Aircraft Maintenance
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Lecture – 13
Maintenance Schedule Contd.

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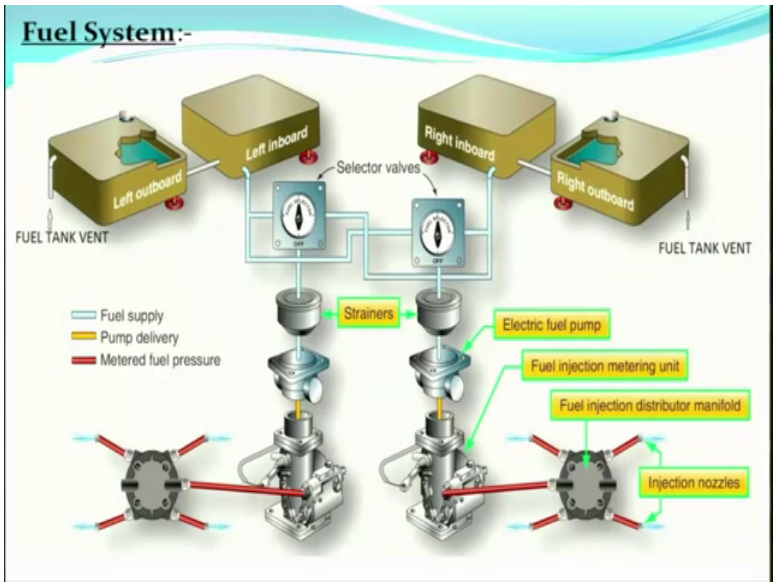

So, next is the fuel system you can see in the figure. This is the basic fuel system diagram shown the from the fuel tanks the fuel is coming to the filters, then to the fuel pump from the fuel pump, it is coming to the fuel air control unit or the metering unit from the fuel metering unit, it is going to the distribution manifold and then to the injector nozzles. So, this is just to brush up the fuel system.

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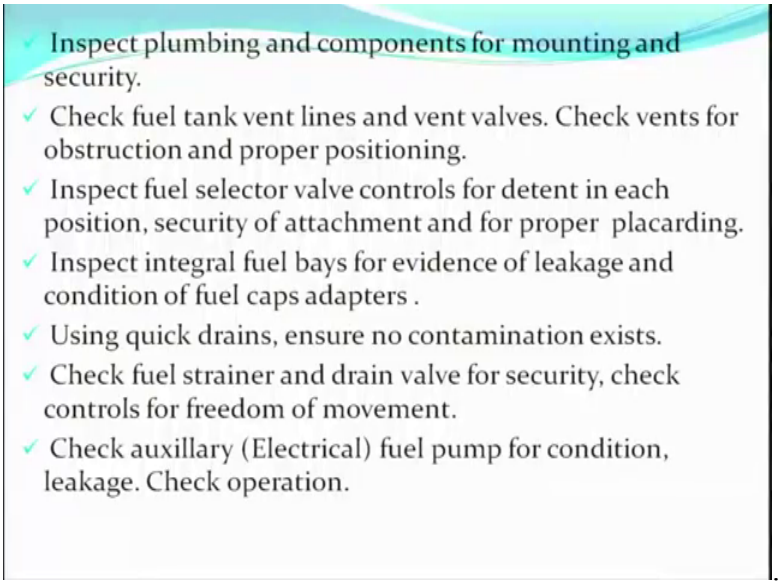

As part of the maintenance inspection in hundred hours on the fuel system we inspect plumbing and components for mounting and security. So, all the plumbings all the components are to be inspected for security whether they are properly mounted or not check fuel tank vent lines and vent valves.

The tank vent lines and the vent valves are to be checked check vents for obstruction and proper positioning. So, vents are to be checked whether they are obstructed or clear and are properly placed properly position then comes your fuel selector valve inspect fuel selector valve controls for detent in each position security of attachment and for proper placarding. So, when you go on the aircraft you see that the fuel tank selective valve is there inside the cabin and you have the option of selecting the fuel from either of the tank or from both the tanks. So, you need to check the fuel selector controls for detent in each position and the security of attachment and proper placarding on the fuel selector valve inspect integral fuel bays for evidence of leakage and condition of fuel cap adapters.

So, we need to check that the fuel base are free of leaks the fuel caps are firmly placed and the cap adapters are in proper condition using quick drains ensure no contamination exists. So, we need to check the drain points we need to ensure that there is no contamination in the drains check fuel strainer and drain valve for security check controls for freedom of movement the fuel strainer is to be cleaned inspected and installed back the drain valves are to be inspected for security we need to check the controls also for free movement check auxillary fuel pumps or the electrical fuel pumps

for condition leakage and operation. So, as part of the hundred hours inspection on the fuel system we are checking the different lines the components.

The vent lines the vent valves fuel selector valves fuel tanks the fuel base the drains the fuel filters and the fuel pumps.

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Coming to the indicating and a recording system inspect instruments for its condition marking for legibility. So, all the in the cockpit all the instruments are to be checked for proper condition the marking and there should not be any visible damage.

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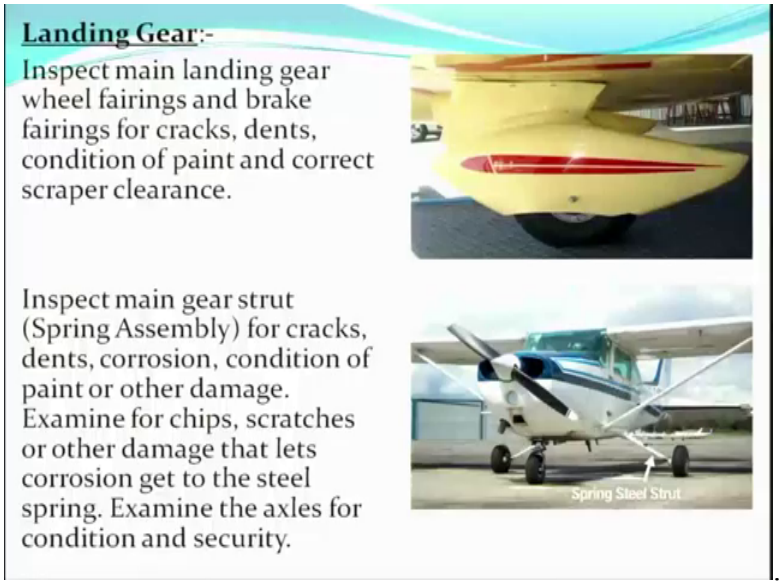

Then comes your landing gear inspect main landing gear wheel fairings and brake fairings for cracks. So, these are the fairings you can see these are the fairings on the wheels you need to inspect your main landing gear wheel fairings and a [bake/brake] brake fairings for cracks dents condition of paint and correct scraper clearance inspect main gear strut this is your strut assembly this is your spring steel strut inspect main gear strut for cracks.

We need to check whether there are cracks in there in this position dents corrosion condition of paint or other damage. So, the landing gear strut is checked for cracks dents corrosion the paint condition and any other damage examine for chips scratches or other damage that lets corrosion get to the steel spring a part from all this we also need to check whether there is any scratch any chip. So, that the corrosion can creepen examine the axles for condition and security.

