



## ***CUSTOMIZED TEACHER ASSESSMENT BLUEPRINT***

### **HEAVY EQUIPMENT**

**Test Code: 5913**

**Version: 01**

#### ***Specific Competencies and Skills Tested in this Assessment:***

##### **Orientation, Safety, and Security**

Explain the appropriate safety dress code for a construction worker on the job site  
Explain the role safety plays in the construction crafts and describe job-site safety  
Explain the appropriate safety precautions around common job-site hazards  
Explain importance of HAZ COM requirement and MSDS  
Describe fire prevention and fire-fighting techniques  
Describe what OSHA is and what part it plays in job-site safety  
Practice safe equipment transportation on public roads and job sites  
Practice job-site safety, prevention of slip and fall and pinch-point accidents and electrocutions  
Identify the main risk and safety factors involved in trenching  
Identify blind spots on and around heavy equipment and importance to the highway inspector  
Define why it is important for all equipment to be secured after working hours

##### **Introduction to Plans, Specs, and Terminology**

Describe what specifications are  
Describe what a right-of-way is  
Match terms associated with soil to the correct definitions  
Select from a list types of compacting equipment  
Name the basic soil stabilization methods  
Define terms associated with basic earth moving operations  
Layout an earthmoving operation given the basic information and general requirements  
Describe various methods for keeping construction sites well drained  
Describe erosion and sedimentation control measures

##### **Introduction to Good Communication Skills**

Demonstrate how to properly fill out a job application  
Describe how to conduct yourself during a job interview  
Demonstrate how to research information for potential career  
Develop a 5-year plan for potential career and or education advancement

## ***Heavy Equipment – Teacher continued***

### **Introduction to Hand and Power Tools**

Describe the basic procedures for taking care of these tools

Recognize and identify some of the commonly used power tools in the construction trade

### **Basic Rigging**

Identify and describe the use of slings and common rigging hardware

Describe the basic hitch configurations and their proper connections

Describe the basic load-handling safety practices

Demonstrate proper use of American National Standards Institute (ANSI) hand signals

Describe basic safety precautions taken into consideration while operating a fork lift

### **Fundamentals of Service**

Demonstrate how to research technical information in service, parts and operation manuals

Describe the operation of a handheld grease gun

### **Equipment Preventative Maintenance**

Recite the preventive maintenance responsibilities of the operator

Specify the basic equipment subsystems

Identify sources of engine oil contamination

List safety tips when working on a cooling system

Properly jump-start vehicles equipped with either 12-volt or 12- to 24-volt electrical systems

Explain the basic principles of hydraulics

Explain hazards associated with hydraulic systems

List safety tips when working on or around tires and rims

### **Introduction to Understanding Surveying and Grades**

Identify equipment used by the operator to check stakes and grades

State the meaning of slope ratio

Calculate cuts and fills using an engineer's rule and hand level

Define terms associated with plan reading, grade setting, and drainage

### **Articulated Dump Trucks**

List all safety devices used on the articulating dump

Explain warning controls and their functions

Identify risks and safety factors involved in transporting and dumping articulating dump load

Demonstrate the proper pre-start and post-start check of an articulating dump

Identify the basic components of an articulating dump

Demonstrate positioning the truck for a safe dumping condition

### **Skid Steer Loaders**

List all safety devices used on the skid steer loader

Demonstrate removing and installing the bucket and/or attachment

Excavate material to build a stockpile of material

Demonstrate load and carry operations

Demonstrate bank loading

Demonstrate proper loading techniques

## ***Heavy Equipment – Teacher continued***

### **Backhoe Loaders**

State safety rules for operating a backhoe loader  
Identify basic components of a backhoe loader  
List the attachment used on backhoe loaders  
Demonstrate removing and installing backhoe bucket  
Excavate a trench with a level bottom  
Demonstrate loading techniques with the backhoe bucket  
Excavate material with loader bucket to build a pile  
Demonstrate load and carry operations  
Change bucket teeth  
Backfill a trench with the loader and/or backhoe buckets  
Demonstrate machine repositioning techniques while using the backhoe

### **Bulldozers**

State safety rules for operating a bulldozer  
Identify basic components of a bulldozer  
Check and adjust track tension  
Demonstrate forming a stockpile  
Demonstrate cut and carry dozing  
Demonstrate cutting a road into a side hill  
Demonstrate moving stockpile from point “A” to point “B”  
Demonstrate spreading material into 6-inch layers  
Demonstrate slot dozing

### **Crawler Loaders**

Identify basic components of a crawler loader  
Change bucket teeth  
Check and adjust track tension  
Demonstrate loading from a stockpile into a dump truck  
Excavate a cellar to specifications  
Demonstrate cutting a road into a side hill  
Demonstrate spreading material in 6-inch lifts or layers

