UNIT – V PERIODIC AND PREVENTIVE MAINTENANCE

Periodic Maintenance

- Periodic maintenance is a process that ensures company assets remain in good condition throughout their useful life.
- It is based on the fixed maintenance schedule for assets like equipment, machinery, and vehicles.
- This type of maintenance heavily relies on the time interval given to the specific model of the asset.
- Surfactants like detergents

Periodic inspections are central to any maintenance program, and are vital to a well-functioning, productive and profitable operation. Machine failures and unexpected breakdowns are costly, disruptive and – most importantly – can pose serious safety risks. Therefore, addressing potential failure scenarios in a proactive manner is crucial for minimizing downtime and improving workplace safety.

Periodic Inspection-Need

Periodic inspection needs the intermittent observation of work requiring inspection by a Project Inspector who is present in the area where the work has been or is being performed and at the completion of the work. All work requiring inspection shall remain accessible and exposed until approved by the Project Inspector. Periodic inspection is the inspection carried out through visual inspections and measurements, if necessary, to maintain normal function and prevent accidents at regular interval.

DEGREASING

Degreasing is the removal of grease and oil from a surface. It is widely used to remove oils and oil-borne soil from objects that have been stamped, machined, welded, die-cast, etc. Degreasing cleans almost all electronic assemblies, electrical components and almost all metals, and nearly any size or shape part can be cleaned. Degreasing is an essential part of the production process, particularly in industries fabricating or assembling metal parts, such as aircraft, appliances, automotive, electronics and railroad.

CLEANING AND REPAIRING SCHEMES

Cleaning, removing dirt, grime, grease, oils and even interim production chemicals from equipment, tools and substrates is a frequent, widespread as well as highly diverse activity throughout the manufacturing, production and utility sectors, as well as in nearly all areas of industry. Degreasing is a universal function in nearly every kind of industrial operation, including automotive, aerospace, oil & gas, power generation, light and heavy manufacturing, steel production, telecommunications and many more. In these and other industries, production and moving equipment of all kinds often attracts significant volumes of dirt, grease and grime in operation and must be cleaned before examination and repairs can begin, or even proactively cleaned periodically just for their own sake as part of regular preventive maintenance to optimize everyday performance. A surface preparation method in adhesive bonding, on adhesive joint strength.

The degreasing operation was performed by three methods: rubbing, spraying and immersion. Strength tests were performed on single-lap adhesive joints of hot-dip galvanized metal sheets made with Loctite adhesive according to the above variants of surface preparation. The experimental results demonstrate that adhesive joint strength is significantly affected by the applied degreasing agent. Moreover, the method of application of the degreasing agent is crucial, too. The results of strength testing reveal that the most effective degreasing method for hot-dip galvanized metal sheet adhesive joints is spraying using extraction naphtha. Thereby degreased samples have the highest immediate strength and shear strength. The use of extraction naphtha is also effective in combination with degreasing by rubbing; however, it is not effective when used in combination with immersion, as reflected in the lowest strength results.

MAINTENANCE

Maintenance of plants and equipment is carried out to prevent problems arising, to put faults right, and to ensure equipment is working effectively. It may be part of a planned program or may have to be carried out at short notice after a breakdown. It always involves non-routine activities and can expose those involved (and others) to a range of risks.

Why maintenance of plants and equipment is important

An effective maintenance program will make plant and equipment more reliable. Fewer breakdowns will mean less dangerous contact with machinery is required, as well as having the cost benefits of better productivity and efficiency. Additional hazards can occur when machinery becomes unreliable and develops faults. Maintenance allows these faults to be diagnosed early to manage any risks. However, maintenance needs to be correctly planned and carried out. Unsafe maintenance has caused many fatalities and serious injuries, either during the maintenance or to those using the badly maintained or wrongly maintained/repaired equipment. An employer provides equipment for use, from hand tools and ladders to electrical power tools and larger plants, need to demonstrate that have arrangements in place to make sure they are maintained in a safe condition. hazards can occur if: tools break during use machinery starts up unexpectedly there is contact with materials that are normally enclosed within the machine, for example caused by leaks, breakage or ejection Failing to correctly plan and communicate clear instructions and information before starting maintenance can lead to confusion and can cause accidents. This can be a particular problem if maintenance is during normal production work or where there are contractors who are unfamiliar with the site. Extra care is also required if maintenance involves working at height or when doing work that requires access to unusual parts of the building entering vessels or confined spaces where there may be toxic materials or a lack of air

