DEVELOPING A FAMILY OF CURVES
FOP FOR AASHTO R 75

Scope

This procedure provides a method to develop a family of curves in accordance with AASHTO R 75-16 using multiple moisture-density relationships developed using the same method, A, B, C, or D, from the FOP for AASHTO T 99/T 180.

All curves used in a family must be developed using a single Method: A, B, C, or D of a procedure for AASHTO T 99 or T 180. See the FOP for AASHTO T 99/T 180.

Terminology

family of curves — a group of soil moisture-density relationships (curves) determined using AASHTO T 99 or T 180, which reveal certain similarities and trends characteristic of the soil type and source.

spine — smooth line extending through the point of maximum density and optimum moisture content of a family of moisture-density curves.

Procedure

1. Sort the curves by Method (A, B, C, or D of the FOP for T 99/T 180). At least three curves are required to develop a family.

2. Select the highest and lowest maximum dry densities from those selected to assist in determining the desired scale of the subsequent graph.

3. Plot the maximum density and optimum moisture points of the selected curves on the graph.

4. Draw a smooth, "best fit," curved line through the points creating the spine of the family of curves.

5. Remove maximum density and optimum moisture points that were not used to establish the spine.

6. Add the moisture-density curves associated with the points that were used to establish the spine. It is not necessary to include the portion of the curves over optimum moisture.

Note 1—Intermediate curves using slopes similar to those of the original moisture-density curves may be included when maximum density points are more than 2.0 lb/ft^3 apart. Intermediate curves are indicated by a dashed line.

7. Plot the 80 percent of optimum moisture range when desired:

    a. Using the optimum moisture of an existing curve, calculate 80 percent of optimum moisture and plot this value on the curve. Repeat for each curve in the family.

    b. Draw a smooth, "best fit," curved line connecting the 80 percent of optimum moisture points plotted on the curves that parallel the spine.

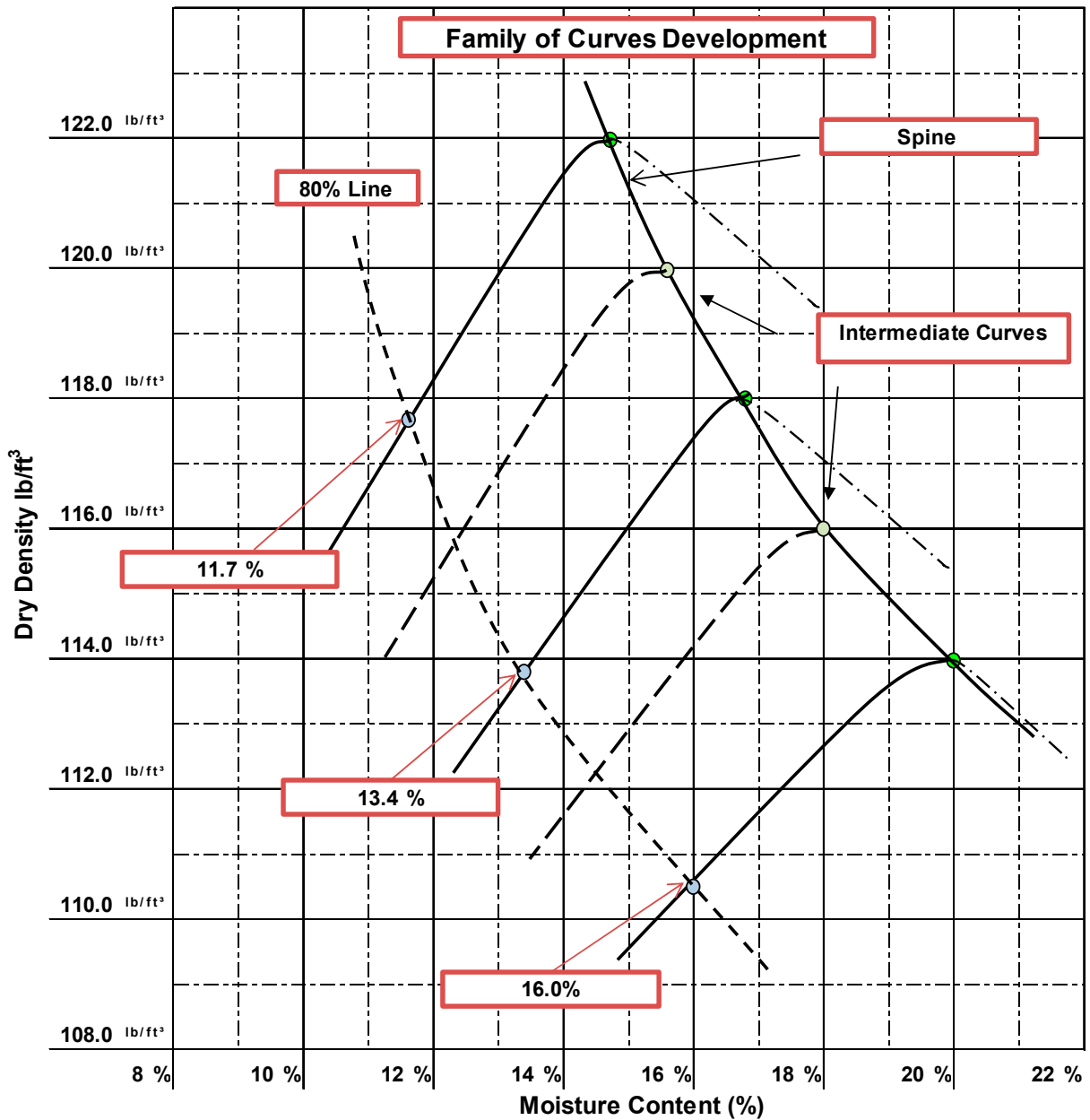EMBANKMENT AND BASE   WAQTC   FOP AASHTO R 75 (16)
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Calculations

Calculate 80 percent of optimum moisture of each curve:

Example:

Optimum moisture of the highest density curve = 14.6%

$$80\% \ point = \frac{80}{100} \times 14.6\% = 11.7\%$$

PERFORMANCE EXAM CHECKLIST

DEVELOPING A FAMILY OF CURVES
FOP FOR AASHTO R 75

Participant Name _____   Exam Date _____

Record the symbols "P" for passing or "F" for failing on each step of the checklist.

Procedure Element	**Trial 1**	**Trial 2**
1. Curves sorted by method and procedure (A, B, C, or D of the FOP for T 99/T 180)?	_____	_____
a. At least three curves per family?	_____	_____
b. Curves within family are similar soil type and from same source?	_____	_____
2. Maximum density and optimum moisture points plotted on the graph?	_____	_____
3. Spine drawn correctly?	_____	_____
4. Maximum density and optimum moisture points removed that were not used for the spine?	_____	_____
5. Moisture-density curves added?	_____	_____
6. Optimum moisture range?	_____	_____
a. 80 percent of optimum moisture calculated for each curve?	_____	_____
b. Curved line through 80 percent of optimum moisture drawn correctly?	_____	_____

Comments: First attempt: Pass_____Fail_____   Second attempt: Pass_____Fail_____

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Examiner Signature _____WAQTC #:_____

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