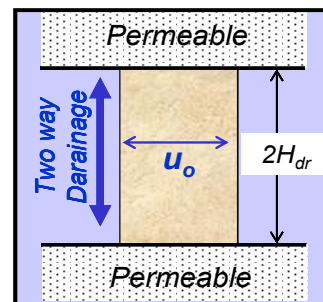
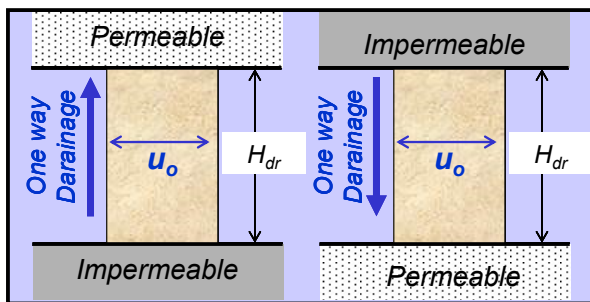
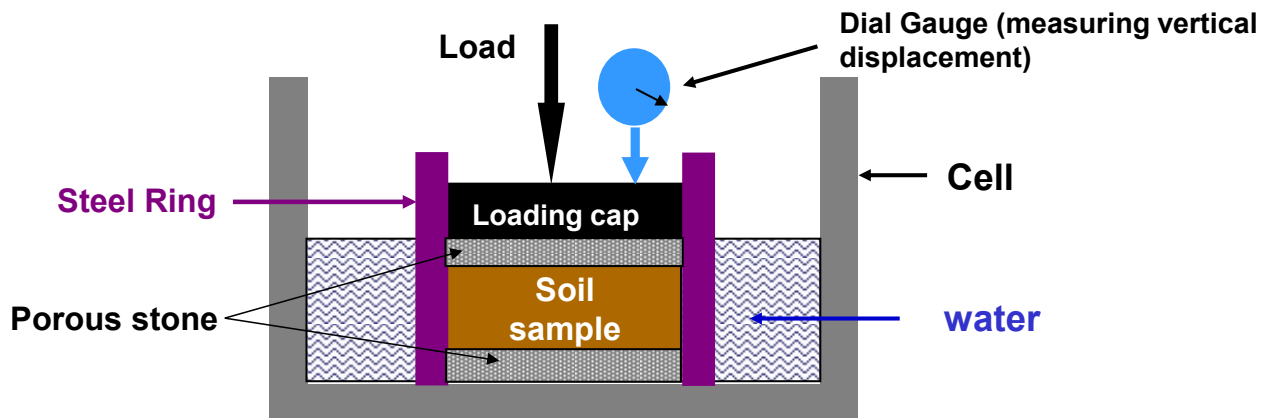
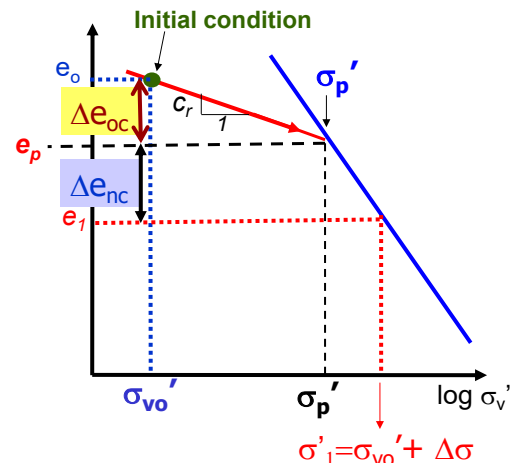
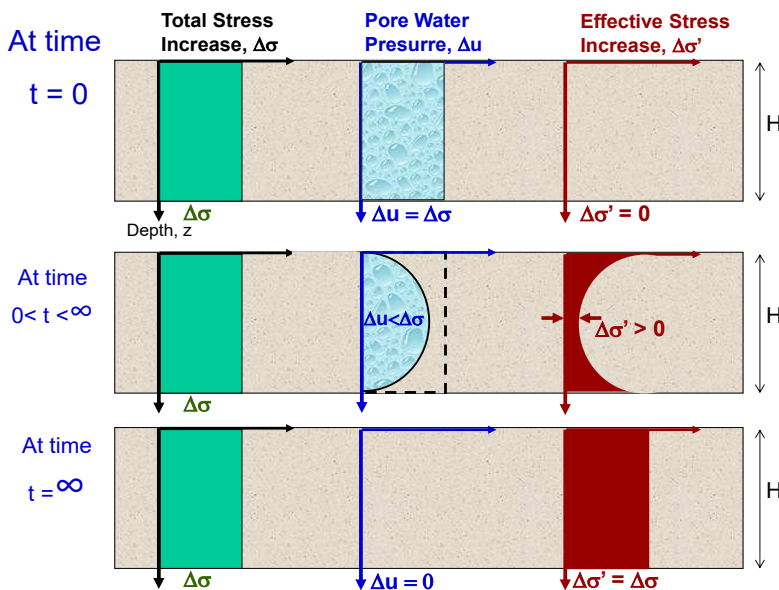
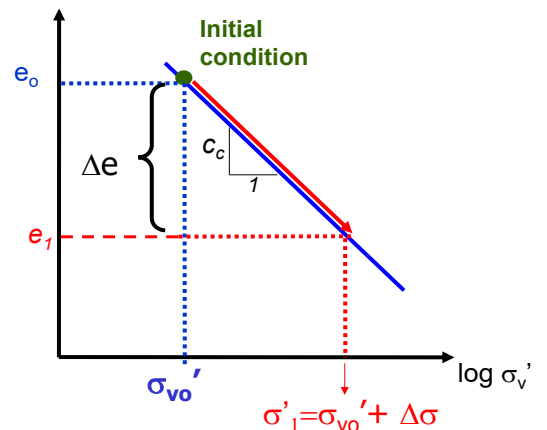


