OBJECTIVE SHEET

POWER SCREEDS

6

INTRODUCTION

Cement masons use screeds to bring concrete to specified grade. The screeding process creates a slab with an essential "plane" surface. Screed tools may be as simple as a piece of wood or as a complex as a self-propelled high production machine. Cement masons require a variety of screeds because of the diverse applications of concrete flat work.

FOCUS ASSIGNMENTS

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1. Observe the use of a power screed at a job site. What type of screed was being used? Describe the flat work job (building slab, highway repair, etc.) and the type of screed used.

2. Why do you think the cement mason chose that particular screed?

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by scoring 85% on the unit test.

SPECIFIC OBJECTIVES

1. State the purpose of power screeding.
2. Name the advantages of power screeding.
3. Identify types of power screeds.
4. Describe the features of vibratory truss screeds.
5. Identify the features of handheld power screeds.
6. Describe the features of roller screeds.
7. List the components of a laser screed.
8. List the steps in the laser screeding process.
9. State the advantages of laser screeds.

INFORMATION SHEET

POWER SCREEDS

6

OBJECTIVE 1

State the purpose of power screeding.

Paving or flatwork projects will require or accommodate different power screeds, but there is no particular rule for choosing the appropriate machine. Cement masons must make choices considering numerous factors such as:

- Cost
- Ability to transport the machine
- Width of the slab
- Thickness of the slab
- Number of operators available
- Time constraints
- Obstacles

OBJECTIVE 2

Name the advantages of power screeding.

WORDS YOU SHOULD KNOW	
F-numbers	the specification and measurement of concrete slab flatness and levelness adopted by the American Concrete Institute; The higher the F-number indicates the better quality of the floor

- Reduction in labor costs
- Increase in productivity
- Achieve higher F-numbers
- Provide ergonomic advantage to the worker

OBJECTIVE 3

Identify types of power screeds.

Though screeding can be accomplished by hand using a wooden or aluminum screed, power screeds have a variety of advantages. Power screeds strike off the concrete flatwork much more quickly and most of them vibrate the concrete during strike-off. The major types of power screeds are as follows:

- **Vibratory truss screeds** — used to strike-off wider areas, making passes up to 75 feet wide (Figure 1).

FIGURE 1

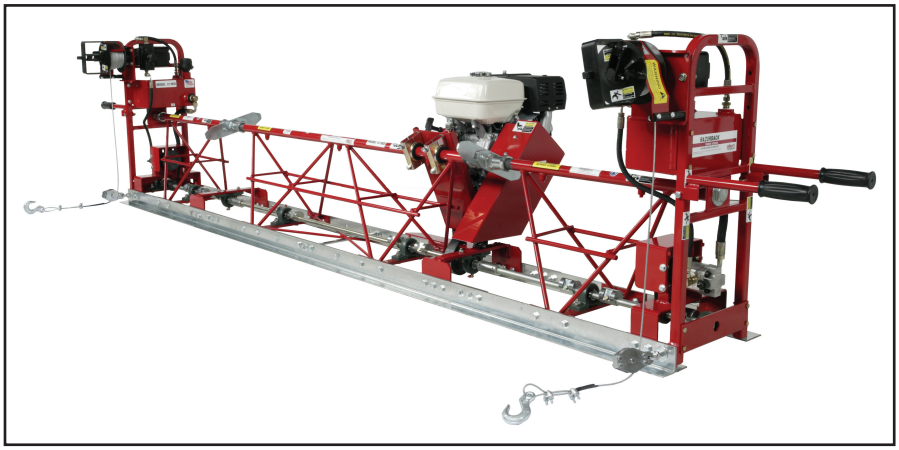

Photo courtesy of Allen Concrete Equipment.

- **Handheld vibrating screeds or float screeds** — consist of handles that the operator uses to guide the screeding process. Narrower than the truss screed, operators can still cover wide areas by making several passes over the slab (Figure 2).

FIGURE 2

Photo courtesy of Lindley Incorporated, Boaz, KY.

- **Roller screeds** — powered by a spinning tube referred to as a "driver" that is propelled by an engine (Figure 3).

FIGURE 3

Photo courtesy of Allen Concrete Equipment.

- **Laser screed** — uses advanced technology to screed large areas of concrete flatwork (Figures 4 and 5).

FIGURE 4

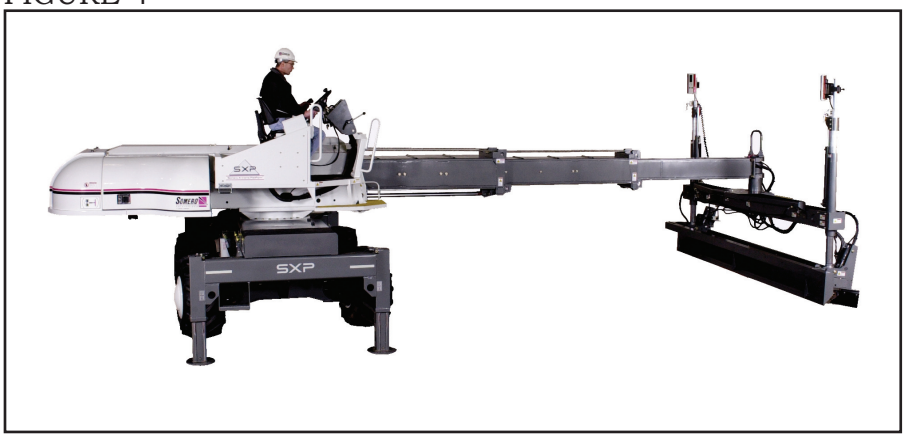

Photo courtesy of Somero Enterprises, Inc.

