

DOCUMENT RESUME

ED 345 067

CE 061 161

TITLE Power Equipment Technology. Ohio's Competency Analysis Profile.

INSTITUTION Ohio State Univ., Columbus. Vocational Instructional Materials Lab.

SPONS AGENCY Ohio State Dept. of Education, Columbus. Div. of Vocational and Career Education.

PUB DATE Jan 92

NOTE 37p.; For related documents, see ED 338 827-852 and CE 061 142-176.

AVAILABLE FROM Vocational Instructional Materials Lab, Ohio State University, 1900 Kenny Road, Columbus, OH 43210-1090 (\$1.50).

PUB TYPE Guides - Classroom Use - Teaching Guides (For Teacher) (052)

EDRS PRICE MF01/PC02 Plus Postage.

DESCRIPTORS Competence; *Competency Based Education; Electrical Systems; Employment Potential; *Engines; Equipment Maintenance; Hand Tools; Job Analysis; Job Skills; *Machine Repairers; Postsecondary Education; *Power Technology; Secondary Education; Standards; Task Analysis; Troubleshooting; Vocational Education; Welding

IDENTIFIERS DACUM Process; Ohio

ABSTRACT

Developed through a modified DACUM (Developing a Curriculum) process involving business, industry, labor, and community agency representatives in Ohio, this document is a comprehensive and verified employer competency profile for power equipment technology occupations. The list contains units (with and without subunits), competencies, and competency builders that identify the skills needed to enter these occupations. The occupational, academic, and employability skills for this occupation or occupational area are included. Within the outline are three levels of items: core, advancing, and futuring. Core items identify the knowledge, skills, and attitudes essential for entry-level employment. These items are required to be taught and will be the basis for questions on the state vocational competency tests. Advancing items identify the knowledge, skills, and attitudes needed to advance in the occupation; futuring items identify the knowledge, skills, and attitudes needed to enter and remain in a given occupation 3 to 4 years from now. This profile contains 24 units: professional behavior; hand tools; shop equipment; fasteners; welding, soldering, and heat-treating equipment; manufacturer's parts, service, and software materials; disassembly, inspection, and reassembly of two-cycle and four-cycle engines; ignition systems; fuel systems; governor systems; lubrication systems; cooling systems; lighting, accessory, and charging systems; engine tune-up; removing and stalling engines; power takeoff accessories; motion drive systems; frame, suspension, and steering systems; tires, wheels, and brakes; servicing multicylinder engines; troubleshooting; equipment maintenance and storage; customer relations; and employability skills. (NLA)

O C A P

OHIO'S COMPETENCY ANALYSIS PROFILE

POWER EQUIPMENT TECHNOLOGY

ED345067

Employer Verification Panel

Charles F. Branz, *All Service Rental Center, Inc.*, Lorain, Ohio

Todd V. Dygert, *Westside Power Equipment*, Columbus, Ohio

Eric Eggert, *Bair Tractor Sales Inc.*, North Canton, Ohio

Russell E. Hartwig, *Consultant*, Cleveland, Ohio

Richard D. Jenkins, *Air Cooled Engines Inc.*, Akron, Ohio


Todd A. Jordan, *Jordan Power & Equipment Co.*, Tallmadge, Ohio

David G. Keysor, *Custom Assembly Inc.*, Scott, Ohio

Rick Lewis, *London Truck and Tractor*, London, Ohio

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
 This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
Points of view or opinions stated in this document do not necessarily represent the position or policy of ERIC.

PERMISSION TO REPRODUCE MATERIAL HAS BEEN GRANTED



TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)



Division of Vocational and Career Education
Ohio Department of Education

Vocational Instructional Materials Laboratory
Center on Education and Training for Employment



BEST COPY AVAILABLE

What is OCAP?

"A comprehensive and verified employer competency list will be developed and kept current for each program." This is the second objective of Imperative 3 of the *Action Plan for Accelerating the Modernization of Vocational Education: Ohio's Future at Work*. Ohio's Competency Analysis Profile (OCAP) lists are the Division of Vocational and Career Education's response to that objective. OCAP lists evolve from a modified DACUM process involving business, industry, labor, and community agency representatives from throughout Ohio. The OCAP process is directed by the Vocational Instructional Materials Laboratory at The Ohio State University's Center on Education and Training for Employment.

How is OCAP used?

Each OCAP contains units (with and without subunits), competencies, and competency builders that identify the occupational, academic*, and employability skills needed to enter a given occupation or occupational area. Within that outline there are three levels of items: core, advancing, and futuring. Core items identify the knowledge, skills, and attitudes essential for entry-level employment. These items are required to be taught and will be the basis for questions on the state vocational competency tests (scheduled to begin in school year 1993-94). Advancing items (marked with one asterisk) identify the knowledge, skills, and attitudes needed to advance in a given occupation. Futuring items (marked with two asterisks) identify the knowledge, skills, and attitudes needed to enter and remain in a given occupation three to four years from now.

School districts may add as many units, subunits, competencies, and/or competency builders as desired to reflect local employment needs, trends, and specialties. Local advisory committees should be actively involved in the identification and verification of additional items. Using OCAP lists, instructors will be able to formulate their vocational courses of study and monitor competency gains via the new criterion-referenced competency testing program that will be directly tied to the competencies identified on the OCAP lists.

*Academic competencies have not been identified for all OCAPs. At a later date math, communication, and science competencies will be released.

The **Employability Skills** portion of this list was verified by the following employer panel:

Gary J. Corrigan, *Dana Corporation*, Ottawa Lake, Michigan
David Crooks, *Bowling Green State University Union Food Service*, Bowling Green, Ohio
Pat Doerman, *Farrow's Harley-Davidson*, Columbus, Ohio
William Gockenbach, *Kaiser Aluminum*, Heath, Ohio
Patsy Hathaway, *CBS Personnel Services, Inc.*, Dayton, Ohio
Marlyn Harman, *Marlyn Harman & Associates*, Cleveland, Ohio
Thomas R. Hyldahl, *Toledo Edison*, Toledo, Ohio
Carol C. James, *Ohio Contractors Association*, Columbus, Ohio
James Mack, *Chrysler Jeep Assembly*, Toledo, Ohio
Rocky McCoy, *Ironton-Lawrence Co. Community Action Organization*, Ironton, Ohio
James Needs, *Independent Crop Producer*, Upper Sandusky, Ohio
Ronald Simmons, *Former GM Executive*, Warren Ohio

Ohio Competency Analysis Profile Power Equipment Technology

Unit 1: Professional Behavior

Competency 1.0.1: Identify and comply with shop safety rules

Competency Builders:

- 1.0.1.1 Follow general shop safety rules at all times
- 1.0.1.2 Locate first-aid station
- 1.0.1.3 Locate fire exits
- 1.0.1.4 Locate and use fire extinguishers
- 1.0.1.5 Inspect condition of extinguishers and other fire safety equipment regularly
- 1.0.1.6 Note liabilities and other legal considerations in servicing power equipment

Competency 1.0.2: Demonstrate appropriate dress and personal hygiene

Competency Builders:

- 1.0.2.1 Wear appropriate attire that is clean and well-maintained
- 1.0.2.2 Practice personal hygiene

Competency 1.0.3: Demonstrate leadership qualities

Competency Builders:

- 1.0.3.1 Arrive at shop on time and ready to work each day
- 1.0.3.2 Start all work assignments promptly
- 1.0.3.3 Demonstrate effective communication skills
- 1.0.3.4 Demonstrate effective social interaction skills
- 1.0.3.5 Demonstrate cooperation, enthusiasm, honesty, reliability, and trustworthiness
- 1.0.3.6 Complete work assignments on or ahead of schedule, stressing quality ahead of time
- 1.0.3.7 Maintain clean work area with tools in good working order
- 1.0.3.8 Maintain complete, accurate records of all jobs completed

Unit 2: Hand Tools

Competency 2.0.1: Practice established safety procedures in selection and use of hand tools

Competency Builders:

- 2.0.1.1 Check condition of each tool before using
- 2.0.1.2 Service tools as needed
- 2.0.1.3 Use tools as intended for specific tasks
- 2.0.1.4 Store tools in designated area

* Advancing
** Futuring

Power Equipment Technology--1/92

Competency 2.0.2: Select and use wrenches and screwdrivers

Competency Builders:

