Instructional/Task Analysis

Related Information: What the Student Should Know

Application: What the Student Should Be Able to Do

Unit 1: Lubrication Systems

1. Definitions of terms associated with lubrication systems
2. Purpose of the lubrication system
3. Types of lubrication systems and their descriptions
4. Types of lubrication systems used on two-stroke-cycle and four-stroke cycle engines
5. Functions of engine oil
6. Characteristics of a good engine oil
7. API oil ratings and their descriptions
8. Statements concerning SAE viscosity numbers
9. Statements concerning oil service ratings
10. Types of oil additives and their definitions
11. Common oil contaminants
12. Types of oil filters used on power product equipment engines
13. Oil-storage designs used in lubrication systems and their descriptions
14. Methods of checking oil level in an engine and their descriptions
15. Guidelines for selecting and using oils
16. Functions of crankcase ventilation
17. Components of a crankcase breather assembly
18. Functions of the components of a crankcase breather assembly
19. Interpret engine-oil application charts
20. Change engine oil and filter
21. Service a crankcase breather assembly
22. Prepare pre-mixed fuel for a two-stroke-cycle engine

Instructional/Task Analysis

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Unit 2: Cooling Systems	
1. Definitions of terms associated with cooling systems	12. Remove, clean, and replace air-cooled system parts
2. Purpose of the cooling system	13. Remove, clean, and replace water-cooled system parts
3. Methods of heat transfer and their definitions	
4. Major types of cooling systems used on power product equipment and their definitions	
5. Types of air-cooled systems and their descriptions	
6. Major components of an air-cooled system	
7. Functions of the major components of an air-cooled system	
8. Types of water-cooled systems and their descriptions	
9. Major components of a water-cooled system	
10. Functions of the components of a water-cooled system	
11. Causes of overheating	
Unit 3: Fuel Systems	
1. Definitions of terms associated with fuel systems	
2. Purpose of the fuel system	
3. Basic types of fuel systems used in power product equipment engines and their descriptions	
4. Components of a typical fuel system and their functions	
5. Types of carburetor designs used on power product equipment engines and their descriptions	
6. Parts of a vacuum-feed carburetor with diaphragm	
7. Parts of a vacuum-feed carburetor with float	

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Unit 3: Fuel Systems (continued)	
8. Parts of a diaphragm carburetor	18. Classify fuel-system designs
9. Subsystems of a carburetor and their functions	19. Service an air filter
10. Principles of carburetor operation	20. Remove and replace a carburetor
11. Venturi principle	21. Service a carburetor
12. Types of fuel filters used on power product equipment	22. Remove and replace a fuel pump
13. Types of fuel pumps used on power product equipment and their descriptions	23. Test and service a fuel pump
14. Principles of fuel-pump operation	24. Remove, service, and replace a fuel filter
15. Methods used to enrich the fuel mixture and their descriptions	
16. Descriptions of fuel-tank design considerations in equipment repair	
17. Types of air filters used on power product equipment engines	
Unit 4Governor Systems	
1. Definitions of terms associated with governor systems	9. Inspect, adjust, and repair an air-vane governor system
2. Purpose of the governor system	10. Inspect and adjust external components of a mechanical governor system
3. Components of an air-vane governor system	11. Replace internal components of a mechanical governor system
4. Functions of the components of an air-vane governor system	
5. Principles of operation of an air-vane governor system	
6. Components of a mechanical governor system	
7. Functions of the components of a mechanical governor system	
8. Principles of operation of a mechanical governor system	

Instructional/Task Analysis

Related Information: What the Student Should Know	Application: What the Student Should Be Able to Do
Unit 5: Basic Electrical Principles	
1. Definitions of terms associated with basic electrical principles	13. Solve problems using Ohm's Law
2. Description of the electron theory of electricity	14. Interpret wiring diagrams for power product equipment electrical circuits
3. Definitions of the difference between a conductor and an insulator	15. Measure resistance
4. Components of a basic electrical circuit and their purposes	16. Check continuity
5. Types of electrical flow	17. Measure amperage in a circuit
6. Basic electrical circuits and their descriptions	18. Check voltage
7. Description of electron flow through a single-wire circuit	
8. Types of electrical-circuit problems and their descriptions	
9. Characteristics of electricity and their definitions	
10. Basic electrical measurements used to measure each electrical characteristic	
11. Equipment used to measure electrical characteristics	
12. Descriptions of the relationship between electricity and magnetism	
Unit 6: Ignition Systems	
1. Definitions of terms associated with ignition systems	
2. Purpose of the ignition system	
3. Types of spark ignition systems and descriptions of the source of electrical power for each	
4. Components of a battery ignition system	
5. Components of types of magneto ignition systems	
6. Purposes of the components of ignition systems	

