Below are substantive changes to PCI 135, Specification for Tolerances of Precast Concrete, due to public comments. Changes are shown in redline/strikethrough format. Only these sections of the proposed document as available for a thirty-day public comment period.

Public comment #3, #9

1.1 Scope. ~~This standard specifies tolerances for the design, manufacture, and installation of precast concrete components and fabricated embeds. For the purpose of this standard, "precast concrete component" shall mean an individual plant-cast concrete member reinforced with any combination of nonprestressed reinforcement or prestressed strand. "Embed" shall refer to any item cast within the precast concrete component, such as a fabricated assembly or proprietary connector.~~

Replace with

1.1.1 This standard specifies tolerances for design, manufacture, and installation of precast concrete components and fabricated embeds.

1.1.2 Precast concrete products excluded from this standard include:
(a) Site-cast precast concrete
(b) Concrete products regulated by ASTM International Standards,

1.1.3 Unless otherwise specified, the following are not in the scope of this standard:
(a) Cast-in-place concrete
(b) Steel sections manufactured in accordance with American Institute of Steel Construction (AISC) specifications
(c) Nuclear and nuclear containment structures
(d) Bins and silos
(e) Canal lining
(f) Chimneys and cooling towers

Public comment #10

Camber—(1) Upward ~~O~~out-of-plane translation of a point within the span of a prestressed component that occurs due to the net bending resulting from an eccentric prestressing force, ~~(~~not including dimensional inaccuracies~~)~~; (2) a built-in curvature.

Public comment #13

Architect—Person, firm, or organization professionally qualified and duly licensed ~~to perform architectural services.~~ issue contract documents or identify construction to be furnished under contract documents.

Public comment #15

Deviation— ~~Departure~~ distance from an established reference point, line, ~~plane,~~ or surface measured ~~in a direction that is~~ perpendicular to the ~~reference~~ line~~, plane,~~ or surface of the component.

Public comment #20

Erection drawings—~~Graphic diagrams of precast concrete components and their connecting hardware developed from information in the contract documents and used for erection and field assembly.~~ Field-installation or component placement drawings that show the location, orientation, and attachment of the individual precast concrete components.

Public comment #21

Glass-fiber-reinforced concrete (GFRC)—A composite of alkali-resistant glass fibers mixed with a sand-cement slurry that has a minimum design thickness of ½ in. (13 mm).

Public comment #23

Licensed design professional—An individual who is licensed to practice structural design as defined by the statutory requirements of the professional licensing laws of the state or jurisdiction in which the project is to be constructed, and who is in responsible charge for all or part of the structural design.

Public comment #24

Pretopped ~~member~~ system**—**~~A construction approach in which precast concrete components create the final surface, reducing the need for cast-in-place concrete topping.~~ A manufactured precast concrete component that creates the final wearing surface.

Public comment #31

Structural ~~precast concrete~~ component—Precast concrete component ~~not defined as being an architectural precast concrete component.~~ that is part of the structural framing system.

Public comment #32

Sweep—Deviation of a longitudinal edge, of a horizontal or vertical component, from a ~~straight~~ line through the ends of that edge.

Public comment #33

Tipping—~~Offset relationship of one edge of an embedded plate to the planned surface, or the offset between two edges of the same embed.~~ The deviation from plane of one or both edges of an embedment.

Public comment #34

Tolerance— The permitted ~~Allowable~~ deviation from a specified ~~requirements such as~~ dimension~~s~~, location, line or plane. ~~and alignment.~~

Public comment #40

2.1.2 Tolerances for fabrication and erection shall be as stipulated in Chapters 3, 4, and 5. Tolerances absent from this standard or the contract documents shall not be considered zero by default.

Public comment #41

1.4 Referenced standards.

Referenced documents identified by an asterisk (*) are not consensus standards; rather, they are documents developed within the precast concrete industry that represent acceptable procedures for design, manufacture, and construction to the extent referred to in the specified section.

Public comment #49

2.2 Responsibilities. This section defines ~~who is responsible for~~ compliance ~~with this standard~~ responsibility.

Public comment #50

2.2.1 The architect or structural engineer of record (SER), or the licensed design professional in responsible charge, shall ~~clearly~~ specify tolerance requirements for precast concrete components as either architectural or structural in contract documents. Contract documents shall include exceptions to this standard and additional tolerances not included in this standard.

Public comment #51

2.2.2 The SER shall specify ~~and clearly communicate~~ required tolerances for precast concrete components, joints, or connections that require additional tolerances to prevent load transfer.

Public comment #52

2.2.3 The specialty structural engineer (SSE) ~~shall determine when tolerances are cumulative and~~ shall account for the effect of tolerances in the design of precast concrete components, their connections, and the performance of the structure.

