Unit 71: Inspection and Repair of Airframe Components and Structures

Unit code: A/600/7204

QCF Level 3: BTEC Nationals

Credit value: 10

Guided learning hours: 60

Aim and purpose

This unit will give learners an understanding of the inspection techniques, related procedures and associated documentation necessary to inspect and repair metallic and non-metallic airframes.

Unit introduction

An understanding of the inspection and repair of airframe components and structures is an essential tool for all mechanical aircraft technicians, particularly those involved in the maintenance, manufacture or overhaul of aircraft.

This unit has been designed to provide learners with an understanding of general airframe structural repairs to metallic and non-metallic materials and the inspection techniques needed to identify structural defects. In particular the unit covers aircraft adhesives, bonding and sealants and the detection and rectification of defects on airframe metallic and composite components and structures. Corrosion inspection and non-destructive inspection techniques are covered in detail, together with the use of repair documentation and structural control programmes. Learners will also develop an understanding of structural component disassembly and reassembly techniques and the methods adopted to troubleshoot and fault-find on aircraft structures and structural components.

This unit is closely associated with *Unit 69: Aircraft Workshop Principles and Practice* and *Unit 70: Aircraft Materials and Hardware*, where some of the knowledge from these units is expanded. This unit

The unit covers part of the knowledge required for those taking the European Aviation Safety Agency (EASA) Part 66 examinations.

Learning outcomes

On completion of this unit a learner should:

1 Know about aircraft adhesives, sealants, bonding techniques, repair procedures and the types and detection of defects in aircraft composite materials

2 Understand general airframe structural repairs, the structural repair manual and structural control programmes

3 Understand the nature of airframe structural component inspection, corrosion repair and non-destructive inspection

4 Understand aircraft component disassembly, reassembly and troubleshooting.

Unit content

1 Know about aircraft adhesives, sealants, bonding techniques, repair procedures and the types and detection of defects in aircraft composite materials

Adhesives and sealants: general types of adhesive eg thermoset, thermoplastic polymers, elastomers, wood glues, epoxy resins, phenolic resins, redux; adhesive safety and service conditions; general types of sealant eg silicones, bedding sealants, Thiokol (PRC), room temperature vulcanising (RTV) sealants, Pro-seal PR 1440; use and characteristics of adhesives and sealants eg heat activated, solvent activated, impact activated, solvent cement

Bonding techniques: pre-treatments and surface preparation eg moisture removal, potting surface of adherents, solvent wipe, surface roughening; curing eg activation systems, moisture curing, uv-light, anaerobic reaction, anionic curing (cyanoacrylates); bonding safety and service conditions

Repair procedures: for non-patch and patch repairs eg resin injection (potting or filling), delamination injection, heat treatment, surface coating bonded external patch, bonded scarf, bonded flush, repair curing using the hot bonder or autoclave, bolted external patch; associated safety eg materials data sheets, personal safety with chemicals and matrix materials, solvent use and safety (methyl-ethyl-ketone, acetone), personal safety while cutting and drilling cured and uncured composite materials

Defect types: cause and identification of typical defects eg structural, impact, foreign object, surface, delamination, disbond, void, contamination, water ingress and other environmental conditions

Defect detection: inspection methods and procedures eg tap test, visual inspection, non-destructive inspection (such as thermography, acoustic emission, ultrasonic, radiography (x-ray, gamma-ray)

2 Understand general airframe structural repairs, the structural repair manual and structural control programmes

Airframe structural repairs: structural classification; approved repair information (structural repair manual, authorised repair drawings); preliminary survey of damage, removal of damage, repair report, damage classification eg allowable, repairable by patching, repairable by insertion, repairable by replacement; repair limits for eg cracks, skin panting, bow, dents; major procedural points and safety issues to be considered during repair work eg inspection of rivet/bolt holes, inspection before closing work, repair material compliance, removal of swarf and burrs, need for jury rigging; typical metallic repair procedures eg for patching, insert, repair to bends and flanges; assessment of composite structures for damage and damage limits, repair of minor damage (scratches, pits, dents, small blisters, minor delamination; typical multi-lamination repairs and repairs to honeycomb core and one or both skins, curing repairs