Maintenance of Work equipment

Maintenance work should only be carried out by those who are competent to do the work, and have been provided with sufficient information, instruction and competent training. With high-risk or complex equipment, these demands may be significant and, in some cases, may be best undertaken by the manufacturer or specialist contractors. However, in many cases, maintenance can be done in-house by suitably trained, competent staff. For some maintenance work, for example the changing of abrasive wheels, there are well-established industry training schemes. In other cases, such as for the use of small-scale scaffold towers, sufficient training may be provided by the equipment hirers. In other work, such as with hand-held chainsaws, training on the safe maintenance of the equipment is normally provided as an integral part of the basic training in its safe use. Establishing a planned maintenance program may be a useful step towards reducing risk, as well as having a reporting procedure for workers who may notice problems while working on

machinery. Some items of plant and equipment may have safety-critical features where deterioration would cause a risk. It must have arrangements in place to make sure the necessary inspections take place. But here are other steps one should consider. Decide if the work should be done by specialist contractors. Never take on work for which is not prepared or competent Plan the work carefully before it start, ideally using the manufacturer's maintenance instructions, and produce a safe system of work. This will avoid unforeseen delays and reduce the risks. Make sure maintenance staff are competent and have appropriate clothing and equipment Try and use downtime for maintenance. You can avoid the difficulties in coordinating maintenance and production work if maintenance work is performed before start-up or during shutdown periods

Safe working areas

It must be provided safe access and a safe place of work. It should not be just focus on the safety of maintenance workers – be taken the necessary precautions to ensure the safety of others who may be affected by their work, such as other employees or contractors working nearby. Set up signs and barriers and position people at key points if they are needed to keep other people out

Safe plant and equipment

Plant and equipment must be made safe before maintenance starts.

Safe isolation

Ensure moving plant has stopped and isolate electrical and other power supplies. Most maintenance should be carried out with the power off. If the work is near uninsulated, overhead electrical conductors, close to overhead travelling cranes, cut the power off first Lock off machines if there is a chance the power could be accidentally switched back on Isolate plant and pipelines containing pressured fluid, gas, steam or hazardous material. Lock off isolating valves

Other factors need to be considered

- Release any stored energy, such as compressed air or hydraulic pressure that could cause the machine to move or cycle
- Support parts of plant that could fall, for example support the blades of down-stroking bale cutters and guillotines with blocks

- Allow components that operate at high temperatures to cool
- Place mobile plant in neutral gear, apply the brake and chock the wheels
- Safely clean out vessels containing flammable solids, liquids, gases or dust, and check them before hot work is carried out to prevent explosions. You may need specialist help and advice to do this safely
- Avoid entering tanks and vessels where possible. This can be very high-risk work. If required, get specialist help to ensure adequate precautions are taken
- Clean and check vessels containing toxic materials before work starts

High-risk equipment

For high-risk equipment, you may need positive means of disconnecting the equipment from the energy source (such as isolation), along with means to prevent inadvertent reconnection, for example by locking off. Formal systems of work, such as a permit to work, are required in some cases to safely manage high-risk maintenance operations.

Significant hazards during maintenance

In some cases, it may not be possible to avoid significant hazards during the maintenance of work equipment so you should take appropriate measures to protect people and minimize the risk. These may include physical measures, such as providing temporary guarding, slow speed hold-to-run control devices, safe means of access, personal protective equipment management issues, including safe systems of work, supervision, monitoring personnel competence (training, skill, awareness and knowledge of risk) It is important that these situations are properly assessed. Workers carrying out maintenance may need to undertake significant on-the-job risk assessment (essentially considering what could go wrong and how to avoid injury), as the situation may develop and change in ways that could not be foreseen at the outset.

Safe maintenance health check

Work equipment may need to be constructed or adapted in a way that takes account of the risks associated with maintenance work, for example: lubrication and adjustment points can be repositioned or adapted to enable the work to be carried out atground level safe means of access can be provided on the equipment (such as handholds, anti-slip surfaces for feet), or so that

guarding to prevent contact with dangerous parts can be kept in place. In most cases (all machinery supplied since 1995), this should have been considered by the manufacturer in the design of the equipment, and by you when deciding which product to purchase. However, this may not always be the case, and it may not apply to older work equipment on your site.

