

Standing Committee on Concrete Technology

Technical Note No. 7

Trial Mix Concrete Requirements with respect to Change of Aggregate Sources

Background

1. Clause 16.18 (f) and Table 16.4A under Clause 16.23 of the General Specification for Civil Engineering Works (2020 Edition)¹ and Clause 6.42A (m) of the General Specification for Building (2022 Edition)² (hereafter referred to as the GS) involve the use of the term “of the same grade and with similar constituents and properties” to describe a previously approved designed mix concrete, of which the test or trial mix data if available, would be used to determine the plant and/or laboratory mix trial requirements for the proposed designed mix concrete in accordance with the specifications.

Change of Aggregate Source

2. In the context of the above GS provisions, the Standing Committee on Concrete Technology (SCCT) considers that a designed mix concrete shall be deemed to satisfy the requirement “of the same grade and with similar constituents and properties” with a previously approved designed mix concrete if it only involves a change in the aggregate source(s), whilst the mix proportion and all other constituents remain unchanged, provided that:
 - i. The rock type³ (e.g. Granite) of the aggregate source(s) of the designed mix concrete is the same as that of the previously approved designed mix concrete; and
 - ii. The aggregates used in the proposed designed mix concrete comply with the requirements of the Construction Standard CS3:2013 (CS3); and
 - iii. The aggregate source(s) of the designed mix concrete possess(es) sufficient performance record of its/their uses in approved designed mix concrete under the Public Works Projects (PWP) in Hong Kong (refer to paragraph 5).
3. The recommendation in paragraph 2 does not apply to designed mix concrete of strength grade exceeding 60 MPa.
4. The recommendation in paragraph 2 concerns the need for plant and/or laboratory mix trials as set out in the GS only. It does not relieve other project-specific requirements (e.g. by way of Particular Specifications under the Contract), if any, in relation to plant and/or laboratory mix trials.

¹ General Specification for Civil Engineering Works published by Civil Engineering and Development Department (CEDD)

² General Specification for Building published by Architectural Services Department (ArchSD)

³ The identification of the type of rock based on the nomenclature given in Table 9.3 of Construction Standard CS3:2013.

This includes trial mix(es) for demonstrating the compliance of a designed mix concrete with specific performance requirement(s), such as workability retention, durability parameters, peak temperature, etc.

Aggregate Sources used in PWPs

5. Pursuant to Section 21.22 in Chapter 7 of the Project Administration Handbook for Civil Engineering Works (2022 Edition), the Public Works Laboratories (PWL) collects aggregate samples and conducts testing through selective active contracts of PWPs once in every three months for various aggregate sources. Subsequently, an Aggregate Summary containing the test results is compiled and circulated to Works Departments for reference, and the list of aggregate sources included in the Aggregate Summary in the past 24 months is uploaded onto the Civil Engineering and Development Department (CEDD) website for reference. The SCCT considers that the aggregate sources included in the Aggregate Summary may be deemed as possessing “sufficient performance record of its uses in approved designed mix concrete under PWPs in Hong Kong” as required under paragraph 2(iii). For the avoidance of doubt, all aggregate sources shall comply with the “Quality assurance and traceability” requirements as set out in Section 6.2.1 of CS3.

Handling of New Aggregate Sources

6. From time to time, new aggregate sources for concrete production are introduced into the local construction industry. If such aggregates from new sources are used in PWPs, the PWL will collect samples and conduct testing of the aggregates and subsequently include in the Aggregate Summary, when the following criteria are met:
 - i. Either Laboratory mix trial or plant trial for a total of 30 designed mix concrete using aggregates of the new source have been conducted, and approved by the Engineer(s)/Supervising Officer(s)⁴ or their representatives of PWPs.
 - ii. Of the 30 mixes in (i) above, at least 5 mixes are from each of (a) Grade 25-40, (b) Grade 45-50, and (c) Grade 55-60; and
 - iii. Of the 30 mixes in (i), at least 5 mixes are from each of designed slump value of (a) ≤ 100 mm, (b) 125-175 mm, and (c) ≥ 200 mm or measured by flow table test or slump flow test.
7. The total number of trial mixes stated in paragraphs 6(i) to 6(iii) can be conducted by different concrete producers, and accumulated from different PWPs⁵ and Housing Authority projects.

⁴ Engineer/Supervising Officer as defined in the contract documents of PWPs.

⁵ PWPs undertaken by ArchSD, CEDD, Drainage Services Department, Electrical and Mechanical Services Department, Highways Department and Water Services Department.

8. Relevant stakeholders (e.g. concrete suppliers) should contact PWL (contact person: Senior Geotechnical Engineer / Laboratory 2, Materials and Testing Division, Geotechnical Engineering Office, CEDD) on matters related to the inclusion of new aggregate sources in the Aggregate Summary.

Effective Date

9. This Technical Note takes immediate effect.

[End]

[24 January 2025]