Repair manual: general familiarity and limitations, ATA 100 specification, numbering system (chapter, section, subject, figure); use of the manual (identification of limits of damage, restricted/non-restricted areas, repair classification A,B,C, use of flow charts)

Structural control programmes: definitions eg ageing aircraft, damage tolerant, safe life, fail safe, design economic life, fatigue damage; familiarity with ageing aircraft procedures and programmes for ensuring continued structural airworthiness eg service bulletins (SB), inspection procedures for corrosion prone areas, supplemental structural inspection document (SSID), ageing aircraft repair and modification programme, corrosion prevention and control programme (CPCP) and repair assessment programme (RAP)

3 Understand the nature of airframe structural component inspection, corrosion repair and non-destructive inspection

Component inspection: classify damage as, allowable, repairable or requiring replacement of damaged parts; inspect metallic and non-metallic airframe/airframe components for damage (such as dents, creases, abrasion, scratches, cracks, nicks, holes, delamination, water ingress, crazing, discolouration, heat damage)

Corrosion repair techniques: identify corrosion (such as pitting, surface, dissimilar metal, exfoliation, micro-biological; inspection eg scheduled checks, awareness of corrosion prone areas (such as exhaust, battery compartment, bilge, wheel well, fuel tanks and landing area, galley, toilets, engine frontal area, wing flap and spoiler recesses, external skin); corrosion repair actions/procedures and related safety precautions eg cleaning and striping corroded area, removing corrosion products, neutralising residual material, restoring protective surface films, applying temporary/permanent coatings or paint finishes

Non-destructive inspection: visual inspection methods and their use, hand magnifiers, glasses, borescopes and fibrescopes (such as use and care of instruments, engine borescopes, borescope methods); use, procedure and interpretation of results for the eg, water washable, post emulsifiable, solvent removable and fluorescent dye penetrant methods; use, equipment, procedures and interpretation of results for specialist NDI methods eg magnetic, ultrasonic, eddy current, X-ray and Gamma-ray flaw detection; comparison and advantages/disadvantages of NDI methods

4 Understand aircraft component disassembly, reassembly and troubleshooting

Disassembly and reassembly: relevant safety precautions eg positioning, jacking/trestling aircraft, working clearance for aircraft/component removal/fit, protection of surface finish, jury rigging when removing large components, working at height, use of correct slinging and hoisting points/equipment, correct stowage and care of aircraft panels and cowlings, de-pressurising systems prior to dismantling, care with disconnection/reconnection of control cables, rods and powered flying control units, special precautions associated with critically bolted joints, use of correct insertion and extraction tools for critically bolted joints, use of jointing compounds; removal/fit procedures for eg critically bolted joints, flying controls, cowlings, doors, windscreens, panels, alighting gear, radomes

Troubleshooting: fault finding documentation/information eg aircraft maintenance manual, troubleshooting charts, functional charts and diagrams, structural repair manual, fault/repair charts and records, occurrence reports, examination and test procedures, software-based records and data; fault finding techniques eg interrogation of built-in test equipment (BITE), pilot reports, results of examination, six-point method (collect evidence, analyse evidence, locate fault, determine and remove cause, rectify fault, check/test system), half split method, unit substitution, functional checks and tests

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	**To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:**	**To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:**
P1 describe the characteristics and safety precautions to be observed when handling and using two adhesives and two sealants and detail an aircraft use for each	**M1** assess and classify damage to a given aircraft structure and explain the maintenance actions and related safety considerations necessary to return the aircraft structure to a serviceable condition	**D1** explain the principles of the acoustic emission method and discuss its on-aircraft use for detecting possible failure to airframe structure
P2 describe the procedure and related safety precautions for the pre-treatment and surface preparation of a polymer matrix composite airframe component requiring a potting surface repair	**M2** explain the nature of micro-biological corrosion and the methods used on aircraft to prevent its formation	**D2** explain how x-rays and gamma rays are produced and compare the use and merits of these two types of radiography for identifying defects in aircraft structure.
P3 describe the procedure and related safety precautions for a bonded flush repair to a polymer matrix composite flying control surface	**M3** explain the need for and nature of the safety checks and system tests on removal and after refit of an aircraft flying control surface	
P4 describe an inspection method and describe the procedure and safety precautions to be followed, for the detection of water ingress and for the detection of delamination, on an aircraft composite component	**M4** explain the use of the six-point troubleshooting method for diagnosing, identifying and rectifying a fault with an aircraft's alighting gear.	
P5 explain the need for approved repair information and detail the methods used for classifying airframe structure and structural damage		

