Earthmoving Equipment

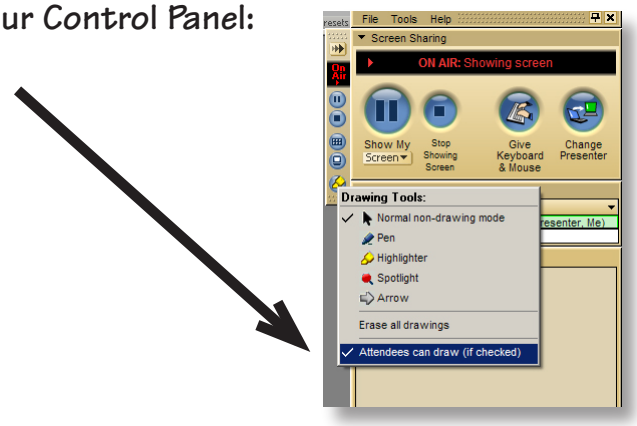
Facilitator Notes

Agenda - 45 minute webinar

Topic	Time
Introduction/Today's Agenda	2 minutes
Earthmoving Equipment.	1 minute
Backhoe Loader	5 minutes
Bulldozer	5 minutes
Motor Grader	5 minutes
Skid Steer Loader	5 minutes
Hydraulic Excavator	5 minutes
Off Highway Truck	2 minutes
Wheel Loader	5 minutes
Track Loader	5 minutes
Next Steps/Quiz Info	5 minutes
Total Webinar Time	**45 minutes**

While People Are Logging In...

- **As soon as you launch GoToMeeting, enable the Drawing feature for attendees by clicking the following on your Control Panel:**



- Welcome participants to the session as they log into GoToMeeting and display Slide 1.
- Introduce yourself.
- Explain that today you'll be talking about Earthmoving Equipment in greater detail.
- Instruct participants to have a pen and their Worksheets and Self Study Guides ready to use during the session.
- As people log in, encourage them to select either the pen or highlighter tool on their control panel to complete the word find on Slide 1. There are instructions for the participants on the slide itself, as you can see below.

Slide 1

Introduction 1 minute

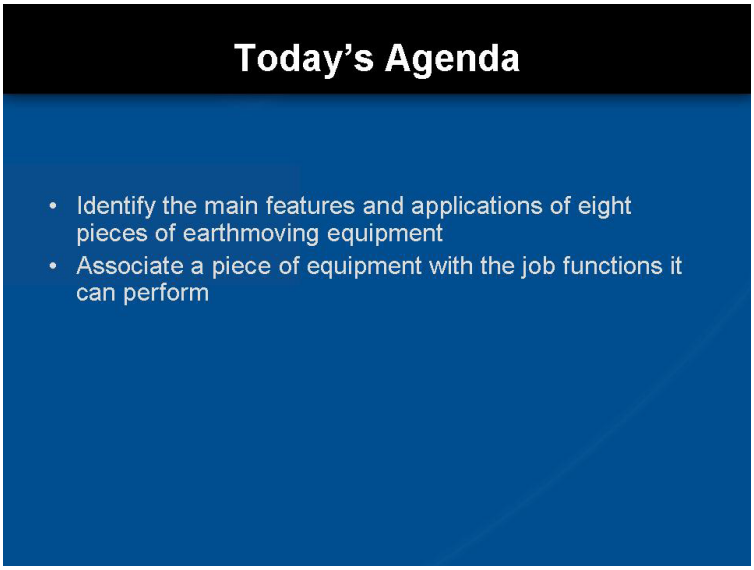
- Briefly display the Slide 2 and announce that today's session focuses on Earthmoving Equipment.

Slide 2

Today's Agenda 1 minute

Transition: *Let's review our objectives for today's session.*

- Display Slide 3.
- Introduce Today's Agenda. Upon completion of today's webinar, participants should be able to:
  - Identify the main features and applications of eight pieces of earthmoving equipment
  - Associate a piece of equipment with the job functions it can perform



Slide 3

Earthmoving Equipment 1 minute

- **Display Slide 4.**

Transition: *Today we're goinjg to focus on eight machines in the Earthmoving Equipment product family. Earthmoving equipment is typically used to dig with buckets, move dirt with blades, and scoop and dump dirt. The machines are also used to dig footings, basements, and trenches, to grade driveways and parking lots, and to build streets or contour the land. Finally, attachments for various earthmoving equipment allow the machines to perform a variety of other tasks as well. Let's take a look at them now.*

Slide 4

- Next, reveal the bullets on Slide 4 and list each of the machines in the product family:
    - Backhoe Loaders
    - Bulldozers
    - Motor Graders
    - Skid Steer Loaders
    - Hydraulic Excavators
    - Off Highway Trucks
    - Wheel Loaders
    - Track Loaders

Backhoe Loader 5 minutes

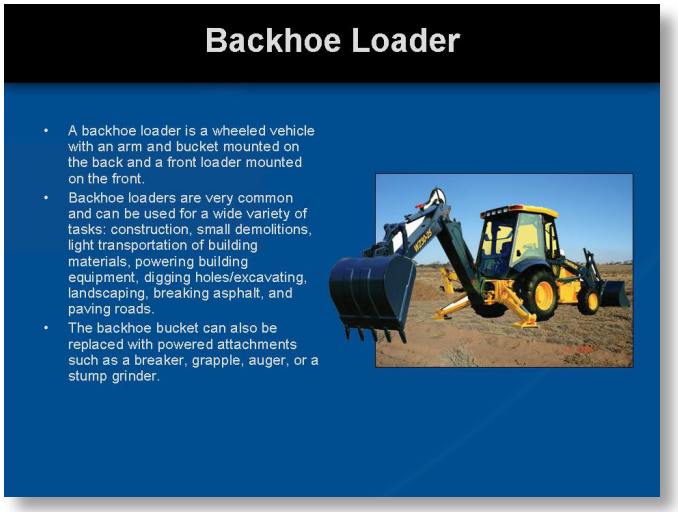
Self Study Guide Page 1/Worksheet Page 1

- **Display Slide 5.**

Transition: *The first product we'll talk about is the backhoe. In North American terms a backhoe includes both a front bucket and a rear hoe, on a chassis originally derived from farm tractors. A dedicated hoe on its own chassis is more properly referred to as an excavator.*

Backhoes are general purpose tools, and are being displaced to some extent by multiple specialized tools like the mini-excavator. On many jobsites which would have previously seen a backhoe used, a skidsteer and a mini excavator will be used in conjunction to fill the backhoes role. Backhoes still are in general use, however.

