

Outdoor power equipment technician (NOC 7335)

Introduction

Outdoor power equipment technicians test, repair and service all-terrain vehicles, snowmobiles and other outdoor equipment. They are employed by dealer service shops and by independent service establishments.

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 3			Most Complex: 3	
Examples				
<ul style="list-style-type: none"> • Read instructions on labels and product packaging, e.g., read handling and storage instructions on the labels of flammable products. (1) • Read comments on work orders, e.g., read descriptions of equipment faults on work orders. (1) • Read magazines and promotional materials, e.g., read brochures from a wide variety of manufacturers and suppliers to learn about equipment, tools and accessories. (2) • Read memos from managers and supervisors, e.g., read notices from supervisors to learn about changes to hours of work, billing practices and equipment purchases. (2) • Read manufacturers' notices and technical service bulletins, e.g., read bulletins to learn about upcoming training events, equipment recalls and changes to warranty programs. (2) • Read repair manuals, e.g., read repair manuals to learn the sequenced tasks needed to overhaul gas and diesel-powered engines. (3) 				
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"> • Identify symbols located on labels, signs, material packaging, schematics and technical drawings, e.g., identify symbols on technical drawings and schematics to determine current types, polarities, centrelines and rotation directions. (1) • Locate data such as parts numbers, serial numbers, dimensions, capacities and operating specifications on labels, e.g., locate parts numbers on spark plug packaging. (1) • Interpret flowcharts, e.g., interpret multi-step flowcharts to learn how to troubleshoot faulty electrical systems. (2) • Complete entry forms, e.g., record part identification numbers, dates, times, dimensions, quantities and unit prices on work orders. (2) • Obtain information from lists and tables, e.g., locate dates, model numbers, ignition types, horsepower and torque ratings, compression ratios, stroke lengths and other data in parts lists and specification tables. (3) • Use a variety of assembly drawings, e.g., examine engine assembly drawings to identify the correct position of covers, gaskets, bearings, sprockets, snap rings, springs and bushings. (4) • Study schematics, e.g., review schematics for electronic systems to troubleshoot faults with switches, voltage regulators, starters and alternators. (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 2	Most Complex: 2
Examples	
<ul style="list-style-type: none"> • Write brief reminder notes, e.g., write brief instructions in logbooks to remind themselves of how to reassemble components such as carburetors, alternators, engines and gearboxes. (1) • Write short notes and comments on warranty claim forms and work orders, e.g., record their observations and describe the condition of parts and equipment on work orders, and justify warranty coverages on claim forms. (2) • Write e-mail, e.g., write e-mail to equipment manufacturers to request information about upcoming training and to clarify service bulletins and recall notices. (2) 	

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	?	?	?	?			
Text rarely requiring more than one paragraph	?	?	?	?			
Longer text		?	?				

D. Numeracy	
Typical: 1 to 3	Most Complex: 3
Examples	
<p>Money Math</p> <ul style="list-style-type: none"> • Not a requirement for this occupation. <p>Scheduling, Budgeting and Accounting Math</p> <ul style="list-style-type: none"> • Not a requirement for this occupation. <p>Measurement and Calculation Math</p> <ul style="list-style-type: none"> • Take a variety of measurements using gauges, e.g., measure battery and charging system voltages, pressures supplied by pumps and compressors, and the temperatures of cooling systems. (1) • Take a variety of dimension measurements using basic hand tools, e.g., measure parts using tape measures. (1) • Calculate amounts of coolants, and oil and gas mixtures, e.g., mix antifreezes and two-stroke engine fuels to specified ratios. (2) • Take a variety of measurements using specialized measuring tools, e.g., use micrometers, bore 	

gauges and calipers to precisely measure the dimensions of pistons, cylinder bores, bearings and shafts. (3)

Data Analysis Math

- Compare measurements of pressure, distance, temperature, torque, voltage and amperage to specifications, e.g., compare measurements of pressure to original equipment manufacturers' specifications to determine the condition of pumps. (1)
- Analyze compression, pressure, temperature, power, torque and electrical energy measurements, e.g., compare a series of pressure readings produced by pumps, compressors and pistons operating at various speeds to troubleshoot equipment and part faults. (3)