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	**To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:**	**To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:**
P6 describe the information that can be found in a structural repair manual and using the manual, detail the repair limits for minor cracks and dents to metallic fuselage skin [IE4]		
P7 define safe life, fail safe and damage tolerant structure and explain the need for and nature of the additional inspection and control programmes used to maintain ageing aircraft		
P8 inspect given aircraft structure for damage and classify the damage as, allowable, repairable or requiring replacement [SM3]		
P9 identify two different types of corrosion and describe the procedure and related safety precautions that must be followed after an on-board battery acid spillage		
P10 explain the use, procedure and interpretation of results for the, boroscope, fluorescent dye penetrant and Ultrasonic methods of non-destructive inspection		
P11 describe the procedures and related safety precautions for, removing a large structural component and for the removal and fit of an aircraft rudder assembly requiring working at height		
P12 explain the use of the maintenance manual in identifying a fault in an aircraft heated windscreen and detail the procedure and related safety precautions necessary to replace the windscreen.		

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

This unit is best delivered in the second year of a BTEC programme, after learners have acquired an understanding of aircraft materials and hardware and basic workshop principles and practice. It could also be usefully delivered in tandem with *Unit 79: Airframe Structural Concepts and Construction Methods*.

The learning outcomes can be delivered in order. The amount of tuition time given to each learning outcome will depend on the needs of individual learners and possibly local aerospace employer requirements, who may have learners attending the programme.

When delivering learning outcome 1, the types of adhesive and sealant, together with their safe handling precautions and application procedures should be emphasised. When using adhesives and sealants for bonding composite materials, mention should be made of the necessary surface treatment and preparation, as well as the curing method used for the bond.

When discussing the use and procedures for the particular types of composite material repairs, emphasis should be put on the safety issues associated with handling and cutting repair materials and with the use of solvents. If possible, a practical approach should be taken when considering the identification and detection of defects in airframe non-metallic composite materials.

When delivering learning outcome 2, emphasis should be placed on the use of and familiarity with the repair manual, associated repair drawings and other sources of information. How particular parts of aircraft structure are classified and the classification and limits associated with airframe damage/defects, needs to be fully understood. Learners are expected to have an understanding of the safety issues associated with the inspection and repair of airframe metallic and composite airframes and/or airframe major components. The amount of time spent delivering the unit content on structural control programmes will depend very much on the needs of the cohort. The content has been written in such a way that the procedural programmes mentioned can have a civil or military bias and can be given a relatively cursory or more in-depth treatment, as needs dictate. However, no matter what approach to delivery is taken, the need for such programmes and the advantages of implementing them, especially those concerned with ageing aircraft, must be fully understood.

When possible, centres would be best advised to adopt a practical approach to the delivery of learning outcome 3. For example, it would be of great benefit to learners, when inspecting and classifying damage to aircraft structures, if they have access to a range of aircraft structural hardware. Access to appropriate hardware would also be of benefit when tutors are delivering the content associated with the identification of the different types of corrosion, the extent of the damage and the repair action necessary to return the structure to an airworthy condition. When delivering the content concerned with non-destructive testing, learners will need to understand the use, procedures and interpretation of results for a range of non-specialist and specialist NDT methods. Having access to a range of NDT equipment will again enhance learning.