SOIL MECHANICS

VOLUME 3 SETTLEMENT



$$S_f = S_i + S_c + S_s$$



SOIL MECHANICS VOL.3

Concept of Ground Settlement

Elastic Settlement

Primary Settlement or Consolidation

Alternative Method for Deriving Pre-consolidation pressures and Coefficient of Consolidation

Concept of Ground Settlement	SM07a-1
1. Idealisation of the Soil Skeleton.....	SM07a-2
2. Immediate Settlement	SM07a-2
3. Consolidation Settlement	SM07a-4
4. Secondary Settlement.....	SM07a-6
5. Total Ground Settlement	SM07a-7
Elastic Settlement.....	SM07b-1
1. Immediate Settlement	SM07b-2
• Hooke's law of Linear Elasticity	
• Behavior under undrained conditions	
• Hooke's law for undrained condition	
2. Stress Distribution.....	SM07b-11
• Point load	
• Newmark chart	
• Square or rectangular loaded area	
• Westergaard's method	
• Stress distribution chart	
• Pressure bulb	
• Approximation – 2:1 slope distribution	
3. Calculation of Immediate Settlement.....	SM07b-22
• Calculation of elastic settlement	
• Calculation of immediate settlement	
• Janbu, Bjerum and Kjaernsli (1956) method	
• Buttler (1974) method	
• Rigid vs flexible footing	
• Smooth vs rough base	
4. Undrained Heave	SM07b-30
5. Undrained Modulus	SM07b-32

Primary Settlement or Consolidation	SM07c-1
1. Consolidation	SM07c-2
• Consolidation process	
• Consolidation process – change in stresses	
• No consolidation in granular soil	
• One dimensional consolidation	
• The vertical strain vs void ratio	
• Consolidation test	
• Pre-consolidation pressure, NC and OC	
• Virgin consolidation line – VCL	
• Over consolidation ratio – OCR	
• Compression and recompression indices	
• Correction of consolidation curve	
• Computation of consolidation settlement	
• Notes of the value of C_c	
2. Skempton Bjerrum Correction Factor.....	SM07c-20
• Skempton Bjerrum Correction Factor	
• Skempton pore pressure parameter	
3. Time Rate of Consolidation.....	SM07c-24
• Time rate of consolidation	
• Degree of consolidation vs time factor	
• Coefficient of consolidation, C_v	
• Typical C_v values for residual soils	
4. Asaoka Method to estimate magnitude and degree of Consolidation Settlement	
.....	SM07c-34
5. Secondary Settlement.....	SM07c-37
• Values of C_α'	
• Values of C_α/C_c	
6. Allowable Settlement.....	SM07c-40
• Allowable differential settlement	
• Criteria for structural damage	
• Settlement of high-rise building on predominantly stiff Frankfurt clay	
7. References	SM07c-42

Alternative Method for Deriving Pre-consolidation Pressures and Coefficients of Consolidation	SM07d-1
1. Introduction	SM07d-2
2. Pre-Consolidation Pressures.....	SM07d-7
• Casagrande's method	
• Proposed parallel rebound method	

3. Coefficient of Consolidation	SM07d-13
• Taylor's method	
• Implementation of Asaoka's method	
4. Violation of Loading Duration	SM07d-17
5. Conclusions	SM07d-18
6. Acknowledgement	SM07d-19
7. References	SM07d-19