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Shane Nortje from ICP REVA gets low down and dirty on what we do and how we do it.

Dieter Marzinger for
ICP REVA



Bomb Proof 4x4s

South Africa has become known worldwide for the manufacture of superior armoured personnel carrying vehicles used in military and security operations in war zones around the globe.

Even in peaceful areas, as in Texas in the USA and several other countries, police departments are adding South African-made armoured vehicles to their fleet of policing vehicles because of their brilliant track record. This has created a highly-competitive local climate among several manufacturers, each vying for a slice of the cake, yet each bringing something unique to the market.

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Armoured vehicles

To find out more “SA Mechanical Engineer” speaks to Shane Nortje, technical manager of ICP, the manufacturers of the Reva armoured vehicle, at the company’s production plant tucked into the quiet, unspoilt landscape of bushveld hills west of Pretoria. “We’re a relatively small company turning out around 30 vehicles a month, but, because of our size, we’re very flexible in terms of customising



Shane Nortje, technical manager of ICP, the manufacturers of the Reva armoured vehicle

vehicles to specific client requirements,” he says. “We have a long wheel base and a short wheel base version as a standard onto which we then design each order for the customer’s specific application and requirements, be it a platform to carry personnel, equipment, weaponry or a combination.”

Shane is the company’s design engineer responsible not only for giving the customer what he or she wants, but also ensuring that their designs comply with the international Stanag standards applicable to armoured vehicles as well as each country’s regulations and road ordinances where the vehicle will operate.

Design software

“Without CAD design software, like the SolidWorks package we use, this flexibility just would not have been possible in the time and given the complexities of clients’ requirements,” he says.

“The same applies to weaponry,” he adds. “We can fit anything, from automated firing systems for machine guns to night vision systems and even heavy armoury such as 120 mm mortar guns. Each vehicle is designed



Just off the production line, the Reva vehicle

specifically for the type of weaponry it will carry and the level of sophistication depends entirely on the customer's requirements. We have fitted highly sophisticated weapon control systems which are operated from inside the vehicle through a monitor and joystick control, for example."

However, the main purpose of armoured personnel-carrying vehicles is to protect the people inside the vehicle and so this features first and foremost in all their design work. "Our biggest problem is weight, you're constantly trying to contain the weight within certain limits, without affecting the ballistic characteristics of the vehicle," says Shane. "Bear in mind that we're working with a vehicle weighing in at about 13 tonne. You can't just add layers of steel or weaponry without considering a whole lot of other factors such as speed, occupant comfort and styling, it has to look good as well."

Protection

Contrary to the general public perception that these vehicle are built on the chassis of an existing 4x4 vehicle, the Reva is a unique vehicle which does not even have a chassis. The main body of the vehicle serves as the chassis onto which everything is mounted. The V-hull is manufactured from 10mm armoured steel while the sides of the vehicle are made from 6mm or 8.9mm protection plating, with a double skin of armour for added protection. The bottom plate consists of 10 or 16mm armoured plate, and the roof, back door, fire wall and nose plate contains 6 to 8.9mm armour. Additional 4mm armoured plates are built into the floor plates where specially-designed suspended seats are mounted for added protection.

"Our stuff is built on a solid V-shaped monocoque hull, a unique, combat-proven South African design which has been modified to withstand all types of threats from different types of fire-power encountered in the world today," explains Shane. "The vehicle hull consists of two layers of armoured steel to leave a 25 mm cavity for increased ballistic properties within the passenger compartment. The upper hull is supported by a V-shaped bottom plate which is internally reinforced by means of a capping plate for ultimate blast protection from mines."

Real testing

Although Shane uses simulation software to check blast and ballistics properties, he doesn't solely rely on these results to finalise a new design. Reva actually tests the vehicle with a real blast as well as showering it in a hail of bullets from all the types of guns which may be used to try and cripple the vehicle. "Although a landmine blast is represented by about 300 grams of TNT, we blast the vehicle with 10 kg of TNT in order to ensure it will withstand the worst case scenario," says Shane, showing us a video as proof.

Other vehicles

Apart from a new model which is in its prototype

The special underground vehicle



The new SUV version from ICP

stage and looks more like a conventional SUV, Reva has also designed an underground vehicle for the mining industry. "The 350 SUV model is an armoured vehicle with finesse, but with a powerful drive train and

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ballistic protection," Shane says in conclusion. "The underground vehicle, the Scavenger, is purpose designed for underground use and designed to fit into a mine cage. This means it has to be much narrower and to achieve this we had to design special axles to remain within the width of a mining cage."

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A vehicle after the blast test