



ERGON

Asphalt & Emulsions

SUCCESS STORY

**FDR With Engineered
Emulsion Saves Georgia
County \$900,000**

CHALLENGE

Strengthen Fly Ash Base,
Prevent Moisture Damage,
Bond Structural Layers

SOLUTION

Full Depth Reclamation with
Engineered Emulsion, Prime Coat,
Chip Seal, HMA Overlay



LOCATION

Indigo Road,
Effingham
County, Georgia



DISTRESS

Delamination,
potholes, loss
of structural
integrity



TRAFFIC

Heavy, frequent
truck traffic



AGENCY

Effingham
County Roads
Department



CONTRACTOR

Ranger
Construction,
Hudson
Construction,
Preferred
Materials Inc.



SUPPLIER

Ergon Asphalt &
Emulsions
(FDR-EE, MC-70,
CRS-2H)

Background: Indigo Road in Effingham County, Georgia, is frequented by 18-ton trucks hauling material from a local sandpit. Major distresses included many potholes and excessive dust that turned to mud after storms or contact with ground water. The main cause of these problems was fly ash, bioparticles released by the exhaust systems of coal-fired power plants, which the road had been paved with years ago.

There are nearly 900 miles of fly ash roads in southeast Georgia. While it is an economical paving binder, fly ash does not always provide a stable road base long term. Its use can also result in road conditions that are immediate points of concern for drivers, whether it's the dust covering their vehicles or the mud that often makes the roads impassable after rain.

For years following their fly ash applications, Effingham County would attempt to strengthen the roads and stop moisture that was weakening the bases by placing successive chip seals or asphalt overlays. Unfortunately, their efforts were not met with long-term success because the excessive dust and mud proved to be significant barriers to adhesion of the treatments.

Challenge: The County was at a crossroads; the cost of continual and ineffective maintenance of their fly ash roads was piling up. They needed a long-term solution to improve these roads while providing reliable, safe and durable routes for local businesses and residents. The conventional option was to completely remove, transport and dispose of the road material at an approved waste site and then replace it with a

graded aggregate base and a hot mix asphalt surface. This process carries a cost of \$1.5 million per centerline mile as estimated by the county.

Roberts Engineering had been talking to the County with the goal of helping solve their road network problems. Addressing the fly ash roads was on top of the County's list, and they wanted to specifically focus on Indigo Road, one of the worst roads in the area and the one with the most challenges. Paul Christian, Director of Municipal Services for Roberts, contacted Ergon A&E's Bill Evans, whom he considers a resource in the industry, to discuss possible solutions. Bill in turn enlisted the help of Mike Hemsley with Paragon Technical Services to study the road, collect and evaluate core samples, and ultimately determine a functional treatment to reduce cost while meeting performance requirements.

Treatment Plan: It was decided that a full depth reclamation process (FDR) would be a potential solution. **This would be the first time FDR would be used to treat a fly ash road.** Ergon's engineered emulsion — FDR-EE — was the selected binder for this process. This emulsion would help facilitate a stable base able to resist moisture damage while also serving as a strong bonding agent for fly ash particles. The FDR application would be followed by a prime coat to prepare and protect the newly constructed road base, and then a chip seal to facilitate return traffic and further seal out moisture, keeping the ground water from rising to the surface. A 1.5-inch hot mix asphalt overlay would be applied as the final wearing course for increased structural value and durability as well as a smooth, dust-free driving surface.



Application Highlights: The County decided to move forward with a winter start date for the one-mile project in early January 2020. FDR, like other asphalt-based treatments, is not typically applied during winter months, as warmer temperatures and drier conditions are more suitable for both performance and production. However, Indigo Road needed immediate attention and the County was eager to see how the FDR-EE would perform. The FDR contractor, Ranger Construction, pulverized six inches of Indigo Road. The pulverized material was then mixed in place with Ergon's FDR-EE, reshaped and compacted.

FDR-EE Mixture Stands Up to Traffic/Weather: Truck traffic was allowed back on the road immediately following application, as there was simply no other option. While it took one week for the mixture to reach optimal water content under consistently heavy rainfall, the FDR-EE mixture held up and withstood the same destructive truck traffic that had so badly deteriorated the previous road structure.

Once the FDR-EE had cured, Hudson Construction applied a prime coat using Ergon's MC-70 at a shot rate of 0.10 gallons per square yard. Again, trucks traveling to and from the sand pit were back on the road immediately following application. Even under pressure from traffic and subjected again to heavy rainfall, the prime coat held up.

Cold and wet weather forced Hudson to wait a month before applying the chip seal using one of Ergon's conventional chip seal emulsion products (CRS-2H) along with size 89 aggregate as the cover stone. The final stage of the project was completed the second week of March, when Preferred Materials Inc. applied the 1.5-inch asphalt overlay.

"This has been a huge success for the community and will be a great opportunity going forward for all involved," said Neal Howard of UHK. "This could not have been accomplished without the efforts of Ergon Asphalt & Emulsions and Paragon Technical Services."

Results: Effingham County Road Department was impressed with how well Indigo Road held up under constant pressure, cold and extremely wet weather. Even though the treatments were placed outside the recommended seasonal application time and were subjected to heavy traffic immediately following application, the Board Members of Effingham County were very pleased with how well they performed. Note: When applied according to seasonal recommendations and without consistently heavy rainfall, this same treatment can be completed in weeks instead of a span of three months. *Additionally, FDR applications using Ergon's engineered emulsion are suitable for all types of roadways in need of rehabilitation.*

Cost Savings: The County was able to save big with the FDR process. At a centerline mile cost of around \$560,000, the FDR treatment plan, including the subsequent treatments for additional durability and resistance, was less than half of that required to remove, transport and then reconstruct the road. If this same process could be used to treat all 900 miles of fly ash roads in southeast Georgia, state, county and city agencies would recognize a potential combined savings of over \$800 million.

Long-Term Strategy: Realizing the success of the Indigo Road project, Effingham County plans to continue FDR-EE applications on other fly ash roads within their network.