



PIONEERING SOLUTIONS IN GROUND SUPPORT
FOR YOUR SUSTAINABLE FUTURE





D47 MD BOLT



The D47 Mechanical Dynamic (MD) Bolt is a 47 mm friction bolt reinforced with a 20 mm bar and a wedge arrangement at the bolt top end. Once the bolt is fully driven into the hole (like the friction bolt), the nut at the bottom is rotated to actuate a set of wedges that firmly anchor the bolt top end in the rock.

D47 MD BOLT FEATURES

- Good all purpose bolt useful for all conditions (including normal rock conditions)
- A productivity improving bolt with high static capacity
- Very simple bolt installation (similar to a standard friction bolt)
- No resins or grouts required, making it far easier to install, able to hammer straight in through wet and broken ground with no complications
- High friction anchorage capacity at the bolt top end
- Applicable to moving ground conditions
- High tensile and shear strength
- Rock plate secured to allow transfer of load to friction bolt and 20 mm bar
- The stopper safety device eliminates possible bar ejection
- The bottom of the tube is sealed to prevent atmospheric corrosion
- Low profile bolt head (no bar protrusion below the nut)
- Eye hanger can be screwed onto the installed bolt
- Fully galvanised for corrosion protection
- Bolt installation quality apparent to operator
- With the common size being 2.4 m these bolts are also available in a range of sizes from 1.8 m, 2.1 m, 2.4 m and 3.0 m.

SAFETY FIRST

Sandvik’s objective is zero harm to our people, the environment we work in, our customers and our suppliers.

The D47 MD Bolt was the first in the emerging hybrid bolt technologies developed to produce a high capacity single pass bolt.

Mining methods, and ground conditions continuously vary while the ultimate safety of personnel and profitability must continue.

The D47 MD Bolt is the ideal product to achieve these goals.

COMPONENT PROPERTIES

Bar Diameter	Ø20 mm
Bar Elongation (5d)	22%
Bar Rolled Thread	M22x2.5 LH
Bar Ultimate Tensile Strength	225 kN
Bar Yield Strength	180 kN
Tube Thickness	3.0 mm
Tube Ultimate Tensile Strength	190 kN
Tube Yield Strength	134 kN
Drill Bit Size	Ø43-45 mm

BOLT TECHNICAL SPECIFICATIONS

Property	Minimum	Typical
Ultimate Tensile Strength	280 kN	300 kN
Shear Strength (calculated)	246 kN	270 kN
Maximum		
Wedge Expansion	52 mm	

PART NUMBER & DESCRIPTION

BMG2018S	1.8 m Long MD Bolt Galvanised
BMB2018S	1.8 m Long MD Bolt Black
BMG2021S	2.1 m Long MD Bolt Galvanised
BMB2021S	2.1 m Long MD Bolt Black
BMG2024S	2.4 m Long MD Bolt Galvanised
BMB2024S	2.4 m Long MD Bolt Black
BMG2030S	3.0 m Long MD Bolt Galvanised
BMB2030S	3.0 m Long MD Bolt Black



D47 MDX BOLT



Designed and developed in Australia for underground hard rock mines. The D47 Mechanical Dynamic Extra (MDX Bolt) has unparalleled "extra expansion" for extremely effective anchorage using the unique wedge design that is able to expand up to 60 mm. The D47 MDX Bolt is particularly suitable for seismic rock conditions and is the new benchmark in seismic ground support stability.

MDX BOLT FEATURES

- A universal bolt suitable for broken, very weak, strong and seismic rock conditions
- A very quick and simple "one-pass" installation-same as the MD Bolt
- No resins or grouts required, making it far easier to install, able to hammer straight in through wet and broken ground with no complications
- Easily installed with standard jumbo tools
- Unique wedge design
- Unique yield design capable of absorbing very high dynamic loads
- High tensile and shear strength
- Fully galvanised for corrosion protection
- The stopper safety device eliminates possible bar ejection
- The bottom of the tube is sealed to prevent atmospheric corrosion
- Low profile head, no protrusion below the nut
- Eye hanger can be screwed onto the installed bolt
- Bolt installation quality apparent to operator
- These bolts are available in a range of sizes from 2.1 m, 2.4 m and 3.0 m.

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The Sandvik D47 MDX Bolt has been developed to provide strata support in a wide variety of rock conditions (weak and competent), and in particular seismic rock conditions.

This development is a progression on the successful MD Bolt being used in Australian mines since 2010.

