Pembroke Hopkins Park Construction Outreach Program
13355 E. 3000 S. Rd., Pembroke Township, IL 60958
Tel: (815) 944-8897 Fax: (815) 944-5675

Competencies / Objectives

Level One

MODULE 22101-05 - ORIENTATION TO THE TRADE (5 Hours)

1. Explain the basic terminology and types of equipment and their uses.
2. Identify career opportunities available to heavy equipment operators.
3. Explain the purpose and objectives of an apprentice training program.
4. Explain operator responsibilities and the characteristics of a good operator.
5. Explain the importance of safety in relation to heavy equipment.

MODULE 22102-05 - HEAVY EQUIPMENT SAFETY (10 Hours)

1. Explain the need for safety measures when working in and around heavy equipment.
2. State the purposes of signs, tags, barricades, and lockout/tagout devices when working on construction sites.
3. Identify safeguards used in a highway construction work zone.
4. Using a material safety data sheet (MSDS) for a hazardous chemical typically used with heavy equipment, state the long- and short-term health effects, first-aid measures, handling and storage, and/or required personal protective equipment.
5. State general guidelines for safe operation and maintenance of heavy equipment.
6. State general guidelines for safe transportation of heavy equipment.
7. State general guidelines for working safely around heavy equipment.
8. State the general dangers of working around an excavation area with heavy equipment.

MODULE 22103-05 - IDENTIFICATION OF HEAVY EQUIPMENT (5 Hours)

1. Identify the various heavy equipment used on a construction site.
2. State the primary use or uses of each equipment item.

MODULE 22104-05 - BASIC OPERATIONAL TECHNIQUES (25 Hours)

1. Describe the basic operational guidelines for heavy equipment.
2. Describe basic safety rules and some specific safety rules when operating heavy equipment.
3. Perform basic prestart inspection, startup, operational movement, and shutdown for heavy equipment under the guidance of an instructor.

MODULE 22105-05 – TRACTORS (17.5 Hours)

1. Identify the operating controls of a typical tractor.
2. Describe the different types of transmission used on tractors.
3. State safety rules for operating tractors and hydraulic systems.
4. Describe the proper methods for operating a tractor on slopes or hills.
5. Explain the proper method for adjusting a drawbar.
6. Perform prestart inspection and maintenance procedures.
7. Start, warm up, and shut down a gasoline-powered and diesel-powered tractor engine.
8. Perform basic maneuvering with a tractor.
9. Attach an attachment to a drawbar, three-point hitch, or power takeoff.
10. Connect hydraulic-powered attachments to the tractor.

MODULE 22106-05 - GRADES, PART ONE (15 Hours)

1. Match terms associated with grade work to the correct definitions.
2. Match types of stakes to their correct usage, and explain markings on grade stakes and bench mark (BM) stakes.
3. Identify equipment used by the operator to check stakes.
4. State the meaning of slope ratio.
5. Distinguish between backslope and foreslope.
6. Check horizontal and vertical distance of cut and fill slope stakes.
7. Check finish subgrade on a cross slope.

Level Two

MODULE 22201-06 - INTRODUCTION TO EARTHMOVING (12.5 Hours)

1. Identify and explain earthmoving items and methods.
2. Describe how to safely set up and coordinate earthmoving operations.
3. Identify and explain earthmoving operations.
4. Identify and explain soil stabilization methods.
5. Identify the best equipment for performing a given earthmoving operation.
6. Lay out a basic earthmoving operation.

MODULE 22202-06 - DUMP TRUCKS (22.5 Hours)

1. Describe why dump trucks are widely used in the construction industry.
2. State the types of dump trucks and their uses.
3. Describe the function and operation of the dump hoist, power takeoff unit, auxiliary axle, engine retarder, differential lockout, air brake system, and manual transmission.
4. Demonstrate and state the steps of the pre-operational safety inspection.

5. Perform the proper warmup, operation, and shutdown procedure.
6. State the duties and responsibilities of a dump truck operator.
7. Identify the controls of a dump truck.
8. Safely operate a dump truck.
9. Back up with a trailer attached to the dump truck.

MODULE 22203-06 – ROLLERS (15 Hours)

1. Describe the uses of a roller.
2. Identify the components and controls on a typical roller.
3. Explain safety rules for operating a roller.
4. Perform prestart inspection and maintenance procedures.
5. Start, warm up, and shut down a roller.
6. Perform basic maneuvers with a roller.
7. Describe the attachments used on rollers.

