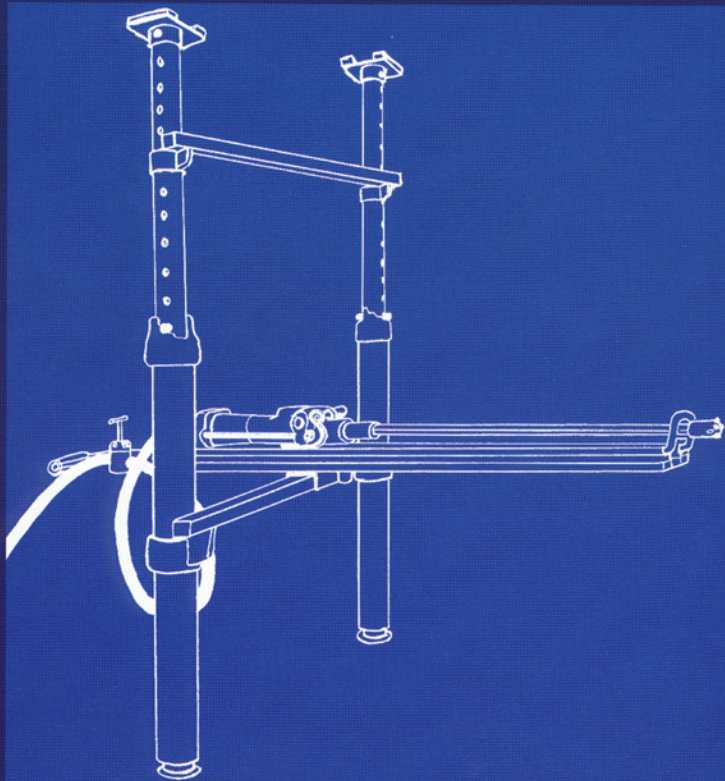


DRILLING RIGS FOR WATER DRILLS



NOVATEK

INNOVATION IN MINING

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BENEFITS OF RIG-MOUNTED DRILLING

- MORE ACCURATE DRILLING AND POSITIONING OF BLASTHOLES.
- BETTER BLAST CONTROL – IMPROVED HANGING AND FOOTWALL CONTROL, PANEL SHAPES AND BETTER ADVANCES PER BLAST.
- MORE EFFECTIVE DRILLING – LOWER OPERATING COSTS AND IMPROVED RELIABILITY.
- FASTER DRILLING RATES (30-35 M DRILLED/DRILL/HOUR) AND HIGHER PRODUCTIVITY.
- SAFER OPERATION AND LOWER EXPOSURE TO HAZARDOUS CONDITIONS.
- LESS PHYSICALLY DEMANDING ON DRILL OPERATORS

APPLICATION OF DRILLING RIGS

• STOPING

- BEAM-MOUNTED DRILLING BOOMS; BEAMS ARE ATTACHED TO TEMPORARY LIGHTWEIGHT PROPS AND ADVANCED ALONG THE PANEL AS DRILLING PROGRESSES. SEPERATE SELF CONTAINED BEAMS AND SUPPORTS CAN ALSO BE USED.
- RAIL MOUNTED RIGS; 2 OR 3 DRILLS MOUNTED ON A CARRIAGE WHICH TRAVELS ALONG A FOOTWALL MOUNTED RAIL SYSTEM.

• ASG DEVELOPMENT

- PROP AND BEAM MOUNTED DRILL RIGS TO ALLOW FOR SIMPLE TRANSPORTATION AND INSTALLATION.

• LARGE-END DEVELOPMENT

- VARIOUS PLATFORMS, CARRIAGE-MOUNTED DRILLS DEVELOPED TO SPECIFIC REQUIREMENTS.

FEATURES

- DESIGNS ARE ENGINEERED TO BE SIMPLE AND ROBUST; PROVIDING MORE ACCURATE AND FASTER DRILLING WITHOUT RESTRICTING THE FLEXIBILITY OF MINING OPERATIONS
- THE DRILLER IS ABLE TO POSITION THE DRILL AT A RANGE OF ANGLES AND POSITIONS WITH EASE. ROLL IN THE REEF, UNEVEN FOOTWALL AND HANGING CONDITIONS CAN EASILY BE ACCOMMODATED.
- ALTERNATELY, WITH RAIL-MOUNTED RIGS, A PRESET DRILLING PATTERN CAN BE SET TO ELIMINATE OPERATOR ERROR
- THE RIGS ARE MODULAR; SIMPLE AND LIGHT TO TRANSPORT AND ERECT.
- MAINTENANCE IS SIMPLE AND CAN EASILY BE DONE ON-SITE.
- CONTROLS ARE SIMPLE; A DRILL ON/OFF VALVE AND A THRUST/RETRACT VALVE WITH A RATE CONTROL. THESE ARE LOCATED AT THE REAR OF THE RIG.
- OPERATORS ARE LOCATED BEHIND THE MACHINE – AWAY FROM THE HIGHEST ROCKFALL AND ROCKBURST ZONE.