For learning outcome 4, visits to an aircraft engineering facility where disassembly/reassembly and troubleshooting associated with aircraft structures and structural components is being undertaken will enhance learners' understanding of the processes used. The depth of coverage of fault-finding techniques may be limited to knowledge of simple techniques such as the use of fault-finding charts or may be extended to an understanding of more sophisticated techniques such as checking the results from an aircrafts on-board acoustic emission system. The depth and breadth of understanding will again be dictated by the needs of the learner. A full understanding of the nature and use of maintenance manuals and other related documentation is required by learners in order to achieve the learning outcome.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

Topic and suggested assignments/activities and/assessment
Whole-class teaching: • introduction to unit content, scheme of work and assessment strategy • use physical examples to explain the types, use, associated safety and service conditions for a range of polymer adhesives and sealants and for the pre-treatment, surface preparation, curing methods and associated safety for adhesive bonding • use physical examples (and where possible demonstrations) to explain and observe the procedures and related safety considerations for a range of repair techniques to composite materials and structures. *Individual learner activities*: • multiple-choice quiz on adhesives, sealants, bonding and repair of composite materials and structures • practical exercises concerning the surface preparation, pre-treatment and curing of bonded joints in composite materials. *Whole-class teaching:* • use physical examples (and where possible demonstration/learner participation) to identify typical defects and detect typical defects in aircraft composite materials and structures. *Individual learner activities*: • identify typical defects in pre-prepared samples or photographs of defects to aircraft composite materials • complete a multiple-choice quiz on types of defect and their detection using visual and non-destructive inspection methods.
Prepare for and carry out **Assignment 1: Aircraft Composites – Nature, Defect Detection and Repair Procedures** (P1, P2, P3, P4).
Whole-class teaching: • explain structural and repair classifications and limitations • explain the damage survey and repair report and the use of the repair manual to determine repair limitation values and information concerning minor repairs • explain typical metallic and composite repair procedures and the use and familiarity with the structural repair manual (including ATA 100 system and/or its military equivalent). *Group activity*: • visit to an aircraft maintenance, repair or overhaul facility to observe and become familiar with typical structural maintenance/repair procedures and use of associated documentation, manuals and repair drawings. *Individual learner activities*: • completion of a formative assignment on aircraft structural repairs and structural control programmes based on visit. *Whole-class teaching:* • use visit as a basis to explain the nature and need for SB, SSID, ageing aircraft modification programmes and corrosion prevention and control programmes (CPCP) and repair assessment programmes (RAP). *Individual learner activities*: • multiple-choice quiz based on structural control programmes.

Topic and suggested assignments/activities and/assessment
Prepare for and carry out **Assignment 2: Airframe Structural Repairs** (P5, P6, P7, M1).
Whole-class teaching: • in a workshop environment explain and demonstrate metallic and non-metallic aircraft component inspection, classify damage and nature of defects. *Individual learner activities*: • for given pieces/areas of airframe structure/components, identify defects and classify damage. *Whole-class teaching:* • in a workshop environment with examples, explain types of corrosion, inspection methods/checks, identification of defects and appropriate repair actions. *Individual learner activities*: • for given pieces/areas of airframe structure/components, identify corrosion type and severity and using appropriate manuals, classify the corrosion damage and write a procedure to return the given example/s to an airworthy condition. *Whole-class teaching:* • in a workshop environment explain and demonstrate non-destructive tests on airframe metallic and non-metallic structure, by visual and specialist means. *Group/individual activities*: • for given airframe/engine components/structure, carry out visual/dye penetrant non-destructive tests and identify defects present and report-on repair actions. *Individual learner activities*: • multiple-choice quiz on airframe structural inspection, corrosion repair and non-destructive inspection.
Prepare for and carry out **Assignment 3: Airframe Inspection, Corrosion Repair and NDT** (P8, P9, P10, M2, D1, D2).
Whole-class teaching: • in an aircraft hangar environment explain and observe aircraft disassembly and reassembly exercises (such as jacking/trestling, major component removal/fit, working at height on airframe structures and components) • observe related safety issues and use of aircraft manuals and other documentation • use appropriate documentation and aircraft hardware to explain the information sources, associated documentation and fault-finding techniques used to locate and determine the cause of faults on aircraft major components and structures. *Individual learner activities:* • complete formative assignment on disassembly/assembly and troubleshooting (as a result of a visit to an appropriate facility or otherwise).
Prepare for and carry out **Assignment 4: Disassembly, Reassembly and Trouble-shooting** (P11, P12, M3, M4).
Feedback on assessment and unit evaluation.

