

# Heavy Equipment Operations

## L1 HEAVY EQUIPMENT OPERATIONS

LEVEL 1



### Curriculum Notes

- 185 Total Hours (including 77.5 hours of Core)
- Revised: 2024, Fourth Edition
- Downloadable instructor resources are available.

#### PAPERBACK

Trainee Guide: \$69.99

ISBN

978-0-13-830422-5

#### DIGITAL (2013, Third Edition Only)

NCCERconnect Access Card: \$74.99

NCCERconnect + Trainee Guide: \$104.99

ISBN

978-0-13-830408-9

978-0-13-830424-9

### MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

#### Introduction to Heavy Equipment (5 Hours)

ISBN 978-0-13-532282-6

(Module ID 22101) Provides an overview of heavy equipment terminology, operations, operator responsibilities, career opportunities, and basic principles of safety.

#### Classification of Heavy Equipment (5 Hours)

ISBN 978-0-13-532286-4

(Module ID 22103) Introduces the most used pieces of heavy equipment in construction and mining. Describes the functional operation and uses for each piece of equipment, along with a general description of heavy equipment drive and hydraulic systems.

#### Heavy Equipment Operation Safety (15 Hours)

ISBN 978-0-13-532292-2

(Module ID 22102) Provides a comprehensive overview of safety requirements on jobsites with emphasis on OSHA, MSHA, and NIOSH requirements. Presents basic requirements for personal protection, safe equipment operations and maintenance, excavations, and HAZCOM.

#### Equipment Inspection, Operation, and Readiness

(25 Hours)

ISBN 978-0-13-532287-1

(Module ID 22108) Describes prestart inspection, operating, and shutdown procedures for heavy equipment. Covers engine systems and preoperational check procedures for hybrid and electrically powered equipment.

#### Introduction to Earthmoving (12.5 Hours)

ISBN 978-0-13-532288-8

(Module ID 22201) Provides a broad introduction to the process of planning and executing earthmoving activities on various types of construction projects. Explains types of heavy equipment used in excavating and methods of stabilizing soils.

#### Introduction to GPS/GNSS (5 Hours)

ISBN 978-0-13-532291-8

(Module ID 22109) Describes types of equipment and GPS and laser instruments used in finish grading. Covers processes for site planning for use with GNSS and autonomous equipment utilizing GPS/GNSS.

#### Utility Tractors (17.5 Hours)

ISBN 978-0-13-532294-9

(Module ID 22105) Covers operation of general utility tractors in the construction industry. Describes duties and responsibilities of the operator, safety rules for operation, the attachment of implements, and basic preventive maintenance practices.

#### Skid Steers (22.5 Hours)

ISBN 978-0-13-532296-3

(Module ID 22212) Describes the many uses of skid steers and the attachments available for these machines. Covers safety practices, as well as inspection, startup, shutdown, and operation of skid steers.

## L2 HEAVY EQUIPMENT OPERATIONS (REVISED)

LEVEL 2



### Curriculum Notes

- 200 Total Hours
- Revised: 2024, Fourth Edition
- Downloadable instructor resources are available.

#### PAPERBACK

Trainee Guide: \$99.99

ISBN

978-0-138304-539

#### DIGITAL (2013, Third Edition Only)

NCCERconnect Access Card: \$99.99

NCCERconnect + Trainee Guide: \$129.99

ISBN

978-0-13-830444-7

978-0-13-830435-5

### MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

#### Excavation Math (7.5 Hours)

ISBN 978-0-13-532297-0

(Module ID 22207) Covers basic math skills required for site excavation work. Includes methods and practice in calculating the areas and volumes of various geometric shapes, as well as formulas and methods used to calculate cut and fill requirements on a job.

#### Interpreting Civil Drawings (20 Hours)

ISBN 978-0-13-532298-7

(Module ID 22209) Explains how to read site plans to calculate cut and fill requirements. Provides instruction and practice in interpreting both roadway and construction site drawings used for excavation and grading work.

#### Soils (10 Hours)

ISBN 978-0-13-532299-4

(Module ID 22308) Describes soil classification systems and explains how shrink and swell factors affect equipment selection. Discusses how soil conditions affect equipment performance and explains techniques for working with various types of soils.

#### Site Work (25 Hours)

ISBN 978-0-13-532301-4

(Module ID 22210) Expands on information covered in Level 1 in relation to setting and interpreting grade stakes. Also provides information and instructions on controlling surface water and groundwater on a jobsite, as well as the layout of foundations and laying of pipe.

