Construction of the Offshore Wind Farm Installation Terminal in Świnoujście

Ground improvement and pavement optimization for haul roads and storage areas

Świnoujście, Poland

CLIENT'S CHALLENGE

Offshore wind farm installation terminal in Świnoujście is the first of its kind in Poland. It will support storage of components used in the construction of wind farms; moreover, it will enable loading and deployment of towers using state-of-the-art jack-up vessels. This project is of crucial importance for offshore wind power industry in the region, since the only comparable terminal on the Baltic Sea is located in Rønne (Denmark).

The client had to design and construct haul roads and storage areas within the port of Świnoujście to guarantee seamless functioning of the terminal.

TENSAR SOLUTION

Design analysis encompassed a range of aspects, including determination of subgrade bearing capacity and predicted deformations. Various loads were taken into account, e.g. component storage and operation of cranes. Subgrade was variable and included interbeds of organic soils.
Based on calculations, three pavement structures were proposed:

STRUCTURE 1 (roads, storage areas, parking areas, loading of 250 kPa)
- E2 ≥ 120 MPa,
- 30 cm – Tensar mechanically stabilized layer using C90/3 unbound mixture (reclaimed crushed concrete) with 0/63 grading,
- 35 cm – Tensar mechanically stabilized layer using C90/3 unbound mixture (reclaimed crushed concrete) with 0/63 grading,
- Separation geotextile,
- Existing subgrade E2 ≥ 15 MPa.

STRUCTURE 2 (unpaved roads and areas, loading of 50 kPa and 250 kPa)
- E2 ≥ 160 MPa,
- 40 cm – Tensar mechanically stabilized layer using C90/3 unbound mixture (reclaimed crushed concrete) with 0/63 grading,

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PROJECT DETAILS

Constructed in
2024

Contractor
Budimex

Client
ORLEN Neptun

Designer
Poldukt Projekt

Geogrid Tensar InterAx

Roads and Storage Areas

• 40 cm – Tensar mechanically stabilized layer using C90/3 unbound mixture (reclaimed crushed concrete) with 0/63 grading,
• Separation geotextile,
• Existing subgrade E2 ≥ 15 MPa.

STRUCTURE 3 (unpaved roads and areas, loading of 500 kPa)
• 29 cm – Tensar mechanically stabilized layer using C90/3 unbound mixture (reclaimed crushed concrete) with 0/63 grading,
• 40 cm – Tensar mechanically stabilized layer using C90/3 unbound mixture (reclaimed crushed concrete) with 0/63 grading,
• 40 cm – Tensar mechanically stabilized layer using C90/3 unbound mixture (reclaimed crushed concrete) with 0/63 grading – stabilized with N2-type geogrid,
• Separation geotextile,
• Existing subgrade E2 ≥ 15 MPa.

B E N E F I T S

- **Reduced quantity of aggregate** required for pavement construction
- **Lower costs and shorter construction time**
- **Increased service life** of the pavement
- **Reduced carbon footprint** of the project

PROJECT BACKGROUND

While constructing the first offshore wind farm installation terminal in Poland, Budimex faced a considerable challenge. Construction of roads and storage areas required accumulation and placement of enormous quantities of materials within relatively short time. Introduction of solutions incorporating stabilization geogrids provided a considerable reduction in the required aggregate quantities.

Around 370,000 m2 of Tensar InterAx geogrids were used in the project. Owing to application of NX geogrids, the required bearing capacity was achieved even with difficult ground conditions. The optimized aperture geometry and three-layer structure of Tensar InterAx ensure confinement of aggregate particles. This solution provides a significant increase in pavement life due to the improved performance of the stabilized layer. Aggregate and geogrid create a mechanically stabilized layer (MSL), which displays considerably greater stiffness and bearing capacity than non-stabilized aggregate.

With support from Tensar, Poldukt Projekt designed the optimized pavement structures for haul roads and storage areas. Each pavement solution included two or three mechanically stabilized layers incorporating Tensar InterAx NX750 and NX850 geogrids.