Chapter 6

9.6 TASKS

Repetitive tasks

Visual inspection

Complex systems

TASKS

Most aircraft maintenance involves replacing and repairing unserviceable parts.

Most activities do involve prior knowledge so that parts, materials, tools and other equipment before the task is started.

- Planning for maintenance, why, what it is required

Planning is critical to making good decisions. And to ensure that qualified **personnel, tools, equipment, material, maintenance data, and facilities are available.**

Lack of required supporting data, facilities, tooling, spares and equipment may mean not possible to complete the task as planned. And maybe:

1, Violations or workaround likely to occur particularly

2, Routine violations may become the norm within an organization during performance of simple maintenance tasks

When working within an organization, an AMT will also be sent on 'type courses':

These courses provide the requisite skills and knowledge to carry out tasks on specific type of equipment.

- Planning of Tasks, Equipment and Spares

1, Planning is critical to making good decisions.

2, ensures there are qualified personnel, tools, equipment, material, maintenance data, and facilities at the right place, at the right time, for the scheduled and, (as much as possible) unscheduled tasks.

Planning should include having knowledge about what relevant resources are available in case they are required.

- Decision making is a critical skill in aviation maintenance Decision making in aviation maintenance: define problem, consider options, select/implement best option, review outcome

KEY POINTS FOR DECISION MAKING IN AVIATION MAINTENANCE:

Decision making include defining the problem, considering the options, selecting and implementing the options available; and reviewing the outcome

Making a decision to address a problem or unexpected situation can add other situational issues, such as stress and time pressures.

Decisions should be informed, should be made based on all the required information available.

best way to invite problems ◊ ALWAYS PLAN BEFORE YOU DO

During a routine inspection a problem is discovered. The problems:

1, Do I know exactly what the task is that must be done?

2, Are the following resources available to do it effectively and accurately within the time permitted?

– Personnel – Equipment/spares – Documentation, information and guidance – Facilities such as hangar space, lighting, etc.

Do I or we have the skills and proficiency necessary to complete the task?.

Blindly starting a task without planning how best to do it is almost certainly the best way to invite problems.

- AMT needs human body capabilities, why, problems (obesity, getting old, staying in shape)

AMTs have a relatively active occupation.

Most tasks tend to have elements of fine motor control, requiring:

Precision

Activities

strength

gross manipulation

The human body is a series of physical links (bones) connected at certain points (joints) that allow various movements.

Muscles provide the motive force for all movements, both:

fine and gross: the musculoskeletal system

As the AMT gets older the musculoskeletal system stiffens and muscles become weaker, injuries become more likely and take longer to heal.

- AMT needs human body capabilities, why, problems (obesity, getting old, staying in shape)

Obesity: limits the physical spaces that can be accessed.

Staying in shape: will minimize the effects of aging and can help make sure that normal weight can be maintained.

Recent awareness of Latent Medical and Environmental Conditions (LMEC):

the tasks on aircraft need to be within the physical limitations of the AMT.

Boeing uses a computerized tool, based on human performance data:

(Body sizes, strengths, leverages, pivots, etc.), to ensure that modern aircraft are designed so that the majority of AMTs will be able to access aircraft equipment, and apply the necessary strength to loosen or tighten objects, etc.

Ease of Maintainability: the ease with which maintenance activities can be performed on an asset or equipment

- Ease of Maintainability Ease of maintainability, definition

  the ease with which maintenance activities can be performed on an asset or equipment

Attempting to lift a heavy object beyond our physical capability may lead to injury

The use of tools generally makes tasks easier and for tasks outside the physical powers

- Physical work causes fatigue, what it is needed. SELUOTION

1, Adequate rest and recovery time between work periods required

2, AMTs should try to take breaks

Missing a break to get a job done within a certain time frame counterproductive due to:

fatigue diminishing motor skills.

Perception

awareness and standards.

Repetitive tasks, danger, success breeds

Repetitive tasks can be tedious and boring.

The main danger with repetitive tasks is that of complacency:

1, AMT practiced the task previously, may NOT use the manual, or use job cards

2, AMT may not be aware of any change in the task

3, Steps may be skipped, or failed to be given due attention, if check something rarely found wrong, damaged, or out of tolerance

Always be wary of changes to procedures or parts, remembering that:

'Success breeds complacency. Complacency breeds failure'. Overconfident.

- Visual inspection, tools, methods

Primary method employed during maintenance to ensure the aircraft remains in an airworthy condition.

Visual inspection: is the process of using the eye, alone or in conjunction with various aids to examine and evaluate the condition of aircraft systems or components

Magnifiers and Borescopes used to improve visual capabilities. Assisted using other senses **(touch, hearing, smell, etc.)**

Technical bulletin important to warn/prepare for known and potential defects.

Blue staining on an aircraft fuselage considered as a not big problem initially, but with technical bulletin information of 'blue ice' external toilet leaks may alert for more serious problem.

Understanding the area, component or system inspected (as specified on the work card)

Making sure environment conducive to the visual inspection (lighting, physical access)

Conduct systematic visual search, moving one's eyes carefully in a set pattern to inspect all parts

Examine thoroughly any potential degradation or defect seen and decide if it is a problem.

Recording all problems found and continue search a few steps prior to where left.

Non-Destructive Inspection (NDI) includes an element of visual inspection, but usually permits detection of defects below visual thresholds.

Use eddy currents and Fluorescent Penetrant Inspection (FPI)

- Complex systems, what is required for complex systems maintenance

All large modern aircraft described as complex systems.

flying controls, landing gear, air conditioning, flight management computers.

Any complex system has a wide variety of inputs.

The system typically performs complex modifications on these inputs, or the inputs may trigger complex responses.

There may be a single output, or many distributed outputs from the system. important

TYPE OF AILERON	NATURE OF SYSTEM
Simple Aileron	Direct connection from control column to control surface; direct movement.
Servo Tab Aileron	Direct connection from control column to servo tab; aerodynamic movement of surface.
Powered Aileron	Connection from control column to servo valve via input; hydraulic movement of surface; feedback mechanism; position indication.
Powered Aileron/Roll Spoiler	As above but with interface to spoiler input system to provide additional roll capability.
Fly-By-Wire Aileron System	No connection from control column to surface. Electrical command signal to electro-hydraulic servo valve on actuator; signal modified and limited by intermediate influence of flight control computer.

specific training needed to maintain complex systems: To understand how the system works and fails, what it is made of, and which components can fail

Written procedures and reference material important source of **guidance**:

1, Describing comprehensively maintenance tasks, such as inspections, adjustments, and tests

2, Describing the relationship of one system to other systems and often most importantly, providing cautions or bring attention to specific areas or components

Working with complex systems, important to make reference to appropriate guidance material:

1, Break down the system conceptually or physically, making it easier to understand and work on.