Frank Lennox, Manager of Technical Services, Buzzi Unicem USA, Signal Mountain Plant, Chattanooga, TN. I have been an ACI member since 1992. I serve on the committees for Roller Compacted Concrete, Pervious Concrete, Concrete Parking Lots and Slag Cements. I am past president of the Georgia Chapter and past Board member of the New Jersey Chapter. I have been promoting the usage of Roller Compacted Concrete since 1999. I am sub-committee chairperson of ASTM C 09.45 Roller Compacted Concrete.

Question?
Can Roller Compacted Concrete mixes be produced through a standard ready mix concrete plant?

Up until 15 years ago, all Roller Compacted Concrete Pavement material was produced using a standard pub mill.
Since 1997 we have been producing RCC through ready mix operations.

**WHAT ABOUT THE MIX DESIGN?**

We use the same techniques prescribed by the industry.

**Strength vs. Cement Content**

![Graph showing the relationship between 28-Day Compressive Strength (psi) and Cement Content (%).](image)

**FIRST MIX DESIGN**

- Cement: 400 lbs
- Fly Ash: 100 lbs
- #67 Stone: 1800 lbs
- Concrete Sand: 1300 lbs
- Water: 18 – 20 gals

Material found at most ready mix concrete operations!
### NEW MIX DESIGN

- Cement: 400 lbs.
- Fly Ash: 100 lbs.
- Coarse Agg. #67: 1100 lbs.
- Coarse Agg. #89 or #7 's: 1100 lbs.
- Fine Aggregate: 1330 lbs.
- Water: 180 lbs.
- Admixture: Standard Water Reducer

### WHAT TYPE OF READY MIX PLANTS DO WE USE TO MAKE RCC?
DRY BATCH OPERATION NEEDS A ELEVATED AREA TO DISCHARGE RCC INTO DUMP TRUCKS!

If you don’t have a ramp to put your R/M trucks on be inventive!

THINK OUT SIDE THE BOX

DRY BATCH OPERATION

300 cubic yards in 4 hours

75 cubic yards per hour!

18.75 yards/hour/truck

5 yards per truck
Load truck - 3 minutes
Mix and adjust - 7 minutes
Discharge - 5 to 8 minutes
Average time 20 minutes per truck – load & discharge

200 cubic yards
3 trucks    5 hours
13 yards/hour/truck
DURABILITY

95 – 98% Compaction with high-density paver.

7 day strength  3500 - 4000
28 day strength  5000 - 6000

WE USE CHEMICAL ADMIXTURES IN OUR RCC!

WATER REDUCER
WATER REDUCER RETARDER
WATER REDUCER ACCELERATOR
POLYCARBOXILATES
HYDRATION STABILIZER

TYPICAL RCC JOB A DRY BATCH PLANT CAN HANDLE.

250 TO 300 YARDS
How many cubic yards can be produced per day?

That depends. The largest job we have done is 700 cubic yards in nine hours.
The smallest was 50 yards.

Dry Batch Operation:
5 to 8 cubic yard loads:
Charge the truck with materials: 3 to 5 minutes.
Mix time: 5 to 10 minutes.
Unload into dump truck: 10 – 15 minutes.
Maximum time to load and unload truck:
30 minutes.

Dry Batch Operation:
Big Question????

Is it worth the time and effort for a ready mix producer to even consider supply a Roller Compacted Concrete job?
### Dry Batch Operation production rate: Conventional Concrete vs. RCC

<table>
<thead>
<tr>
<th></th>
<th>R/M</th>
<th>RCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Typical load size, c/y</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>2. Typical delivery trip time</td>
<td>2 hours</td>
<td>20 min.</td>
</tr>
<tr>
<td>3. Cubic Yards/Driver Hour</td>
<td>3.5</td>
<td>15</td>
</tr>
</tbody>
</table>

If you can make Pervious Concrete

You can make Roller Compacted Concrete!

**THANK YOU! ANY QUESTIONS????????**