WORK INSTRUCTIONS FOR ENGINEERS

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OP-3-31. CHECKLIST FOR 1D CONSOLIDATION LABORATORY TEST

31.0 CHECKLIST FOR 1D CONSOLIDATION LABORATORY TEST

	CHECKLIST ITEMS *(refer to respective explanatory notes at the end of this table.)	Checked By G&P Geotechnics	Lab Supervisor
1.0	**PRELIMINARY PREPARATION**		
1.1	**Sample For Testing**:· • Fine Silts/Clay: ID ≥ 6mm smaller than UD diameter.· • Coarse Silt/Sand: as close to UD diameter as possible.· • Minimum 50 mm dia, Max 105mm dia.		
1.2	Porous Plates:· • Diameter of top porous plate ~ 0.5mm smaller than ID of Consolidation Ring.· • Clean unclogged and saturated with deair water.		
1.3	Dial Gauge: · • Reliable to 0.002mm readings. • Travel of ≥ 10mm.		
1.4	Loading Device: · • Applied Vertical Force accuracy of 1% or 1 kPa, whichever is greater. • Apparatus must accommodate ≥ 75% of specimen thickness. • Force applied centrally to loading cap.		
1.5	Ancillary Items: • Moisture Contents and particle density apparatus· • Timer accurate to 1s. • Water Supply at room temperature· • Thermometer· • Balance or measuring instruments readable to 0.1g· • Cutting tools for specimen trimming.		
1.6	Miscellaneous Items: • Flat glass plate. • Lubricating oil or silicon grease, to reduce the internal side friction of the ring. • Cloth.		
2.0	**SPECIMEN PREPARATION**		
2.1	Specimen:· • Normally orientated in lab test in the same direction relative to the stratum as in situ applied stress· • Measure specimen height to 0.05mm· • Place in ring on watch glass and weigh to 0.1g· • Take a similar soil sample for Particle Density and Initial Moisture Content determination.		

2.2	Apparatus for Consolidation Test:· • Consolidation Cell :- (a) Consolidation ring, of stainless steel or plated brass, rigid, with polished internal surface and cutting edge. (b) Cell body and base (water tight). (c) Consolidation ring retainer and fixing screws or nuts. (d) Loading cap (pressure pad). (e) Two porous discs of ceramic ware, sintered bronze or sintered fused aluminium oxide and free draining (not clogged). • Consolidation Press or Load Frame (a) Rigid beam supported in suitable bearings to provide a convenient magnification ratio accurate to within 1%. (b) Adjustable counterbalance weight on beam. (c) Loading yoke assembly, to apply a vertical force to the specimen. (d) Rigid support and mounting for compression dial gauge. (e) Weight hanger for slotted weights.· • Rigid stand or bench, to which the load frame (or several frames) can be bolted (to floor). • Calibrated mass, the exact value of which should be known to an accuracy of 1%		
2.3	Assembly:· • Adjust counter balanced loading beam until just made contact with loading cap and beam is slightly above horizontal. • Add a small weight (≤ 2 kPa) to maintain good contact.		
3.0	**TEST PROCEDURE**		
3.1	LOADING SEQUENCE: The load for each stage shall be double of the previous load. The load at each stage is held constant for 24 hours.		
3.2	PREPARE AND CHECK THE APPARATUS: • Consolidation Ring is clean and not distorted, the inside face is smooth and the cutting edge is sharp with no burrs. • Check the beam moves freely and the weight hanger is fitted. • With the loading yoke in the vertical position, adjust the counterbalance weight so that the beam and hanger assembly is in balance.		
3.3	WEIGH AND MEASURE CONSOLIDATION RING WITH SPECIMEN.		
3.4	**Cut and Trim Specimen into Consolidation Ring:·** • Extrude an undisturbed specimen from a tube sample. • Cut off the extruded portion (specimen) and place on a flat glass plate for trimming.		

	• Sample should never be left exposed to the atmosphere for too long during the specimen preparation. • Use the ring as a template, trim the sample to 1 or 2mm larger than the final specimen size for a short distance ahead of the cutting edge. • Push the ring slowly and steadily with vertical axis. • Cut off and trim the remaining surplus soil flush with the end of the ring, • Ensure no unnatural cavities formed against the inside face of the ring.		
3.5	• Determine specific gravity from trimmings· • Determine moisture contents of the soil samples adjacent to trimmed soil at both ends (top and bottom) of the specimen for comparison after the test.		
3.6	Assembly : • Weigh specimen in ring. • Assemble ring and specimen in consolidation cell.· • Fit cell in load frame. • Set up loading yoke. • Adjust beam. • Set dial gauge.		
3.7	Loading and Recording Readings: • Record compression gauge reading (initial reading) • Apply required pressure (loading) • Take settlement reading at suitable time intervals. • Maintain pressure until primary consolidation has completed • Equal time of consolidation period for each pressure increment		
4.0	**PLOTTINGS**		
	Either: 1. Compression Gauge Records vs. log-time or; 2. Compression Gauge Records vs. square-root-time		
5.0	**RECORDS**		
5.1	Statement of method used with clause 3 of BS1377:Part 5:1990		
5.2	Initial dimension of the specimen		
5.3	Initial moisture content, bulk density and dry density		
5.4	Indicate particle density (assumed or measured)		
5.5	Initial void ratio and degree saturation		
5.6	Swelling pressure (2 significant figures), if required.		
5.7	A plot of the voids ratio		
5.8	Plots of compression vs. time for each load increment		
5.9	Calculated coefficient of volume compressibility, m_v & coefficient of consolidation, c_v for each load increment (2		

	significant figures)		
5.10	Values of coefficient of secondary compression, c_{sec} for each load increment (2 significant figures), if required.		
5.11	Method of time fitting used.		
5.12	Laboratory temperature		
5.13	Location and depth of the test specimen within the original sample		
Signature: **Note: Once a copy is signed, this procedure has been clearly demonstrated and understood by the parties involved. Therefore, there shall be no problems in repeating the procedures for subsequent static load tests without the presence of G&P representation.**			

Explanatory Notes:

Item No.	Explanation
5.9	m_v is in m^2/MN and c_v is in m^2/year.
5.8	Using log time method to determine the c_v, but the corrected zero (d_0) to be obtained from Square-root-time method.