Lifting Equipment Appreciation

Lifting Operation

- *Regulation 8(2) of LOLER defines a lifting operation as '… an operation concerned with the lifting or lowering of a load'. A 'load' is the item or items being lifted, which includes a person or people.*

Lifting Equipment

- *This term is used in two different ways in LOLER. It is a generic term used to cover all lifting accessories and appliances, but also has a more specific meaning covering lifting appliances and their anchorages and fixings.*

Lifting Accessories

- *Any device such as a sling, shackle, eyebolt, clamp, spreader beam etc. used to connect the load to a lifting appliance but which is not itself part of the load or the appliance.*

Lifting Machine

- *A device or mechanism, such as a crane, winch, pulley block, gin wheel, chain block, which does the work in lifting the load or provides the means of movement, or the supporting structure and anchoring devices for such a mechanism, e.g. runway, gantry etc. which may also permit a suspended load to be moved in the horizontal plane.*

Thorough Examination

- *Every employer shall ensure that before lifting equipment is put into service for the first time by him it is thoroughly examined for any defect unless the lifting equipment has not been used before; and*

- *In the case of lifting equipment for which an EC declaration of conformity should have been drawn up, the employer has received such declaration made not more than 12 months before the lifting equipment is put into service*

Thorough Examination

- *Maximum fixed periods for thorough examinations and inspection of lifting equipment as stated in regulation 9 of LOLER are:-*

- *Lifting accessories 6 Months*
- *Lifting equipment 12 Months*
- *Man-Riding equipment 6 Months*

In Service Inspection / Pre Use Check

- *In-service inspection is a visual inspection carried out by the Responsible Person to check for obvious signs of damage or wear which might affect the equipment's fitness for use*

Responsible Person

- *A Responsible Person is a person who has sufficient knowledge and training to enable him/her to recognise obvious defects and is responsible to his/her employer for the 'in-service' inspection of equipment*

Working Load Limit (WLL)

- *Working Load Limit (sometimes called maximum SWL)*
- *The maximum load or mass that an item of lifting equipment is designed to sustain, i.e. raise, lower or suspend. This is the load required to be marked on an item by the product standards.*

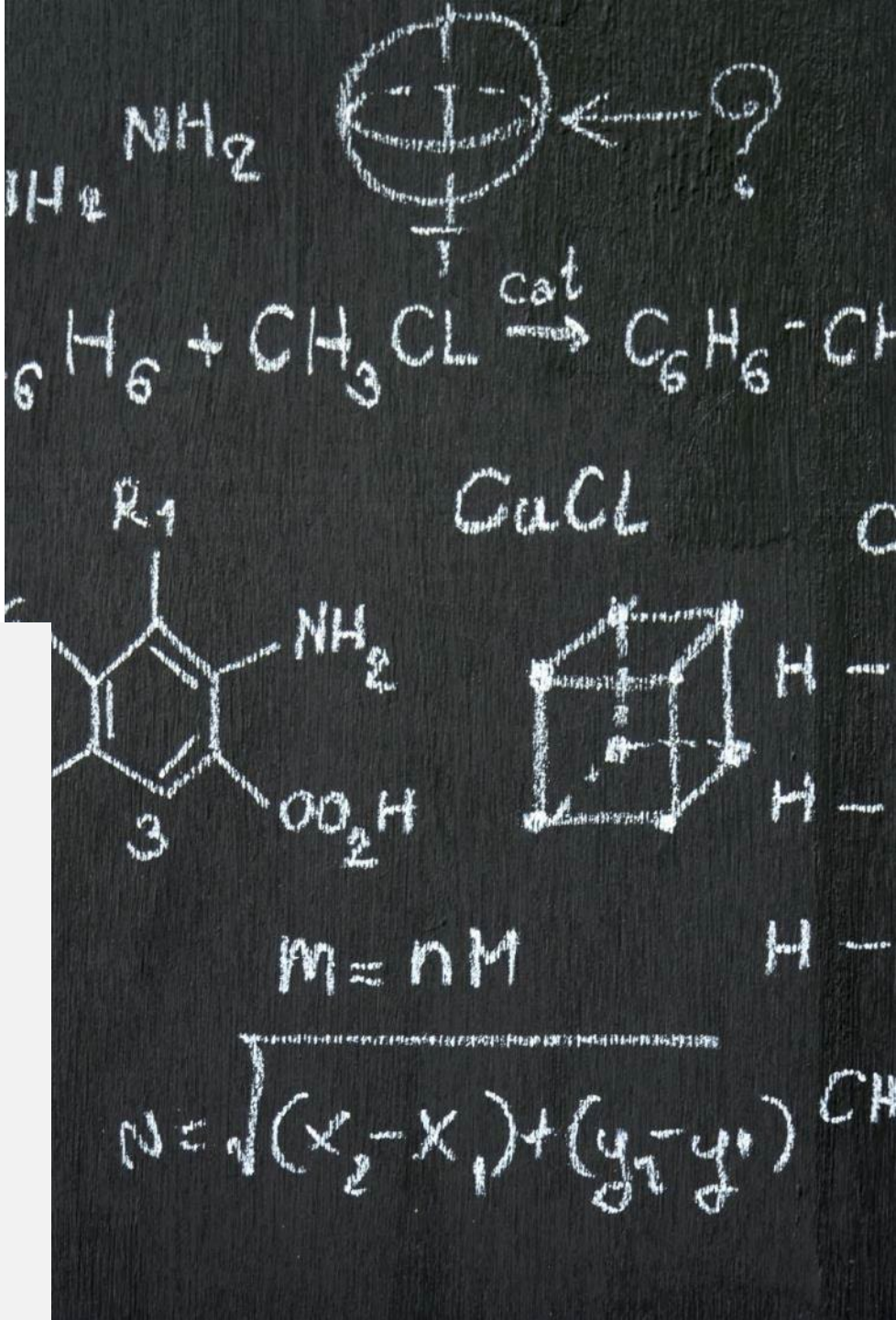
Safe Working Load (SWL)

- *The SWL is required to be marked on the item by LOLER and which appears on any report of thorough examination.*
- *The SWL is the maximum load that the accessory can lift under particular service conditions, which can vary depending on application.*

Factor of Safety

- *Coefficient of Utilisation (CoU), Factor of Safety (FOS), Working Coefficient*

- *It is a factor which is applied to the MBL to determine the WLL. It varies with the product to take account of the susceptibility to damage and considers the type of stresses the item will meet in normal use.*



Mode Factor

- *A factor applied by the user (slinger or rigger) that takes into account the geometry of a sling assembly to obtain the maximum load it may lift for a particular mode of use.*

LOLER

1. Regulation 2 - Interpretation

2. Regulation 3 - Application

3. Regulation 7 – Marking

4. Regulation 8 – Organisation

5. Regulation 9 – Thorough Examination

6. Regulation 10 – Reports and Defects

Regulation 2 - Interpretation

- *Regulation 2 defines 'Lifting Equipment' as any work equipment for lifting of lowering loads and includes its attachments used for anchoring, fixing or supporting it.*

- *Regulation 2 defines 'Lifting Accessory' as work equipment for attaching loads to machinery for lifting.*

Regulation 3 - Application

- *The duty to comply with LOLER is placed on the employer, but regulation 3 makes it clear that the term includes the following:*
  - *Self employed persons who use lifting equipment*
  - *Persons who have control of lifting equipment*
  - *Persons who supervise, manage or use lifting equipment*
  - *Or the way in which lifting equipment is used, to the extent of their control.*

Regulation 7 - Marking

- *All lifting equipment, including accessories, must be clearly marked to indicate their 'safe working loads' (SWL) - the maximum load the equipment can safely lift.*

- *Where the SWL of any equipment or accessory depends on its configuration, the information provided on the SWL must reflect all potential configurations (for example, where the hook of an engine hoist can be moved to different positions, the SWL should be shown for each position).*
- *In some cases, the information should be kept with the lifting machinery, eg the rated capacity indicator fitted to a crane, showing the operator the SWL for any of the crane's permitted lifting configurations.*

Regulation 7 - Marking

- *Accessories must also be marked to show any characteristics that might affect their safe use. This may include the weight of the parts, where their weight is significant.*

- *Where equipment is to be used to lift people, it should be marked to indicate the number of people that can be lifted in addition to the SWL of the equipment.*

- *Lifting equipment which is not designed for lifting people - but which might be used this way in error - must be clearly marked to indicate it should not be used to lift people.*

Regulation 8 - Organisation

- *All lifting operations involving lifting equipment must be:*
  - *properly planned by a competent person*
  - *appropriately supervised, and carried out in a safe manner*

Regulation 8 - Organisation

- *In planning any lifting operation, the identification and assessment of risk is key to identifying the most appropriate equipment and method for the job. Lifting operations range from:*
- *the very simple and commonplace, where minimal on-the-job planning by trained, competent people may be all that is needed to manage risk; to*
- *very complex operations, which require sophisticated and detailed planning / records, with very high levels of expert input, monitoring and supervision - undertaken by specially trained personnel*