- 2.0.2.1 Check condition and accuracy of tools before using
- 2.0.2.2 Select and use socket wrenches
- 2.0.2.3 Select and use hex wrenches
- 2.0.2.4 Select and use Torx drivers and sockets
- 2.0.2.5 Select and use Allen wrenches
- 2.0.2.6 Select and use end wrenches
- 2.0.2.7 Select and use screwdrivers
- 2.0.2.8 Select and use torque wrenches
- 2.0.2.9 Clean tools and store in designated area after each use

Competency 2.0.3: Use manufacturer's special purpose tools

Competency Builders:

- 2.0.3.1 Use special purpose tools according to manufacturer's directions
- 2.0.3.2 Clean special purpose tools and store in designated area after each use

Competency 2.0.4: Select and use pliers and clamping tools

Competency Builders:

- 2.0.4.1 Check condition of tools before using
- 2.0.4.2 Service, adjust, or replace tools as needed
- 2.0.4.3 Select and use pliers
- 2.0.4.4 Use clamping tools
- 2.0.4.5 Clean tools and store in designated area after each use

Competency 2.0.5: Select and use diagnostic tools and equipment

Competency Builders:

- 2.0.5.1 Select and use precision measuring tools and instruments, including micrometers (inside and outside), dial indicator, vernier caliper, straight edge, and feeder gauge
- 2.0.5.2 Inspect and adjust, repair, or replace tools as needed
- 2.0.5.3 Set up and use electronic testing equipment
- 2.0.5.4 Clean tools and store in designated area after each use

Competency 2.0.6: Select and use cutting, impact, and forming tools

Competency Builders:

- 2.0.6.1 Select and use cutting tools
- 2.0.6.2 Select, inspect, set up, and use impact tools
- 2.0.6.3 Use forming tools
- 2.0.6.4 Clean tools and store in designated area after each use

Competency 2.0.7: Repair and recondition hand tools

Competency Builders:

- 2.0.7.1 Remove broken and unrepairable tools from service
- 2.0.7.2 Check tools for indications of needed repairs before and after each use
- 2.0.7.3 Repair or replace tools as needed

Unit 3: Shop Equipment

Competency 3.0.1: Use personal safety apparatus

Competency Builders:

- 3.0.1.1 Wear eye/face protection, safety shoes, gloves, and/or apron approved by Occupational Safety and Health Administration (OSHA)
- 3.0.1.2 Inspect personal safety apparatus for indications of needed repairs or replacement
- 3.0.1.3 Clean and repair safety apparatus regularly
- 3.0.1.4 Comply with all applicable OSHA standards
- 3.0.1.5 Comply with all applicable Environmental Protection Agency (EPA) standards

Competency 3.0.2: Use power tools and stationary equipment

Competency Builders:

- 3.0.2.1 Identify types of power tools and stationary equipment
- 3.0.2.2 Select, set up, and use power tools and stationary equipment
- 3.0.2.3 Inspect and maintain power tools and stationary equipment
- 3.0.2.4 Store accessories in designated area

Competency 3.0.3: Use portable electrical and pneumatic equipment

Competency Builders:

- 3.0.3.1 Follow standard safety procedures
- 3.0.3.2 Select and use portable electric and pneumatic equipment
- 3.0.3.3 Inspect, clean, adjust, and repair tools as needed
- 3.0.3.4 Store tools in designated area
- 3.0.3.5 Remove worn and unsafe tools from service

Competency 3.0.4: Operate power cleaning equipment

Competency Builders:

- 3.0.4.1 Wear personal safety apparatus
- 3.0.4.2 Check and service power cleaning equipment before each use
- 3.0.4.3 Set up and use power cleaning equipment
- 3.0.4.4 Inspect and maintain power cleaning equipment
- 3.0.4.5 Store power cleaning equipment in designated area

Unit 4: Fasteners

Competency 4.0.1: Select proper type of fastener

Competency Builders:

- 4.0.1.1 Select proper grades and types of bolts and nuts
- 4.0.1.2 Select proper type of alternate fasteners
- 4.0.1.3 Maintain accurate inventory of all fasteners

Power Equipment Technology--1/92

Competency 4.0.2: Remove seized fasteners

Competency Builders:

- 4.0.2.1 Select proper removal tools and hardware
- 4.0.2.2 Use drilling and extracting tools
- 4.0.2.3 Store removal tools in designated area after each use

Competency 4.0.3: Restore internal and external threads

Competency Builders:

- 4.0.3.1 Select proper threading tools
- 4.0.3.2 Use threading tools
- 4.0.3.3 Store threading tools in designated area after each use

Unit 5: Welding, Soldering, and Heat-Treating Equipment

Competency 5.0.1: Practice established safety procedures when using heat-producing tools and equipment

Competency Builders:

- 5.0.1.1 Wear personal safety apparatus
- 5.0.1.2 Use caution when handling hot materials
- 5.0.1.3 Check work area for safety hazards

Competency 5.0.2: Operate oxyacetylene welding, brazing, and cutting equipment

Competency Builders:

- 5.0.2.1 Select proper type of fire extinguisher and safety equipment
- 5.0.2.2 Select, inspect, and set up oxyacetylene components
- 5.0.2.3 Inspect, service, and adjust regulators and connections
- 5.0.2.4 Weld or cut with oxyacetylene equipment
- 5.0.2.5 Shut down and disconnect oxyacetylene equipment
- 5.0.2.6 Store and secure equipment in designated area

Competency 5.0.3: Solder with propane torch

Competency Builders:

- 5.0.3.1 Select proper grade of solder
- 5.0.3.2 Set up and use propane torch
- 5.0.3.3 Shut down and disconnect propane equipment
- 5.0.3.4 Store and secure equipment in designated area

Competency 5.0.4: Solder with soldering gun

Competency Builders:

- 5.0.4.1 Select proper grade of solder
- 5.0.4.2 Select and use proper size of solder gun
- 5.0.4.3 Store solder and gun in designated area

Competency 5.0.5: Solder with soldering iron

Competency Builders:

- 5.0.5.1 Select proper grade of solder
- 5.0.5.2 Select and use proper size of soldering iron
- 5.0.5.3 Store solder and iron in designated area

Competency 5.0.6: Operate arc welder

Competency Builders:

- 5.0.6.1 Follow established safety procedures
- 5.0.6.2 Set up and adjust arc-welding equipment
- 5.0.6.3 Select electrode type
- 5.0.6.4 Weld with arc-welding equipment
- 5.0.6.5 Turn off and disconnect components
- 5.0.6.6 Store components in designated area

Competency 5.0.7: Operate metal inert gas (MIG) welder*

Competency Builders:

- 5.0.7.1 Follow established safety procedures*
- 5.0.7.2 Set up and adjust MIG welding equipment*
- 5.0.7.3 Weld with MIG equipment*
- 5.0.7.4 Turn off and disconnect components*
- 5.0.7.5 Store components in designated area*

Competency 5.0.8: Operate tungsten inert gas (TIG) welder*

Competency Builders:

- 5.0.8.1 Follow established safety procedures*
- 5.0.8.2 Set up and adjust TIG equipment*
- 5.0.8.3 Weld with TIG equipment*
- 5.0.8.4 Turn off and disconnect components*
- 5.0.8.5 Store components in designated area*

Unit 6: Manufacturers' Parts, Service, and Software Materials

Competency 6.0.1: Maintain microfiche and computer resources

Competency Builders:

- 6.0.1.1 Inspect software files to ensure proper placement of materials
- 6.0.1.2 Use software resources to locate part numbers
- 6.0.1.3 Return materials to proper sequence after each use
- 6.0.1.4 Perform periodic maintenance on hardware

* Advancing
** Futuring

Power Equipment Technology--1/92

Competency 6.0.2: Locate engine identification numbers

Competency Builders:

- 6.0.2.1 Refer to service manuals for location of numbers
- 6.0.2.2 Find identification numbers on engines

Competency 6.0.3: Locate unit identification numbers

Competency Builders:

- 6.0.3.1 Refer to service manual for location of numbers
- 6.0.3.2 Find identification numbers on unit

Competency 6.0.4: Record and interpret identification and reference numbers

Competency Builders:

- 6.0.4.1 Refer to service manuals to interpret model numbers
- 6.0.4.2 Note specifications for model referenced

Competency 6.0.5: Use specifications from manual(s) in determining parts analysis decisions

Competency Builders:

- 6.0.5.1 Utilize specification charts to record size specifications
- 6.0.5.2 Compare actual measurements with specifications

Competency 6.0.6: Identify replacement part numbers

Competency Builders:

- 6.0.6.1 Use manufacturer's numbering system to locate correct parts listing
- 6.0.6.2 Locate needed part and reference or variance numbers
- 6.0.6.3 Use reference or variance numbers to determine part number
- 6.0.6.4 Record part number, refer to current price guide, and determine availability and price

Competency 6.0.7: Record part numbers and prices on work order

Competency Builders:

- 6.0.7.1 Fill out work orders
- 6.0.7.2 Record part number, description, quantity, and price on work order
- 6.0.7.3 Compile list and calculate totals for cost of repair parts
- 6.0.7.4 Review work order and check for accuracy

Competency 6.0.8: Refer to manufacturers' bulletins

Competency Builders:

- 6.0.8.1 Review parts bulletins for obsolete parts
- 6.0.8.2 Review service bulletins periodically
- 6.0.8.3 Record changes in part numbers according to bulletin announcements

Competency 6.0.9: Use computer to locate part storage location*

Competency Builders:

- 6.0.9.1 Access computer inventory system*
- 6.0.9.2 Delete or add to inventory count*

Unit 7: Disassembly, Inspection, and Reassembly of Two-Cycle and Four-Cycle Engines

Competency 7.0.1: Practice established safety procedures during disassembly and reassembly

Competency Builders:

- 7.0.1.1 Wear personal safety apparatus
- 7.0.1.2 Follow standard safety procedures when using hand tools

Competency 7.0.2: Disassemble engine

Competency Builders:

- 7.0.2.1 Drain and properly store or dispose of all fluids
- 7.0.2.2 Disassemble carburetion and fuel systems
- 7.0.2.3 Disassemble ignition and short block assemblies
- 7.0.2.4 Inspect parts for signs of needed repairs

Competency 7.0.3: Identify parts

Competency Builders:

- 7.0.3.1 Identify fuel system components
- 7.0.3.2 Identify ignition and short block assemblies
- 7.0.3.3 Tag and arrange parts on bench

Competency 7.0.4: Clean and measure parts and analyze for wear

Competency Builders:

- 7.0.4.1 Record manufacturer's specifications for parts
- 7.0.4.2 Measure and record actual size or worn dimensions of parts
- 7.0.4.3 Compare manufacturer's specifications with actual measurements when making analysis
- 7.0.4.4 Compile list of parts needed to complete task

Competency 7.0.5: Service, recondition, repair, or replace defective parts

Competency Builders:

- 7.0.5.1 Recondition or replace worn parts
- 7.0.5.2 Use manufacturer's part numbers when requesting replacement components
- 7.0.5.3 Follow manufacturer's repair instructions when replacing parts

Power Equipment Technology--1/92

Competency 7.0.6: Reassemble engine

Competency Builders:

- 7.0.6.1 Assemble short block and ignition components according to manufacturer's specifications
- 7.0.6.2 Assemble carburetion and fuel systems according to manufacturer's specifications
- 7.0.6.3 Adjust components during reassembly

Competency 7.0.7: Test engine

Competency Builders:

- 7.0.7.1 Mount engine onto test stand or in/onto unit
- 7.0.7.2 Add lubricant and fuel according to manufacturer's specifications
- 7.0.7.3 Place engine in well-ventilated area
- 7.0.7.4 Start engine
- 7.0.7.5 Analyze engine performance while running
- 7.0.7.6 Make necessary adjustments

Unit 8: Ignition Systems

Competency 8.0.1: Practice established safety procedures

Competency Builders:

- 8.0.1.1 Wear personal safety apparatus
- 8.0.1.2 Hook up electronic testing equipment

Competency 8.0.2: Inspect and service/replace spark plugs

Competency Builders:

- 8.0.2.1 Differentiate between types of plug styles, heat ranges, and numbering systems
- 8.0.2.2 Remove, inspect, and analyze plug(s)
- 8.0.2.3 Determine if plug wear is normal or due to another cause
- 8.0.2.4 Select, install, and retorque plugs according to manufacturer's specifications

Competency 8.0.3: Test and analyze magneto, battery, electronic, and computerized ignition systems

Competency Builders:

- 8.0.3.1 Differentiate between types of ignition systems
- 8.0.3.2 Use electronic testing equipment
- 8.0.3.3 Compile list of parts needed for repair
- 8.0.3.4 Store testing equipment in designated area

Competency 8.0.4: Replace and adjust ignition system components

Competency Builders:

- 8.0.4.1 Identify common replacement parts of ignition system
- 8.0.4.2 Use manufacturer's parts system to locate replacement part numbers
- 8.0.4.3 Secure needed replacement parts and install according to manufacturer's specifications
- 8.0.4.4 Conduct spark test upon completion of service

Unit 9: Fuel Systems

Competency 9.0.1: Practice established safety procedures

Competency Builders:

- 9.0.1.1 Wear personal safety apparatus
- 9.0.1.2 Store fuels in designated safety areas using metal containers approved by Occupational Safety and Health Administration (OSHA)
- 9.0.1.3 Use caution when handling gasoline and working on fuel systems
- 9.0.1.4 Clean fuel spills immediately
- 9.0.1.5 Ensure engine is switched off and cold before adding fuel

Competency 9.0.2: Inspect and service/replace air cleaners

Competency Builders:

- 9.0.2.1 Differentiate types of air-filtering systems
- 9.0.2.2 Disassemble, inspect, analyze, and service/replace components as needed
- 9.0.2.3 Dispose of used parts or components appropriately

Competency 9.0.3: Inspect fuel system components

Competency Builders:

- 9.0.3.1 Check condition of fuel tanks, lines, filters, and connections
- 9.0.3.2 Analyze inspection results and list needed parts for repair
- 9.0.3.3 Replace, service, or repair components
- 9.0.3.4 Dispose of used parts or components appropriately

Competency 9.0.4: Inspect and rebuild carburetors

Competency Builders:

- 9.0.4.1 Differentiate common types of carburetors
- 9.0.4.2 Disassemble, inspect, analyze, and repair/replace components according to manufacturer's specifications
- 9.0.4.3 Install carburetor and make initial adjustment
- 9.0.4.4 Start engine and make final adjustments

Power Equipment Technology--1/92

Competency 9.0.5: Service, test, and adjust fuel injectors

Competency Builders:

- 9.0.5.1 Differentiate types of fuel injectors and operational characteristics
- 9.0.5.2 Disassemble, inspect, analyze, and repair/replace components according to manufacturer's specifications
- 9.0.5.3 Install fuel injectors and make initial adjustments
- 9.0.5.4 Start engine and make final adjustments

Competency 9.0.6: Service and rebuild fuel pumps

Competency Builders:

- 9.0.6.1 Differentiate types of fuel pumps
- 9.0.6.2 Locate, remove, and disassemble fuel pumps
- 9.0.6.3 Inspect fuel pump components
- 9.0.6.4 Perform required repairs and reinstall pump to unit
- 9.0.6.5 Start engine to check installation and function

Competency 9.0.7: Trace fuel and airflow of induction systems

Competency Builders:

- 9.0.7.1 Differentiate types of airflow induction systems
- 9.0.7.2 Differentiate types of air-filtering devices
- 9.0.7.3 Inspect interior of induction system for possible leaks
- 9.0.7.4 Perform required repairs and reinstall components
- 9.0.7.5 Start engine to check installation and function

Competency 9.0.8: Perform wastegate test on turbocharger systems*

Competency Builders:

- 9.0.8.1 Locate wastegate*
- 9.0.8.2 Test functioning*
- 9.0.8.3 Perform required repairs and reinstall components*
- 9.0.8.4 Start engine to check installation and function*

Competency 9.0.9: Service alternate fuel systems

Competency Builders:

- 9.0.9.1 Identify alternate fuel systems
- 9.0.9.2 Inspect and maintain alternate fuel systems
- 9.0.9.3 Perform required repairs and reinstall components
- 9.0.9.4 Start engine to check installation and function

Unit 10: Governor Systems

Competency 10.0.1: Practice established safety procedures

Competency Builders:

- 10.0.1.1 Wear personal safety apparatus
- 10.0.1.2 Follow standard safety procedures when using hand tools

Competency 10.0.2: Inspect, repair, and adjust all linkage, springs, bellcranks, and diaphragm speed-control components

Competency Builders:

- 10.0.2.1 Differentiate types of speed-control systems and related components
- 10.0.2.2 Disassemble, inspect, analyze, and repair components according to manufacturer's specifications
- 10.0.2.3 Reassemble speed-control devices according to manufacturer's specifications