SPECIFICATIONS

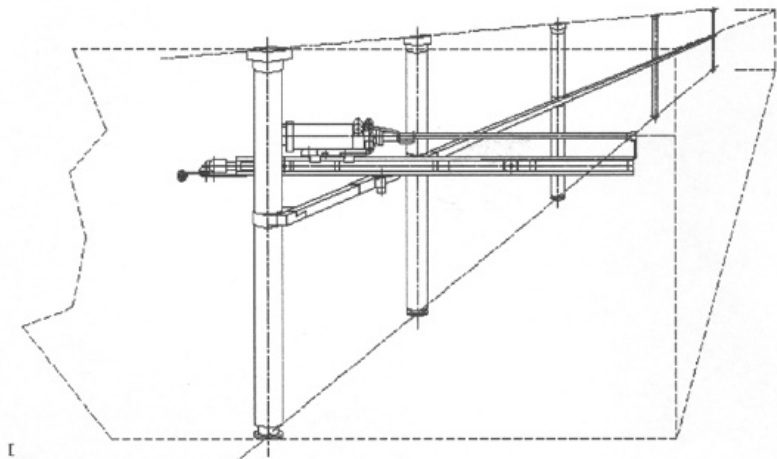
THE DRILL RIGS ARE DESIGNED TO USE STANDARD NOVATEK WATER DRILLS. THESE DRILLS CAN THEREFORE BE USED BOTH ON DRILLING RIGS AND WITH JACKLEGS TO PROVIDE FOR ALL POSSIBLE DRILLING DUTIES IN A WORKING AREA.

RIG CONFIGURATIONS, DIMENSIONS AND MASSES VARY ACCORDING TO APPLICATIONS. THE RIG DESIGN IS ADAPTED TO SUIT SPECIFIC DRILLING CONDITIONS, HOLE PATTERNS AND SUPPORT PATTERNS TO MEET THE REQUIREMENTS OF EACH USER.

NOVATEK BEAM-TYPE DRILL RIGS FOR USE IN STOPING AND DEVELOPMENT DRILLING



Novatek's range of beam-type drill rigs are engineered to provide a very-cost-effective and simple system for the drilling of blastholes in stoping and development tunneling. The rigs are designed to mount onto temporary or permanent support using traverse beams on which the drill boom is able to slide. The design has the advantages of being modular and low mass, so that the components can be stored in the working area and rapidly assembled by hand.



BENEFITS OF DRILLING WITH BEAM RIGS

- More accurate drilling and positioning of blastholes
- Better blast control – improved hanging and foot wall control, panel shape and better advances per blast. Breaking of faces up to the socket ends is normal.
- More effective drilling – lower drill operating costs and improved reliability
- Faster drilling rates (30 – 35 m drilled/drill/hour with water drills) and higher productivity.
- Safer operation and lower exposure to hazardous conditions.
- Less physically demanding on drill operators.

APPLICATION OF BEAM DRILLING RIGS

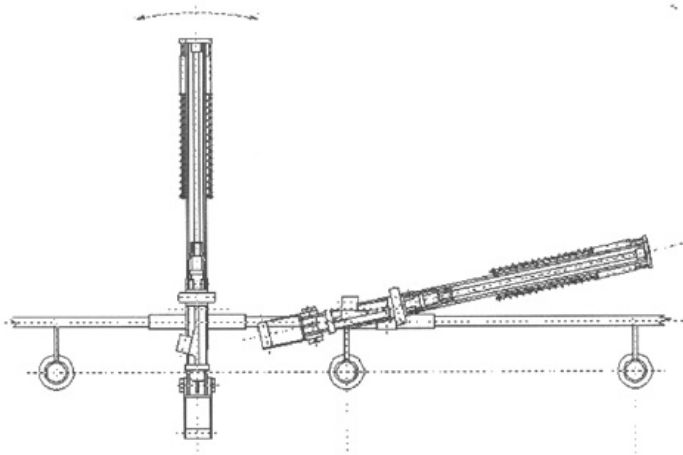
- Stoping
 - Beam-mounted drilling booms; beams are attached to temporary lightweight props and advanced along the panel as drilling progresses. Separate self contained beams and supports can also be used.
- ASG and Small-End Development
 - Prop and beam mounted drill rigs to allow for simple transportation and installation.

