



# Raiseboring

Macmahon Underground Mining

## Our equipment

Raisedrill	Depth/Diameter	Suitable for
RBR 900VF (May 2013)	Up to 2000m depth at 8m diameter	Surface or underground use
Robbins 121R	Up to 600m depth at 6m diameter, Up to 1,000m at smaller diameters	Surface use only
Robbins 85R	Up to 400m at 4.5m diameter	Surface or underground use
Robbins 84R	Up to 300m at 4m diameter	Surface or underground use
Robbins 73R (three rigs)	Up to 400m at 3.5m diameter	Surface or underground use
Tamrock Rhino 1296	Up to 300m at 3.5m diameter	Surface or underground use
Dresser 800 (two rigs)	Up to 200m at 2.4m diameter	Surface or underground use
Dresser 480 (two rigs)	Up to 200m at 1.8m diameter	Surface or underground use
Robbins 34R (one rig)	60m at 1.4m diameter. Capable of drilling blind up-holes up to 1m diameter	Surface or underground use

**With the most comprehensive range of equipment in Australia and a team of experienced personnel, Macmahon offers specialist raisedrilling services to both mining and civil construction clients.**

Macmahon took delivery of the world's largest raisedrilling machine in April 2013. The Herrenknecht 900VF provides more than 50 per cent higher thrust than the next biggest existing machine. The 900VF has the capacity to excavate 8m diameter openings to a depth of up to 2,000m. The machine will alter the risk profile associated with raisedrilling operations and provide greater flexibility for clients when it comes to long term hoisting and ventilation options for deep mines.

Macmahon can tailor its services to meet individual client needs, with vertical raisebore techniques including the construction of:

- Vertical development of large diameter shafts for ventilation or haulage up to 8.0mØ
- Vertical and angled holes to 3.5m in diameter
- Up holes (box holes)

Macmahon's existing shaft size capability ranges from 0.6m to 6.3m diameter, with completed shafts over 1,100m deep. While Macmahon is predominantly engaged for the construction of vertical shaft development, the Company is also experienced in subvertical and horizontal raisedrilling.

Macmahon regularly delivers raisedrilling in combination with other shaft development services ranging from site setup, collar (foundation) development, pre-sinks, full face benching, horidiam, stripping, lining, ground support and project management. Macmahon can operate independently on site, owning all associated equipment required to ensure a successful excavation, including a mud plant for drilling in adverse ground conditions, reaming heads, forklifts and air compressors.

All raisedrills have 'soft control' systems that are either hydraulically driven or incorporate the latest electric drive system, ensuring the maximum flexibility in operation, protect the drill string and in-hole equipment and reduce usage of consumables such as bits and cutters.

### Past and Past present contracts include:

#### Olympic Dam Mine (SA) – BHP Billiton

Underground slots for 18 years. A total of 33 surface vent shafts to date, the latest being 4.5m diameter x 574m.

#### Leinster Nickel Operation (WA) – BHP Billiton

3 x 4.5m diameter raises; 2 x 3.5m diameter raises; 1 x 3m diameter raise underground, varying lengths.

#### George Fisher Operation (QLD) – Xstrata

6.3m diameter x 720m surface raise, 6.3m diameter x 520m surface raise.

#### Goldfields Agnew Operation (WA)

Underground ventilation upgrade including 4.5m diameter x 420m surface raise, 4.5m diameter x 400m underground raise.

#### Beltana Coal Mine (NSW)

6.34m diameter x 80m; 6.34m diameter x 150m. Drilled with Rotary Vertical Drilling System (RVDS) – pilot hole accuracy +/- 250mm over hole length.

#### Moranbah Nth (QLD)

5.8m diameter x 170m ventilation shaft, fully concrete lined with a 32m pre-sink.

#### Telfer (WA)

4.5m diameter x 831m ventilation shaft.

#### Cobar (NSW)

Three ventilation shafts: 3.1m diameter x 883m; 4m diameter x 874m; 4m diameter x 844m, including support to the shafts after drilling was completed.

#### Springvale Colliery Lithgow (NSW)

Two 4m diameter x 140m shafts, fully concrete lined.

#### Environmentally sensitive sites

- Pike River Coal (NZ) – 3.5m diameter x 300m in an environmentally sensitive area with all components of the equipment being flown in and out by helicopter.
- Jabiru (NT)
- Henty (TAS)
- Hong Kong Drainage system – 23 vertical shafts. Sites are set up in residential and highly populated areas severely restricting site size and access with a strong focus on environmental and safety requirements.