

Aircraft Mechanics NOC 7315

Introduction

Aircraft mechanics maintain, repair, overhaul, modify and test aircraft structural, mechanical and hydraulic systems. They are employed by aircraft manufacturing, maintenance, repair and overhaul establishments and by airlines, the armed forces and other aircraft operators.

The three most important essential skills are:

1. Reading
2. Document Use
3. Thinking (Critical Thinking)

Note: Each Essential Skills task is followed by a number in brackets, e.g., (2). This number reflects the estimated complexity rating for that task. The actual complexity rating may vary in some workplaces.

A. Reading	
Typical: 1 to 4	Most Complex: 4
Examples	
<ul style="list-style-type: none">• Read instructions on labels and product packaging, e.g., read instructions on product labels to learn application and safe storage procedures. (1)• Read short notes and text entries on forms, e.g., read notes on snag and defect cards to learn about non-routine repairs to be performed, and text entries on requisition forms to determine the delivery time and availability of parts. (2)• Read safety-related information, e.g., read Material Safety Data Sheets (MSDS) to learn how to safely handle products such as aviation hydraulic fluids like Skydrol. (2)• Read memos and notices, e.g., read memos and notices from their employers to learn about matters such as changes to their organizations' reporting procedures, hours of work and upcoming training. (2)• Read sequenced instructions, e.g., read sequenced instructions to learn how to switch internal relays on and off in programmable logic controllers. (2)• Read newsletters, periodicals and trade magazines, e.g., read articles in publications such as <i>Wings</i> and <i>Aircraft Maintenance Technology</i> to learn about new data link devices. (3)• Read maintenance reports and instructions on work orders, e.g., read maintenance reports to learn about work performed previously on aircraft they are to service. (3)• Read detailed technical service bulletins, e.g., read technical service bulletins issued by aircraft manufacturers to learn about faulty wiring harnesses. (3)• Read air worthiness directives, e.g., read air worthiness directives from Transport Canada to learn about new regulations for the inspection of tail rotors on helicopters. (3)• Read a wide variety of operating, repair, maintenance, testing and quality control manuals, e.g., read complex aircraft maintenance manuals to troubleshoot and repair faults, and carry out maintenance activities. (4)• Read and interpret a variety of regulations, e.g., read regulations issued by Transport Canada to	

learn about changes to Aviation Occupational Health and Safety Regulations. (4)				
Reading Summary				
Type of Text	Purpose for Reading			
	To scan for specific information/To locate information	To skim for overall meaning, to get the 'gist'	To read the full text to understand or to learn	To read the full text to critique or to evaluate
Forms	?			
Labels	?			
Notes, Letters, Memos	?	?		
Manuals, Specifications, Regulations	?	?	?	
Reports, Books, Journals				

B. Document Use	
Typical: 1 to 4	Most Complex: 4
Examples	
<ul style="list-style-type: none"> • Observe warning signs and hazard icons on labels, material packaging and technical drawings, e.g., identify hazards by observing signs located near propellers and rotors. (1) • Scan labels on product packaging, equipment and technical drawings to locate data such as dimensions, part identification numbers and operating specifications. (1) • Scan gauges and digital readouts for operating data such as revolutions per minute, electrical readings, torque and thrust forces. (1) • Locate data in graphs, e.g., use engine performance graphs to locate expected engine operating specifications at various altitudes and temperatures. (3) • Complete entry forms such as log-in sheets, work orders, maintenance records, assembly checklists, inspection worksheets, inventory tracking documents and release forms, e.g., use inspection worksheets to record dates, service intervals, part identification numbers and numerical data such as the specifications and quantities of parts. (3) • Obtain data from a wide variety of lists, schedules and tables, e.g., identify times, dates and tasks to be carried out in detailed maintenance timelines and schedules. (3) • Interpret assembly drawings, e.g., use assembly drawings to identify the order and positioning of parts when reassembling cabinetry in kitchen galleys. (4) • Interpret schematic drawings, e.g., use complex process schematics for aircraft hydraulic, cooling, fuel and electrical systems to learn how these systems operate and to identify circuits and devices. (4) • Interpret scale drawings, e.g., use detailed scale drawings to locate ventilation system components. (4) 	
Document Use Summary	
<input checked="" type="checkbox"/>	Read signs, labels or lists.
<input checked="" type="checkbox"/>	Complete forms by marking check boxes, recording numerical information or entering words, phrases, sentences or text of a paragraph or more.