Dos and don'ts of plant and equipment Maintenance

To maintain plant and equipment safely ensure maintenance is carried out by a competent person (someone who has the necessary skills, knowledge and experience to carry out the work safely maintain plant and equipment regularly – use the manufacturer's maintenance instructions as a guide, particularly if there are safety-critical features have a procedure that allows workers to report damaged or faulty equipment provide the proper tools for the maintenance person schedule maintenance to minimize the risk to other workers and the maintenance person wherever possible make sure maintenance is done safely, that machines and moving parts are isolated or locked and that flammable/explosive/toxic materials are dealt with properly

To prevent accidents and injuries:

 don’t ignore maintenance

 don’t ignore reports of damaged or unsafe equipment

never use faulty or damaged equipment

OVERHAULING OF MECHANICAL COMPONENTS

Overhauling of a machine is defined as a process of general maintenance performed on a machine or other industrial equipment. The goal of overhauling is to keep the system in serviceable condition. Regular checks can prevent all kinds of critical damage. Machinery overhaul is usually performed by companies offering maintenance services. The frequency of overhauling can be agreed upon, routine maintenance is usually scheduled for once a year. A more frequent equipment check is recommended for older machines and especially larger machines involving complex mechanisms.

BENEFITS OF OVERHAULING

Cost-effective

While it may seem unreasonable to further invest in a machine which is still in operation, overhauling of machines will protect your business from undesirable expenses in the future. Replacing a few parts here and there is without a doubt more cost effective than buying new machinery. A sudden breakdown of a machine can cause major financial losses in the industrial sector. Even a single machine out of order means thousands and thousands of rupees lost in potential profit. Major global industrial companies recognize a timely repair to minimize costs and prevent critical equipment failures.

Extended life length

Regular maintenance extends the life length of equipment. Especially, predictive overhauling allows potential issues to be fixed even before the failure occurs. Naturally, when a piece of industrial equipment isbeing in use, the mechanisms tend to wear down with time. However, extensive use of machinery which hasshown signs of wear-down and damage can lead to a critical breakdown. Overhauling stops the extensive damage of the machinery and increases the lengths of its life cycle.

Increased performance

After years of extended use, the performance of the machinery is nowhere near its productivity at the beginning of the life cycle. With an overhaul, the machine's performance can be restored up to 100%. Suchan impressive number basically means one can enjoy the benefits of using the almost-brand-new equipment without any limitations. Increased performance of the machine represents the possibility to increase the level of production, hence expand the company's profit.

Reduced labor costs

Replacement of the entire piece of industrial equipment is essentially more time consuming than a small repair or replacement of just one part. Instead of replacing the entire machine for a new one, only certain parts are replaced or even repaired. Predictive maintenance reduces the number

of critical “callouts” and naturally the amount of time spent on a service call.

OVERHAULING OF A MACHINE IN STAGES

Overhauling usually involves the following stages:

 Inspection

First of all, the machine will be thoroughly inspected. Experienced maintenance crews perform an inspection on the overhauled machine under production conditions. It means, the machine’s performance is monitored while the machine is in use. Such a procedure allows to allocate any issues and perform the troubleshooting more effectively.

 Disassembly

After the initial inspection, the piece of equipment should be taken apart. Disassembly is crucial for further check and the next steps of the overhauling process, such as repair. A skilled maintenance worker is capableof putting the machine down efficiently, indicating which parts of the equipment need to be replaced or repaired.

 Repair

Depending on the issue, the machine is either repaired or certain damaged parts are replaced. This step onceagain proves how effective overhauling is as opposed to replacing the whole piece of equipment at once. Replacement of parts might take longer than a simple repair, as the spare parts might need to be ordered froma manufacturer.

 Reassembly

Following the successful replacement of spare parts, reassembly of the whole mechanism is performed. Beingone of the final steps, the reassembly is crucial for the functioning of the equipment. Certain skill is surely needed to perform reassembly, so it’s best handled by professionals.