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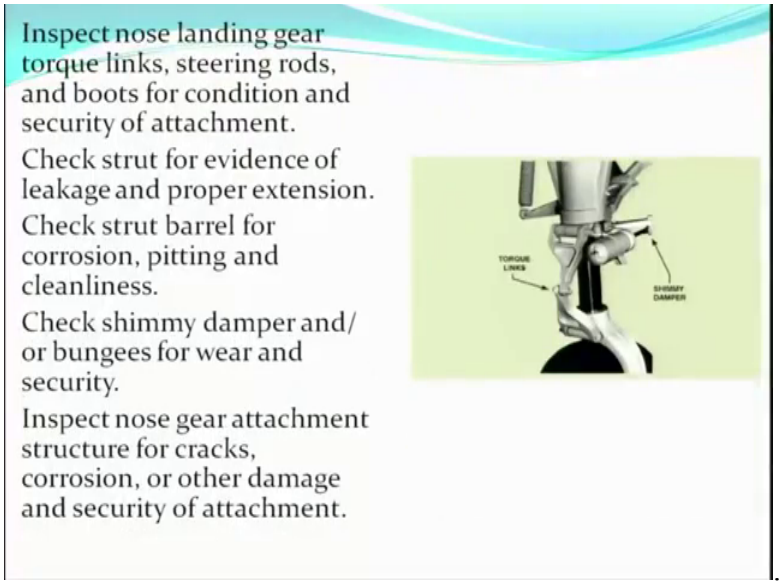

The axles here they also need to be examined for condition and security coming to the nose landing gear the nose landing gear these are the torque links this is your shimmy damper this is your nose gear strut we need to check the landing gear torque links these torque links the attachment points.

The steering rods and a boots for condition and security of attachment then we check the strut for leakage and proper extension we need to check that whether there is any leakage here or not and the strut is properly extended check strut barrel for corrosion pitting and cleanliness the strut barrel has to be checked for corrosion pitting and cleanliness check shimmy damper and or bungees for wear and security we need to check the shimmy dampers for leakage for wear for security inspect nose gear attachment structure for cracks corrosion or other damage and security of attachment. So, the nose gear attachment is to be checked for cracks corrosion and any other damage and also security of attachment. So, the entire landing gear inspection involves inspecting for cracks corrosion damage leakage at different parts on the spring steel main gear strut main this nose landing gear strut extension proper extension leakage.

The torque links inspection their attachment and the shimmy dampers attachment the steering rods attachment and the different springs attached on the landing gear they need to be inspected for condition and security of attachment inspect tor.

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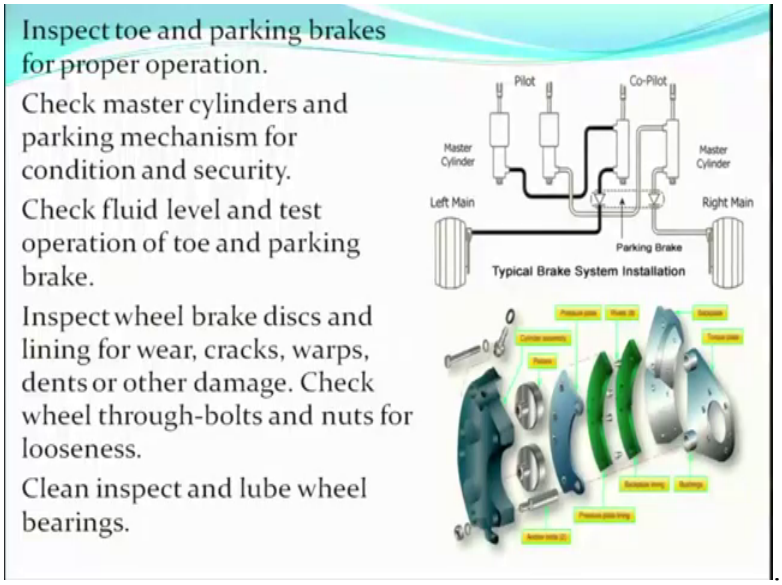

And parking break for proper operation now a part from the inspection on the landing gear the break part the breaks are also to be inspected the main breaks and the barking breaks are to be inspected for proper operation check master cylinder and parking mechanism for condition and security these are your master cylinders this is your break system of a typical aircraft these are your master cylinder which are there inside the cabin.

So, you need to check the master cylinders for condition security and leakage check fluid level and test operation of toe and parking brakes we need to check the fluid level in the master cylinders and we need to check the operation and the parking brakes operation inspect wheel brake discs and lining for wear cracks warps dents or other damage coming to the brake unit we need to check the brake disc for and the linings for wears crack warps dents and other damage check wheel through bolts and nuts for looseness all the bolts the wheel bolts are to be checked for any looseness clean and inspect lube wheel bearings the bearings are to be removed cleaned inspected lubricated and installed back.

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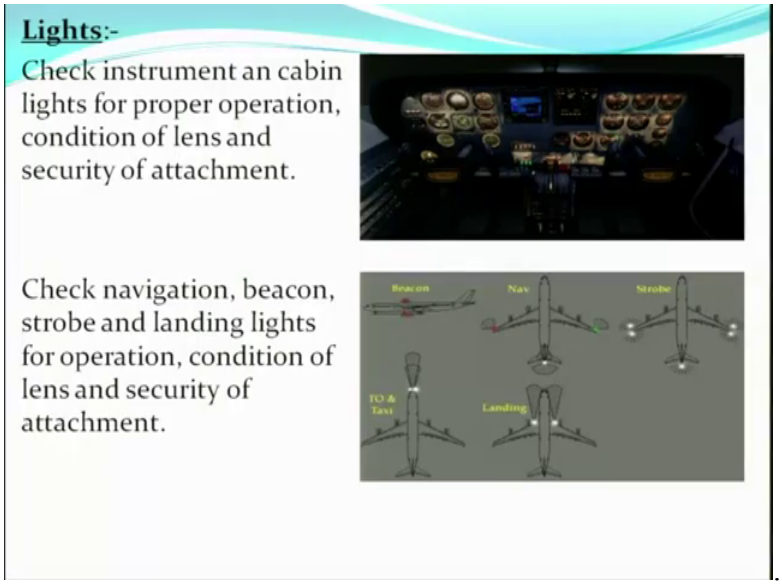

Next comes your lights check instrument an cabin lights for proper operation condition of lens and security of attachments check navigation beacon strobe and landing lights for operation condition of lens and security of attachment. So, in the hundred hours inspection we are inspecting all the lights in the cabin light outside the cabin light all navigation beacon strobe landing lights all lights are inspected for operation condition of lens and security of attachment.

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Next comes your vacuum system inspect vacuum system for condition and security this is in the diagram you can see this is a vacuum system here this is your drier vacuum

pump this is your filter the central air filter. So, in this hundred hours inspection you will check the vacuum system for condition and security check vacuum system hoses for hardness deterioration looseness or collapsed hoses.

So, all the hoses which are part of the vacuum system are to be inspected for hardness deterioration looseness or collapsed hoses inspect vacuum pump for condition and security this is the vacuum pump we need to inspect the vacuum pump for condition and security of attachment inspect the breather lines for any obstruction there is a breather line attached to the vacuum system that breather line is to be inspected for any obstruction inspect the regulator valve and filter assembly for security of installation inspect filter for damage as part of the vacuum system there are two type of filters installed one is the central air filter and another is the regulator valve filter both the filters are inspected for security of installation they are cleaned there the central air filter and the valve the regulator valve filter they are first removed inspected if required cleaned or replaced and then installed back.

So, as part of the inspection you also inspect whether there is any damage on these filters. So, in the vacuum system in hundred hours inspection we are inspecting the hoses the different hoses for condition for deterioration for attachments proper attachments we are inspecting the vacuum pump for security of attachment we are inspected the breather line attached to the vacuum pump for any obstruction and we are inspecting the different filters installed in the vacuum system.

