

CERTIFIED INSPECTOR TRAINING

Grading and Bases

I. Division 150 Equipment

A. General Requirements

B. Typical Equipment You Will See

C. Compaction Equipment

1. Tamping ,or Sheeps foot Rollers.
2. Pneumatic Tired Rollers
3. Trench Rollers
4. Steel Rollers
5. Vibrating Compactors.
6. Vibratory Rollers

D. Water Hauling Equipment

1. Trailers, Trucks, or Tankers
2. Watering Equipment

E. Hauling Equipment

II. Clearing and Grubbing

A. Description

B. Limits

C. What to Remove

D. What Remains

E. Holes

F. Disposal Areas

G. Large Trees

H. Payment

III. Temporary Erosion and Pollution Control

A. Specifications.

B. Materials

1. Seed.
2. Fertilizer.
3. Mulch.
4. Hay Bales.
5. Silt Fence.

C. Construction Requirements

D. KDOT's Stormwater Pollution Prevention Plan (SWPPP)

E. Contractor's Erosion Control Schedule

1. Site Description of the project.
2. Description of the control measures.
3. Acknowledgement of state and local requirements.
4. Description of maintenance procedures.

F. Construction Requirements

1. Erosion and pollution control measures should start within 14 days after construction activities cease.
2. Erodible surface area exposed must be less than 70,000 sq. m. (17 acres) per equipment spread.
3. When a borrow area is excavated below groundwater elevation a berm must be constructed to prevent runoff from entering.
4. Work on a project can be stopped if erosion control is not maintained.

G. Temporary Erosion Control Devices

1. Berms.
2. Slope drains.
3. Slope barriers.
4. Sediment basins.
5. Inlet sediment barrier.
6. Temporary seeding.
7. Temporary stream crossings. Stream crossings must be made from clean sand or rock, they cannot be made from material encountered in the vicinity of the crossing.
8. Devices must be maintained and deficiencies corrected immediately.
9. Contractor removes the devices when they are no longer needed.

IV. Grading

A. Excavation for Highway

1. Section 205
 - a. Special Provisions on the internet.

2. Bid Items
 - a. Common Excavation.
 - b. Rock Excavation.
 - c. Unclassified Excavation.
 - d. Common Excavation (Contractor Furnished).
 - e. Eradication of Traveled Way.
 - f. Unstable Excavation.
 - g. Unsuitable Excavation.
3. Tables and Graph
 - a. Table I. Summary of Soil Characteristics.
 - b. Table II. Summary of Existing Moisture Contents, Densities and Compacted Volume Manipulation Factors.
 - c. Moisture – Density Curve.
4. Construction Requirements
 - a. Suitable material
 - b. Maintain drainage.
 - c. Unsuitable material .
 - d. Unstable material.
 - e. Eradication of traveled way
 - f. Method of Measurement
5. Basis of Payment
 - a. Contract unit price per meter
 - b. Contract unit price for Eradication of Traveled Way.
 - c. Unstable Excavation
 - d. Unsuitable Excavation
 - e. Replacement of Unsuitable/Unstable material.
6. Waste and Borrow Areas
 - a. All waste or borrow areas need to be approved by the engineer.
 - b. Clearances for wildlife, archaeological and hazardous.
 - c. Area Construction office sends requests for clearances to KDOT Environmental Section.
 - d. No borrow or waste areas are permitted in wetlands, below ordinary high water table, or in a stream or flood plain.
 - e. Borrow or waste area shown on the plans.
 - f. Temporary stream crossings.
 - g. Contact Environmental Services if artifacts or items of archaeological significance are found.

B. Removal of Existing Structures

C. Embankment

1. Embankment.
2. Frozen soil.
3. Rocks, broken concrete or other solid materials should not be placed where piling is to be driven.
4. Slopes steeper than 1:4 should be benched. Drainage must be maintained at all times.
5. Maintaining drainage.
6. Shale is not considered rock.
7. Foundation Treatment
8. Place material in loose lifts not exceeding 8 inches and compact until each layer is hard, firm and uniform.
9. Water may be required to achieve compaction.
10. Adequate number of motor graders.
11. Rock may be placed in lifts up to 2 feet thick.
12. You have the authority to suspend delivery of material until previously delivered material is properly placed.
13. Embankment (Contractor Furnished)