 Testing

The final step that concludes the overhauling process. Without testing it is naturally impossible to identify ifthe performed repair was effective. During testing the retrofit is either proclaimed successful or – less frequently – the process goes back to the starting point (inspection).

ELECTRIC MOTOR OVERHAUL

A standard electric motor overhaul includes initial equipment inspection and

diagnosis, bearings replacement, a test run and report.

A sample motor overhaul work scope includes –

- Collection from site
- Inspect and record all relevant data from the nameplate
- Carry out electrical and mechanical check tests to verify motor condition and any reported faults, where possible
- Dismantle motor
- Clean and inspect all component parts
- Datum checks, including bearing journals and seatings, shaft extensions, shaft extensions run out, shaft seal fits, commutator diameter, and brush surface length

 Repair or replacement of defect components and parts

 Steam cleaning, stove drying and varnishing of stator and rotor windings as specified in IEEE

1068

 Rotating parts dynamically balanced to ISO grade 2.5 or better

 Up to date motor plate fitted before dispatch

 Delivery service to customer site and recommissioning

COMMON TROUBLES AND REMEDIES OF ELECTRIC MOTOR

1. Low resistance

Low resistance is the most common cause of failure in electric motors. It is also often the most difficult to overcome. Under conditions such as overheating, corrosion or physical damage, degradation of the insulationof the internal windings of the motor may occur. This then causes insufficient isolation between the motor windings or conductors, leading to short circuits, leakages and eventually motor failure. Regularly inspect the insulation of the windings for signs of wear and replace before low resistance leads tofailure. If you are unsure, consult an expert.

2. Overheating

Overheating is generally caused by either a high temperature in the operating environment or poor power quality. It is responsible for around 55% of insulating failures in electric motors. For every 10 degrees Celsiusthat the temperature of a motor rises, the insulation life is reduced by half. To avoid overheating, ensure that electric motors are kept as cool as possible. This can be done by maintaining as cool an operating environment as possible and regularly checking the temperature of the motor.

3. Electrical overload

Electrical overload is also commonly referred to as overcurrent. It is caused by an excessive flow of currentwithin the windings of the motor, which exceeds the design current that the motor is able to carry efficientlyand safely. It is important to install effective overcurrent protection which is able to detect overcurrent and interrupt supply to protect the motor.

4. Vibration

Vibration can be extremely damaging to electric motors, frequently causing premature failure. It is often caused by the motor being positioned on an uneven or unstable surface. However, vibration can also be a result of an underlying issue with the motor, such as misalignment or corrosion. Electric motors should be regularly inspected for vibration using a motor analyzing tool. Ensure that electromotors are positioned on a flat and stable surface.

5. Contamination

Electric motors frequently operate in environments where dust, dirt and chemicals are present, which may find their way inside the motor, leading to contamination and motor failure. Ensure that work areas, tools and fixtures are kept as clean as possible at all times to help eliminate the chances of contamination entering the motor.

PREVENTIVE MAINTENANCE

DEFINITION

Preventive maintenance is an undeniably critical competent to any maintenance strategy. It's key to lowering maintenance costs, reducing equipment downtime, improving asset lifespan and efficiency, and increasing workplace safety.

Need of Preventive maintenance

 Preventive Maintenance is very much needed by decrease business downtime and closure due to unexpected equipment failure.

 Preventive Maintenance is to increase equipment life expectancy.

 Preventive Maintenance will ensure all equipment and employees work is in safe by eliminating the unexpected machinery breakdowns, etc.

 Preventive maintenance will significantly reduce safety risks for employees.

Steps for preventive maintenance

1. Create an Asset List.

2. Identify the Priorities.

3. Identify Critical Tasks for the Preventive Maintenance.

4. Determine Maintenance Frequency.

5. Create a Preventive Maintenance Checklist & Schedule.

6. Work with the Asset Maintenance Team.

Advantages and Disadvantages of preventive maintenance.

