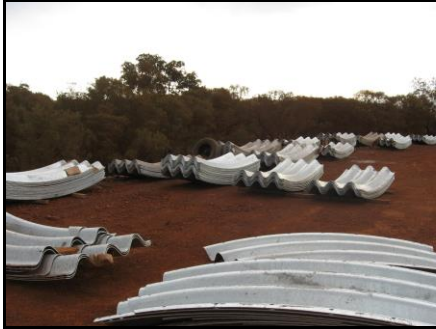


9 Warman Street Neerabup WA 6031 Tel: (08) 9404 5391 Fax: (08) 9404 5392  
P.O. Box 362, Capella, QLD 4723 Tel: (07) 4984 9111 Fax: (07) 4984 9788

## Installation Overview - Deep-corrugated plate structures

Slide 1



Erection of the structure starts with the initial sorting and layout of corrugated plate panels. Panels are easily identified by curved length or coding for plate thickness. Project: Yandi, WA, Rio Tinto.

Slide 2



Final checks are made on the cast-in base-channels. Project: Yandi, WA, Rio Tinto.

Slide 3



Erection crews commence pre-assembly of arch 'roof' sections in double rings. Project: Yandi, WA, Rio Tinto.

Slide 4



Continued pre-assembly of arch 'roof' sections in double rings. Project: Yandi, WA, Rio Tinto.

Slide 5



Pre-assembled roof sections. Project: Yandi, WA, Rio Tinto.

Slide 6



Initial assembly of wall sections. Note adjustable supports both internally and externally allowing full support and adjustment. Project: Yandi, WA, Rio Tinto.

Slide 7



Manoeuvring of pre-assembled roof section with sling and guide ropes attached to existing bolt holes. This arch has a max. span of 9.4m, a rise of 6.9m and a length of 60m. Project: Yandi, WA, Rio Tinto.

Slide 8



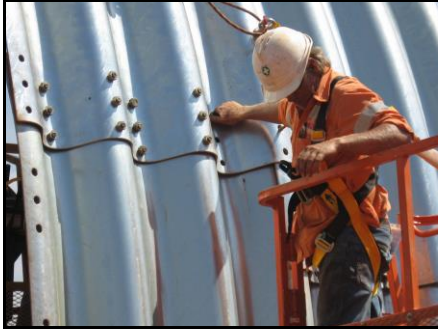
Placement of first roof section with 7 plates around the circumference. Full support and control is maintained throughout. Project: Yandi, WA, Rio Tinto.

Slide 9



The alignment of the bolt holes between the footing panels and the roof section. Project: Yandi, WA, Rio Tinto.

Slide 10



Bolt placement. Project: Yandi, WA, Rio Tinto.

Slide 11



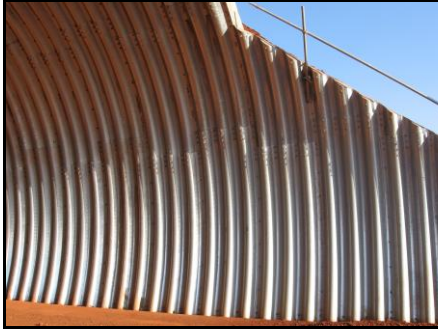
Final assembly of the first two full rings, full support maintained throughout. Full dimensional checks are made with site engineer. Project: Yandi, WA, Rio Tinto.

Slide 12



Completion of arch. Project: Yandi, WA, Rio Tinto.

Slide 13



Detail of stepped bevelled-end treatment. Project: Yandi, WA, Rio Tinto.

Slide 14



Backfilling has reached the critical 'shoulder' stage. Roundel site engineer typically in attendance at this stage. Project: Yandi, WA, Rio Tinto.

Slide 15



Only light compaction tools are used for the fill directly over the crown of the arch until adequate cover has been achieved (a minimum of 600mm but dependent on construction loading). Project: Yandi, WA, Rio Tinto.