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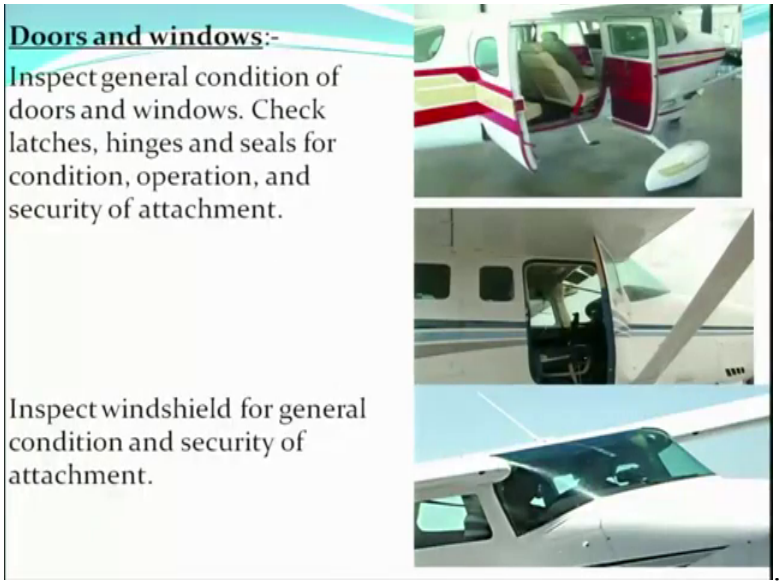

Doors and windows inspect the general condition of doors and windows check latches hinges and seals for condition operation and security of attachment. So, the doors and windows are to be inspected for condition operation all the locking mechanism all the latches the hinges are to be inspected for condition for security of attachment the door attachment points.

The hinges they are also to be inspected inspect windshield for general condition and security of attachment. So, this windshield you can see here this is the windshield the windshield has to be inspected for general condition and security of attachment a part from the windshield all the glass panels all the windows they also need to be inspected thoroughly cleaned and checked for any damage.

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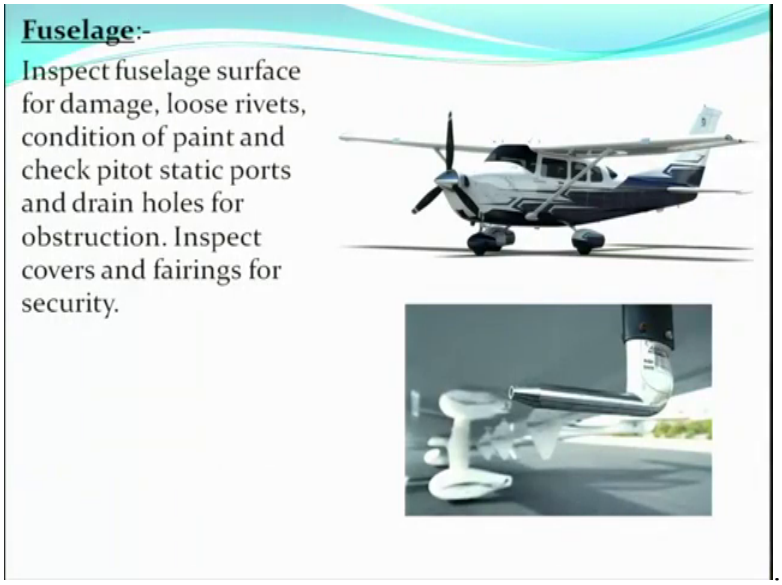

Then comes your fuselage inspect the fuselage surface for damage loose rivets condition of paint and check pitot static ports and drain holes for obstruction inspect covers and fairings for security as part of the hundred hours inspection the complete fuselage surface the fuselage skin has to be checked for any damage loose rivets the condition of paint has to be checked all over the fuselage.

The pitot this is your pitot tube here you need to check the security of attachment of pitot tube the static holes are to be checked and all the drain holes are to be checked for any obstruction the covers and a fairings are also to be inspected for security.

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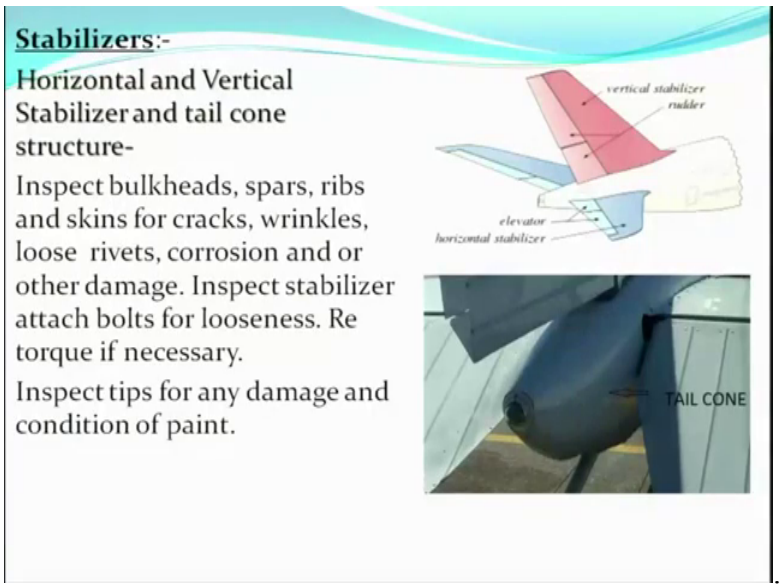

Then you come to the stabilizers the horizontal and vertical stabilizers and the tail cone structure the figure you can see this is your vertical stabilizer this is your rudder the vertical stabilizer is called the fin then this is your rudder this is your vertical tail plane and this is your horizontal tail plane this is your horizontal stabilizer and the alleviators. So, on the tail surface on the tail section we are inspecting the bulkheads the spars the rivets the ribs and skins for cracks wrinkles loose rivets corrosion and or other damage inspect stabilizer attachment bolts for looseness all the bolts which are attaching.

The stabilizer the horizontal stabilizer as well as the vertical stabilizer attachment bolts they are to be inspected for looseness and re torque if require inspect tips for any damage and condition of paint the tips the horizontal stabilizer tips and the vertical stabilizer tips are to be inspected for any damage and the condition of paint. So, on the tail plane we have checked the condition of the skin we have checked for loose rivets we have checked internally the bulkheads spars ribs for any damage we have also checked the attachment bolts which are attaching the stabilizer attachment bolts which are attaching the horizontal stabilizer which are fixing the vertical stabilizers these bolts are checked for tightness and re torqued if required the tips of the horizontal stabilizer.

The vertical stabilizer are inspected for condition and for paint. So, this was about the tail plane in the 100 hours inspection.

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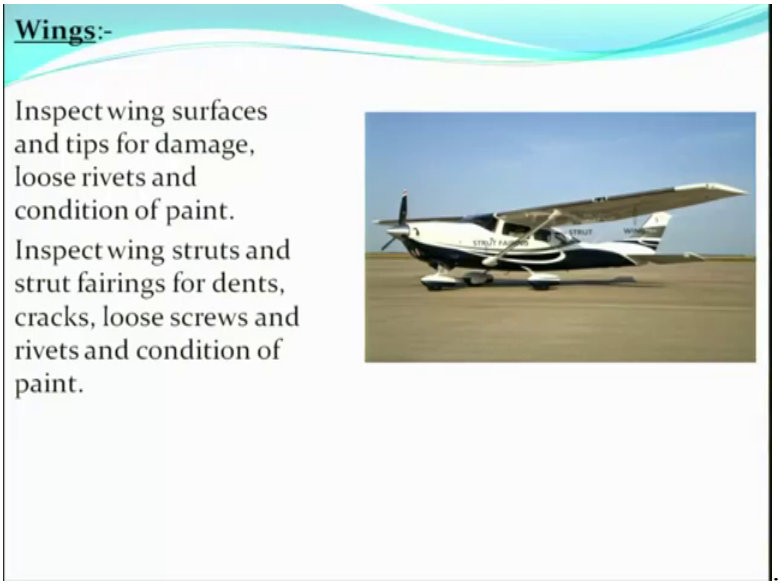

Coming to wings inspect wing surfaces and tips for damage loose rivets and condition of paint similarly on the wing surfaces also we [nec/need] need to check the tips for damage we check the condition of the paint and the loose rivets on the outer skin inspect wing strut and strut fairings these are your struts we need to check the wing strut and the strut fairings for dents cracks loose screws and rivets and condition of paint. So, the wing strut are checked for cracks loose screw and rivets the condition of the paint and the wing fairing also needs to be inspected.