#### Grades and Grading (15 Hours)

ISBN 978-0-13-532304-5

(Module ID 22106) Introduces the concept of preparing graded surfaces using heavy equipment. Covers identification of

construction stakes and interpretation of marks on each type of stake. Describes the process for grading slopes.

#### Backhoes (30 Hours)

ISBN 978-0-13-532305-2

(Module ID 22303) Identifies and describes the common uses, types, components, instruments, controls, and attachments of backhoes. Presents safety guidelines, prestart inspection procedures, and preventive maintenance requirements. Describes basic startup and operation, and covers common work activities associated with backhoes.

#### Loaders (17.5 Hours)

ISBN 978-0-13-532307-6

(Module ID 22205) Covers the uses of wheel and track loaders, as well as operator maintenance, loader safety, and operating procedures. Includes procedures for using loaders in excavation, grading, and demolition work.

#### Dozers (30 Hours)

ISBN 978-0-13-532308-3

(Module ID 22302) Identifies and describes the common uses, types, and components of dozers. Presents safety guidelines, prestart inspection procedures, and preventive maintenance requirements. Describes basic startup and operation, and covers common work activities associated with dozers.

#### Excavators (35 Hours)


ISBN 978-0-13-532309-0

(Module ID 22304) Identifies and describes the common types, uses, and components of excavators. Presents safety guidelines, prestart inspection procedures, and preventive maintenance requirements. Describes basic startup and operation, and covers common work activities associated with excavators.

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## Heavy Equipment Operations Level 3

**L3 HEAVY EQUIPMENT OPERATIONS (REVISED)**



**LEVEL 3**

**Curriculum Notes**

- 145 Total Hours
- Revised: 2024, Fourth Edition
- Downloadable instructor resources are available.

<b>PAPERBACK</b>	<b>ISBN</b>
Trainee Guide: \$99.99	<b>978-0-13-830237-5</b>
<b>DIGITAL</b> (2013, Third Edition Only)	<b>ISBN</b>
NCCERconnect Access Card: \$99.99	<b>978-0-13-830229-0</b>
NCCERconnect + Trainee Guide: \$129.99	<b>978-0-13-830236-8</b>

### MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

#### Rough Terrain Forklifts (25 Hours)

ISBN 978-0-13-532542-1

(Module ID 22206) Covers the uses of forklifts on construction sites. Includes instructions for lifting, transporting, and placing various types of loads, as well as safety, operation, and maintenance procedures.

#### Conventional Forklifts (10 Hours)

ISBN 978-0-13-532544-5

(Module ID 22107) Covers operation of vertical-mast Sit-Down Counterbalance (SDCB) forklifts, commonly known as conventional forklifts. Describes duties and responsibilities of the operator, safety rules for operation, and distinguishing features. Includes operation for both indoor and outdoor environments.

#### Compaction Equipment (25 Hours)

ISBN 978-0-13-532546-9

(Module ID 22203) Provides training on common types of compaction equipment; the primary instruments, controls, and attachments of a roller; safety guidelines associated with compaction equipment; and prestart inspections, preventive maintenance, and proper operating procedures. Presents factors involved in work activities associated with a roller.

#### Scrapers (20 Hours)

ISBN 978-0-13-532547-6

(Module ID 22204) Provides training on common types of compaction equipment; the primary instruments, controls, and attachments of a roller; safety guidelines associated with compaction equipment; and prestart inspections, preventive maintenance, and proper operating procedures. Presents factors involved in work activities associated with a roller.

#### Scrapers (20 Hours)

ISBN 978-0-13-532547-6

(Module ID 22204) Describes the types of scrapers used in site preparation, as well as the safe practices associated with the operation of scrapers. Covers operator inspection and maintenance requirements, along with startup, shutdown, and operating techniques.

#### Dump Trucks (25 Hours)

ISBN 978-0-13-532548-3

(Module ID 22311) Identifies the types of on-road and off-road dump trucks and common instruments and control systems. Describes operator inspection and maintenance, safe driving practices for both on-road and within a jobsite, and startup and shutdown procedures.

#### Loaders (17.5 Hours)

ISBN 978-0-13-532307-6


(Module ID 22205) Covers the uses of wheel and track loaders, as well as operator maintenance, loader safety, and operating procedures. Includes procedures for using loaders in excavation, grading, and demolition work.

#### Motor Graders (40 Hours)

ISBN 978-0-13-532308-3

(Module ID 22305) Identifies and describes the common uses and types of motor graders. Presents safety guidelines, prestart inspection procedures, and preventive maintenance requirements. Describes basic startup and operation, and covers common work activities associated with motor graders.