While the MDX Bolt maintains the key features of the MD Bolt, regarding the ease of installation (single pass with no grout), its performance in both the seismic and very weak rock conditions has been significantly improved.

COMPONENT PROPERTIES

Bar Diameter	Ø20 mm
Bar Elongation (5d)	22%
Bar Rolled Thread	M22x2.5 LH
Tube Thickness	2.5 mm
Drill Bit Size	Ø43-45 mm

BOLT TECHNICAL SPECIFICATIONS

Property	Minimum	Typical
Ultimate Tensile Strength	205 kN	210 kN
Yield Strength	155 kN	180 kN
Shear Strength (calculated)	225 kN	246 kN
Dynamic Capacity	28 kJ	30 kJ
Dynamic Displacement	129 mm	142 mm
Maximum		
Wedge Expansion	60 mm	

PART NUMBER & DESCRIPTION

BXG4721	47 mm x 2.1 m Long MDX Bolt Galvanised
BXG4724	47 mm x 2.4 m Long MDX Bolt Galvanised
BXG4730	47 mm x 3.0 m Long MDX Bolt Galvanised



D39 MDX BOLT



Designed and developed in Australia for underground hard rock mines. The D39 Mechanical Dynamic Extra (MDX Bolt) has unparalleled "extra expansion" for extremely effective anchorage using the unique wedge design that is able to expand up to 47 mm. The MDX Bolt is particularly suitable for seismic rock conditions and is the new benchmark in seismic ground support stability.

D39 MDX BOLT FEATURES

- A universal bolt suitable for broken, very weak, strong and seismic rock conditions
- A very quick and simple "one-pass" installation
- No resins or grout required
- Installed with standard bolting equipment and tools
- Yielding design capable of absorbing high dynamic loads
- High tensile and shear strength
- Fully galvanised for corrosion protection
- The stopper safety device eliminates bar ejection
- The bottom of the tube is sealed to prevent atmospheric corrosion
- Low profile head, no protrusion below the nut
- Eye hanger can be screwed onto the installed bolt
- Bolt installation quality apparent to operator
- These bolts are available in a range of lengths from 2.1 m, 2.4 m and 3.0 m

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The Sandvik D39 MDX Bolt has been developed to provide strata support in a wide variety of rock conditions (weak and competent), and in particular seismic rock conditions.

This development is a progression on the successful MD Bolt being used in Australian mines since 2010.

While the MDX Bolt maintains the key features of the MD Bolt, regarding the ease of installation (single pass with no grout), its performance in both the seismic and very weak rock conditions has been significantly improved.

COMPONENT PROPERTIES

Bar Diameter	Ø20 mm
Bar Elongation (5d)	22%
Bar Rolled Thread	M22x2.5 LH
Tube Thickness	2.3 mm
Drill Bit Size	Ø35-38 mm

