that is only 72" (1.8M) long that provides 77" (1.96M) of feed length for single pass installation of 6' (1.8M) bolts. The feed provides 6000 lbs. (2240 kg) of thrust. The drill heads provide up to 350 ft-lb (475 N-m) of torque. The feed includes drill steel guides and clamps. The machine can install friction, expandable, mechanical, resin, tensional rebar, and cable bolts with no alterations to the machine.

BOLTER FUNCTIONS

With 40° of chassis articulation, the machine can negotiate turns with as little as 2.5 m (8 ft. 3 in.) inside radius. The bolting boom includes 40° boom swing and boom lift. The bolting basket can swing 30° and tilt. This combination of freedom of movements allows the bolting basket to reach around corners, or to be kept parallel with the chassis even with the boom swung completely to one side, and to keep the bolting basket level even when bolting on ramps up to 10.2°.

Figure 2. Fletcher model N3114-AD/E Roof Bolter in operation.

The lifting boom allows the drilling basket to set flat 6" below grade or lift it 4.5' (1.37M) so that the drill unit can reach to a top height of 4.4 m (14 ft. 6 in.), eliminating the need for backfilling before roof support can be installed.

MSHA approved canopies provide protection to the operator in both chassis and basket work positions. The operator can tram and control all drilling and bolt installation functions from the basket. Basket sidewalls and collapsible rock guards protect the operator while bolting.

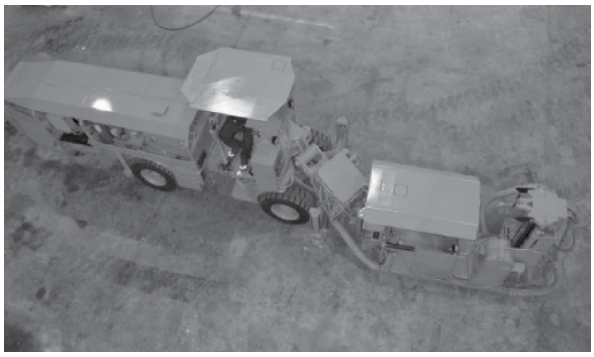

Figure 3. Basket swing can be used to keep the basket parallel to the stope when the boom is swung.

A mesh handling assembly on the mast allows the machine to lift and position roof mesh into position for surface control. The operators have successfully used the machine to lift and position wire mesh panels up to 12' long x 4' wide (3.66M x 1.2M) into position against the top or side of the headings. The operator can then bolt the mesh into place without leaving the machine, installing "mickies", or setting scaling bars.

The operators bolting compartment with canopy is mounted to a lifting boom which keeps the operator at a convenient height for bolting. This feature coupled with the feed being mounted on dual rotary actuators allow bolts to be installed reasonably perpendicular to all entry faces even at full height. The machine can bolt from floor to floor sideways and can also bolt the face.

It has been built in a full diesel and also a diesel tram - electric bolt configuration. The bolter has proven to be capable of negotiating uneven floor, 90 degree turns in narrow openings, and ramps of up to 19% grade. The operator is under a protective canopy for protection from rock falling while bolting, and while installing mesh. The noise level for the operator has been reduced by over 8 Db versus a jackleg. The machine drills at ¾"/sec (3.75 fpm – 1.14 M/min). The machine inserts 5' (1.5m) friction bolts in 9-10 seconds.

CONCLUSION

We feel that this new machine concept is a significant step forward in improving safety for installing ground support in narrow confines. For 37 years Fletcher has led the industry in development of safer and more productive roof bolters for a variety of mining conditions in seam heights from 30" to 50' (0.76 M – 15.24M). We now hope to lead in developing roof bolters for narrow or confined space applications. Fletcher would like to thank the mining companies which have worked diligently with us to bring this concept to a reality.