Competency 10.0.3: Adjust speed-controlling devices according to manufacturer's specifications

Competency Builders:

- 10.0.3.1 Inspect settings on speed-controlling devices
- 10.0.3.2 Inspect components of speed-controlling devices
- 10.0.3.3 Replace or repair components of speed-controlling devices
- 10.0.3.4 Reinstall and adjust components
- 10.0.3.5 Preset components prior to test run

Competency 10.0.4: Test unit with actual or simulated load

Competency Builders:

- 10.0.4.1 Place unit in well-ventilated test area
- 10.0.4.2 Start engine
- 10.0.4.3 Compare revolutions per minute (RPM) with manufacturer's specifications
- 10.0.4.4 Make necessary adjustments to meet specifications

Unit 11: Lubrication Systems

Competency 11.0.1: Practice established safety procedures

Competency Builders:

- 11.0.1.1 Dispose of oily rags in proper container according to Environmental Protection Agency (EPA) requirements
- 11.0.1.2 Clean up spills immediately
- 11.0.1.3 Dispose of used oil according to Occupational Safety and Health Administration (OSHA) and EPA requirements
- 11.0.1.4 Handle hot lubricants carefully

Competency 11.0.2: Change oil and filter

Competency Builders:

- 11.0.2.1 Run engine to normal operating temperature and turn off
- 11.0.2.2 Select proper tools and equipment
- 11.0.2.3 Drain oil and remove filter
- 11.0.2.4 Reinstall drain plug and filter and torque to specifications
- 11.0.2.5 Fill crankcase with specified oil and check level
- 11.0.2.6 Dispose of used oil and filter according to EPA requirements

Power Equipment Technology--1/92

Competency 11.0.3: Inspect and service crankcase breathers

Competency Builders:

- 11.0.3.1 Locate and identify crankcase breather components
- 11.0.3.2 Inspect for proper functioning
- 11.0.3.3 Repair or replace defective components
- 11.0.3.4 Start engine and check system operation

Competency 11.0.4: Service or repair oil pumps, screens, lines, and splashers

Competency Builders:

- 11.0.4.1 Distinguish between types of lubrication circulation systems
- 11.0.4.2 Inspect system components for signs of wear or needed service
- 11.0.4.3 Repair or replace components
- 11.0.4.4 Start engine and check system operation

Competency 11.0.5: Inspect and service internal lubrication components

Competency Builders:

- 11.0.5.1 Disassemble internal components
- 11.0.5.2 Check condition of components
- 11.0.5.3 Perform required service or repairs
- 11.0.5.4 Reassemble components
- 11.0.5.5 Start engine and check system function

Competency 11.0.6: Select and store oil and lubricants

Competency Builders:

- 11.0.6.1 Distinguish types of lubricant according to usage
- 11.0.6.2 Refer to manufacturer's specifications for capacity and viscosity
- 11.0.6.3 Store lubricants in designated area according to OSHA and EPA requirements

Unit 12: Cooling Systems

Competency 12.0.1: Practice established safety procedures

Competency Builders:

- 12.0.1.1 Wear personal safety apparatus
- 12.0.1.2 Handle coolant and other cooling system chemicals carefully
- 12.0.1.3 Release caps from pressurized systems carefully
- 12.0.1.4 Store coolant and other cooling system chemicals in designated area according to Environmental Protection Agency (EPA) requirements

Competency 12.0.2: Remove shroud and clean fins and housing

Competency Builders:

- 12.0.2.1 Secure proper tools and materials prior to servicing
- 12.0.2.2 Disassemble and inspect air-cooled system components
- 12.0.2.3 Analyze results and perform necessary service or repairs
- 12.0.2.4 Reassemble system according to manufacturer's directions

Competency 12.0.3: Conduct pressure and coolant tests on liquid-cooled engines

Competency Builders:

- 12.0.3.1 Identify and select required tools
- 12.0.3.2 Conduct pressure and coolant checks according to manufacturer's recommendations
- 12.0.3.3 Compare findings with manufacturer's specifications and analyze results
- 12.0.3.4 Secure necessary repair parts or materials
- 12.0.3.5 Perform service or repairs according to manufacturer's specifications

Competency 12.0.4: Check and replace thermostats, fans, and radiators

Competency Builders:

- 12.0.4.1 Identify system components
- 12.0.4.2 Turn engine off before servicing cooling fans
- 12.0.4.3 Set up and use testing equipment
- 12.0.4.4 Compare test results with manufacturer's specifications
- 12.0.4.5 Analyze condition of system components and determine needed repairs
- 12.0.4.6 Make necessary repairs

Competency 12.0.5: Inspect and repair/replace water pumps, lines, and connections

Competency Builders:

- 12.0.5.1 Locate and visually inspect components for leaks
- 12.0.5.2 Check condition of hoses and connections
- 12.0.5.3 Repair or replace faulty components

Competency 12.0.6: Perform seasonal service on cooling systems

Competency Builders:

- 12.0.6.1 Refer to manufacturer's recommendations for seasonal servicing
- 12.0.6.2 Service system components to acceptable specifications
- 12.0.6.3 Follow recommended procedures for storing units to be placed out of service
- 12.0.6.4 Document status of system for future reference

Competency 12.0.7: Check system operation

Competency Builders:

- 12.0.7.1 Place unit in safe, well-ventilated test area
- 12.0.7.2 Check cooling system levels and fins
- 12.0.7.3 Start unit and allow for normal operating temperature
- 12.0.7.4 Check for proper circulation and cooling under normal operating conditions
- 12.0.7.5 Store unit in designated area

Unit 13: Lighting, Accessory, and Charging Systems

Competency 13.0.1: Practice established safety procedures

Competency Builders:

- 13.0.1.1 Wear personal safety apparatus
- 13.0.1.2 Use caution when working with electronic testing equipment
- 13.0.1.3 Make connections according to manufacturer's recommendations when using testing instruments
- 13.0.1.4 Perform all electrical tests on nonmetallic work surfaces
- 13.0.1.5 Maintain dry work area when bench-testing components

Competency 13.0.2: Trace current flow of electrical systems

Competency Builders:

- 13.0.2.1 Interpret schematic drawing
- 13.0.2.2 Trace current flow of circuit on a schematic drawing
- 13.0.2.3 Use wire codes to identify circuit
- 13.0.2.4 Inspect circuit from power source to electrical device

Competency 13.0.3: Conduct voltage, current, resistance, charging, and load tests

Competency Builders:

- 13.0.3.1 Select and use electrical testing equipment
- 13.0.3.2 Perform voltage, current, resistance, charging, and load tests
- 13.0.3.3 Compare test results with manufacturer's specifications
- 13.0.3.4 Compile list of needed repairs

Competency 13.0.4: Replace or service defective components

Competency Builders:

- 13.0.4.1 Consult manufacturer's replacement parts software when replacing defective components
- 13.0.4.2 Remove and replace components
- 13.0.4.3 Conduct performance check of parts replaced

Competency 13.0.5: Utilize electrical troubleshooting techniques

Competency Builders:

- 13.0.5.1 Explain manufacturer's recommendations in troubleshooting electrical systems
- 13.0.5.2 Locate circuit or component failure problems systematically
- 13.0.5.3 Compare test results with manufacturer's specifications in making final analysis
- 13.0.5.4 Compile list of needed repairs

Unit 14: Engine Tune-up

Competency 14.0.1: Practice established safety procedures

Competency Builders:

- 14.0.1.1 Maintain clean, well-organized work area
- 14.0.1.2 Wear personal safety apparatus
- 14.0.1.3 Follow standard safety procedures when using tools

Competency 14.0.2: Test compression

Competency Builders:

- 14.0.2.1 Identify, set up, and use compression-testing equipment
- 14.0.2.2 Assess condition and compare with manufacturer's specifications
- 14.0.2.3 Determine potential problems

Competency 14.0.3: De-carbon combustion chamber

Competency Builders:

- 14.0.3.1 Remove cylinder head and inspect combustion chamber
- 14.0.3.2 De-carbon cylinder head and combustion chamber components
- 14.0.3.3 Inspect head gasket for signs of leaks
- 14.0.3.4 Compile list of needed repair parts
- 14.0.3.5 Perform required repairs

Competency 14.0.4: Inspect and service valve train

Competency Builders:

- 14.0.4.1 Locate and identify valve train components
- 14.0.4.2 Remove valve train components according to manufacturer's recommendations
- 14.0.4.3 Clean, inspect, and service parts
- 14.0.4.4 Assemble valve train according to manufacturer's specifications