Slide 5



Self Study Guide Pg. 1


Earthmoving Equipment
Equipment Certification - Equipment Product Families

Earthmoving equipment is typically used to dig with buckets, move dirt with blades, and scoop and dump dirt. The machines are also used to dig footings, basements, and trenches, to grade driveways and parking lots, and to build streets or contour the land. Finally, attachments for various earthmoving equipment allow the machines to perform a variety of other tasks as well.

Backhoe Loader

A backhoe loader is a wheeled vehicle with an arm and bucket mounted on the back and a front loader mounted on the front.

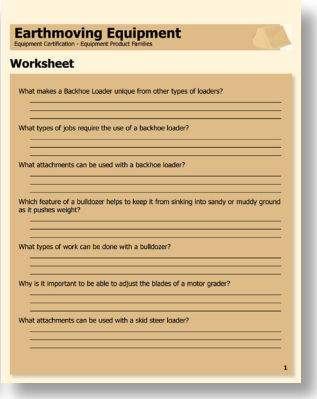
Backhoe loaders are very common and can be used for a wide variety of tasks: construction, small demolitions, light transportation of building materials, powering building equipment, digging holes/excavating, landscaping, breaking asphalt, and paving roads.

The backhoe bucket can also be replaced with powered attachments such as a breaker, grapple, auger, stump or asphalt grinder, pallet forks, or street sweeper.

A backhoe operator turns the seat around to face the rear of the machine. Outriggers are lowered to the ground for stability while the backhoe digs trenches and footers. Dirt can then be scooped up with the front bucket and dumped into a truck to be hauled away.

1

Worksheet Pg. 1


Earthmoving Equipment
Equipment Certification - Equipment Product Families

Worksheet

What makes a Backhoe Loader unique from other types of loaders?

What types of jobs require the use of a backhoe loader?

What attachments can be used with a backhoe loader?

Which feature of a bulldozer helps to keep it from sinking into sandy or muddy ground as it pushes weight?

What types of work can be done with a bulldozer?

Why is it important to be able to adjust the blades of a motor grader?

What attachments can be used with a skid steer loader?

1

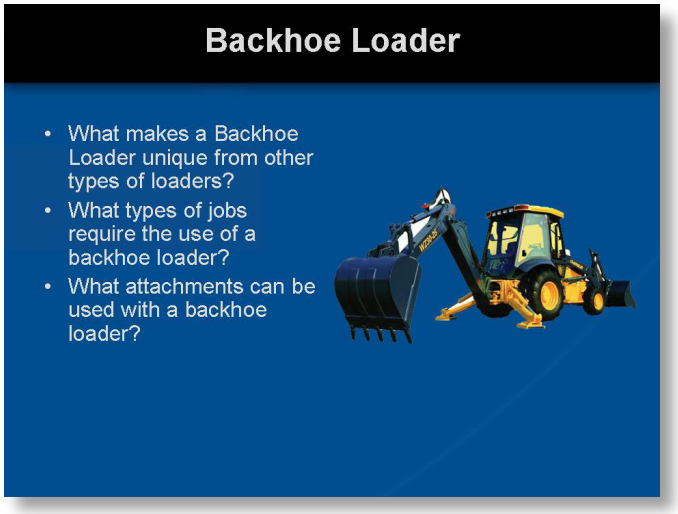
- Reveal the bullets on Slide 5 and identify features and applications of a Backhoe Loader:
  - A backhoe loader is a wheeled vehicle with an arm and bucket mounted on the back and a front loader mounted on the front.
  - Backhoe loaders are very common and can be used for a wide variety of tasks: construction, small demolitions, light transportation of building materials, powering building equipment, digging holes/excavating, landscaping, breaking asphalt, and paving roads.
  - The backhoe bucket can also be replaced with powered attachments such as a breaker, grapple, auger, or a stump grinder.

Backhoe Loader (cont'd.)

- **Display Slide 6.**

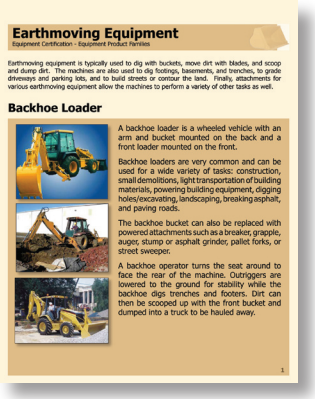
Discussion Questions:

- What makes a Backhoe Loader unique from other types of loaders?
  (Answer: The Backhoe Loader is unique because it adds a hoe or bucket on the back of the machine in addition to the loader attached to the front.)
- What types of jobs require the use of a backhoe loader?
  (Answer: construction, digging trenches or foundations (footing), small demolitions, light transportation of building materials, powering building equipment, digging holes/excavating, landscaping, breaking asphalt, and paving roads.)
- What attachments can be used with a backhoe loader?
  (Possible response: the bucket on a backhoe can be replaced with powered attachments such as a breaker, grapple, auger, stump or asphalt grinder, pallet forks, or street sweeper.