FEATURES

- Designs are engineered to be simple and robust; providing more accurate and faster drilling without restricting the flexibility of mining operations.
- The driller is able to position the drill at a range of angles and positions with ease. Roll in the reef, uneven footwall and hanging conditions can easily be accommodated.
- The rigs are modular; simple and light to transport and erect.
- Maintenance is simple and can easily be done either underground or on-mine.
- Controls are simple; a drill on/off valve and a thrust/retract valve with a rate control. These are located at the rear of the rig.
- Operators are located behind the machine – away from the statistically highest rockfall and rockburst zone.

Attachment of beam to preloaded elongates that that are installed instead of temporary support.





Movement of Boom Past Support – Top View

SPECIFICATIONS

The drill rigs are designed to use either standard Novatek water drills or standard pneumatic drills. These drills can therefore be used both on drilling rigs and with jacklegs to provide for all possible drilling duties in a working area.

Rig configurations, dimensions and masses vary according to applications. The rig design is adapted to suit specific drilling conditions, hole patterns, support patterns as per the requirements of each user.

Note that due to ongoing product development, specifications may be subject to change without notice.

FEED BOOMS FOR WATER HYDRAULIC DRILLS

SIZE	Stroke 1500 mm	Stroke 2000 mm	Stroke 2500 mm #
Length	2100 mm	2700 mm	3300 mm
Width x height (without drill)	330 x 250 mm		
Width x height (with drill)	330 x 280 mm		
Mass, dry - boom only	35 kg	40 kg	50 kg
Mass, dry - with drill	63 kg *	68 kg *	78 kg *
Supply pressure	9 – 18 MPa		
Supply flow	2 – 5 l/min avg		
Drillsteel effective length	1200 - 1800 mm	2200 – 2400 mm	2400 – 3000 mm
Drilled hole depth	1200 -1500 mm	2000 mm	2400 - 2500 mm
Drillsteel section	22 or 25 mm AF		
Corrosion protection	Ext galvanised		
Controls	Lever on/off, separate feed control		
Supply fitting	NW 13 staple lock		

NOTE * With Novatek mk3 water drill, mass is approx 6 kg lower for mk4 drill.
Different strokes can be provided to suit application.

FEED BOOMS FOR PNEUMATIC DRILLS

Figures are approximate and subject to change.

SIZE	Stroke 1500 mm	Stroke 2000 mm	Stroke 2500 mm #
Length	2000	2500	3000
Width x height (without drill) *	150 x 250		
Width x height (with drill) *	150 x 300		
Mass, dry - boom only	28 kg	32 kg	37 kg
Mass, dry - with drill	55 kg	59 kg	64 kg
Supply pressure	Up to 700 kPa		
Drillsteel effective length	1200 - 1800 mm	2200 - 2400 mm	2400 - 3000 mm
Drilled hole depth	1200 -1500 mm	2000 mm	2400 - 2500 mm
Drillsteel section	22 or 25 mm AF		
Corrosion protection	Ext paint/galvanised		
Controls	Combined on/off & feed		
Supply fitting	To suit mine standard		

NOTE * Dimensions and mass will vary according to drill – illustrated for Seco S 23/5 (27 kg).
Different strokes can be provided to suit application.

STOPE DRILLING SYSTEM

TYPE	Attachment to Temporary Support	Attachment to Preloaded Elongate Support
Stope width range	500mm to 2600mm	500mm to 2600mm
Support type	Camlok-type prop with collars and chain	Standard preloadable elongates of 140 – 180 mm diameter
Support spacing intervals	1 to 2 m	Up to 2.5m
Typical support pattern to replace temporary support – breast mining	2.5m spacing on dip Spacing on strike is dependent on face advance/blast (typically 1,0 to 1,5m)	2.5m spacing on dip Spacing on strike is dependent on face advance/blast (typically 1,0 to 1,5m)
Traverse beam lengths	1 to 2 m	Up to 2.5m
Traverse beam type	Interlocking beam sections to form continuous beam in panel	Interlocking beam sections to form continuous beam in panel
Beam attachment to support	Clamp-on collars with height adjustment using chain	Clamp-on collars – removed and assembled onto successive rows of supports
Mounting of boom on traverse beam	Sliding saddle with adjustment for sideways drilling angle	Sliding saddle with adjustment for sideways drilling angle
Movement of boom past supports	Rotate boom parallel to traverse beam, move past support, rotate boom to continue drilling	Rotate boom parallel to traverse beam, move past support, rotate boom to continue drilling

