Errata for Recommended Practice for
Lateral Stability of Precast, Prestressed Concrete Bridge Girders (CB-02-16)

March 2020

In 2016, the Precast/Prestressed Concrete Institute published the *Recommended Practice for Lateral Stability of Precast, Prestressed Concrete Bridge Girders (CB-02-16)*. The errata published herein are intended to supplement, revise, or clarify the information provided in the recommended practice. PCI suggests you mark the changes in your copy so that your recommended practice is as accurate as possible.

As this recommended practice is used, additional errata may be discovered. You are urged to notify PCI of any potential errata for committee review. You are also encouraged to send any questions or comments to PCI regarding the material in the recommended practice and suggested improvements or clarifications. Please send to transportation@pci.org.

On page 1, add the following to the end of section 1.0

"Limitations: This document was developed to assess the stability of single web precast, prestressed concrete girders such as, but not limited to, AASHTO I-girders, bulb tees, decked bulb-tees, and wide-flange sections such as the Nebraska shape. It is not intended for the analysis of the stability of multiple web section such as box girders, tub girders, U-shaped girders, nor northeast extreme tee (NEXT) girders."

On page 8, replace the first list item in the second paragraph of section 3.2.2 with:

1. Factor of safety against cracking to provide an uncracked section

On page 8, add the following immediately after the second paragraph of section 3.2.2:

"2. Factor of safety against failure using cracked sections

If the factor of safety for the cracked girder section at rollover *FS'* is less than the factor of safety against cracking *FS* this indicates that the maximum factor of safety occurs just before cracking. In this case, *FS'* is equal to *FS*.

For the uncracked section, the rotation…."

On page 9, add the following to the last paragraph in section 3.2.3:

"…from both directions to establish the critical factors of safety. Both sides of the girder should be checked to determine the critical stresses and factors of safety. Girder stability should also be checked for wind load with no sweep or other dead load eccentricities."

On page 10, last equation in section 3.2.3.1,

change

$$FS = \frac{M_r}{M_a} = \frac{y_r\,\theta}{(z_o\theta - z_{wind} + e_{wind})(1 + 2.5\theta) + e_i} \geq 1.5$$

to

$$FS' = \frac{M_r}{M_a} = \frac{y_r\,\theta}{(z_o\theta - z_{wind})(1 + 2.5\theta) + e_{wind} + e_i} \geq 1.5$$

On page 11, last equation in section 3.2.3.2,

change

$$FS = \frac{M_r}{M_a} = \frac{y_r\,\theta}{(z_o\theta + z_{wind} - e_{wind})(1 + 2.5\theta) + e_i} \geq 1.5$$

to

$$FS' = \frac{M_r}{M_a} = \frac{y_r\,\theta}{(z_o\theta + z_{wind})(1 + 2.5\theta) - e_{wind} + e_i} \geq 1.5$$

This change should also be made in the MathCAD example calculations.

On page 11, add the following paragraph at the end of section 3.2.3.2:

"…adequate lateral moment capacity to resist 1.5M_a. There may be cases where the wind decreasing rotation results in the girder rotating past vertical. This case will not have factors of safety against cracking, nor failure that are more critical than the factors of safety in the case of wind increasing rotation."

On page 11, replace the second paragraph of section 3.3.1 with the following:

"~~Two different checks are performed to verify the stability of a supported girder: 1) the potential for cracking resulting from lateral deformation and, 2) the potential for the girder rolling over due to failure. This takes the forms of computing the safety factor against cracking and the safety factor against girder rollover.~~ Three different checks are performed to verify the stability of a supported girder: 1) the potential for cracking resulting from lateral deformation, 2) the potential for the cracked girder to fail prior to rolling over, and 3) the potential for the girder rolling over due to failure. This takes the form of computing the factor of safety against cracking, the factor of safety against failure, and the factor of safety against girder rollover."

On page 12, in Figure 3.3.1-1, revise the calculation of the "angle at support spring" to equal "$\theta - \alpha$" instead of "$\alpha - \theta$" under the left and right figures.

On page 13, replace the first paragraph of section 3.3.2 with the following:

"~~The introduction of wind and centrifugal force into the equilibrium equations simply adds the overturning forces due to these lateral loads into the acting moment equation along with the added lateral deflections from these forces. These forces and the resulting free body diagram are shown in Figure 3.3.2-1 . Typically, centrifugal force is ignored in the analysis of transporting rigs on curves, simulating a stopped vehicle on a superelevated surface or a transporting rig in a superelevation transition outside of the curve. However, where the transporting rig is turning on a surface with superelevation sloping away from the turning direction, the centrifugal force can add to the overturning moment.~~ The introduction of wind and centrifugal force into the equilibrium equations simply adds the overturning forces due to these lateral loads into the acting moment equation along with the added lateral deflections from these forces. These forces and the resulting free body diagram are shown in **Figure 3.3.2-1**. Centrifugal force should be considered for all turning direction cases. The contributing or negating effect of cross slopes on centrifugal force should be considered by the stability engineer in the analysis of stability during transport. The case of a truck stopped on a superelevated curve should also be considered."

On page 15, in the equations for M_a and θ'_{max}, change "$(WS - CE)\ h_r$" to "$(WS - CE)(h_r + z_{max}\ \alpha)$".

On page 18, at the end of section 3.5, add the following paragraph:

"…consideration of all lateral eccentricities that are not affected by girder rotation

The horizontal component of the tension force in the lifting cables also results in a lateral bending moment and vertical deflection of the girder that shifts the center of mass with respect to the roll axis. These effects should be considered."

On page 24, section 4.2.2,

change

$$\require{cancel}\cancel{E_c = 120{,}000 K_1 w_c^{2}\sqrt[3]{f'_c}}$$

to

$$E_c = 120{,}000 K_1 w_c^2 f_c'^{\,0.33}$$

This change should also be made in the MathCAD example calculations.

On page 45, before NOTATION, add the following:

EXAMPLE CALCULATIONS

Errata have revised the notations and equations used in the document example calculations in Section 6. These errata do not address changes to the numerical values and results. The reader can expect slightly different numerical results when calculating factors of safety using the revised equations.

These example calculations will be superseded by updated examples, incorporating the errata to these recommended practices, in a major future stability product titled *Calculation of Lateral Stability for Precast, Prestressed Concrete Bridge Girders*.

On page 46, add the following notation:

$f_{b.seat3.bracing}$ = concrete stress in girder bottom flange subjected to wind with bracing

On page 47, add the following notation:

$f_{t.seat3.bracing}$ = concrete stress in girder top flange subjected to wind with bracing

On page 48, add the following notation:

$M_{wind.seat3.bracing}$ = modified lateral moment due to wind with bracing

On page 49, add the following notations:

$ratio_{gs.gh}$ = ratio of girder spacing to girder height
$total_{CD}$ = total drag coefficient multiplier on girder system

On page 51, change the definition of $z_{CF.trans}$ to "center of mass eccentricity due to centrifugal force during transit" and change the definition of $z_{t.trans}$ to "center of mass eccentricity with wind and centrifugal force during transit".

On page 51, in the definitions of all z_{wind} notations, change "eccentricity due to lateral wind deflection" to "center of mass eccentricity due to lateral wind deflection".

On page 51, add the following notations:

$\delta_{wind.ext.global}$ = windward exterior girder deflection in global girder system
$\delta_{wind.ext.single}$ = windward exterior girder deflection without bracing