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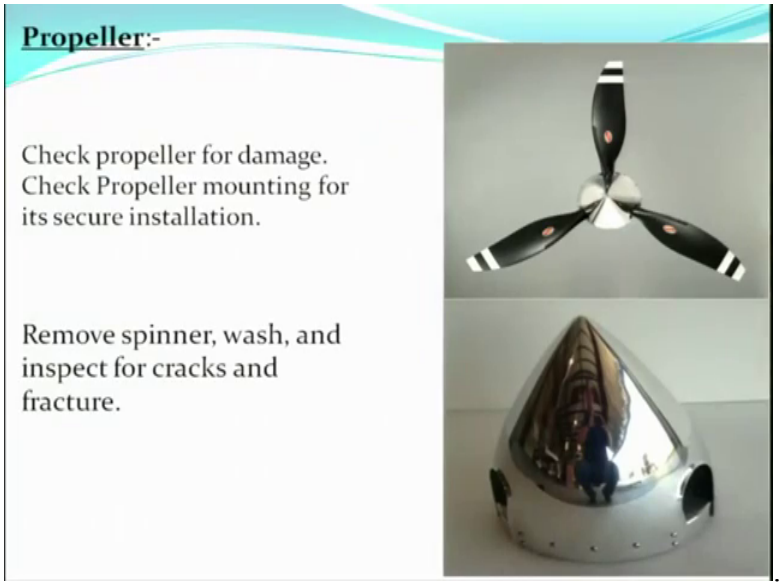

Then your propeller the propeller is to be inspected for any damage the propeller mounting is to be checked for secure installation.

As we have checked in the fifty hour inspection similarly we are checking it in the hundred hour inspection also the spinner the prop the spinner has to be removed washed inspected for cracks and fracture.

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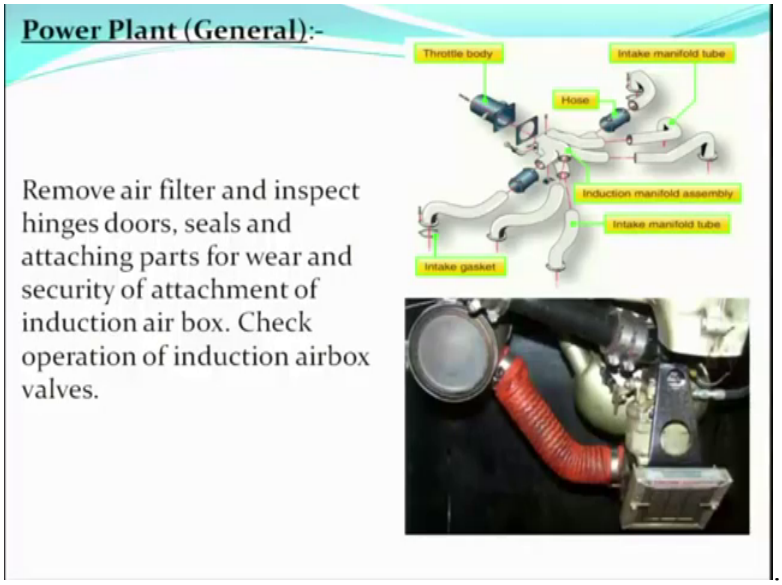

In the power point general, you remove the air filter and inspect hinge doors seals and attaching parts for wear and security of attachment of the induction air box. So, the induction air box in the induction air system we are removing the air filter we are cleaning them or replacing them as required we are inspecting the hinge doors and seals for security of attachment in the induction air box check operation of induction air box valves. So, different air box valves different air crafts may have a different system. So, the in case if there are air box valves they also need to be inspected and checked for operation. So, you can see here in the figure.

This is your induction manifold this is your induction manifold assembly then these are your induction manifold tubes then these tubes are going to the different cylinders in the engine and then you have the gaskets. So, as part of the hundred hour inspection we see whether there is any leakage on the attachment part where there is any damage on the manifold or the induction tubes.

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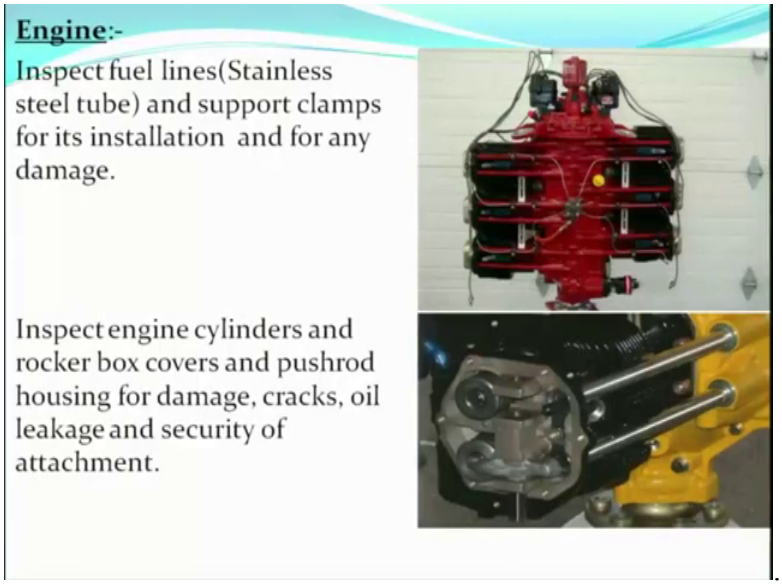

On the engine inspect fuel lines the stainless steel tubes and support clamps for its installation and for any damage. So, the fuel lines on the engines you can see this is the top view of an engine shown you can see these white lines these are the metal lines the engine fuel line these fuel lines they are stainless steel tubes they need to be inspected for any damage for any distortion for any leakage and this clamps you see this black things these are the clamps which are supporting this fuel lines when we go on the air craft you see it actually on the air craft.

So, these support clamps are to be inspected for correct installation for any looseness or damage inspect engine cylinders and rocker box covers and push rod housing for damage cracks oil leakage and security of attachment. So, these are the cylinders in the cylinders and we have the covers over this which are called the rocker box covers these covers are removed we inspect the cylinders we inspect the rocker box covers we inspect the push rod housings these are the push rod housings these are the different valves the intec valves and exhaust valves they are inspected for damage cracks any oil leaks and security of attachment when the rocker box covers are removed there is a gasket on the rocker box cover that gasket is also replaced we are not supposed to use reuse the gaskets in case if it is removed.

Then new gaskets has to be installed.

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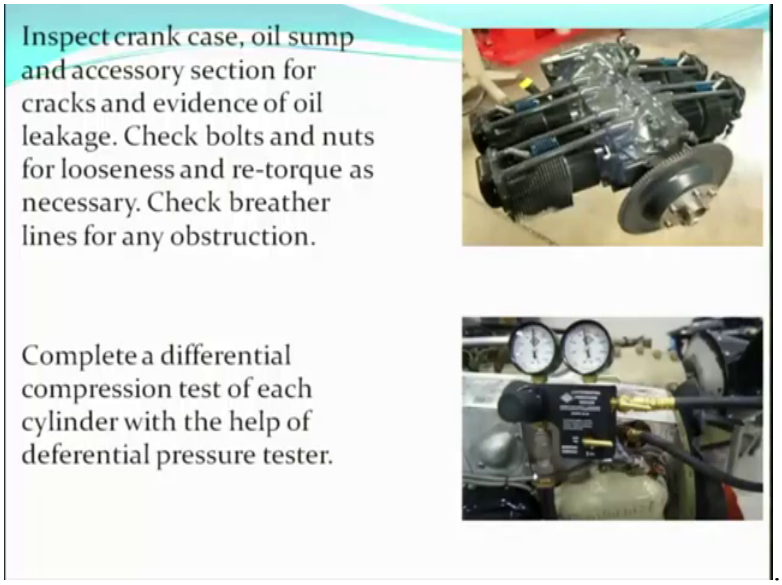

Inspect crank case oil sump and accessory section for cracks and evidence of oil leakage on the engine the crank case the oil sump and the accessory section is to be inspected for any creek any cracks for any evidence of oil leakage check bolts and nuts for looseness and re torque as necessary a part from the visual inspection in which we are inspecting the leaks the cracks the bolts and nuts are to be inspected for tightness in case you find any of them loose they need to be re torqued check breather lines for any obstruction the breather lines the drain lines are also to be checked for any obstruction as part of the hundred hours inspection a very important check we carry out an engine compression check this is which is carried out with a help of a differential compression tester.