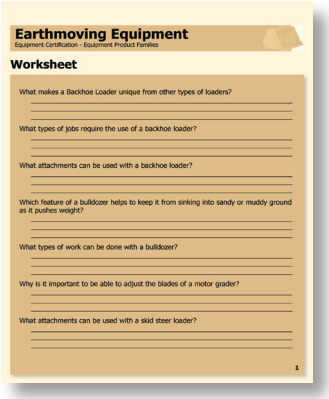


Slide 6

Self Study Guide Pg. 1



Worksheet Pg. 1



- **Encourage participants to write responses on their worksheets. The questions on their worksheets correspond to the Discussion Questions above.**

- **Display Slide 7.**

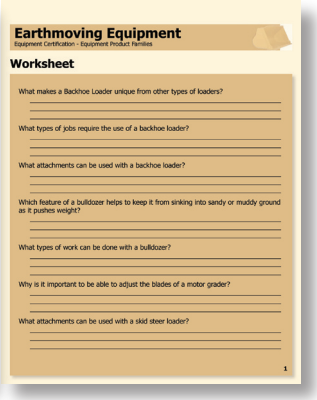
Self Study Guide Page 2/Worksheet Page 1

Transition: *The next piece of equipment we'll talk about is the bulldozer. A bulldozer has a blade on the front that does not raise or lower - it simply pushes things forward. The bulldozer blade is a heavy metal plate on the front of the tractor, used to push objects and shove sand, soil and debris.*

Slide 7

Self Study Guide Pg. 2

Worksheet Pg. 1



Reveal the bullets on Slide 5 and identify features and applications of a Bulldozer:

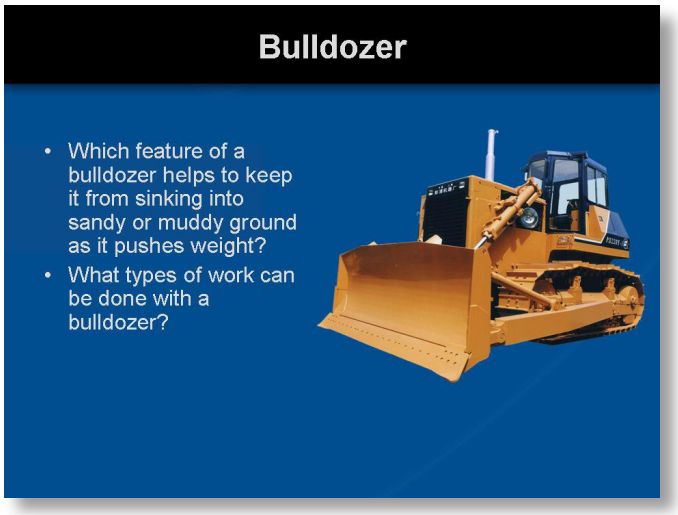
- A bulldozer is a crawler (caterpillar tracked tractor), equipped with a blade used to push large quantities of soil, sand, rubble, etc, during construction work.
- The tracks give them excellent ground hold and mobility through very rough terrain. Wide tracks help distribute the bulldozer's weight over large area (decreasing pressure), thus preventing it from sinking in sandy or muddy ground.
- Bulldozers have excellent ground hold and use their own weight to push very heavy things and remove obstacles that are stuck in the ground.

Bulldozer (cont'd.)

- **Display Slide 8.**

Discussion Questions:

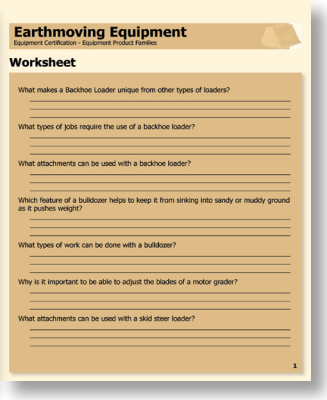
- Which feature of a bulldozer helps to keep it from sinking into sandy or muddy ground as it pushes weight?
  - **Instruct the participants to make sure their GoToMeeitngControl Panels are fully displayed so they can submit their response via Chat. Instruct participants to click the To button in GoToMeeting and select YOUR NAME (Organizer_Presenter) and type their responses into the chat window and press Enter.**
- (Answer: the tracks, which give them excellent ground hold and mobility through very rough terrain.)
- What types of work can be done with a bulldozer?
  (Possible response: A bulldozer is used to clear land to build houses, airports and highways, as well as for clearing and grading land, cutting drainage ditches, contouring hillsides, demolition, site cleanup, backfilling new foundations, and building streets and parking lots.)



Slide 8

Self Study Guide Pg. 2

Worksheet Pg. 1

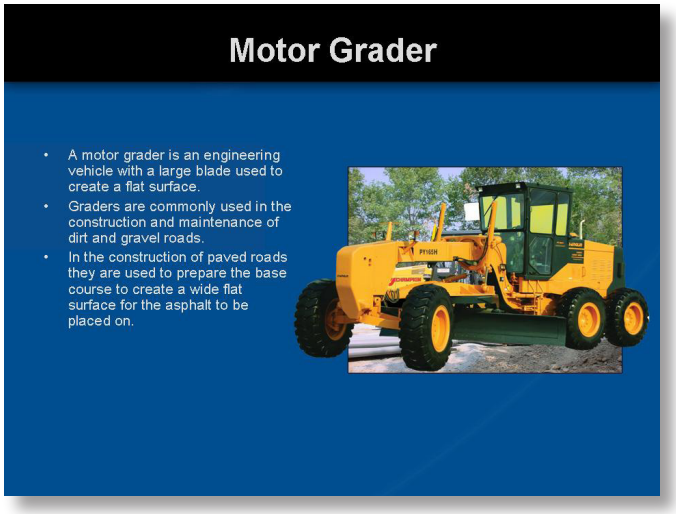


- **Encourage participants to write responses on their worksheets. The questions on their worksheets correspond to the Discussion Questions above.**

- **Display Slide 9.**

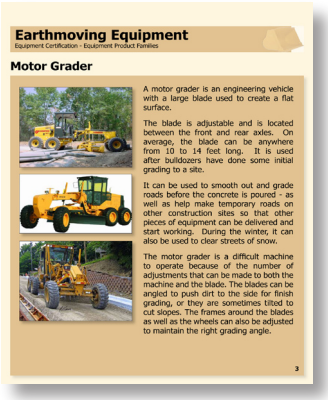
Self Study Guide Page 3/Worksheet Page 1