Assessment

It is expected that a range of assessment methods will be used for this unit. Evidence may be gathered from written responses to assignments and formal timed assessment. Evidence from observation records or expert witness testimony may also be appropriate, particularly in order to achieve some of the assessment criteria associated with learning outcome 3.

Four assignments could be used to assess this unit. The first assignment, covering learning outcome 1 could involve a series of written tasks. These will require learners to detail the characteristics, safety precautions and procedures associated with the handling of adhesives and sealants (P1) and with the pre-treatment and preparation for potting repairs to polymer matrix composite (PMC) materials (P2). In addition learners must be able to describe the procedures and related safety precautions for a typical bonded flush repair to a PMC control surface (P3) and detail the method and describe the procedure and related safety issues when detecting water ingress and delamination in an aircraft PMC component (P4).

The second assignment could also involve a series of written tasks. These should give learners an opportunity to demonstrate that they understand the need for approved repair information and can classify airframe structure and structural damage (P5). This will involve an understanding of the information contained within and the use of the repair manual and other aircraft documentation (P6). Learners will also need to demonstrate an understanding of safe-life, fail safe and damage tolerant structure and its relationship to fatigue damage and the additional problems associated with ageing aircraft (P7). An additional task can be set requiring learners to assess and classify damage to aircraft structure and explain the maintenance actions that need to be taken to return the aircraft to an airworthy condition (M1). This will require them to select and consult the appropriate specialist manuals and associated documentation, compare the damage with laid down standards and then consider the most appropriate actions needed to return the structure to a serviceable condition.

A third assignment could cover the requirements of learning outcome 3, which would require learners to carry out a practical inspection of an aircraft structure for damage (P8). This will require centres to have suitable samples of aircraft structure for assessment purposes. The use of photographs for assessing damage is not recommended as dimensions need to be known or measured in order to assess the extent of the damage and to determine if it complies with repair manual requirements. If possible the aircraft structure used for P8 should also include examples of at least two different types of corrosion for learners to identify. They should then describe the related safety issues and procedures that must be followed, after a battery acid spillage onto the aircraft airframe (P9).

Written tasks could be also set as part of the third assignment, requiring learners to explain the use of non-destructive inspection techniques (P10), the nature of micro-biological corrosion and the methods used on aircraft to prevent it (M2). Learners could also be given an investigative task requiring them to write a report on the principles and on-aircraft use of the acoustic emission method for detecting possible failure to airframe structure (D1). This should include the methods by which the output data is obtained and interpreted. They should fully understand how X-rays and Gamma rays are produced (including the equipment used in their production and the related safety issues associated with this equipment). The report should also assess the relative merits and uses for each of these types of radiography, detailing examples of their use (D2). The investigative report covering D1 and D2 could be made a separate assignment if centres prefer.

The fourth assignment could require learners to investigate and report on the procedures and associated safety precautions that must be complied with in order to safely remove large structural components and to remove/fit a rudder assembly, when working at height (P11). Learners must also be able to explain the use of the maintenance manual and show awareness of the related safety precautions concerned with fault identification and replacement of an aircraft heated windscreen (P12). The report should include an explanation of the safety and procedural requirements for the removal and refitting of an aircraft flying control surface (M3), in particular the handling of the surface at removal and the integrity of the attachments and operating devices and the types of functional test/checks required after fit. Learners need to explain the use

