must be strictly followed.

Mercury contamination is far more serious than any of the battery spillages and prompt action is required to ensure the integrity of the aircraft structure.

While contamination from mercury is extremely rare on passenger aircraft, sources of mercury spillage result from the breakage of (or leakage from) containers, instruments, switches and certain test equipment. The spilled mercury can, quickly, separate into small globules, which have the capability of flowing (hence its name 'Quick Silver') into the tiniest of crevices, to createdamage.

Mercury can rapidly attack bare light alloys (it forms an amalgam with metals), causing intergranular penetration and embrittlement which can start cracks and accelerate powder propagation, resulting in a potentially catastrophic weakening of the aircraft structure.

Signs of mercury attack on aluminium alloys are greyish powder, whiskery
growths, or fuzzy deposits. If mercury corrosion is found, or suspected, then it must be assumed that intergranular penetration has occurred and the structural
strength is impaired. The metal in that area should be removed and the area repaired in accordance with manufacturer's instructions.

Ensure that toxic vapour precautions are observed at all times during the following operations:
Do not move aircraft after finding spillage. This may prevent spreading. Remove spillage carefully by one of the following mechanical methods:
Capillary brush method (using nickel-plated carbon fibre brushes).
Heavy-duty vacuum cleaner with collector trap.
Adhesive tape, pressed (carefully) onto globules may pick them up
Foam collector pads (also pressed, carefully, onto globules).
Alternative, chemical methods, of mercury recovery entail the use of:
Calcium polysulphide paste
Brushes, made from bare strands of fine copper wire Neutralise the spillage area, using 'Flowers of Sulphur' Try to remove evidence of corrosion

The area should be further checked, using radiography, to establish that all globules have been removed and to check extent of corrosion damage
Examine area for corrosion using a magnifier. Any parts found contaminated should be removed and replaced.
Note 1: Twist drills (which may be used to separate riveted panels, in an attempt to clean contaminated surfaces) must be discarded after use.
Note 2: Further, periodic checks, using radiography, will be necessary on any airframe that has suffered mercury contamination.

PERMANENTANTI-CORROSIONTREATMENTS

These are intended to remain intact throughout the life of the component, as distinct from coatings, which may be renewed as a routine servicing operation. They give better adhesion for paint and most resist corrosive attack better than the metal to which they are applied.
Electro-Plating

There are two categories of electro-plating, which consist of:
Coatings less noble than the basic metal. Here the coating is anodic and so, if

base metal is exposed, the coating will corrode in preference to the base metal. Commonly called sacrificial protection, an example is found in the cadmium (or zinc) plating of steel.
Coatings more noble (e.g. nickel or chromium on steel) than the base metal. The nobler metals do not corrode easily in air or water and are resistant to acid attack. If, however, the basic metal is exposed, it will corrode locally through electrolytic action. The attack may result in pitting corrosion of the base metal or the corrosion may spread beneath thecoating.

SprayedMetalCoatings

Most metal coatings can be applied by spraying, but only aluminium and zinc are used on aircraft. Aluminium, sprayed on steel, is frequently used for high- temperature areas. The process (aluminising), produces a film about 0.1 mm (0.004 in) thick, which prevents oxidation of the underlying metal.
Cladding

The hot rolling of pure aluminium onto aluminium alloy (Alclad) has already been discussed, as has the problem associated with the cladding becoming damaged, exposing the core, and the resulting corrosion of the core alloy. Surface Conversion Coatings
These are produced by chemical action. The treatment changes the immediate
surface layer into a film of metal oxide, which has better corrosion resistance than the metal. Among those widely used on aircraft are:

Anodising of aluminium alloys, by an electrolytic process, which thickens the natural, oxide film on the aluminium. The film is hard and inert
Chromating of magnesium alloys, to produce a brown to black surface film of chromates, which form a protective layer
Passivation of zinc and cadmium by immersion in a chromate solution.

Other surface conversion coatings are produced for special purposes, notably the phosphating of steel. There are numerous proprietary processes, each known by its trade name (e.g. Bonderising, Parkerising, or Walterising).

NONDESTRUCTIVE INSPECTION/TESTING

The preceding information in this chapter provided general information regarding aircraft inspection. The remainder of this chapter deals with several methods often used on specific components or areas on an aircraft when carrying out the more specific inspections.

They are referred to as nondestructive inspection (NDI) or nondestructive testing (NDT). The objective of NDI and NDT is to determine the airworthiness of a component without damaging it, which would render it unairworthy. Some of these methods are simple, requiring little additional expertise, while others are highly sophisticated and require that the technician be highly trained and specially certified.

