



# Earthwork – Embankment Construction – Settlement Periods and Surcharges

## Revision and Approval

Revision	Date	Nature of Changes	Approved By
0	08-31-2020	Original Issue	Richard Foley

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## Background

This process establishes Structure Construction (SC) responsibilities and procedures for monitoring settlement periods and surcharges, including the installation of settlement monitoring devices.

Settlement periods and surcharges are established in the contract documents but can be lengthened or shortened by SC staff as needed. Settlement monitoring devices are generally required in the contract documents when anticipated settlements are large. If settlement monitoring devices are not required but are needed; they should be ordered by the engineer as change order work.

Prior to reviewing this Bridge Construction Memo (BCM), it is essential to review the contract specifications 19-6.03D, *Earthwork – Embankment Construction – Settlement Periods and Surcharges*, that this BCM is based on as identified in the title block above. The information in the contract specifications typically will not be repeated in the text of this BCM.

## Process Inputs

1. Project Supplemental Information: Information Handout
2. RE Pending File
3. [Foundation Manual](#), Chapter 4, *Footing Foundations*, Section 5, *Ground Improvement/Soil Modification*

# Procedure

1. All work associated with this process is charged as: [Project Direct – Construction](#).
2. [Inspection of field work](#) for this process is:
  - a. Intermittent during platform installation.
  - b. Benchmark during settlement period.
3. Before embankment construction begins:
  - a. Review contract documents, RE pending file, the Geotechnical Design Report and/or the Final Foundation Report, which includes foundation recommendations, settlement requirements, and the Geotechnical Services contact:
    - i. If settlement monitoring devices are not specified in the contract's Special Provisions, confirm with the geotechnical designer that settlement monitoring devices are not needed.
    - ii. When settlement monitoring devices are specified, inform the geotechnical designer that the project has started and the schedule for the monitoring devices:
      1. If large settlements are expected, consideration for its potential effect on nearby (adjacent) infrastructure should be evaluated; i.e. damage to existing or new construction. Discuss this with the geotechnical designer.
  - b. Discuss with the Contractor the placement and requirement to not disturb the settlement hubs:
    - i. If the settlement hubs or settlement platform is damaged or disturbed it must be remedied promptly. The settlement period may need to be extended for the time between the last measurement and the reestablishment of the monitoring.
  - c. Discuss required embankment construction restrictions, settlement period, surcharges (if applicable), and required settlement monitoring devices with the Contractor.
  - d. When settlement monitoring devices not specified in the contract are ordered, issue a change order for settlement platform construction in a timely manner.
4. During embankment construction:
  - a. Coordinate with District Survey Branch, if necessary, to establish settlement hubs and a bench mark sufficiently away from the work to be unaffected by the embankment settlement.

- b. Coordinate installation of settlement monitoring devices, if required, with the Foundation Testing and Instrumentation Branch and the Contractor according to California Test [\(CT\) 112](#), *Method for Installation and Use of Embankment Settlement Devices*.
5. During embankment settlement period:
- a. As soon as the embankment (and surcharge, if applicable) is complete, install settlement monitoring hubs. Usually, four (4) hubs is enough but larger than standard areas require additional hubs.
  - b. Verify that the Contractor installed protection for monitoring the settlement hubs and equipment. Regularly check that they are not disturbed.
  - c. Record settlement accurately at prescribed intervals to monitor progress and provide information to the geotechnical designer:
    - i. When settlement monitoring devices are used, record and monitor per CT 112 for settlement monitoring devices.
  - d. Coordinate with the geotechnical designer to determine when the settlement period is complete:
    - i. Notify the Contractor in writing immediately:
    - ii. When settlement monitoring data indicates the period should be extended, notify the Contractor in writing immediately when the decision is made.
    - iii. Notify the RE of settlement period completion and changes for coordination with the Contractor's Critical Path Method updates.
  - e. Document all inspection, construction, and quality assurance activities, pertinent to this BCM, in the daily reports per [BCM C-7](#), *Daily and Weekly Reports*.
6. File all test results and daily reports in the appropriate category in the project records as specified in the Construction Manual, [Section 5-1.02](#), *Contract Administration – Project Records and Reports – Organization of Project Documents*.
7. For additional information, refer to the [Foundation Manual](#), Chapter 4, *Footing Foundations*, Section 4-5, *Ground Improvement/Soil Modification*.

## **Process Outputs**

1. Record of settlement device readings
2. Letter(s) to the Contractor
3. Change Order for settlement platform installation if needed
4. Daily reports

# **Attachments**

None