

2023 Idaho Heavy Equipment/Diesel Technology Criticality Survey (39)	
CONTENT STANDARD 1.0: PROFESSIONAL ORGANIZATIONS AND LEADERSHIP	
Performance Standard 1.1: Effective Leadership and Participation in Career Technical Student Organizations (CTSO) and Professional Associations	
Q2. 1.1.1 Explore the role of professional organizations and/or associations in the heavy equipment/diesel industry.	1.67
Q3. 1.1.2 Participate in content aligned CTSO.	1.69
Q4. 1.1.3 Participate in a CTSO event at the local level or above.	1.64
Q5. 1.1.4 Engage in career exploration and development through CTSO participation.	1.74
CONTENT STANDARD 2.0: TRANSPORTATION AND HEAVY EQUIPMENT CAREERS	
Performance Standard 2.1: Career Exploration	
Q6. 2.1.1 Describe the value of the transportation and equipment industry and its effects on society.	2.00
Q7. 2.1.2 Investigate new and emerging technologies in the transportation and equipment industry.	2.18
Q8. 2.1.3 Research the different career opportunities in the transportation and equipment career pathway.	1.90
Q9. 2.1.4 Describe requirements (e.g., education, training, credentials, legal choices) for entering and continuing a career pathway.	2.13
Performance Standard 2.2: Industry Ethics and Standards	
Q10. 2.2.1 Describe the Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration (MSHA) safety standards and consequences for violating them.	2.21
Q11. 2.2.2 Describe common environmental practices and the role of the Environmental Protection Agency (EPA) in the diesel industry.	2.08
Q12. 2.2.3 Identify Department of Labor Federal Employment Laws.	1.69
Q13. 2.2.4 Describe personal accountability and responsibility for your career and safety.	2.62
CONTENT STANDARD 3.0: SAFETY AND TOOLS	
Performance Standard 3.1: Lab Safety	
Q14. 3.1.1 Perform a job hazard analysis (e.g., manual lifting requirements, high-voltage commercial, alternative fuel-powered vehicles/equipment, high-pressure fluids, stored energy) prior to service.	2.38
Q15. 3.1.2 Describe the importance of maintaining a positive and active safety culture.	2.49
Q16. 3.1.3 Adhere to ventilation requirements and procedures when working in the lab/shop area.	2.28
Q17. 3.1.4 Identify marked safety areas.	2.31
Q18. 3.1.5 Identify the location and the types of fire extinguishers and other fire safety equipment.	2.18
Q19. 3.1.6 Describe procedures for using fire extinguishers and other fire safety equipment.	2.18
Q20. 3.1.7 Identify the location and use of eye wash stations and chemical showers.	2.28
Q21. 3.1.8 Identify site-specific emergency procedures and the location of evacuation routes.	2.23
Q22. 3.1.9 Comply with the required use of safety glasses, ear protection, gloves, and shoes (i.e., personal protection equipment [PPE]) during lab/shop activities.	2.64
Q23. 3.1.10 Identify clothing, jewelry, and hair hazards before engaging in lab/shop activities.	2.49
Q24. 3.1.11 Describe location of safety data sheets (SDS) and their purpose.	2.18
Q25. 3.1.12 Describe common shop hazards and housekeeping duties.	2.31
Q26. 3.1.13 Describe the requirements of reporting workplace safety incidents.	2.26
Performance Standard 3.2: Tool and Equipment Safety	
Q27. 3.2.1 Identify tools and equipment used in the lab/shop.	2.31
Q28. 3.2.2 Identify standard and metric designations on tools and equipment.	2.28
Q29. 3.2.3 Identify hazards associated with the use of hand and power tools and equipment.	2.38
Q30. 3.2.4 Demonstrate safe handling of tools and equipment.	2.44
Q31. 3.2.5 Reference procedures for handling tools, fuels, and equipment, including EV-related and alternative fuels.	2.18
Q32. 3.2.6 Demonstrate lifting procedures and use of support equipment (e.g., jacks and jackstand placement, lifts, cribbing, hoists, rigging).	2.49
Q33. 3.2.7 Maintain tools and equipment, inspecting them prior to use and removing tools from service when in need of repair or replacement.	2.31