GENERAL TECHNIQUES

Before conducting NDI, it is necessary to follow preparatory steps in accordance with procedures specific to that type of inspection. Generally, the parts or areas must be thoroughly cleaned. Some parts must be removed from the aircraft or engine. Others might need to have any paint or protective coating stripped. A complete knowledge of the equipment and procedures is essential and if required, calibration and inspection of the equipment must be current.

VISUAL INSPECTION

Visual inspection can be enhanced by looking at the suspect area with a bright light, a magnifying glass, and a mirror (when required). Some defects might be
so obvious that further inspection methods are not required.
The lack of visible defects does not necessarily mean further inspection is unnecessary. Some defects may lie beneath the surface or may be so small that the human eye, even with the assistance of a magnifying glass, cannot detect them.

BORESCOPE

Inspection by use of a borescope is essentially a visual inspection. A borescope is a device that enables the inspector to see inside areas that could not otherwise be inspected without disassembly.
An example of an area that can be inspected with a borescope is the inside of a reciprocating engine cylinder. The borescope can be inserted into an open spark plug hole to detect damaged
pistons, cylinder walls, or valves.
Another example would be the hot section of a turbine engine to which access could be gained through the hole of a removed
igniter or removed access plugs specifically installed for inspection purposes. Borescopes are available in two basic configurations.
The simpler of the two is a rigid type of small diameter telescope with a tiny mirror at the end that enables the user to see around corners. The other type uses fiber optics that enables greater flexibility.
Many borescopes provide images that can be displayed on a computer or video monitor for better interpretation of what is being viewed and to record images for future reference. Most borescopes also include a light to illuminate the areabeing viewed.

Penetrant inspection will detect such defects as surface cracks or porosity. These defects may be caused by fatigue cracks, shrinkage cracks, shrinkage porosity, cold shuts, grinding and heat treat cracks, seams, forging laps, andbursts.
Penetrant inspection will also indicate a lack of bond between joined metals.

The main disadvantage of penetrant inspection is that the defect must be open to the surface in order to let the penetrant get into the defect. For this reason, if the part in question is made of material which is magnetic, the use of magnetic particle inspection is generally recommended. Penetrant inspection uses a penetrating
liquid that enters a surface opening and remainsthere, making it clearly visible to the inspector.
It calls for visual examination of the part after it has been processed, increasing the visibility of the defect so that it can be detected.

Visibility of the penetrating material is increased by the addition of one of two types of dye, visible or fluorescent.

The visible penetrant kit consists of dye penetrant, dye remover emulsifier, and developer. The fluorescent penetrant inspection kit contains a black light assembly, as well as spray cans of penetrant, cleaner, and developer.
The light assembly consists of a power transformer, a flexible power cable, and a hand-held lamp. Due to its size, the lamp may be used in almost any position or location.

EDDY CURRENT INSPECTION

Electromagnetic analysis is a term which describes the broad spectrum of electronic test methods involving the intersection of magnetic fields and circulatory currents.

The most widely used technique is the eddy current. Eddy currents are composed of free electrons under the influence of an induced electromagnetic field which are
made to "drift" through metal.
Eddy current is used in aircraft maintenance to inspect jet engine turbine shafts and vanes, wing skins, wheels, bolt holes, andspark plug bores for cracks, heat or frame damage. Eddy current may also be used in

repair of aluminum aircraft damaged by fire or excessive heat.
Different meter readings will be seen when the same metal is in different hardness states. Readings in the affected area are compared with identical materials in known unaffected areas for comparison.

ULTRASONIC INSPECTION

Ultrasonic detection equipment makes it possible to locate defects in all types of materials. Minute cracks, checks, and voids too small to be seen by x-ray can be located by ultrasonic inspection. An ultrasonic test instrument requires access to only one surface of the material to be inspected and can be used with either straight line or angle beam testing techniques.
Two basic methods are used for ultrasonic inspection. The first of these methods is immersion testing. In this method of inspection, the part under examination and the search unit are totally immersed in a liquid couplant, which may be water or any other suitable fluid.
The second method is called contact testing, which is readily adapted to field use and is the method discussed in this chapter. In this method, the part under examination and the search unit are coupled with a viscous material, liquid or a paste, which wets both the face of the search unit and the material under examination. There are three basic ultrasonic inspection methods:
pulseecho;
through transmission;and
resonance.

DISASSEMBLY AND RE-ASSEMBLY TECHNIQUES

Design engineers not only design the components and systems of an aircraft, they design the assembly and re-assembly of the aircraft and components as well.

The aircraft, engine and component manufacturer's maintenance manuals contain the approved methods of disassembly and assembly of the aircraft and its components. The instructions in these manuals must be followed at all times. Occasionally, it will be necessary to contact the manufacturer for a procedure when it does not appear in a manual. This is preferred over "winging it". A great amount of damage can be inflicted by disassembling or re-assembling an aircraft assembly in the wrongmanner.

