

# CPR – REBUILT TO LAST



## Highway 21 Repairs Newark, NJ

### >>> CONCRETE PAVEMENT RESTORATION (CPR) WITH DIAMOND GRINDING

WHEN THE NEW JERSEY DEPARTMENT OF Transportation (NJDOT) set out to repair Highway 21 on the north side of Newark, locally known as McCarter Highway, they sought a cost-effective solution that would result in a safe, smooth ride. The pavement was between 50 and 80 years old and utilized a jointed reinforced concrete pavement design comprised of 73-foot mesh reinforced panels. In the early 1990s, the heavily travelled surface began to polish, which led to increased wet weather accidents. Since the 9-inch concrete pavement was still structurally sound, the NJDOT applied a thin microsurfacing. A second thin asphalt microsurfacing treatment was applied in 2001. In 2007, the NJDOT was again faced with the issue of delamination and deterioration of the thin asphalt overlays. Recognizing that the existing concrete pavement was structurally sound, the NJDOT decided to remove the asphalt overlay and diamond grind the underlying concrete pavement.

This rehabilitation project spanned a total of 9.8 miles of highway – typically three lane widths -- including both north- and south-bound lanes. Approximately 50 percent of the project consisted of elevated roadway utilizing concrete curb and gutter for stormwater drainage. The techniques used to complete the project included asphalt milling, catch

basin reconstruction, slab stabilization, pre-cast panel replacement, partial depth repair, joint resealing and diamond grinding for the final ride and surface texture. Approximately 4,900-square-yards of precast concrete panels were used to replace the deteriorated full-depth sections of the roadway, and 267,000-square-yards of pavement were diamond ground, improving the ride quality by 30 percent.

According to the NJDOT, this project validates that an asphalt overlay of an existing concrete pavement can be effectively removed and replaced with a diamond ground surface texture. The ride is superior to the old microsurfacing (at six years) and the concrete pavement still has the structural capacity to carry today's heavy traffic load. The project showed that an urban freeway with curb and gutter drainage can be rehabilitated with CPR under a night-only construction schedule. Further, the life-cycle cost of diamond grinding is lower than HMA overlay when the concrete contains hard, durable aggregates. Using the bid tabs on this project, it was determined that a one-inch microsurfacing overlay generated approximately 0.05 tons of Reclaimed Asphalt Pavement (RAP) per square yard. Assuming a value of \$10/ton for the RAP, it could generate income of \$.50/sq yd per inch of asphalt overlay removed.

#### TEAM MEMBERS

- New Jersey DOT, District N1 (Owner and designer)
- HNTB Corporation (Construction inspection)
- Crisdel Group Inc. (Prime contractor)
- Interstate Improvement Inc. (Diamond grinding contractor)
- Fort Miller (Precast slab supplier)
- GeoTech Services Inc. (Slab stabilization subcontractor)
- Mattiola Construction (Concrete cutting and joint sealing subcontractor)
- CRAFCO Inc. (Partial depth repair material supplier)