So, a the compression test has to be carried out as per the guidelines mentioned in the maintenance manual this compression check is a very important check which tells us about the health of our engine.

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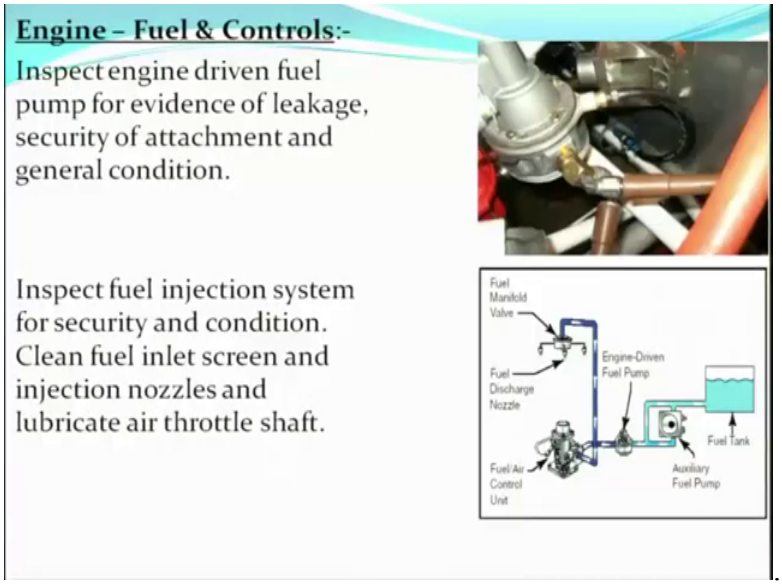

Engine fuel and controls inspect the engine driven fuel pump for evidence of leakage security of attachment and general condition the engine driven fuel pump is also checked for any leakage for security of attachment and general condition the fuel injection system is checked for security of for security and condition. So, the fuel injection system or the fuel air control unit or the fuel metering unit this is checked for security of attachment and general condition the fuel inlet screen in the unit is removed cleaned and installed back the injection nozzles are cleaned and the controls the engine controls on the fuel.

Air metering unit or the fuel air control unit or the throttle control and the mixture control they are cleaned and lubricated and a general inspection is carried out on the fuel air control unit. So, when you go on the air craft you will see fuel air control unit there are various checks the throttle and the mixture control the throttle control and the mixture control they are cleaned they are lubricated they are proper operation the travel of the control is checked the we check that your control is free to move there is no binding and after inspecting everything they are lubricated again.

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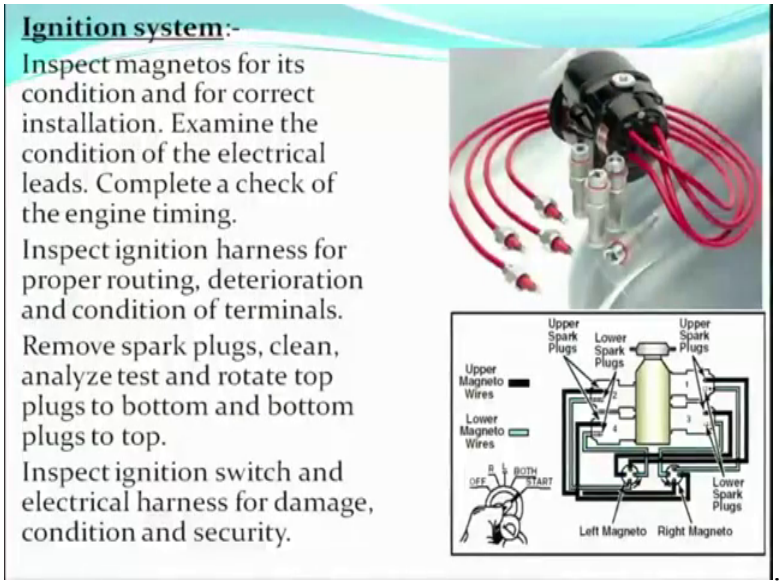

Coming to the ignition system inspect magnetos for its condition and for correct installation. Now you can see in the figure these are your magnetos we inspect the magnetos for condition and correct installation examine the condition of the electrical leads the electrical leads which are coming out of the magnetos.

They are inspected for general condition and complete a check of the engine timing the engine timing has to be checked as per the guidelines specified in the maintenance manual we also check the synchronization of the magnetos there are two magnetos installed in the ignition system we check whether the two magnetos are synchronised or not there is a proper timing check proper timing specified for the ignition system for each engine as per as it is mentioned in the manual. So, depending on the timing depending on the guidelines specified by the manufacturer a special engine timing check is also carried out as part of the hundred hours inspection inspect ignition harness for proper routing deterioration and condition of terminals the ignition harness.

You can see this harness this harness is checked for proper routine deterioration and the condition of the terminals these terminals are inspected for condition remove spark plugs clean analyze test and rotate top and plugs top plugs to bottom and bottom plugs to top then coming to the spark plugs the spark plugs are removed cleaned they are there gap is adjusted they are tested for sparks and then installed back the top plugs are installed at the bottom position and the bottom plugs to the top position this is part of the hundred hours schedule inspect the ignition switch and electrical harness for damage condition

and security. So, this is your ignition switch here the ignition switch is also inspected for condition damage and security.

So, in the ignition system you are seeing that we are inspecting the magnetos the ignition harness the wires the cables the terminals we are inspecting the spark plugs and the ignition switch we have also trans replaced rubber we have switch the positions of the plugs the top plugs have gone to the bottom position and the bottom plugs have gone to the top position.

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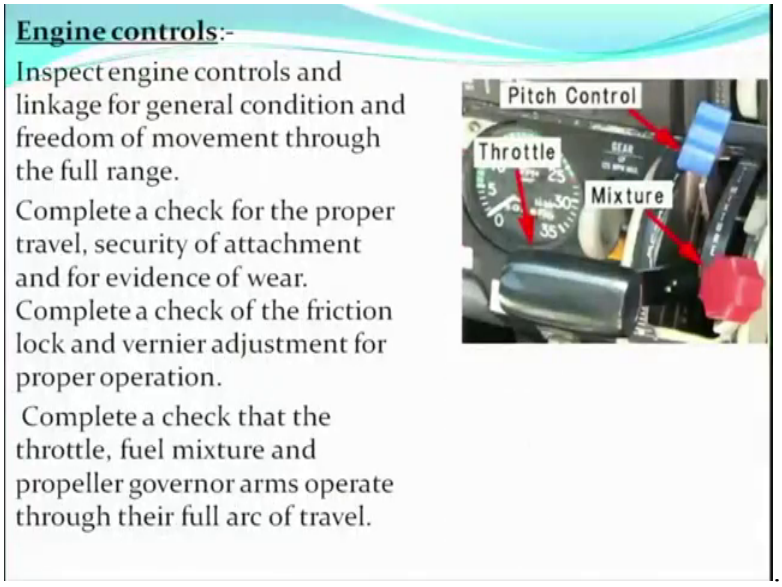

Engine controls inspect engine controls and linkage for general condition and freedom of movement through the full range. So, basically there are three controls in the engine and a single crystal engine aircraft one is the throttle this is the throttle then this is the propeller control then you have the mixture control we check the con the engine controls for linkage for general condition and freedom of movement through the full range complete a check for the proper travel security of attachment and for evidence of wear. So, we check the proper travel.