Transition: *The next piece of Earthmoving Equipment we'll discuss is the Motor Grader. A grader's purpose is to "finish grade" (in other words, to refine or set precisely) the "rough grading" performed by heavy equipment/such as a bulldozer. Graders can produce inclined surfaces and are also used to finish grade prior to the construction of large buildings.*

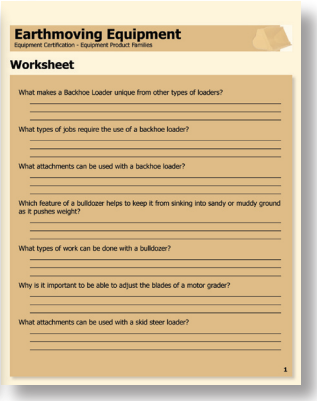


Slide 9

Self Study Guide Pg. 3



Worksheet Pg. 1



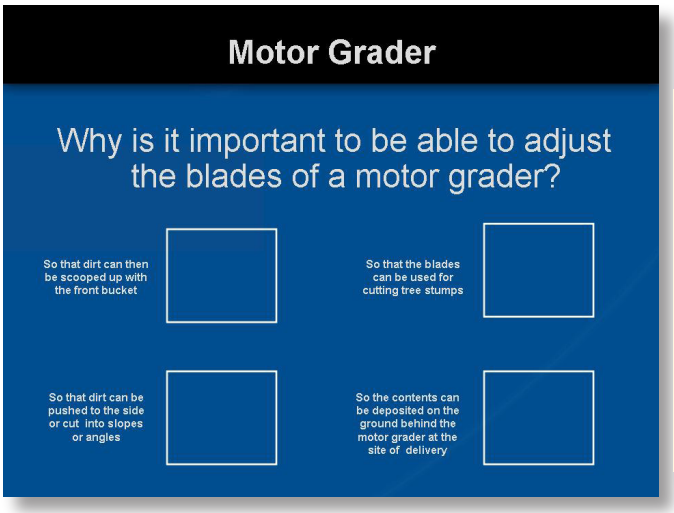
Reveal the bullets on Slide 9 and identify features and applications of a Motor Grader:

- A motor grader is an engineering vehicle with a large blade used to create a flat surface.
- Graders are commonly used in the construction and maintenance of dirt and gravel roads.
- In the construction of paved roads they are used to prepare the base course to create a wide flat surface for the asphalt to be placed on.

- **Display Slide 10.**

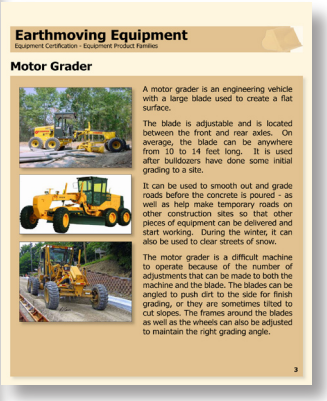
Discussion Question:

- Why is it important to be able to adjust the blades of a motor grader?
  - **Instruct the participants to make sure their GoToMeeting Control Panels are fully displayed so they can submit their response via the pen/highlighter tool. Instruct participants to click the Highlighter button on GoToMeeting toolbar and select the pen or highlighter tool to provide their answers.**
- **On Slide 10, read the four choices from which participants should choose in order to answer the Discussion Question:**
  - So that dirt can then be scooped up with the front bucket
  - So that dirt can be pushed to the side or cut into slopes or angles
  - So that the blades can be used for cutting tree stumps
  - So the contents can be deposited on the ground behind the motor grader at the site of delivery
- (Answer: So that dirt can be pushed to the side or cut into slopes or angle.)

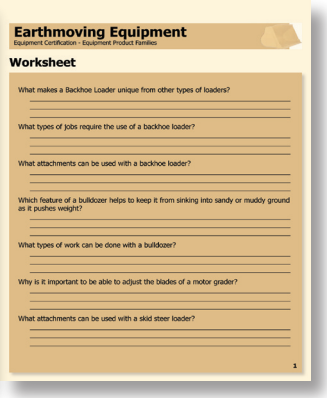


Slide 10

Self Study Guide Pg. 3



Worksheet Pg. 1



- **Encourage participants to write responses on their worksheets. The questions on their worksheets correspond to the Discussion Question above.**

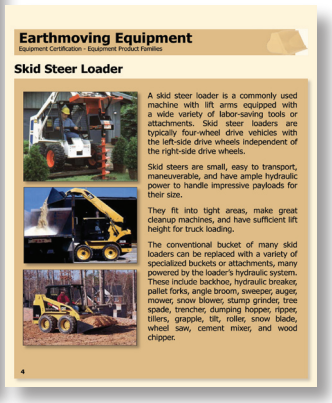
- **Display Slide 11.**

Self Study Guide Page 4/Worksheet Page 1

Transition: *Many of you may be familiar with a Skid Steer Loader, which is often simply called a Bobcat. This machine can perform a wide variety of jobs and is capable of zero-radius, "pirouette" turning, which makes them extremely maneuverable and valuable for applications that require a compact, agile loader. The name "skid steer" originated from this feature - by slowing or stopping one side's wheels and not the other side, the machine will "skid" and make the tight turn. Unlike in a wheel or track loader, the lift arms in these machines are alongside the driver with the pivot points behind the driver's shoulders.*

Slide 11

Self Study Guide Pg. 4


Earthmoving Equipment
Equipment Certification - Equipment Product Families

Skid Steer Loader

A skid steer loader is a commonly used machine with lift arms equipped with a wide variety of labor-saving tools or attachments. Skid steer loaders are typically four-wheel drive vehicles with the left-side drive wheels independent of the right-side drive wheels.