The cost of such a mistake can be extremely expensive and may even cost one's job or certification. Thus, a first step is to pull the manufacturer's instructions and have them at the job location to be followed step bystep.
The controlled protected environment of the hangar or shop is usually preferred for disassembly of aircraft and aircraft component however a great deal of work can be performed on the ramp if needed.

Take steps to control the environment around the work area.
Basic aircraft maintenance hangar etiquette should be followed. A clean well defined area for the work is essential. Cordon off the area if required for safety.

Placards should be posted as needed in the hangar. Tags should be placed
on the flight deck warning other technicians that work is being done on a certain component or system and it should not be operated. These "Do Not Operate" tags are typically placed on the controls and switches of the system being repaired. Circuit breakers related to the system should also be pulled and tagged. These will be some of the first steps in the instructions given for disassembly of
a unit given in the maintenance manual.

REPLACEMENT OF MAJOR COMPONENTS/MODULES

This type of operation will normally be completed at a large maintenance base, where all the required equipment is available. An example could be the replacement of a wing that has suffered major damage.

Other types of similar work might be the replacement of damaged wing tips, empennage surfaces and nose cones. If the aircraft is at an 'outstation' when the damage occurs, confirmation should be sought as to whether the aircraft can be flown back to base for repair, or repaired where itis.

DISASSEMBLY AND RE-ASSEMBLY OF MAJOR COMPONENTS

Most of the work done, during this phase of maintenance, is scheduled in with normal aircraft maintenance. The components may not only be removed and reinstalled at different times during the maintenance, but work
will also be done on the items whilst they are removed. 6

They may also be removed to allow access to other parts of the airframe during the maintenance. Items such as engines, propellers, landing gears and wheels require some form of maintenance. This may include a simple condition check, or a full overhaul of its component
parts, allowing checks on internal component parts for wear, damage and corrosion.

The full procedure for this type of work will be carried out in accordance with the maintenance manuals. This book will give all the operations required to dismantle the component and will advise what to look for whilst
the item is undergoing maintenance.

It will also state the re-assembly method, including the fitting of new parts such as seals, gaskets, oil and other consumables that have to be replaced, during overhaul.

DISASSEMBLY AND RE-ASSEMBLY OF MINOR COMPONENTS

A typical passenger aircraft can contain hundreds of small components that work together as parts of a larger system. This can include a wide range of hydraulic and pneumatic components that can be mechanical, electromechanical or electricalin operation. Other components might include those installed into fuel, air conditioning, pressurization, electrical and electronicsystems.

BASIC DISASSEMBLY AND REASSEMBLYTECHNIQUES

All of the previously mentioned procedures require the use of the correct techniques over a wide range of working practices. These techniques will ensure that the components are removed, dismantled, re-assembled and re-installed in accordance with both the relevant manuals and using the correct 'standardpractices'.
Maintenance manuals dictate the correct type and size of locking wire or split pin to be used during overhaul or maintenance of a component. These publications
also stipulate exact detail of items such as the lock wire angle of approach and the correct positioning of a split
pin.

Maintenance manual chapters 20 and 70 list the standard practices that should be used during overhaul. Other locking devices include items such as single tab washers, shake-proof washers, circlips and locking rings. Some can only be used once only whilst others are reused provided they are stillserviceable.

The replacement of spring washers is 'advised' during overhaul and repair, especially on engines and pumps. Other devices used for locking or holding fasteners in position, such as multi-tab washers and lockingplates
can normally be reused.
Stiff nuts with fiber or nylon inserts can be checked to ascertain if a certain degree of stiffness is still available. If the nut can be run along a thread by hand it should be replaced.

They should not be used in high temperature areas. In all matters relating to aircraft, the manufacturer has the final say on which fasteners can be
reused and which must be replaced.

Because friction is essential to keep the fasteners secure, sometimes it is necessary to do a 'torque check' on the bolt/nut combination, in order to confirm their continuing serviceability.
This is especially true of all metal fasteners that can normally be re-used.
The majority of nuts, bolts and set-screws, on an aircraft, are subject to a standard torque value. This depends on their material, finish, lubrication, thread type and size, although the manufacturer's torque value will be the
correct one to use.

The correct torque loadings are normally applied using a torque wrench that has been previously calibrated to the correct value. In some special instances, pre-load indicating washers may be specified.

When assembling any component or major airframe part, the manufacturer will specify whether the torque value is 'lubricated' or 'dry'. Lubricated values are measured with the threads and all mating surfaces lightly lubricated
with oil, sealant or anti-seize compound as appropriate.

