J.H. Fletcher & Co.

• An Introduction to Fletcher MRS (Mobile Roof Support) Equipment.
The Mobile Roof Support Concept.

- The Concept of the use of Mobile Roof Supports (MRS) was developed by the US Bureau of Mines in the 1970’s.
- The purpose was to develop equipment that would provide a safe working environment for pillar extraction.
- Prior to the introduction of MRS units the traditional method of extracting pillars involved the very dangerous work of setting timbers.
Mobile Roof Supports.

• J.H Fletcher & Co. began producing MRS units in 1988. To date some 250 units have been manufactured.
• ALL Fletcher MRS units are still in service.
• High Capacity units support 800 tons (726 tonnes) each.
• Depending on the model selected machine heights are from 32” (820mm) up to 16.4’ (5.0m).
MRS Main Components 1.

- Roof Plate Assembly
- Chain Curtain
- Telescopic Lift Cylinders
- Crawler Frame
- Cable Reel & Plow
MRS Main Components 2.

- Lemniscate / Caving Shield
- Integral Hydraulic Tank
- Main MRS Frame
Roof Plate Assy.

- Proven Rugged Design of Welded Construction
- Designed to carry a point load - Not only a Uniformly Distributed Load.
- Canopy will not bend or deflect under load. - If canopy bends the machine will be difficult to extract.
- Canopy Assembled from high strength (100,076 psi) (690 Mpa) T1 steel.

POINT LOAD OF 600 Tons or 800 Tons
Canopy Movements.

Note: Sloping Edges

- Operator Controlled front to rear canopy adjustment. (+ or – 25 degrees).
- Lateral Deflection(+ or - 15 degrees).
- Sloped edges are designed to deflect lateral loading, and allows material to fall more easily from the roof plate.
- Optional: Hydraulically Powered Tilt Frame for side to side movement of canopy.
Optional Roof Plate Tilt

- Hydraulically powered, and remote controlled.
- Especially useful in high seams to avoid Roof Plate interference between machines.
- Depending upon machine height, tilt can be up to $+/- 15$ degrees.
Cable Reel & Plow

- The Plow is constructed from High Strength Steel, and houses the Cable Reel, Electrical Enclosure, & Hydraulic Valve Bank.
- Will withstand a retrieval force of 150 tons (136 tonnes).
- Plow cylinders can lift the MRS chassis from the floor.
- With the powerful tram capability of the machine it will plow large amounts of material.

Note! The Plow can lift the MRS off the Floor
High Visibility Load Monitor & Gauges
MRS Crawler Frame.

- Well balanced, and maneuverable.
- Variable speed, high torque 16” wide crawler system capable of up to 90 f/min (27m/min)
- The full roof pressure is taken directly through the frame, and tracks to the mine floor.
- When tramming ground pressure is only 81 kPa (13 psi).
- Powerful drive system with variable speed / torque.
Telescopic Lifting Cylinders

Note! - No Moving Hoses

- The Hydraulic Lift Cylinders are all “Gun” drilled. - No moving hoses, and no fittings on the rod-end.
- Strong “Ball & Socket” connection onto the canopy
- Yield valves return oil to the tank - not on the mine floor
- Depending upon the mines operating range; cylinders are available in either two or three stages.
Lemniscate / Caving Shield

- The Lemniscate Linkage is partially external and incorporates a Caving Shield to protect the internals of the MRS.
- The pivot connection at the Roof Plate provides good flexibility and range of motion.
- Hydraulic valving balances the pressures to the lift cylinders to minimize stress.
- The Caving Shield will provide an horizontal “push-out” force to assist with tramming from caved areas more easily.
MRS Raising with Lemniscate Linkage
MRS Remote Control.

Note! Remote Fire Suppression

- Transmitter is small, and lightweight.
- Touch Pad uses sealed membrane controls - No toggle switches to break or leak.
- Four transmitters, are usually supplied with each MRS system
- Fire Suppression System can be actuated from the transmitter.
MRS Under Test.
MRS BENEFITS.

• Improved Safety.
• Higher Productivity.
• Higher Yield.
• Extend Life of the Mine.
• Mining Pillars on Retreat is more cost effective.
• Higher Equipment Utilization.
• Less Manpower.
• Protects the Production Equipment.
• Roof Caving More Predictable.
• More Stable Pillar Line.
Setting Timber versus an MRS System.

- The diagram at the side illustrates two mining methods.
- Figure A illustrates MRS’s being used in a “Christmas Tree” pattern.
- Figure B illustrates how the pillars would be removed by setting timber posts.

Figure 2. Mining plan using (A) MRS and (B) posts.
Improved Safety & Productivity with an MRS System

Cave Line with MRS

Cave Line with Posts

Cave Line with Posts
Typical Mining Plan 1.

DEEP-CUT PLAN USING MOBILE ROOF SUPPORTS
PILLAR EXTRACTION USING THE XMAS TREE METHOD

Note: A similar sequence applies to blocks of comparable dimensions
E.G.: 40 x 60 ft, 50 x 60 ft, etc.

Scale 1" = 20 Feet
Typical Australian Mining Plan.

- Australian mines have been using the MRS system for a number of years.
- The typical Australian system tends to use three MRS units as opposed to the four units used in the USA.
MRS Product Support.

- All MRS systems are custom built to meet each mine application.
- Full support and assistance with Mining Plans, Cut Sequences etc.
- Operator and Supervisory Training at the mine, and on the section.
MRS Drawing

- **Operating Height =** 174” (4.42m)
- **Machine Width =** 87.9” (2.235m)
- **Machine Length =** 204” (5.18m)
- **Machine Weight =** 70,400# (32,000kg)
# 800 Ton MRS Range

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“Our goal is to manufacture equipment for underground mining that increases safety and production through engineering innovation, quality control, experienced service and ownership stability”

- J. Robert Fletcher
Chairman

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