Advantages	Disadvantages
1. Less equipment downtime	Upfront costs - keeping equipment well-maintained requires investment
2. Longer asset life	More labor-intensive, so you'll need more staff on hand
3. Fewer interruptions to critical operations	Potential for over-maintenance
4. Increased workplace safety and improved compliance with OSHA (Occupational Safety and Health Administration)	
5. Improved efficiency (assets in good condition perform better)	

STEPS / PROCEDURE FOR PERIODIC AND PREVENTIVE MAINTENANCE OF

1. MACHINE TOOLS:

A machine tool can continue to produce accurate workpieces within specified limits throughout its working life, if the wear of the machine tool does not exceed certain limits and parts which become faulty due to wear or other damages are replaced / repaired timely. The improved maintenance would reduce machine tool downtime and lead to higher productivity. Periodic and Preventive maintenance are the planned maintenance of machine tools and equipment. The aim of periodical or preventive maintenance are to reduce wear and tear and take timely action before failure condition. Lubrication is most important part of periodical or preventive maintenance. All moving parts need timely lubrication. Lubrication schedule should be strictly followed. If certain points are not checked periodically, they may lead to major break-down. All wearing parts in the machine tool or the parts subjected to fatigue should be replaced before failing as per the instructions of the manufacturer. Preventive maintenance is essential to keep the machine in order for production and safety, and this increases the reliability and availability of machine tool.

A proper periodical maintenance schedule should be followed making daily / weekly / monthly checks. Daily checks include cleaning the machine, checking lubricating oil levels and oil flow in sight glasses, checking coolant level and to keep the maintenance department informed of even the minor defects noted in the performance of the machine. Weekly checks include checking of all lubrication levels, checking or changing coolant, filters hydraulic and pneumatic

lines. Monthly checks include checking of spindle drive belts for wear, hydraulic pumps and hydraulic oil system, and movement of all axes under manual control. Six monthly checks include checking of machine alignment and replacement of oils and filters.

2. PUMPS:

Perfect maintenance of an engineering system starts with a good maintenance schedule. The maintenance schedule should be prepared keeping in mind the probable trouble spots, their degree and frequency. For periodic check-up and maintenance, the following maintenance schedule may be used.

Maintenance Schedule

A. Operator tasks (to be undertaken during the operation of the plant)

 Visual examination of system for damaged or leaking pipes, fittings and components.

 Visual examination of fluid level in reservoir and the fluid condition

 Visual check of operating pressures, filter condition indicators

 Check whether guards are in place

 Check operation of system and the work produced

B. Periodic maintenance (weekly or monthly)

 Carry out operator tasks

 Check fixing of all units

 Check pressure readings at the test points of the system

 Check pumps for noise level and operating temperature

 Check all actuators for damage, noise level, operating temperature, output speeds and force

 Check pre-charge of all accumulators

 Check for correct operation of interlocks.

C. Annual maintenance

 Empty fluid reservoir and check fluid condition

 Clean reservoir internally and externally and examine for rust

 Examine all hoses, pipe works and fittings for damage, wear and leaks. Replace as required.

 Examine electric motor.

 Examine the flexible coupling between pump and motor

 Check filter elements, replace any which have been in service for a year long

 Clean filter bowl

 Check filter condition indicators for correct operation

 Check leakage of pumps and motor by running them under normal conditions and comparing leakage rates with that of a new unit or manufacturer's recommendations. If leakage is excessive, return to manufacturer for overhaul.

 Check leakage across the piston seals of cylinders, re-seal as required. If replacing the cylinder seals obtains a full seal kit from the manufacturer, change all the seals.

PREVENTIVE MAINTENANCE CHECKS FOR AIR COMPRESSOR

On an industrial air compressor, preventive maintenance is crucial to ensure the functionality of the system and its various attachments. The key parts to check include the filters, vents, belts and bearings, all of which could become troublesome to the system if dirt and grime build up. Moreover, you must apply and reapply lubricant at timely intervals on all applicable parts of an air compressor.

The following components are the most important to inspect and clean and/or lubricate according to schedule:

1. Air Filter

The purpose of an air compressor is to produce clean, pure, compressed air that will ultimately power numerous functions. To ensure the quality of air that comes out at the end, the ambient air that goes into the compressor must be filtered of impurities before it leaves the machines. None of that could be possible without a clean air filter. If the air filter is dirty, impurities and particulates could corrupt the compressed air and degrade the quality of end-point applications. Therefore, clean the air filter regularly. Change it out at regular intervals, which vary based on the environment.