When assembling some components, it may be vital that certain alignments, dimensions or profiles are achieved. During initial production, most of the airframe and many of the components are assembled in a jig.
A jig is device that allows the manufacture, repair or rigging of components to a high dimensional
accuracy. This guarantees consistency over a number of components. The jig holds all of the items

securely, so that, when assembled, the whole component is exactlythe shape that the designer has stipulated.

Jigs are used to build fuselage and wing sections in the factory. They are also used to ensure that small actuators are pre-set to the exact length, to assist in 'rigging' the controls containing the actuator.

ABNORMALEVENTS

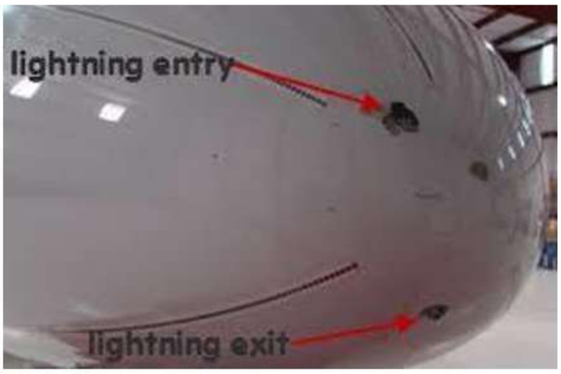
SPECIAL INSPECTIONS

During the service life of an aircraft, occasions may arise when something out of the ordinary care and use of the aircraft might happen that could possibly affect its airworthiness.
When these situations are encountered, special inspection procedures should be followed to determine if damage to the aircraft structure or any other type of damage has occurred.

The procedures outlined on the following pages are general in nature
and are intended to acquaint the aviation technician with the areas which should be inspected. As such, they are not all inclusive. When performing any abnormal
event inspection, always follow the detailed procedures in the aircraft maintenance manual.
In situations where the manual does not adequately address the
situation, seek advice directly from the manufacturer and from other maintenance technicians who are highly experienced with them.

LIGHTNING STRIKES AND HIRF PENETRATION

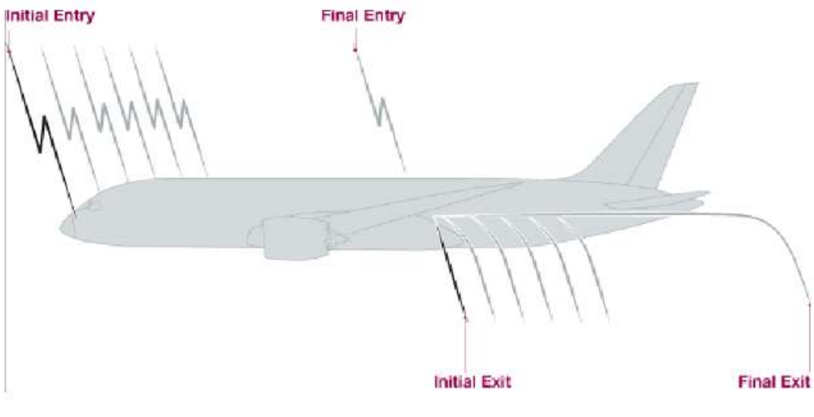
Although lightning strikes to aircraft are extremely rare, if a strike has occurred, the aircraft must be carefully inspected to determine the extent of any damage that might have occurred.



When lightning strikes an aircraft, the electrical current must be conducted through the structure and be allowed to discharge or dissipate at
controlled locations. These controlled locations are primarily the aircraft's static discharge wicks, or on more sophisticated aircraft, null field discharger's.
When surges of high voltage electricity pass through good electrical conductors, such as aluminum or steel, damage is likely to be minimal or nonexistent.

When surges of high voltage electricity pass through nonmetallic structures, such as a fiberglass radome, engine cowl or fairing, glass or plastic window, or a composite structure that does not have built-in electrical bonding, burning and more serious damage to the structure could occur. Visual inspection of the structure is required.

Look for evidence of degradation, burning or erosion of the composite resin at all affected structures, electrical bonding straps, static discharge wicks and null field dischargers. Other non-destructive tests may also be required. Follow maintenance manual instructions for inspection procedures after a lightningstrike.



HIGH INTENSITY RADIATED FIELDS (HIRF) PENETRATION

HIRF can interfere with the operation of the aircraft's electrical and electronic systems by coupling electromagnetic energy to the system wiring and
components.
High intensity radiated fields and their effect on the electronics and avionics of an aircraft that flies through them have been of increasing concern in recent decades.
The basic concern for better identification and protection from HIRF has arisen for the following reasons:

Operation of modern aircraft is increasingly dependent upon electrical/electronic systems, which can be susceptible to electromagneticinterference.