Regulation 8 - Organisation

- *The complexity of the plan and the extent of the resources used to manage risk must reflect the complexity and difficulty of the lifting operation.*

Regulation 9 – Thorough Examination

- *Lifting equipment must be thoroughly examined in a number of situations, including:*
  - *before first use (unless there is a valid Declaration of Conformity made less than 12 months earlier)*
  - *where it depends on installation, or re-installation / assembly at another site*
  - *where it is exposed to conditions causing deterioration, liable to result in danger*

Regulation 9 – Thorough Examination

- *Records of thorough examinations should be made and, where defects are identified, they should be reported to both the person using the equipment (and to any person from whom it has been hired or leased), and the relevant enforcing authority (HSE for industrial workplaces; local authorities for most other workplaces).*

Regulation 10 – Reports and Defects

- *A person making a thorough examination for an employer under regulation 9 shall –*
- *(a) notify the employer forthwith of any defect in the lifting equipment which in his opinion is or could become a danger to persons;*

- *(b) as soon as is practicable make a report of the thorough examination in writing authenticated by him or on his behalf by signature or equally secure means and containing the information specified in Schedule 1 to – The employer; and*

Regulation 10 – Reports and Defects

- *Where there is in his opinion a defect in the lifting equipment involving an existing or imminent risk of serious personal injury, send a copy of the report as soon as is practicable to the relevant enforcing authority.*

- *Every employer who has been notified under paragraph (1) shall ensure that the lifting equipment is not used before the defect is rectified.*

- *In normal circumstances the report should be completed within 28 days of the examination and in the event of serious defects reports should be made forthwith (immediately)*

Chain Slings

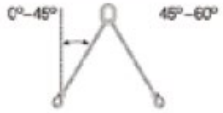
Two Leg Chain Slings

Single Leg Chain Slings

Three Leg Chain Slings

Four Leg Chain Slings

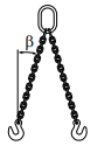
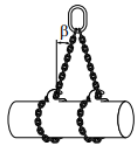
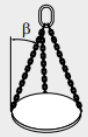
WORKING LOAD LIMITS FOR G100 AND G80 CHAINS

Chain Size (mm)	Grade	WORKING LOAD LIMITS IN TONNES					
		 Single Leg	 Endless	 Two Leg		 Three & Four Leg	
6	100	1.4	2.2	2.0	1.4	2.9	2.1
7	80	1.5	2.5	2.12	1.5	3.15	2.24
8	80	2.0	3.15	2.8	2.0	4.25	3.0
8	100	2.5	4.0	3.5	2.5	5.3	3.8
10	80	3.15	5.0	4.25	3.15	6.7	4.75
10	100	4.0	6.4	5.6	4.0	8.4	6.0
13	80	5.3	8.5	7.5	5.3	11.2	8.0
13	100	6.7	10.6	9.5	6.7	14.0	10.0
16	80	8.0	12.5	11.2	8.0	17.0	11.8
16	100	10.0	16.0	14.0	10.0	21.0	15.0
20	80	12.5	20.0	17.0	12.5	26.5	19.0
20	100	16.0	25.6	22.4	16.0	33.6	24.0
22	80	15.0	23.6	21.2	15.0	31.5	22.4
22	100	19.0	30.4	26.5	19.0	40.0	28.0
26	80	21.2	33.5	30.0	21.2	45.0	31.5
26	100	26.5	42.4	37.1	26.5	55.7	39.8
32	80	31.5	50.0	45.0	31.5	67.0	47.5

GRADE 12 LOAD CHART

Load capacities of pewag winner pro.

The load capacities as shown in the table are the maximum values of the various sling types, stated according to the standard (Uniform Load) method of rating.

Safety factor 4		I-leg-chains		II-leg-chains		II-leg-chains		III- + IV-leg-chains
								
Angle of inclination	**β**	**-**	**-**	**0° – 45°**	**45° – 60°**	**0° – 45°**	**45° – 60°**	**0° – 45°**
Load factor		**1**	**0.8**	**1.4**	**1**	**1.12**	**0.8**	**2.1**
Code	**d**	**Load capacity [kg]**						
WINPRO 7	7	2,360	1,900	3,350	2,360	2,650	1,900	5,000
WIN 7	7	1,900	1,500	2,650	1,900	2,120	1,500	4,000
Ni 7 G8	7	1,500	1,200	2,120	1,500	1,700	1,200	3,150
WINPRO 8	8	3,000	2,360	4,250	3,000	3,350	2,360	6,300
WIN 8	8	2,500	2,000	3,550	2,500	2,800	2,000	5,300
Ni 8 G8	8	2,000	1,600	2,800	2,000	2,240	1,600	4,250
WINPRO 10	10	5,000	4,000	7,100	5,000	5,600	4,000	10,600
WIN 10	10	4,000	3,150	5,600	4,000	4,250	3,150	8,000
Ni 10 G8	10	3,150	2,500	4,250	3,150	3,550	2,500	6,700
WINPRO 13	13	8,000	6,300	11,200	8,000	9,000	6,300	17,000
WIN 13	13	6,700	5,300	9,500	6,700	7,500	5,300	14,000
Ni 13 G8	13	5,300	4,250	7,500	5,300	5,900	4,250	11,200
WINPRO 16	16	12,500	10,000	17,500	12,500	14,000	10,000	26,500
WIN 16	16	10,000	8,000	14,000	10,000	11,200	8,000	21,200
Ni 16 G8	16	8,000	6,300	11,200	8,000	9,000	6,300	17,000

Marking

The marking of a chain sling may be on the main ring or master ring. Often with a tag fitted to the upper terminal fitting in such a way that it does not obstruct the free movement of any part of the sling. The usual method of marking is by hard stamping.

The following information should be on the chain sling;

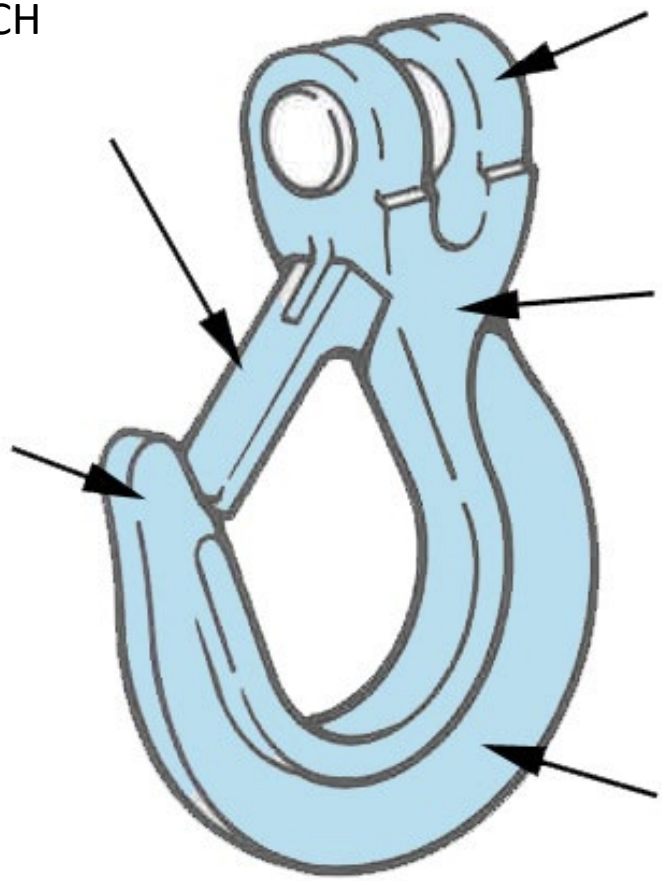
- ✓ *Identification mark*
- ✓ *Safe working load, in the case of a multi-leg sling this must include the rated angle of angle range*
- ✓ *The grade mark*
- ✓ *BS EN 818-4 calls for the manufacturers of assemblers name or symbol to be given and, in the case of multi-leg slings, the number of legs must be stated.*
- ✓ *The CE mark is applicable*