Unit 15: Removing and Installing Engines

Competency 15.0.1: Practice established safety procedures during engine removal and installation

Competency Builders:

- 15.0.1.1 Wear personal safety apparatus
- 15.0.1.2 Select and use jacking, hoisting, and supporting equipment
- 15.0.1.3 Disconnect and remove battery before beginning engine removal process
- 15.0.1.4 Double-check hookup assembly before attempting to lift engine out of unit

Competency 15.0.2: Prepare and secure unit for engine removal

Competency Builders:

- 15.0.2.1 Maneuver unit into work area
- 15.0.2.2 Secure unit with safety stands and holding devices
- 15.0.2.3 Double-check setup to ensure safety

Power Equipment Technology--1/92

Competency 15.0.3: Tag and disconnect controls, wires, and lines

Competency Builders:

- 15.0.3.1 Tag all wires before disconnecting
- 15.0.3.2 Disconnect wires and controls
- 15.0.3.3 Disconnect lines and drain fluids

Competency 15.0.4: Secure engine and remove mounting bolts

Competency Builders:

- 15.0.4.1 Support engine before removing bolts
- 15.0.4.2 Remove mounting bolts
- 15.0.4.3 Store bolts systematically

Competency 15.0.5: Remove engine

Competency Builders:

- 15.0.5.1 Select and set up hoist equipment
- 15.0.5.2 Attach hoist line or chains
- 15.0.5.3 Hoist engine out of unit
- 15.0.5.4 Position engine on engine stand

Competency 15.0.6: Reinstall engine in unit

Competency Builders:

- 15.0.6.1 Attach hoist to engine
- 15.0.6.2 Lower engine into unit
- 15.0.6.3 Align engine onto mounting brackets
- 15.0.6.4 Tighten mounting bolts according to manufacturer's specifications
- 15.0.6.5 Reconnect controls, wires, and lines
- 15.0.6.6 Remove hoisting and supporting equipment

Competency 15.0.7: Test engine and make final adjustments

Competency Builders:

- 15.0.7.1 Refer to service manual and inspect arrangement of wires and control cables
- 15.0.7.2 Make all adjustments according to manufacturer's specifications
- 15.0.7.3 Add needed fuel, oil, and lubricants
- 15.0.7.4 Maneuver unit into well-ventilated test area
- 15.0.7.5 Start engine
- 15.0.7.6 Make final analysis of engine performance

Unit 16: Power Takeoff (PTO) Accessories

Competency 16.0.1: Practice established safety procedures

Competency Builders:

- 16.0.1.1 Wear personal safety apparatus
- 16.0.1.2 Follow standard safety procedures when using tools
- 16.0.1.3 Identify possible safety catch point hazards
- 16.0.1.4 Follow standard equipment setup procedures
- 16.0.1.5 Ensure power is off before making adjustments and repairs

Competency 16.0.2: Inspect and repair/replace components in PTO accessories

Competency Builders:

- 16.0.2.1 Identify types of PTO accessories
- 16.0.2.2 Inspect, service, and/or repair components in PTO accessories

Competency 16.0.3: Install PTO accessories

Competency Builders:

- 16.0.3.1 Align and connect PTO components
- 16.0.3.2 Tighten attachments to unit
- 16.0.3.3 Double-check completed work before test-running unit
- 16.0.3.4 Test and verify that all safety components are in place and operational
- 16.0.3.5 Start engine and observe function to determine needed adjustments
- 16.0.3.6 Make final adjustments with power off

Competency 16.0.4: Adjust PTO clutches and drivetrains

Competency Builders:

- 16.0.4.1 Identify common clutches and drivetrains
- 16.0.4.2 Refer to manufacturer's recommendations for proper adjustment procedures
- 16.0.4.3 Inspect, service, and/or repair clutches and drivetrains
- 16.0.4.4 Check completed work before test-running unit
- 16.0.4.5 Start engine and observe function to determine needed adjustments
- 16.0.4.6 Make final adjustments with power off

Unit 17: Motion Drive Systems

Competency 17.0.1: Practice established safety procedures

Competency Builders:

- 17.0.1.1 Ensure power is off before servicing motion drive systems
- 17.0.1.2 Wear personal safety apparatus
- 17.0.1.3 Identify safety hazards before servicing motion drive systems

Power Equipment Technology--1/92

Competency 17.0.2: Inspect, service, and repair manual, fluid, and electromagnetic clutches

Competency Builders:

- 17.0.2.1 Differentiate common types of clutch systems
- 17.0.2.2 Disassemble, inspect, and recondition/replace drive system components
- 17.0.2.3 Make adjustments according to manufacturer's specifications
- 17.0.2.4 Conduct final inspection before test-running unit

Competency 17.0.3: Inspect, service, and repair belt, shaft, and chain drive devices

Competency Builders:

- 17.0.3.1 Inspect components for wear
- 17.0.3.2 Remove, replace, or adjust drive components
- 17.0.3.3 Make adjustments according to manufacturer's specifications
- 17.0.3.4 Test and verify that all safety components are in place and operational
- 17.0.3.5 Conduct final inspection before test-running unit

Competency 17.0.4: Remove and replace motion drive system

Competency Builders:

- 17.0.4.1 Select tools and equipment
- 17.0.4.2 Demonstrate safe use of hoisting equipment
- 17.0.4.3 Secure unit before removing and replacing drive system
- 17.0.4.4 Follow manufacturer's service manual for proper procedure

Competency 17.0.5: Disassemble, inspect, and reassemble transmissions, transaxles, transmissions, and differentials in frame

Competency Builders:

- 17.0.5.1 Refer to service manual for correct procedures
- 17.0.5.2 Identify types of transaxles, transmissions, and differentials
- 17.0.5.3 Identify system components and disassemble specified system
- 17.0.5.4 Perform required repairs
- 17.0.5.5 Reassemble and test system

Competency 17.0.6: Inspect, service, and repair hydraulic and pneumatic drives

Competency Builders:

- 17.0.6.1 Use extreme caution when inspecting high pressure lines
- 17.0.6.2 Identify types of hydraulic and pneumatic drive systems
- 17.0.6.3 Inspect systems for leaks or line wear
- 17.0.6.4 Service and repair system
- 17.0.6.5 Start engine and perform final inspection

Unit 18: Frame, Suspension, and Steering Systems

Competency 18.0.1: Practice established safety procedures

Competency Builders:

- 18.0.1.1 Wear personal safety apparatus
- 18.0.1.2 Secure unit
- 18.0.1.3 Inspect frame, suspension, and steering systems for signs of wear
- 18.0.1.4 Follow established safety rules in selection and use of tools and equipment

Competency 18.0.2: Inspect components of frame, suspension, and steering systems for wear or damage

Competency Builders:

- 18.0.2.1 Inspect condition of system components
- 18.0.2.2 Determine minimum and maximum tolerances for normal wear according to manufacturer's specifications
- 18.0.2.3 Compare condition of system with manufacturer's specifications
- 18.0.2.4 Compile list of items or parts needed for repair

Competency 18.0.3: Service or repair worn components

Competency Builders:

- 18.0.3.1 Follow manufacturer's service recommendations for preventive service
- 18.0.3.2 Perform preventive service at specified intervals
- 18.0.3.3 Repair or replace worn or damaged components that do not meet specifications
- 18.0.3.4 Record maintenance work performed

Competency 18.0.4: Check frame and suspension systems for proper alignment and trueness

Competency Builders:

- 18.0.4.1 Refer to service manual for frame and suspension specifications
- 18.0.4.2 Inspect unit
- 18.0.4.3 Record findings
- 18.0.4.4 Perform required repairs

Unit 19: Tires, Wheels, and Brakes

Competency 19.0.1: Practice established safety procedures

Competency Builders:

- 19.0.1.1 Note potential safety hazards when working with tires, wheels, and brakes
- 19.0.1.2 Wear personal safety apparatus
- 19.0.1.3 Follow standard safety procedures when using tire-servicing tools and equipment

Power Equipment Technology--1/92

Competency 19.0.2: Conduct wheel test for out-of-roundness

Competency Builders:

- 19.0.2.1 Select and set up equipment for checking out-of-roundness
- 19.0.2.2 Refer to manufacturer's specifications for allowable tolerances
- 19.0.2.3 Repair or replace components that do not meet specifications

Competency 19.0.3: Check for and replace broken or bent spokes

Competency Builders:

- 19.0.3.1 Differentiate common types of spoke lacing patterns
- 19.0.3.2 Check for bent or broken spokes
- 19.0.3.3 Repair or replace damaged or broken spokes

Competency 19.0.4: Balance wheels

Competency Builders:

- 19.0.4.1 Select equipment
- 19.0.4.2 Set up and operate equipment to locate out-of-balance conditions
- 19.0.4.3 Remove wheels from unit
- 19.0.4.4 Balance wheels according to manufacturer's specifications
- 19.0.4.5 Replace wheels on unit

Competency 19.0.5: Inflate tires to specified pressure

Competency Builders:

- 19.0.5.1 Use air pressure gauge
- 19.0.5.2 Determine whether tires require minimum or maximum allowable pressure
- 19.0.5.3 Inflate and adjust tire pressure to manufacturer's specifications

Competency 19.0.6: Remove, repair, or replace tube and tubeless tires

Competency Builders:

- 19.0.6.1 Remove wheel from unit
- 19.0.6.2 Remove tire from wheel using standard tire-changing equipment
- 19.0.6.3 Determine if propane-based sealant has been used in tire or tube before breaking the bead
- 19.0.6.4 Inspect tire and tube for signs of wear
- 19.0.6.5 Repair, replace, and remount tire according to manufacturer's specifications

Competency 19.0.7: Service, recondition, or replace brakes

Competency Builders:

- 19.0.7.1 Identify components of drum and disc brake systems
- 19.0.7.2 Inspect brake components for signs of needed repair
- 19.0.7.3 Recondition or replace brake components

Competency 19.0.8: Adjust brakes

Competency Builders:

- 19.0.8.1 Inspect brake components for proper installation and alignment
- 19.0.8.2 Adjust brakes according to manufacturer's specifications
- 19.0.8.3 Start and operate unit for short distance to assess accuracy of brake adjustment
- 19.0.8.4 Stop unit and make needed readjustments to brakes

Unit 20: Servicing Multicylinder Engines

Competency 20.0.1: Practice established safety procedures

Competency Builders:

- 20.0.1.1 Wear personal safety apparatus
- 20.0.1.2 Identify potential hazards of working with multicylinder engine units
- 20.0.1.3 Follow standard safety procedures when working with components in motion

Competency 20.0.2: Identify types of engines

Competency Builders:

- 20.0.2.1 Differentiate types of multicylinder engines
- 20.0.2.2 Identify cylinder arrangement, cycle, and general characteristics of engine

Competency 20.0.3: Determine engine operational sequence

Competency Builders:

- 20.0.3.1 Refer to manufacturer's service manual for firing-order sequence
- 20.0.3.2 Identify crankshaft throw design*
- 20.0.3.3 Remove valve cover, roll engine by hand, and observe operational sequence

Competency 20.0.4: Adjust valve train components

Competency Builders:

- 20.0.4.1 Record firing order and position crankshaft to top dead center with #1 cylinder on compression stroke
- 20.0.4.2 Check and adjust valve lash to manufacturer's specifications
- 20.0.4.3 Continue to rotate engine for additional valve sequence and cylinder positioning for correct adjustment
- 20.0.4.4 Double-check all adjustments
- 20.0.4.5 Replace valve cover and torque to specifications

Competency 20.0.5: Set timing to manufacturer's specifications

Competency Builders:

- 20.0.5.1 Select static or dynamic timing instruments
- 20.0.5.2 Set initial timing statically according to manufacturer's specifications
- 20.0.5.3 Connect dynamic timing light
- 20.0.5.4 Ensure wires are clear of potential hazards and start engine
- 20.0.5.5 Observe actual timing and adjust to manufacturer's specifications

* Advancing

** Futuring

Power Equipment Technology--1/92

Competency 20.0.6: Adjust carburetor synchronization

Competency Builders:

- 20.0.6.1 Select and set up carburetor synchronization instruments
- 20.0.6.2 Refer to manufacturer's service manual for acceptable tolerances
- 20.0.6.3 Start engine and make adjustments
- 20.0.6.4 Start engine and analyze performance

Competency 20.0.7: Run cylinder leak-down test

Competency Builders:

- 20.0.7.1 Refer to service manual for leak-down testing procedure
- 20.0.7.2 Set up leak-down tester
- 20.0.7.3 Conduct test and record findings
- 20.0.7.4 Compare findings with manufacturer's specifications
- 20.0.7.5 Perform required repairs
- 20.0.7.6 Disconnect and store equipment

Unit 21: Troubleshooting

Competency 21.0.1: Practice established safety procedures

Competency Builders:

- 21.0.1.1 Wear personal safety apparatus
- 21.0.1.2 Follow standard safety procedures

Competency 21.0.2: Conduct tests on ignition systems

Competency Builders:

- 21.0.2.1 Conduct spark check with plug removed
- 21.0.2.2 Identify, set up, and use electronic testing equipment
- 21.0.2.3 Compare test data with manufacturer's specifications
- 21.0.2.4 Recondition, replace, and adjust components as needed

Competency 21.0.3: Inspect fuel system components

Competency Builders:

- 21.0.3.1 Check for leaks
- 21.0.3.2 Inspect fuel for contamination
- 21.0.3.3 Inspect mating surfaces and shafts for air leaks
- 21.0.3.4 Preset adjustments of components according to manufacturer's specifications

Competency 21.0.4: Run compression check in engines with and without automatic compression release

Competency Builders:

- 21.0.4.1 Refer to service manuals for pressure specifications
- 21.0.4.2 Use compression-testing equipment
- 21.0.4.3 Compare findings with specifications and analyze condition
- 21.0.4.4 List problems based on test findings
- 21.0.4.5 Make needed repairs

Competency 21.0.5: Inspect governor and speed-control components

Competency Builders:

- 21.0.5.1 Inspect governor components for signs of wear
- 21.0.5.2 Refer to manufacturer's specifications for top governor speed RPM
- 21.0.5.3 Set idle and top RPM within specifications
- 21.0.5.4 Double-check completed work with appropriate testing equipment

Competency 21.0.6: Inspect safety lockout devices

Competency Builders:

- 21.0.6.1 Distinguish between types of safety lockout mechanisms
- 21.0.6.2 Use testing equipment according to manufacturer's recommendations
- 21.0.6.3 Inspect and repair/replace defective components
- 21.0.6.4 Test lockout systems

Competency 21.0.7: Inspect cooling and lubrication systems

Competency Builders:

- 21.0.7.1 Inspect cooling systems for signs of leaks or other service needs
- 21.0.7.2 Conduct system checks according to manufacturer's recommendations
- 21.0.7.3 Analyze system condition and make needed repairs
- 21.0.7.4 Inspect lubrication system and make analysis

Unit 22: Equipment Maintenance and Storage

Competency 22.0.1: Practice established safety procedures

Competency Builders:

- 22.0.1.1 Wear personal safety apparatus
- 22.0.1.2 Maintain clean and orderly work area
- 22.0.1.3 Remove spark plug(s) from engine before servicing

Competency 22.0.2: Drain and clean fuel system components

Competency Builders:

- 22.0.2.1 Use compressed air according to Occupational Safety and Health Administration (OSHA) specifications
- 22.0.2.2 Handle caustic substances according to material safety data sheets (MSDSs)
- 22.0.2.3 Dispose of used gasoline and caustic substances according to Environmental Protection Agency (EPA) requirements

Competency 22.0.3: Service, clean, and sharpen power saw chain

Competency Builders:

- 22.0.3.1 Identify pitch and cutter style of chain
- 22.0.3.2 Clean chain with proper solvent
- 22.0.3.3 Inspect chain for damage
- 22.0.3.4 Repair or replace cracked or broken links
- 22.0.3.5 Sharpen according to manufacturer's specifications
- 22.0.3.6 Reinstall and adjust chain according to manufacturer's specifications

Power Equipment Technology--1/92

Competency 22.0.4: Remove, clean, inspect, sharpen, and balance cutting blades

Competency Builders:

- 22.0.4.1 Remove spark plug(s) before servicing cutting blade
- 22.0.4.2 Remove blade
- 22.0.4.3 Clean and inspect blade for wear and/or damage
- 22.0.4.4 Cover one end of blade when sharpening opposite end
- 22.0.4.5 Sharpen and balance blade
- 22.0.4.6 Remount blade

Competency 22.0.5: Retorque mounting bolts or nuts

Competency Builders:

- 22.0.5.1 Use new blade bolt each time blade is removed
- 22.0.5.2 Select proper grade and thread bolt
- 22.0.5.3 Torque blade bolt or nut to manufacturer's specifications
- 22.0.5.4 Recheck and record reading on work order

Competency 22.0.6: Service batteries

Competency Builders:

- 22.0.6.1 Wear personal safety apparatus
- 22.0.6.2 Remove battery from unit
- 22.0.6.3 Clean dirt and corrosion from exterior surface
- 22.0.6.4 Inspect battery components for signs of damage
- 22.0.6.5 Set up and operate charger
- 22.0.6.6 Conduct test on battery
- 22.0.6.7 Reinstall new or serviced battery into unit
- 22.0.6.8 Dispose of old battery according to OSHA and EPA specifications

Competency 22.0.7: Check and adjust air pressure in tires

Competency Builders:

- 22.0.7.1 Inspect tires and tubes for signs of wear
- 22.0.7.2 Inflate or reduce pressure according to recommendations on sidewalls

Competency 22.0.8: Clean, repair, and paint decks, frames, and sheet metal covers and shrouds

Competency Builders:

- 22.0.8.1 Wear personal safety apparatus
- 22.0.8.2 Remove rust or corrosion
- 22.0.8.3 Remove gas tank from unit when making welding repairs
- 22.0.8.4 Clean, prime, and paint surfaces according to paint manufacturer's directions
- 22.0.8.5 Clean and store painting equipment
- 22.0.8.6 Store unused paint in designated safe area

Competency 22.0.9: Prepare unit for off-season storage

Competency Builders:

- 22.0.9.1 Drain gasoline from tank
- 22.0.9.2 Start engine and allow carburetor(s) to run dry
- 22.0.9.3 Coat cylinder(s) with oil
- 22.0.9.4 Drain and refill crankcase with oil
- 22.0.9.5 Remove and store battery
- 22.0.9.6 Store unit in dry, well-ventilated area

Unit 23: Customer Relations

Competency 23.0.1: Review operational safety issues when dealing with customers

Competency Builders:

- 23.0.1.1 Explain customer safety policy
- 23.0.1.2 Advise customers of potential shop safety hazards
- 23.0.1.3 Explain liability considerations when dealing with customers
- 23.0.1.4 Maintain nonargumentative status when dealing with customers

Competency 23.0.2: Demonstrate courtesy when communicating with customers

Competency Builders:

- 23.0.2.1 Practice tactfulness when talking with customers
- 23.0.2.2 Assist in loading and unloading of units to be serviced
- 23.0.2.3 Use special care when handling customer-owned units
- 23.0.2.4 Fill out work order completely and check it with customer
- 23.0.2.5 Obtain customer signature on work order

Competency 23.0.3: Tag and store units according to shop policy

Competency Builders:

- 23.0.3.1 Code tag and attach to unit
- 23.0.3.2 Issue claim check to customer
- 23.0.3.3 Place tagged unit in preservice area

Competency 23.0.4: Follow service repair routine

Competency Builders:

- 23.0.4.1 Follow approved shop policy/procedure when servicing units
- 23.0.4.2 Troubleshoot and analyze potential problems before disassembly
- 23.0.4.3 Preorder commonplace replacement parts before beginning work
- 23.0.4.4 Communicate with service manager during repairs
- 23.0.4.5 Communicate with customer during repairs

Power Equipment Technology--1/92

Competency 23.0.5: Calculate estimates*

Competency Builders:

- 23.0.5.1 Refer to manufacturer's parts list and price book in calculating cost*
- 23.0.5.2 Record flat rate permitted for repair and figure labor cost*
- 23.0.5.3 List parts and labor estimates on work order*
- 23.0.5.4 Calculate estimated total cost for repair*
- 23.0.5.5 Contact customer and obtain approval before proceeding with repairs*

Competency 23.0.6: Use appropriate telephone manners when scheduling customer service work

Competency Builders:

- 23.0.6.1 State identity when answering telephone
- 23.0.6.2 Greet customer with enthusiasm
- 23.0.6.3 List and read back requested service and/or repair needs
- 23.0.6.4 Schedule time of delivery or pickup within reasonable time parameters
- 23.0.6.5 Confirm delivery and work to be done by summarizing before ending conversation
- 23.0.6.6 Express gratitude to customer for calling

Unit 24: Employability Skills

Subunit 24.1: Career Development

Competency 24.1.1: Investigate career options

Competency Builders:

- 24.1.1.1 Determine interests and aptitudes
- 24.1.1.2 Identify career options
- 24.1.1.3 Research occupations matching interests and aptitudes
- 24.1.1.4 Select career(s) that best match(es) interests and aptitudes
- 24.1.1.5 Identify advantages and disadvantages of career options, including nontraditional careers
- 24.1.1.6 Assess differences in wages, annual incomes, and job opportunities based on geographic location
- 24.1.1.7 Develop a career plan

Competency 24.1.2: Analyze potential barriers to employment

Competency Builders:

- 24.1.2.1 Identify common barriers to employment
- 24.1.2.2 Describe strategies to overcome employment barriers

Unit 24: Employability Skills

Subunit 24.2: Decision Making and Problem Solving

Competency 24.2.1: Apply decision-making techniques in the workplace

Competency Builders:

- 24.2.1.1 Identify the decision to be made
- 24.2.1.2 Compare alternatives
- 24.2.1.3 Determine consequences of each alternative
- 24.2.1.4 Make decisions based on values and goals
- 24.2.1.5 Evaluate the decision made

Competency 24.2.2: Apply problem-solving techniques in the workplace

Competency Builders:

- 24.2.2.1 Diagnose the problem and its causes
- 24.2.2.2 Identify alternatives and their consequences in relation to the problem
- 24.2.2.3 Examine multicultural and nonsexist dimensions of problem solving
- 24.2.2.4 Utilize resources to explore possible solutions to the problem
- 24.2.2.5 Compare and contrast the advantages and disadvantages of each solution
- 24.2.2.6 Determine appropriate action
- 24.2.2.7 Evaluate results

Unit 24: Employability Skills

Subunit 24.3: Work Ethic

Competency 24.3.1: Evaluate the relationship of self-esteem to work ethic

Competency Builders:

- 24.3.1.1 Identify special characteristics and abilities in self and others
- 24.3.1.2 Identify internal and external factors that affect self-esteem

Competency 24.3.2: Analyze the relationship of personal values and goals to work ethic both in and out of the workplace

Competency Builders:

- 24.3.2.1 Distinguish between values and goals
- 24.3.2.2 Determine the importance of values and goals
- 24.3.2.3 Evaluate how values affect goals
- 24.3.2.4 Identify short-term and long-term goals
- 24.3.2.5 Prioritize personal goals
- 24.3.2.6 Describe how personal values are reflected in work ethic
- 24.3.2.7 Describe how interactions in the workplace affect personal work ethic
- 24.3.2.8 Examine how life changes affect personal work ethic

Competency 24.3.3: Demonstrate work ethic

Competency Builders:

- 24.3.3.1 Examine factors that influence work ethic
- 24.3.3.2 Exhibit characteristics that reflect an appropriate work ethic

* Advancing

** Futuring

Unit 24: Employability Skills

Subunit 24.4: Job-Seeking Skills

Competency 24.4.1: Prepare for employment

Competency Builders:

- 24.4.1.1 Identify traditional and nontraditional employment sources
- 24.4.1.2 Utilize employment sources
- 24.4.1.3 Research job opportunities, including nontraditional careers
- 24.4.1.4 Interpret equal employment opportunity laws
- 24.4.1.5 Explain the critical importance of personal appearance, hygiene, and demeanor throughout the employment process
- 24.4.1.6 Prepare for generic employment tests and those specific to an occupation/organization

Competency 24.4.2: Design a résumé

Competency Builders:

- 24.4.2.1 Identify personal strengths and weaknesses
- 24.4.2.2 List skills and/or abilities, career objective(s), accomplishments/achievements, educational background, and work experience
- 24.4.2.3 Demonstrate legible written communication skills using correct grammar, spelling, and concise wording
- 24.4.2.4 Complete résumé using various formats
- 24.4.2.5 Secure references

Competency 24.4.3: Complete and process job application forms

Competency Builders:

- 24.4.3.1 Explain the importance of an application form
- 24.4.3.2 Identify ways to obtain job application forms
- 24.4.3.3 Describe methods for handling illegal questions on job application forms
- 24.4.3.4 Demonstrate legible written communication skills using correct grammar, spelling, and concise wording
- 24.4.3.5 Return application to proper person, request interview, and follow up