<input checked="" type="checkbox"/>	Read completed forms containing check boxes, numerical entries, phrases, addresses, sentences or text of a paragraph or more.
<input checked="" type="checkbox"/>	Read tables, schedules or other table-like text (e.g., read production schedules).
<input checked="" type="checkbox"/>	Enter information on tables, schedules or other table-like text.
<input checked="" type="checkbox"/>	Recognize common angles such as 15, 30, 45 and 90 degrees.
<input checked="" type="checkbox"/>	Draw, sketch or form common shapes such as circles, triangles, spheres, rectangles, squares, etc.
<input checked="" type="checkbox"/>	Interpret scale drawings (e.g., floorplans or maps).
<input checked="" type="checkbox"/>	Take measurements from scale drawings.
<input checked="" type="checkbox"/>	Make sketches.
<input checked="" type="checkbox"/>	Obtain information from sketches, pictures or icons (e.g., computer toolbars).

C. Writing	
Typical: 1 to 3	Most Complex: 3
Examples	
<ul style="list-style-type: none"> Write brief reminders and notes, e.g., write notes to remind themselves of upcoming deadlines. (1) Write brief e-mail to request and provide information, e.g., write e-mail messages to supervisors and human resource departments to comment on work conditions and make enquiries about hours of work and holiday schedules. (2) Write text entries for a variety of maintenance, quality control, inspection and accident reporting forms, e.g., complete maintenance report forms to record the work they performed, the materials used and observations of defects such as dented fuselages. (2) Write detailed logbook entries, e.g., write detailed comments in logbooks to describe the condition of parts and to record inspection outcomes. (3) May write longer reports to describe faults and their effects on production, e.g., write detailed reports that discuss the need for unusual repairs, the timelines that will be affected and the additional costs that will be incurred. (3) 	

Writing Summary

Length	Purpose for Writing						
	To organize or remember	To keep a record or document	To inform or request information	To persuade or justify a request	To present an analysis or comparison	To present an evaluation or critique	To entertain
Text requiring less than one paragraph of new text	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Text rarely requiring more	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

than one paragraph							
Longer text		?	?				

D. Numeracy	
Typical: 1 to 3	Most Complex: 3
Examples	
Money Math	
<ul style="list-style-type: none"> • Not a requirement for this occupation. 	
Scheduling, Budgeting and Accounting Math	
<ul style="list-style-type: none"> • Not a requirement for this occupation. 	
Measurement and Calculation Math	
<ul style="list-style-type: none"> • Measure aircraft parts and components using measuring tools such as rulers, protractors and gauges, e.g., use gauges to measure pressure supplied by pumps, compressors and air exchange units. (1) • Calculate amounts for mixtures and solutions, e.g., mix ingredients at specific ratios to create items such as fillers and adhesives. (2) • Calculate dimensions, weights, volumes and other specifications for aircraft components and systems, e.g., calculate total weights for custom components installed in aircraft, rotor balance points and the areas of fuselages, wings and rotors. (3) • Take a variety of precise measurements using specialized measuring tools, e.g., use bore gauges and micrometers to measure inside diameters of cylinder bores and outside diameters of pistons. (3) 	
Data Analysis Math	
<ul style="list-style-type: none"> • Compare data such as operating hours, landing cycles, pressures, thrust, horsepower, acidity, revolutions per minute, and air and ground speed to specifications. (1) • Calculate summary measures to monitor the progression of faults and wear, e.g., average multiple pressure readings to determine the severity of tire valve defects. (2) • Analyze measurements and instrument readings to determine the operating condition of aircraft and aircraft components and to troubleshoot faults, e.g., analyze multiple counterweight angle measurements to determine whether average values are within allowable tolerances. (3) 	
Numerical Estimation	
<ul style="list-style-type: none"> • Estimate time required to complete aircraft repairs and modifications. They consider the requirements of the tasks, the availability of parts and the time required to complete similar jobs in the past. (2) • Estimate the percentage of wear and useful life remaining for parts such as tires, valves, shocks, batteries and brake pads. They consider the extent of wear and the parts' operational lives. (2) 	

