

SUPERFLEX CABLE



What is Superflex Cable ? **Why make cable this way ?**

Where Superflex Cable originated **How it is made**

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Basic specifications and tables **Distribution in Australia**



If you are into Serious Lifting, steel Superflex and steel chain make a safe team



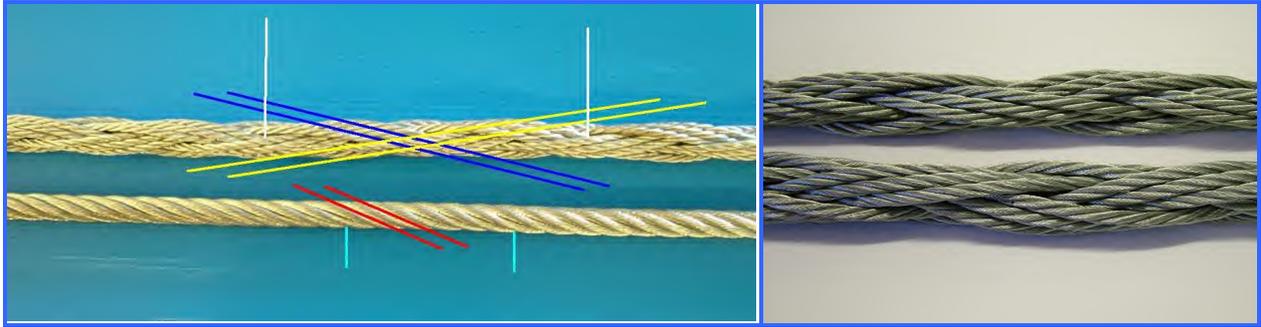
Dave Pollock and 400 kN automatic cycle vertical proof load and test machine

Superflex cable is manufactured by ANDROMEDA INDUSTRIES PTY LTD

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SUPERFLEX CABLE – what it is

It is a steel cable of plaited configuration, not laid or twisted like wire rope.



The picture shows the **plaited construction of Superflex**. The blue lines represent the "Z" lay sets and the yellow lines represent the "S" lay sets. The helix angle in both lays is approx 10 deg. The white lines indicate the node points on Superflex where the sets cross over. The distance between the white lines is the cable pitch, usually expressed as a ratio of diameter.

At the bottom is ordinary wire rope of 6 x 24 construction. The red lines represent the helix angle of the wire rope, in this case approx 20 deg. The light blue lines represent the helical pitch of this wire rope.

As you will see, the **helical pitch of Superflex is half of that of ordinary wire rope.**

This is one of the main reasons that Superflex **demonstrates a high tensile strength**, considering its relatively low mass compared to wire rope.

SUPERFLEX CABLE – why make cable this way ?

The main reason is **to make a better cable.**

The interplaiting of the sets of strands, creates a very tough and set-resistant cable composed of many more wires than is possible with a laid wire rope.

Superflex comprises **912 individual wires** in its cross section. This makes for a cable of great flexibility and yet is still **tough and practical for general use.**

By comparison an ordinary wire rope of six strands with 912 wires (6 x 152) would be impractical to make and not able to stand normal usage for slings.

SUPERFLEX CABLE – how it came about

Superflex cable originated when customers kept asking Raymond McLaren for **more flexible** slings back in the 1960's.

Because he had learned some plaiting and braiding in fibre materials before he took up wire rope work, he was able to apply this knowhow to making **braided** wire rope slings.

After many tests of the various braids and plaits, he considered that the construction known as **four by three sinnet** was the most versatile and possessed the **best operational properties** for the bending and twisting that slings are subject to.

It also exhibited useful handling properties during assembly of some types of terminations and slings. **This 4 x 3 sinnet is still the basic configuration**, although the constituent wire ropes in this product have been specially developed and manufactured for the purpose.

SUPERFLEX CABLE – natural advantages over other wire ropes or fibre based slings

The biggest advantage of Superflex is flexibility.

It also provides this without losing too much in heavy duty **toughness and durability.**

In summary, it is a **practical and heavy duty cable with great flexibility.**

Steel slings are inherently safer than fibre slings, not the least because their condition is easily ascertained by visual inspection. Damage is obvious, and inspection is easy. Steel does not lose its tensile capability over time without symptoms showing up in the form of broken or abraded wires, corrosion or sets caused by mishandling.

