TOTAL PETROCHEMICALS

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Road construction using polypropylene

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Did you know that petrochemicals are used by civil engineers when building roads and the support structures they require? A good example is the new "Tamarins Road" project on the French island of La Réunion, where a metallocene polypropylene resin manufactured by Total Petrochemicals is used to produce the geotextiles needed to stabilise the road embankments.

The "Route des Tamarins" is the largest construction project ever undertaken in the Indian Ocean zone. The long-awaited highway will relieve congestion on La Réunion's coastal road, which is now saturated with traffic. The new highway will run from Saint Paul to L'Etang Salé, a distance of 33.7 kilometers, and will comprise two dual carriageways on different levels.
The whole project has been planned with an eye to sustainable development and preservation of the landscape along the route.
Both the island authorities funding the project and the Main Roads Department responsible for its execution have called on leading landscape architects and engineering experts.

Calling on specialist advice

The new road now under construction between the sea and the coastal mountains will require no less than 120 support structures, including four huge bridges as well as several interchanges and a number of roofed-over sunken stretches. In addition, within a few kilometers of its departure point, the highway is being built on two huge embankments, 350 meters long and 4-5 meters high, stabilised with geotextiles.

These landscaped embankments, which provide a platform for the actual roadway, are being built by **TenCate Geosynthetics France**, which has world-renowned expertise in the construction of geotextile-reinforced structures. For La Réunion's new highway, the company recommended its Bidim geotextile reinforcing produce with metallocene polypropylene resin offered by Total Petrochemicals.

High-performance nonwovens

To achieve the optimum mechanical properties, TenCate's Bidim geogrid nonwovens are produced from Total Petrochemicals metallocene resins. **Metallocenes** are the latest generation of catalyst used in the polypropylene polymerisation process. This type of catalyst is also called "single site" as opposed to the older "multiple sites" catalysts. Metallocenes achieve a very narrow molecular weight distribution in a highly controlled way, resulting in polymer chains with very uniform length and nature.

Total Petrochemicals metallocene grades are specially formulated to suit the spunbond process used to produce nonwovens. Their narrow molecular weight distribution results in low elongational viscosity, which makes them ideal for the fast drawing of continuous filaments forced by an airflow. Their low gel content and high product consistency prevent fiber breaks, which tend to disrupt production and weaken nonwovens.

Total Petrochemicals metallocene resins are an ideal choice for geotextile applications requiring very strong nonwovens, because of the much higher filament tenacity they allow. This fiber strength is directly transmitted to the nonwovens through the bonding process used by TenCate in producing its Bidim geogrid.

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Sustainable development

Stronger nonwovens mean higher-performance geotextile, and they can also help reduce product weight while still meeting mechanical requirements. This downgauging reduces the environmental footprint of the nonwovens left in the ground as part of construction. Production processes are cleaner too: at TenCate's plant, the fumes that are usually emitted by the high-temperature spunbond process are reduced by a factor of 4 to 5 thanks to the use of more environment-friendly metallocene grades.

A high-tech solution, and aesthetic too!

Given the shape and dimensions of the embankments required for the new road, project engineers opted for a geotextile with elongation resistance of 95 kN/meter*. Between them, the two structures required several thousand square meters of geotextile.

The embankments are made from layers of landfill (crushed local basalt) interspersed with layers of geotextile. Then to avoid disfiguring the landscape, stonemasons are cladding the embankment walls with volcanic stone that is typical of the island landscape.

A happy marriage between technical innovation and aesthetic quality.

* *kilonewtons per meter (unit of traction per meter)*