Public comment #53

2.2.4 ~~The precast concrete~~ Manufacturer shall be certified in the appropriate group and category of the PCI Plant Certification Program, or in accordance with AC157 ~~by the International Accreditation Service,~~ and shall comply with the requirements of this standard.

Public comment #54

2.2.5 ~~The precast concrete~~ E~~e~~rector shall ~~be responsible for maintaining tolerances during erection.~~ install precast concrete components within the tolerances in Chapter 5.

Public comment #55

~~**2.3.1** Tolerances shall not be combined to increase the tolerances for an individual precast concrete component or increase tolerances of the structural system.~~

2.3.1 A tolerance shall be interpreted in accordance with a through c.

(a) Tolerances are not cumulative.

(b) Two or more tolerances shall not be combined to create a new tolerance that is greater than or less than any applicable tolerance for an individual precast concrete component.

(c) The most restrictive tolerance shall control.

Public comment #56

~~**2.3.3** Erection activities that would cause a precast concrete component to be out of tolerance shall not be made without coordination among the architect, SER or SSE, the precast concrete producer, the erector, and other affected trades.~~ Erection tolerances shall be in accordance with Chapter 5.

2.3.3.1 Erection activities that would cause a precast concrete component to be out of tolerance shall not be made without coordination among the architect, SER or SSE, manufacturer, erector, and other affected trades.

Public comment #57

2.3.2 (a) The SER or SSE has determined that the out-of-tolerance~~s~~ ~~are~~ component is acceptable and structural requirements have been satisfied.

Public comment #59

5.1.1 Resolve ~~T~~tolerance discrepancies ~~found during erection or after placement shall be resolved~~ in accordance with Sections 2.2.2 and 2.2.3.

Public comment #60

2.3.2.2 Excessive camber variations of AASHTO ~~prestressed American Society of State Highway and Transportation Officials (AASHTO)~~ of prestressed bridge components ~~sections~~ shall not be a sole reason for rejection ~~for AASHTO sections~~.

Public comment #62

2.3.3.1 Erection activities that would cause a precast concrete component to be out of tolerance shall not be made without coordination among the architect, SER or SSE, ~~the precast concrete producer~~ manufacturer, ~~the~~ erector, and other affected trades.

Public comment #64

3.2.1 Weld tolerances and weld inspection requirements shall be in accordance with one of the following: …No change to remainder of provision.

Public comment #67

~~Note:~~ Warping tolerances of ~~final~~ fabricated embed plate shall ~~not exceed tolerances in~~ be in accordance with AISI S100~~-16~~ and AISI S240~~-15~~.

Public comment #72

4.1.1 ~~Refer to~~ Comply with Section 2.3 ~~when~~ if tolerances are exceeded.

Public comment #74/75

4.2.1 ~~Production tolerances for~~ Fabricate architectural precast concrete components (Fig. 4.2.1) to the following production tolerances. ~~shall be: Length~~ Height or width tolerance increments shall be based on the respective minimum ~~length~~ dimensions and are not proportional ~~length~~.

Public comment #77

4.2.1 NS12 – Location of winder washer track or buttons…..+/- ~~1/8~~ 1/4 in. (+/- ~~3~~ 6mm)

Public comment #81

4.2.1 NS6: Reinforcing ~~steel bar and welded-wire reinforcement~~ materials:

Public Comment #84

4.2.2. c = Tipping of individual bricks from the panel plane of exposed brick surface joint…..+/- ~~1/8~~ 1/4 in. (+/- ~~3~~ 6mm) <= depth of formliner

Public Comment #85

4.2.2. e = Individual step in the face from panel plane of exposed brick surface …..+/- ~~1/8~~ 1/4 in. (+/- ~~3~~ 6mm) <= depth of formliner joint

Public Comment #86

4.2.2 Notes:

Tolerances from Section 4.2.1 shall be used for additional tolerances not shown in Fig. 4.2.2.

