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DIVISION OF OIL, GAS AND MINING
FACSIMILE COVER SHEET

DATE: 12/09/02
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NUMBER OF PAGES: (INCLUDING THIS ONE) 5
FROM: Wagne Western

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MESSAGE:

Estimate for rocking and hand spread
mulch. I can reduce rocking but
hand spread mulch is a problem. Any
suggestions?

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435-687 4825

Project: _____
Date: _____
Prepared by: _____

Dennis Oakley

WORKSHEET 10
PRODUCTIVITY FOR HYDRAULIC EXCAVATOR USE (BACKHOE OR POWER SHOVEL)

Earthmoving Activities:

Characterization of the Excavator Used (type, size, etc.):

Description of Excavator Used (loading geometry, materials, etc.):

Productivity Calculations:

Net Bucket Capacity = $\frac{\text{heaped bucket capacity}}{\text{LCY}} \times \text{bucket fill factor}^* = \frac{1}{1} \text{ LCY}$

Hourly Production = $\frac{1 \text{ LCY}}{\text{net bucket capacity}} \times 60 \text{ min/hr} \div \frac{0.15 \text{ min}}{\text{cycle time}^{**}} \times \frac{.83}{\text{efficiency factor}} = \frac{332}{332} \text{ LCY/hr}$

Hours Required = $\frac{2420 \text{ LCY}}{\text{volume to be handled}} \div \frac{332 \text{ LCY/hr}}{\text{net hourly production}} = \frac{7.3}{7.3} \text{ hr}$

* See loader section of the equipment manual.

** See excavator section of equipment manual.

Data Source(s):

load 0.09 min
dump 0.04 min
 .13 min

load/dump 0.13 min
maneuver 0.02 min
0.15 min

Note $2' \times 4' \times 3' = 24 \text{ ft}^3$
assume $27 \text{ ft}^3 \approx 1 \text{ CY}$

1 acre = 43560 ft^2

$43560 \text{ ft}^2 \times 1.5 = 65340 \text{ ft}^3 = 2420 \text{ CY}$

Pocking, Deep Gouging and Extreme Roughening

Extreme surface roughening creates microbasins by using a backhoe or trackhoe shovel. The trackhoe shovel is used to dig, poke, or push basins with a minimum elevation of eighteen inches. These basins should be 1 1/2 to 2 feet deep and have the width of the bucket. This allows the basins to be up to four feet wide. The most common construction method is to dig a bucket load of soil and then drop it two to three feet above the soil

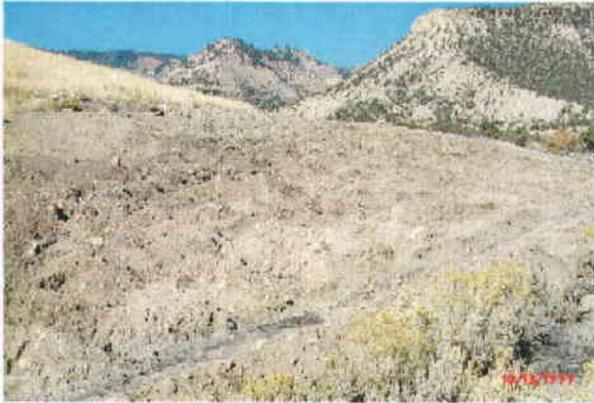


Figure 3.18: The soil surface is roughened, seeded and then hydromulched. Sunnyside Mine.

surface. The process is repeated in a random and overlapping pattern, making it impossible for water to flow down slope. Finished roughened soils should be difficult to walk over. On poor, shaley sites, such as the Mancos Shale, the pocks can fill with sediment within a short time period. Therefore, the pocks should be as large as possible and resemble the moguls of a ski slope. Conversely, on sites with adhesive soils, the pocks should not be too large, because they would fill with water. Straw, alfalfa, or hay can be spread during roughening and anchored to the soil surface by jabbing

the materials into the soil surface or tacking them with a hydromulch slurry.

Because a drill seeder cannot be used on such rough surfaces, seed must be broadcast by hand or hydrosseeded ([Chapter 4, Section 2](#)). In areas with extremely dry and loose soil, it may be advantageous to wait until the soil has settled before starting the seeding process. One method is to broadcast half the seed immediately and broadcast half the seed after the soil settles.

Ripping

Ripping is used as a soil-roughening technique in areas too large to economically roughen by gouging with a backhoe. Ripping is also used to break compacted layers of soil. Ripper shanks should be at least two feet long. Rip compact soil when it is relatively dry to permit shattering beneath the surface. The equipment travels along the contour of the slope, ripping to a depth of two feet or more.



Figure 3.19: Deep ripping breaks up compact soil. Summit #1 Mine.

Note: The distance between rippers should be equal to the depth ripped.