Another advantage of steel slings is that they can withstand temperatures up to the lower tempering temperatures of carbon steel, which is about 400 deg C. No fibre sling yet produced can do this.



Superflex strop sling in unused condition, size Three/5



1) *Overhand knot in same strop, load is 300 kg f*



2) *The same strop with knot removed, shows only the faintest trace of set from the knot*

The three pictures above demonstrate of the flexibility of Superflex cables

**For technical and commercial enquiries
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SUPERFLEX CABLE – interesting things about it

Because it is a **balanced pair opposite laid cable** it possesses the property of torque balance. This means that an axial load (all loads in cable are axial, or along the axis) does not induce a torque resultant.

Because of this peculiar property, long slings do not spin the load.

Another useful property is that the cable can be bifurcated. This means that it can be split in half, with six strands peeling to the left and six strands peeling to the right. This process is started at one of the **node points**

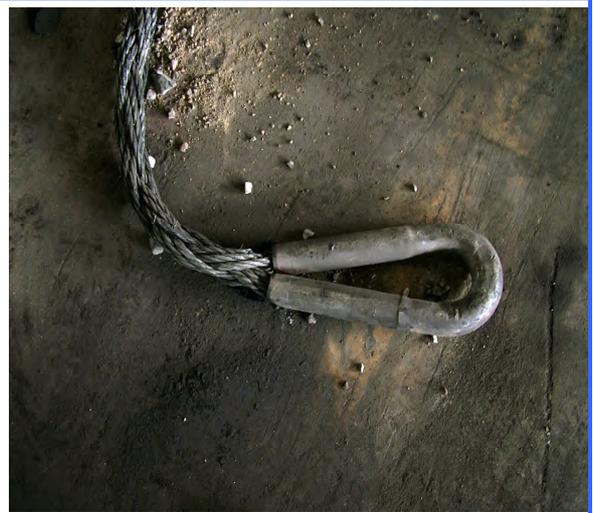
Why is this useful ? It means that a special bifurcated steel fitting can provide a termination which is the **smallest possible in mass and dimensions**. See a batch of Chock Winch Ropes at right fitted with this termination.



Although Superflex cable was not designed as a running rope, it has found application in the mining industry on the chock moving machines. See pics below.



Pic of Raymond McLaren visiting an outlying customer in China, where the chock winch ropes are used in Longwall mining operations.



This picture, taken at a Chinese coal mine in Shanxxi province, shows a heavily overloaded and abused cable and fitting, yet it is still in usable condition.

*In order to effectively use Superflex for this application, a **new terminal fitting was needed.***

*Being for underground coal mining, It had to be very compact, strong and **all steel.***

*In response to this need, our R&D Division has developed this **Bifurcated steel fitting.***



All steel bifurcated terminal fitting on Superflex cable

SUPERFLEX CABLE – how it is made

Although such cable can be made by hand in short pieces, **with some difficulty**, Andromeda manufactures this in long pieces in a machine known as an Orbital Square Plaiter, which arranges the 12 wire ropes into four sets each of three wire ropes.

Two of these sets (of three wire ropes) are laid helically in “Z” lay, and two sets are laid in “S” lay.

The “Z” and “S” lay are interplaited during each revolution of the machine.



*The first version of this machine was **invented and built by Raymond McLaren** about 1975, after eight years of part time design work and two years full time construction work.*

*As far as is known, this is still the only **Orbital Square Plaiter** in the world.*