Competency 24.4.4: Demonstrate interviewing skills

Competency Builders:

- 24.4.4.1 Investigate interview environment and procedures
- 24.4.4.2 Explain the critical importance of personal appearance, hygiene, and demeanor
- 24.4.4.3 Demonstrate question and answer techniques
- 24.4.4.4 Demonstrate methods for handling difficult and/or illegal interview questions

Competency 24.4.5: Secure employment

Competency Builders:

- 24.4.5.1 Identify present and future employment opportunities within an occupation/organization
- 24.4.5.2 Research the organization/company
- 24.4.5.3 Use follow-up techniques to enhance employment potential
- 24.4.5.4 Compare and evaluate job offers

Unit 24: Employability Skills

Subunit 24.5: Job Retention Skills

Competency 24.5.1: Analyze the organizational structure of the workplace

Competency Builders:

- 24.5.1.1 Identify and evaluate employer expectations regarding job performance, work habits, attitudes, personal appearance, and hygiene
- 24.5.1.2 Be aware of and obey all company policies and procedures
- 24.5.1.3 Examine the role/relationship between employee and employer
- 24.5.1.4 Recognize opportunities for advancement and reasons for termination

Competency 24.5.2: Maintain positive relations with others

Competency Builders:

- 24.5.2.1 Exhibit appropriate work habits and attitude
- 24.5.2.2 Identify behaviors to establish successful working relationships
- 24.5.2.3 Cooperate and compromise through teamwork and group participation
- 24.5.2.4 Identify alternatives for dealing with harassment, bias, and discrimination based on race, color, national origin, sex, religion, handicap, or age

Unit 24: Employability Skills

Subunit 24.6: Job Advancement

Competency 24.6.1: Analyze opportunities for personal and career growth

Competency Builders:

- 24.6.1.1 Determine opportunities within an occupation/organization
- 24.6.1.2 Compare and contrast other opportunities
- 24.6.1.3 List benefits of job advancement
- 24.6.1.4 Evaluate factors involved when assuming a new position within or outside an occupation/organization

Power Equipment Technology--1/92

Competency 24.6.2: Exhibit characteristics needed for advancement

Competency Builders:

- 24.6.2.1 Display a positive attitude
- 24.6.2.2 Demonstrate knowledge of a position
- 24.6.2.3 Perform quality work
- 24.6.2.4 Adapt to changing situations and technology
- 24.6.2.5 Demonstrate capability for different positions
- 24.6.2.6 Participate in continuing education/training programs
- 24.6.2.7 Respect, accept, and work with ALL individuals in the workplace

Unit 24: Employability Skills

Subunit 24.7: Technology in the Workplace

Competency 24.7.1: Assess the impact of technology in the workplace

Competency Builders:

- 24.7.1.1 Cite how past business/industry practices have influenced present business/industry processes
- 24.7.1.2 Investigate the use of technology in the workplace
- 24.7.1.3 Analyze how present skills can be applied to learning new technologies

Competency 24.7.2: Use a variety of technological applications

Competency Builders:

- 24.7.2.1 Explore basic mathematical, scientific, computer, and technological principles
- 24.7.2.2 Use technology to accomplish assigned tasks
- 24.7.2.3 Create solutions to problems using technical means

Unit 24: Employability Skills

Subunit 24.8: Lifelong Learning

Competency 24.8.1: Apply lifelong learning to individual situations

Competency Builders:

- 24.8.1.1 Define lifelong learning
- 24.8.1.2 Identify factors that cause the need for lifelong learning

Competency 24.8.2: Adapt to change

Competency Builders:

- 24.8.2.1 Analyze the effects of change
- 24.8.2.2 Identify reasons why goals change
- 24.8.2.3 Describe the importance of flexibility when reevaluating goals
- 24.8.2.4 Evaluate the need for continuing education/training

Unit 24: Employability Skills

Subunit 24.9: Economic Education

Competency 24.9.1: Analyze global enterprise system

Competency Builders:

- 24.9.1.1 Identify characteristics of various enterprise systems
- 24.9.1.2 Examine the relationship between competition, risk, and profit
- 24.9.1.3 Illustrate how supply and demand influence price

Competency 24.9.2: Evaluate personal money management

Competency Builders:

- 24.9.2.1 Describe the need for personal management records
- 24.9.2.2 Identify methods of taxation
- 24.9.2.3 Analyze how credit affects financial security
- 24.9.2.4 Compare types and methods of investments
- 24.9.2.5 Prepare a personal budget
- 24.9.2.6 Be an informed and responsible consumer
- 24.9.2.7 Analyze the effects of advertising on the consumer

Unit 24: Employability Skills

Subunit 24.10: Balancing Work and Family

Competency 24.10.1: Analyze the effects of family on work

Competency Builders:

- 24.10.1.1 Recognize how family values, goals, and priorities are reflected in the workplace
- 24.10.1.2 Identify present and future family structures and responsibilities
- 24.10.1.3 Describe personal and family roles
- 24.10.1.4 Analyze concerns of working parent(s)
- 24.10.1.5 Examine how family responsibilities can conflict with work
- 24.10.1.6 Resolve family-related conflicts
- 24.10.1.7 Explain how to use support systems/community resources to help resolve family-related conflicts

Competency 24.10.2: Analyze the effects of work on family

Competency Builders:

- 24.10.2.1 Identify responsibilities associated with paid and nonpaid work
- 24.10.2.2 Compare the advantages and disadvantages of multiple incomes
- 24.10.2.3 Explain how work can conflict with family responsibilities
- 24.10.2.4 Explain how work-related stress can affect families
- 24.10.2.5 Identify family support systems and resources

Unit 24: Employability Skills

Subunit 24.11: Citizenship in the Workplace

Competency 24.11.1: Exercise the rights and responsibilities of citizenship in the workplace

Competency Builders:

- 24.11.1.1 Identify the basic rights and responsibilities of citizenship
- 24.11.1.2 Examine the history and contributions of all racial, ethnic, and cultural groups

Competency 24.11.2: Cooperate with others in the workplace

Competency Builders:

- 24.11.2.1 Identify situations in which compromise is necessary
- 24.11.2.2 Examine how individuals from various backgrounds contribute to work-related situations
- 24.11.2.3 Demonstrate initiative to facilitate cooperation
- 24.11.2.4 Give and receive constructive criticism to enhance cooperation

Unit 24: Employability Skills

Subunit 24.12: Leadership

Competency 24.12.1: Evaluate leadership styles appropriate for the workplace

Competency Builders:

- 24.12.1.1 Identify characteristics of effective leaders
- 24.12.1.2 Compare leadership styles
- 24.12.1.3 Demonstrate effective delegation skills
- 24.12.1.4 Identify opportunities to lead in the workplace

Competency 24.12.2: Demonstrate effective teamwork skills

Competency Builders:

- 24.12.2.1 Identify the responsibilities of a valuable group member
- 24.12.2.2 Exhibit open-mindedness
- 24.12.2.3 Identify methods of involving each member of a team
- 24.12.2.4 Contribute to the efficiency and success of a group
- 24.12.2.5 Determine ways to motivate others

Competency 24.12.3: Utilize effective communication skills

Competency Builders:

- 24.12.3.1 Identify the importance of listening
- 24.12.3.2 Demonstrate assertive communication
- 24.12.3.3 Recognize the importance of verbal and nonverbal cues and messages
- 24.12.3.4 Analyze written material
- 24.12.3.5 Prepare written material
- 24.12.3.6 Give and receive feedback
- 24.12.3.7 Articulate thoughts
- 24.12.3.8 Use appropriate language

Unit 24: Employability Skills

Subunit 24.13: Entrepreneurship

Competency 24.13.1: Evaluate the role of small business in the economy

Competency Builders:

- 24.13.1.1 Identify the benefits of small business to a community
- 24.13.1.2 Analyze opportunities for small business in a community

Competency 24.13.2: Examine considerations of starting a business

Competency Builders:

- 24.13.2.1 Research a business idea
- 24.13.2.2 Compare various ways to become a small business owner
- 24.13.2.3 Investigate factors to consider in financing a new business
- 24.13.2.4 Evaluate entrepreneurship as a career option

Distributed by

Vocational Instructional Materials Laboratory

The Ohio State University
1900 Kenny Road
Columbus, Ohio 43210-1090