The increasing use of non-metallic materials like carbon or glass fibre in the construction of the aircraft reduces their basic shielding capability against the effects of radiation from external emitters.

Emitters are increasing in number and in power. They include ground-based systems (military systems, communication, television, radio,radars
and satellite uplink transmitters) as well as emitters on ships or other aircraft.

Environmental factors such as corrosion, mechanicalvibrations, thermal cycling, damage and subsequentrepair and modifications can potentially degrade
an aircraft's electromagnetic protection

There are three primary areas to be considered for aircraft operating in HIRF environments:
Aircraft Structure (Airframe Skin andFrame).
Electrical Wiring Installation Protection (Solidor Braided ShieldingConnectors).
Equipment Protection (LRU case,Electronics Input OutputProtection).

SPECIFIC TESTING - HIRF
The milliohmmeter is often used to measure the path resistance of earthing straps (grounding wires) or other bonding. This technique is limited to the indication of only single path resistance values.

The Low-frequency Loop Impedance testing method complements DC bonding testing and can be used together with visual inspection.

Cable shielding, aircraft structure shielding and circuit protection devices are designed to protect vital avionicsfrom HIRF. Visual inspection and measurement of shielding and bonding effectiveness are maintenance actions used to check these.

HEAVY LANDINGS
A heavy or overweight landing, can cause damage to the aircraft both visible and hidden. All damage found should be entered in the aircraft’s Technical Log.
An aircraft landing gear is designed to withstand landing at a particular aircraft weight and rate of descent. If either of these parameters was exceeded during a landing, then it is probable that some damage has been caused to the landing gear, its supporting structure or elsewhere on the airframe. Over-stressingmay
occur if the aircraft is not parallel to the runway when it lands or if the nose- or tail-wheel strikes the runway before the main wheels.
Some aircraft are provided with heavy landing indicators, which give a visual indication that specified ‘g’ forces have been exceeded. Long aircraft may have a tail scrape indicator fitted, as a scrape is more likely.
In all instances of suspect heavy landings, the flight crew should be questioned for details of the aircraft’s weight, fuel distribution, landing conditions and whether any unusualnoises
were heard during the incident.
Primary damage, that may be expected following a heavy landing, would normally be concentrated around the landing gear, its supporting structure in the wings or fuselage, the wing and tailplane attachments and the engine mountings.

Secondary damage may be found on the fuselage upper and lower skins and on the wing skin and structure. Different aircraft have their own heavy landing procedures. For example, some aircraft, which show no primary damage, need no further inspection, whilst others require that all inspections are made after every reported heavy landing. This is because some aircraft can have hidden damage in remote locations whilst the outside of the aircraft appears to beundamaged.

Example of Post Heavy Landing InspectionThe following items give an example of a typical post heavy landing inspection: Landing GearExamine tyres for creep, damage, and cuts.

Examine wheels and brakes for cracks and other damage. Examine axles, struts and stays for distortion.

Check landing gear legs for leaks, scoring and abnormal extension. Examine gear attachments for signs of cracks, damage or movement.

Some aircraft require the removal of critical bolts and pins for NDT checks.

There are numerous other checks that need to be done, depending on the damage found (or not found), during the inspections. This can include engine runs and functional checks of all the aircraft systems.

Signs of some damage and distortion could be a reason to do full rigging and symmetry checks of the airframe.

FLIGHT THROUGH SEVERE TURBULENCE

If an aircraft has been flown through conditions of severe turbulence, the severity of the turbulence may be difficult to assess and report. For aircraft that utiliseaccelerometers, flight data recorders or fatigue meters, the records obtained can give an overall picture of the loads felt by the aircraft.

They cannot, however, give a full picture and so must only be used for guidance. Turbulence can be too fleeting to record on some forms of load instrumentation.

As a general guide only, loadings greater than – 0.5g and + 2.5g on transport aircraft could indicate some damage to the airframe and engines. Aircraft, which have no recording devices installed, must have reports of flight through severe turbulence thoroughlyinvestigated.

Severe turbulence may cause excessive vertical or lateral forces similar to those felt during a heavy landing. The forces felt may be increased by the inertia of heavy components such as engines, fuel and water tanks andcargo.

Damage can be expected at similar points to those mentioned previously
concerning heavy landings. It is also possible for damage to occur in those areas of the wings, fuselage, tail unit and flying controls where the greatest bending moment takes place. Pulled rivets, skin wrinkles or other similar structural faults may provide signs of damage.

As with a ‘heavy landing’ report, further inspection, involving dismantling of some major structural components, may be necessary if external damage is found during the initial inspection following flight through turbulence.