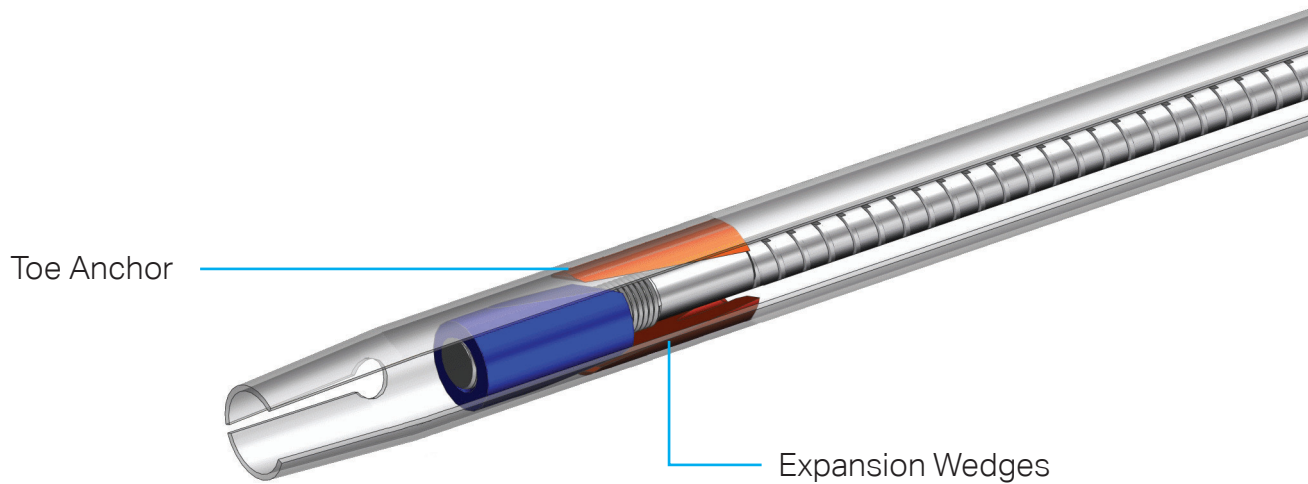
BOLT TECHNICAL SPECIFICATIONS

Property	Minimum	Typical
Ultimate Tensile Strength	205 kN	225 kN
Yield Strength	155 kN	180 kN
Shear Strength (calculated)	207 kN	227 kN
Dynamic Capacity	24 kJ	28 kJ
Dynamic Displacement	108 mm	129 mm
Maximum		
Wedge Expansion	47 mm	

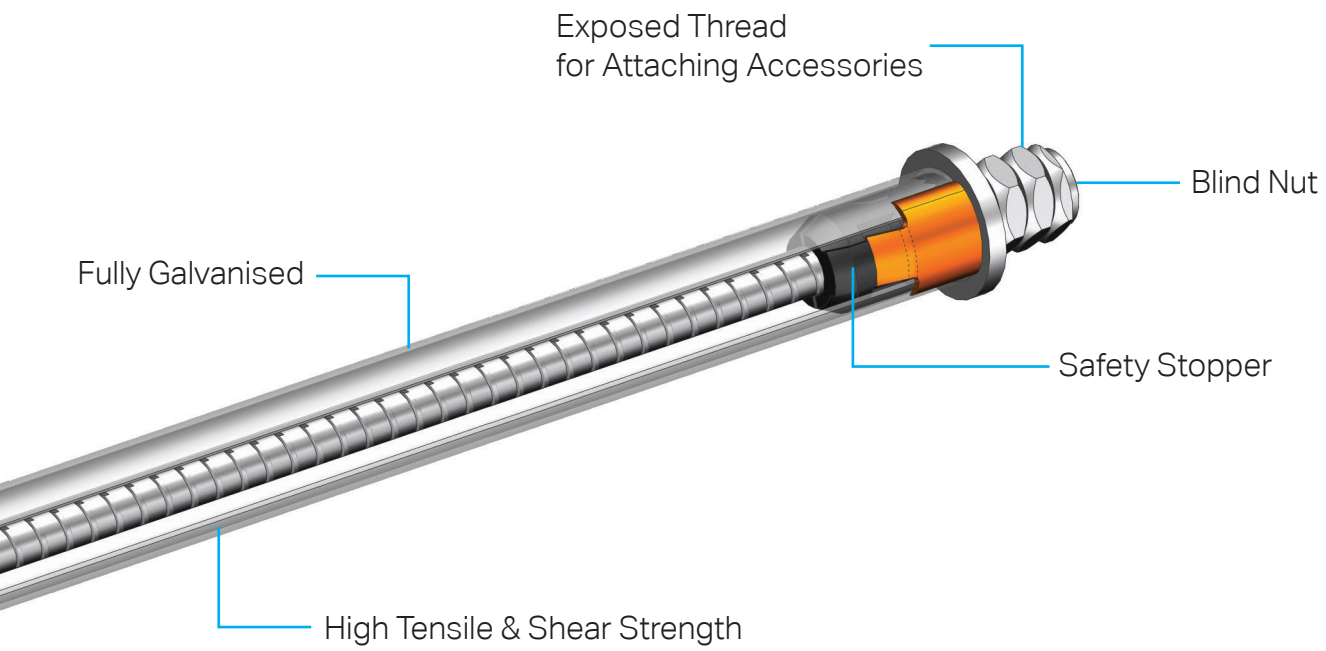
PART NUMBER & DESCRIPTION

BXG3921	Ø39 mm x 2.1 m Long MDX Bolt Galvanised
BXG3924	Ø39 mm x 2.4 m Long MDX Bolt Galvanised
BXG3930	Ø39 mm x 3.0 m Long MDX Bolt Galvanised