MODULE 22204-06 – SCRAPERS (17.5 Hours)

1. Describe the uses of a scraper.
2. Identify the components and controls on a typical scraper.
3. Explain safety rules for operating a scraper.
4. Perform prestart inspection and preventive maintenance procedures for scrapers.
5. Start, warm up, and shut down a scraper.
6. Perform basic manuevers with a scraper.
7. Perform the basic earthmoving operations with a scraper.

MODULE 22205-06 – LOADERS (17.5 Hours)

1. Describe the uses of a loader.
2. Identify the components and controls on a typical loader.
3. Explain safety rules for operating a loader.
4. Perform prestart inspection and maintenance procedures.
5. Start, warm up, and shut down a loader.
6. Perform basic maneuvers with a loader.
7. Perform basic earthmoving operations with a loader.
8. Describe the attachments used on loaders.

MODULE 22206-06 – FORKLIFTS (17.5 Hours)

1. Describe the uses of a forklift.
2. Identify the components and controls on a typical forklift.
3. Explain the safety rules for operating a forklift.
4. Perform prestart inspection and maintenance procedures.

5. Start, warm up, and shut down a forklift.
6. Perform basic maneuvers with a forklift.
7. Perform basic lifting operations with a forklift.
8. Describe the attachments used on forklifts.

MODULE 22207-06 – EXCAVATION MATH (25 Hours)

1. Identify basic geometric shapes.
2. Calculate the surface area of squares, rectangles, triangles, trapezoids, and circles using formulas.
3. Calculate the volume of cubes, rectangular objects, prisms, and cylinders.
4. Calculate the excavation volume of a job using information supplied on the building plans.
5. Calculate the weight of an excavation from its volume.

MODULE 22208-06 – GRADES, PART TWO (20 Hours)

1. Define selected terms associated with plan reading, grade setting, and drainage.
2. State how cycle time affects scheduling of earthwork.
3. Describe proper practices for setting grades from a bench mark.
4. Describe proper practices for setting grades using a laser level or string.
5. Describe various methods for keeping construction sites well drained.
6. Describe the work required for the basic grading operations.
7. Describe proper practices for setting the grade of a trench and drain pipe.
8. Interpret construction plans to determine grading requirements.

MODULE 22209-06 – CIVIL BLUEPRINT READING (20 Hours)

1. Describe the types of drawings usually included in a set of plans, and list the information found on each type.
2. Identify the different types of lines used on drawings.
3. Define common abbreviations and symbols used on plans.
4. Read and interpret drawings to determine the type of excavations needed to prepare the site.
5. Describe the operator's duties to ensure that the job is completed safely and according to the plans.

Level Three

MODULE 22301-06 – INTRODUCTORY SKILLS FOR THE CREW LEADER
CHAPTER ONE – ORIENTATION TO THE JOB (16 Hours)

1. Discuss the history, trends, and economic conditions of the construction industry.

2. Describe how workers' values have changed over the years.
3. Explain the importance of training for construction industry personnel.
4. List the new technologies available, and discuss how they are helpful to the construction industry.
5. Identify the gender and minority issues associated with a changing workforce.
6. Describe what employers can do to prevent workplace discrimination.
7. Describe the four major categories of construction projects.
8. Differentiate between formal and informal organizations.
9. Describe the difference between authority and responsibility.
10. Explain the purpose of job descriptions and what they should include.
11. Distinguish between company policies and procedures.

CHAPTER TWO – LEADERSHIP SKILLS

1. Explain the role of a crew leader.
2. List the characteristics of effective leaders.
3. Be able to discuss the importance of ethics in a supervisor's role.
4. Identify the three styles of leadership.
5. Describe the forms of communication.
6. Explain the four parts of verbal communication.
7. Demonstrate the importance of active listening.
8. Illustrate how to overcome the barriers to communication.
9. List some ways that supervisors can motivate their employees.
10. Explain the importance of delegating and implementing policies and procedures.
11. Differentiate between problem solving and decision making.