MAINTENANCEPLANNING

To ensure continued airworthiness, aircraft manufacturers are required to provide operators with a maintenance program approved by the authorities of the country of certification.

An aircraft maintenance program is essential to allow for safe and economic operations and it is necessary to obtain a type certificate. The entire program is written and known as the Maintenance Planning

Document(MPD).

Operators typically customize a maintenance program for their own use based on the manufacturer's program. Each change in the maintenance program of a
manufacturer has to be approved by the authorities. From these written and approved programs, planning for all maintenance functions is derived.

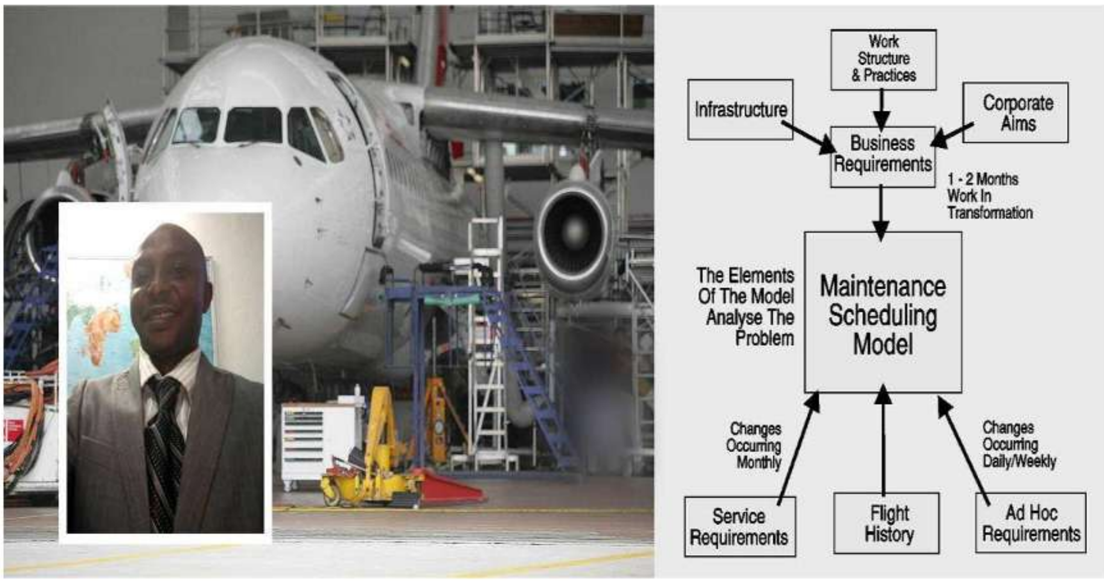
Various maintenance working groups may be established to study details of a specific maintenance function or proposed modification to the maintenance program.

MPD's are live documents that are regularly updated with knowledge from the manufacturer and field operators. A global industrial process is used
by manufacturers, EASA, FAA, airline operators, and maintenance organizations to modify and ratify changes to the MPD.

An Industry Steering Committee (ISC) chaired by a representative of the airlines and co-chaired by the aircraft manufacturer receives and reviews information pertaining to the maintenance of anaircraft

All modifications to a maintenance operator's own maintenance program must be approved by authorities (NAA and EASA). An operator's program adapts the MPD so that it is easier to implement for the operator's particular situation.

Work cards containing the various steps in maintenance tasks to be used by the technician may be the manufacturer's cards or they may be modified by the maintenance operator.



A planning department of the maintenance operator prepares and issues the work cards to the technicians as a part of a maintenance package that is accomplished during the scheduled maintenance time when the aircraft will be out of service.
All steps on all work cards must be signed off by the technician performing the work

MODIFICATION PROCEDURES
A modification which has no impact on weight, center of gravity, structural strength, reliability, characteristics of usage, or any other characteristic which has an impact on the airworthiness of the systems is known as a minormodification.

All other modifications are major modifications. Manufacturers, operators, vendors and other aviation companies can propose to modify all or part of a system
or component on the aircraft. However, the decision to incorporate a modification is up to the operator.

The modification must follow the procedure described in the approval specifications, and the holder of the approval must provide the conformity of the modification with the conditions for certification

Modification can be evaluated on the component level and also on the system level when installed on the aircraft. Tasks typically performed during evaluation of
a modification are as follows:

A review of the installation plan andwiring.
Verification of the presence oflabels.
Evaluation of the structuralinstallation.
A safety analysis.
Evaluation of the conditions equipment/aircraftenvironment.
Structuraljustifications.
A written evaluation of electrical aspects ofrepair.
A statement/analysis of the effect of the modification on weight andbalance.

Ground tests and or flight tests may be needed to ensure the modification performs as designed. These are performed by the applicant with or without participation
of the authorities.