Math Skills Summary	
a. Mathematical Foundations Used	
Whole Numbers	Read and write, count, round off, add or subtract, multiply or divide whole numbers, e.g., read part numbers; count landing and take-off cycles; add and subtract inventory.
Integers	Read and write, add or subtract, multiply or divide integers, e.g., read and write temperature readings; identify forward and reverse angles for propeller pitches.
Fractions	Read and write, add or subtract fractions, multiply or divide by a fraction, multiply or divide fractions, e.g., read and write part specifications and tool sizes in fractions of inches; add and subtract fractions of inches to determine thicknesses and clearances.
Decimals	Read and write, round off, add or subtract decimals, multiply or divide by a decimal, multiply or divide decimals, e.g., read and write measurements on forms, charts, tables and drawings; add, subtract and multiply decimals to determine volumes, thicknesses, clearances and areas.
Percent	Read and write percents, calculate the percent one number is of another, calculate a percent of a number, e.g., read percents on engine performance reports; identify parts' wear and defects as percentages; calculate percentage increases in horsepower and thrust.
Equivalent Rational Numbers	Convert between fractions and decimals or percentages. Convert between decimals and percentages, e.g., convert between fractions and decimals to select correctly sized drill bits; convert between decimals and percentages to calculate rates of fuel consumption.
Equations and Formulae	Solve problems by constructing and solving equations with one unknown. Use formulae by inserting quantities for variables and solving, e.g., use power loss formulas to calculate electrical loads.
Use of Rate, Ratio and Proportion	Use rates, ratios and proportions, e.g., use rates to determine the weight of fuel burned by an engine per hour.
Measurement Conversions	Perform measurement conversions, e.g., convert dimensions from inches to centimetres and millimetres; convert distances from miles to kilometres; convert pounds per square inch to kilograms per square centimetre; convert volume and displacement specifications from cubic inches to litres.
Areas, Perimeters, Volumes	Calculate areas, perimeters and volumes, e.g., calculate the area of fuselages and wings; calculate the perimeter of blades and rotors; calculate the volume of fuel and water tanks.
Geometry	Use geometry, e.g., use geometric construction methods to align engines with wings and aircraft bodies.
b. Measurement Instruments Used	
Examples	
<ul style="list-style-type: none"> • Time using clocks, watches and stop watches. • Weight and mass using triple-beam balances and electronic scales. • Distance and dimension using tapes, callipers, dial indicators, bore gauges, feeler gauges, verniers and micrometers. 	

- Liquid volume using graduated containers.
- Temperature using thermometers, electronic sensors and gauges.
- Pressure using pressure gauges, vacuum gauges and manometers.
- Electrical potential (volts) using multimeters.
- Wattage using wattmeters.
- Angles using protractors, inclinators and profile boards.
- Density using hydrometers.
- Air-to-fuel ratios using gas analyzers.
- Surface tension in dynes using tensiometers.
- Acidity using pH test strips.
- Speed using speedometers and pitot tubes.
- Use the SI (metric) measurement system.
- Use the imperial measurement system.

E. Oral Communication

Typical: 1 to 3

Most Complex: 3

Examples

- Listen to announcements made over public address systems. (1)
- Discuss parts and supplies with storekeepers and parts clerks, e.g., speak with aviation partspersons to ascertain the availability of parts and supplies. (1)
- Talk to supervisors about a variety of topics such as assignments, hours of work, work loads, safety protocols and housekeeping practices. (2)
- Exchange information with flight schedulers, e.g., talk to flight schedulers to determine the arrival and departure times of planes and to update them on the status of emergency repairs so departure times can be scheduled. (2)
- Communicate with aircraft owners and pilots to answer questions, explain maintenance procedures and gather information, e.g., gather detailed information from aircraft owners and pilots to determine repair requirements. (2)
- Exchange technical repair and troubleshooting information with apprentices, co-workers, supervisors and manufacturers' service representatives, e.g., explain to apprentices how control cables are correctly tightened and talk to technical representatives from aircraft manufacturers to learn how to troubleshoot unusual faults. (3)

Oral Communication Summary

Type	Purpose for Oral Communication (Part I)					
	To greet	To take messages	To provide or receive information,	To seek, obtain information	To co-ordinate work with that of others	To reassure, comfort

			explanation, direction			
Listening (little or no interaction)			?	?		
Speaking (little or no interaction)			?	?	?	
Interact with co-workers			?	?	?	
Interact with those you supervise or direct			?	?	?	
Interact with supervisor/manager			?	?	?	
Interact with peers and colleagues from other organization			?	?	?	
Interact with customers/clients/public			?	?	?	
Interact with suppliers, servicers			?	?	?	
Participate in group discussion			?	?	?	
Present information to a small group						
Present information to a large group						
	Purpose for Oral Communication (Part II)					
Type	To discuss (exchange information, opinions)	To persuade	To facilitate, animate	To instruct, instill understanding, knowledge	To negotiate, resolve conflict	To entertain
Listening (little or no interaction)						
Speaking (little or no interaction)						
Interact with co-workers	?			?		
Interact with those you supervise or direct	?			?		
Interact with supervisor/manager	?	?		?		
Interact with peers and colleagues from other organization	?			?		
Interact with customers/clients/public	?	?		?	?	
Interact with	?				?	