Pre Use Inspection

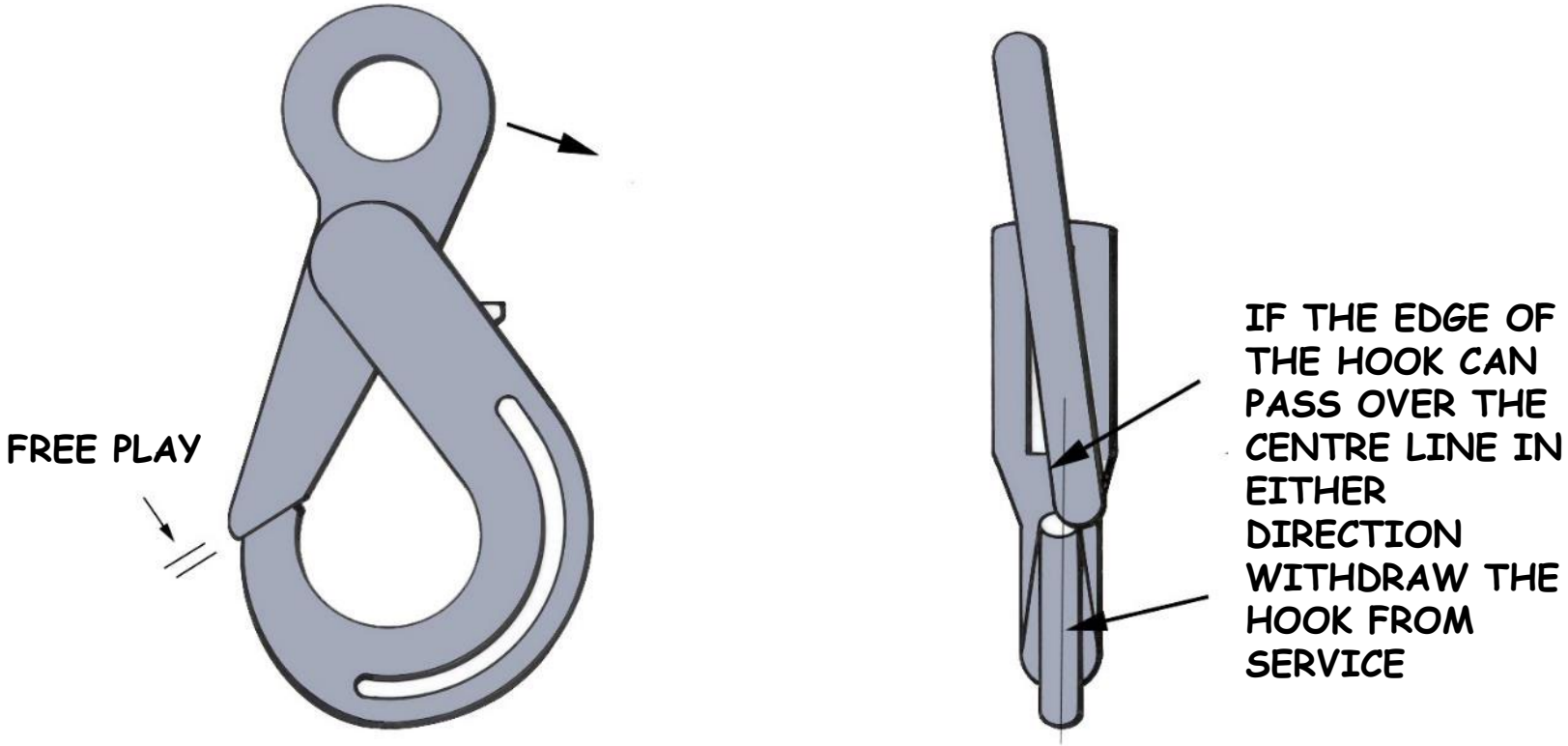
During the examination of chain slings the following should be checked:

- *Markings should be clear and legible*
- *Hooks for openings and distortion*
- *Links and rings for distortion or roundness.*
- *Chain for bent and twisted links. The links should articulate freely.*
- *Cracks, weld faults and marks in weld areas.*

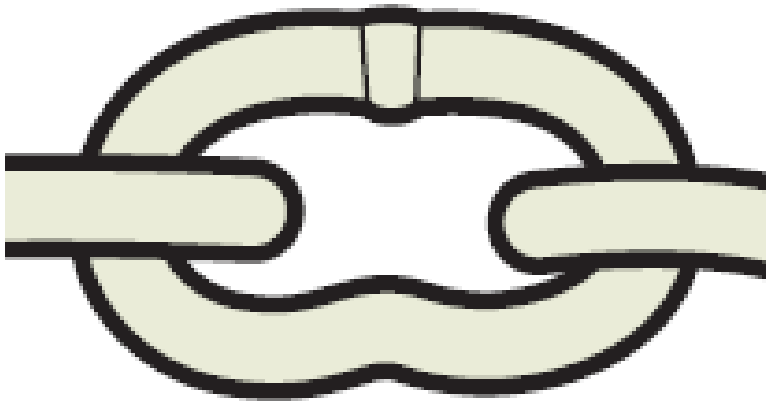
PRE USE CHECK



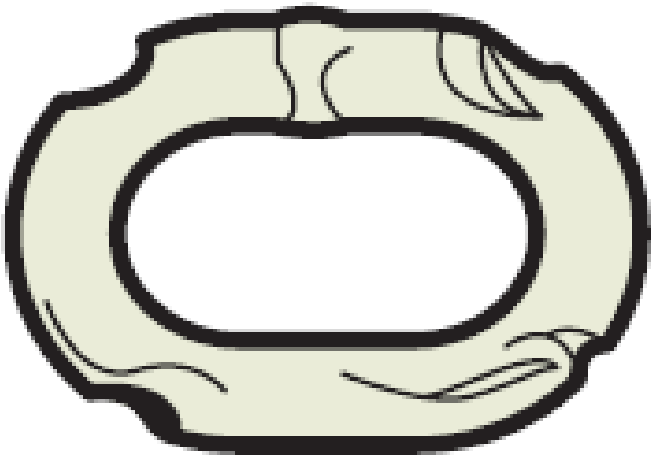
PRE USE CHECK



Bent Link



Gouged Link



Textile Slings – Round slings & Web Slings

Duplex Webbing Slings

Round Slings

MATERIALS

- *Webbing slings and Round slings are made from the following materials:*
  - *Polyamide (Nylon) (Tag colour **GREEN**)*
  - *Polyester (Tag colour **BLUE**)*
  - *Polypropylene (Tag Colour **BROWN**)*

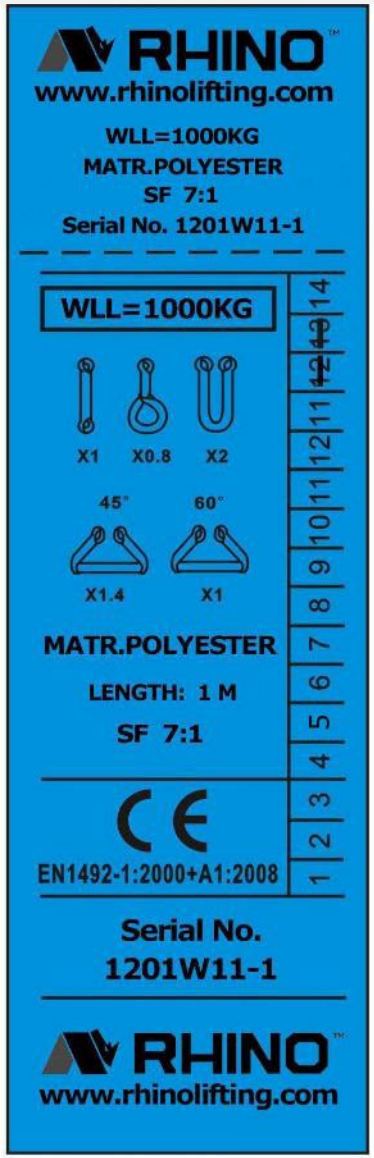
These may be endless or in the form of single or multi-leg slings which may terminate in soft eyes of metal terminal fittings.

IDENTIFICATION

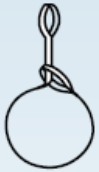
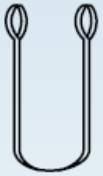
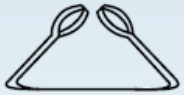
The marking on the label must contain the following;

1. *SWL in straight and all other angles*
2. *Distinguishing mark (Serial number)*
3. *Nominal length*
4. *Material of the webbing*
5. *Manufactures name*
6. *CE mark*
7. *Standard manufactured to*
8. *Safety factor*
9. *Year of manufacture*

Example of a standard polyester webbing sling label



WEBBING SLING CAPACITIES

Cap	Colour	Vertical x 1	Choke x 0.8	Basket 0° x 2	Basket 0°–90° x 1.4	Basket 120° x 1
						
1t	VIOLET	1000	800	2000	1400	1000
1.5t	WHITE	1500	1200	3000	2100	1500
2t	GREEN	2000	1600	4000	2800	2000
3t	YELLOW	3000	2400	6000	4200	3000
4t	GREY	4000	3200	8000	5600	4000
5t	RED	5000	4000	10000	7000	5000
6t	BROWN	6000	4800	12000	8400	6000
8t	BLUE	8000	6400	16000	11200	8000
10t	ORANGE	10000	8000	20000	14000	10000
12t	ORANGE	12000	9600	24000	16800	12000

COLOUR CODING

As well as the colour code the WLL is also indicated by stripes or lines along the length of the sling
i.e 1 stripe = 1tonne, 2 stripes = 2tonne and so on

