

Summary:

Through the Materials & QA Subtask Group of the Concrete Task Group of the Rock Products Committee (RPC), Caltrans and Industry partnered to create a specification that would allow the use of recycled concrete for certain applications.

Background:

- RPC “provides leadership and commitment to develop and improve Caltrans material specifications, test methods, and construction procedures used in the construction of transportation facilities that improve mobility across California, working with the Industry and the Federal Highway Administration.”
http://www.dot.ca.gov/hq/esc/Translab/OSM/rpc_concrete_task_group/index.htm
- Between 2-8% of all concrete produced in California is returned to the batch plant.
- CalEPA’s Climate Action Team estimates that this corresponds to 2,200,000 lb of CO₂ excess per year.
- At the request of the RPC Materials & QA STG, Climate Earth provided an in depth analysis on the potential carbon footprint reduction that would be realized if Caltrans were to pursue the use of recycled plastic concrete.

Precedence Considered:

- Other transportation agencies have adopted the use of recycled aggregates for certain applications
- The Greenbook Standard Specifications were taken into consideration during the specification development
- California Public Resources Code and the US Environmental Protection Agency’s CISTIC protocol were also referenced for the development of the specifications

Specifications:

- Contractors are now allowed to use returned plastic concrete for certain applications provided that certain criteria are met.
- Some of the criteria that must now be met include the following:
 - The weighmaster certificate must be submitted along with:
 - Quantity of returned plastic concrete
 - Time, type, brand and dosage of the hydration stabilizing admixture (HSA)
 - Copy of the original weighmaster certificate of the returned plastic concrete
 - Batch plant must have an endorsement complying with the Department’s MPQP

Other Requirements:

- Concrete may contain a maximum of 15 percent returned plastic concrete.
- Returned plastic concrete must not exceed 100° F at any time.
- Must be proportioned within 4 hours after original batching if HSA is not used
- If HSA is used, HSA must be added within 4 hours of original batching and returned plastic concrete must be proportioned within 4 hours after adding HSA.

**Benefits:**

- Study found that 15% recycling returned plastic concrete would result in a 15.3% reduction in carbon footprint (in kgCO₂e/cyd) and a 16.2% reduction in embodied energy for 1 CYD concrete mix. Study located at: http://www.dot.ca.gov/hq/esc/Translab/OSM/rpc_concrete_task_group/documents/Environmental_Impacts_of_Recycled_Plastic_Concrete.pdf
- Reduced waste materials sent to landfills
- Conservation of natural resources such as water, aggregate and cement.
- Decreased transportation impacts associated with shipping waste material and replacement material
- Decreased overall project costs

Applications:

- Cement slurry
- Curb, gutter and sidewalks