CHAPTER THREE – SAFETY

1. Demonstrate an understanding of the importance of safety.
2. Give examples of direct and indirect costs of workplace accidents.
3. Identify safety hazards of the construction industry.
4. Explain the purpose of the Occupational Safety and Health Act (OSHA).
5. Discuss OSHA inspection programs.
6. Identify the key points of a safety program.
7. List the steps to train employees on how to perform new tasks safely.
8. Identify a supervisor's safety responsibilities.
9. Explain the importance of having employees trained in first aid and Cardio-Pulmonary Resuscitation (CPR) on the job site.
10. Describe the signals of substance abuse.
11. List the essential parts of an accident investigation.
12. Describe the ways to maintain employee interest in safety.

PHPCOP

CHAPTER FOUR – PROJECT CONTROL

1. Describe the three phases of a construction project.
2. Define the three types of project delivery systems.
3. Define planning and describe what it involves.
4. Explain why it is important to plan.
5. Describe the two major stages of planning.
6. Explain the importance of documenting one's work.
7. Describe the estimating process.
8. Explain how schedules are developed and used.
9. Identify the two most common schedules.
10. Explain short-interval production scheduling (SIPS).
11. Describe the different costs associated with building a job.
12. Explain the supervisor's role in controlling costs.
13. Illustrate how to control the main resources of a job: materials, tools, equipment, and labor.
14. Define the terms production and productivity and explain why they are important.

MODULE 22302-06 – DOZERS (30 Hours)

1. Describe the uses of a dozer.
2. Identify the components and controls on a typical dozer.
3. Explain safety rules for operating a dozer.
4. Perform prestart inspection and maintenance procedures.
5. Start, warm up, and shut down a dozer.
6. Perform basic maneuvers with a dozer.
7. Perform basic earthmoving and excavation operations with a dozer.

MODULE 22303-06 – BACKHOES (30 Hours)

1. Describe the uses of a backhoe.
2. List types of backhoes.
3. Identify the components and controls on a typical backhoe.
4. Explain safety rules for operating a backhoe.
5. List accessories used on a backhoe.
6. Perform prestart inspection and maintenance procedures.
7. Start, warm up, and shut down a backhoe.
8. Perform basic maneuvers with a backhoe.
9. Perform basic earthmoving operations with a backhoe.

MODULE 22304-06 – EXCAVATORS (40 Hours)

1. Describe the uses of an excavator.

2. Identify the types of excavators and their uses.
3. Identify the components and controls on a typical excavator.
4. Explain safety rules for operating an excavator.
5. Describe and use accessories used on an excavator.
6. Perform prestart inspection and maintenance procedures.
7. Start, warm up, and shut down an excavator.
8. Perform basic maneuvers with an excavator.
9. Perform basic earthmoving and excavation operations with an excavator.

MODULE 22305-06 – MOTOR GRADERS (40 Hours)

1. Describe the uses of a motor grader.
2. List types of motor graders and their uses.
3. Identify the components and controls on a typical motor grader.
4. Explain safety rules for operating a motor grader.
5. List accessories used on a motor grader.
6. Perform prestart inspection and maintenance procedures.
7. Start, warm up, and shut down a motor grader.
8. Perform basic maneuvers with a motor grader.
9. Perform basic earthmoving operations with a motor grader.

MODULE 22306-06 – ADVANCED OPERATIONAL TECHNIQUES (20 Hours)

1. Identify and explain various components of a company's safety program.
2. Describe the reasons and procedure for an OSHA inspection.
3. Identify and explain the role you play in keeping yourself safe.
4. Describe ways to identify unsafe excavation sites and ways to help keep excavations safe.
5. Discuss safety methods when working around water.
6. Identify ways to reduce project costs.
7. Describe and demonstrate safe loading and transport of heavy equipment.
8. Demonstrate an understating of laser and GPS technology.

MODULE 22307-06 – FINISHING AND GRADING (20 Hours)

1. Explain the requirements for finishing and final grading of earthwork.
2. Use heavy equipment to perform fine grading and finishing work.
3. Describe and demonstrate techniques for finish grading of subgrade, base, slopes, parking areas, and drainage structures.

MODULE 22308-06 – SOILS (7.5 Hours)

1. Describe the characteristics of different types of soils.

2. Explain the various engineering properties of soil.
3. State factors that affect soil density.
4. Discuss how soil factors affect equipment selection.
5. Describe wet digging techniques.