Effects of Acids/Alkalis

Chemical resistance

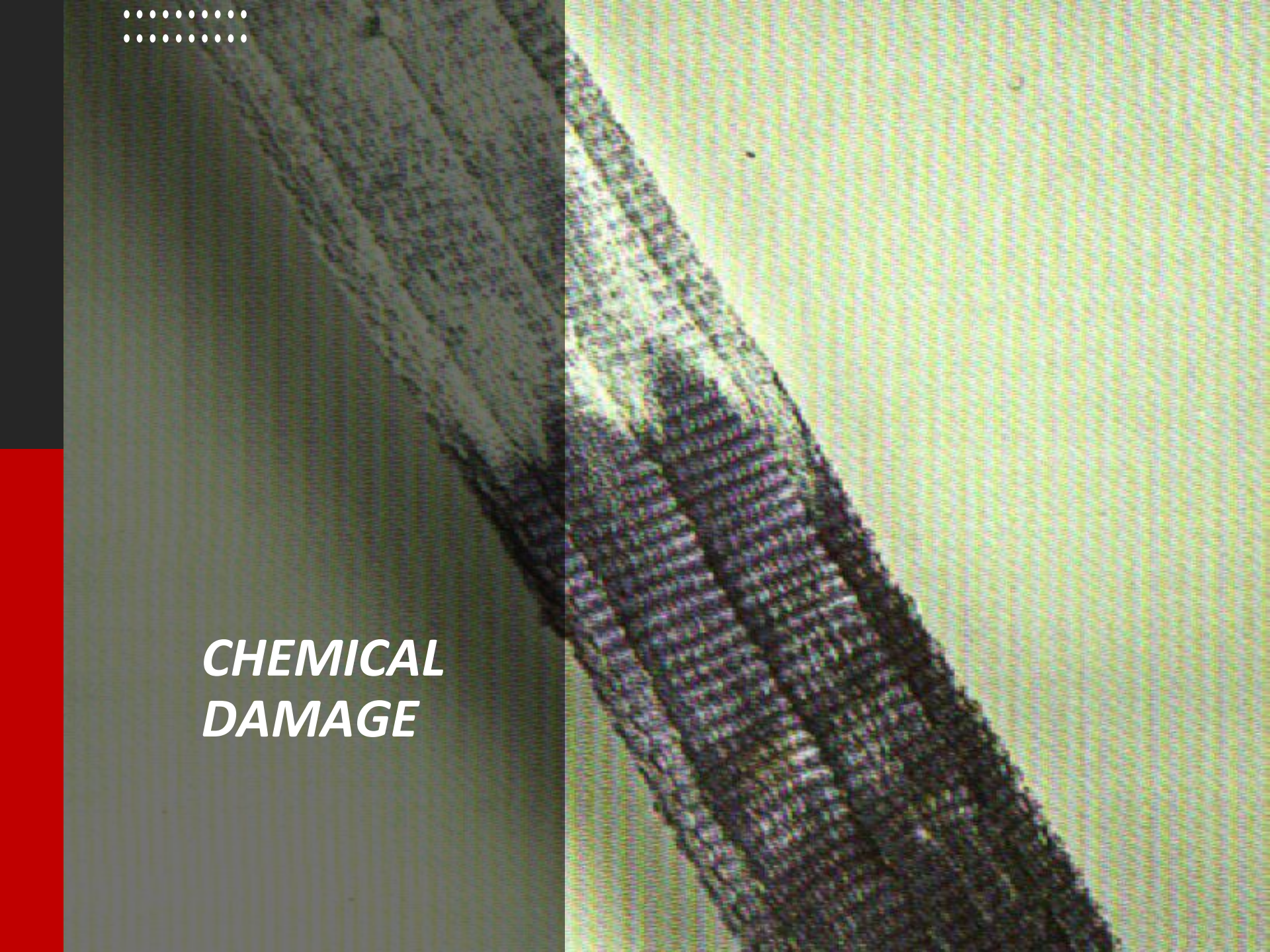
Natural fibres have no resistance to chemical attack; however the various man-made fibres have selective resistance to chemicals as follows:

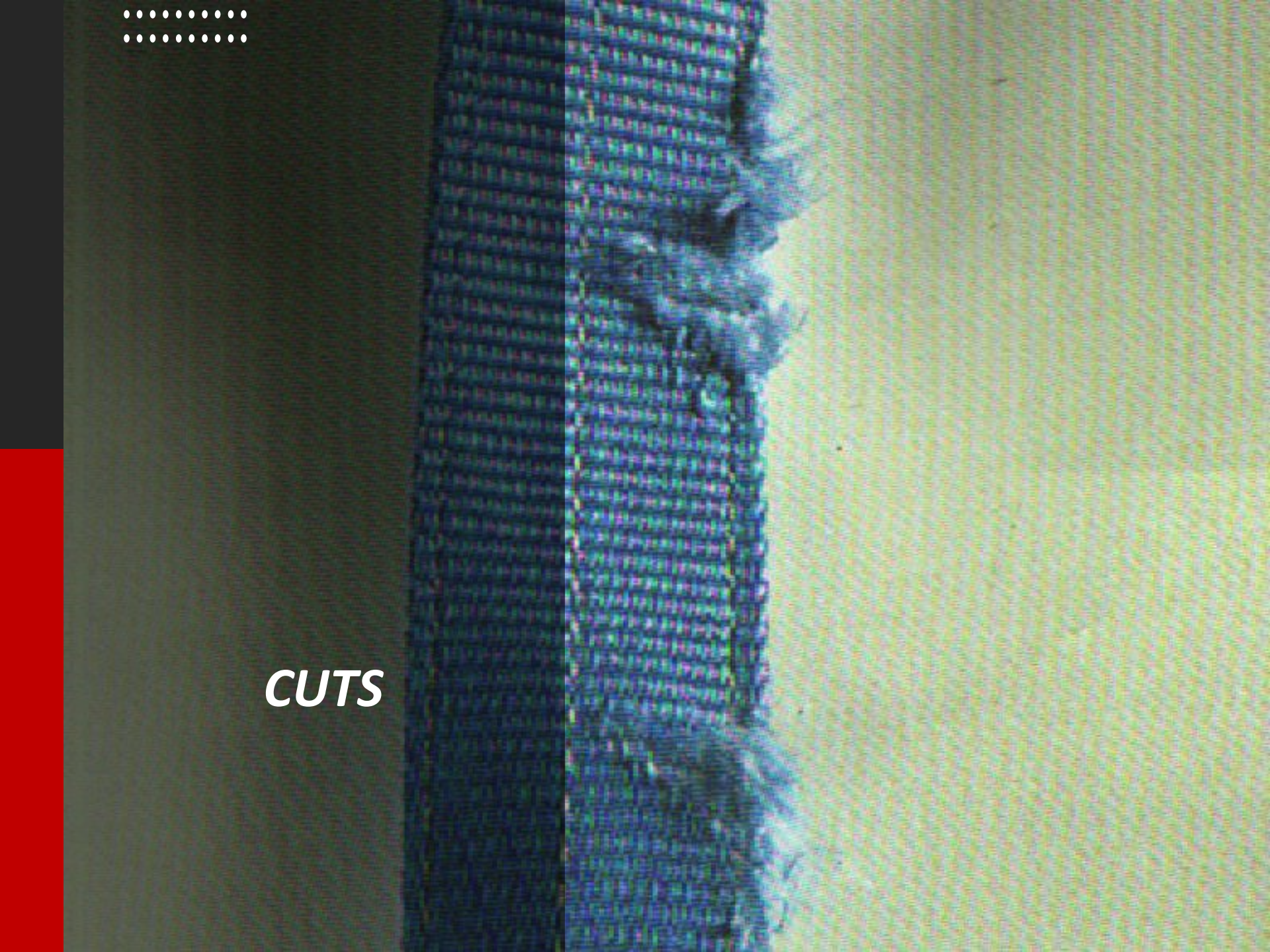
- *Polyamide is immune to the effects of alkalis, but is attacked by acids.*
- *Polyester is resistant to acids but damaged by alkalis.*
- *Polypropylene is little affected by acids or alkalis but is damaged by solvents, tars, paints etc.*

Rejection Criteria

- *Cuts especially at edge of sling*
- *Damage to stitching*
- *Burns or heat damage*
- *Chemical attack*
- *Illegible markings or lost label*
- *Knots*
- *Beware re-use of single use slings*

