EXCEPTIONAL ACOUSTIC RESULTS
SYDNEY METRO - NORTHWEST RAIL TUNNEL

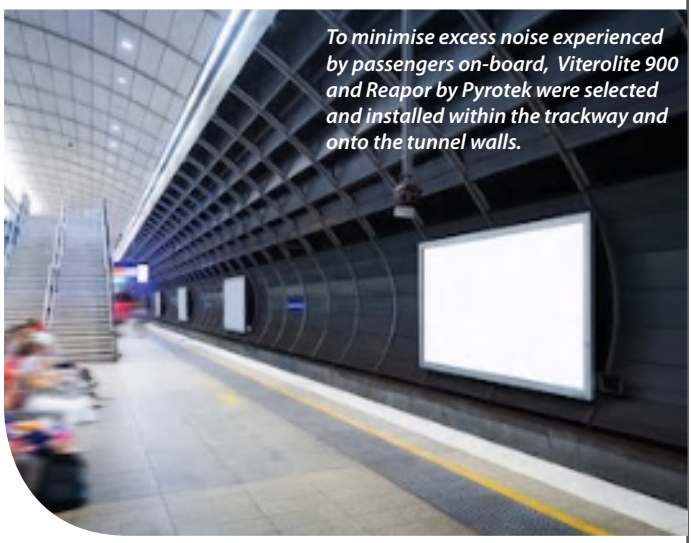
CASE STUDY

BACKGROUND

Sydney Metro Northwest, the first stage of Australia's largest public transport project runs from Rouse Hill to Epping including twin15km tunnels, a 4 km elevated skytrain, and 270 metre cable-stayed bridge.

A suitable absorbing material to reduce reverberation was required to line the tunnel near tracks and walls however it would safely need to form part of a fire safe environment. Non-combustibility was crucial to ensure the material will not emit smoke or toxic fumes particularly with regard to inhalation in the event of a fire emergency in the tunnel. Also, a designated pathway as a method of safe egress meant materials needed to be "trafficable", and durable enough to be walked on during an emergency or in times of routine maintenance.

Northwest Rapid Transit (NRT) was awarded the operations, trains and systems contract to provide the best consideration for passenger comfort & safety in carriages and deliver maximum noise levels of 78 dB(A) within passenger areas of carriages when operating in the tunnels.



To minimise excess noise experienced by passengers on-board, Viterolite 900 and Reapor by Pyrotek were selected and installed within the trackway and onto the tunnel walls.

Artists impression of the new stations of the Sydney Metro.

DEVELOPING A UNIQUE SOLUTION

Pyrotek secured the contract to work with NRT against global competitors after presenting Viterolite 900 as the solution for the floor between tracks in the underground rail tunnels. The complete system was engineered to create the best environment possible with calculations successfully predicting to overcome noise level requirements to deliver greater comfort for commuters.

When approached by NRT, Pyrotek proposed two materials. One track absorber for the tunnel floor and another for tunnel walls. Viterolite 900 is a 100% non-combustible, concrete-like material with high impact resistance and a broad range of frequency absorption to address the project's difficult criteria. Viterolite 900 was cast into large tiles custom designed to fit in between tracks.
Reapor was then specified to be affixed to the lower tunnel walls. With high performance, it's complimented by the fact it is made from recycled glass and is deemed non-combustible.

RESULTS

Materials were compliant to the acoustic specification providing adequate noise control, to improve safety for drivers, passengers and those nearby. The products and supply met customers expectations from design concept , delivery and noise criteria. Locally produced high performance acoustic materials exceeded expectations - reducing noise levels to comply under 78 dB(A).

Being close-by and with a good capacity to understand NRT requirements meant a highly successful result. Providing materials to specification in line with a fluctuating schedule gave NRT the flexibility in conjunction with local Pyrotek team for ease of installation. A new plant and equipment was designed to produce the large volume of panels required and a site was leased nearby in Sydney to manufacture locally.

Locally produced high performance acoustic materials exceeded expectations - reducing tunnel noise levels to comply under 78 db(A).

Surpassing the benchmark for passenger comfort and safety criteria on the Sydney Metro Northwest project proved a challenging and rewarding achievement for the partnership between Northwest Rapid Transit (NRT) and Pyrotek Australia. The products have provided 'outstanding acoustic performance' and 'the results have exceeded our expectations and will only get better when the rail tracks flatten'

Left: Reapor provides exceptionally high NRC 0.95 for tunnel walling application. Viterolite® 900 was custom cast and installed in between the rail track