

High Performance Ultrathin CRCP in South Africa

National Concrete Pavement
Technology Center



Background

- The South African Road Agency (SANRAL) owns 20,000 km of roadway
- 76% is older than design
- 1,000 km is concrete. Remainder is
 - Thin asphalt or seals
 - Crushed stone base
 - Cement treated soil
 - Compacted fill.
- The preferred rehabilitation is HPCRCP







**2" CRCP to
come**

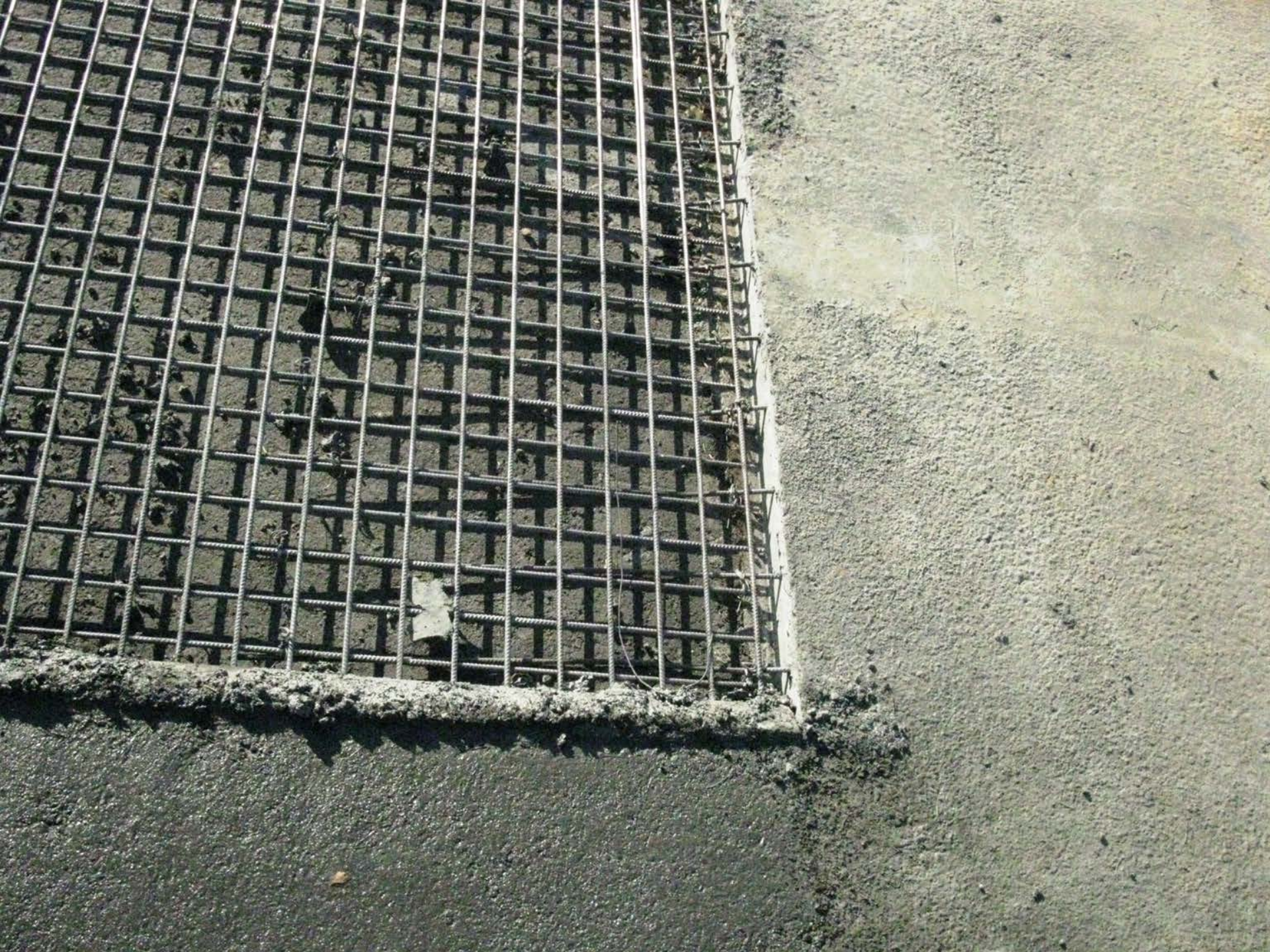
**8" CRCP in truck
lanes**

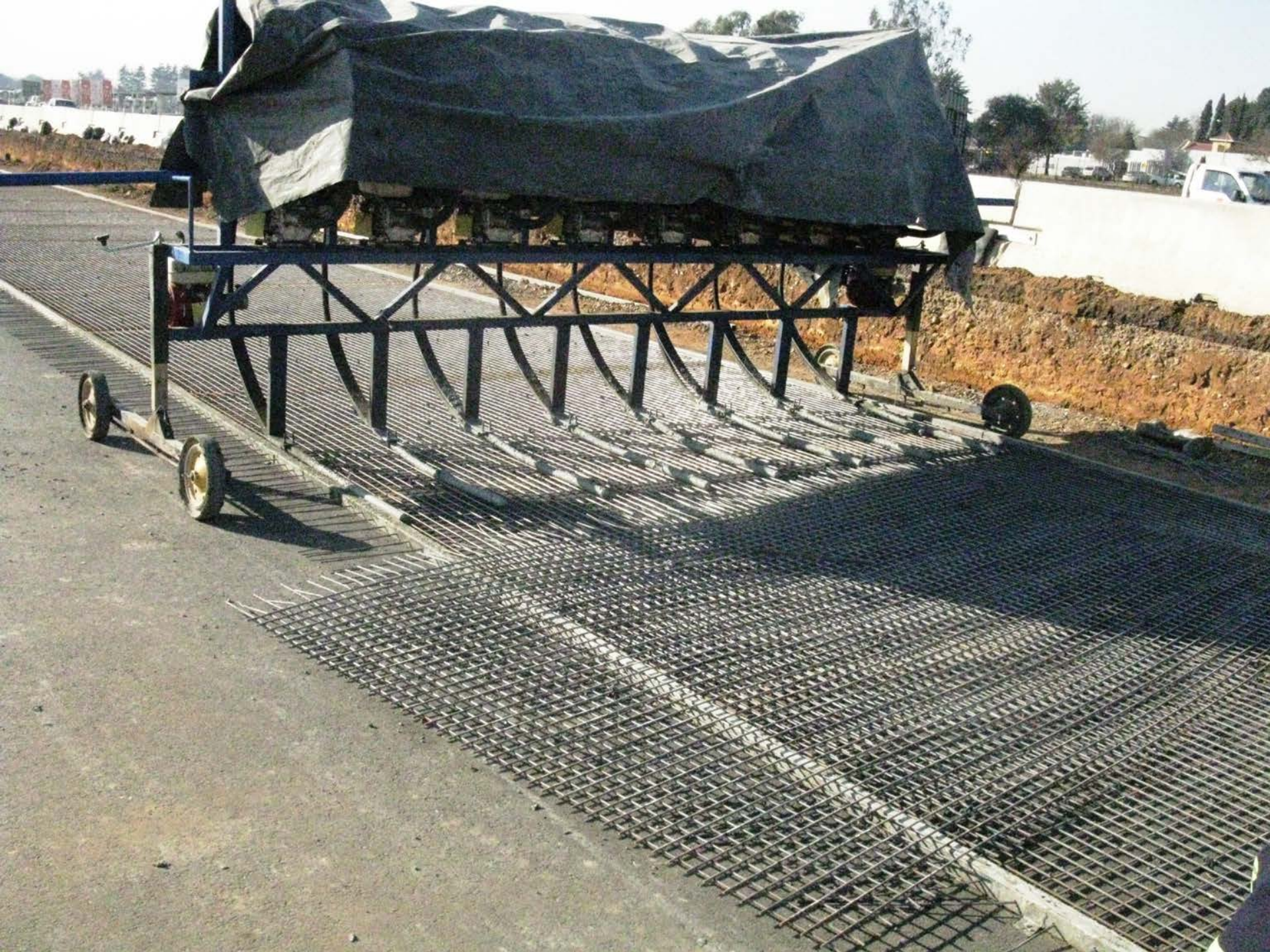




Placing the mat



















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Some Details

- 1½” hooked end steel fibers at 5 lb/ft³
- 0.1 lb/ft³ polyprop fibers
- 15,000 psi compressive strength
- ¼” welded wire mesh at 2” spacing
- Structural design using local M-E package cncPave
- No contraction joints



Some Differences

- Labor is cheap and equipment is expensive
- Weather
 - Johannesburg is warm (75°F) wet summer, cool (30°C) dry winter
 - Cape Town is cool (50°C wet winter, warm dry summer)
 - No deicing salts are used
- Foundation systems are very different



Some Needs

- Mixture needs a knowledgeable supplier
- Difficult to get full consolidation around the mesh
- Difficult to maintain cover of the mesh



Performance

- Test Section at a quarry lasted several times longer than planned
- One section is 4 years old, carrying 16 million E80 including 2000 trucks.
- Remains in good condition.



Some Difficulties

- Johannesburg
- Placed in summer – failed in winter
- 4-mm steel was pulled apart as the slabs contracted



Some Difficulties

- Cape Town
- Placed in “fall”, failed in very hot (44°C) summer
- Blowup
- 5.5% downhill slope





Cape Town



Cape Town



Cape Town



Future Plans

- Make the section 2½” thick
- Drop strength to ~10,000 psi
- Add edge beams to help with curling and warping and edge loads
- Revise mesh to be 50-mm transverse, 100-mm longitudinal
- Support system. Asphalt should have no voids to prevent stripping