2. Oil Filter

Oil can degrade the quality of compressed air if it passes through the system and gets carried to the end of an application. Some of the worst-affected processes would include pneumatic spray painters, air cleaners and anything else where oil could corrupt the surface in question. Therefore, it is crucial to ensure oil, when present in the system, is removed from the compressed air before the air leaves the machine. Check oil filters weekly, regardless of whether the compressor is lubricated or non-lubricated. Moreover, replace the oil filter entirely at recommended intervals, which can range from 4,000 to 8,000 hours of use depending on your unit. If the oil filter gets heavily covered in oily residue before that time, replace it sooner.

3. Lubricant

Lubricant is one of the most vital elements in the function of an air compressor. On all the internal metal parts and joints, lubricant allows for smooth, non-corrosive movement. Without lubrication, tension occurs between the touching metal surfaces, which leads to the corrosion of parts and joints. Once corrosion takes hold, rust is liable to spread and eat through certain mechanical parts. However, even when lubricant is present, it can lose its viscosity and become corrosive if it gets too old. Check the lubricant level daily to ensure the health of your air compressor. Every three to six months, wipe off old lubricant and reapply a fresh coat. Each time you replace the lubricant, be sure you also change out the separator element.

4. Motor Bearings

For a motor to run, the bearings must have proper lubrication. The tiny metal balls are constantly rolling against each other, as well as against the interior walls of the round encasement. Consequently, rust could form on the bearings without proper lubrication. If rust forms, the bearings will gradually slow and ultimately become stuck in place. When this happens, the motor fails. To protect the health and performance of the air compressor motor, grease the bearings every 4,000 hours. Be sure to inspect the bearings at quarterly intervals between each greasing to ensure they remain sufficiently lubricated.

5. Belts

For an air compressor to go about its internal motions, it is crucial for the belts to have proper tension. The rubber of each belt must also remain firm, yet flexible, to ensure balanced movement between the pulleys ofconnected parts. Over time, however, the rubber on a belt will inevitably wear down and crack in certain places. Therefore, it is crucial to replace the belts before they lose their tension or, even worse, snap in the middle of an operation. Inspect each belt once per week to verify they are free of wear. Adjust the tension if necessary and replace each belt once wear takes hold.

6. Intake Vents

An air compressor performs the magic feat of transforming ambient air into something that can power heavy-duty machinery and effectively serve as a replacement for electrical power. That said, the compressor itself can only do so much to turn mundane air into something powerful. While internal components do their job to purify the air for end-point use, that job is harder for the machine to perform if the intake vents become lined with dirt and grime. To ensure the incoming air remains as clean as possible and to prevent dirt from getting sucked into the system, inspect the intake vents weekly and clean them when necessary.

7. Other Parts and Things to Check

In addition to the periodic cleaning, lubrication and replacement of parts, check various points along the air compressor and its attachments at regular intervals. Inspect the following on a

weekly basis:

 Air dryer performance

 Amps

 Oil level

 Temperatures

 Vibration

 Voltage

Inspect the air compressor for signs of oil or air leaks. Also check the pneumatic hoses for air leaks, as leakage severely reduces the efficiency of an air compressor. Furthermore, make sure the coolers are free of dirt.

PREVENTIVE MAINTENANCE CHECK SCHEDULE

When you make an air compressor preventive maintenance checklist, you need to first take into account the type of compressor in question. Most compressors need preventive maintenance on various system parts at intervals that range from daily to annually.

1. Air-Cooled Reciprocating Compressor

Daily: Perform the following steps every day, or after every eight hours of use.

 Check the lubricant level to verify it never drops below the mid-range of the bayonet gauge. If the lubricant becomes discolored, empty and refill it.

 Empty water out of the receiver tank.

 Visually inspect the compressor and verify the safeguards are in place.

 Check for leaks and vibrations.

Weekly: Perform the following steps every week, or after every 40 hours of use.

 Check the pressure relief valves.

 Clean the surfaces of the compressor and intercooler.

 Inspect the compressor and hoses for air leaks.

 Clean out the air intake filter.

When the weather is humid or the environment is dusty, perform the preceding steps twice weekly, or every 20 hours.

Monthly: Every month, or after every 160 hours of use, inspect the belt tension inside the air compressor.

Quarterly: Every three months, or after every 500 hours of use, perform the following steps.

