CASE STUDY

LOAD SUPPORT

Monitored paved road including base and subbase rehabilitation

7th Street, Nisku, Alberta

The Nisku community is located approximately 25km south of the City of Edmonton and lies adjacent to the Edmonton International Airport. This industrial area, under the jurisdiction of the County of Leduc, continually experiences heavy commercial truck loads. The County desired to find innovative solutions for building stronger pavement structures that would rehabilitate and extend the service life of their road network.

The University of Alberta's Department of Civil Engineering in Edmonton conducted a research study to compare the performance of a cement-treated base (CTB) versus a Tough Cell® NPA Geocell-stabilized road base.

This project was instrumental in establishing quantitative data to clearly illustrate the properties, differences, advantages/disadvantages and most importantly, the long-term performance of specific pavement reinforcement methods.

Each method was employed in a 500m-long section of the same road and were both monitored over winter seasons to evaluate structural performance.

PERFORMANCE RESULTS:

The demonstration comparing cement stabilization and Tough Cell® has been monitored since the completion of construction in 2012. In spite of the heavy traffic on the road, there is no sign of failure or any other distress in the Tough Cell® NPA Geocell section and the road is performing without problems after five years of operation. This project served as substantiation of the technology and its acceptance by the Alberta Ministry of Transportation.

PROJECT AT A GLANCE

APPLICATION:
County road rehabilitation evaluation site

LOCATION
Alberta, Canada

DATE OF INSTALL:
July - August 2012

CLIENT:
County of Leduc

Conveniently located at the crossroads of air, highway and rail transportation, Leduc is a growing, dynamic city of 30,000 in the heart of Canada's economic engine.

CONSTRUCTION:
Paradox Access Solutions

The authorized Tough Cell® distributor in North America, specializing in the supply and installation of high quality access solutions and services to customers in the pipeline, utility, municipal, general construction and oil & gas industries.

ENGINEERING DESIGN
Stratum Logics Inc.

Global geotechnical engineering design specialists exceptionally proficient in the deployment of cutting-edge geosynthetics for civil engineering across 75 countries in all types of challenging soils and climates.

CONTRACTOR(S):
Genivar, QC

Project Highlights

Monitored paved road including base and subbase rehabilitation,
(7th St. Nisku, AB between 12th and 15th avenues)

THE CHALLENGE

The industrial area of Nisku in the County of Leduc experiences heavy truck loads which exposes pavement structure to excessive damage, with exponential growth of similar traffic expected in coming years. 7th St. is a two-lane road with rural geometry serving as the access road to numerous heavy industrial businesses in Nisku, and is bisected by railway track. The existing road was in very poor serviceability condition. The County elected to reconstruct the sections to the north and south of the railway with two different base pavement structures. The University of Alberta agreed to conduct field monitoring, data analysis and a report for this project.

Pre-existing road marked with proof-rolled weak spot

Fatigue cracking in road surface before construction

THE SOLUTION

Existing road materials were recycled using a milling machine and used to form the sub-base of the new road. A layer of woven geotextile was placed as a separator between the sub-base and a 200mm subgrade layer in the north section between the railway and 15th avenue followed by a 150 mm layer of Tough Cell® NPA geocells infilled with new granular material. In the south section, a 150 mm Cement Treated Base (CTB) consisting of approx. 16 kg/m2 of cement mixed with recycled base material as per typical pavement construction in Nisku) was used over a 300mm subgrade.

Total area: 500m x 8m

Product(s): 330-150 Type B Tough Cell® Geocell; woven geotextile.

Infill: 20mm granular base course (GBC) with protective cap of 50 mm granular fill

Completion: 65 mm HMA riding course

Woven geotextile installed as a separator between the base and subgrade

Installed Tough Cell® geocells

THE BENEFITS

As of April 2015 and experiencing the projected heavy traffic levels, there was no sign of failure or other distress in the Tough Cell® reinforced section, in contrast to both transverse and longitudinal cracking evident in the comparative CTB section as early as June 2014. The road is still under observation after 5 years and is expected to deliver the desired longevity of service life to the County.

Completed road

Top: Completed road after 1 year of operation
Bottom: CTB section left of crossing shows cracking

PARADOX
ACCESS SOLUTIONS

An industry leader in innovative access solutions, Paradox Access Solutions has provided industrial access and ground reinforcement for the oil and gas, pipeline, utility, municipal and construction industries since 2004. We are COR, CQN, PICS, ISN, ACSA, and ComplyWorks qualified and employ the highest safety standards.

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