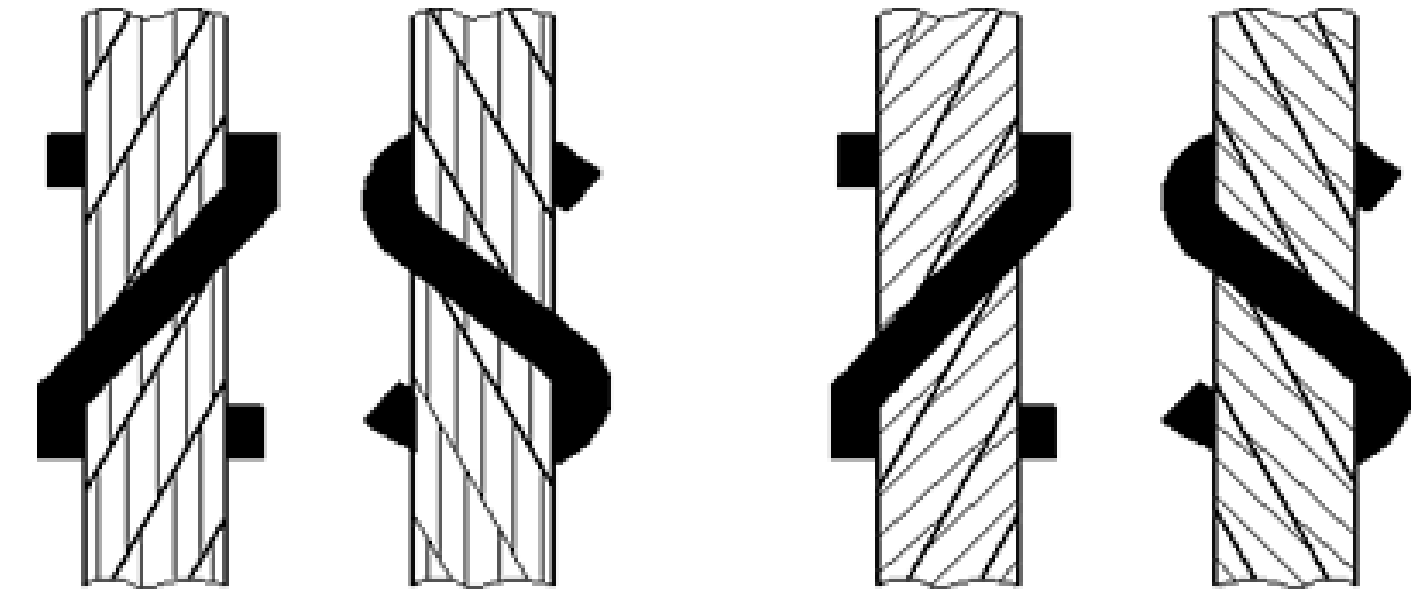

Abrasive
Damage


CHEMICAL
DAMAGE


CUTS

Steel Wire Rope and Steel Wire Rope Slings

Lays (Ordinary & Lang's)



Lays (Ordinary & Lang's)

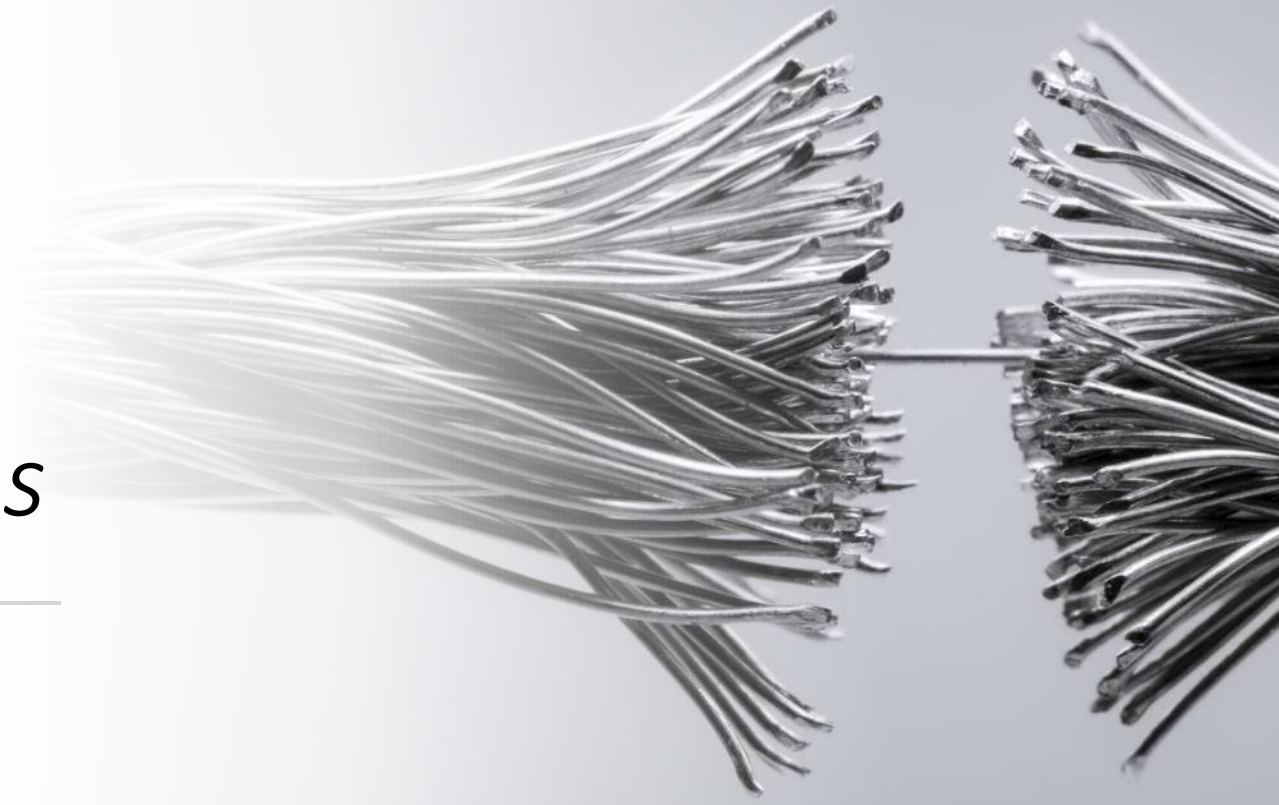
- *Conventional construction wire ropes, where the wires in the strands are spun in the opposite direction to the strands in the wire rope, can be supplied in either **Right Hand** or **Left Hand Lay**.*

- *Right hand lay is more common and is predominantly used for sling assemblies; however some hoisting applications incorporate two ropes, one of each hand to overcome load rotational characteristics during hoisting.*

- ***Lang's Lay** construction wire rope has the wires spun in the same direction as the strands in the rope and must not be used for the manufacture of sling assemblies.*

- *The construction provides a greater external contact surface area and when running over sheaves but both ends of the wire rope must be fixed and the rope prevented from rotating.*

Broken Wires

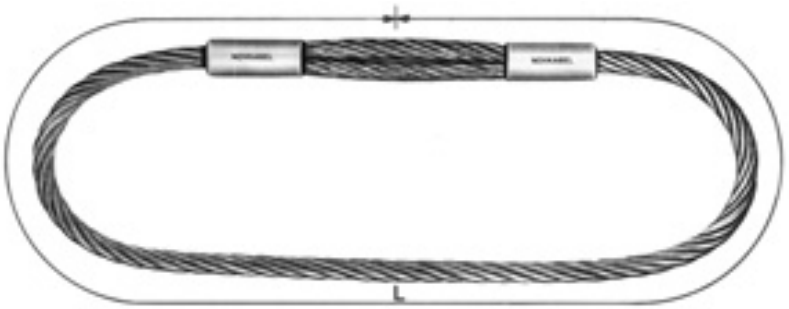


- *Broken wire (maximum 5% in any length equal to 10 times the diameter) Remember that, in certain applications, even one broken wire presents a hazard to the user or equipment*

Single Leg Wire Rope Sling with Soft Eyes at each end.

