



**VOEST ALPINE MINING &
TUNNELLING PTY LTD**

**Ergonomics of Underground Coal
Mining Equipment – ABM25 Innovations**

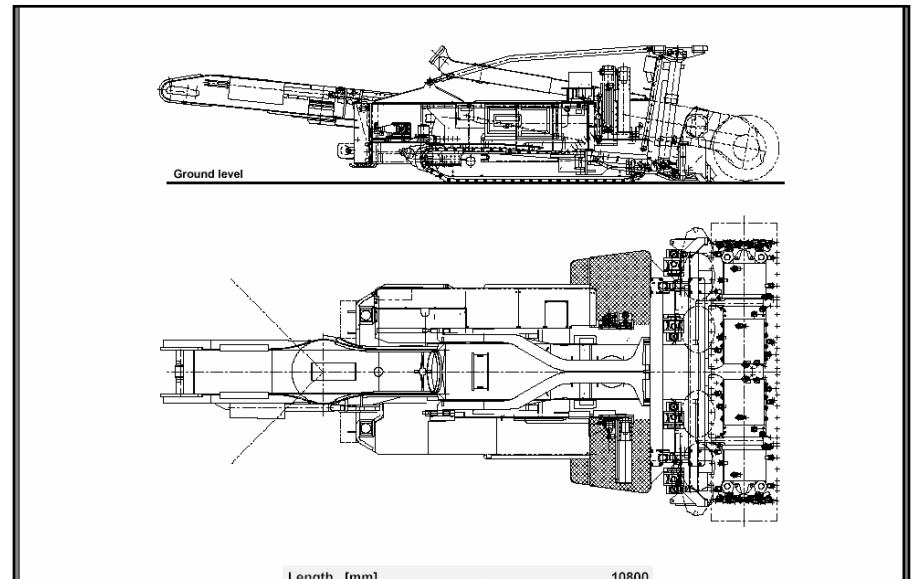
Ergonomics of Underground Coal Mining Equipment

ABM25 innovations

- **Where we have come from (ABM20)**
- **The 1st ABM25 (3rd Qtr 2003)**
- **The ABM25S (3rd Qtr 2006) – evolution from West Wallsend**
- **Other ergonomic initiatives**

ABM20 ~ 1992

- The first commercially manufactured simultaneous cut and bolt miner
- Machine design based on the functional requirements of operation
- Canopy to protect drill rig operators (2 x 20 tonne)
- Area for material pods
- Integrated ventilation



Safety Statistics Summary

ABM & CM

CM

- By Injury
 - ✓ Strain 40%
- By Body Part
 - ✓ Back 21%
 - ✓ Knee 11%
 - ✓ Fingers 6%
- By Job Task/Description
 - ✓ Cable Handling 32%
 - ✓ Handling 10%
 - ✓ Repairs/maint. 9%
 - ✓ Roof Bolting 7%

ABM

- By Injury
 - ✓ Strain 36%
- By Body Part
 - ✓ Back 29%
 - ✓ Knee 14%
 - ✓ Fingers 9%
- By Job Task/Description
 - ✓ Cable Handling 23%
 - ✓ Handling 12%
 - ✓ Repairs/maint. 15%
 - ✓ Roof Bolting 12%

Source: Coal Services Statistics
1999 – 2003 n=858

Summary

Injury Type; Strains, pulls, twists, bruises	75%
Body Part; Back, Arm and Knees	85 – 95%
Job Task; Handling (cables / supplies etc)	50%
Op./Maint./Inspections	45%

Note: Statistics do not consider age, shift roster, shift etc. When injury occurred, accident severity (ie disabling, medical, LTI etc)

1st ABM25 (3rd Qtr 2003)

- Platforms/work areas
- Operator protection
- Materials handling
- Maintenance
- Controls
- Environment



ABM25S (3rd Qtr 2006)

•Including West Wallsend improvements

- Lighting – access, work area, controls
- Rubber floor mats – non slip, anti fatigue
- Ventilation – air fans, ducting design etc
- Hand rails

•Platforms/work areas

•Materials handling

•Maintenance

•Controls

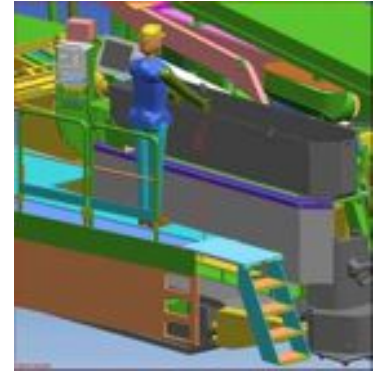
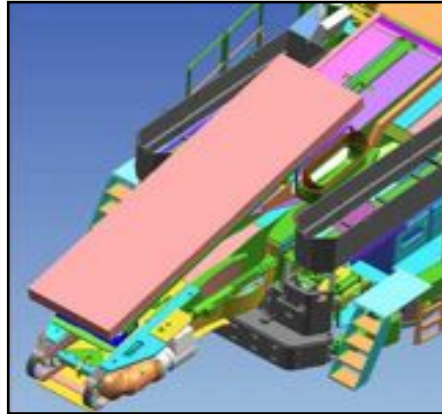
•Environmental



Platforms/Work Areas

- Slimmer machine – increased work platform area (wider, larger area inbye rib rig)
- Rear platform steps fold up for flitting and breakaways
- Raise /lower platforms

Materials Handling



- Mesh carrier designed to “load, carry and position”
- Mesh carrier twists for easier access for operators to pick up mesh
- Materials pods (with side cut outs etc), mesh, straps loaded with Eimco – minimises manual handling
- Raise /lower platforms - improved access to materials pods and mesh/straps



Maintenance/Controls

- New drill rig motors – smaller pumps
- Improved maintenance access
- Push button roof rig controls
- New operator screen locations both sides



Environmental

- Noise attenuation power pack covers
- ITP dust suppression system
- Horizon control



Other Ergonomic Initiatives

- The ABM is presently the safest miner on the market
- We either continue to manage this environment or automate
- Development system improvements are still required for operators to maintain performance levels
- The ABM is the best product suited to the automation process
- Long term view – implement safe, reliable automated systems – slowly reduce operator exposure to the hazardous environment



The Solution Partner of choice