 Change out the lubricant.

 Inspect the lubricant filter, and change the oil filter if applicable.

 Inspect the torque on the pulley nuts and screws.

Biannually: Every six months, or after every 1,000 hours of use, perform the following steps:

 Change out lubricant — this step also applies if the lubricant is synthetic, which lasts twice as long as regular.

 Check valves for signs of leaks or carbon prints.

 Clean the crankcase.

 Clean the strainer screen of the crankcase.

 Examine the motor-area contact points and pressure switch diaphragm.

2. Lubricant-Injected Rotary Compressor

Daily: Each day, or after every eight hours of use, do the following tasks.

 Monitor all gauges and indicators for normal operation.

 Check fluid level.

 Observe for fluid leaks.

 Observe for unusual noise or vibration.

 Drain water from air/fluid reservoir.

Monthly: Every four weeks, perform the following.

 Service air filter as needed. This should be a daily or weekly task if extremely dirty conditions exist.

 Clean water cooler and fluid cooler fins, for air-cooled units only.

 Wipe entire unit down to maintain appearance.

Biannually: Every six months, or after every 1,000 hours of use, perform these tasks.

 Take fluid sample.

 Change fluid filter.

 Check pressure relief valve.

Periodically/Yearly: Complete these tasks each year.

 Go over unit and check all bolts for tightness.

 Change air/fluid separator.

 Change air filter.

 Lubricate motors.

 Test pressure relief valve for proper operation.

 Check safety (HAT) shutdown system.

3. Lubricant-Free Rotary Screw Compressor

Daily: Each day, or after every eight hours of use, do the following tasks.

 Check readings on display.

 Check if condensate is discharged during operation.

 Drain condensate manually (when applicable).

 On compressors with integrated dryer, check the dew point

Every Three Months: Every three months, or after 500 hours of running use, do the following.

 Check the pressure drop over the (optional) filters.

 Inspect the air inlet filters: check for cleanness and damage. Replace a dirty or damaged filter with a new one.

 Check the coolers. Clean by air jet if necessary.

Biannually: Every six months, or after every 1,000 hours of use, perform these tasks.

 Operate the safety valve.

 Clean the compressor.

 On compressors with an integrated dryer, brush or blow of the finned surface of the condenser. Inspect and clean the electronic drain.

Periodically/Yearly: Perform these tasks every year.

 Replace the air inlet filters.

 Test the safety valves.

 Have temperature protection and motor overload tested.

 Check tension and condition of the V-belts.

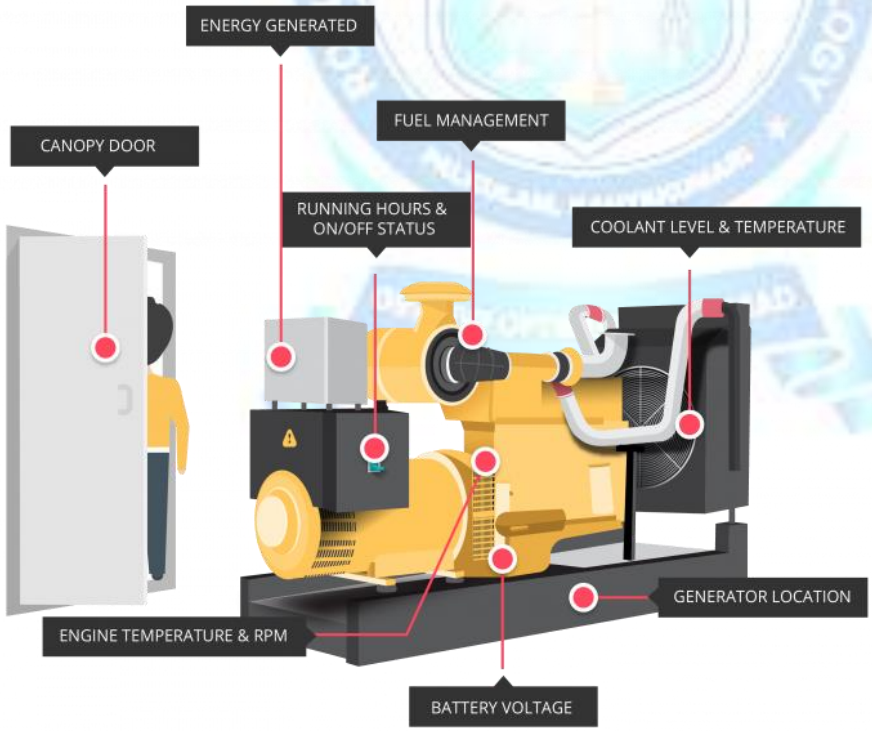
Every Two Years: Every two years, complete the following tasks:

 Replace V-belt(s).