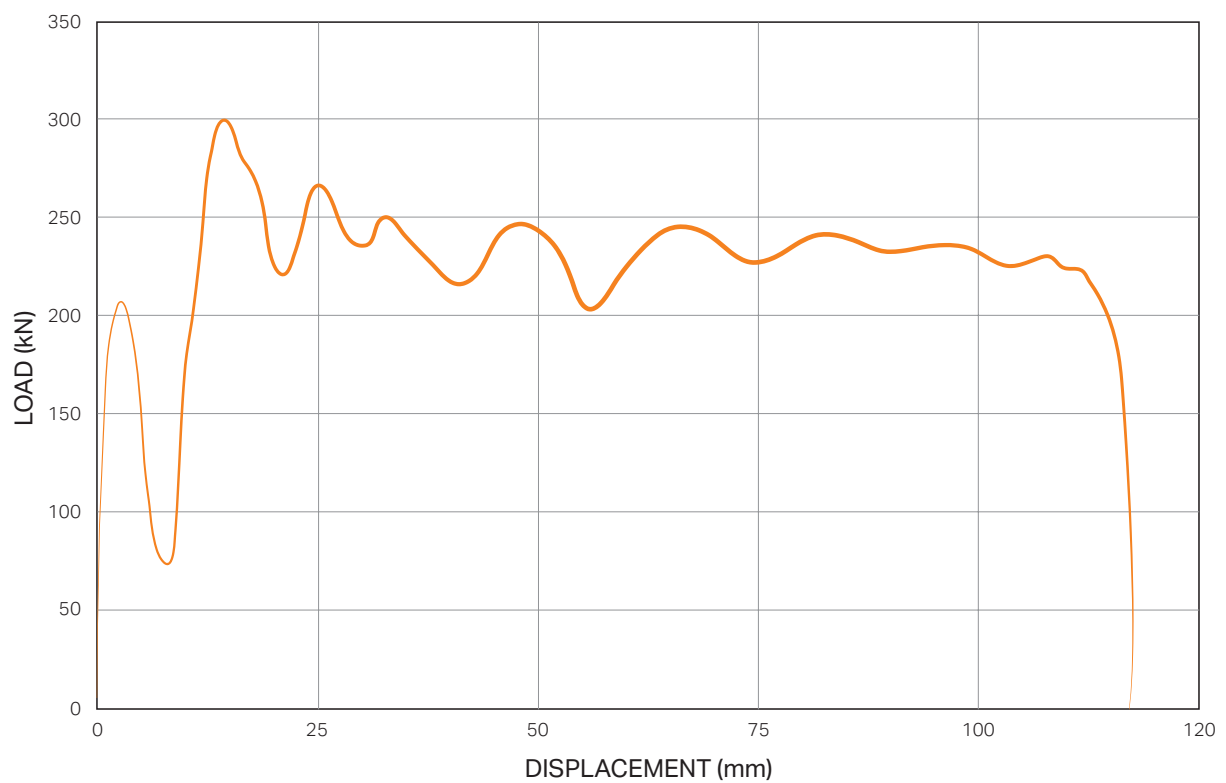
GREATER EXPANSION EXTRA ANCHORAGE



MDX BOLT



TYPICAL MDX BOLT RESPONSE TO DYNAMIC LOADING





MESH CLAMP

Designed and developed in Australia for underground hard rock mines, the mesh clamp is an accessory product for the MD/MDX rock bolt range which is suitable for installation by the Jumbo or Rock Bolters with the D47 MD, D47 MDX and D39 MDX bolts.

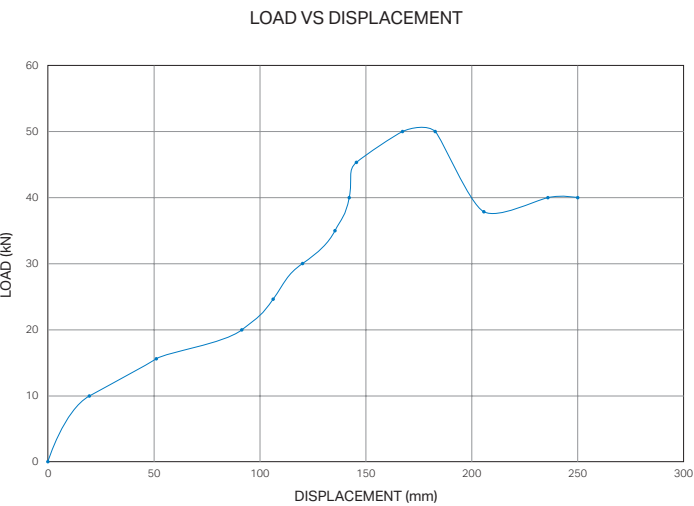
Installed with existing tools within the meshing cycle the mesh clamp will save up to nine bolt installations per round making for a very quick and easy to install, one pass installation.

