



WSDOT SOP 738

Establishing Maximum Field Density for Recycled Concrete Aggregates by Test Point Evaluation

1. Scope

- 1.1 This test method describes the procedure for determining the maximum test point density that can be achieved with a controlled group of compaction equipment on a consistent thickness of recycled concrete aggregate. The density of the material will be determined by a nuclear density gauge using either backscatter or thin layer method. Compactive effort will be applied incrementally and density readings taken after each pass of the roller until the point where additional compactive effort ceases to increase the density of the material. Once the maximum density has been achieved, the compactive effort will be recorded and repeated unless one of the parameters changes. Parameters would include: lift thickness, compaction equipment, moisture content, material source or gradation.

2. Referenced Documents

2.1 AASHTO Standards

T 310 In-place Density and Moisture Content of Soil and Soil-aggregate by Nuclear Methods (Shallow Depth)

2.2 WSDOT Standards

M 41 *Standard Specifications*

M 46 *Materials Manual*

3. Significance

- 3.1 A section of roadway or fill is compacted. After each increment or roller pass (a pass is defined as one time being from the start of the test strip to its end) the material is tested for density by the use of the nuclear density gauge. The density is recorded after each increment until the maximum density has been achieved.

4. Apparatus

- 4.1 Equipment and nuclear density/moisture gauge required to perform a moisture/density determination according to AASHTO T 310.
- 4.2 Standardize the gauge according to AASHTO T 310.

5. Test Site Location

- 5.1 At the beginning of placement, choose a uniform section large enough to perform the test point evaluation. The test point evaluation area needs to be representative of the placement area and approximately 100 feet long. Equipment other than that required to compact the material should be kept off the evaluation area during testing.

6. Procedure

- 6.1 Test the first lift of material at or near optimum moisture after performing the first pass with the roller or compactor.
- 6.2 Take a one minute reading with the nuclear gauge in the test location.
- 6.3 Record wet density results (lb/ft³) for each location of the report form.
- 6.4 Clearly mark the test location (if using paint, do not paint the gauge).
- 6.5 All subsequent density determinations must be in the same location and the same gauge orientation as the first test.
- 6.6 Make another pass with the roller or compactor over the entire test area.
- 6.7 Repeat density reading. Record on report form.
- 6.8 Continue compacting and testing, maintaining moisture content, until the density readings level off or start to drop. This indicates the relative density has reached its maximum with the compaction equipment being used.
Note: A slight decrease in density may be observed before maximum density is achieved. If suspected, examine the material, and if no fracture of the material is visible, continue the rolling/density testing process until maximum density is achieved.
- 6.9 Once the relative density has reached its maximum, the test point evaluation will be considered complete and the compaction method shall be repeated on subsequent aggregate placement and compaction.
- 6.10 Moisture content should be monitored regularly (at least daily) with the use of the nuclear gage to ensure the material is at or near the optimum moisture content. If the moisture content is more than two points below the optimum moisture content the test point evaluation will be considered invalid.

7. Report

- Contract number
- Compaction equipment type
- Material type and source
- Lift thickness

DOT Form 350-070, gauge number, , and on the Test Point Evaluation Report Form