 Replace the check valves.

MAINTENANCE STEPS OF DIESEL GENERATOR

A Diesel generator is processing the electric generator to generate electrical energy. This is the specific case of the engine generator. A diesel compression-ignition engine often is designed to run fuel oil also some types are adapted to run with liquid fuels or natural gas. Generator Users require less maintenance due to their durability (it means measures the length of product life), reliability (it means the product will not fail within a specific period of time), and the sturdiness characteristic (It means the durability of the product), and also they are considered cheaper to operate due to the low fuels costs as compared to the other types of fuels such as gasoline and propane.



Step 1: Lubrication Service

The Engine oil must be checked while powering off the generator at regular intervals using a dipstick. Allow the oil in the upper portion of the engine to drain back into the crankcase and follow the engine manufacturer's recommendations for API oil classification and oil viscosity. Keep watching the oil level as near as possible to the full mark on the dipstick by adding the same quality and brand of oil. The oil and filter must also be changed at particular time intervals. Check regularly with the engine manufacturer for procedures for draining the oil and replacing the oil filter and their disposal is to bed one appropriately to avoid environmental damage or liability.

Step 2: Cooling System

Check the coolant oil level during shutdown periods at the specified interval. Must be noted these points "remove the radiator cap after allowing the engine to cool, and, if necessary, add coolant until the level is about 3/4 in" And a More critical role in balancing diesel engines require a balanced coolant mixture of water, antifreeze, and coolant additives. Examine the exterior of the radiator for obstructions, and remove all dirt, grimy or foreign material with a soft brush or cloth with caution to avoid damaging the fins. If available means, use the low-pressure compressed air or a stream of water in the opposite direction of normal airflow to clean the radiator

Step 3: Fuel System

This is the important point when it comes to the maintenance of diesel generators. Diesel is subject to contamination and corrosion within a period of time is one year, and therefore regular generator set exercise is highly recommended to use up stored fuel before it degrades. The fuel filters should be drained at the designated intervals due to the water vapor that accumulates and condenses in the fuel tank. Better check regularly testing and fuel polishing may be required if the fuel is not used and replaced in three to six months

Step 4: Testing Batteries

If the battery's charges reach the dead-end level is a common cause of standby power system failures. The battery must be kept fully charged and well-maintained at an all-time 40% to 100% to avoid regular testing and inspection to know the current status of the battery and avoid low battery levels.

Step 5: Routine Engine Exercise

Regular exercising keeps the engine parts lubricated and thwarts oxidation of electrical contacts, uses up the fuel before it deteriorates, and helps to provide diesel generator maintenance to reliable engine starting. Engine exercise is recommended to be executed 15 days once or 25 days once for a minimum of 30 min

Step 6: Keep your Diesel Generator Clean

Maintain your engine all-time nice and clean because it will be taken care of Oil drips and other issues. Check day-by-day hoses and belts that are in good condition or not. Frequent checks can keep better conditions and other nuisances from nesting in your equipment. However, the generator users thought is a generator set that is rarely used and might not need a lot of care. So, please avoid this kind of thought and keeps regular maintenance of diesel generators based on manufacturer guidelines.

Step 7: Exhaust system inspection

In case of any leaks along the exhaust line which usually occur at the connection points, the welds, and the gaskets. Find the place of leakages and repair them immediately by a technician.

Step 8: Operating Inspections

When the Diesel Generator is Running these Guidelines Should Be inspected in operation inspection. Common Manufacturer Inspections guidelines for diesel generators are below,

 Disconnect generator batteries.

 Drain the fuel system and change fuel filters.

 Drain coolant and change coolant filters.

 Replace air filters.

 Cover all intake and exhaust ports.

 Disconnect all generator supply connections.