

Durafill™ geofoam helps Wisconsin DOT deal with poor soil conditions on bridge reconstruction between two lakes



Project:

The reconstruction and raising of the bridge and both sides of the approaching road on County Trunk Highway "DR" (Delafield Road) over the Bark River in the town of Summit, WI.

The site, adjacent to I-94 between Upper and Lower Nemahbin Lakes, posed significant challenges due to the abundance of surrounding water and very soft soil conditions.

Product:

Durafill ultra lightweight EPS geofoam. Large blocks of expanded polystyrene commonly known as geofoam.

Application:

The Durafill blocks were used as lightweight fill and support for approximately 275 feet of the road approach on each side of the bridge and the bridge abutment, replacing the far heavier fill options of aggregate and standard dirt. Durafill provides long term, lightweight support for the road, preventing it from settling under the weight of the pavement and the load burden on the road.

Timeframe:

The project began in March 2003 and was completed in May 2003.

Project Participants:

General Contractor:
(Bridge Construction)

Zenith-Tech
Ben Johnson – Project Engineer

Sub-contractor:
(Responsible for placing geofoam blocks)

Payne & Dolan
Doug Buth – Project Manager

Road design:
(Engineering consultants)

Ruekert-Mielke
Mike Ritterling – Project Manager

The Challenge:

The project site was a floodplain river basin area connecting two lakes not more than 300 feet apart. The underlying soil, largely comprised of peat and humus, was quite soft and not of substantial bearing strength for the road. The soil condition issues were especially critical because the road was to be raised 6 feet from its original height, requiring additional fill and further weight burden. There were also many utilities, including large transmission lines and towers, precariously close to the road.

"Standard gravel or aggregate fill would have displaced the underlying soil, potentially taking several nearby buildings and utility structures along with it," said Ritterling. "To completely dig out the underlying soil and replace it with stone would have been very expensive and time consuming. We were looking for a cost-effective alternative without sacrificing performance. Geofoam was the best solution from an economic and performance standpoint."



The Performance

The use of Durafill reduced the weight burden on the underlying soil by more than 7.5 million pounds.

The delivery of the varying shapes and sizes of Durafill was coordinated to correspond to the sequence in which the blocks were to be installed. There was no need to cut the blocks on-site.

In addition to the cost savings provided by not having to completely dig out the underlying soil, the use of geofoam saved time as well. "You can place the blocks and not worry about compacting the fill as you do with dirt and gravel. This saves about 50% in time over the standard fill process," said Ritterling.

Project Product Specs

Amount: 2,200 cubic yards, comprising 20+ full trailer loads, laced under 575 feet of road.

Type: Durafill 22 (EPS 22)

Block Size: Split evenly between standard size blocks (49" x 41" x 194") and various sizes and shapes of custom-cut blocks



Common Applications for Durafill

Durafill has very low density, good insulation, low hydraulic conductivity, and a superior compressive strength-to-weight ratio. It is suited for a wide range of geotechnical engineering applications including:

- Lightweight fill for building and road construction on unstable soil
- Roadway and runway sub-grade and foundation insulation
- Slope stabilization
- Retaining wall and abutment backfill: lateral pressure reduction
- Landscape design



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