suppliers, servicers						
Participate in group discussion	?				?	
Present information to a small group						
Present information to a large group						

F. Thinking	
Typical: 1 to 3	Most Complex: 3
a. Problem Solving	
Examples	
<ul style="list-style-type: none"> Encounter incorrectly completed and inadequately documented repairs. They report documentation problems to supervisors and restart their work once the required documentation is available. (1) Have to delay jobs due to equipment breakdowns and lack of parts. They inform supervisors of the delays and carry out other work until equipment repairs are completed and the needed parts arrive. (2) Are unable to complete and inspect repairs because data such as specifications and instructions are unavailable. They consult with service managers, co-workers, suppliers and colleagues for advice, and research websites to locate useable information. (2) Are unable to meet repair and inspection deadlines due to scheduling changes and heavy workloads. They enlist the help of co-workers, work overtime to complete high priority work and ask supervisors to prioritize repairs. (2) 	
b. Decision Making	
Examples	
<ul style="list-style-type: none"> Decide to replace, refurbish and repair parts, e.g., decide to replace parts that are worn beyond allowable specifications. (1) Select the parts, tools and equipment required to perform tasks and determine the order in which repairs are carried out. They consider the scope of repairs, manufacturers' specifications, availability of parts and equipment, and procedures established by regulatory bodies. (2) Select the service, reporting and inspection procedures required for various types of repairs. They consider their own certification levels, types of repairs being performed and the regulations and protocols established by employers, regulatory bodies and manufacturers. (2) May decide to issue airworthiness certificates, e.g., consider the results of repair and maintenance activities, and the dangers posed by deficiencies before allowing aircraft to fly. (2) 	
c. Critical Thinking	
Examples	

- Judge the accuracy of readings taken using diagnostic equipment, e.g., evaluate the accuracy of navigational diagnostic testing equipment readings by screening sets of readings for anomalies. (1)
- Judge the condition of aircraft parts and components. They consider parts' service lives, the presence of defects such as dents, loose connections and contamination, and the degree to which parts meet specifications for parameters such as size, pressure and electrical output. (2)
- May evaluate the performance of apprentices. They consider apprentices' abilities to follow proper record keeping, testing and repair protocols, diagnose and troubleshoot faults, locate information such as specifications and complete repairs efficiently. (2)
- Evaluate the severity of defects and the effects they will have on the safe operation of aircraft, e.g., evaluate the effects that hail and bird strikes have on the structural integrity of components such as engine inlets. (3)
- Evaluate the quality and adequacy of completed repairs, e.g., evaluate their own work by considering the degree to which they followed proper repair and test protocols, the quality of workmanship and the results of post-repair inspections and tests. (3)

d. Job Task Planning and Organizing

Own Job Planning and Organizing

They organize their daily job tasks to accomplish the work assigned to them by supervisors and schedulers. They are generally assigned one work order at a time but may be required to plan tasks for multiple repair jobs and to ensure the efficient use of labour, parts and equipment. Those working in line-maintenance departments are frequently required to modify job task plans to perform and inspect repairs to aircraft that are unexpectedly grounded due to serious mechanical faults. (2)

Planning and Organizing for Others

They may organize the activities of apprentices and helpers to ensure tools and equipment are used properly and that regulations established by employers, manufacturers and certifying bodies are followed. (2)

e. Significant Use of Memory

Examples

- Remember a system's basic parameters and operating tolerances.
- Remember the faults associated with error and trouble codes for various types of equipment.

f. Finding Information

Examples

- Find information about aircraft maintenance and repair histories by speaking with aircraft owners, pilots, supervisors and co-workers and by reviewing previously completed work orders, snag cards and maintenance logs. (2)
- Find information about repair and reporting procedures. They discuss problematic repairs with co-workers and supervisors. They read service manuals, process standards documents and updates, bulletins, special instructions and airworthiness directives issued by engineers, manufacturers and Transport Canada. (2)

- Find information about needed repairs and maintenance tasks. They review maintenance logs, work orders and snag cards, and collect data from onboard computers and databases. They speak with supervisors, co-workers and pilots. They conduct diagnostic tests and perform extensive inspections. (3)

G. Working With Others

Aircraft mechanics usually work independently to perform their job tasks but may be assigned jobs that require two or more workers to complete. They coordinate job tasks with parts clerks, avionics, propulsion and instruments technicians, schedulers, dispatchers and other aircraft mechanics and aircraft inspectors to ensure repairs are completed properly, and shop space and tools are used efficiently. (2)

Participation in Supervisory or Leadership Activities

✓	Monitor the work performance of others.
✓	Inform other workers or demonstrate to them how tasks are performed.
✓	Orient new employees.
X	Make hiring recommendations.
✓	Assign routine tasks to other workers.
X	Assign new or unusual tasks to other workers.
✓	Identify training that is required by, or would be useful for, other workers.
X	Deal with other workers' grievances or complaints.