**L1 HEAVY EQUIPMENT OPERATIONS (REVISED)**



**LEVEL 1**

**Curriculum Notes**

- 175 Total Hours (includes Core)
- Revised: 2020, Third Edition
- Downloadable instructor resources are available.

<b>PAPERBACK</b>	<b>ISBN</b>
Trainee Guide: \$69.99	<b>978-0-13-663897-1</b>
<b>DIGITAL</b> (2013, Third Edition Only)	<b>ISBN</b>
NCCERconnect Access Card: \$74.99	<b>978-0-13-448249-1</b>
NCCERconnect + Trainee Guide: \$104.99	<b>978-0-13-723965-8</b>

### MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

#### Orientation to the Trade (5 Hours)

ISBN 978-0-13-663915-2

(Module ID 22101) Provides an overview of heavy equipment terminology, operations, operator responsibilities, career opportunities, and basic principles of safety.

#### Heavy Equipment Safety (10 Hours)

ISBN 978-0-13-663907-7

(Module ID 22102) Provides a comprehensive overview of safety requirements on job sites with emphasis on OSHA, MSHA, and NIOSH requirements. Presents basic requirements for personal protection, safe equipment operations and maintenance, and HAZCOM.

#### Identification of Heavy Equipment (5 Hours)

ISBN 978-0-13-663920-6

(Module ID 22103) Instructs trainees in the care and use of the different types of hand and power tools they will use on the job. Gives trainees the information they need to select the appropriate tools for different tasks, and reviews tool maintenance and safety issues.

#### Basic Operational Techniques (27.5 Hours)

ISBN 978-0-13-663916-9

(Module ID 22104) Covers prestart checks of a machine's hardware (frame, body panels, tires or tracks, and safety equipment), driveline components, hydraulic system components, electrical components, and controls. Reviews machine safety issues. Explains how to safely start, move, steer, stop, and shut down different types of machines.

#### Utility Tractors (17.5 Hours)

ISBN 978-0-13-663910-7

(Module ID 22105) Covers operation of general utility tractors in the construction industry. Describes duties and responsibilities of the operator, safety rules for operation, the attachment of implements, and basic preventive maintenance practices.

#### Introduction to Earthmoving (12.5 Hours)

ISBN 978-0-13-663924-4

(Module ID 22201) Provides a broad introduction to the process of planning and executing earthmoving activities on various types of construction projects. The use of heavy equipment such as bulldozers, scrapers, excavators, and loaders is explained.

#### Grades (15 Hours)

ISBN 978-0-13-663918-3

(Module ID 22106) Introduces the concept of preparing graded surfaces using heavy equipment. Covers identification of construction stakes and interpretation of marks on each type of stake. Describes the process for grading slopes.

#### Vertical-Mast Sit-Down Counterbalance Forklifts (7.5 Hours)

ISBN 978-0-13-663909-1

(Module ID 22107) Covers operation of vertical-mast Sit-Down Counterbalance (SDCB) forklifts, commonly known as conventional forklifts. Describes duties and responsibilities of the operator, safety rules for operation, and distinguishing features. Includes operation for both indoor and outdoor environments.

## Heavy Equipment Operations Level 2

### L2 HEAVY EQUIPMENT OPERATIONS

#### LEVEL 2

##### Curriculum Notes

- 167.5 Hours
- Revised: 2013, Third Edition
- Downloadable instructor resources are available.

##### PAPERBACK

Trainee Guide: \$99.99

##### ISBN

978-0-13-340251-3

##### DIGITAL

NCCERconnect Access Card: \$99.99

##### ISBN

978-0-13-448252-1

NCCERconnect +

Trainee Guide: \$129.99

978-0-13-453963-8

### MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

#### Rough Terrain Forklifts (22.5 Hours)

ISBN 978-0-13-340322-0

(Module ID 22206-13) Covers the uses of forklifts on construction sites. Includes instructions for lifting, transporting, and placing various types of loads, as well as safety, operation, and maintenance procedures.

#### On-Road Dump Trucks (20 Hours)

ISBN 978-0-13-340319-0

(Module ID 22202-13) Covers uses, inspection, startup, shutdown, operator maintenance, and operation of dump trucks used to carry loads on public highways. Includes operation of dump trucks in normal and emergency situations.

#### Excavation Math (17.5 Hours)

ISBN 978-0-13-340323-7

(Module ID 22207-13) Covers basic math skills required for site excavation work. Includes methods and practice in calculating the areas and volumes of various geometric shapes, as well as formulas and methods used to calculate cut and fill requirements on a job.