Single Leg Wire Rope Sling with Thimble eyes at each end

Endless Wire Rope Assembly



Forged Open Spelter Socket

Forged Closed Spelter Socket

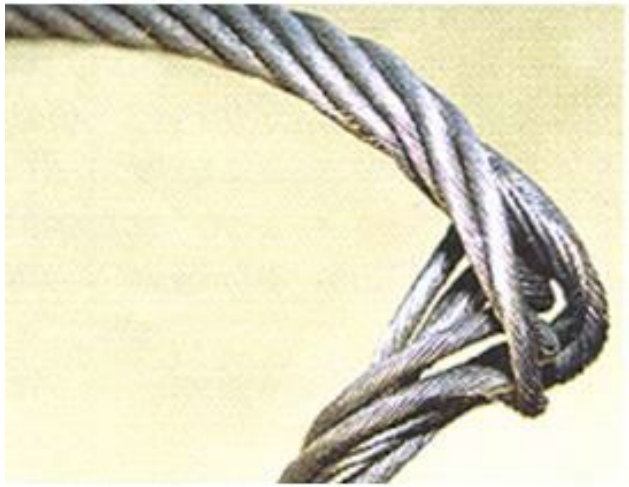
Pre Use Inspection

Pre Use Checks (Faults)

1. *Wire breaks*
2. *Corrosion*
3. *Reduction in rope diameter*
4. *Unusual rope movement*
5. *Evidence of rope end*
6. *Evidence of any incorrect fitting*
7. *Evidence of any component wear*

REJECTION CRITERIA

KINKS



- *These occur in a wire rope or sling due to improper handling. A kink starts from a loop in the wire and although it can occur in normal service, it is usually found during the handling of the wire rope prior to it going into service.*

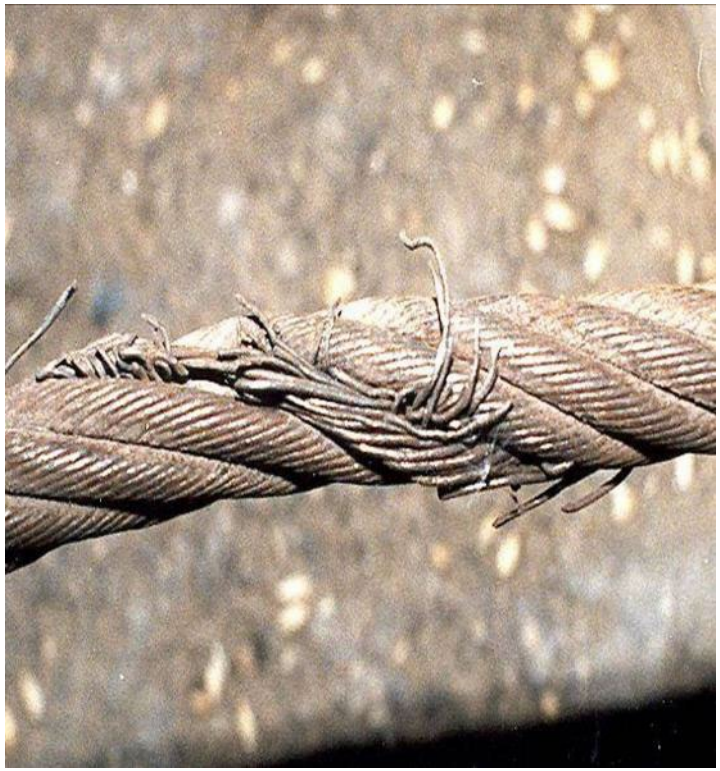
- *A loop, which has not been drawn tightly enough, can easily be removed by turning the rope in the correct direction to restore the lay. However, if the rope is pulled with the loop still present then permanent structural damage occurs and the rope is irreparably damaged at that position. A kink of this nature can result in a 25% reduction of the Breaking Load.*

LUBRICATION

- *Regular and correct lubrication or wire rope is essential to preserve the internal as well as the external condition of the rope.*
- *Ropes are supplied with internal lubrication and most have also been externally treated. After a period of service, they must be again treated with an approved neutral (non-acid) lubricant. Modern fibre cores cannot be relied on to act as lubricant reservoirs.*

FATIGUE

- *The wires of a rope can become brittle and ultimately break due to bending back and forward when passing over sharp corners. Fatigue in the outer wires is often associated with excessive wear is also set up in the inner wires due to bending and the rubbing of one wire on another, particularly when the rope lacks lubrication.*



WEAR AND CORROSION

- It is obvious that the strength of a wire rope is continually being reduced during service, owing to the action of abrasion, bending, corrosion and other factors. Inspection is necessary at regular intervals throughout the service in addition to the periodic examination and the observer must keep in mind the fact that the safety of the rope depends upon its continuing strength.

SHACKLES

SHACKLES

Large Dee Shackle

Alloy Dee Shackle c/w
Safety pin

Alloy Bow Shackle c/w
Screw type pin

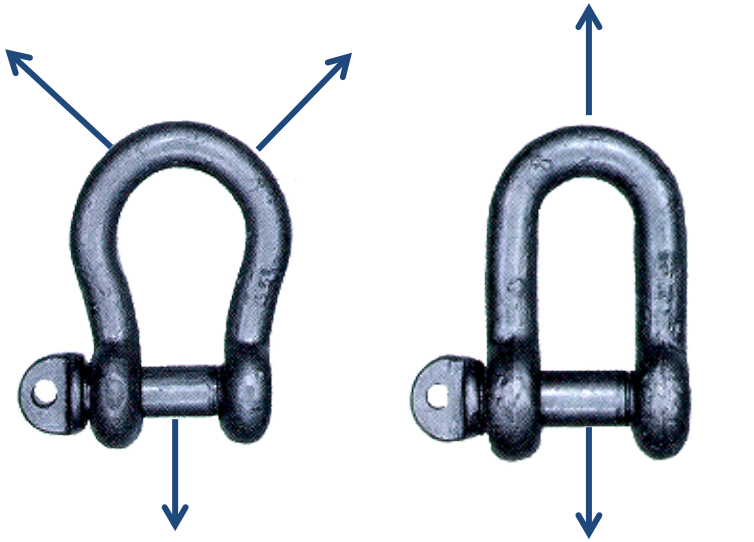
Large Bow Shackle

Alloy Dee
Shackle c/w
Screw type pin

Alloy Bow
Shackle c/w
Safety pin

DEE & BOW

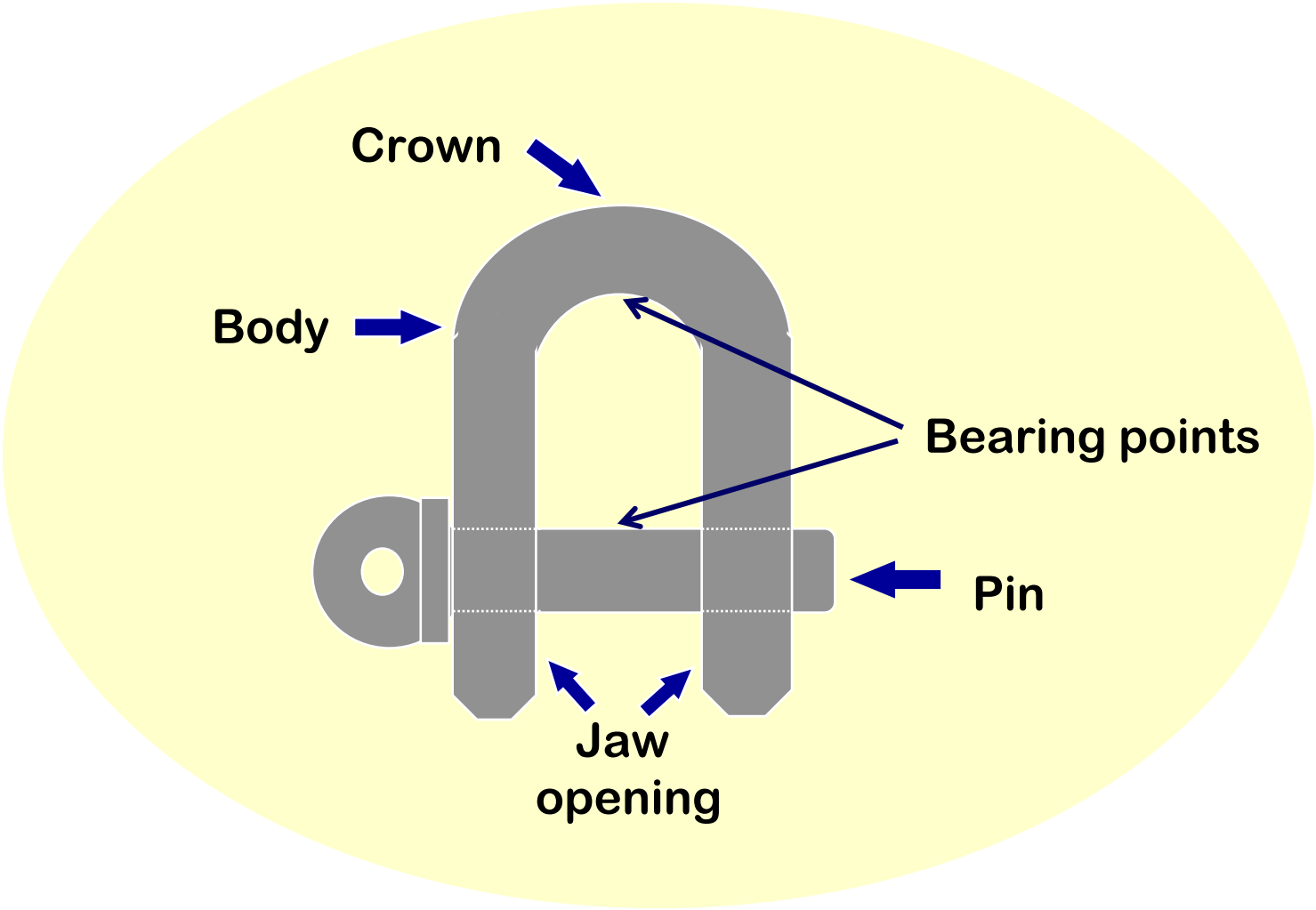
they are designed to take safe working loads between the centre of the pin and the bearing points in the crown



Bow Shackle **Dee Shackle**

Shackles must have a SWL at least equal to the total load imposed on them

DEE SHACKLE



USES

Bow Shackle used to join three or more items

Dee shackle generally used to join two items in straight line

USES

Pin types – Screw Pin and Bolt & Nut with Split Pin

What are the advantages of this type of pin?

