

*We design ground anchor systems  
We do not just provide tendons*

750kN working load removable anchors  
support diaphragm for the Al-Quds Tower, Qatar



You will find more information providing design guidance for high capacity soil anchors on our website than available from any other source.

Also there are more ground anchor technical papers available for inspection and downloading than from any other single information source.

There is much information on SBMA Case Histories of permanent, temporary and removable anchors.

To learn about anchors and how they can benefit your project go to:

- ↳ [www.geotech.net.au](http://www.geotech.net.au)
- ↳ [www.SBMASystems.com](http://www.SBMASystems.com)
- ↳ [www.theanchorman.com](http://www.theanchorman.com)

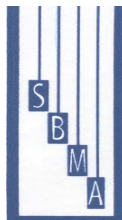
## Single Bore Multiple Anchor Ltd

Licensees of some SBMA systems:-

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- Australia:** Geotechnical Engineering  
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- Qatar:** Ammico Contracting Co.  
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- Hong Kong:** Ove Arup & Partners Hong Kong  
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- USA East Coast:** Moretrench  
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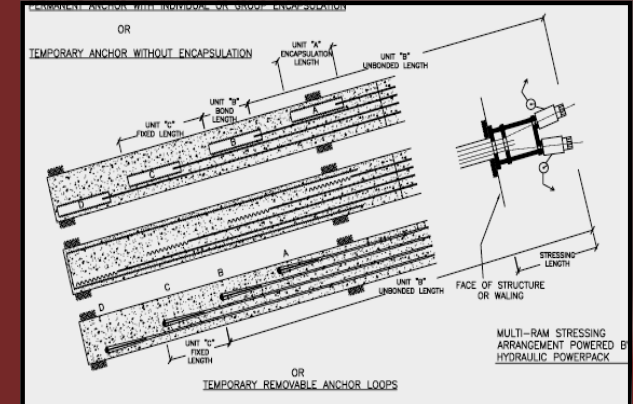


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# SINGLE BORE MULTIPLE ANCHOR



## SBMA Technology

- ↳ Removable Multiple Anchors
- ↳ Permanent Multiple Anchors
- ↳ Carbon Fibre Anchors
- ↳ Actively Stressed Soil Nails



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## The Single Bore Multiple Anchor System (Patented)

- ↘ A multiple of unit anchors grouted in a single bore
- ↘ Each unit anchor has a short efficient fixed length (2.5 to 5m) installed at a staggered depth
- ↘ Each unit anchor is individually designed on ground strength at that depth and units are frequently founded in different inter-bedded soils.
- ↘ Number of unit anchors varies from three to seven
- ↘ Total of unit fixed lengths range from 12 to 25m
- ↘ The system enhances capacities in all standard size drilled and grouted boreholes
- ↘ Working loads of up to 2250 kN already used in soils
- ↘ Working load of 3650 kN already used in weak rock
- ↘ Approx 100,000 unit anchors have been installed on a world wide basis.
- ↘ High load SBMAs can allow a 50% reduction in the anchors used on a contract
- ↘ Test loads of over 5000kN have been achieved in soils

## Single Bore Multiple Anchors Testing and Stressing

- ↘ Owing to the staggered location of unit anchors fixed lengths; each unit anchor has its own free length
- ↘ Each unit anchor has its own loading jack, synchronised with loading of other jacks simultaneously
- ↘ Each jack is powered by a central hydraulic power pack to guarantee uniform loading
- ↘ Controlled loading of every component make this stressing the worlds most refined system
- ↘ Each unit anchor exhibits its own loading characteristics based on the soil type in which it is fixed
- ↘ Each unit anchor satisfies the Codes requirement criteria of elastic extension and creep limitation
- ↘ SBMA exhibit lower creep losses than conventional anchors owing to uniform load distribution
- ↘ During investigation trial each unit anchor is loaded to failure. Hence a six unit anchor presents 6 sets of ultimate bond stress values and 6 sets of creep criteria
- ↘ SBMA Ltd have a highly extensive set of test data for a wide range of soils which allow accurate prediction of anchor capacities

## Single Bore Multiple Anchor Permanent (Patented)

- ↘ The entire length of each unit anchor is fully isolated from the surrounding ground
- ↘ Both free and fixed lengths carry two plastic protective barriers against corrosion in addition to the cement grout
- ↘ SBMAs were the worlds first anchors to be fully pre-fabricated with a double plastic barrier to eliminate corrosion

## Single Bore Multiple Anchor Anchor Removable (Patented)

- ↘ Engineers now have an obligation to reduce the impact of their design works on the environment
- ↘ Totally removable SBMAs allow both the entire free length and fixed length strand to be removed from the borehole after use
- ↘ Several major world cities already demand that tendons of temporary work anchors are removable
- ↘ SBMA system guarantees full strand removability since there is no strand tendon bond to the grout over any length
- ↘ SBMA removable anchors are installed in standard size boreholes
- ↘ SBMA removable anchors mobilise the same ultra high capacities in soil as the permanent anchor
- ↘ Typical working loads 800 to 2000 kN
- ↘ On one contract over 100 kilometres of prestressing strands were removed
- ↘ The high capacity removable anchor system can allow installation of half the numbers than other types of anchor
- ↘ For example 450 anchors each with 2000 kN working load were used on one contract alone

### 2000 kN working load removable anchors in Hong Kong



## The Actively Stressed Soil Nail System (Patented)

- ↘ The tendon comprises of two tensile members. One actively stressed and one passive
- ↘ Both tensile members are installed in a standard size grouted bore.
- ↘ The actively stressed member allows load application to *prestress against the facing* or a facing block.
- ↘ During active stressing the grout column is not in contact with the back of the facing.
- ↘ Active loads of typically 50 to 200 kN are simply applied with a stressing jack.
- ↘ After stressing the bore void behind the facing is grouted up.
- ↘ The bond resistance is provided in the resistant zone of the soil mass and the member is debonded through the active zone.
- ↘ The prestressing of the facing or facing block with the soil behind *reduces the face or slope crest movement* particularly those associated with new slopes and excavation.
- ↘ The installed passive member ties the active zone to the resistant zone as in a conventional nail.
- ↘ Tensile members comprised of steel materials are isolated from the environment by encapsulation in a corrugated duct
- ↘ Tensile members comprised composite tendons are non-degradable.
- ↘ Tensile members may consist of *flexible materials* which can be coiled and eliminate use of couplers.
- ↘ Tendon system can extend the *life expectancy* of the nail.
- ↘ 12m long nails have been *safely tested* to loads of 800 kN only using a 6m bonded length
- ↘ The Actively Stressed Soil Nail is particularly suited for *stabilisation of steep faces* and new slopes.
- ↘ Where nails are particularly long the active member may be longer than the passive member for overall stability
- ↘ The installation of two tensile members *increases the factor of safety* provided and may enhance the *stability in seismic areas*.