~~Dimensional tolerances of terra-cotta and thin brick used in formliners shall be in accordance with ASTM C67.~~

Public Comment #95

4.3.1 NSc_4 = Insulation ~~to~~ along the panel length. . . . . .+0 in., –¼ in. (+0 mm, –6 mm)

Public Comment #97

4.3.2

~~*n*2 = Size of rough opening . . . . . .±1 in. (±25 mm)~~

~~*n*3 = Size of finished opening. . . . . ±½ in. (±13 mm)~~

replaced with:

*n*2 = Size of blockouts . . . . . .±1/2 in. (±13 mm)

Public Comment #104 - Add Flat Slab production tolerances

Public Comment #18

4.3.~~7~~8 k: Reinforcing ~~steel bar and welded-wire reinforcement~~ materials:

Public Comment #119

4.3.~~7~~8 *q*2 = Location of handling device transverse to length of component. . .~~±1/2~~1 in. (~~±13~~25 mm)

Public Comment #121

4.3.~~8~~9 *b* = Width (overall). . . . . +3/8 ~~1/8~~ in., –¼ in. (+10 ~~3~~ mm, –6 mm)

Public Comment #139/140

4.3.~~23~~24 ~~ASTM C1433-20e1 *Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers* shall be used for reinforcement placement tolerances.~~ Comply with reinforcement placement tolerances in accordance with ASTM C1433.

Public Comment #143

4.4.1 n_1 = Location of ~~window~~ opening within panel

Public Comment #146

4.4.1 *o* = Location of sleeves, hose bibs, electrical boxes, and other nonstructural embeds

. . . . . ~~±3/8~~½ in. (~~±10~~13 mm)

Public Comment #150

5.1.1 Resolve tolerance discrepancies ~~found during erection or after placement shall be resolved~~ in accordance with Sections 2.3.2 and 2.3.3.

Public Comment #155

5.3 Unless more-stringent tolerances are specified in ~~listed within the~~ contract documents, erect precast concrete components ~~shall~~ in conformance with ~~erection tolerances listed in~~ Sections 5.3.1 through 5.3.13.

Public Comment #160 - Delete the “+” and “+/-“ from in front of dimensions (Strike through may not be apparent due to font.)

j = Differential bowing or camber as erected between adjacent components of the same design:

Exposed relative to adjacent panel . . . . . ~~+~~¼ in. (+6 mm)

Nonexposed relative to adjacent panel. . . . . ~~±~~½ in. (±13 mm)

Public Comment #161

k = Opening height between spandrels. . . . . ±~~1/4~~½ in. (±~~6~~ 13 mm)

