

ATT-52/95 UNDISTURBED SAMPLING**1.0 SCOPE**

This method describes the procedures for obtaining undisturbed Shelby and penetrometer tube soil samples, and soil core samples.

2.0 EQUIPMENT

Shelby tubes		large canvas bags
penetrometer tubes	(457 mm split or 152 mm penos)	sealing wax
		melting pan
soil core carrying cases		log book
pocket penetrometer		shipping tags
putty knife		soup spoon
large plastic bags (200 x 100 x 450 mm)		twist ties

Data Sheet: Soil Survey Sample Identification (MAT 6-12)

NOTE: This method assumes that the drilling company from which the seismic rig will be rented, has available all other equipment necessary for the sampling, ie. peno sampling spoon, Shelby adapter, 63.5 kg drop hammer, bits, drill flights, propane torch, etc.

3.0 PROCEDURE**3.1 Equipment Preparation**

1. Before the drilling begins, park the truck as close as possible to the drill at a location that will not interfere with its operation.
2. Lay out sufficient peno and Shelby tubes to do the sampling, along with the putty knife, soup spoon and a pad of Soil survey Sample Identification forms.
3. Light the Contractor's propane torch and place the wax pan over the flame.
4. Place about 2 blocks of wax into the pan. As soon as the wax melts, turn the heat down low on the torch to prevent burning the wax. Apply only sufficient heat to keep the wax molten.

3.2 Shelby Samples

1. When the depth for a Shelby sample is reached, have the drill operator clean out the hole.
2. Screw the Shelby adapter on the drill rod.

3. Insert a Shelby tube into the adapter up to the recess opening.
4. Turn the Shelby so that the holes in the tube match with those on the adapter.
5. Insert the lock bolt through the matching holes and fasten the washer and nut on the bolt.
6. Lower the drill rod with the Shelby into the hole.
7. Use the drill's hydraulic system to force the Shelby into the soil to a depth approximately 75 mm less than the height of the sample tube. Ensure the drill operator does not push the Shelby into the soil twice.
8. Rotate the drill slightly to shear off the soil trapped in the Shelby tube, then raise the drill rod out of the hole and disconnect the Shelby.
9. Use the putty knife to trim off any excess or loose soil on both ends of the tube.

NOTE: Since it is impossible to completely clean out the hole before sampling, there may be some loose material on the top of the sample. This shall be trimmed away, if possible. At the cutting end of the tube, trim away at least 15 mm of soil to accommodate the wax seal.

10. Carefully clean the inside walls of the tube at both ends so that the wax will seal properly to the metal.
11. Seal the top and bottom of the tube to prevent moisture loss, by spooning wax over the ends. Be certain that both ends are completely coated. Preferably the wax should be applied in two stages; the first filling $\frac{1}{2}$ of the cavity, the second about 5 minutes later, filling the remainder.
12. Pick off the number stamped on the Shelby tube and record it along with the sample depth in the log book, on the hole log, and on the sample identification form, as shown in Figure 1.
13. Place the tube aside and allow the wax to cool for about 10 minutes, then place the sample in a large canvas bag.

3.3 Penetrometer Samples

1. When the depth for a peno sample is reached, have the drill operator clean out the hole as well as possible.
2. Pull the drill out of the hole and remove the bit from the drill rod.
3. Assemble one 457 mm split tube or three 152 mm peno tubes inside the sampling spoon. Each peno tube must be placed in the spoon with its number facing upwards in the direction of the top of the hole.

SOIL SURVEY SAMPLE IDENTIFICATION

JOB IDENTIFICATION										
	FILE NO.	TRK	TO	DATE SAMPLED	PROJECT MANAGER	SAMPLE NO.	DISTRICT NO.	NO. OF SAMPLES		
	67:14	N. OF 25th BASE LINE	N. OF WABASCA RIVER	86.10.02-03	B. ROBINSON	2	15	7		
	JOB NO.	MATERIALS TECHNOLOGIST	PHONE NO.	POST OFFICE (PROJECT MANAGER)						
	P227D	M. SMITH	927-3333	FORT VERMILION						
LAB SAMPLE NO.	TAC NO.	HOLE NO.	STATION	LOCATION	TOPSOIL	SAMPLE DEPTH	TRANSITION	FIELD REMARKS	FIELD VISUAL DESCRIPTION	INSTRUCTIONS
1030		5	3+134	1.5m RT#	0.05	1.50				SAMPLE SOURCE: 1 SOIL SURVEY 2 SHELLS 3 FENCE 4 50mm SOL. 5 S P T TWO DEGRAD. PLACES FOR THE DEPTH OF TOPSOIL. SAMPLE DEPTH AND TRANSITION DEPTH (M) ADDITIONAL INSTRUCTIONS IN SECT. 3.1.3 MATERIALS SEE 1 MANUAL NOTE: THE LOWER PORTION OF THIS FORM IS USED BY THE TRANSPORTATION LABORATORY
1592						4.55				
1611						7.60				
1039						10.65				
1536		6	4+785	3.0m LT#	0.10	1.50				
1539						4.55				
1568						7.60				