of the six-point troubleshooting method for diagnosing, identifying and rectifying a fault with the aircrafts alighting gear (M4). The scenario set for this task may limit the type of fault/s to the undercarriage assemblies themselves, although learners must include the necessary system functional tests and checks required after rectification.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, P4	Aircraft Composites – Nature, Defect Detection and Repair Procedures	A formal assignment requiring learners to respond to written tasks.	Written responses to set written tasks, carried out under controlled conditions.
P5, P6, P7, M1	Airframe Structural Repairs	A formal assignment requiring learners to respond to written tasks.	Written responses to set written tasks, carried out under controlled conditions.
P8, P9, P10, M2, D1, D2	Airframe Inspection, Corrosion Repair and NDT	A two-part assignment, consisting of a practical inspection exercise of aircraft structure (P8) (and possibly identification of two types of corrosion P9), followed by an assignment consisting of set written tasks. Evidence for successful completion of D1 and D2, may be gathered here or a separate investigative assignment could be set.	Evidence gathered by tutor observations and/or learners written report and written responses to set theoretical tasks. If additional investigative assignment option is followed for D1, D2, then a written report resulting from the investigation could be used to provide evidence.
P11, P12, M3, M4	Disassembly, Reassembly and Trouble-shooting	An investigative assignment set in an environment where there is access to specialist aircraft maintenance manuals and related information (and preferably related aircraft hardware).	A written report, based on learners' investigations.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Engineering sector suite. This unit has particular links with:

Level 1	Level 2	Level 3
		Aircraft Materials and Hardware
		Aircraft Workshop Principles and Practice
		Airframe Structural Concepts and Construction Methods
		Aircraft Maintenance Practices

This unit has been mapped against the EASA Part-66 examinations and when taken with *Unit 69: Aircraft Workshop Principles and Practice*, *Unit 70: Aircraft Materials and Hardware*, *Unit 72: Aircraft Maintenance Practice* and *Unit 79: Airframe Structural Concepts and Construction Methods*, covers the knowledge requirements for Modules 6: Aircraft Materials and Hardware and Module 7 Aircraft Maintenance Practices.

The unit also contributes knowledge towards SEMTA Level 3 National Occupational Standards in Aeronautical Engineering, particularly:

- Unit 13: Repairing Airframes and Structures
- Unit 14: Modifying Airframes
- Unit 151: Removing and Replacing Major Assemblies of Aircraft Airframes
- Unit 173: Overhauling Major Components of Aircraft Airframes
- Unit 326: Maintaining Doors on Aircraft
- Unit 327: Maintaining Fuselage, Nacelles/Pylons on Aircraft
- Unit 329: Maintaining Windows on Aircraft.

Essential resources

The following resources are considered the minimum to effectively deliver the unit content:

- a range of aircraft airframe structural components
- physical examples of corrosion to aircraft airframe structures or structural components
- examples of aircraft adhesives, sealants, composite materials and composite airframe components
- access to specialist repair manuals, maintenance manuals and related inspection procedures and other documentation.

Employer engagement and vocational contexts

Liaison with employers can help centres provide learners with industrial experience and access to resources that may not be available at the centre. Much of the work for this unit can be set in the context of learners' work placements or be based on case studies of local employers. Further information on employer engagement is available from the organisations listed below:

- Work Experience/Workplace learning frameworks – Centre for Education and Industry (CEI – University of Warwick) – www.warwick.ac.uk/wie/cei/
- Learning and Skills Network – www.vocationallearning.org.uk
- Network for Science, Technology, Engineering and Maths Network Ambassadors Scheme – www.stemnet.org.uk
- National Education and Business Partnership Network – www.nebpn.org
- Local, regional Business links – www.businesslink.gov.uk
- Work-based learning guidance – www.aimhighersw.ac.uk/wbl.htm

Indicative reading for learners

Textbooks

Crane D – *Airframe Volume 1: Structures* (Aviation Supplies and Academics, 2007) ISBN 9781560275480

Other

ATA – 100 Series, specialist manuals and publications from the Joint Aviation Authority sanctioned by the European Aviation Safety Agency (Civil)

Air Publications – 101 series of manuals and aircraft engineering publications (Military)

Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

Skill	When learners are ...
Independent enquirers	analysing and evaluating information that can be found in a structural repair manual, judging its relevance and value
Self-managers	organising time and resources, prioritising actions when inspecting an aircraft structure for damage.

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Reflective learners	setting goals with success criteria for their development and work
Team workers	collaborating with others when working in groups to inspect aircraft structures for damage
Self-managers	anticipating, taking and managing risks when inspecting aircraft structures.

Functional Skills – Level 2

Skill	When learners are ...
English	
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	researching and investigating airframe inspection and maintenance techniques
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	describing the procedures and related safety precautions for inspecting and maintaining airframe components and structure.