Public Comment #162 - match figures in MNL 117. Also reference Fig. 5.4.1

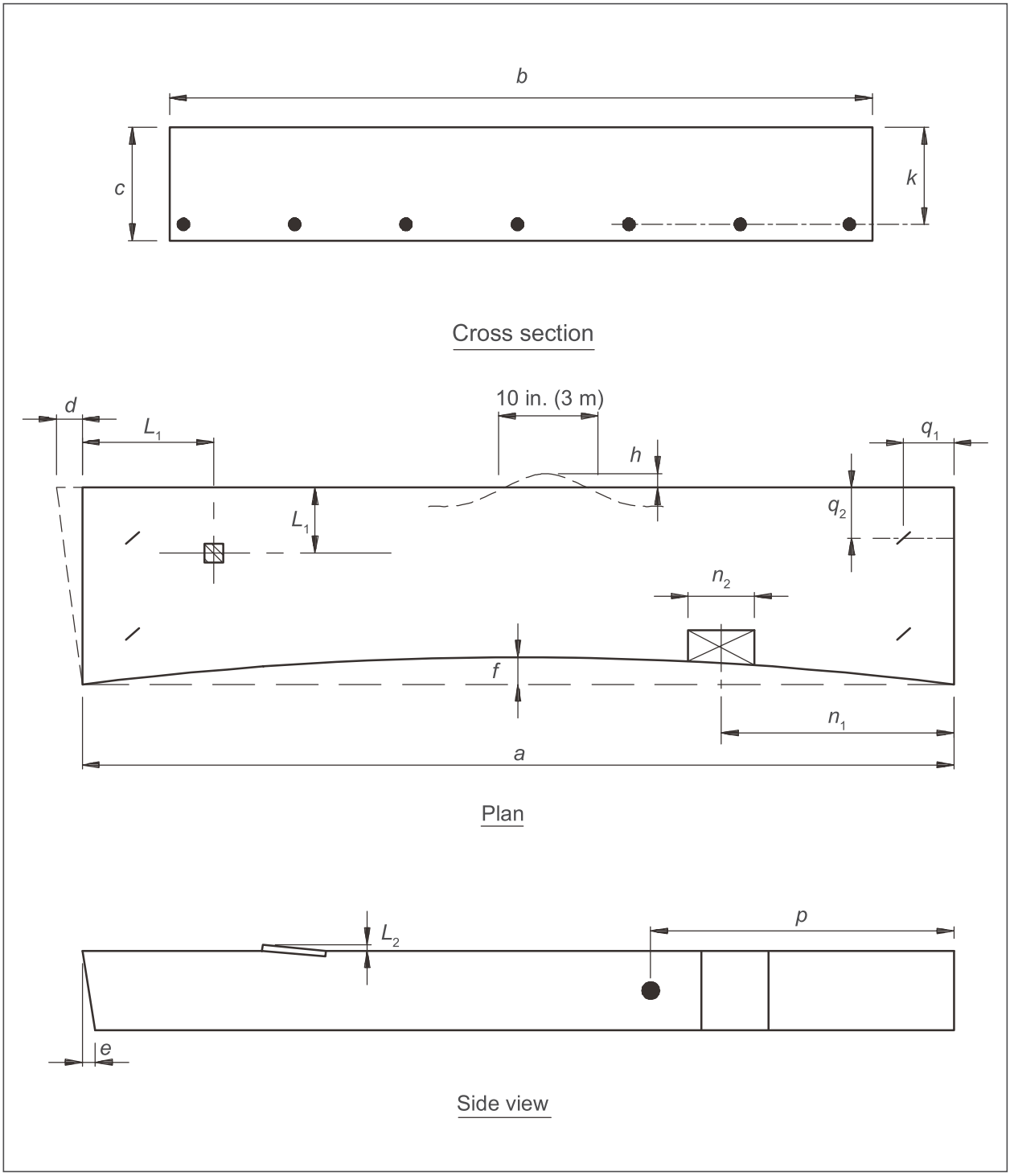

Figure 4.3.6. Flat slab.

4.3.6 Fabricate precast concrete solid flat slabs (Fig. 4.3.6) to the following production tolerances:

a = Length . . . . . ±½ in. (±13 mm)

b = Width (overall) . . . . . ±¼ in. (±6 mm)

c = Depth (overall) . . . . . ±¼ in. (±6 mm)

d = Variation from specified plan end squareness or skew
. . . . . .±¼ in. per 12 in. width; ±½ in. maximum
(±6 mm per 300 mm width; ±13 mm maximum)

e = Variation from specified elevation end squareness or skew . . . . . .±¼ in. (±6 mm)

f = Sweep, for component length:

Component length ≤40 ft (≤12 m). . . . . ¼ in. (6 mm)

Component length >40 to 60 ft (>12 to 18 m) . . . . . ⅜ in. (10 mm)

g = Camber variation from design camber. . . . . ±¼ in/ per 10 ft;
(±¾ in. maximum (±6 mm per 3 m; ±19 mm maximum)

g_1 = Differential camber between adjacent untopped components of the same design to receive topping
. . . . . ¼ in. per 10 ft; ¾ in. maximum
(6 mm per 3 m; 19 mm maximum)

g_2 = Differential camber between adjacent pretopped components of the same design
. . . . . ⅛ in. per 10 ft; ⅜ in. maximum
(3 mm per 3 m; 10 mm maximum)

h = Local smoothness of any surface . . . . . ¼ in. per 10 ft (6 mm per 3 m)

k = Location of reinforcing material . . . . . .±¼ in. (±6 mm)

L_1 = Location of embedment . . . . . ±1 in. (±25 mm)

L_2 = Tipping and flushness of embedment . . . . . .±¼ in. (±6 mm)

n_1 = Location of blockout . . . . . ±1 in. (±25 mm)

n_2 = Size of blockouts . . . . . ±½ in. (±13 mm)

p = Location of inserts for structural connections . . . . . .±½ in. (±13 mm)

q_1 = Location of handling device parallel to length of component . . . . . ±6 in. (±150 mm)

q_2 = Location of handling device transverse to length of component. . . . . ±1 in. (±25 mm)