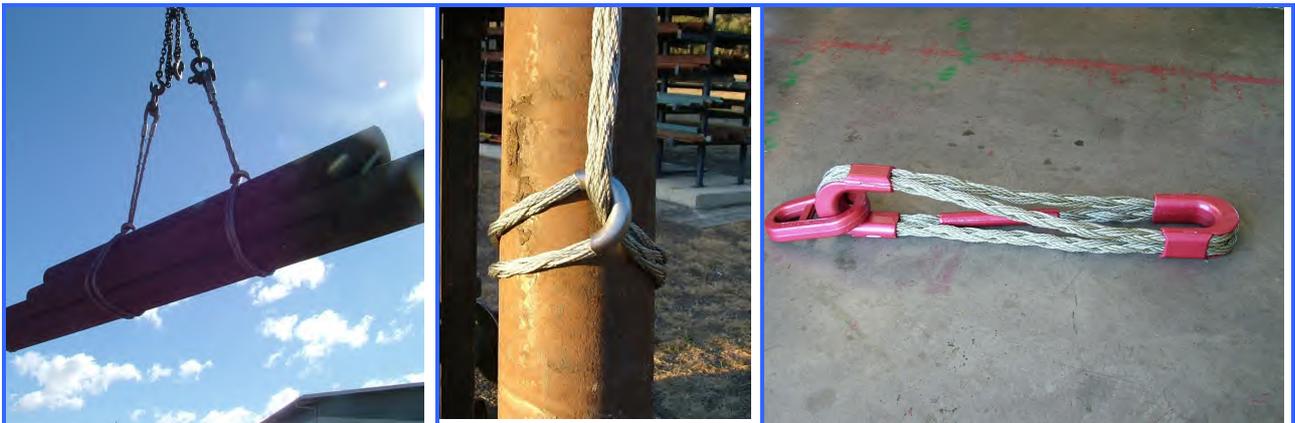
Picture shows Peter Marr loading a batch of cable.

SUPERFLEX CABLE is manufactured by Andromeda Industries Pty Ltd of Moonbi, NSW

Reels of cable are manufactured at Moonbi in Plaiting Machine # 3.

Some of this cable is then further assembled into slings in our sling assembly shop.

These slings and reels of cable are then despatched to resellers around Australia. The Superrflex cable will then be further assembled into slings at the point of sale.



Typical slings made of Superflex cables – left, strops on steel bars, mid, strop on steel tube, right, 200 tonne recovery strop used on heavy mining trucks

SUPERFLEX CABLE - present position in the rigging gear industry in Australia.

At this time, 2010, Superflex cable is used to make slings for **general lifting operations** where flexibility and ease of handling are seen as important.

The recent introduction of the Low Deformation Steel Ferrule system has **enabled a wider application**, especially in caustic environments or in salt water.

As well, **the LD ferrules** provide a slimmer fitting with a tapered end to enable generally easier handling around loads. (which is where most slings are used.)



The Low Deformation ferrule system has been developed over some 15 years by Andromeda from concepts put forward by Raymond McLaren in the 1980's. Under Research Project # 078, a coordinated set of ratios was developed by R&D Engineer, Grahame Dunn in the 1990's. This project has been entirely funded and managed by Andromeda and our staff.

DISTRIBUTION IN AUSTRALIA --

Superflex cable is supplied to major wire rope and rigging gear houses around Australia. Companies such as **Bullivants, Nobles and Robertsons**, assemble Superflex slings at regional centres for supply to local end users. These are typically mining and industrial operations.

Technical backup is provided by Andromeda, and new products are introduced from time to time through these companies. Development is always ongoing, it is the nature of the industry.

Some of the physical properties of Superflex cable before it is made into slings.									
Cable nominal size	Minimum breaking force (MBF) kN	Mass per 100 metres – kg	WLL on single fall of cable – kN	Nominal diameter (ND) - mm	Sides of enclosing square – mm	Volume per metre – litres (l/m)	Max length made in PM3 m	Free breaking length – m	
Two-0	30	20	6.0	8	9x9	0.081	4000	15000	
Two-5	50	31	10	10	11x11	0.121	3000	16200	
Three-0	75	47	15	12	13x13	0.169	2500	16000	
Three-5	95	60	19	14	15x15	0.225	2000	15900	
Four-0	125	79	25	16	17x17	0.289	1500	15900	
Four-5	157	100	31	18	19x19	0.361	1200	15700	
Five-0	210	131	42	20	21x21	0.441	900	16100	
Five-5	270	168	54	22	24x24	0.576	650	16100	
Six-5	340	212	68	26	28x28	0.784	500	16100	
Eight-0	530	337	106	32	36x36	1.29	320	15800	
Ten-0	780	499	156	40	46x46	2.12	200	15700	

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