Q34. 3.2.8 Demonstrate accurate measurement techniques when using precision measuring tools (e.g., micrometer, dial-indicator, dial-caliper).	2.21
CONTENT STANDARD 4.0: BASIC VEHICLE/EQUIPMENT	
Performance Standard 4.1: Vehicle/Equipment Service Information	
Q35. 4.1.1 Interpret vehicle/equipment service information.	2.13
Q36. 4.1.2 Record diagnostic codes, using electronic service tool and manufacturer's procedure.	2.13
Q37. 4.1.3 Interpret technical service bulletins (TSBs), special service messages, quotes, service campaigns/recalls, vehicle/equipment/service warranty applications, and service interval recommendations.	2.05
Q38. 4.1.4 Identify vehicle/equipment identification number (VIN) and production-date code.	2.05
Q39. 4.1.5 Identify other vehicle/equipment information (e.g., engine, tire, emissions).	2.10
Performance Standard 4.2: Vehicle/Equipment Handling for Service and Returning to Customer	
Q40. 4.2.1 Identify information needed (e.g., miles, hours, make/model, VIN/serial number) and the service requested on a repair order.	2.18
Q41. 4.2.2 Perform a 360-degree vehicle/equipment, walk-around inspection.	2.21
Q42. 4.2.3 Identify the need for fender covers, seat covers, and floor mats.	1.87
Q43. 4.2.4 Describe the three Cs (i.e., concern, cause, correction) when inspecting and repairing vehicle/equipment.	2.45
Q44. 4.2.5 Interpret vehicle/equipment service and repair history and its possible effects on current repair.	2.05
Q45. 4.2.6 Identify types of information (e.g., pictures, video) needed to complete a repair.	1.97
Q46. 4.2.7 Describe the process of creating and completing a work order and service report.	2.05
Q47. 4.2.8 Prepare the vehicle/equipment for return to customer (e.g., cleanup, floor mats, steering wheel cover).	2.08
CONTENT STANDARD 5.0: DIESEL ENGINE SERVICE	
Performance Standard 5.1: Diesel Engine Theory, Components, and Operation	
Q48. 5.1.1 Describe the operation of a diesel engine.	2.21
Q49. 5.1.2 Describe the operations of a diesel engine's subsystems.	2.16
Q50. 5.1.3 Identify internal and external base engine components related to common diesel engines.	2.11
Q51. 5.1.4 Identify emission/after-treatment system components.	2.24
Performance Standard 5.2: Preliminary Engine Inspection	
Q52. 5.2.1 Inspect fuel, oil, diesel exhaust fluid (DEF) and coolant levels, and condition; determine needed action.	2.26
Q53. 5.2.2 Identify engine fuel, oil, coolant, air, and other leaks; determine needed action.	2.21
Q54. 5.2.3 Interpret observed engine exhaust smoke color and quantity.	1.89
Q55. 5.2.4 Interpret diagnostic codes related to engine function.	2.13
Q56. 5.2.5 Identify causes for power derate and inducement levels.	2.03
CONTENT STANDARD 6.0: Drive Train Overview	
Performance Standard 6.1: Basic Drive Train Introduction	
Q57. 6.1.1 Identify drive train components, transmission type and configuration.	2.16
Q58. 6.1.2 Describe the functions of drive train components.	2.16
CONTENT STANDARD 7.0: Steering and Suspension Overview	
Performance Standard 7.1: Basic Steering and Suspension Introduction	
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Q60. 7.1.2 Identify suspension components.	2.21
Q61. 7.1.3 Describe the functions of steering and suspension components.	2.16
CONTENT STANDARD 8.0: PREVENTATIVE MAINTENANCE INSPECTIONS	
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Q62. 8.1.1 Perform a Form A Preventative Maintenance Inspection.	2.16
Q63. 8.1.2 Perform a Form B Preventative Maintenance Inspection.	2.13
Q64. 8.1.3 Perform a Federal Motor Carrier Safety Administration (FMCSA) Safety Inspection.	1.95
Q65. 8.1.4 Describe the development, practices, and procedures of preventative maintenance programs.	1.92
CONTENT STANDARD 9.0: HYDRAULIC SYSTEMS	
Performance Standard 9.1: Hydraulic System Operation and Theory	

Q66. 9.1.1 Identify hydraulic system theory and safety procedures.	1.87
Q67. 9.1.2 Interpret system diagrams and schematics.	2.08
Q68. 9.1.3 Identify hydraulic system units of measurement (e.g., pressure, flow).	1.84
Performance Standard 9.2: Basic Hydraulic System Components	
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Q70. 9.2.2 Describe system type (i.e., closed or open) and proper operation.	1.87
Q71. 9.2.3 Identify pump types, actuators, and controls.	1.82
CONTENT STANDARD 10.0: BRAKE SYSTEM	
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Q73. 10.1.2 Identify brake components for hydraulic brake systems.	2.19
Q74. 10.1.3 Identify brake components for air brake systems.	2.38
Q75. 10.1.4 Describe wear limits and failures in brake linings, drums, and rotors.	2.27
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Q77. 10.2.2 Inspect and measure brake drums or rotors; replace as needed.	2.16
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Q79. 10.2.4 Inspect and service wheel bearings, according to manufacturer's specifications.	2.19
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Q90. 11.1.11 Locate shorts, grounds, and opens in electrical/electronic circuits.	2.14
Q91. 11.1.12 Inspect and test fusible links, circuit breakers, relays, solenoids, and fuses; replace as needed.	2.22
Q92. 11.1.13 Describe basic functions and structure of a controller area network (i.e., CAN/BUS).	2.00
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Q97. 11.2.4 Inspect and clean battery boxes, mounts, and hold downs; repair or replace as needed.	2.11
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Q99. 11.2.6 Inspect, test, and clean battery cables and connectors; repair or replace as needed.	2.30
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Q105. 11.3.3 Inspect and test, starter relays and solenoids/switches; replace as needed.	2.11
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Q107. 11.3.4 Replace starter, inspecting flywheel ring gear or flex plate.	2.05
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Q117. 11.5.4 Inspect and test switches, bulbs/LEDs, sockets, connectors, terminals, relays, wires, and control components/modules of parking, clearance, and taillight circuits; repair or replace as needed.	1.97
Q118. 11.5.5 Inspect and test tractor-to-trailer multi-wire connector(s); repair or replace as needed.	2.03
Q119. 11.5.6 Inspect, test, and adjust stop light circuit switches, bulbs/LEDs, sockets, connectors, terminals, wires, and control components/modules; repair or replace as needed.	2.06
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