

**EXCAVATION**

1. **APPLICABILITY**

Construction Specification 21 is applicable to all types of excavation. The specification defines classes of excavation and includes special requirements for certain types of excavation but does not establish and define all types of excavation. It is intended that the types of excavation be established on a job or project basis, as needed.

The "class" of excavation defines the kind of material to be excavated. The "type" of excavation defines the functional purpose of the excavation. Established types of excavation may include (but are not restricted to):

- a. Foundation Excavation with or without Stripping;
- b. Cutoff, Keyway, or Core Trench Excavation;
- c. Channel Excavation;
- d. Structure Excavation;
- e. Auxiliary Spillway Excavation;
- f. Abutment Shaping Excavation;
- g. Borrow Area Excavation.

Any of the established types may include excavation of materials in either class or may be unclassified. However, the excavation of a given class of material may be more difficult in one type of excavation than in another. These factors must be carefully considered as a basis for establishing types of excavation to be designated on the drawings and listed in the bid schedule.

For projects involving considerable quantities of excavation of different classes of material under conditions that vary in different part of the works, bids must be asked, and payments made, on the basis of both type and class of excavation. For such projects it is necessary that the bid schedule be set up in terms of both type and class of excavation (for example: Channel Excavation, Common; and Channel Excavation, Rock).

For projects involving only one type of excavation and for projects involving small quantities of excavation, it may be sufficient to include only the classes of excavation in the bid schedule.

2. **MATERIAL SPECIFICATIONS**

There are no material specifications complementary to Construction Specification 21, Excavation.

3. **ITEMS TO BE INCLUDED IN CONTRACT SPECIFICATIONS AND DRAWINGS**

- a. The horizontal and vertical extent of each type of excavation. Indicate the vertical extent as approximate where the exact depth required is not known.

- b. Designation and definition of types of excavation.
- c. Excavation pay limits when Method 1, Section 10, is used.
- d. Surface finish requirements, such as grading tolerances. This may be especially important at the crest of an auxiliary spillway.
- e. The location and limits of all borrow areas. Outline all surface grading requirements following completion of borrow material utilization.
- f. The location and limits of all waste areas. When borrow areas serve also as waste areas, coordination of construction activities may be important.
- g. Boring logs and test pit logs pertinent to all areas to be excavated. In addition to descriptions of materials, logs must also include, when it exists, water table elevations and dates of observation. For purposes of the construction drawings, no indications of correlation of materials between logs shall be shown. Interpretation of materials is to be avoided and left to the contractor for determination.
- h. Existing access and haul roads.
- i. Special requirements for dewatering and keeping the excavation dry, with cross reference to Construction Specification 11, Removal of Water, where applicable.
- j. Special requirements for control of blasting, including written plans and approvals, if applicable.
- k. Special requirements for control of erosion, water pollution and air pollution, with cross-reference to Construction Specification 5, Pollution Control, as applicable.
- l. Requirements for control of the size gradation of excavated rock where necessary in order to obtain material of a particular gradation for rock fill or riprap.
- m. Methods of measurement and payment, if the standard specification includes more than one method.
- n. Requirements for concrete to fill voids from over-excavation (refer to Construction Specification 31, Concrete for Major Structures, or 32, Structure Concrete) if requirements in Section 9 are not adequate.

#### 4. DISCUSSION OF METHODS

##### a. Section 5, Use of Excavated Materials

- (1) Method 1 is intended for use when the quality, condition and relative location of significant quantities of the materials to be excavated are known to be

suited to the economic construction of the required earthfills and earth backfills, and particularly where alternate sources of material are less desirable or do not exist.

- (2) Method 2 is intended for use when the known data indicate that the use of alternate sources of earthfill materials may result in more economical construction of the required earthfills and earth backfills.

b. Section 6, Disposal of Waste Materials

- (1) Method 1 is intended for use when areas for wasting unsuitable and/or excess materials are available at the site, when the waste fill will beneficially supplement the function of the permanent works or when there is no known market for such waste materials as may be produced.
- (2) Method 2 is intended for use when areas for wasting unsuitable and excess material are not readily available at the site or when there is a known market for such waste materials as may be produced.

c. Section 10, Measurement and Payment

Note in Section 11 when volume calculations other than the average cross-sectional end area method will be used and describe the applicable method. Example - "In lieu of computing excavation volumes by the method of average cross-sectional end areas, the volume may be computed by the prismatic formula method with the assistance of computer aided design program."

- (1) Method 1 is intended for excavations where the pay limits can best be defined on the drawings.
- (2) Method 2 is intended for excavations bounded by simple plane surfaces and constant or gradually varying cross section throughout.
- (3) Method 3 is intended for excavations whose lower limits are determinable only by examination of the materials encountered and where the lower limits have been designated on the drawings as approximate or "to be determined by the Engineer during construction".
- (4) Method 4 is intended for structure excavation bounded by fairly simple plane surfaces where pay limits are not shown on the drawings.

When specifications are prepared using electronic procedures and all but one method are deleted for use in a contract specification, delete "All Methods The following provisions apply to all methods of measurement and payment." and left justify the remaining text.