



## Case Study

**application** | **Wooden Bridge Deck Repair**

**location** | **Ontario, Canada**

**product** | **Mirafi® MTK700 & FGC100**

**job owner**

**Ministry Transportation Ontario  
(Thunderbay District)**

**contractor**

**Villeneuve Construction,  
Hearst Ontario**

TenCate™ develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

### THE CHALLENGE

The Pagwa River Bridge is located 62km (41 miles) east of Highway 11 and Highway 625 junctions in the district of Thunderbay, Ontario. This portion of Highway 11 is one of the most remote sections of the Trans Canada Highway in the province of Ontario. There are only small communities and there aren't any major inter-sections for this 120km stretch of highway. Temperatures can drop to -25C (-13F) in the winter.

The existing bridge's creosote wooden deck had been replaced 12 years earlier. Over the course of this time The Ministry of Transportation had experienced periodic delamination of the asphalt from the bridge deck. Wooden decks like this experience a lot of vibration and some buoyancy which leads to the delamination. The ministry realized that to minimize future maintenance they would have to completely rehabilitate the bridge deck using more than just an asphalt re-surfacing.

### THE DESIGN

Upon investigating the condition of the existing pavement, The Ministry of Transportation decided on a major pavement rehabilitation plan. The 2 lane bridge has a 4% cross fall from curb to curb and 10% from abutment to abutment. The new pavement system was to consist of removing the existing pavement on the deck surface, applying a waterproofing membrane and installing a fiberglass composite paving grid, asphalt overlay and lane markings.

The Ministry specified Mirafi® MTK700 as the

moisture barrier and Mirafi® FGC100 Composite Fiberglass Paving grid for the interlayer materials. Mirafi® MTK700 is a unique and cost effective waterproofing membrane comprised of self-adhering rubberized asphalt and durable polypropylene woven fabric. A peel-n-stick release paper covers the self-adhesive mastic, and is removed prior to installation. Mirafi® FGC100 is composed of a high modulus 100kN/m (6,852lb/ft) fiberglass paving grid with a 139g/m<sup>2</sup> (4.0oz/yd<sup>2</sup>) nonwoven geotextile bonded to the back side. Mirafi® FGC paving grid is specifically designed to provide high strength at very low strains (less than 2% strain). This product property, commonly referred to as tensile modulus, is the key to adding reinforcement to a paved structure. The high strength at low strains is key to retarding reflective cracking that occurs in asphalt pavement overlays. The nonwoven paving fabric, with a properly applied tack coat, creates an excellent moisture barrier and provides good contact with the existing pavement.

The pavement reconstruction consisted of Mirafi® MTK700, PGAC 52-34 Asphalt Tack Coat, Mirafi® FGC100 stapled at 150mm (6in) centres with galvanized 50mm (2in) staples and 40mm (1.5in) of asphalt. When installing Mirafi® FGC100 over a waterproofing membrane it is recommended to sandwich the paving grid between 2 layers of asphalt. This is done to prevent delaminating of Mirafi® FGC from the MTK700. In this case, the Ministry opted to staple Mirafi® FGC directly to the bridge deck.



Mirafi® MTK700 placed on wooden bridge deck ready to have PGAC 52-34 asphalt tack coat applied.



Placement of Mirafi® FGC100 with tractor mounted lay down-rig.



Asphalt tack coat being applied to Mirafi® MTK700.

## THE CONSTRUCTION

Once mobilized on site, Villeneuve Construction - the successful bidder started the removal of asphalt pavement from the bridge deck. To minimize traffic disruption, the resurfacing was done in two stages. Traffic was diverted to one side of the bridge while the opposite side was being repaired.

The surface was first cleaned and then Mirafi® MTK700 was applied, a PGAC 52-34 asphalt emulsion was applied at a application rate of 0.29 kg/m<sup>2</sup> (0.25-0.27gal/yd<sup>2</sup>) using a mobile hand spray unit. Temperature of the PGAC was approximately 138 C. Next, using a paving grid lay down rig mounted to a backhoe, the contractor started to install Mirafi® FGC100. Any wrinkles were slit and relaid flat. Once laid, Mirafi® FGC100 was stapled to the bridge deck with 50mm (2in) galvanized staples. Almost immediately after the paving grid was installed, a thunderstorm came through and soaked it. The contractor had to completely dry the system out with blowers. If this was not done, when the asphalt is placed, steam would have been generated which would have adversely affected the bond of the asphalt to Mirafi® FGC. Once dried, 40mm (1.5in) of asphalt was placed.

## THE PERFORMANCE

Mirafi® MTK700 and FGC100 were installed in June 2009 and have now gone through 2 winters. The pavement is showing no signs of distress.



40mm (1.5in) of asphalt has been placed over Mirafi® FGC100 and is being compacted.



Completed bridge deck one year after completion.

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365 South Holland Drive Tel 800 685 9990 Fax 706 693 4400  
Pendergrass, GA 30567 Tel 706 693 2226 www.mirafi.com



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