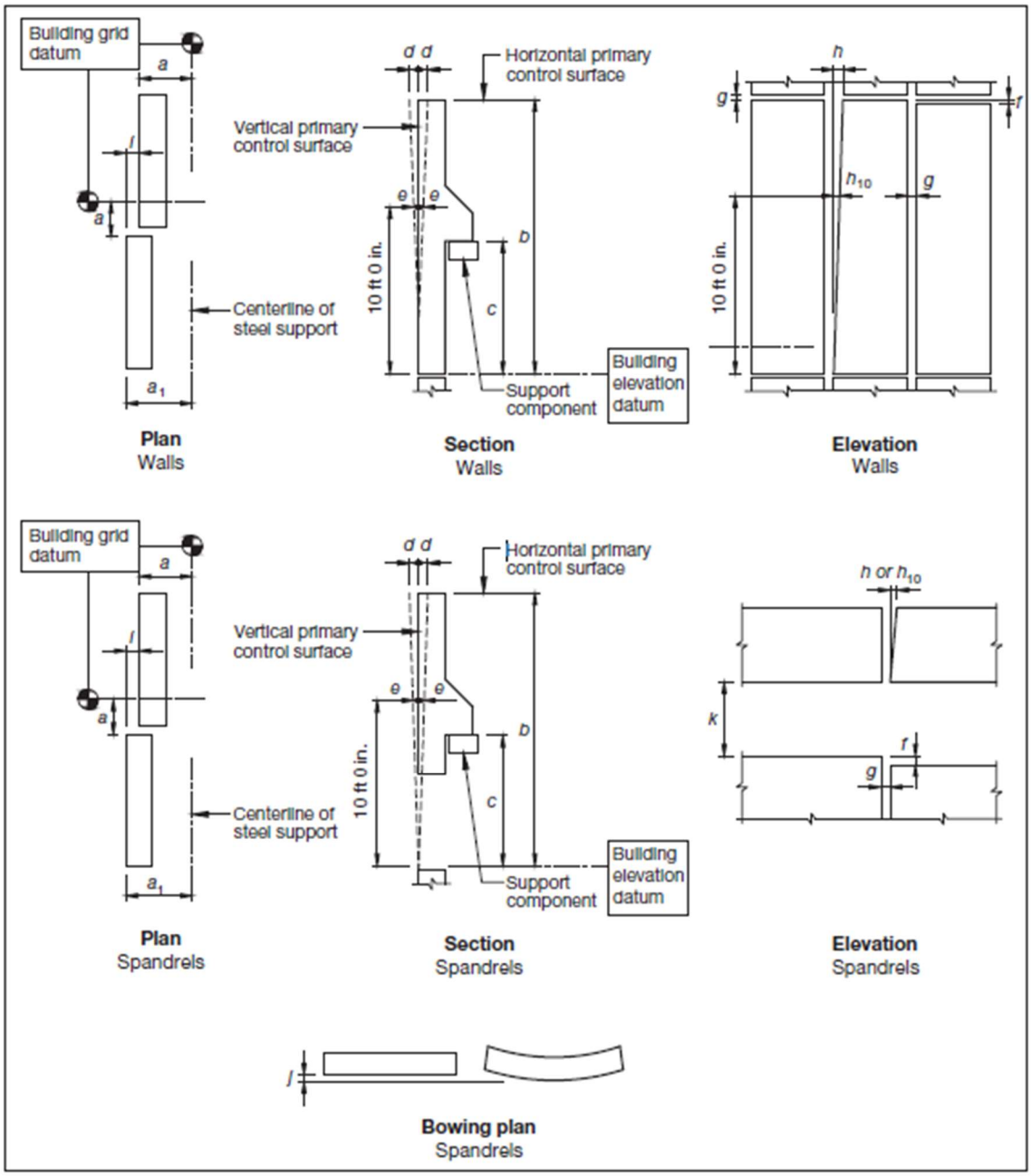

Figure 5.3.4. Architectural wall panel or spandrel erection tolerances.

5.3.4 Erect architectural precast concrete wall panels or spandrels (Fig. 5.3.4) to the following erection tolerances:

202

Add note at bottom of fig. 5.3.4: See Fig. 5.4.1 for GFRC panel erection tolerances.

203

204

Public Comment #164

5.3.5 *h* = Maximum ~~j~~Joint taper over length of panel. . . . . ½ in. (13 mm)

Public Comment #170

5.3.8 f = Maximum jog in alignment of matching edges at the primary control surface …+/- ¼”

Public Comment #171 - Add g to read Bearing (in span direction)

5.3.8 *g* = Bearing (in span direction). . . . . ±¾ in. (±19 mm)

Public Comment #172

Note added: Headroom clearance shall comply with the requirements of Section 1011.3 of the *International Building Code*.

Public Comment #178 - Revise sketch

Public Comment #179

5.4.1 *d* = Maximum plumb variation over height of structure:

Structure height >100 ft (>30 m) ..... ~~.3/8 in.~~ 1⁄8 in. per 10 ft; 2 in. maximum (3 mm per 3 m; 50 mm maximum)

Public Comment #182/184

5.5.2.2 When ~~Where~~ connections cannot be completed as detailed, provisions (a) through (c) shall be met:

(a) The erector shall notify the specialty structural engineer (SSE).

(b) The structural engineer of record or SSE shall approve the increased tolerances or provide a modified connection detail such that structural requirements have been satisfied.

(c) The most restrictive tolerance shall control.

Public Comment #185

5.5.3 Bearing. Bearing requirements shall be met in accordance with the precast concrete erection drawings. Specific minimum requirements shall be provided by the SSE ~~specialty structural engineer, as necessary~~ and shown on the erection drawings.