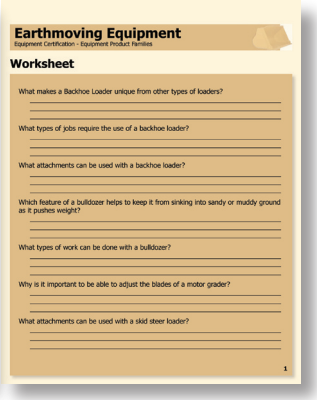
Skid steers are small, easy to transport, maneuverable, and have ample hydraulic power to handle impressive payloads for their size.

They fit into tight areas, make great cleanup machines, and have sufficient lift height for truck loading.

The conventional bucket of many skid loaders can be replaced with a variety of specialized buckets or attachments, many powered by the loader's hydraulic system. These include backhoe, hydraulic breaker, pallet forks, angle broom, sweeper, auger, mower, snow blower, stump grinder, tree spade, trencher, dumping hopper, ripper, tillers, grapple, tilt, roller, snow blade, wheel saw, cement mixer, and wood chipper.

4

Worksheet Pg. 1


Earthmoving Equipment
Equipment Certification - Equipment Product Families

Worksheet

What makes a Backhoe Loader unique from other types of loaders?

What types of jobs require the use of a backhoe loader?

What attachments can be used with a backhoe loader?

Which feature of a bulldozer helps to keep it from sinking into sandy or muddy ground as it pushes weight?

What types of work can be done with a bulldozer?

Why is it important to be able to adjust the blades of a motor grader?

What attachments can be used with a skid steer loader?

1

Reveal the bullets on Slide 11 and identify features and applications of a Skid Steer Loader:

- A skid steer loader is a commonly used machine with lift arms that are powered by hydraulics.
- A skid steer loader is typically a four-wheel drive vehicle with the left-side drive wheels independent of the right-side drive wheels.
- The conventional bucket of many skid loaders can be replaced with a variety of specialized buckets or attachments.

Skid Steer Loader (cont'd.)

- **Display Slide 12.**

Discussion Questions:

- What attachments can be used with a skid steer loader?
  - **Display Page 9 of the Self Study Guide so participants can see the list of common attachments.**
    (Possible responses: backhoes, hydraulic breakers, pallet forks, angle brooms, sweepers, augers, mowers, snow blowers, stump grinders, tree spades, trenchers, dumping hoppers, rippers, tillers, grapples, tilts, rollers, snow blades, wheel saws, cement mixers, and wood chippers.)

- **Display Slide 12.**

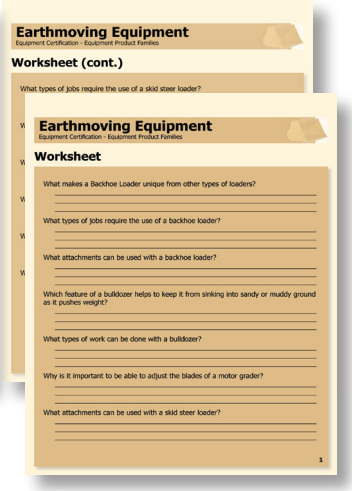
- Instruct participants to turn to Page 2 of their Worksheets.

- What types of jobs require the use of a skid steer loader?
  (Possible responses: General construction jobs, small excavation jobs,, small demolition jobs, warehouse work, jobsite cleanup, digging holes, mowing, blowing snow, grinding stumps, landscaping)

Slide 12

Self Study Guide Pg. 4

Worksheet Pp. 1-2

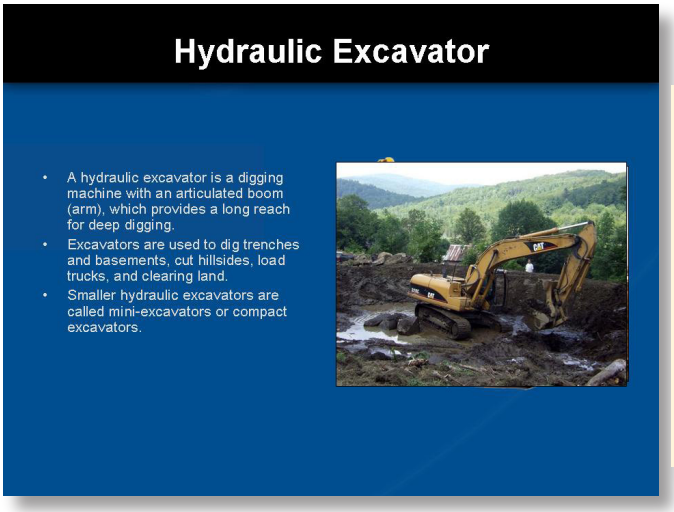


- **Encourage participants to write responses on their worksheets. The questions on their worksheets correspond to the Discussion Question above.**

- **Display Slide 13.**

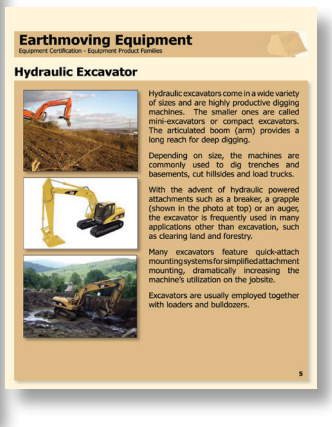
Self Study Guide Page 5/Worksheet Page 2

Transition: *Excavators are sometimes also called diggers and 360-degree excavators, sometimes abbreviated simply to a 360. Tracked excavators are sometimes called trackhoes by analogy to the backhoe. Even though the 'back' in backhoe refers to the action of the bucket (which pulls "back" toward the machine) and not the location of the shovel, excavators are also occasionally referred to as fronthoes or even just "hoes".*

