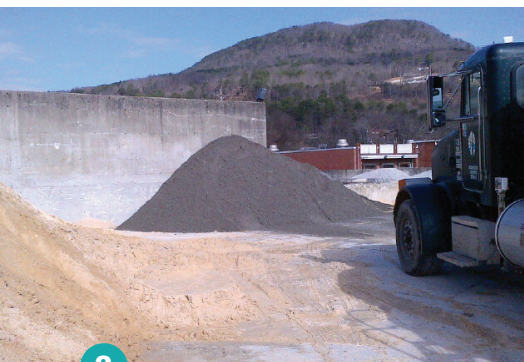


Dry-Batch Ready Mix Operation Yields 1500 Cubic Yards of Roller-Compacted Concrete Pavement



1 Ramp elevates ready mix truck higher than dump truck.



2 Dumping RCC onto concrete paved area.



3 Using a front-end loader into dump truck makes the process go quickly.

Roller-compacted concrete (RCC) was specified as the paving material for the new Marion County Regional Institute of Technical Excellence in Kimball, Tennessee. Local RCC paving contractor, Robert Smith, Inc., contacted NRMCA's member, Sequatchie Concrete Services, to provide RCC for this job. A dry batch operation was the closest Sequatchie plant (six miles away) to this project. This was not a challenge for the Sequatchie operations staff since they have been providing RCC for most of the RCC projects in the Chattanooga, Tennessee area for more than 10 years. Most of their RCC has been produced at their central batch plant in Chattanooga. But, over the years, they have had to produce RCC from some of their smaller dry batch operations. During the last 10 years a lot has been learned from trial and error about making RCC out of a dry-batch operation. **But, it can be done. Successfully!**

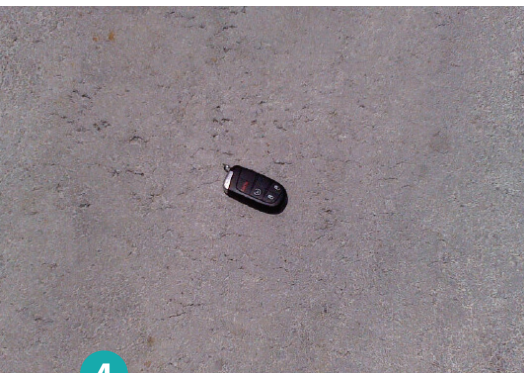
So how was this dry-batch ready mix plant able to provide 300 cubic yards per day of RCC in four hours and only use two to three trucks, mostly two trucks per day, as per Jeff Bleil, operation manager, Sequatchie Concrete Services.

The process utilized is kind of unique, but not new. It was used years ago while providing RCC for a TDOT access road. Most RCC literature states a ramp is needed to elevate the ready mix truck higher than the dump truck (photo 1).

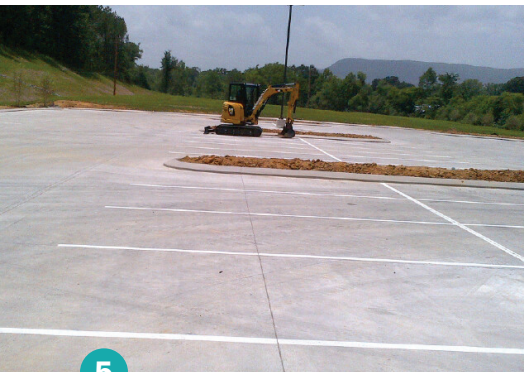
By dumping the RCC onto a concrete paved area (photo 2) and using a front-end loader to load the dump trucks (photo 3), it goes more quickly. Try to get 40 to 50 yards of material on the ground before the first dump truck arrives, enough material to fill five to six dump trucks. The paving contractor used six dump trucks for this job. While the front-end loader is filling the dump trucks, the ready mix trucks are refilling the RCC pile. The material never runs out. In this type of operation, there is always some time between when the last truck is loaded and the first truck returns for more RCC to be added to the pile. Even though the pile might get a little low, there is time to build it back up. With the proper mix, there is little segregation.

The standard RCC mix was used. It consisted of the following materials: 400 lbs Type I/II portland cement, 100 lbs Type F fly ash, 850 lbs of #67 and 850 lbs of #89 coarse aggregate, 1,415 lbs manufactures sand, 350 lbs natural sand and 25 gallons water, along with 4 oz/cwt of a polycarboxylate admixture. (The admixture is used for workability not water reduction).

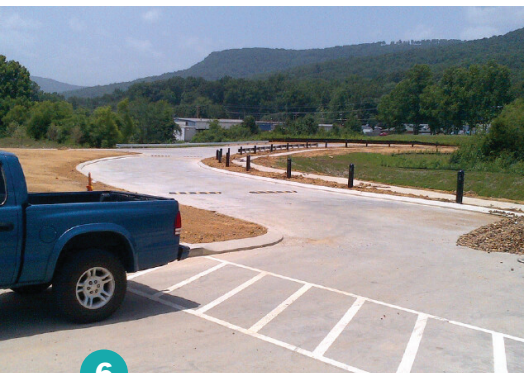
Since the job was only six miles away and the mean day time temperature was 65-70°F, a retarder was not needed. (RCC is treated just like conventional concrete when it comes to hot and cold weather, retarders in hot weather and accelerators in cold weather.)



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6

Loading and Discharge Sequence:

1. Use Clean, Well Operating Trucks!
 - a. RCC is a product that needs to be mixed well
2. Check moistures of coarse and fine aggregates before loading procedures begin.
3. Make adjustments to the mix design weights accordingly
4. Loading:
 - a. Make sure barrels are empty of wash-out water and returned concrete
 - b. Loading sequence is the same as regular concrete
 - i. 80% of design water
 - ii. Admixtures
 - iii. Dry materials
 - iv. Remaining design water (**It is very important that all design water, minus moisture adjustments, is added during loading sequence.**)
 - c. Mixing Time: Approximately 1 minute per cubic yard of material. This time may vary depending on truck.
 - d. **It is important that roller-compacted concrete is mixed well.**
5. Quantity of load: five to six cubic yards per truck is all a 10 yard capacity truck can handle. Because of the dryness of RCC, if more than this quantity is put into a truck, the material will not mix well and discharging will take longer.
6. Wash out rack: **Light** washing of rear blades and hopper. Care should be taken to not get any water into the RCC mix.
7. RCC moisture check: A small amount should be discharged onto the ground and checked for moisture percentage by using a hand held moisture meter. This should be done by your quality control person, not the truck driver. (Moisture content of RCC is very important. Too dry or wet is not acceptable.)
8. Pull to unloading site and start unloading. Moisture should be checked when truck is half unloaded by the same means as in #7. Moisture adjustments can be made if needed.

Why was RCC used on this job?

During the planning stage of this project, the design-build contractor suggested using roller-compacted concrete paving for durability and cost savings. After the contractor took the architect and county officials to see a RCC project placed at a local bus depot, they were sold on RCC. Heidi Hefferlin, of Hefferlin + Kronenberg Architects said that the usage of roller-compacted concrete was the right choice.

Roller-compacted concrete pavement was a winner for everyone involved. The county got

a paving product that will last a long time. The local ready mix producer got 1500 cubic yard job, and a local paving contractor also got work. Without a strong promotion effort, this parking lot and entrance/exit lanes would have been asphalt. The real winner was the NRMCA member, Sequatchie Concrete Services.

The bottom line is that high-quality roller-compacted concrete can be produced in a standard dry batch ready mix operation!

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