ALABAMA DEPARTMENT OF TRANSPORTATION

Bureau of County Transportation
1409 Coliseum Blvd., Montgomery, Alabama 36110-2060
Phone: (334) 242-6206 FAX: (334) 353-6530
Internet: http://www.dot.state.al.us

Robert Bentley
Governor

John R. Cooper
Transportation Director

September 8, 2014

MEMORANDUM FY 2014-14

To: All County Engineers and Division/Region County Transportation Engineers

From: Mr. D.E. Phillips, Jr., P.E.
State County Transportation Engineer

By: Joshua A. Sanford
Joshua A. Sanford, P.E.
County Transportation Design Engineer

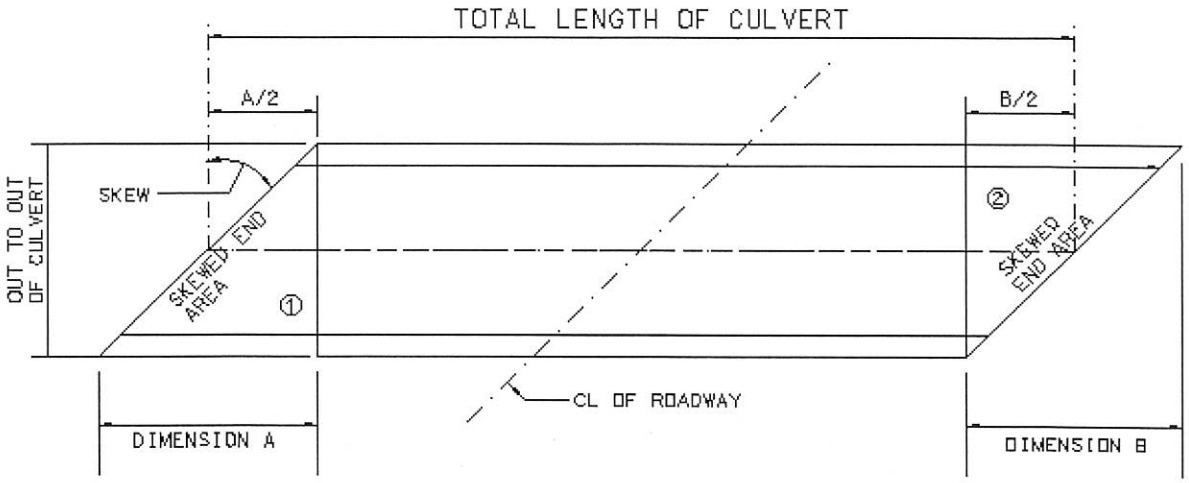
RE: **Revision to Procedural Guidelines for County Projects/ County Road Design Policy**

Page 10.11 concerning steel reinforcement quantities for skewed culverts in the 2007 edition of the ***Procedural Guidelines for County Projects*** has been revised. Page 10.11 should be replaced with the newly revised page 10.11 provided in the attachment to this memorandum. The formulas for calculating the additional steel reinforcement for skewed end areas were incorrect. In addition to correcting these formulas, a calculation example has also been provided to hopefully address any other questions that you might have.

Please feel free to contact me should you have any questions or comments concerning this matter.

DEP/JAS/lj
Attachment
CC: Mr. Ed Austin, P.E., State Innovative Programs Engineer
PC: File

PLAN PREPARATION



Calculate the reinforcing steel quantity for the total length of the culvert using the quantities shown on the standard drawing and add the following amounts for the skewed end areas:

Dimension A or B (feet) =
(Out to Out Culvert Length) X (Tangent of the Skew)

Additional Steel Reinforcement for Skewed End Area ① - Lbs =
(Lbs/ft for the Fill Height on Skewed Area 1) X (Dimension A/2)

Additional Steel Reinforcement for Skewed End Area ② - Lbs =
(Lbs/ft for the Fill Height on Skewed Area 2) X (Dimension B/2)

Calculation Example for Steel Reinforcement Quantities for Skewed Culverts

Given:
Required Bridge Culvert: CQ 16X16X46 (Cast in Place)
12 Degree Skew Rt. Ahead with 5' of fill

Solution:
Reinforcing Steel Quantity for total length of culvert = (1537 lbs/ft X 46ft) = **70,702 lbs**
Dimension A or B (feet) = (67.58' X Tan 12°) = 14.36 ft
Additional Steel Reinforcement for Skewed End Area 1 - Lbs = (1537 lbs/ft X 7.18ft) = **11,035.66 lbs**
Since Area 2 = Area 1, Additional Steel Reinforcement for Skewed End Area 2 = **11,035.66 lbs**

Add curb, toewall, and wing quantities to the above steel reinforcement quantities.

8. Item - Temporary Striping

Set up the item of temporary striping on all resurfacing projects.

9. Roadway Pipe/Roadway Culvert Data, Selection, and Summary Boxes

a) When roadway pipes and/or roadway culverts are required on a project, the "Hydraulic Data" sheet shown on page 12.14 must be submitted for each structure. Pages 12.15 - 12.26 provides additional information needed to complete this form.

The hydraulic data is also required if a structure is to be extended a significant amount. The Division County Transportation Engineer, in consultation with the County Engineer, should make this determination.