#### Interpreting Civil Drawings (20 Hours)

ISBN 978-0-13-340325-1

(Module ID 22209-13) Explains how to read site plans to calculate cut and fill requirements. Provides instruction and practice in interpreting both roadway and construction site drawings used for excavation and grading work.

#### Site Work (20 Hours)

ISBN 978-0-13-340326-8

(Module ID 22210-13) Expands on information covered in Level 1 in relation to setting and interpreting grade stakes. Also provides information and instructions on controlling surface water and ground water on a job site, as well as the layout of foundations and laying of pipe.

#### Soils (10 Hours)

ISBN 978-0-13-340328-2

(Module ID 22308-13) Describes soil classification systems and explains how shrink and swell factors affect equipment selection. Discusses how soil conditions affect equipment performance and explains techniques for working with various types of soils.

#### Skid Steers (22.5 Hours)

ISBN 978-0-13-340327-5

(Module ID 22212-13) Describes the many uses of skid steers and the attachments available for these machines. Covers safety practices, as well as inspection, startup, shutdown, and operation of skid steers.

#### Loaders (17.5 Hours)

ISBN 978-0-13-340321-3

(Module ID 22205-13) Covers the uses of wheel and track loaders, as well as operator maintenance, loader safety, and operating procedures. Includes procedures for using loaders in excavation, grading, and demolition work.

#### Scrapers (17.5 Hours)

ISBN 978-0-13-340320-6

(Module ID 22204-13) Describes the types of scrapers used in site preparation, as well as the safe practices associated with the operation of scrapers. Covers operator inspection and maintenance requirements, along with startup, shutdown, and operating techniques.

### L3 HEAVY EQUIPMENT OPERATIONS

#### LEVEL 2

##### Curriculum Notes

- 215 Hours
- Revised: 2014, Third Edition
- Downloadable instructor resources are available.

##### PAPERBACK

Trainee Guide: \$99.99

##### ISBN

978-0-13-340256-8

##### DIGITAL

NCCERconnect Access Card: \$99.99

##### ISBN

978-0-13-448244-6

NCCERconnect +

Trainee Guide: \$129.99

978-0-13-453962-1

### MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

#### Finishing and Grading (25 Hours)

ISBN 978-0-13-377955-4

(Module ID 22307-14) Provides training on common types of equipment and instruments used for finish grading; materials and methods used to stabilize soils and control soil erosion; and finishing and grading methods used for various applications.

#### Compaction Equipment (25 Hours)

ISBN 978-0-13-377956-1

(Module ID 22203-14) Provides training on common types of compaction equipment; the primary instruments, controls, and attachments of a roller; safety guidelines associated with compaction equipment; and prestart inspections, preventive maintenance, and proper operating procedures. Presents factors involved in work activities associated with a roller.

#### Backhoes (30 Hours)

ISBN 978-0-13-377957-8

(Module ID 22303-14) Identifies and describes the common uses, types, components, instruments, controls, and attachments of backhoes. Presents safety guidelines, prestart inspection procedures, and preventive maintenance requirements. Describes basic startup and operation, and covers common work activities associated with backhoes.

#### Off-Road Dump Trucks (30 Hours)

ISBN 978-0-13-377958-5

(Module ID 22310-14) Identifies and describes the common types, uses, and components of off-road dump trucks. Presents safety guidelines, prestart inspection procedures, and preventive maintenance requirements. Covers basic startup, driving maneuvers, loading, and dumping procedures for off-road dump trucks.

#### Dozers (30 Hours)

ISBN 978-0-13-382759-0

(Module ID 22302-14) Identifies and describes the common uses, types, and components of dozers. Presents safety guidelines, prestart inspection procedures, and preventive maintenance requirements. Describes basic startup and operation, and covers common work activities associated with dozers.

#### Excavators (35 Hours)

ISBN 978-0-13-377959-2

(Module ID 22304-14) Identifies and describes the common types, uses, and components of excavators. Presents safety guidelines, prestart inspection procedures, and preventive maintenance requirements. Describes basic startup and operation, and covers common work activities associated with excavators.

#### Motor Graders (40 Hours)

ISBN 978-0-13-377962-2

(Module ID 22305-14) Identifies and describes the common uses and types of motor graders. Presents safety guidelines, prestart inspection procedures, and preventive maintenance requirements. Describes basic startup and operation, and covers common work activities associated with motor graders.

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