life.

If a battery becomes discharged the electrolyte can freeze. See list below. Specific Gravity

(cor. to 80° F/26° C) Freezing Temp

1.280 -92° F (-69° C)

1.265 -72.3° F (-57.4° C)

1.250 -62° F (-52.2° C)

1.200 -16° F (-26.7° C)

1.150 +5° F (-15° C)

1.100 +19° F (-7.2° C)

Charged Specific Gravity Open Circuit Voltage

100% 1.265-1.275 12.6

75% 1.225-1.235 12.4

50%	1.190-1.200	12.2
25%	1.155-1.165	12.0
0%	1.120-1.130	11.7

Determining state of charge by voltage is more difficult as there must be no load or surface voltage present.

When taking specific gravity measurements, it is important to correct for temperature to get a true reading. As a rule of thumb, specific gravity will change by 0.0003 for each ten degrees Fahrenheit change in temperature above or below 77° F (25° C). Below 77° F subtract from readings and above 77° F add to the readings. As an example a reading of 1.265 at 67° F corrected for temperature would be 1.262 and a

reading of 1.265 at 87° F corrected for temperature would be 1.268.

It is recommended that fully charged gravity and voltage readings be taken of each cell every month and compared with readings from the preceding period. The readings will indicate any marked difference in battery condition as well as differences between cells. A good rule of thumb is if there is 0.025 points or less between the high and low cell the battery is not defective. Low readings would indicate the battery being discharged.

Sometimes the battery may be operated between the middle range or it's capacity due to load demands and or lack of charging time. At least once every three to four weeks the battery system must be fully charged. During discharge

sulfate is formed. If the sulfate is allowed to remain for too long a period it will become very difficult to remove and the battery system will not accept a charge.

The charging system can have a profound effect on the life of the battery. A high voltage setting can cause excessive gassing and water loss. Eventual damage to the battery system will take place. A low setting will leave the batteries in an under charged condition resulting in a loss of capacity and eventually the battery system may not take a charge. A proper setting will result in a minimum of water consumption and still able to maintain the batteries at full charge.

Remember batteries may expel explosive gases. Keep sparks, flames, burning cigarettes or any other ignition sources away from the battery system at all times.

Always wear a face shield when working near batteries.

Preventive maintenance of ignition system

Spark Plug Wires

Spark plug wires are used on all generations of electrical systems. On the conventional and electronic ignition systems, spark plug wires connect the distributor to the spark plugs at each cylinder. In the distributorless ignition system, the spark plug wires connect the coil packs to the spark plugs. The spark plug wires carry high voltage electricity.

Changing Spark Plug Wires

Changing the spark plug wires is relatively easy. A couple of tips should be taken into account. Engines have certain firing orders that cannot be mixed up. Remove and replace only one wire at a time to avoid mixing up the wires. It is also a good practice to use dielectric grease in the boot end of each spark plug wire to inhibit corrosion.

Spark Plugs

The spark plug, used in all generations of ignition systems, completes the high voltage circuit. Voltage at the spark plug needs to be great enough to arc across a gap thus creating a spark. This spark is what ignites the air-fuel mixture. The center electrode on the spark plug is commonly made of copper or platinum. The gap between the center electrode and the grounded electrode is usually between 0.020 to

0.080 of an inch. Most engines have one spark plug per cylinder.

Changing Spark Plugs

When changing spark plugs, it is recommended to use anti-seize compound on the threads. This prevents seizing that can result from the reaction when different metals come in contact with one another – especially important on vehicles with aluminum heads. This also allows easier removal of the spark plugs during the next service.

Crankshaft and Camshaft Sensors

The crankshaft and camshaft sensors are used on distributorless ignition systems. They keep track of piston and valve positions in the engine to efficiently time the spark.

Since they are so important we must keep then in good shape all the time in order to do so we must check then regularly and that require inspection of the cams for any damage and adjust the timing of the cam shaft is crucial to the ignition of the cylinder

Summary

The ignition system is designed to ignite the air-fuel mixture in the combustion chamber. Ignition systems have gone through three stages: conventional, electronic, and distributorless. Even though the ignition system may seem complex with

computers, ignition modules, and sensors, there are things that the do-it-yourselfer can do to maintain and tune-up the engine to make it run smoothly for thousands of miles.

Preventive maintenance of electronic system

A steady supply of current is crucial to operating the highly sophisticated electronics in today's vehicles. Lack of current or fluctuations in the supply of current can:

cause the "Check Engine" light to come on

cause poor engine performance or stalling

result in malfunctions of the computers that operate your vehicle's climate control, ride control and ABS brakes.