### **Wheel Loaders**

State safety rules for operating a wheel loader  
Describe the accessories used on wheel loaders  
Perform preventative maintenance according to manufacturer’s recommendations  
Demonstrate moving and parking the machine safely  
Demonstrate bank loading into dump truck  
Demonstrate loading from a stockpile into a dump truck  
Demonstrate forming a stockpile  
Demonstrate load and carry operations  
Demonstrate spreading material in 6-inch layer

## ***Heavy Equipment continued***

### **Excavators**

State safety rules for operating an excavator

Identify the basic components of an excavator

Perform preventive maintenance according to manufacturer's recommendations

Demonstrate the proper pre-start and post-start check of an excavator

Start the engine and demonstrate engine warm-up and shutdown procedures

Demonstrate removing, installing, and adjusting bucket

Check and adjust track tension

Demonstrate moving concrete barriers and structures

Demonstrate placing objects in specified areas with a excavator bucket within specified time limit

Demonstrate loading a dump truck

Demonstrate excavating a trench 10 feet deep, 50 feet long according to OSHA standards then backfilling

Demonstrate a counter rotational turn while holding the upper structure in one position

## ***Heavy Equipment – Teacher continued***

### **Written Assessment:**

Administration Time: 3 hours  
Number of Questions: 232

#### ***Areas Covered:***

11%	Orientation, Safety, and Security
8%	Introduction to Plans, Specs, and Terminology
2%	Introduction to Good Communication Skills
2%	Introduction to Hand and Power Tools
5%	Basic Rigging
2%	Fundamentals of Service
13%	Equipment Preventative Maintenance
12%	Introduction to Understanding Surveying and Grades
5%	Articulated Dump Trucks
4%	Skid Steer Loaders
9%	Backhoe Loaders
8%	Bulldozers
4%	Crawler Loaders
7%	Wheel Loaders
8%	Excavators

### **Sample Questions:**

What is the minimum distance spoil can be placed from any trench wall?

- A. 2 feet
- B. 3 feet
- C. 4 feet
- D. 5 feet

Which tool is best suited for cutting pipe?

- A. cut off saw
- B. chain saw
- C. reciprocating saw
- D. jig saw

Relief valves protect the hydraulic system from

- A. over-pressurizing
- B. over-speeding
- C. under-pressurizing
- D. under-speeding

When dumping material on a pile, the loader should be raised

- A. to full height
- B. to 3/4 height
- C. only as high as required
- D. to 7/8 height

An excavator attachment that can be used for lifting logs is a

- A. blade
- B. ripper
- C. grapple
- D. hammer

## ***Heavy Equipment – Teacher continued***

### **Performance Assessment:**

Administration Time: 2 hours and 25 minutes  
Number of Jobs: 5

#### ***Areas Covered:***

- 24%      **Dig a Flat Bottom Trench Using a Backhoe**  
*Inspect for proper personal protective equipment and work attire, perform pre-operational inspection, enter the machine, travel to work area, parking machine, set up machine for digging, digging process, reposition machine, transport back to staging area, overall appearance and accuracy.*
- 12%      **Perform a Pre-Operational Inspection on a Skid Steer Loader;**  
**Identify Lubrication Points and Lubricate a Grease Fitting**  
*Inspect for proper personal protective equipment and work attire, perform pre-operational inspection, identification of the problem, accurately point out 10 points of lubrication, grease fitting.*
- 17%      **Properly Set Up a Laser and Determine Elevations at 4 Grade Stakes**  
**Off of a Benchmark**  
*Inspect for proper personal protective equipment and work attire, set up laser and tripod, take reading at benchmark, establish height of instrument, obtain readings at stake locations, determine elevations of stake locations, correctly determine cut of fill requirements, correctly determine amount of cut or fill required, stored laser and tripod properly.*
- 27%      **Back Fill Trench and Grade with a Dozer**  
*Inspect for proper personal protective equipment and work attire, perform pre-operational inspection, enter the machine, travel to work area, parking machine, inspect area, backfill the excavation process, grade area, transport back to staging area, park and shut down, backfill and grade quality.*
- 20%      **Load a Haul Unit with a Wheel or Crawler Loader**  
*Inspect for proper personal protective equipment and work attire, perform pre-operational inspection, enter the machine, travel to work area, parking machine, inspect loading area for hazards and terrain conditions, obtain a bucket of material, travel from pile to loading area, spot haul unit, load haul unit, release haul unit, maintain loading area, transport back to staging area, park and shut down.*

***Sample Job:*** Back Fill Trench and Grade with a Dozer

***Maximum Job Time:*** 25 minutes

***Participant Activity:*** The participant will perform a pre-operation inspection of the equipment and area. Backfill and grade an excavation designated by the evaluator.