Bolt, Nut & Pin – close on last thread allowing rotation. Pin fitted hand tight

Pre Use Inspection

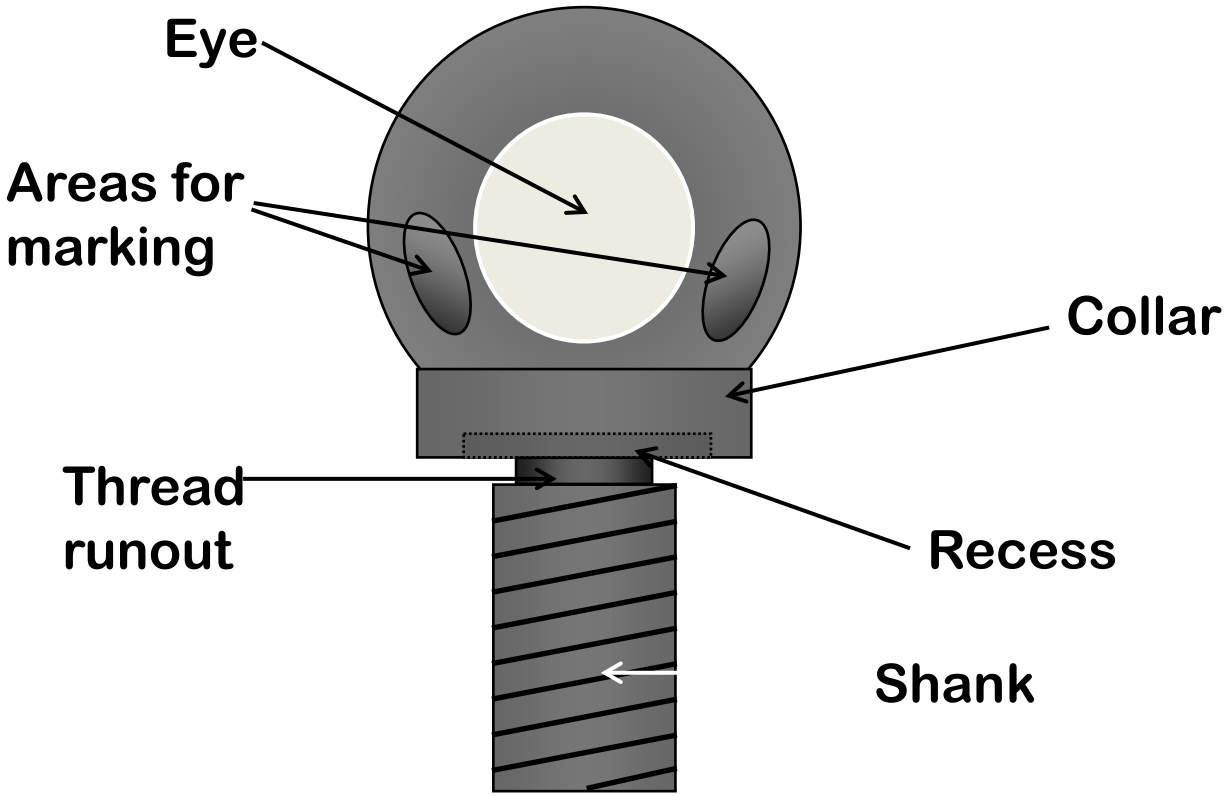
1. *Correct marking (SWL, ID, Grade, Size and Manufactures stamp).*
2. *Remove shackle pin and examine for wear, deformation and cracking.*
3. *Ensure it is the correct pin for the shackle.*
4. *Check pin threads for wear/deformation.*
5. *Examine shackle body for deformation and cracking and check for wear in the crown and pin holes.*
6. *Check alignment of pin holes and ensure the pin fits correctly.*
7. *In the case of safety pin shackles, ensure split pins are fitted.*

Rejection Criteria

- *Deformation and cracking.*
- *Wrong pin fitted for the shackle.*
- *Examine shackle body for deformation and cracking and check for wear in the crown and pin holes.*
- *The maximum permissible wear is 8% reduction in material diameter on either the pin or the body*
- *In the case of safety pin shackles, split pins are missing*

EYEBOLTS

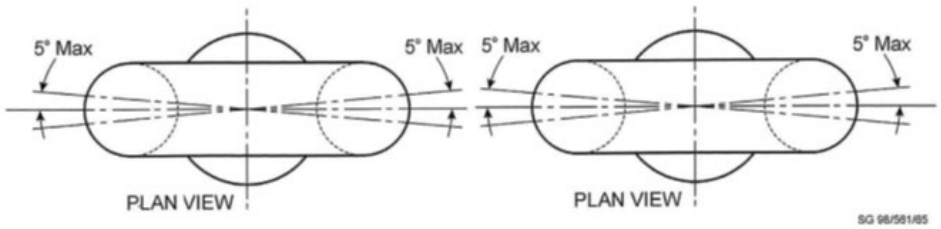
COLLAR EYEBOLT



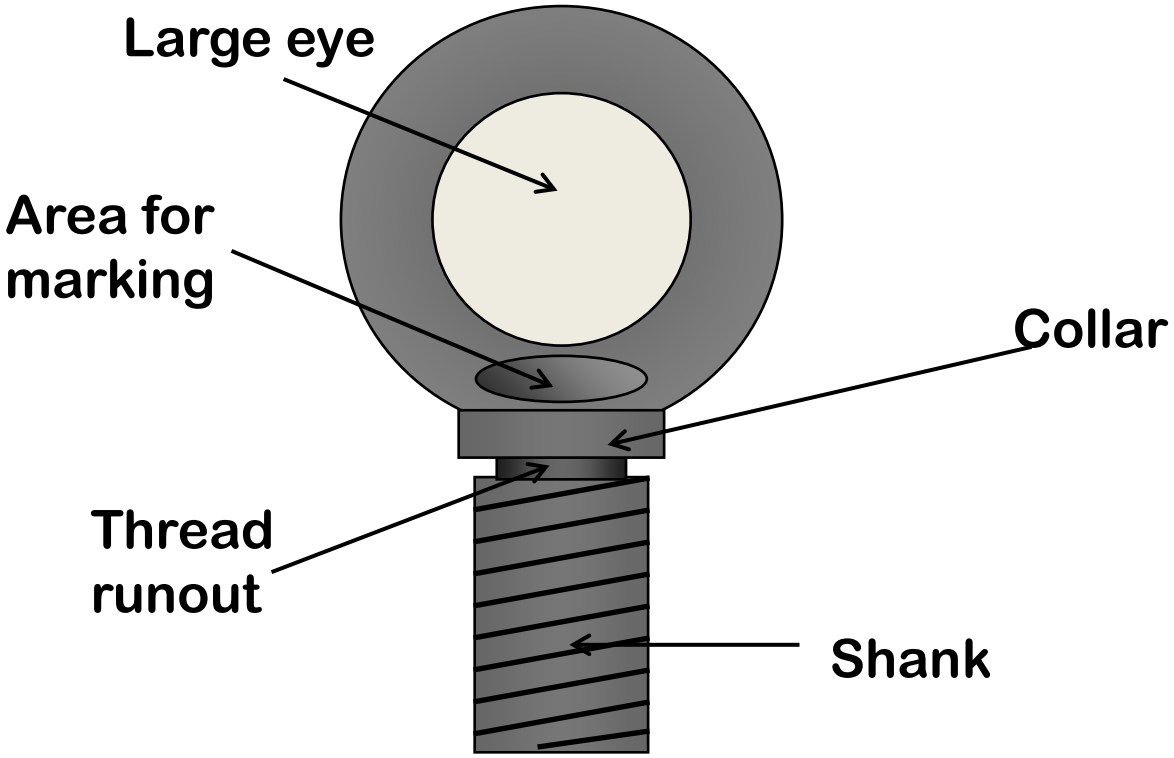
COLLAR EYEBOLT

Collar Eyebolts: Suitable for most general duties

Always use a shackle to connect hook to a collared eye bolt as the eye is too small to accept a hook of the same capacity