D. Compaction

1. Bid Items
 - a. Compaction of Earthwork (Type __*)(MR__*)
 - b. Water
1. Compaction in Cuts
2. Moisture Control Requirements
3. Contractor is responsible for the stability of the embankment.
4. All loose rock within the right of way that will interfere with mowing shall be removed.
5. Moisture Requirements
 - a. MR 0-5, from optimum to +5%
 - b. MR 3-3, optimum $\pm 3\%$
 - c. MR 5-5, optimum $\pm 5\%$
 - d. MR 90, uniform and allow compaction required
6. Compaction Requirements
 - a. Type AAA, at least 100% of standard density
 - b. Type AA, at least 95% of standard density
 - c. Type A, at least 90% of standard density
 - d. Type B, Sheepsfoot walkout

E. Payment

1. Pay plan quantity, unless there are changes or there is a disagreement.
 - a. When there is a bid item for compaction
 - AA. Water is paid by the megagram (Mg).
 - BB. Compaction is paid by the cubic meter (cu. m.)
 - CC. Excavation is paid by the cubic meter.
 - DD. Water used for pre-watering is paid 75% of the total used.

F. Testing Frequencies

1. Construction Manual, Part V, Appendix A
 - a. Compaction.
 - b. Moisture.
2. Show page from Part V.

G. Shoulder Construction

1. Remove vegetation from shoulders and fore slopes if required.
2. Compact to requirements designated. Maximum lift thickness is 8 inches loose.
3. Prevent injury to the edge of the pavement when constructing.
4. Method of Measurement
 - a. Item for separate measurement only when included on the plans.
 - b. Water for compaction is measured by the Mg.

H. Slope Stakes and Grade Stakes

1. Slope stakes, Section 3.07.01 of the Construction Manual
 - a. Surveyors mark slope stakes differently, but, they should all contain the same information.
 - b. All measurements are referenced from centerline of the road or project.
 - c. Work toward the centerline from cut/fill stakes.
 - d. Show example of cut and fill stakes and how to read them.
 - e. Show example that show location of cut stakes and of fill stakes.
2. Grade stakes, Section 3.08 of the Construction Manual
 - a. Generally set at the right-of-way line.
 - b. Known a bluetops if set in the roadbed for grading purposes.
 - c. Show example of a grade stake and how to read them.

I. Grading Records

1. Records of all work must be accurate and up to date.
2. Construction Manual Part IV, page 10 gives examples of what records are needed.
3. Measure and record classification and quantities of work.
4. Record dimensions, weight, and any calibrations for equipment.
5. Maintain a daily record of events (diary)
 - a. What work was performed.
 - b. Location of the work.
 - c. Notes of any instructions given to the contractor.
 - d. Note any problems or disagreements.
 - e. List any visitors to the project.

J. Precast Concrete Pipe

1. Division 1900.
2. The Producer must be prequalified. The list is on the internet.
3. Covers precast concrete pipe, end sections, inlets, manholes, and boxes.
4. Only Class II or stronger pipe is required.

V. Soils, Subgrades, and Bases

- 1) Bulk fill and undisturbed soil
 - a) compaction level usually > 95% of proctor standard
 - b) moisture content is currently usually unspecified for bulk fill, but this will be a specified item in the future
 - c) volume change likely under load and varying moisture conditions
 - d) Equipment requirements in section 150
 - e) Discussion about construction procedures shown in slides
 - f) Test and acceptance requirements

- 2) Subgrade Soils
 - a) compaction level at least 95% of proctor standard.
 - b) moisture content tightly controlled (MR-5-5 for bituminous pavements or MR-0-5 for PCC pavements)
 - c) controlled moisture conditions
 - d) volume change
 - e) very high volume change
 - f) Equipment requirements in section 150
 - g) Discuss construction procedures
 - h) Test and acceptance requirements

- 3) Lime or fly ash treated subgrade
 - a) Lime treatment is used to chemically stabilize clay soils
 - b) Lime comes in several forms
 - i) Pebble quick
 - ii) Hydrated
 - iii) Carbide lime slurry
 - c) Rate of application
 - d) Density requirements
 - e) Equipment requirements in section 150.
 - f) Discuss construction procedures
 - g) Test and acceptance requirements

- 4) Base Courses (Std. Specs section 304, 305, 306,307)
 - a) Base courses
 - b) Drainable bases
 - c) Dense graded bases
 - i) Granular subbase
 - ii) Water bound base
 - iii) Portland cement treated base (PCTB)
 - d) Equipment requirements in section 150.
 - e) Discuss construction procedures
 - f) Test and acceptance requirements