

Challenge

Testing military vehicles creates a unique and challenging set of circumstances for doors. So, when Vault Systems Australia were approached by the Australian Ministry of Defence to supply a set of bespoke, oversized doors for a new indoor test firing range, they turned to their global partner, Rhino Doors.

The facility in question involved live ammunition testing of heavy ordnance in an enclosed space, generating a large volume of noise. The main purpose of the doors requested by the Australian Ministry of Defence was sound attenuation – specifically a noise reduction level of $Rw50dB$. Due to the doors being in close vicinity to the firing of live ordnance, they were also required to provide a high degree of fragmentation protection, as well as offering modest blast protection (35kPa; instantaneous rise with a very short duration).

Due to these requirements, Rhino's engineering team was presented with two distinct challenges:

- The doors would be exceptionally heavy due to their size (a structural opening of 6400mm wide x 5000mm high) and their integrated armour plating (20mm thick). A further complication was that the client required these heavy, oversized doors be manually operated.
- Transportation of the doors over 10,000 miles from Rhino's manufacturing facility in Port Talbot, Wales to Brisbane, Australia would be a major logistical challenge.



Solution

Several design details were combined to achieve the specified acoustic requirements. The mass of the specified 20mm thick armour plate, in combination with other design details such as various types of insulation, seals, and bespoke designed shoot bolts which compress the seals when the leaves are in the closed position, ensured that the doors met the noise reduction level of Rw50dB. To further help in meeting the acoustic attenuation requirements, Rhino incorporated a design feature that allows the leaves to be parallel with the frame at the end of the closing sequence; thus, allowing further compression of the perimeter seals.

Rhino's experience gained from other recent projects which included acoustic testing of full-scale doors, proved invaluable given the unique and sizeable challenges presented by this project.

To facilitate manual operation of such exceptionally heavy doors (with each leaf weighing 4.3 tonnes), Rhino designed a bespoke 'crane' hinge that utilises a variety of axial and radial bearings to afford ease of manual operation.

As for transporting the doors to the other side of the world, Rhino designed the doors so that they could be 'broken down' into their constituent parts to make container delivery easier. Rhino's design also allowed for ease of assembly and installation on site in Australia; whilst maintaining the specification requirements.

Results

The door sets were designed and subsequently approved by the client in record time, with manufacture completed according to schedule. This included full scale testing in Rhino's workshop to validate ease of manual operation for a 4.3 tonne leaf.

Following the completion of successful tests, the door sets were transported to Australia using conventional shipping containers, followed by assembly, painting and installation by Rhino's Australian partners, Vault Systems Australia.



Find out how Rhino Doors can engineer a portal/entry solution for you at:

www.rhinodoors.com

