Heavy Equipment Operations

Orientation to the Trade (5 Hours)
(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)
(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 hazard communication.

Identification of Heavy Equipment (5 Hours)
(Module ID 22103) Instructs trainees in the care and use of the different types of heavy equipment. Reviews machine safety issues. Explains how to safely start, move, stop, and shut down different types of machines.

On-Road Dump Trucks (20 Hours)
ISBN 978-0-13-340319-0
(Module ID 22202-13) Introduces the concept of preparing graded surfaces using heavy equipment. Covers identification of construction staking and interpretation of marks on each type of stoke. Describes the process for grading slopes.

Utility Tractors (17.5 Hours)
(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 (17.5 Hours)
(Module ID 22106) Introduces the concept of preparing graded surfaces using heavy equipment. Covers identification of construction staking and interpretation of marks on each type of stoke. Describes the process for grading slopes.

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

Soils (10 Hours)
(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)
(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)
(Module ID 22201-13) 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 (7.5 Hours)
(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.

Soil Classification

Soils are classified into different types depending on their physical characteristics. Here is a brief overview of the main types:

- Clay: Made up of fine-grained particles that give it a high water-retaining capacity and strong bonding properties.
- Silt: Composed of particles between sand and clay, it has moderate to high water-retaining capacity.
- Sand: Made up of larger particles than silt, it has low water-retaining capacity and is easily drained.
- Loam: A combination of sand, silt, and clay in roughly equal proportions, providing a balanced water-holding capacity.
- gravel: Larger than sand, gravel can be used as a foundation material or aggregate in construction.

Earth Moving

Earth moving involves the movement of soil, rock, or other materials to prepare a site for construction or to grade and level the land. This process is crucial for ensuring the structural integrity of buildings, roads, and other infrastructure projects. Proper earth moving can help prevent slope failures, ensure proper drainage, and create a stable foundation for buildings and other structures.
Heavy Equipment Operations Level 3

**Curriculum Notes**
- 215 Hours
- Downloadable instructor resources are available.

**Compaction Equipment (25 Hours)**
(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)**
(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)**
(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)**
(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)**
(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.

**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)**
(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.