Slide 16



The Critical Backfill Zone can be clearly seen around the arch and alongside the general embankment fill. Heavy construction loads must be kept out of this area until minimum construction covers are achieved. Project: Yandi, WA, Rio Tinto.

Slide 17



Alternative compaction methods at minimal cover. Project: Gibihi Road, Moura, QLD, Anglo Coal.

Slide 18



Spread and compaction of fill materials running perpendicular to the arch. Gibihi Road, Moura, QLD, Anglo Coal.

Slide 19



Compaction of fill materials running perpendicular to the arch. Gibihi Road, Moura, QLD, Anglo Coal.

Slide 20



Backfilling over the top of the structure with minimum cover achieved. Heavier construction equipment now being used. Project: Yandi, WA, Rio Tinto.

Slide 21



Minimum cover reached and construction equipment allowed over the top of the arch. Project: Yandi, WA, Rio Tinto.

Slide 22



CBS – ‘Composite Beam System’ – installation at BHP’s Worsley Alumina project, Marradong, WA. Concreted ribs offer substantial increases in structural performance. This installation included fully-reinforced concreted rings.

Slide 23



Detail of the CBS system – placement of reinforcement bars and capping plates is shown. Project: BHP’s Worsley Alumina project, Marradong, WA.

Slide 24



Close-up detail of the reinforcement bars of the CBS system, prior to placement of the capping plates & concreting. Project: BHP’s Worsley Alumina project, Marradong, WA.

Slide 25



Concreting of CBS rib. Project: BHP's Worsley Alumina project, Marradong, WA.

Slide 26



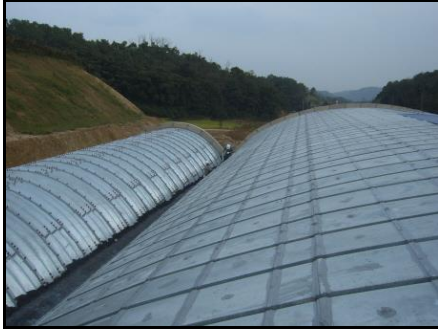
Concreting of CBS rib. Project: BHP's Worsley Alumina project, Marradong, WA.

Slide 27



Concreting of CBS rib. Project: BHP's Worsley Alumina project, Marradong, WA.

Slide 28



Detail of double arch structures. The larger one to the right fitted with the CBS system. Project: Korea.

Slide 29



The twin-arches are ready for backfilling works. Project: Korea.

Slide 30



Backfilling of the twin structures almost completed. Project: Korea.

Slide 31



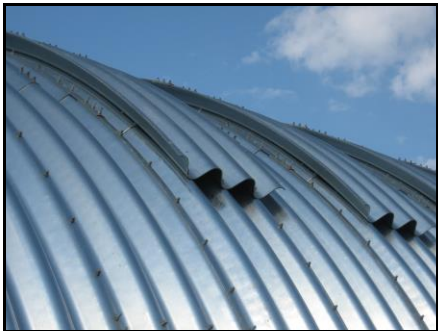
Large-span arch, haul road crossing, Dawson Coal Mine, Anglo Coal, QLD. Max. span 13.0m, rise 7.35m, length 84m.

Slide 32



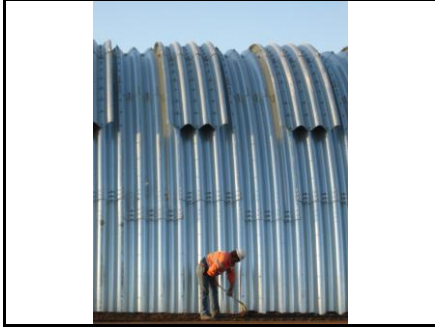
Detail of large-span arch, haul road crossing, Dawson Coal Mine, Anglo Coal, QLD. Note double ribs; these are back-to-back ribs and are not concreted.

Slide 33



Double ribs detail.

Slide 34



Detail of double rib – Gibihi Road,  
Dawson, Moura, QLD