

SERIES 3, ISSUE 3 – FORM SURFACE DEFECT ASSESSMENT

A form surface defect rating index can be used during the quality control process to determine the severity of surface defects on concrete-formed surfaces resulting from the performance of the concrete mixture and evaluate whether the appearance of the forming surface on precast concrete is maintained over time. The rating index provides a method to monitor the consistency of the surface aesthetics of concrete members, and it can be used to determine the suitability of a concrete mixture for a given application. Precast concrete manufacturing plants can also use this rating index to document and track progress of mixture development, consolidation technique, and efforts to troubleshoot defects.

An example of a form surface defect rating index is provided here for reference. This index is subjective and is intended for internal quality control purposes only.

When using the form surface defect rating index, visually inspect the formed surface of the concrete member to identify the presence and distribution of defects and blemishes. Assign an index value to the concrete member using the criteria shown in Table 1. One or more of the worst items in a category can be used to establish the defect rating. Record the presence of surface defects along with the corresponding values from the index table.

TABLE 1. FORM SURFACE DEFECT RATING INDEX

0	Formed surface is smooth and defect free. Minor pinholes, not exceeding 1/16 in., cover no more than 5% of the surface area. Bugholes or voids greater than 1/4 in. are found in generalized areas but not throughout the member. Minor rust or markings are isolated to one area of the member.
1	Minor pinholes, not exceeding 1/16 in., cover more than 5% of the surface area. Bugholes or voids greater than 1/4 in. do not exceed two per square foot. Rust or markings appear four or more times on one member. Scaling, rust, or markings are predominantly in an isolated area of the piece.
2	Small bugholes or voids greater than 1/8 in. cover more than 50% of the formed surface. Bugholes or voids greater than 1/4 in. cover more than 20% of the surface. Voids larger than 1/2 in. do not exceed three per square foot. Scaling, rust, or markings appear on up to 50% of product length.
3	Many large bugholes or voids are observed. Small bugholes or voids cover more than 90% of the formed surface. Large amounts of scaling, covering more than 50% of formed surface, are observed. Consistent or patterned rust or markings cover more than 50% of the formed surface.

Quarter-point increments may be used to adjust form surface defect ratings if the appearance does not fit clearly into one rating category.

For possible causes of surface effects and suggested remedies, see ACI 309.2R-15, *Guide to Identification and Control of Visible Surface Effects of Consolidation on Formed Concrete Surfaces*.

Definitions from ACI CT-18, ACI Concrete Terminology

- **Bugholes:** see **surface air voids** (preferred term).
- **Honeycomb:** voids left in concrete between coarse aggregates due to inadequate consolidation.
- **Scaling:** Local flaking or peeling away of the near-surface portion of hardened concrete or mortar.
- **Surface air voids:** small regular or irregular cavities, usually not exceeding 5/8 in. (15 mm) in diameter, resulting from entrapment of air bubbles in the surface of formed concrete during placement and consolidation.

PCI Plant Quality Talk Quality Enhancement Committee



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Note: Please complete this form and return to the Quality Control Manager. All crew members should be observant and report to their foreman anything out of the ordinary on a project. See something, say something.

NOTES	ATTENDEE SIGNATURES
DATE	
PRESENTER	