

Frank Lennox, Manager of Technical Services, Buzzi Unicem USA, Signal Mountain Plant, Chattanooga, TN. I have been a 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.

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ACI CONVENTION, DALLAS, TX

Roller Compacted Concrete and the Ready Mix Industry



Frank Lennox
Manager of Technical Services
Member of ACI 327-Roller Compacted Concrete Committee
Sub-committee chairman ASTM C9.45 Roller Compacted Concrete

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Question ?

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

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Up until 15 years ago, all Roller Compacted Concrete Pavement material was produced using a standard pug mill.

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Since 1997 we have been producing RCC through ready mix operations.

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WHAT ABOUT THE MIX DESIGN?

We use the same techniques prescribed by the industry.

Moisture Content (%)	Dry Density (lb/cf)
3%	141.5
4%	143.0
5%	143.5
6%	143.0
7%	142.0

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Strength vs. Cement Content

Cement Content (%)	28-Day Compressive Strength (psi)
12%	4,800
13%	5,300
16%	6,100

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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!

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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

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Texture: New Mix



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WHAT TYPE OF READY MIX PLANTS DO WE USE TO MAKE RCC?

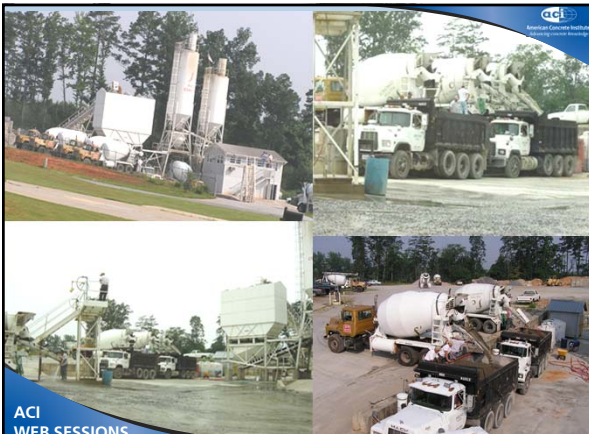
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DRY BATCH OPERATION NEEDS A ELEVATED AREA TO DISCHARGE RCC INTO DUMP TRUCKS!

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

THINK OUT SIDE THE

BOX

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DRY BATCH OPERATION

300 cubic yards in 4 hours

75 cubic yards per hour!

18.75 yards/hour/truck

- 3 MINUTES TO LOAD TRUCK
- 6 MINUTES UNLOAD TRUCK
- 4 READY MIX TRUCKS USED

MINUTES LOADING TIME

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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

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

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DURABILITY

95 – 98% Compaction with high-density paver.

7 day strength 3500 - 4000

28 day strength 5000 - 6000

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WE USE CHEMICAL ADMIXTURES IN OUR RCC!

WATER REDUCER

WATER REDUCER RETARDER

WATER REDUCER ACCELERATOR

POLYCARBOXYLATES

HYDRATION STABILIZER

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TYPICAL RCC JOB A DRY BATCH PLANT CAN HANDLE.

250 TO 300 YARDS

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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.

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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.

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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?

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**Dry Batch Operation production rate:
Conventional Concrete vs. RCC**

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

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If you can make Pervious Concrete



You can make Roller Compacted Concrete!



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

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