The installation process follows a smooth application on first thread, before pin shear resulting in actuating the second thread. Focusing on functionality and strength, the mesh clamp is stronger than the mesh, (min 50 kN) ensuring that the mesh would be first to fail.



BOLT MESHING CLAMP FEATURES

- Allows securing of mesh to pre-installed MD/MDX bolt
- No need to install extra bolts
- A simple “one-pass” installation
- Installed with standard bolting equipment and tools
- Clamps the mesh firmly
- Fully galvanised for corrosion protection



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The following products are protected by patents in the United States of America, Australia and elsewhere.
The following list of Sandvik products may not be all inclusive, and other Sandvik products not listed here may be protected by one or more patents.

- SANDVIK MD & MDX BOLTS: U.S. PATENT NO. 8714883 B2; AUSTRALIAN PATENT NO. 2010223134 B2.
- SANDVIK EYE HANGER: AUSTRALIAN PATENT NO. 2011236039 B2.
- SANDVIK IN-SITU DROP TEST RIG: U.S. PATENT NO. 9927339 B2; AUSTRALIAN PATENT NO. 2014213657 B2.
- SANDVIK MD BOLT: U.S. PATENT NO. 9797249 B2; AUSTRALIAN PATENT NO. 2015273708 B2.
- ADDITIONAL PATENTS MAY BE GRANTED OR PENDING IN THE U.S., AUSTRALIA AND ELSEWHERE.

TECHNICAL SPECIFICATIONS

Typical clamping force developed at 400Nm	70 - 80 kN
Laboratory load tested with typical 100x100x5.6 mm welded mesh	50 kN push load without failure of the Mesh Clamp

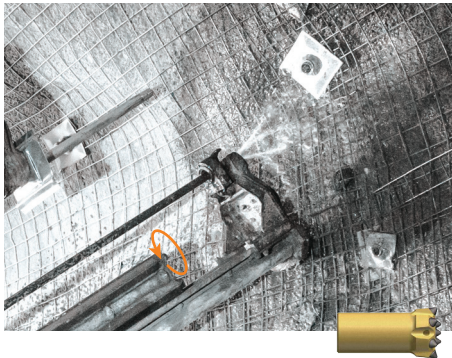
PART NUMBER & DESCRIPTION

BMCG	Mesh Clamp
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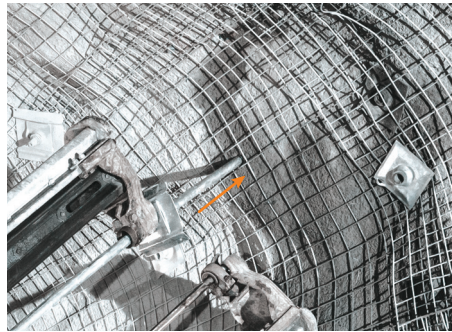
MD/MDX BOLT INSTALLATION STEPS

Using the MD or MDX "one-pass" bolting system, an average of 30 – 45 bolt installations can be performed per hour and in some cases peaking to 60 bolts per hour (using a HLX5 drifter). Compared to resin and grouted bolts, the MDX or MD bolting system is very quick to install and with a simple twist after installation the operator knows that it has been a successful install, which is somewhat unknown with resin or grouted bolts,



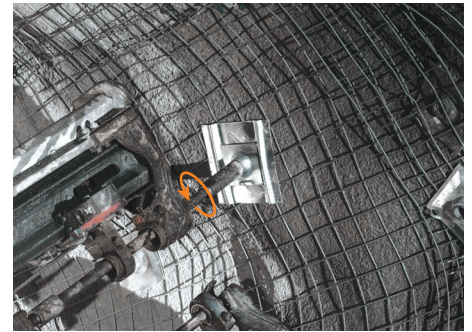
STEP 1.

Drill hole with 43.5-45.5 mm diameter drill bit.



STEP 2.

Hammer the bolt into the hole with no driver rotation and with water on.



STEP 3.

After the bolt is fully inserted, rotate the driver* left hand rotation without percussion until drifter stalls (350-450 Nm).

* MD/MDX Bolt driver must be used for installation with no other tools required for installation.

