

## Colorado Procedure 12C-19

*Standard Practice for*

### **Contractor's Excavation and Embankment Process Control Notebook**

#### **1. SCOPE**

- 1.1. This Standard describes the best practice to be used when developing appropriate worksheets and forms in a Process Control (PC) notebook.
- 1.2. The requirements such as, but not limited to: the sample size, specimen size, number of specimens, interpretation of results, reporting significant digits, and precision statements are in the specific test method.

#### **2. GENERAL PC NOTEBOOK REQUIREMENTS**

- 2.1. The following information shall be included on each page of a worksheet or form:
  1. Project number, Contract ID, and Project location
  2. Name of the laboratory performing the test
  3. Date, location, and time the sample was taken or the beginning of the test
  4. Name of the person taking the sample, performing the test, and certifications
  5. Test number
  6. Type of test performed
  7. Remarks area

#### **3. SAMPLE LOCATION WORKSHEET**

- 3.1. The following shall be included on the sample location worksheet:
  1. Stationing, elevation, lift thickness, and lift number placed
  2. Sampling method (core, grab, auger, shovel, in place, etc.)

**4. SITE PREPERATION WORKSHEET**

4.1. When preparing the site for embankment, the following shall be included in the worksheet:

1. Clearing and grubbing conducted in accordance with Specification 201.
2. Thickness of top soil removed by Station interval.
3. Type, thickness, and volume of unsuitable materials removed.
4. Area and depth of material plowed or scarified
5. Depth of excavation below subgrade elevation in bedrock areas
6. Description of foundation materials below embankment fill (include AASHTO soil classification) by Station interval
7. Compaction methods used to prepare embankment foundation by Station interval
8. Moisture content, dry density, and percent relative compaction of foundation materials where applicable.
9. Existing slope of embankment foundation area by Station interval
10. Bench key depth where required
11. Number of benches and depth of each bench as embankment is constructed to grade
12. Volume of bench excavation used in embankment
13. Trouble area location, type (swampy ground, springs, etc.), and mitigation

**5. EMBANKMENT PLACEMENT AND COMPACTION WORKSHEET**

5.1 When placing and compacting embankment material the following shall be included on the worksheet:

1. Site conditions (standing water, weather, temperature, etc.)
2. Material processing performed prior to placement to meet material requirements specified
3. Material placement method (end dump, side dump, belly dump, cast, etc.)
4. Structure type adjacent to embankment
5. Embankment Material Classification and results to verify classification
6. Changes in material types and corresponding changes in construction methods
7. Lift number and loose lift thickness
8. Spreading equipment used
9. Moisture conditioning and compaction methods and equipment used
10. Methods to document or test compaction, and results of observations or tests conducted. Description of defective work and corrective action taken.
11. Location and elevation of fill placement by Station interval and volume placed daily.
12. Daily summary of all tests conducted and results.

5.2 When placing and compacting Soil Embankment, the following shall be included on the worksheet:

1. Classification and corresponding compaction and testing methods used
2. Processing methods to achieve maximum particle size
3. Changes in material type and corresponding changes to construction and testing methods
4. Processing methods for Non-durable bedrock and placement location
5. Results of moisture-density testing, proof rolls, and documentation of test strip acceptance where applicable
6. Condition and performance of each lift of material placed and compacted

5.3 When placing and compacting Rock Embankment and Rock Fill, the following shall be included on the worksheet:

1. Processing methods to achieve material requirements in accordance with Specification 203
2. Documentation of sampling for and results of slake durability testing
3. Contractor moisture conditioning, placement and compaction methods
4. Results of proof rolls, documentation of test strip acceptance
5. Changes in material type and corresponding changes to construction and testing methods
6. Description of compaction equipment and methods used, and documentation of deviations from minimum equipment requirements specified if applicable
7. Condition and performance of each lift of material placed and compacted

## 6. TEST STRIP OR PROOF ROLL

6.1. When constructing a test strip or conducting a proof roll, the following shall be included on the worksheet:

1. Moisture conditioning, compaction equipment, and compaction methods used to construct the test strip
2. Equipment used in proof roll
3. Axle load and weight ticket
4. Lift thickness and lift number
5. Results of proof roll pass/fail
6. Observation of deflection, rutting, or pumping and corrective action taken.
7. Start and end time
8. Was test strip or proof roll separate or incorporated into embankment

## 7. SUBMITTAL OF PC NOTEBOOK

Once the Contractor has completed all Excavation and Embankment work on the Project the Contractor shall submit the final PC notebook to the Department in an electronic format. The file shall be scanned in sequential order by date and the file should be a pdf. The electronic PC notebook shall be delivered to the Department within 10 working days after the end of the work.

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