

### Site Formation Temporary or Permanent Filling Work

Authorized persons (APs) and registered structural engineers (RSEs) should be aware of the potentially disastrous consequences of flowslides of loosely placed, unretained earth fill. Regrettably, examples of inadequate compaction are still found on or adjacent to construction sites.

2. In view of the above, site formation plans must indicate the location of all fill slopes and areas where stockpiling is not permitted. Where in the opinion of the Building Authority (BA) the failure of a fill slope arising from private building works could endanger the public, the BA will require the AP/RSE to submit for approval suitable drawings of the filling work. These drawings should specify the standards laid down in Appendix A attached. If the fill slopes should pose significant risk to life, the BA will require the AP/RSE to provide qualified supervision of the filling work by a full-time resident engineer.
3. Prior to filling work, the AP/RSE should give notice to the BA of the date of commencement of the work.
4. During construction, the AP/RSE should submit monthly reports to BD giving records of tests on compaction of fill slopes together with a covering assessment on the adequacy of compaction. The reports should be prepared and signed by the party preparing the geotechnical contents of the submission (hereinafter called the "geotechnical engineer") and certified by the AP/RSE. The contents of the covering assessment should include :
  - (a) a summary of the results of in situ density tests and laboratory compaction tests of the fill, highlighting areas of non-compliance with the specified compaction standards; and
  - (b) details of any corrective measures taken to rectify areas of inadequate compaction.

Records of compaction tests in accordance with Appendix A should also be kept on site for inspection by the officers of the Buildings Department (BD) and Geotechnical Engineering Office (GEO).

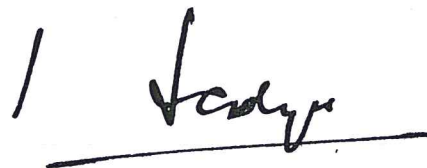
5. Where there is reason to believe that the placed fill may be loose, the BA will arrange for field checks to be carried out, initially by GCO probes, and supplemented by observations of fill materials in trial pits if an appreciable cobble and boulder content in the fill is suspected. The AP/RSE will be required to arrange for labourers to carry out the GCO probes and trial pit excavation.
6. If loose fill is detected, the AP/RSE must arrange for the geotechnical engineer to carry out in situ density tests of the loose layer in the presence of officers of BD and GEO. Where extensive loose fill is found which could pose a significant threat if not rectified, the BA will issue a Cease Works Order under Buildings Ordinance section 23 or 24A.

/6. Upon ....

7. Upon completion of the filling work and prior to submitting certificate of completion of site formation works and seeking an occupation permit, the AP/RSE should submit to the BD :

- (a) "as-built" plans and sections of the work showing its relationship to existing and proposed buildings; and
- (b) complete records of in situ density tests and laboratory compaction tests of the fill, all to be in accordance with Appendix A.

8. The issue of an occupation permit will normally be refused under Buildings Ordinance section 21(6)(a) if temporary fills have not been removed from site or if permanent fills, the failure of which would endanger the public, have not been formed in compliance with Appendix A.



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### Standards for Filling Work

- (1) The in situ field dry densities of compacted materials forming the peripheral portion of an earth fill slope shall be not less than 95% of the maximum dry density described in item (2) below.
- (2) The maximum dry density and optimum moisture contents shall be determined in accordance with the standard given in GEO Report No. 36 (GEO, 1994). Each soil type shall be tested when first used and thereafter at the same time as every set of field density tests are obtained. Records shall be kept, identifying on drawings the soil type, plan location and elevation reference to Principal Datum of each test together with the maximum dry density and optimum moisture contents. Graphs of dry density vs moisture contents, laboratory test record sheets and a complete soil description are to be kept in a companion folder.
- (3) The in situ field density and moisture contents shall be determined in accordance with the standard given in GEO Report No. 36 (GEO, 1994) to determine the relative compaction achieved. The number of determinations for each batch of fill material shall be as stated in Table 1 below. Records shall be kept, identifying on drawings the soil type, plan location and elevation reference to Principal Datum of each test together with dry density of soil tested, moisture contents and relative compaction achieved (%). The field sheets, calculation sheets and a complete soil description are to be kept in a companion folder. When only a small amount of fill (depth less than 1 m and total volume less than 300 m<sup>3</sup>) is proposed, the frequency of in situ density testing may be reduced if the in situ density tests are supplemented by the results of penetration tests.
- (4) All tests shall be carried out by or under the supervision of the geotechnical engineer, or by an independent testing agency.

Table 1

#### Number of Determinations for Moisture Content and Relative Compaction Achieved

Description	Size of area of fill in batch *	No. of determinations per batch *
Area of fill in excavations for structures, pits and trenches and on formations	0 - 100 m <sup>2</sup>	3
	100 - 500 m <sup>2</sup>	2 for each 100 m <sup>2</sup> or part thereof
	exceeding 500 m <sup>2</sup>	1 for each 100 m <sup>2</sup> or part thereof
Other areas of fill	0 - 1 ha	4 for each 1000 m <sup>2</sup> or part thereof
	1 - 10 ha	3 for each 1000 m <sup>2</sup> or part thereof
	exceeding 10 ha	2 for each 1000 m <sup>2</sup> or part thereof

\* A batch of fill material is any quantity of fill material of the same type and has similar properties throughout.