To maintain a steady supply of voltage, the electrical system in your vehicle is comprised of two systems: a starting system and a charging system.

The starting system, which gets your vehicle's engine going, is comprised of a starter motor, starter solenoid, starter relay, neutral safety switch and ignition switch. The starter solenoids and relays can be part of the starter or mounted on it; some may be mounted in other locations, so, if your vehicle doesn't "crank," the problem may or may not be caused by your starter.

Diagnosing the starter system requires several different tests. A "starter draw test" determines if the starter is drawing more amperage than is needed to

turn over the engine. A "circuit test" determines if all the other components are working properly and if voltage is present when and where it is needed.

Your vehicle's battery must maintain enough voltage to turn the starter and overcome the engine's resistance. That's where your vehicle's charging system steps in. The alternator, alternator drive belt and voltage regulator that make up the charging system work together to supply enough voltage to run your vehicle's accessories and continuously recharge your battery to keep it from going dead.

A battery goes dead because of electrical drain caused by one of the following:

a short circuit

Undercharging due to a bad drive belt, alternator or voltage regulator overcharging, which can cause

serious and expensive damage to highly sensitive computer electronics and your battery.

You need the right equipment and technician to make an accurate diagnosis of your electrical system, without causing possible further damage to sensitive electronic components. A properly performed electrical system analysis can save you money and future headaches by diagnosing the problem right the first time!

Preventive maintenance of fuel system

Since you purchased your new vehicle, dirt, varnishes and carbon deposits have been forming in the fuel system, on the intake valves and in the combustion areas. These buildups can rob the car performance, and if left untreated, these buildups may lead to costly engine repairs.

Symptoms related to carbon buildup are:

