Florida Department of Transportation

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INTERIM SECRETARY

STRUCTURES DESIGN BULLETIN 17-01

(FHWA Approved: February 15, 2017)

DATE: February 15, 2017

TO: District Directors of Transportation Operations, District Directors of Transportation Development, District Design Engineers, District Construction Engineers, District Structures Design Engineers, District Structures Maintenance Engineers, Structures Manual Holders

FROM: Robert V. Robertson, P.E., State Structures Design Engineer

COPIES: Brian Blanchard, Courtney Drummond, Tim Lattner, David Sadler, Rudy Powell, Amy Tootle, Daniel Scheer, Gregory Schiess, SDO Staff, Jeffrey Ger (FHWA)

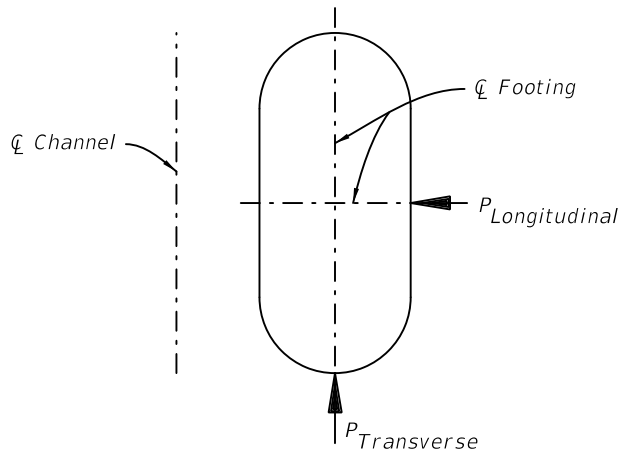
SUBJECT: Footings, Piers and Columns Subject to Vessel Collision

REQUIREMENTS

1. Replace ***Structures Design Guidelines*** Section 2.11.9 and Figure 2.11.9-1 with the following:

   Apply the transverse and longitudinal vessel impact forces as shown in Figure 2.11.9-1.

Figure 2.11.9-1 Application of Vessel Impact Forces on Footings, Piers and Columns



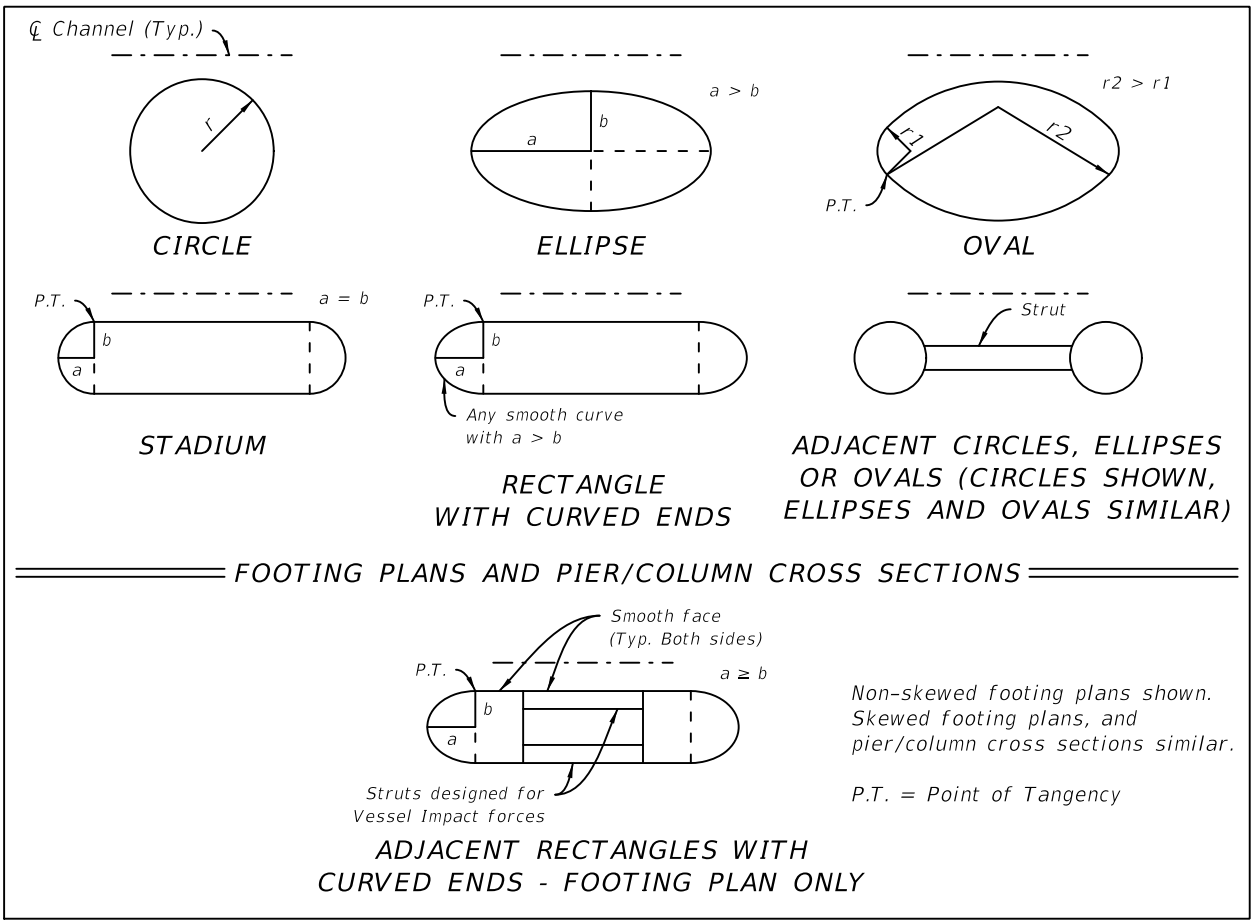
FOOTING PLAN
(Stadium shape footing shown, other footing, pier and column shapes similar)

2. Add the following new section and figure to the ***Structures Design Guidelines***:

2.11.11 Footing, Pier and Column Shapes

Design and detail all substructure bridge components subject to direct vessel impact, such as waterline footings, piers and columns supported on mudline footings, and bascule piers to have rounded faces adjacent to approaching vessels. See Figure 2.11.11-1 for examples.

Figure 2.11.11-1 Rounded Footing, Pier and Column Shapes



BACKGROUND

Research conducted at the University of Florida has shown that the magnitude of the force imparted onto the structure by an aberrant barge during a collision is largely dependent on the pier/footing geometry. The internal steel structure of the barge consists of longitudinal steel frames that are spaced at 2 to 3 feet. As the barge bow engages the structure, the force imparted onto the structure is proportional to the number of frames engaged in the impact simultaneously. A flat surface impact will engage and buckle all the frames simultaneously whereas a curved or rounded shape will engage and buckle the longitudinal frames sequentially, thus reducing the impact force imparted onto the pier/footing.

Research reports are available at the following links:

http://www.fdot.gov/structures/structuresresearchcenter/Final%20Reports/BD545_29.pdf

http://www.fdot.gov/structures/structuresresearchcenter/Final%20Reports/2014/FDOT-BDK75-977-31-rpt.pdf

IMPLEMENTATION

These requirements are effective immediately on all design-bid-build projects at 60% plans or less. These requirements may be implemented immediately on all other design-bid-build projects at the discretion of the District.

These requirements are effective immediately on all design-build projects for which the final RFP has not been released. Design build projects that have had the final RFP released are exempt from these requirements unless otherwise directed by the District.

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RVR/CEB