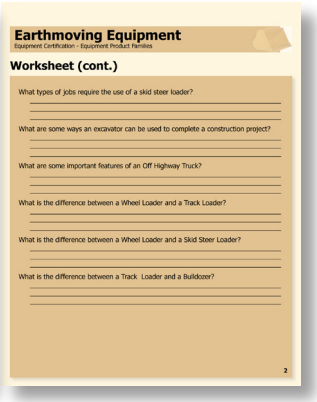


Slide 13

Self Study Guide Pg. 5


Earthmoving Equipment
Equipment Certification - Equipment Product Families
Hydraulic Excavator
Hydraulic excavators come in a wide variety of sizes and are highly productive digging machines. The smaller ones are called mini-excavators or compact excavators. The articulated boom (arm) provides a long reach for deep digging.
Depending on size, the machines are commonly used to dig trenches and basements, cut hillsides and load trucks.
With the advent of hydraulic powered attachments such as a breaker, a grapple (shown in the photo at top) or an auger, the excavator is frequently used in many applications other than excavation, such as clearing land and forestry.
Many excavators feature quick-attach mounting systems for simplified attachment mounting, dramatically increasing the machine's utilization on the jobsite.
Excavators are usually employed together with loaders and bulldozers.
5

Worksheet Pg. 2


Earthmoving Equipment
Equipment Certification - Equipment Product Families
Worksheet (cont.)
What types of jobs require the use of a skid steer loader?
What are some ways an excavator can be used to complete a construction project?
What are some important features of an Off Highway Truck?
What is the difference between a Wheel Loader and a Track Loader?
What is the difference between a Wheel Loader and a Skid Steer Loader?
What is the difference between a Track Loader and a Bulldozer?
2

Reveal the bullets on Slide 13 and identify features and applications of a Hydraulic Excavator:

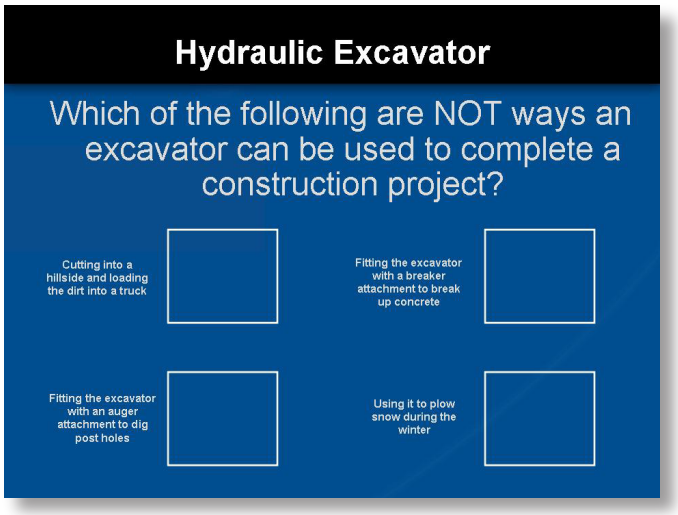
- A hydraulic excavator is a digging machine with an articulated boom (arm), which provides a long reach for deep digging.
- Excavators are used to dig trenches and basements, cut hillsides, load trucks, and clearing land.
- Smaller hydraulic excavators are called mini-excavators or compact excavators.

Hydraulic Excavator (cont'd.)

- **Display Slide 14.**

Discussion Question:

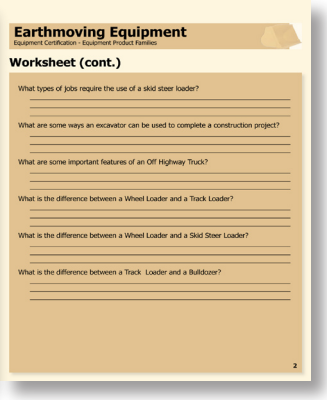
- Which of the following are NOT ways an excavator can be used to complete a construction project?
  - **Instruct the participants to make sure their GoToMeeitngControl Panels are fully displayed so they can submit their response via the pen/highlighter tool. Instruct participants to click the Highlighter button on GoToMeeting toolbar and select the pen or highlighter tool to provide their answers.**
- **On Slide 14, read the four choices from which participants should choose in order to answer the Discussion Question:**
  - Cutting into a hillside and loading the dirt into a truck
  - Fitting the excavator with an auger attachment to dig post holes
  - Using it to plow snow during the winter
  - Fitting the excavator with a breaker attachment to break up concrete
- (Answer: Using it to plow snow during the winter.)



Slide 14

Self Study Guide Pg. 5

Worksheet Pg. 2



- **Encourage participants to write responses on their worksheets. The questions on their worksheets correspond to the Discussion Questions above.**

Off Highway Truck 2 minutes

- **Display Slide 15.**

Self Study Guide Page 6/Worksheet Page 2

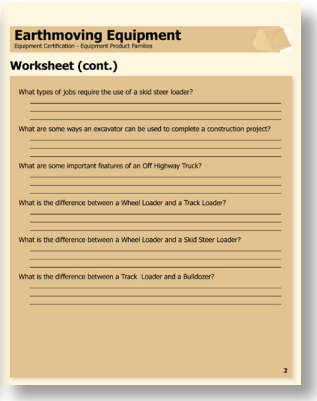
Transition: *Off Highway Trucks are exactly what they sound like - large trucks that are used within or between job sites and are typically not used to drive long distances. In other words, you will not usually see one of these vehicles driving down a highway - instead it would be driven within the confines of a mining operation or huge construction job.*

Slide 15

Self Study Guide Pg. 6


Earthmoving Equipment
Equipment Certification - Equipment Product Families
Off Highway Truck
An off highway truck is used for transporting loose material (such as sand, gravel, rocks, or dirt). A typical truck is equipped with a hydraulically operated open-box bed hinged at the rear, the front of which can be lifted up to allow the contents to be deposited on the ground behind the truck at the site of delivery.
Off highway trucks more closely resemble heavy construction equipment or engineering vehicles than they do highway dump trucks. They are used strictly off-road for mining and heavy dirt hauling jobs.
The term 'dump' truck is not generally used by the mining industry, or by the manufacturers that build these machines. The more appropriate US term for this strictly off road vehicle is 'haul' truck.
6

