



CASE STUDY

Newpac Reclaim Tunnel

Hunter Valley, NSW, Australia

Reclaim Tunnel
TechSpan®

Owner: Newpac Mine
 Consultants: Roche Process
 Engineering, Haald
 Engineering
 Tunnel Erector: Civil Build
 Construction: August 2006

Background

Newpac No. 1 Colliery (Newpac) is an underground coal mine located in the Hunter Valley region of New South Wales. Newpac is a Greenfield project, which began operating in March 2001.

With a resource of 252 million tonnes of high quality coal, current production is on a bord and pillar basis with 1.1 million Run of Mine (ROM) tonnes to be produced in FY2006.

Challenge

Under the Expanded Case Mine Plan, ROM production will increase to 4 million tonnes per annum from January 2007 using newly installed longwall mining equipment, upgraded underground conveyors, the refurbished Ravensworth Coal Preparation Plant and larger ROM and product coal stockpiles.

Two new coal-handling tunnels were needed: One to handle the raw coal and the other to handle the clean "product" coal. The raw coal tunnel needed to incorporate three chambers, including one for bobcat turnaround. The product coal tunnel needed to incorporate five different chutes to allow coal to be delivered from the stockpile above through a valve onto the conveyor below.

Solution

The Reinforced Earth Company (RECO) successfully tendered for the design and supply of the two reclaim tunnels with a precast concrete arch design based on the TechSpan® system. Construction of the tunnels began in August 2006.

The intricate arch design needed to identify and consider the various loading cases arising in relation to the height and position of the coal stockpile as well as live load considerations. The design also needed to accommodate considerable changes in grade to some sections of tunnel.

Reinforced Earth headwalls and wingwalls were adopted at tunnel entrances.

RECO also proposed to incorporate voids to the roof of the arch to five locations along the length of the product coal tunnel in order to accommodate the coal valves, which would release coal from the stockpile above onto the conveyor below. To do this, RECO designed a unique ring beam system to tie the arches together and to support the valves. A number of "special" arch units were precast to allow for incorporation of the ring beam.



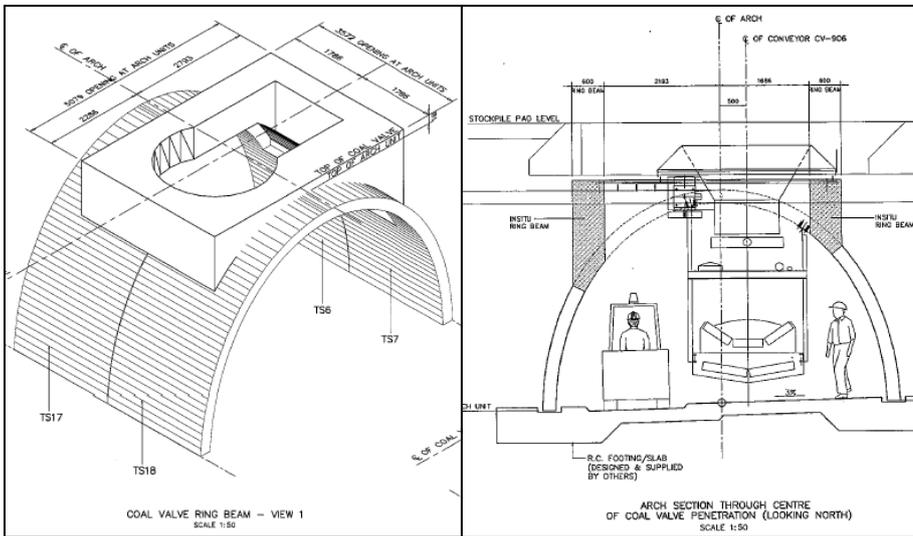
Main Picture: The TechSpan® reclaim tunnel is designed for a coal stockpile height of almost 30 meters. However, the more significant challenge for RECO's design team is that the shape and location of the stockpile changes continuously, generating unbalanced loading onto the tunnel below.

Above: View of the coal feeder unit inside the TechSpan® reclaim tunnel at the Newpac coal mine in NSW.

Mining infrastructure



REINFORCED EARTH
SUSTAINABLE TECHNOLOGY



Left: Drawings detailing unique ring beam system.

Above: Specially manufactured TechSpan® units with voids in the roof of the tunnel to take the coal feeder units.

This scheme removed the need to construct the more commonly used heavily reinforced *insitu* box chambers. Thus the RECO design was seen to improve construction efficiency and reduce costs.

Special Features / Benefits

- SCI precasters successfully turned out six arch units a day, which was an increase by 50% on previous jobs of this type. This was necessary to meet the construction program demands. This rate of precasting was exceptional particularly in view of all the mould changes required due to the high number of “special” units the project required.

- Incorporation of voids to the arch and a unique ring beam arrangement to allow for inclusion of coal valves to release coal from the stockpile above, onto the conveyor below.
- The second such reclaim tunnel supplied to Roche Process Engineering in as many years. Newpac built on the success of a similar tunnel at Foxleigh in Queensland. Further opportunities are being explored.

Project specifications

System	TechSpan®	
Tunnel	Product Coal	Raw Coal
Arch Type	TSB	TSB Truncated
Span	6.5m	6.5m
Height	3.975m	3.675m
Length	160m	79m
Thickness	250mm	250mm
No. Units	See Table Opposite	

Breakdown of Precast Units

	Male	Standard	Special	Female	Standard	Special
Product Coal	85	66	19	91	61	30
Raw Coal	39	25	14	33	21	12



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