Engine pinging

Hesitation

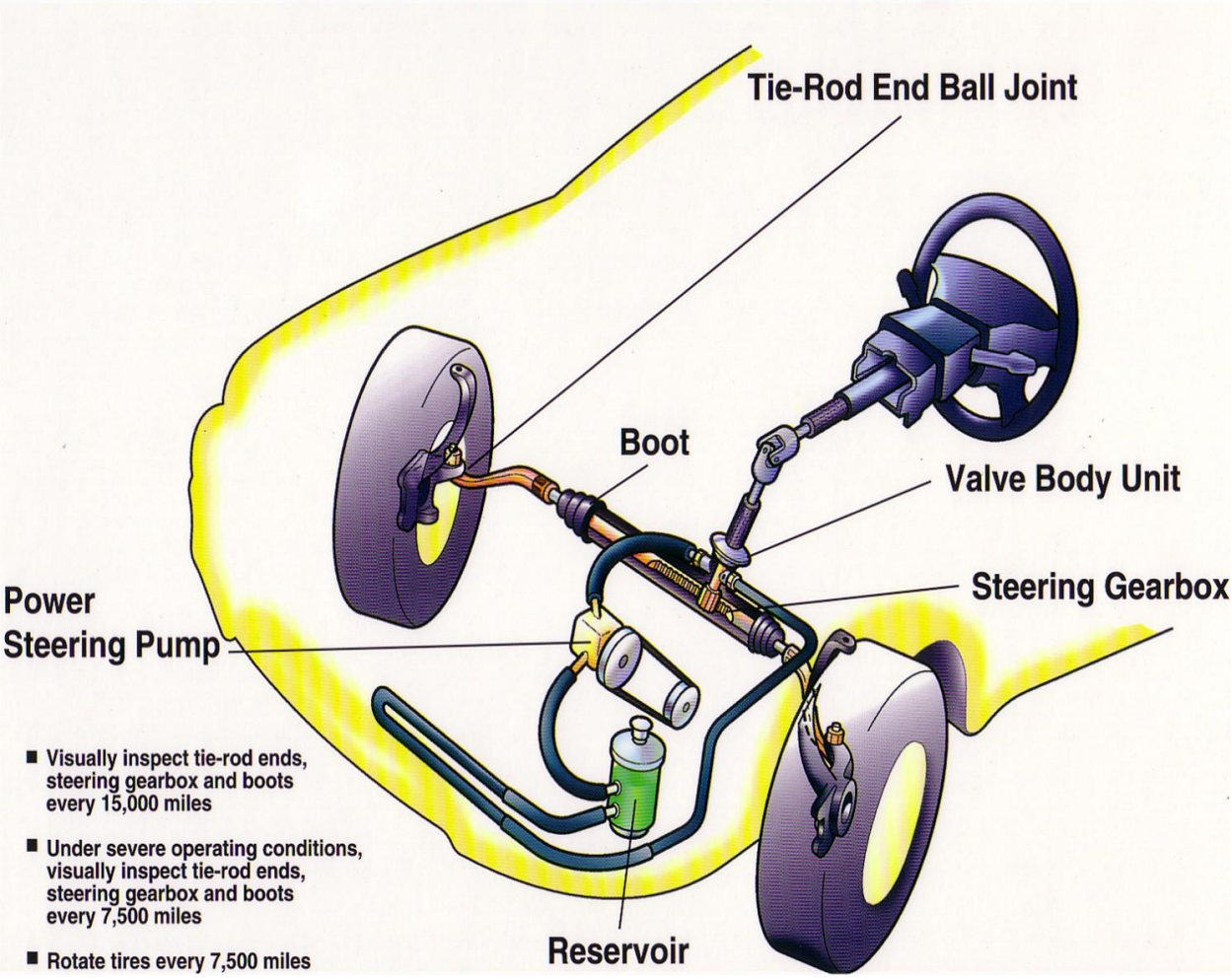
Poor acceleration Lack of power

Repeated stalling or poor performance when cold rough idle and poor fuel economy.

The Fuel Carbon Cleaning System is a revolutionary new process that will clean the vehicle's fuel system, including injectors, and remove harmful carbon deposits.

After the Fuel Carbon Cleaning System cleans the engine, you will notice improved performance, acceleration and increased fuel economy. Make an appointment today! Take care of the vehicle, and the vehicle will take care of you.

Preventive maintenance of steering system



At one time or another, most drivers encounter a power steering problem with their car anything from fluid leaks or noise to stiff steering or hard turning after first starting the car. Normal driving eventually

causes the power steering fluid to suffer from heat, friction and electrochemical degradation. The high pressure created when you hold hard turns is especially damaging.

The power steering fluid, which starts out clear, eventually turns dark with age. Sludge and varnish deposits build up in the power steering system and prevent the easy turning and responsive handling you expect from the vehicle.

The Power Steering Fluid Flush safely removes varnish and sludge deposits. It is also the best way to remove wear metals that slowly grind away the power steering's internal components, including the power steering hoses, power steering pump, rack and pinion and/or gear box.the Power Steering Fluid Flush thoroughly cleans the vehicle’s steering system and protects it with fresh power steering fluid and conditioners that revitalize the seals and 0rings.

If the vehicle's power steering system is showing any signs of contaminated fluid, try this service before major and expensive repair work becomes necessary.

The pressure in a power steering system during hard turns is much higher than that in an automatic transmission under load. The ATF will become very hot under pressure and break down much faster than power steering fluid. Once this electrochemical degradation begins, your power steering pump, rack and pinion will be subject to leaks, stiffness or complete power steering system failure.

Preventive maintenance of TRANSMISSION

The transmission's vital parts get clogged with sludge and varnish deposits because, just like the oil

In the car's engine, automatic transmission fluid (ATF) suffers from heat, friction and electrochemical degradation. In fact, nearly nine out of ten transmission failures are due to overheating and fluid contamination.*

However, unlike oil, which can be completely drained from the car's engine, most of the transmission fluid cannot be drained. Instead it stays in the torque converter, valve body and transmission cooler lines, making a complete fluid drain impossible.

Typical transmission service removes and replaces only 25% of the car's contaminated automatic transmission fluid. Adding new fluid to the remaining contaminated fluid can actually cause sludge and varnish deposits to clog filters and further restrict flow. This can result in a serious malfunction or even complete failure of your automatic transmission.

Now you have an option. theTransmission Fluid Exchange safely removes most, if not all, of the old, contaminated fluid, as well as varnish and sludge deposits. It also cleans the transmission cooler, valve body and torque converter to remove worn metals that slowly grind away the transmission's internal components. The Transmission Fluid Exchange thoroughly cleans the car's transmission and protects it with fresh ATF and conditioners that revitalize the seals and or rings

If the vehicle's transmission is showing any of the typical signs of contaminated transmission fluid slippage or rough or hard shifting try this service. It may help you avoid the cost of major repair work or even prevent the need for a new transmission.

Note* According to the Automatic Transmission Rebuilders Association

Tires

Tire balancer

- You should check the pressure in the car's tires every month to avoid under or over inflation. You can find the appropriate pressure level in the owner's manual or printed inside the car's door frame. You should also check the tire treads for uneven wear, which may indicate a wheel alignment problem. A tread-depth gauge is a useful tool for checking the life of the tires. If the tread is below 2/32 of an inch, replace the tires.