

EFA Soil Samples
Cherokee Co.
Road S-348
Tube Labeled: Sample #4 (Scour Hole)

Preliminary Remarks:

Again, the available sample length was approximately 26 inches. That sample was divided into three sections:

Section 4A ...0.0 to 10.0 inches
Section 4B ...10.0 to 20.0 inches
Section 4C ...20.0 to 26.0 inches

Due to the limitations of the soil extractor, a 10 inch sample is about the maximum length that could be tested. Each section will be subjected to a series of flow velocities. Each flow rate had a time duration of 1 hour or a total erosion amount of 50 millimeters.

The logging rate parameter of the "Erosion" program was set to 1 second. This logging rate will be the same for all of the following tests.

NOTE: Testing will begin at a flow velocity of 0.6 m / sec.

For sample designated 4A: (0.0 to 10.0 inches)

Soil Description: Reddish-Brown Silty Clay Loam w/ Sand Loam pockets to Brown Silty Clay.

Trim 50 mm: Stones, roots and loose material required excessive trimming.

Test #4A-1
File name Tube4A Run1.txt
Velocity 0.6 m / sec
Total push 1 mm
Test duration 1 hour

Remarks: Small scours developed when Sand pockets eroded.

Trim 12 mm: Small stones.

Test #4A-2
File name Tube4A Run2.txt
Velocity 1.0 m / sec
Total push 9 mm
Test duration 1 hour

Remarks: 7 mm eroded in the first 25 minutes. The erosion rate then slowed when a more clayey material was exposed.

Trim 6 mm

Test #4A-3
File name Tube4A Run3.txt
Velocity 1.5 m / sec
Total push 50 mm
Test duration 0.425 hours

Remarks: 45 mm of sandy material was pushed in 5.7 minutes. The erosion rate slowed dramatically when clayey material was encountered.

Trim 12 mm

Test #4A-4
File name Tube4A Run4.txt
Velocity 2.0 m / sec
Total push 1 mm
Test duration 1 hour

Remarks: A much more clayey material. Little to no visible scour.

Trim 6 mm

Test #4A-5
File name Tube4A Run5.txt
Velocity 2.5 m / sec
Total push 50 mm
Test duration 0.442 hours

Remarks: A large half-inch deep scour hole developed on the back side of the flow and steadily moved forward for the first 15.7 minutes. A large soil push was required to fill the resulting void. A fairly fast erosion rate continued until the test was terminated at 26.5 minutes.

Testing Terminated on Section 4A

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For Sample designated 4B: (10.0 to 20.0 inches)

NOTE: Testing will begin at 1.0 m / sec.

Soil Description: Brown Silty Clay w/ Sand pockets.

Test #4B-1

File name Tube4B Run1.txt

Velocity 1.0 m / sec

Total push 1 mm

Test duration 1 hour

Remarks: Little to no visible erosion.

Trim 6 mm

Test #4B-2

File name Tube4B Run2.txt

Velocity 1.5 m / sec

Total push 1 mm

Test duration 1 hour

Remarks: Small scour holes formed when Sand pockets eroded.

Trim 6 mm ...

Test #4B-3

File name Tube4B Run3.txt

Velocity 2.0 m / sec

Total push 1 mm

Test duration 1 hour

Remarks: Small isolated portions eventually broke away. The resulting holes never deepened nor grew larger.

Trim 6 mm

Test #4B-4

File name Tube4B Run4.txt

Velocity 2.5 m / sec

Total push 42 mm

Test duration 1 hour

Remarks: A scour hole developed on the left side of the flow. The hole deepened to a depth of one-half inch and maintained the same depth throughout the 42 mm of push.

Trim 18 mm

Test #4B-5

File name Tube4B Run5.txt

Velocity 3.0 m / sec

Total push 50 mm

Test duration 0.283 hours

Remarks: Steady erosion rate.

Trim 6 mm

Test #4B-6

File name Tube4B Run6.txt

Velocity 3.5 m / sec

Total push 50 mm

Test duration 0.183 hours

Remarks: Steady erosion rate.

Trim 6 mm

Test #4B-6

File name Tube4B Run6.txt

Velocity 3.5 m / sec

Total push 50 mm

Test duration 0.183 hours

Remarks: Steady erosion rate.

Trim 6 mm

Test #4B-7

File name Tube4B Run7.txt

Velocity 4.0 m / sec

Total push 18 mm

Test duration 0.065 hours

Remarks: Steady erosion rate for 3.9 minutes. Remaining 2 inches of sample lifted out. Test terminated.

Testing Terminated on Section 4B

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For Sample Designated 4C: (20.0 to 26.0 inches)

NOTE: Testing will begin at 1.5 m / sec.

Soil Description: Brown-Tan Silty Clay w/ Sand pockets

Test #4C-1

File name Tube4C Run1.txt

Velocity 1.5 m / sec

Total push 1 mm

Test duration 1 hour

Remarks: Small scour holes developed when Sand pockets eroded.

Trim 6 mm

Test #4C-2

File name Tube4C Run2.txt

Velocity 2.0 m / sec

Total push 11 mm

Test duration 1 hour

Remarks: Scour rate was steady with 9 mm in 40 minutes. It then slowed to 2 mm in the last 20 minutes.

Trim ? mm

Test #4C-3

File name Tube4C Run3.txt

Velocity 2.5 m / sec

Total push 50 mm

Test duration 0.917 hours

Remarks: Scour rate was steady through 26 minutes and 19 mm of push. At that time, small roots began to slow the scour rate up to the 49 minute mark with 35 mm of push. The roots then washed away and the scour rate increased.

Trim 6 mm

Test #4C-4

File name Tube4C Run4.txt

Velocity 3.0 m / sec

Total push 50 mm

Test duration 0.328 hours

Remarks: Steady rate of erosion. After reaching the 50 mm mark, only 1 inch of sample remained – not enough for further testing.

End of Testing for Tube Labeled “ Sample #4 “ (Scour Hole)