Numerical Estimation

- Estimate the time required to complete repairs, e.g., consider the requirements of the tasks, the time taken to complete similar tasks in the past and the availability of parts. (1)
- Estimate percentage of wear and remaining life for a wide variety of parts including batteries, hoses and shafts. (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 and count parts.
Integers	Read and write, add or subtract, multiply or divide integers, e.g., read and write voltages and temperatures.
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 in fractions of inches; add and subtract fractions of inches to determine thicknesses, gaps 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 dimensions in thousandths of inches and millimetres; add, subtract and multiply decimals to determine thicknesses, gaps and clearances.
Percent	Read and write percents, calculate the percent one number is of another, calculate a percent of a number, e.g., estimate the percentage of wear on components such as brake calipers and tires.
Equivalent Rational Numbers	Convert between fractions and decimals or percentages. Convert between decimals and percentages, e.g., convert tool and drill bit diameters between fractions and decimal equivalents.
Equations and Formulae	Use formulae by inserting quantities for variables and solving, e.g., use formulae to calculate voltage drops, resistances and required amperages.
Measurement Conversions	Perform measurement conversions, e.g., convert pounds per square inch to kilograms per square metre; convert bolt and bit dimensions from inches to centimetres and millimetres; convert miles to kilometres.
Areas, Perimeters, Volumes	Calculate areas and volumes, e.g., calculate the required volume of gasoline additives, antifreeze, engine coolants and oil lubricants.

Summary Calculations	Calculate averages, e.g., For example, calculating averages across set of readings and measurements to troubleshoot faults.
b. Measurement Instruments Used	
Examples	
<ul style="list-style-type: none"> • Time using clocks and watches. • Distance or dimension using micrometers, dial gauges, tapes, spacers, feeler gauges, brass gauges and Vernier calipers. • Liquid volume using dip sticks, graduated beakers and measuring cups. • Temperature using thermometers, heat gauges and electronic sensors. • Pressure using pressure, vacuum and compression gauges. • Electrical potential (volts) using multimeters. • Revolutions per minute using tachometers. • Kilometres and miles per hour using speedometers. • Rotational force in foot pounds and Newtons using torque wrenches. • Use the SI (metric) measurement system. • Use the imperial measurement system. 	

Your comments:

E. Oral Communication						
Typical: 1 to 3				Most Complex: 3		
Examples						
<ul style="list-style-type: none"> • Listen to announcements made over public address systems. (1) • Discuss repair parts and supplies with partspeople and suppliers, e.g., talk with parts people to determine prices and availabilities for small engine parts. (1) • Talk to co-workers and supervisors about a wide range of subjects, e.g., discuss repair procedures and work processes at staff meetings, and talk about assignments and deadlines with supervisors. (2) • May discuss repairs with customers, e.g., speak with customers to discuss costs and time estimates for repairs and to explain maintenance schedules and procedures. (2) • Exchange detailed repair information with manufacturers' technical support representatives and other small engine mechanics, e.g., phone help lines to discuss unusual electrical, cooling and hydraulic system faults with manufacturers' technical support representatives. (3) 						
Oral Communication Summary						
Type	Purpose for Oral Communication (Part I)					
	To greet	To take messages	To provide or receive information, explanation,	To seek, obtain information	To co-ordinate work with that of others	To reassure, comfort

			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"> Find that they have missed repair deadlines. They inform supervisors and customers to explain why deadlines were missed and to adjust work schedules to complete the work as quickly as possible. (1) Are unable to repair small engines because repair parts and data such as specifications and instructions are unavailable. They contact specialty suppliers for rare and out-of-production parts and sometimes fabricate parts that are not available. They find specifications and instructions by consulting customers, service managers, co-workers, colleagues, suppliers and manufacturers. (2) 	
b. Decision Making	
Examples	
<ul style="list-style-type: none"> Decide which tools to use in order to troubleshoot, repair and maintain small engines and equipment, e.g., consider the type of small engines and equipment being serviced and the nature of the repairs. (1) Choose among refurbish, repair and replacement options for worn and broken parts and equipment. (2) Decide the most efficient course of action to complete particular jobs, e.g., determine troubleshooting and repair sequences to efficiently diagnose and repair faults. (3) 	
c. Critical Thinking	
Examples	
<ul style="list-style-type: none"> Evaluate the suitability of shop tools, diagnostic equipment, repair parts and supplies, e.g., judge the suitability of parts, materials and supplies such as spark plugs and lubricants, paying particular attention to ease of installation and improved equipment performance. (2) Assess the condition of small engine parts and components, e.g., assess the condition of engines by reviewing manufacturers' specifications, taking direct measurements and inspecting parts visually. (2) Evaluate the quality of repairs, e.g., inspect repairs for misaligned belts and pulleys, excessive noise and vibrations, unusual fumes and leaking seals, connections and hoses. (3) 	
d. Job Task Planning and Organizing	
Outdoor power equipment technicians organize their daily activities according to the work assigned to them by supervisors. They schedule their activities and organize repair tasks to ensure the	

efficient use of labour, parts and equipment. (2)