H. Digital Technology

Typical: 1 to 3

Most Complex: 3

Examples

Word Processing

- Not a requirement for this occupation.

Spreadsheet Software

- Not a requirement for this occupation.

Bookkeeping, Billing and Accounting Software

- Not a requirement for this occupation.

Communication Software

- Use communications software, e.g., use email applications to exchange information and documents with co-workers, supervisors, engineers and manufacturers. (2)

Data Bases

- Use databases to access information, e.g., access their organization's databases to locate inventories and flight schedules, and to retrieve specifications and technical drawings. (2)
- Use databases to input information, e.g., input information into databases to complete a variety of entry forms such as snag cards, maintenance logs and airworthiness reports. (2)
- Use databases to optimize workflow, e.g., use corporate aircraft maintenance planning software to access the maintenance schedules required by manufacturers. (3)

Presentation Software

- Not a requirement for this occupation.

Graphics Software

- May use graphics software, e.g., use graphics software incorporated into scan tools to access data displays such as signal values. (2)

Internet

- Use the Internet to access training courses and seminars offered by training institutions, unions, suppliers and employers. (2)
- Use Internet browsers and search engines to access technical service bulletins, electrical codes, specifications and troubleshooting guides. (2)
- Use Internet browsers to access and share information on Web forums and blogs. (2)
- Search through Internet websites and navigate several menus to locate technical data such as pin assignments on integrated circuit chips. (2)

Programming and System Design

- Upload data from onboard computers, e.g., upload data and trouble codes from onboard computers to determine an aircraft's operating conditions and status. (1)
- Download programs onto onboard computers, e.g., use laptops supplied by manufacturers to upload updates to navigation-related programs onto onboard computers. (1)
- May install and service distributed control system (DCS) software to control system parameters such as speeds, outputs, pressures and temperatures. (3)

Other Digital Technology

- Use diagnostic equipment such as dynamometers to troubleshoot and repair engine faults. (1)
- Use electronic scanning equipment to access data such as fault codes from onboard computers and sensors. (1)
- Use a variety of digital hand such as multimeters. (1)
- Use built-in flight test equipment to troubleshoot faults and access trouble codes, e.g., use onboard test equipment to interrogate onboard systems and isolate electrical faults. (2)

I. Continuous Learning

Aircraft mechanics must continually update their technical skills and keep abreast of changes to regulations and repair procedures. They are required to re-certify competencies and complete varying amounts of technical and safety training yearly in accordance with guidelines established by manufacturers, employers and certifying bodies such as Transport Canada. They keep up to date on changes to regulations by speaking with supervisors, co-workers and colleagues and by reading service letters, updates, aircraft maintenance manuals, bulletins and restriction directives, airworthiness directives and quality instructions. (3)

How Learning Occurs

Learning may be acquired:

<input checked="" type="checkbox"/>	As part of regular work activity.
<input checked="" type="checkbox"/>	From co-workers.
<input checked="" type="checkbox"/>	Through training offered in the workplace.
<input checked="" type="checkbox"/>	Through reading or other forms of self-study <ul style="list-style-type: none">• at work.• on worker's own time.• using materials available through work.• using materials obtained through a professional association or union.• using materials obtained on worker's own initiative.
<input checked="" type="checkbox"/>	Through off-site training <ul style="list-style-type: none">• with costs paid by the worker.

J. Other Information

In addition to collecting information for this Essential Skills Profile, interviews with job incumbents also covered the following topics.

Physical Aspects

Aircraft mechanics require good upper limb, multiple limb and hand-eye coordination. They stand, bend, stretch, balance and kneel when repairing and inspecting aircraft. They may be required to lift heavy objects such as aircraft windscreens and tires. They use their sense of hearing, sight, smell and touch to determine the operating condition of parts and detect faults. Colour vision is essential for work on colour coded wiring.

Attitudes

Aircraft mechanics need to be perfectionists with high professional standards.