HAZARD NOTIFICATION

When handling Sandvik rock bolts, be aware of the bolts mass and use correct handling techniques; crates can be stacked a maximum of four (4) high on compact and level ground, and one (1) high in all other instances. Use of Sandvik rock bolts may require the operator to enter the machine boom area, always ensure the boom is isolated in accordance with site requirements prior to entering boom operational area, and remain clear of all pinch points. If a Sandvik rock bolt fails to install correctly (complete insertion and stall rotation motor/drifter (set to 350-450 Nm)), a secondary bolt must be installed adjacent to the failed bolt. To ensure ongoing installation quality, routine static testing is recommended. Sandvik rock bolts are offered in a Hot Dip Galvanised coating (in accordance to AS/NZS 4680); however, certain ground conditions may elevate corrosion rates, please be sure to regularly inspect ground support to ensure excessive corrosion is not present.

EXTREME PERFORMANCE

MD/MDX BOLT ACCESSORIES

Available to the MD or MDX bolting system are a vast array of bolting accessories enhancing your mining operation with performance like no other. For example our patented Eye Hanger has an SWL of 2t for holding services such as vent bag, pipes and fans, installed in seconds the Eye Hanger makes hanging your mine services a breeze.

Other accessories include the MD/MDX Bolt Driver, Combination Plate, Rock Plate, Bolt Pull Collar, Meshing Clamp and the Domed Nut.



Combination Plate Galvanised



Bolt Meshing Clamp



Eye Hanger Galvanised



Rock Plate



Bolt Pull Collar



Bolt Driver 900 mm



Bolt Driver 200 mm

PART NUMBER & DESCRIPTION

BDT38-200	Bolt Driver Thread T38 200 mm
BDR38-200	Bolt Driver Thread R38 200 mm
BDT38-400	Bolt Driver Thread T38 400 mm
BDR38-400	Bolt Driver Thread R38 400 mm
BDT38-600	Bolt Driver Thread T38 600 mm
BDR38-600	Bolt Driver Thread R38 600 mm
BDT38-900	Bolt Driver Thread T38 900 mm
BDR38-900	Bolt Driver Thread R38 900 mm
BPG3002806	Combination Plate Galvanised 6 mm Rock Plate
BPB3002806	Combination Plate with Black 6 mm Rock Plate
BPG3002808	Combination Plate with 8 mm Rock Plate
BPB3002808	Combination Plate Black with 8 mm Rock Plate
BPG150650	Rock Plate 150 mm sq x 6 mm
BCG	Bolt Pull Collar
BHG	Eye Hanger Galvanised
BMCG	Bolt Meshing Clamp, Galvanised
RBDN	Domed Nut



D47 MD Bolt



D47 MDX Bolt



D39 MDX Bolt

BOLT IDENTIFICATION SYSTEM

Once fully installed MD/MDX Bolts are easily identified by a colored tab inserted into the end of the blind nut.

Bolt type can be identified from warehouse to post installation.

Bolt traceability code is protected.

Since changing over to the Sandvik range of bolting products we have increased our production efficiency and dramatically reduced machinery downtime.

— Andreas Stiehl
Senior Rock
Mechanics Engineer
Kirkland Lake Gold



EXTREME LOAD

THE SANDVIK DROP TEST UNIT

Both the MD and MDX Bolts are able to yield and withstand changing ground conditions. But the finest attribute of the MDX Bolt is its' seismic capabilities, being able to withstand a 30.5 kJ dynamic load with as little as 153 mm displacement.

Sandvik has developed the first ever test apparatus that allows in-situ (installed as per standard practice) dynamic testing of ground support members with the ability to record both load and displacement of the bolt.

The apparatus allows for testing bolts installed up to 10° from vertical which allows application of shear loading, whereas existing laboratory testing is limited to purely axial loading.

This aspect is critical, as bolts are not always installed perfectly perpendicular to the rock surface.

There are no assumptions required with the rig or the testing, as bolts are installed in site rock and loaded as required by site.

Some features of the Dynamic Test Rig (DTR) include:

- The rig can be transported to any mine site and can be used to test any dynamic bolt
- The rig is fully self-contained (only requires access to mine supply air to run the lifting hoist)
- Energy application levels between 12 to 35 kJ in increments of 1.0 kJ
- Allows free displacement until drop rig impacts with floor (not typically experienced)

DROP TEST RESULTS

The summary of test data achieved from 11 mine sites accross 3 different bolt systems.

ENERGY DISPLACEMENT PERFORMANCE