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Unit 6: Ignition Systems (continued)

7. Classifications of ignition-system components as part of the primary circuit or the secondary circuit
8. Principles of operation of a battery ignition system
9. Principles of operation of types of magneto ignition systems
10. Test and inspect ignition system
11. Remove and replace breaker points and condenser
12. Check, test, and service magnets, flywheel, and armature
13. Test and adjust an electronic ignition
14. Perform a coil power test
15. Check ignition timing

Unit 7: Starting Systems

1. Definitions of terms associated with starting systems
2. Purpose of the starting system
3. Types of starting systems and descriptions of their principles of operation
4. Components of a recoil starting system and their purposes
5. Components of a DC electric starting system and their purposes
6. Components of an AC electric starting system and their purposes
7. Service a recoil starting system
8. Remove, disassemble, test, service, reassemble, and replace a DC electric starting system

Unit 8: Charging Systems

1. Definitions of terms associated with charging systems
2. Purpose of the charging system
3. Major components of a charging system and their purposes
4. Sources of electrical power for the various stages of power product equipment operation
5. Parts of a flywheel alternator
6. Principles of flywheel-alternator operation
7. Test and service a flywheel-alternator charging system

Instructional/Task Analysis

Related Information: What the Student Should Know	Application: What the Student Should Be Able to Do

Unit 9: Exhaust Systems

Related Information: What the Student Should Know	Application: What the Student Should Be Able to Do
1. Definitions of terms associated with exhaust systems	9. Remove, service, and replace an exhaust system on a two-stroke cycle engine
2. Purpose of the exhaust system	10. Remove, service, and replace an exhaust system on a four-stroke cycle engine
3. Major components of the exhaust system	
4. Functions of the major components of the exhaust system	
5. Types of exhaust systems and their descriptions	
6. Classifications of exhaust systems used on two-stroke-cycle engines and four-stroke-cycle engines	
7. Descriptions of equipment problems that can occur from operating equipment with a worn or damaged exhaust system	
8. Statement of the danger of operating a power product equipment engine in a closed area	

Unit 10: Troubleshooting

Related Information: What the Student Should Know	Application: What the Student Should Be Able to Do
1. Definitions of terms associated with troubleshooting	5. Interpret troubleshooting charts
2. Purpose of troubleshooting	6. Troubleshoot the fuel system
3. Major areas of engine troubleshooting	7. Troubleshoot the ignition system
4. Steps in the troubleshooting process	8. Troubleshoot engine compression
	9. Troubleshoot the charging system

Related Information: What the Student Should Know	Application: What the Student Should Be Able to Do

Unit 11: Engine Overhaul

Related Information: What the Student Should Know	Application: What the Student Should Be Able to Do
1. Definitions of terms associated with engine overhaul	5. Determine whether an engine should be overhauled
2. Definitions of overhaul operations associated with the piston and connecting-rod assembly	6. Disassemble, inspect, and service a two-stroke-cycle engine
3. Definitions of overhaul operations associated with the crankshaft assembly	7. Reassemble a two-stroke-cycle engine
4. Definitions of overhaul operations associated with the valve assembly	8. Disassemble a four-stroke-cycle engine
	9. Inspect and service a cylinder on a four-stroke-cycle engine
	10. Inspect and service the piston, rings, and connecting rod on a four-stroke-cycle engine
	11. Inspect and service a crankshaft and crankcase assembly on a four-stroke-cycle engine
	12. Inspect and service a valve assembly on a four-stroke-cycle engine
	13. Reassemble a four-stroke-cycle engine

Unit 12: Failure Analysis

Related Information: What the Student Should Know	Application: What the Student Should Be Able to Do
1. Definitions of terms associated with failure analysis	7. Complete a failure-analysis checklist
2. Reasons for performing failure analysis	8. Evaluate cause of engine failure
3. Descriptions of operational, material, or combination failures	9. Perform failure analysis
4. Signs of engine failure and their definitions	
5. Common causes of engine failure	
6. Steps in the failure-analysis process	