

PCI's New Architectural Specification Program and Its Effect on the Bridge Construction Community

by Randy Wilson, Precast/Prestressed Concrete Institute

PCI's architectural precast concrete certification categories are about to change. How will that affect the bridge producers whose plants are PCI certified under the existing BA (bridge products with an architectural finish) category? The simple answer is that producers who deliver bridge components conforming to PCI-MNL-116, *Manual for Quality Control for Plants and Production of Structural Precast Concrete Products*,¹ and produce precast concrete components with an architectural finish should be certified in the new AD category,² while also maintaining their current bridge product category (B1 to B4). This article focuses on the impact of the new AD category, which applies to heavy structural components that are produced from standard steel molds, rather than highly complex custom-molded components covered in other categories.

First, we should answer two questions: "Why the change?" and "What are the options?"

Why the Change?

Making an engineer's or architect's vision come to life can be both exhilarating and challenging. What is easily developed in the design stage is often difficult to achieve in reality. Designer creativity and advanced production techniques are expanding the expressive potential of architectural precast concrete. In response, and through collaboration between the design community and the precast concrete industry, PCI's Architectural Certification Program is expanding with new categories that are more specific to the various construction markets that use the benefits of precast concrete solutions. These new categories align the designer's expectations with the demonstrated capabilities of the precast concrete producer and the components required for the project.

Most bridge components perform a utilitarian or structural purpose first and an aesthetic purpose second. As such, there are certain limitations to color, shape, texture, and tolerances compared with a purely architectural or facade panel with custom forming, complex shapes, and tight tolerances. However,

more communities are realizing that bridges contribute to the community's culture by reflecting the local architecture. The visual interest of a bridge (texture, color, function, and form) is a key aspect discussed in Frederick Gottemoeller's "Aesthetics Commentary" in every issue of *ASPIRE*.[®]

Using PCI manuals, owners, architects, engineers, contractors, and precast concrete producers can define acceptable product standards for structural performance, connection types, tolerances, and other quantifiable characteristics. However, aesthetic traits are often determined by one person's or one group's assessment of appearance-related criteria, including uniformity.

What Are the Options?

There is currently a wide variety of PCI-certified precast concrete plants across North America. These plants have different production techniques, different levels of technology, and different product focuses, and are grouped into A (architectural), B (bridge), and C (commercial) categories. Expanding the architectural certification program with four new categories, AA, AB, AC, and AD, better aligns precast concrete producers' capabilities with designers' expectations. The PCI architectural certification category requirements (**Table 1**) provide an overview of the producer's capabilities that are required for each category.

The requirements do not necessarily represent the full extent of an individual producer's capabilities. Categories AA, AB, and AC align with PCI-MNL-117, *Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products*,³ which is rarely used for bridge products. Category AD aligns more closely with the bridge and commercial markets that produce components in accordance with MNL-116 (structural concrete).

Figure 1 shows example mock-up panels for the PCI architectural certification categories. Category AD is for the most simplistic panels—flat

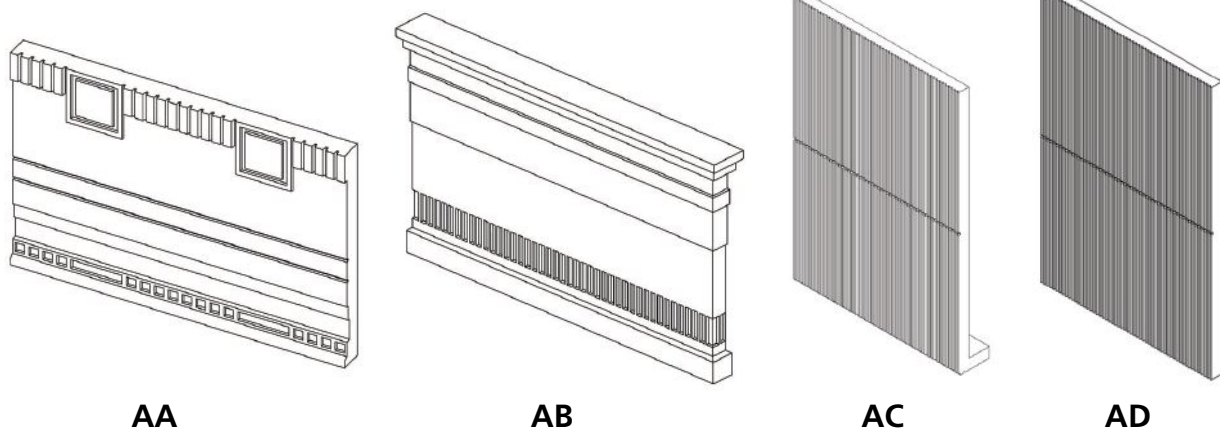


Figure 1. Example mock-up panels for the PCI architectural certification categories. Figure: Adapted from *PCI Architectural Certification Program Supplemental Requirements*.²

