

State of Illinois  
Department of Transportation  
Bureau of Materials and Physical Research  
Springfield

POLICY MEMORANDUM

Revised: March 1, 2014

7-08.2

This Policy Memorandum supersedes 7-08.1 dated June 1, 2012

TO: REGIONAL ENGINEERS AND HIGHWAY BUREAU CHIEFS

SUBJECT: RECYCLING PORTLAND CEMENT CONCRETE INTO AGGREGATE

Section 1003 and 1004 of the Standard Specifications for Road and Bridge Construction includes "crushed concrete" as an acceptable source of aggregate material. Care must be taken, however, to assure that quality and gradation requirements are not compromised when recycled concrete is used in lieu of other aggregate materials. Freeze-thaw, ASR and Chloride Content tests are required if the crushed concrete is to be recycled as Portland cement concrete. Concrete removal and crushed concrete stockpiling and handling must be performed in such a manner as to avoid contamination of the aggregate with dirt and foreign matter.

Acceptance of crushed concrete shall be determined using one of the following methods:

I. Project Acceptance

Recycling Portland cement concrete may be specified by special provision for appropriate projects. The crushed concrete shall be recycled from IDOT-specified concrete in the project. The Engineer shall approve the concrete removal method prior to crushing and continually monitor the method during crushing for unacceptable contamination.

Quality. The fact that the original aggregate in the concrete met "Class A" quality does not mean that the product resulting from the crushing of the concrete will meet "Class A" quality. Preliminary samples of existing concrete from a number of locations (minimum 3) in any potential recycling project shall be submitted to the Central Laboratory for quality testing. A period of three months is required for freeze-thaw testing if the material is to be recycled into any uses covered under 1004.02 (f) in the Standard Specifications for Road and Bridge Construction. This work shall be completed prior to advertising the project for bidding.

Quality testing shall include Illinois Test Procedures 96 "Resistance to Degradation of Small-size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine" and Illinois Test Procedure 203 "Deleterious Particles in Coarse Aggregate". Standard "Class A" quality limits shall apply but Recycled Asphalt Pavement (RAP) shall be counted as Other Deleterious and shall not exceed 2.0%. RAP shall not be considered as Other Deleterious when Crushed Concrete is used as Aggregate Wedge Shoulders, Type B.

- A. Gradation. Gradation sampling and testing shall conform to the Aggregate Gradation Control System (AGCS).
- B. Stockpiling. Contamination in the stockpile area is as detrimental as contamination when picking up the broken concrete. Stockpile pads shall be provided and haul roads/plant area properly maintained to assure that acceptable material is not contaminated prior to use.

Stockpiling, hauling, and loading shall conform to the Aggregate Gradation Control System.

## II. Central Recycling Plant

Portland Cement Concrete may be recycled by crushing at a central recycling plant.

Concrete used as raw feed at a central recycling plant shall not be contaminated with soil or foreign matter. A small amount of soil embedded in the base of the concrete slab is acceptable. A small amount of construction debris, steel, fabric, wood from forms, and a small amount of RAP leftover from milling is also acceptable. Raw feed piles shall not have excavated soil or aggregate, bricks, slabs of HMA pavement or washout from concrete trucks.

Acceptance for quality and gradation shall be on a stockpile-by-stockpile basis.

- A. Quality. Each stockpile shall have one quality sample per each 10,000 tons per specific gradation submitted for quality testing. The quality samples shall be taken from stockpiled material. Since non-IDOT specified concrete may be included in recycling at central recycling plants, the crushed concrete produced at the central recycling plant is not acceptable for Class A quality use, Class B quality use, or Class C quality hot-mix asphalt mixture use, except as specified herein.

For HMA Surface courses and HMA Binder courses: Quality testing shall include Illinois Test Procedure 96 "Resistance to Degradation of Small-size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine", and Illinois Test Procedure 203 "Deleterious Particles in Coarse Aggregate". Standard "Class B" quality limits shall apply but there will be no limit on RAP from the Deleterious Count. Illinois Test Procedure 327 "Resistance to Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus" shall also be performed and a 15.0% limit shall be applied.

For Granular Embankment Special, Granular Subbase, Stabilized Subbase, Aggregate Base, Aggregate Surface and Aggregate Shoulders: Quality testing shall include Illinois Test Procedure 96 "Resistance to Degradation of Small-size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine" with standard "Class D" quality limits applied. Illinois Test Procedure 203 "Deleterious Particles in Coarse Aggregate" shall also be performed but standard "Class C" quality limits shall apply except the Other Deleterious maximum percent limit shall be 7.0%, with no more than 5.0% RAP allowed, nor more than 2.0% other material defined as Other Deleterious. RAP shall not be considered as Other Deleterious when Crushed Concrete is used as Aggregate Wedge Shoulders, Type B.

- B. Gradation. Gradation sampling and testing shall comply with the Aggregate Gradation Control System.
- C. Stockpiling. Stockpiling, hauling, and loading shall comply with the the Aggregate Gradation Control System. Stockpile pads shall be provided and the haul roads/plant area properly maintained to prevent contamination.

III. Recycled Returned Ready-Mix Concrete

Portland Cement Concrete may be recycled by curing returned concrete either at the Concrete Mix Plant or at a Central Recycling Plant as outlined below:

Returned concrete shall be dumped on a clean stockpile area or concrete pad. A small amount of fines scattered on the pad prior to dumping the returned concrete, will assist in removal of the cured concrete.

No water shall be added to the returned concrete before dumping.

After the concrete truck is empty, it shall then proceed to a different area to “wash out”. “Wash out refers to the use of water and agitation to remove the ready-mix residue from the inside the ready-mix truck.

The returned concrete shall be cured for a minimum of 2 weeks to gain strength. Cured concrete is then broken up and placed in piles.

- A. Quality. IDOT reserves the right to test this material for quality, as outlined in Section II (A), herein, if contamination is present in the stockpile.
- B. Gradation. Gradation sampling and testing shall comply with the Aggregate Gradation Control System. “Wash out” material may be mechanically blended with the returned concrete during aggregate production as long as the final product still meets the required gradation.
- C. Stockpiling. Stockpiling, hauling, and loading shall comply with the Aggregate Gradation Control System. Stockpile pads shall be provided and the haul roads/plant area properly maintained to prevent contamination.



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