The security of attachment and for any evidence of wear complete a check of the friction lock and varnier adjustment for proper operation. So, within the controls there is a friction lock we check the friction lock for operation and the varnier attachment adjustments complete a check that the throttle fuel mixture and propeller governor arms operate through the full arc of travel. So, when you go on the aircraft you will see that

how these controls are moved we need to check during the full arc of travel the controls are moving freely and there is no binding in the movement of the controls apart from the movement checks these controls all these controls are cleaned and lubricated.

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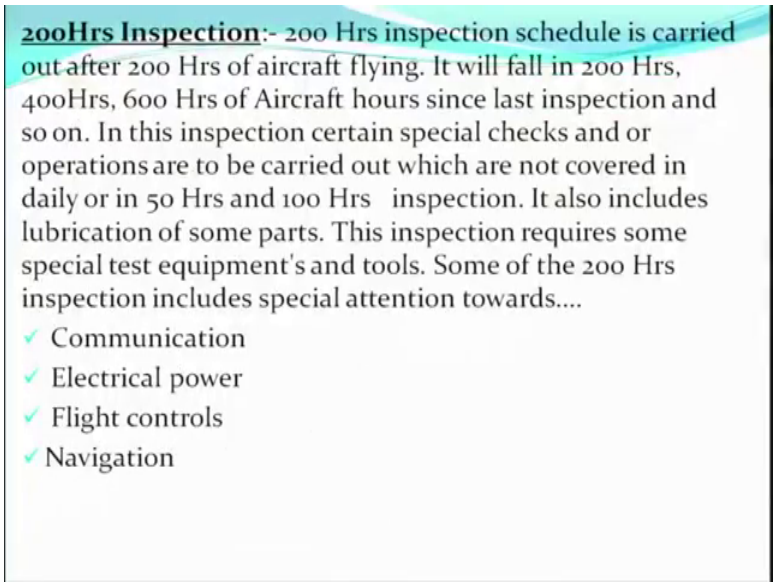

This was all about hundred hours inspection next is 200 hours inspection which is carried out after 200 hours of aircraft flying it will fall in 200 hours four hundred hours six hundred hours of aircraft operation.

Since last inspection and. So, on in this inspection certain special checks and operations are to be carried out which are not covered in the daily inspection or in fifty hours or hundred hours inspection it also includes lubrication of some parts this inspection requires some special test equipments and tools we will see what are the special inspections what are the areas where we carry out inspections as part of the 200 hours schedule.

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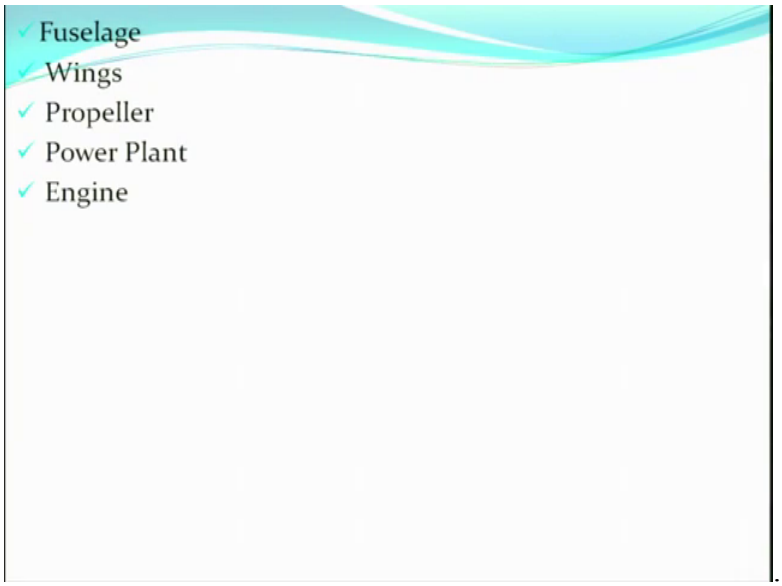

The communication section electrical power flight controls navigation fuselage wings propeller power plant engine.

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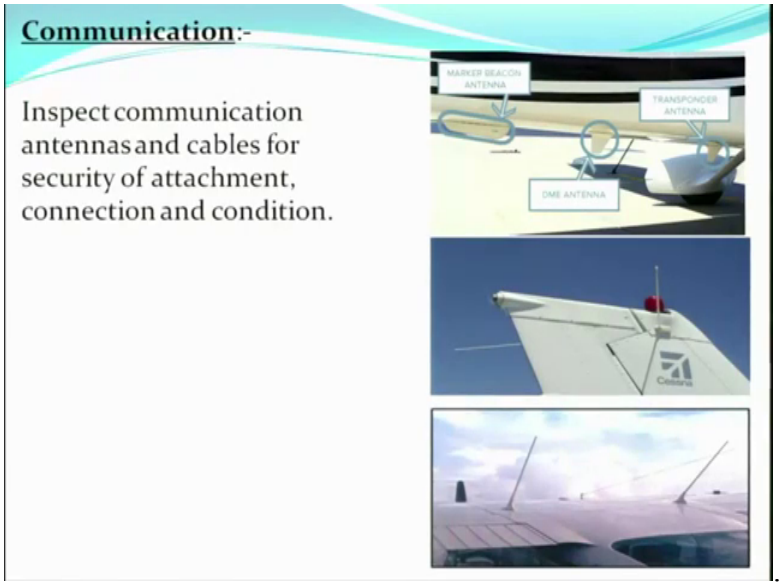

In the communication we inspect the communication antennas there are various antennas installed on the aircraft there is a marker beacon antenna dme antenna transponder antenna elt antennas navcom antennas various antennas are installed as part of the communication and navigation system the all the antennas and cables are checked for security of attachment connections and conditions.

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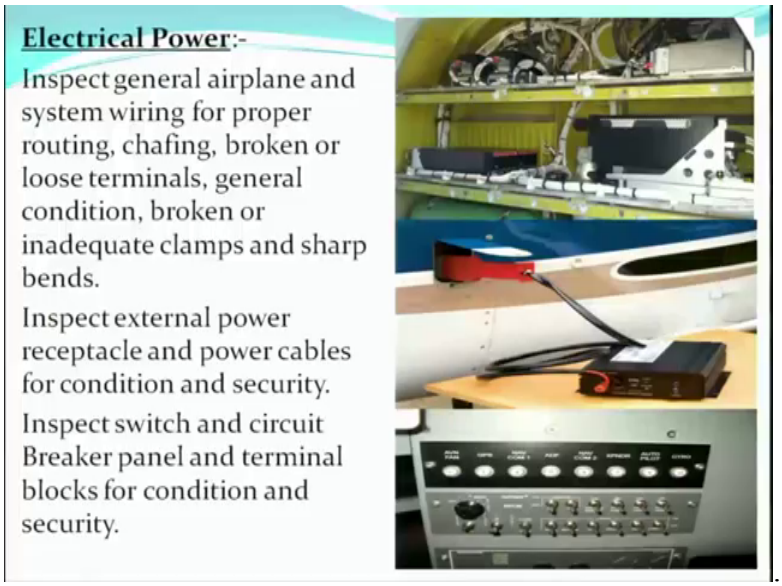

Electrical power inspect the general airplane and system wiring for proper routing chafing broken or loose terminals general condition broken or inadequate clamps and sharp bends.

So, as part of the 200 schedule in the electrical system we are inspecting the system wiring the routing of the wiring any broken or loose terminals general condition broken or inadequate clamps or sharp bends. So, this was not checked in the hundred hours this part of the 200 hours, we are checking the complete wiring in general of the electrical system inspect external power receptacle and power cable for condition and security. So, the external power is receptacle power cables are been checked condition and security inspect switch and circuit breaker panel and terminal blocks for condition and security in this figure you can see these are this is these are the circuit breakers these are your switches.