Table 1. PCI Architectural Certification Category Requirements²

Required Architectural Precast Concrete Production Capabilities		Certification Category				
		AA	AB	AC	AD	AT
Color and finish of face mixture	White cement	X	X	X		X
	White and gray cement	X	X	X		X
	Gray cement	X	X	X	X	X
	Multiple colors in finished face	X	X			
	Single color in the finished face	X	X	X	X	X
	Multiple textures in the finished face	X	X			
	Single texture in the finished face	X	X	X	X	X
Panel geometry	Flat panels	X	X	X	X	X
	Panels with sequential returns	X	X			
	Panels with single cast returns	X	X	X		
	Three-dimensional (3-D) form surface (buildups, liners, projections on face)	X	X			X
	3-D form surface (reveals and liners only)	X	X	X	X	X
	3-D panels including radius (concave, convex)	X	X			X
Embedded material and veneer	Tile, stone, terra cotta	X	X			
	Thin brick	X	X	X	X	
Production capability	Batch plant mixing	X	X	X		
	Batch plant or truck mixing				X	
	Fixed or temporary covered production required	X	X			
Technology	3-D BIM submittals per project specifications	X	X			
Production tolerances	PCI-MNL-135 AA (modified MN-117)	X				
	PCI-MNL-135 (current MNL-117)		X	X		X
	PCI-MNL-135 (current MNL-116)				X	
Erection tolerances	PCI-MNL-135 AA (modified MNL-117)	X				
	PCI-MNL-135 (current MNL-117)		X	X		X
	PCI-MNL-135 (current MNL-116)				X	
PCI-certified erector	Required	X	X	X		
Plant audits	Two unannounced audits per year	X	X	X	X	X
Key feature evaluations	Must be demonstrated every two years	X	X	X	X	X

Notes: 3-D = three-dimensional; AT= architectural trim products such as coping and lintels; BIM = building information modeling. Category AD is the category most likely to apply to bridge products.

panels with features that may include a one-colored, single-textured face, reveals, or thin brick, and with tolerances per PCI-MNL-116. Panels in category AC encompass the features of category AD with added single-cast returns and more stringent tolerances per PCI-MNL-117. Category AB is for panels that are more complex than those in category AC. An AB panel may incorporate sequential returns, multiple colors or textures, a three-dimensional formed surface, or embedded material such as stone or tile, or be a curved panel. Finally, panels in category AA have the same features as AB panels but with more stringent tolerances for production and erection.

PCI-MNL-135, *Tolerance Manual for Precast and Prestressed Concrete Construction*,³ is being updated to reflect the changes in the new architectural certification categories and is currently moving through the review process. Until it is released, the current edition will be used along with the tolerances specifically listed in the supplemental conditions for the

new certification program and the new architectural guide specifications that are scheduled to be published in September 2021.

The certification categories require the precast concrete producer to demonstrate specific manufacturing capabilities, achieve specific aesthetic finishes, and produce finished mock-up panels that meet specific tolerances defined for each category. The auditing process will verify the complexity level achievable by the specific precast concrete plant.

Bridge project specifiers who elect to have precast concrete components with complex shapes, multiple colors, custom formliners, and other specialty finishes, should consider specifying the AA, AB, or AC categories and should consult with local PCI-certified plants that are qualified under the B1, B2, B3, or B4 categories, as appropriate. Specifiers are strongly urged to reach out to PCI or PCI-certified producers to understand the precast

concrete producer's specific manufacturing capabilities and establish category-specific limitations, before including these PCI architectural precast category requirements in concrete bridge project specifications.

When Is This Change Happening?

Beginning October 1, 2021, the A1, BA, and CA categories will be discontinued. All references to these categories should be removed from the specifications and replaced with the new architectural categories. To be clear, the existing bridge certifications categories (B1, B2, B3, and B4) will remain unchanged.

All PCI-certified producers who are using category A1, BA, or CA must declare a new category via the PCI certification application process. That process includes producing three mock-up panels to demonstrate capabilities, with one of those mock-ups being produced in the presence of an auditor. There will be no default or grandfathering of certification categories. Every architectural precast concrete producer that is currently PCI certified must be recertified under the new program to obtain an architectural group certification.

All precast concrete projects involving architectural treatments bidding on or after October 1, 2021, should include one of the new categories when specifying any precast concrete component with an architectural appearance. It will be imperative for precast concrete producers to work diligently with specifiers during design and during the bidding process to ensure the proper certification categories are specified.

Conclusion

The new specification categories provide value to various construction industry stakeholders by aligning the PCI-certified precast concrete producer's proven aesthetic capabilities with project requirements. They also provide a format for the precast concrete producer to discuss specific capabilities, establish realistic expectations, and avoid costly discrepancies, thereby reducing project risk for all parties.

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References

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