SOIL SURVEY SAMPLE IDENTIFICATION

JOB IDENTIFICATION										
	FILE NO.	TRK	TO	DATE SAMPLED	PROJECT MANAGER	SAMPLE NO.	DISTRICT NO.	NO. OF SAMPLES		
	67:14	N. OF 25th BASE LINE	N. OF WABASCA RIVER	86.10.02-03	B. ROBINSON	5	15	9		
	JOB NO.	MATERIALS TECHNOLOGIST	PHONE NO.	POST OFFICE (PROJECT MANAGER)						
	P227D	M. SMITH	927-3333	FORT VERMILION						
LAB SAMPLE NO.	TAC NO.	HOLE NO.	STATION	LOCATION	TOPSOIL	SAMPLE DEPTH	TRANSITION	FIELD REMARKS	FIELD VISUAL DESCRIPTION	INSTRUCTIONS
		5	3+134	1.5m RT#	0.05	3.05		152 305 457		SAMPLE SOURCE: 1 SOIL SURVEY 2 SHELLS 3 FENCE 4 50mm SOL. 5 S P T TWO DEGRAD. PLACES FOR THE DEPTH OF TOPSOIL. SAMPLE DEPTH AND TRANSITION DEPTH (M) ADDITIONAL INSTRUCTIONS IN SECT. 3.1.3 MATERIALS SEE 1 MANUAL NOTE: THE LOWER PORTION OF THIS FORM IS USED BY THE TRANSPORTATION LABORATORY
11						6.10		3 6 18	SANDY CLAY	
12						9.15		4 8 16	SILTY CLAY	
14						12.20		18 34 62	CLAYEY SAND	
15						13.20		31 68 121	CLAYEY SAND	
16		6	4+785	3.0m LT#	0.10	3.05		44 106 150	SANDY CLAY	
17						6.10		4 11 18	SILTY SAND	
18						9.15		8 16 31	SANDY CLAY	
19						12.20		11 42 59	SILTY CLAY	
								26 87 142	CLAYEY SAND	

FIGURE 1

4. Screw the spoon on the drill rod.
5. Lower the sampler to the bottom of the hole.
6. Attach the 63.5 kg drop hammer to the top of the drill rod.
7. Use the cathead and the rope attached to the hammer to raise the hammer. Ensure that the drop is 762 mm.
8. Mark the drill rod so that you know when the sampler has been driven 152, 305 and 457 mm. This will be helpful in counting the number of blows for each depth. Release the hammer and begin the blow count.
9. Record the number of blows required to drive the sampler 152, 305 and 457 mm respectively.
10. When a depth of 457 mm is reached, remove the hammer.
11. Pull the drill rod out of the hole.
12. Remove the sampling spoon from the drill rod.

13. Unscrew the shoe from the end of the spoon and slide the tube(s) out of the sampler.
14. If three 152 mm peno tubes were used:
 - a) Keep the tubes in the proper order.
 - b) Select the best tube for submission to the a Laboratory. Usually the bottom sample (adjacent to the cutting shoe) is submitted if it is a full 152 mm sample. If the bottom tube does not contain a full sample, select the next full tube.
 - c) Trim and seal the sample as directed in Section 3.2, steps 9 to 11.
 - d) Record the peno tube number and the sample depth in the log book, on the hole log and on the sample identification form.
 - e) Allow the wax to cool, then place the sample in a canvas bag.
15. If the split 457 mm peno tube was used:
 - a) Split the tube and remove the sample.
 - b) Identify the soil and estimate its moisture condition as described in ATT-29, Soils Identification, hand Method. Enter the results beside the hole log in the Log book and the Soil Survey Sample Identification Form.
 - c) Place the sample in a large plastic bag.
 - d) Remove the air from the bag and tightly seal the bag with a twist tie.
 - e) Attach a sample tag to the twist tie.
 - f) Record the tag number and sample depth in the log book in the hole log and on the sample identification form.
 - g) Place the sealed plastic bag in a large canvas bag.

3.4 Soil Cores

1. Remove the bit from the drill rod and attach a section of coring pipe. The core sections come in 1.5 m and 3.0 m lengths. Either may be attached to secure the samples, depending on the anticipated rock depth.
2. Lower the stem into the hole to the depth of the rock or rock-like formation.
3. Connect the water supply to the drill apparatus. Water must circulate through the stem to cool the bit and remove loose cuttings when drilling through rock.

4. Begin wet drilling. Drill to the depth of the core flight or until the end of the rock layer is reached.
5. Pull the core flight out of the hole. The flight is equipped with a core catcher which prevents the sample from falling into the hole when the drill is raised.
6. Unscrew the core flight from the drill rod.
7. Slide the sample out of the barrel into the recesses provided in a soil core box. Ensure the samples are placed in the proper order of depth.
8. Use large plastic bags or plastic wrap to wrap each length of core to prevent the sample from drying out.
9. Apply masking tape to the raised partitions separating the core slots for the full length of each sample. On the tape, write the depths for starting and ending the sampling, and the hole identification.

In lieu of masking tape, tags may be compiled showing the same information and placed in the slot with each sample. Prevent the tags from being damaged by the samples, ie. use two tags and fold one over the other, or place the tags in plastic bags.
10. Continue wet drilling and obtaining samples, until the required hole depth is reached.

3.5 Sample Identification

Compile a Soil Survey Sample Identification form for all of the samples. The form should be folded, placed in a plastic bag and the bag placed inside the canvas bag/s containing the corresponding samples.

Be certain that the peno and Shelby tube numbers recorded on the forms are correct, and include the blow counts for the peno samples.

Soil core samples should not be recorded on the same form used to record penetrometer or Shelby tubes. For these samples a Soil Survey Sample Identification form should be compiled for each box of samples.

3.6 Handling Samples

Undisturbed samples shall not be allowed to freeze. During sampling in freezing weather conditions, the samples shall be placed in the cab of the truck as soon as they are waxed. The truck shall be left idling throughout the sampling with the heater on. Up until the time that they are brought into a Laboratory, they shall be stored in a heated garage, hotel room, field office, etc. Also, these samples shall not be subjected to any unnecessary rough handling. Severe jolts or jarring could damage or dislodge the wax seal or disturb the sample.

4.0 HINTS AND PRECAUTIONS

1. Deep Drilling methods shall be reviewed by all personnel assigned to a drilling project before sampling is undertaken.