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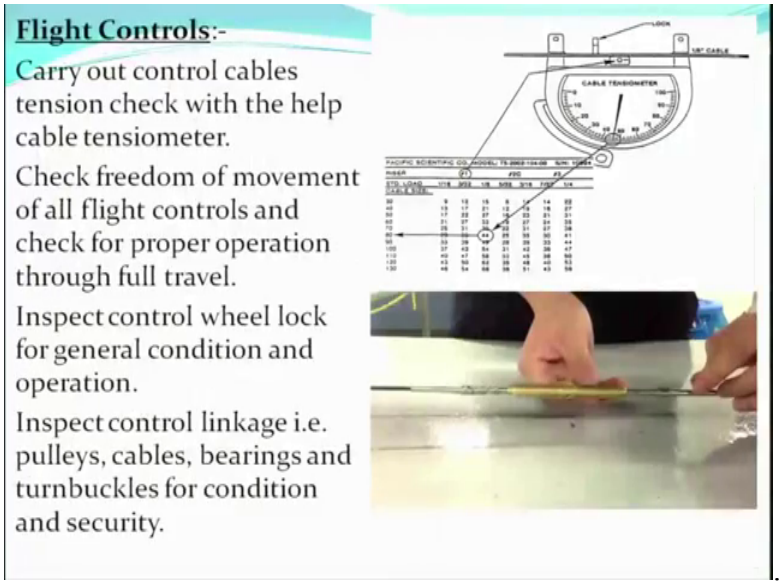

So, the all the switches the circuit breakers are been checked for condition and security coming to the flight controls carry out control cables tension check with the help of cable tensiometer. So, this is your cable tensiometer with the help of this cable tensiometer we will check the tension of cables in your control flight control system check freedom of movement of all flight controls and check for proper operation through full travel. So, you will check the full travel check the control surface travel check we will do the cable tension check as part of this inspection inspect control wheel lock for general condition and operation the control wheel lock is also to be checked for condition and operation inspect control linkages that is pulleys cables bearings and turnbuckles for condition and security.

So, as part of this inspection the pulleys the cables the bearings turnbuckles in the flight controls part is inspected for condition and security.

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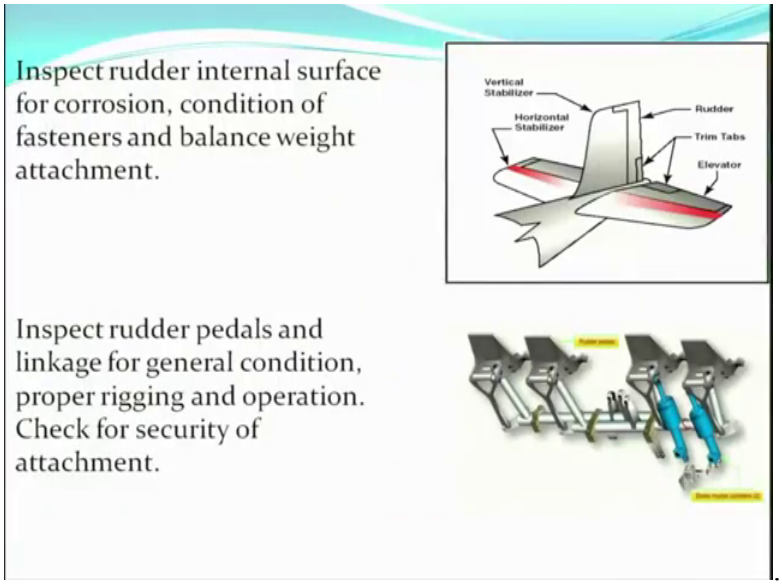

Inspect rudder internal surface for corrosion condition of fasteners and balance weight attachments the internal surfaces of the rudders the alleviators as far as possible is checked for corrosion condition of fasteners balance weights of any for attachment and security inspect rudder pedals and linkages for general condition proper rigging and operation check for security of attachment the rudder pedals are inspected for general condition for proper rigging and operation and security of attachment.

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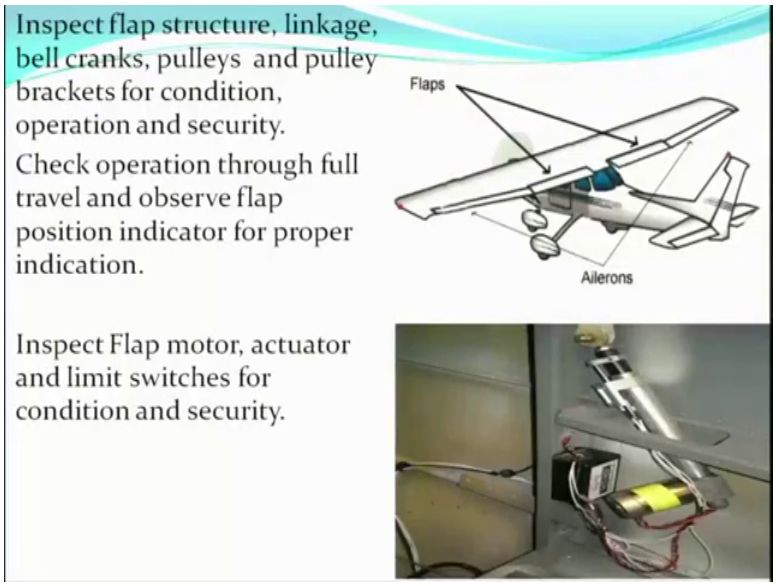

The flap structures the linkages bell cranks pulleys pulley brackets are checked for condition operation and security as part of the flight controls the flap system is also checked from the complete flap structure.

The linkages all the bell cranks pulleys pulley brackets within the system are inspected for condition and security check operation through full travel and observe flap position indicator for proper indication we operate the flaps check them through the full travel and we also observe the flap position indicator for proper indication inspect flap motor actuator and limit switches for condition and security the flap motor the actuator and all the limit switches are also inspected as part of the 200 hours schedule in the flight control section.

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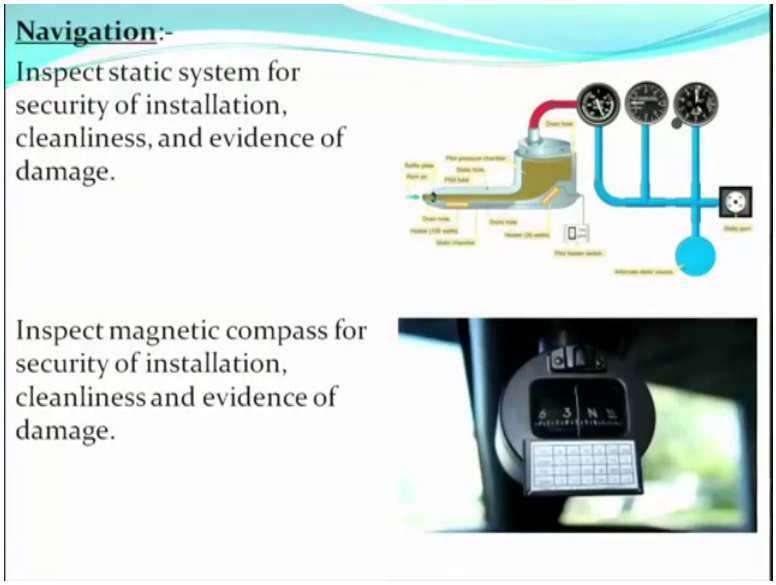

Now, coming to navigation inspect static system for security of installation cleanliness and evidence of damage. So, the complete pitot and static system this is the pitot tube the pitot tube is inspected the all the lines are inspected all the drain points are inspected the static ports are inspected for cleanliness evidence of damage for security of installation there is a pitot static leak check which is to be carried out.

That pitot static leak check is carried out to see whether there is any leakage in the system inspect magnetic compass for security of installation cleanliness and evidence of damage the magnetic compass the direct reading magnetic compass in some of the basic aircrafts is installed plus compass is checked for security of installation cleanliness evidence of dem damage and leakage.

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The instrument panels avionics units are inspected for deterioration cracks and security of instrument panel mounts. So, in the cockpit the instrument panels the avionics units are checked for deterioration cracks and security of the instrument panel mounts the fuselage.