Worksheet Pg. 2


Earthmoving Equipment
Equipment Certification - Equipment Product Families
Worksheet (cont.)
What types of jobs require the use of a skid steer loader?
What are some ways an excavator can be used to complete a construction project?
What are some important features of an Off Highway Truck?
What is the difference between a Wheel Loader and a Track Loader?
What is the difference between a Wheel Loader and a Skid Steer Loader?
What is the difference between a Track Loader and a Bulldozer?
2

Reveal the bullets on Slide 15 and identify features and applications of an Off Highway Truck:

- An off highway truck is used for transporting loose material such as sand, gravel, rocks, or dirt.
- Off highway trucks are used off-road for mining and heavy dirt hauling jobs.
- The more appropriate U.S. term for this strictly off-road vehicle is 'haul' truck.

- **Display Slide 16.**

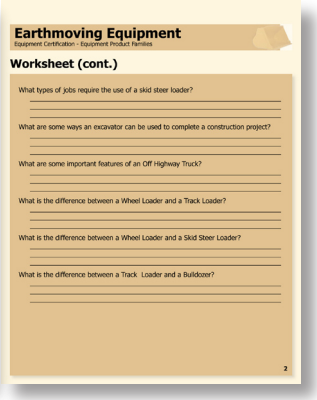
Self Study Guide Page 7/Worksheet Page 2

Transition: *Wheel Loaders are multi-purpose machines used to load material (asphalt, demolition debris, dirt, feed, gravel, logs, raw minerals, recycled material, rock, sand, wood chips, etc.) into or onto another type of machinery (truck, conveyor belt, feed-hooper, rail-car, etc.).*

Slide 16

Self Study Guide Pg. 7

Worksheet Pg. 2



Reveal the bullets on Slide 16 and identify features and applications of a Wheel Loader:

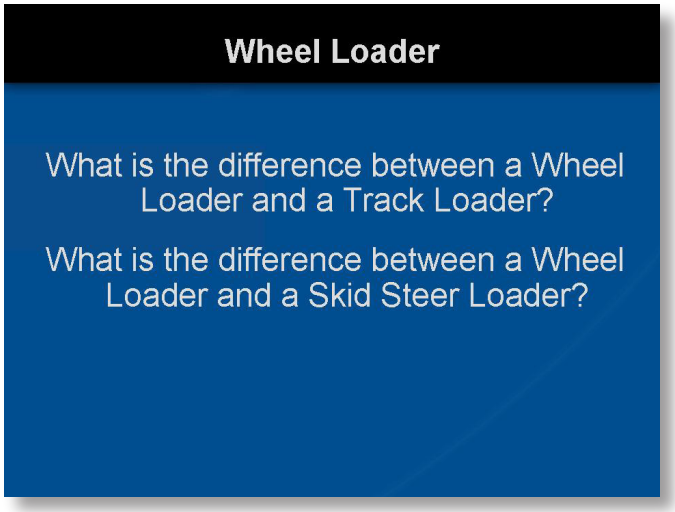
- A wheel loader is used to load trucks with dirt, rock or snow, and to backfill (replace) dirt.
- They very maneuverable, which enables the operator to make turns in tight areas to load, carry or dump material. (*There is a hinge behind the front wheels to increase maneuverability*)
- Wheel loaders can be equipped with tools such as brooms, rakes, pallet forks, grapples, and multi-purpose buckets.
- Log & lumber fork attachments are geared to lumber mills.

Wheel Loader (cont'd.)

- **Display Slide 17.**

Discussion Questions:

- What is the difference between a Wheel Loader and a Track Loader?
  (Possible response: The Wheel Loader has wheels and the Track Loader has tracks for better traction.)
- What is the difference between a Wheel Loader and a Skid Steer Loader?
  (Possible responses: Skid Steers are smaller, they have wheels that spin in opposite directions for tight turns, the lift arms in Skid Steers are alongside the driver with the pivot points behind the driver's shoulders.)



Slide 17

Self Study Guide Pg. 7


Earthmoving Equipment
Equipment Certification - Equipment Product Families

Wheel Loader

Wheel loaders are popular for loading trucks with dirt, rock or snow. They are are also used for backfilling (replacing) dirt.

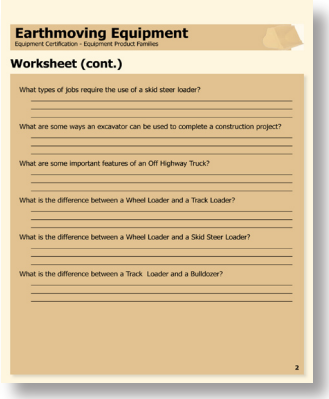
Wheel loaders are very maneuverable, which enables the operator to make turns in tight areas to load, carry or dump material.

Wheels provide better mobility and speed and do not damage paved roads as much as tracks, but provide less traction.

Wheel loaders come in many sizes and can be equipped with tools such as brooms, rakes, pallet forks, grapples, and multi-purpose buckets. Log & lumber fork attachments are geared to lumber mills.

7

Worksheet Pg. 2


Earthmoving Equipment
Equipment Certification - Equipment Product Families

Worksheet (cont.)

What types of jobs require the use of a skid steer loader?

What are some ways an excavator can be used to complete a construction project?

What are some important features of an Off Highway Truck?

What is the difference between a Wheel Loader and a Track Loader?

What is the difference between a Wheel Loader and a Skid Steer Loader?

What is the difference between a Track Loader and a Bulldozer?