Own Job Planning and Organizing

Outdoor power equipment technicians may plan the job tasks of helpers and apprentices to ensure the efficient completion of repairs, housekeeping duties and effective use of tools. (2)

e. Significant Use of Memory

Examples

- Remember equipment operating parameters.
- Remember previous repairs that give insight into current jobs of a similar nature.

f. Finding Information

Examples

- Find information on stickers, labels, assembly drawings, repair manuals and websites to determine proper use, application and installation of parts and supplies. (1)
- Find operational information about equipment by reviewing displays on computerized scanning equipment, onboard sensors and hand-held diagnostic tools. (1)
- Locate information about repairs, e.g., review work orders, recall notices and service bulletins, and speak to co-workers, supervisors, customers and manufacturers. They inspect, operate and test defective equipment needing repairs to gather operational data and to learn about faults. (2)
- Locate troubleshooting and repair procedures for unusual faults by calling technical support lines and by reading repair manuals and technical service bulletins. (3)

G. Working With Others

Outdoor power equipment technicians carry out service and repair tasks independently. They may coordinate job tasks with helpers, apprentices and partspersons to ensure the efficient completion of repairs and the effective use of shop space and tools.

Participation in Supervisory or Leadership Activities

<input checked="" type="checkbox"/>	Monitor the work performance of others.
<input checked="" type="checkbox"/>	Inform other workers or demonstrate to them how tasks are performed.
<input checked="" type="checkbox"/>	Orient new employees.
<input checked="" type="checkbox"/>	Make hiring recommendations.
<input checked="" type="checkbox"/>	Assign routine tasks to other workers.
<input checked="" type="checkbox"/>	Assign new or unusual tasks to other workers.
<input checked="" type="checkbox"/>	Identify training that is required by, or would be useful for, other workers.
<input checked="" type="checkbox"/>	Deal with other workers' grievances or complaints.

H. Digital Technology	
Typical: 1 to 2	Most Complex: 2
Examples	
<p>Word Processing</p> <ul style="list-style-type: none"> • Not a requirement for this occupation. <p>Spreadsheet Software</p> <ul style="list-style-type: none"> • Not a requirement for this occupation. <p>Bookkeeping, Billing and Accounting Software</p> <ul style="list-style-type: none"> • Not a requirement for this occupation. <p>Communication Software</p> <ul style="list-style-type: none"> • Use communications software, e.g., use email applications such as Outlook to exchange information and documents with suppliers, manufacturers, co-workers and colleagues. (2) <p>Presentation Software</p> <ul style="list-style-type: none"> • Not a requirement for this occupation. <p>Graphics Software</p> <ul style="list-style-type: none"> • Not a requirement for this occupation. <p>Data Bases</p> <ul style="list-style-type: none"> • Use specialized service databases to access job assignments, input information on new jobs, retrieve and review past service information, and complete work orders. (2) • Use databases to retrieve repair information and technical drawings. (2) <p>Internet</p> <ul style="list-style-type: none"> • Use the Internet to access service, maintenance and repair information. (2) • Use the internet to access recent technical service bulletins, parts and component information, recall notices, frequently asked questions and specifications on manufacturer websites. (2) • Use the Internet to access training courses and seminars offered by suppliers and 	

employers. (2)

Other Digital Technology

- Use electronic scanning equipment to access data such as fault codes from onboard computers and sensors. (1)
- Use a variety of digital hand tools such as multimeters. (1)
- Download programs onto onboard computers, e.g., use laptops supplied by manufacturers to upload system parameter updates, such as new air-to-fuel ratios, to electronic control units (ECUs). (2)

I. Continuous Learning

Continuous learning is very important to outdoor power equipment technicians because they need to maintain current knowledge of small engine technologies. They learn at work by viewing instructional videos, reading trade magazines, bulletins and repair manuals, and speaking with customers, suppliers, manufacturers, colleagues, co-workers and supervisors. They may be required to successfully complete annual recertification exams in order to work on repairs covered by certain manufacturers' warranties. (2)

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 and/or employer.

J. Other Information

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

Physical Aspects

Outdoor power equipment technicians balance, bend, kneel, stand and stretch when working and frequently lift heavy objects such as snow throwers and lawn mowers. They may use a variety of senses to carry out their work. For example, they may detect fuel combustion problems by smelling exhaust fume odours, and pump failures by listening to sounds and feeling vibrations.

Attitudes

Outdoor power equipment technicians need to be patient and well-organized. They should also enjoy working with their hands.