

ALDOT-225-83
CONSTRUCTION OF MOISTURE-DENSITY CONTROL STRIPS FOR SOIL AND/OR
AGGREGATE BASE LAYERS

1. Scope

- 1.1. This method is for use in conjunction with non-destructive in-place moisture-density test devices on soil and/or aggregate base layers with or without chemical additives. (Excluding bituminous materials.)

2. Applicable Documents

- 2.1. Alabama Department of Transportation Specifications, Section 306.
- 2.2. ALDOT 105.
- 2.3. ALDOT 222.
- 2.4. ALDOT 253.

3. Location

- 3.1. Each control strip shall be constructed on a normal tangent section of the project and on an underlying surface approved by the Engineer.

Note 1: When a 500 ft. (150 m)length tangent section does not exist, a control strip may be constructed on a curved section.

- 3.2. An in-place density test will be taken on the underlying layer to assure that it meets specifications as to density requirements.

4. Materials

- 4.1. The materials used in constructing control strips for each of the respective courses shall conform to the specified requirements for the material to be used in such courses.
- 4.2. Sufficient material shall be dumped and spread in order to obtain the minimum required compacted thickness for the required widths.
- 4.3. After the material has been placed and processed, a sample for analysis will be obtained and split with one-half going to the Division Laboratory and the other half going to the Central Laboratory. The same shall apply for a Laboratory Density sample.
 - 4.3.1. In conjunction with the above, a moisture sample will be picked up and dried in the field laboratory.

5. Equipment

- 5.1. Equipment proposed by the Contractor for use in construction of control strips shall be subject to the approval of the Engineer prior to use. The type and weight of the compaction equipment shall be such that uniform density shall be obtained throughout the depth of the layer of material being compacted, and in addition thereto, the following shall be provided:
 - 5.1.1. For base layers containing fine-grained slightly cohesive soil binders, a roller with staggered contact points (sheeps foot type) or a self-propelled pneumatic-tired roller and/or a grid roller. The loaded roller weight shall not be less than 15 T (13.6 t).
 - 5.1.2. For base layers composed of all crushed aggregates or aggregate bases with coarse-grained friable binders, a three-wheel steel roller weighing not less than 15 T (13.6 t) loaded or a vibratory steel wheel roller with a dead weight of not less than 5 T (4.5 t) and an impact load of at least 15 T (13.6 t) shall be provided.
 - 5.1.3. Finish rollers may be either tandem steel wheel or self-propelled pneumatic-tired rollers weighing not less than 12 T (10.9 t).

6. Lift Thickness

- 6.1. Control strips shall not be constructed in lifts greater than 6 in. (150 mm) in compacted thickness.
 - 6.1.1. If, during the initial rolling, testing indicates that uniform density is not being obtained for the full thickness of the lift, the following procedure will apply: With a motor patrol, shift approximately one-half (1/2) of the material in one travelway onto the adjacent travelway (Note 2) and proceed with initial rolling on the travelway from which the material was removed.

Note 2: On shoulder layers that are constructed separate from the main travelway, the material removed may be shifted onto the main travelway, in order that roller coverage may be obtained for full width of the shoulder layer.
 - 6.1.2. After completion of the initial rolling on the travelway referred to in Step 6.1.1, shift approximately one-half (1/2) of the material from the adjacent travelway onto this completed travelway.
 - 6.1.3. Proceed with initial rolling on the travelway from which the material was removed in Step 6.1.2.
 - 6.1.4. After completion of the initial rolling in the travelway referred to in Step 6.1.3, distribute the remaining loose material over the entire width and proceed with initial rolling.

7. Moisture Control

- 7.1.1. Water from an approved source shall be uniformly distributed throughout the loose mass until the content is above the optimum content established during laboratory moisture-density tests. Moisture content of the target optimum moisture should be determined as directed by the Materials and Tests Engineer.

8. Procedure

- 8.1 Rolling shall begin immediately after the final mixing or spreading operations. The rolling shall begin at the edge of each layer and with overlapping coverage parallel to the edges progress into the center.

Note 3: When a control strip is constructed on a curved section, rolling shall begin at the lower edge and, in successive passes parallel to edge, progress to the high side.

Note 4: A test point within the control strip shall be selected and each roller coverage over this point shall be checked by the non-destructive test device. Complete roller coverage over the entire control strip.

Note 5: The entire strip shall have the same number of passes as at the test point.

Note 6: On base layers not placed full width, it may be necessary to place a berm of loose material adjacent to the edge of the material being compacted.

Note 7: When sheepsfoot type rollers are being used, occasional light blading by motor patrol will be required and may be required when using other aforementioned type rollers.

Note 8: Sheepsfoot type rollers shall not be operated at speeds exceeding that recommended by the manufacturer.

Note 9: During hot and dry climatic conditions, additional watering will be required.

- 8.2 After completion of the initial rolling, finish rolling shall begin.
- 8.3 Finish rolling and light blading shall continue until all breakdown roller marks are eliminated and the surface requirements are in compliance for the applicable layer. (Note 9)
- 8.4 After completion of the finish rolling, ten test points within the control strip shall be selected. Test points will be selected by use of a random number table for both longitudinal and transverse location.
- 8.5 At each test point, obtain gauge response for both moisture and density. Rotate gauge at least 90° over the same center point and obtain equal time readings for both moisture and density. All twenty moisture and density readings must be obtained on the same day that the control strip was constructed. Delays due to rain showers or equipment malfunction will void the

control strip; also, delays due to rain showers which increase the moisture content by more than one (1) percent will void the control strip.

- 8.6 Convert the mean readings into lbs/ft³ (kg/m³) for both moisture and density from calibration supplied with the testing device.
- 8.7 Convert to dry density and percent moisture. (Note 10)

Note 10: Calculations for dry density and percent moisture are located in test method ALDOT-222.