2

- **Encourage participants to write responses on their worksheets. The questions on their worksheets correspond to the Discussion Questions above.**

- **Display Slide 18.**

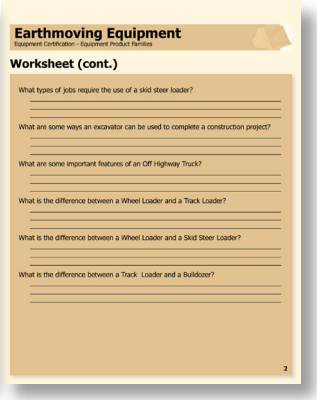
Self Study Guide Page 8/Worksheet Page 2

Transition: *These machines are capable in nearly every task, but master of none. A dozer, excavator, or wheel loader will out perform a track loader under a set of conditions, but the ability of a track loader perform almost every task on a job site is why it remains a part of many company's fleets. Specialized attachments are typically only used with mini-track loaders and not the larger ones.*

Slide 18

Self Study Guide Pg. 8

Worksheet Pg. 2



Reveal the bullets on Slide 18 and identify features and applications of a Track Loader:

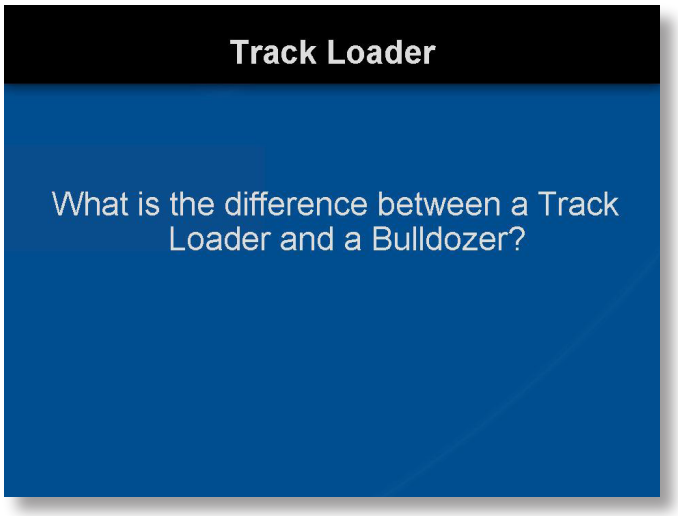
- A track loader is a vehicle with a tracked chassis and a loader on the front for digging and loading material.
- Track loaders are used on wet, soft or variable ground conditions where skid steer or wheel loader tires don't provide adequate traction or flotation.

Track Loader (cont'd.)

- **Display Slide 19.**

Discussion Questions:

- What is the difference between a Track Loader and a Bulldozer?
  (Possible response: The Track Loader has a square wide bucket connected to the end of two booms (arms) to scoop up loose material from the ground, such as dirt, sand or gravel, and move it from one place to another without pushing the material across the ground. Bulldozers simply push things forward.)



Slide 19

Self Study Guide Pg. 8

Earthmoving Equipment
Equipment Certification - Equipment Product Families

Track Loader

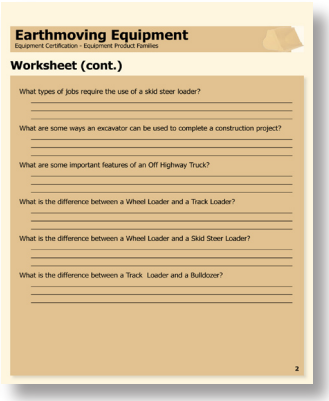
A track loader is an engineering vehicle consisting of a tracked chassis with a loader for digging and loading material.

The best applications for a track loader are those with wet, soft or variable ground conditions where skid steer loader tires don't provide adequate traction or flotation. Landscapers appreciate the track loader because of its low ground pressure, which minimizes ground disturbance.

These machines are capable in nearly every task, but master of none. A dozer, excavator, or wheel loader will out perform a track loader under a set of conditions, but the ability of a track loader to perform almost every task on a job site is why it remains a part of many company's fleets.

8

Worksheet Pg. 2



Earthmoving Equipment
Equipment Certification - Equipment Product Families

Worksheet (cont.)

What types of jobs require the use of a skid steer loader?

What are some ways an excavator can be used to complete a construction project?

What are some important features of an Off Highway Truck?

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What is the difference between a Wheel Loader and a Skid Steer Loader?

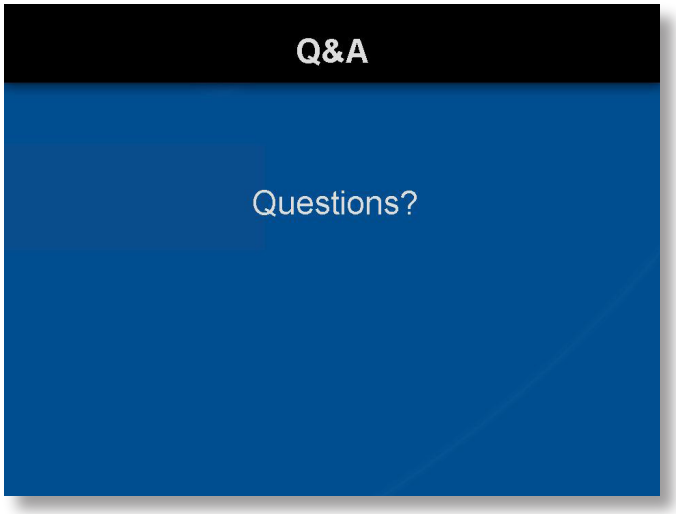
What is the difference between a Track Loader and a Bulldozer?

2

- **Encourage participants to write responses on their worksheets. The questions on their worksheets correspond to the Discussion Questions above.**

Q&A

- **Display Slide 20.**
- Answer and discuss any questions participants may have. Follow up with answers to questions you cannot answer in the session.



Slide 20

Quiz Info 1 minute

- Explain that you will be mailing each of the participants a Quiz immediately after the session. Request that participants complete the quiz as soon as possible and either mail, fax, or email the completed quiz to Instructional Design.

Next Steps 4 minutes

- **Display Slide 21.**
- Describe the next steps in the Equipment Certification program and field any questions.

Slide 21