ROLLER COMPACTED CONCRETE
Tuesday, March 25, 2008

94th Annual Purdue Road School
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WHAT WE WILL DISCUSS
• Background of RCC
• What about local use?
• Ready Mixed Roller Compacted Concrete
• Questions

RCC BACKGROUND

Definition
“Roller-Compacted Concrete (RCC) is a no-slump concrete that is compacted by vibratory rollers.”

• Zero slump (consistency of DGA)
• No forms
• No reinforcing steel
• No finishing
• Consolidated with vibratory rollers

Concrete pavement placed in a different way!

Benefits of RCCP
• Economical
• High load carrying ability
• Eliminates rutting and spans weak subgrades
• Excellent freeze-thaw durability
• Simple, fast construction
• High production with minimum labor
• Light surface for better night time visibility

Intermodal Yards
Logging Yards

Distribution Centers

18 acre distribution center in Austin, TX

10 years after construction

Warehouse Facilities

Big Jobs…

- We know we can do big jobs
  - Pug Mill
  - High Density Asphalt Paver
- What about smaller jobs
  - Conventional paver
  - Ready Mix Plant

UNION COUNTY

YOU HAVE GOT TO TRY…
Union County

- Wanda Hartman & Southeast Cement Association RCC Seminar
- She believed it could be done with local equipment
- Teamed with IMI & Union County Crews

Useful Information… But?

Can we obtain enough compaction through a conventional county owned asphalt paver and roller?

HENRY COUNTY

- Chad Hayes of Busters Cement
- Joe Wiley Henry County Highway Administrator

Henry County

- Project was completed quickly.
- We did not have a proctor
- We did make some cylinders
- Wanda calls it “Black Cold Patch”

- Perform a test pour at Buster’s landfill access road
- Do a full scale analysis of the system
**Steps**

- Buster’s determined their rcc mix design (confidential)
- Buster’s had engineering firm run a proctor on the mix design
- RCC batched into ready mix trucks and placed into county dump truck for transportation
- RCC placed with Henry County equipment
- Density tested via nuclear gauge

**RCC Mix Design**

- Buster’s proprietary design
- Cement
- Flyash
- Aggregates from readily available sources
- Nothing “special” or readily available from any ready mix producer
- No batch water

**Proctor**

![Proctor Graph]

**Batching**

- Buster’s older plant in New Castle
- Placed into ready mix truck
- Transported into Dump trucks

**READY MIX TO DUMP TRUCK**
DUMP TRUCK TO JOBSITE

CHECK DEPTH OUT OF THE PAVER

DENSITY OUT OF PAVER

CALIBRATED TO PROCTOR

ROLL WITHOUT AND WITH VIBRATOR ON
### DENSITY AFTER ROLLING

<table>
<thead>
<tr>
<th>Lift (in)</th>
<th>Wet Density (pcf)</th>
<th>Dry Density (pcf)</th>
<th>Moisture (%)</th>
<th>Proctor (%)</th>
<th>Roller (y/n)</th>
<th># Passes w/o Vibrator</th>
<th># Passes w/ Vibrator</th>
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* Tested at joint

### First Run

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### COMPRRESSIVE STRENGTH

### SPLIT TENSILE
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Testing Data
(56 day: 28 dry, 28 fog room)

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<th>Load (lbs)</th>
<th>Stress (psi)</th>
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<tr>
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<td>8,900</td>
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<td>Sample 2</td>
<td>231,380</td>
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<tr>
<td>Average</td>
<td>241,440</td>
<td>8,540</td>
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<tr>
<td>Sample 1</td>
<td>86,620</td>
<td>765</td>
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<td>Sample 2</td>
<td>90,125</td>
<td>790</td>
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<tr>
<td>Average</td>
<td>88,373</td>
<td>778</td>
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Split Tensile = 8.4 *√Compressive

GOOD RESULTS

CONCLUSIONS
1. Ready Mix Plants can produce quality roller compacted concrete
2. County highway asphalt pavers & rollers can provide enough energy to obtain 98% of the modified proctor
3. Split Tensile = 8.4 *√Compressive
4. This is a viable market

QUESTIONS?