FIGURE 5

Photo courtesy of Somero Enterprises, Inc.

OBJECTIVE 4

Describe the features of vibratory truss screeds.

WORDS YOU SHOULD KNOW	
VPM	Vibrations per minute

Truss screeds consist of cast metal frames with triangular cross sections. Vibrating aluminum or steel blades mounted on the frames screed the concrete surface. Because of their heavy weight, side rails support the frame and a hand-powered or motor-powered winch pulls the screed across the surface area. The vibration has the effect of bringing fine particles to the surface and pushing down the larger rock aggregates.

- Vibratory truss screeds may be air powered or engine powered.

  - ❑ **Air powered** — The air-powered screed operates by means of brass pistons that produce a much higher VPM making them an excellent choice for low slump concrete. It can consolidate slabs up to 12-inches thick.

    ✔ **NOTE:** This machines requires an air compressor.

  - ❑ **Engine powered** — The engine-powered screed uses a belt and pulley to create the vibration needed to consolidate the concrete.

- Can be adjusted to create a crowned, inverted, or level slab.
- Cement masons control the winches or hydraulics that pull the screed across the slab.
- A vibratory truss screed will require one of the following: end handles, winches, engine kit, or crown and invert adapters.
- A vibrating truss screed can make passes up to 75 feet wide.

  ✔ **NOTE:** The truss screed has some disadvantages. Hauling it may require a flatbed and a cherry picker may be necessary to put the truss screed in place.

OBJECTIVE 5

Identify the features of handheld power screeds.

Handheld power screeds consist of T or U shaped handles attached to strike off blades of various lengths. An engine mounted on the handle creates a vibration that levels the concrete surface. Features of the handheld power screed are as follows:

✔ **NOTE:** Although truss screeds are used for wide spans of concrete, a handheld power screed can accomplish the same task by making several passes over the area. This process is advantageous because the handheld power screed does not have the same difficulties of transport and operational procedures of that of the truss screed. However, a truss screed will produce a flatter floor.

- Reduces the labor-intensive work of manual screeding whereupon the finisher is bent over and physically pulling material to grade.
- Easier to haul and place than larger truss screeds and require less time in setting up and beginning operations of larger screeds.
- Can be used for a variety of flat work such as patios, sidewalks and industrial floors.

  ✔ **NOTE:** The handheld power screed is not as fast or accurate on larger slabs.

OBJECTIVE 6

Describe the features of roller screeds.

Roller screeds operate by means of a motorized steel tube that spins up to 250 RPM in the opposite direction that it is pulled. The tube varies in length from 6 feet to 43 feet. The rolling action of the tube strikes off excess concrete, leveling the surface area. Features of the roller screed are as follows:

- Roller screeds require the construction of side forms
- They can move forward and reverse making them capable of multiple passes.
- A small vibrating system can be fitted into the roller tube.
- Three to four passes are usually required before the surface is ready for finishing.
- They are capable of striking off very low slump concrete.
- With the use of a winch, the roller screed can be used on inclines.

EXAMPLE: Roller screeds are frequently chosen for medium-size placements such as repairing highway sections and placement of pervious concrete.

OBJECTIVE 7

List the components of a laser screed.

Somero Enterprises was awarded a patent for their invention of the laser screed in 1987. In 1999, they created a 3-D laser system that determines surface elevations of a slab, and then uses the information to screed the concrete. The main components of a 3-D laser screed are as follows:

- A heavy-duty laptop computer designed for construction work

- A Geodimeter — a robotic device that measures elevation levels and conveys that information to the computer (Figure 6).

FIGURE 6

- The target — a hand-held apparatus containing a set of prisms that reflect infrared and laser signals back to the Geodimeter.

- Somero machine-control software

OBJECTIVE 8

List the steps in the laser screeding process.

1. Cement mason sets up Geodimeter and creates a radio link between the Geodimeter and the computer.

2. Cement mason sets the target at the finished concrete elevation every 75-100 feet

3. Geodimeter relays information from target to computer adjusting the concrete elevation.

   ✔ **NOTE:** The above steps create a computer model of the job site referred to as the “mesh.”

4. At this stage concrete placing begins. The cement mason places the target on the right side of the screed head and plugs the computer into the screed.

5. Geodimeter continuously locates the target and radios information to the computer.

6. With this information, the computer then adjusts the elevation to create a plane surface.

OBJECTIVE 9

State the advantages of laser screeds.

- Competitive pricing for larger job sites such as warehouses

  ✔ **NOTE:** More than 90% of parking lots are currently made of asphalt. Recently, however, engineers are discovering the economical advantages of concrete paving over that of asphalt.

- High productivity: laser screeds are capable of screeding 50,000-70,000 square feet a day.

- Floors can be screeded to high F-number requirements