Service Bulletin (SB) concerns minimum modifications which affect neither safety nor the operational status of the aircraft. Often it deals with the improvement of reliability. An Evaluation SB is used for the evaluation of new materials.

STORES PROCEDURES

Aircraft maintenance operations have various stocking and storage procedures often depending on the size of the maintenance operation and the number of different aircraft serviced. In general, the job of organization and storage of components and materials is performed notby the technician but by parts storage specialists.
Theprocess for requesting a particular part is secured by a part numbering system.

When materials, parts and components are not installed on aircraft, they need to be kept in accordance with storage instructions defined by their manufacturer.

Storage locations of spare parts and aircraft elements are important. They must be clean, ventilated and maintained at a constant temperature with a low
constant percentage of humidity to reduce to a the effect of condensation.

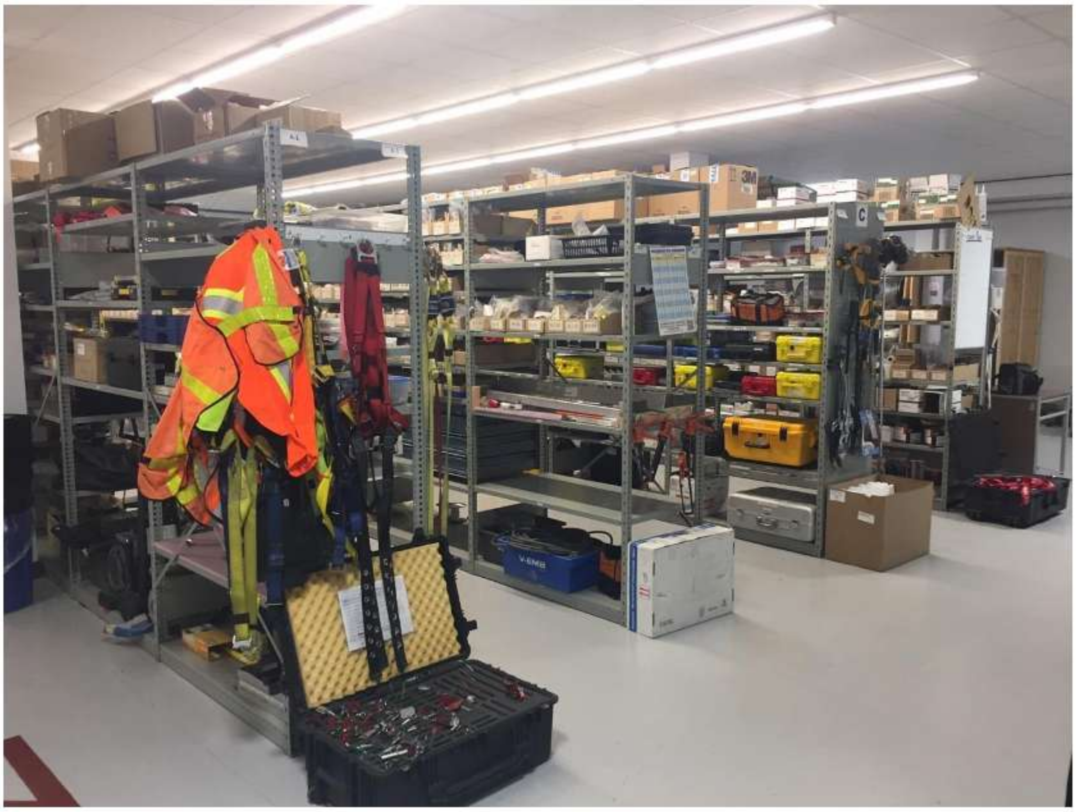
Vapor Phase Inhibitors (VPI) are sometimes used when storing ferrous and other metallic materials susceptible to corrosion. The VPI protects the material from corrosionby saturating the environment around the material with avapor.
Flammable materials have unique storage requirements. Safe fire prevention code compliance must be followed. Many flammable materials are stored in a separate building or part of the hangar. Special storage cabinets are oftenused.

Separation of stocked materials and aircraft parts or components may need to occur. Certain materials have detrimental effects on other materials.

Phenolic plastics must be isolated from steel parts treated with cadmium
to prevent corrosion of the steel parts and magnesium alloys must not be stocked close to inf lammable materials.

Common sense and storage standards are used when storing any material for use on aircraft. Every part, component or material should be handled and stored in a specific manner to preserve it.

The container a part or component is stored in is also of concern. Polyethylene, rigid PVC, undulated plastics or card board boxes can be used. Often a form fitted foam liner securely holds the part in the container. Boxes of cast plastics equipped with movable separators allow the separation of small parts and permits better adapted use of space.