GULLY AND SMALL-END DEVELOPMENT DRILLING SYSTEM

Type	Attachment to Camlok-type Temporary Support	Attachment to Hydropowered Active Support
Drilling capacity	2 drills operating on separate beams – subject to end height	2 drills operating on separate beams – subject to end height
Height range	Nominally 1600 mm to 2600 mm, other sizes to suit standard prop sizes	Nominally 1900 mm to 2600 mm, other sizes made to suit mine conditions
Support spacing intervals	Up to 2.5 m	Up to 2.5 m
Traverse beam lengths	Up to 2.5 m	Up to 2.5 m
Traverse beam type	Separate beam sections with indexing positions	Separate beam sections with indexing positions
Beam attachment to support	Clamp-on collars with height adjustment using chain	Clamp-on collars with height adjustment using chain
Mounting of boom on traverse beam	Sliding saddle with adjustment for sideways drilling angle	Sliding saddle with adjustment for sideways drilling angle
Powering system	Manual installation of props	Props are set and actively preloaded using hydropower
Supply manifold	N/a	Manifold including control valves and non-return valve for powering 2 props
Accessories	Foldable ladder - optional	Foldable ladder - optional
	Manual hoist - optional	Manual hoist - optional

ATTACHMENTS FOR USE WITH PRELOADED PERMANENT ELONGATES

Type	Collar clamp	Chain clamp
Elongate sizes	To suit skimmed poles of uniform diameter (Man-Dirk 155mm) Made to suit	To suit poles typically of 140-180mm diameter
Suitable elongates	Preloaded to approx 20T using pressurised pod – other types may loosen due to vibration during drilling	Preloaded to approx 20T using pressurised pod – other types may loosen due to vibration during drilling
Clamping action	Over-centre toggle clamping hinged collar around pole	Over-centre toggle tensions chain attached around pole.
Removable	Yes	Yes
Position adjustment	Move to desired position and clamp	Move to desired position and clamp
Corrosion Protection	Galvanised/painted	Galvanised/painted
Mass	4.5 kg approx	5.3 kg approx

ATTACHMENTS FOR USE WITH CAMLOK OR OTHER TEMPORARY SUPPORTS

Note that the system may not be suitable for use with all types of temporary support; this is influenced by the actual profile of the props, the drilling pattern and the positioning of the traverse beams. Please consult with Novatek, stating stope widths, prop type and drilling patterns.

Some external modification of the props may be required (removal of handles, attachment of suspension chain).

Type	Chain-supported collar
Prop sizes	To suit standard prop sizes
Suitable props	Camlok Other types may be suitable, discuss details with Novatek
Collar attachment	Collars fitted loosely to prop, supported by suspended chain
Removable	Yes
Position adjustment	Move to desired position and engage chain link over hook on collar
Corrosion Protection	Galvanised/painted
Mass	3.5 kg

TRAVERSE BEAMS

Type	Interlocking beams
Dimensions	50x50mm square tube in lengths to suit support spacing, typically 1.5m and 2.5m
Mounting onto clamps	Mates with tubes on , allowing for limited misalignment Beams are male/ female ended to form continuous beam along the working face
Position adjustment	Use of drilled holes and chained pins to set hole spacing to required burden
Corrosion Protection	Galvanised/painted
Mass	1,5m - 9 kg 2,5m - 15 kg

MOUNTING SADDLES

Type	C type – Stope, Development and Roofbolt Drilling	Special Roofbolting Only
Corrosion Protection	Galvanised/painted	Galvanised/painted
Installation	C shaped cradle, installed on top of square section traverse beam	Collar fits around circular beam
Movement of saddle	Saddle is equipped with rollers to facilitate movement. When thrust, the force locks the cradle onto traverse beam.	
Position adjustment	Use of drilled holes and chained pins to set hole spacing to required burden. Hole angles can be set on the saddle.	Clamps secure the rig in drilling position
Roofbolting	Install C shaped cradle onto side of beam and secure in place with pins. Boom is secured to cradle using NW32 staple	Designed specifically for roofbolting using a vehicle-based mounting, to suit each specific application
Mass	Approx 5.5 kg	Approx 10 kg

Novatek drill rigs, booms, methods of support and attachment are subject to patent protection.