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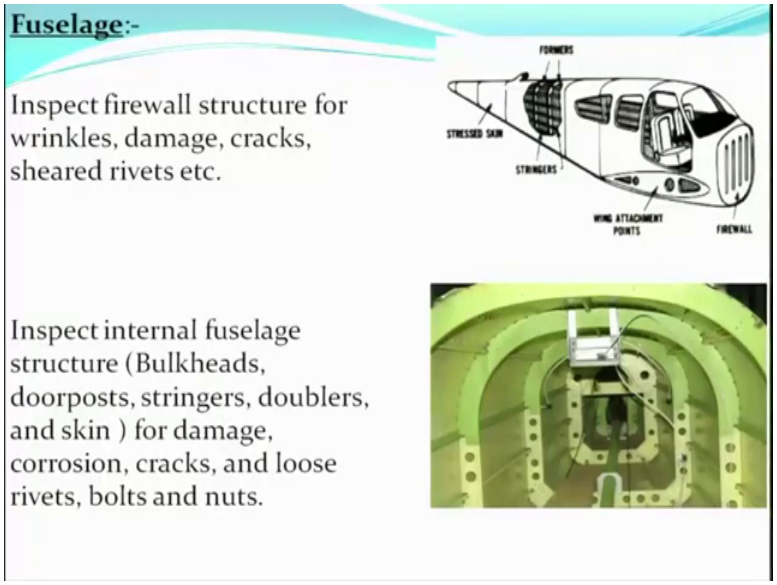

The fuselage the fire wall structure this is your fire wall in front of the fire wall is the engine installed this fire wall structure is checked for wrinkles damages cracks sheared rivets etcetera.

The internal fuselage structure is to be checked all the bulkheads doorposts stringers doublers and skin for damage corrosion cracks loose rivets bolts and nuts you can see this is a detailed elaborate inspection which was not there in the hundred hours, but in 200 hours, we are doing the bulkheads inspection the door post stringers doublers skin everything inside the structural inspection are been carried out for damage corrosion cracks loose rivets bolts nuts.

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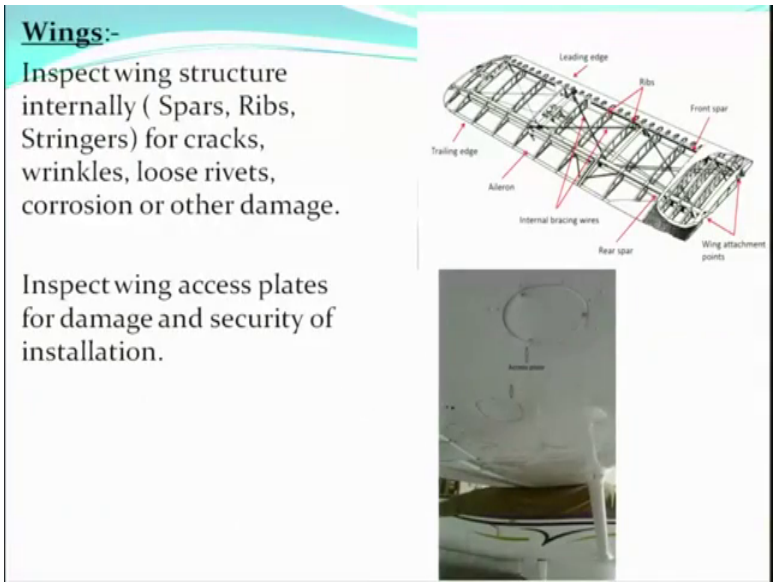

In the wings, the wings structure is inspected internally you have you can see the wings structure in the diagram there are spars you can see this is your front spar this is your real spar various ribs in the wing. So, we inspect the internal structure we inspect the spars the ribs different stringers for cracks wrinkles loose rivets corrosion or other damage.

So, as far as possible through the inspection panels we will inspect the internal structure of the wing inspect wing access plates for damage and security of installation we will inspect these are the wing access plates you can see different inspection panels these inspection panels are removed internal structure is inspected as far as possible through these inspection panels and we also inspect the inspection panels these panels for damage and security of installation.

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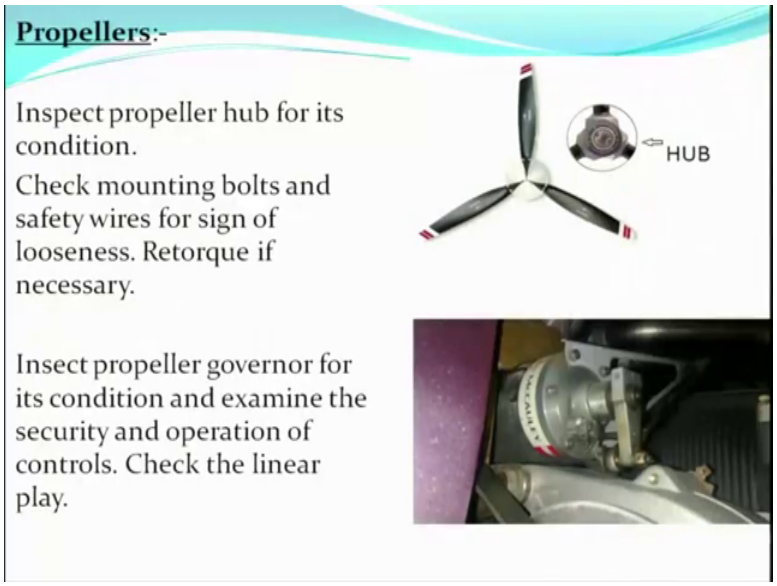

Propellers you inspect the propeller hub for its condition the spinner has been removed and inside is the hub we check the hub for condition we check the propeller mounting bolts and safety wires for sign of looseness and are re torque if necessary.

So, the propeller mounting bolts are checked for any looseness and they are re torque if necessary the safety wires are checked for any sign of looseness and in case if they are loose then that locking that the wire locking is removed and it is freshly wire locked inspect propeller governor for its condition and examine the security and operation of controls this is your propeller governor this propeller governor is checked for its condition and security and operation of controls.

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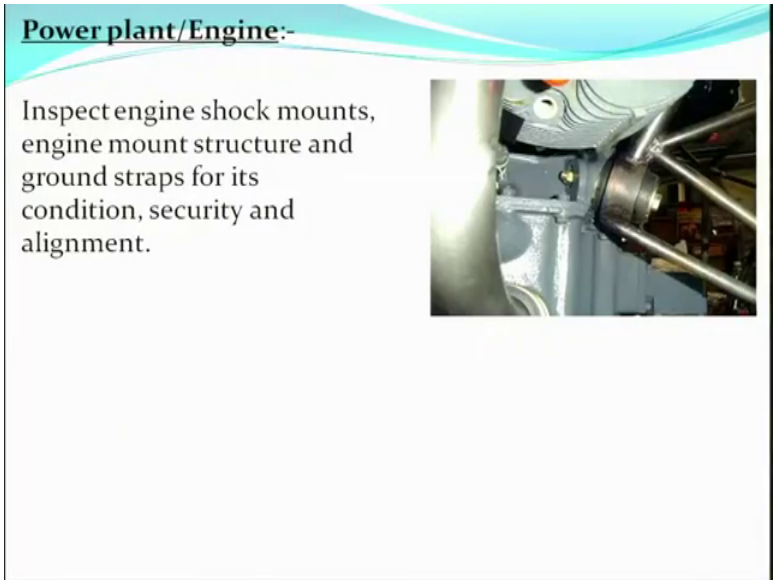

And we also check the linear play in these controls inspect engine shock mounts engine mount structure and ground straps for its condition security and alignment. So, in the engine the engine mounting the rubber shock mounts are inspected the shock mount structure is checked for any damage for condition security and alignment. So, we have seen the different inspections which are carried out in the different inspection schedules we have seen the inspection programme the maintenance programme.

Now, we will go on the aircraft, we will try to see some of the components, we will try to see the location of the components and some maintenance which is carried out actually on the aircraft.