The following is a list of just some of the items used in aircraft maintenance that have specific handling and storage methods:

- Ball-bearings and cylindricalbearings
- Aircraft batteries
- Ropes twisted from hardrubber
- Pressurized gasbottles
- Electrical wires
- Forged, cast and profiledparts
- Instruments
- Oil radiators andradiators
- Paint and coatingmaterial
- Tubes
- Tires
- Pyrotechnicalmaterial
- Parts in hard rubber or containing hardrubber
- Sheet, bars and tubes inmetal
- Spark plugs
- Survival equipment
- (Flexible)reservoirs
- (Rigid)reservoirs
- Wood
- Transparent acrylicpanels
- Windscreens
- Metallic cables

MAINTENANCE INSPECTION/QUALITY CONTROL/QUALITY ASSURANCE

A maintenance inspection/quality control or quality assurance system must be in place at all maintenance organizations.
It should be part of the organizational structure yet independent from the remainder of the maintenance organization to ensure it can carry out the business of quality assurance and conformity for airworthiness without interference.

The quality assurance system includes the following capabilities, functions and procedures:

Delivery, approval or modification ofdocumentation.

Evaluation, audit and inspection of vendors andsubcontractors.
Verification that products, parts, materials and equipments supplied conform to the defined applicable data. (This is for both used and newparts.)
Identification and traceability of parts and components as well asmaintenance performed.
Confirmation of conformance of manufacturingprocesses.
Inspection and testing during flighttests.
Calibration of tools, patterns and testmaterial.
Recording ofnon-conformities.
Holding of historical maintenancerecords.
Qualification and competency of maintenancestaff.
Delivery of airworthinessapprovals.
Handling, storage and packaging of all spare parts, components andmaterials.
Internal quality audits and corrective actions resulting from internalaudits.

The quality assurance system/department ensures work is performed satisfactorily when performed at locations other than the maintenance organization's approved installations. In fact, all maintenance on the aircraft operated by an organization and maintained by a maintenance organization is done under the supervision of the quality assurance system/department of the maintenance organization

ADDITIONAL MAINTENANCE PROCEDURES - UNSCHEDULED MAINTENANCE

Unscheduled maintenance occurs due to failures during operation and from findings during inspections and checks. Typical inspection and check unscheduled maintenance items are:
Corrosiontreatment.
Adjustment or replacement of components that are not performing tostandards.
Repair of structural cracks and deformations out of tolerances inpressurized areas.

It is rare that an aircraft in operation is totally free of faults. Additional maintenance items must be corrected and performed following the procedures of the AMM (Aircraft Maintenance Manual). All maintenance work is entered into the technical logbook and must be accompanied by a certificate of release to service issued by certifying maintenance staff.

Pre-flight and transit checks can be performed by the flight crew and do not require certifying maintenance staff. However, ETOPS operations (Extended Range
Twin-Engine Operational Performance Standards) require that ETOPS approved certifying staff perform these functions before any departure to an ETOPS sector.

All failures found during operation or maintenance are entered into the technical logbook. This is an operational document and not a maintenance document. The person responsible for maintenance operations ensures that following items are entered into logbook:
Type of work (included P/N and S/N in case of equipmentreplacement).
References of the documentationused.
References in case of deferredwork.
Date and place ofwork.
Name of staff responsible for the workperformed

Maintenance on faults and anomalies reported in the logbook is typically performed by the line maintenance staff with follow-up by the quality control department of the maintenance operation.

The repetitive character of a particular failure is not always detectable by line maintenance staff due to the passing of time and the geographical distribution of line stations, etc. It is therefore essential that line maintenance staff accurately report these failures in the logbook so that engineering
services can analyze with precision the repetitive character of these faults.

A safety analysis of an aircraft is made by the manufacturer and is approved by the authorities. A list of equipment indispensable for flight operation is established. This list is called a MMEL (Master Minimum Equipment List) or "No Go" List. Base on the MMEL, a MEL (Minimum Equipment List) unique to each aircraft
permits the aircraft to fly to a base at which a deferred maintenance operation can and must be performed.

The information contained in the MEL document is:
The minimum number of systems which imperatively have to be in a perfect condition to perform a flight.
The operational procedures and/or maintenance operations to compensatetemporarily for the failure of asystem.

The eventual limits to rectify a fault. Line maintenance staff regularly consult the list of deferred maintenance items to ensure that no time required for repair has been exceeded. It is also important to note that the addition of a new deferred maintenance item does not combine with an item alreadydeferred
to exceed the limits spelled out in the MEL, a CDL (Component Deviation List) or a HIL (Hold Item List). Maintenance operators create a logbook entry confirming accomplishment of corrective action to remove an item from the deferred maintenance list.