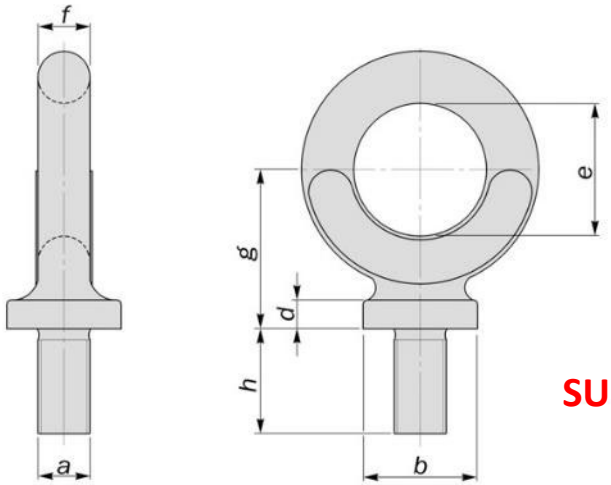


DYNAMO EYEBOLT



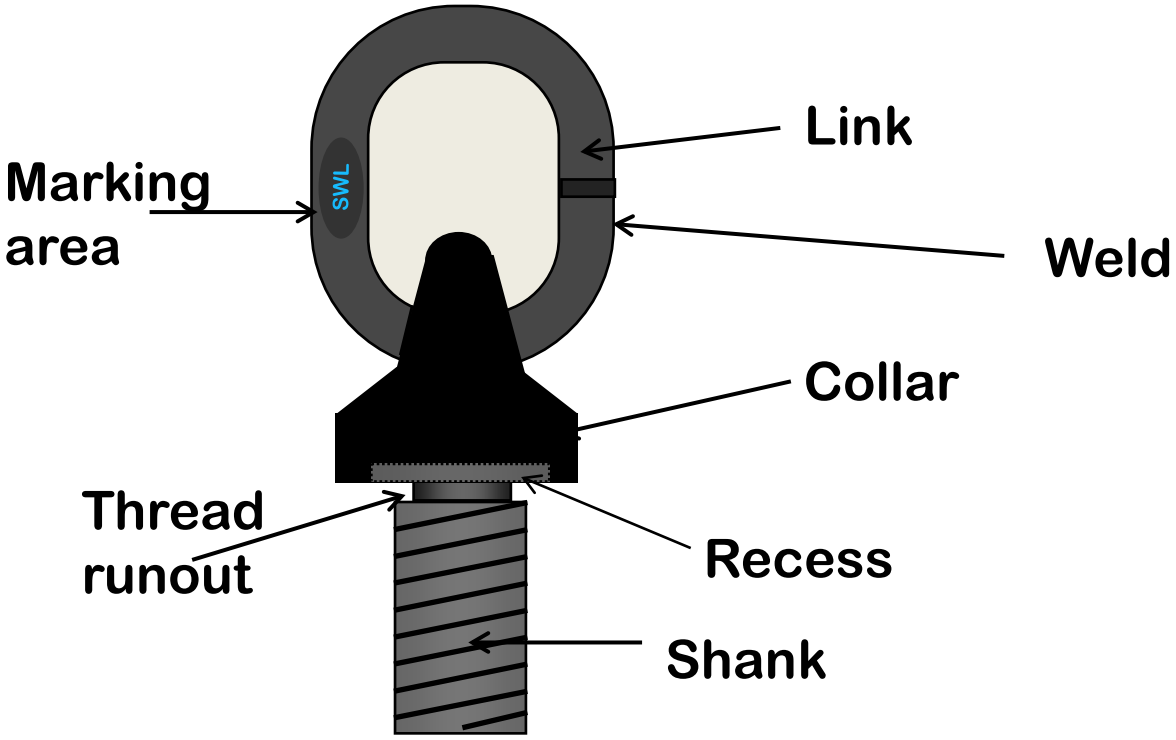
DYNAMO EYEBOLT

Dynamo Eyebolts: Suitable only where a truly axial load is guarantee



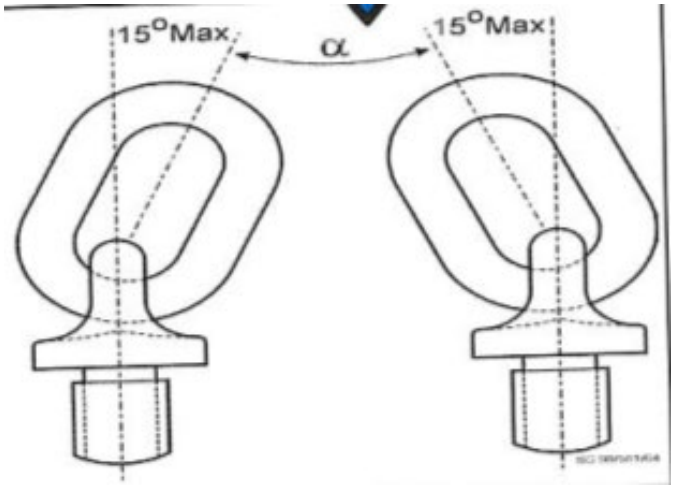
SUITABLE FOR VERTICAL LIFTS ONLY

EYEBOLT WITH LINK



EYEBOLT WITH LINK

Eyebolt with link: Suitable for most general duties



Should be used where hooks are fitted to 2 leg sling.

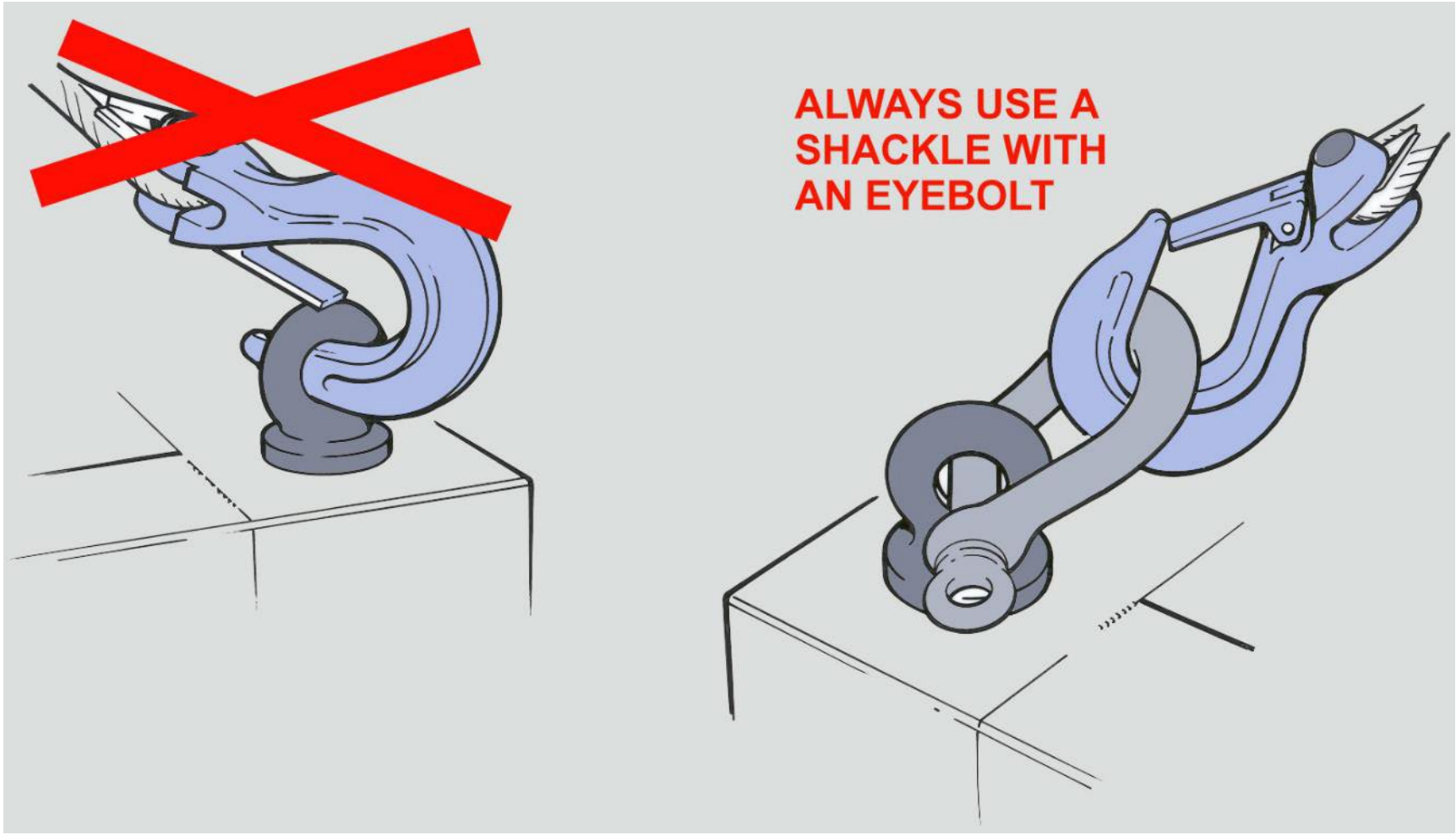
Can be loaded in any direction up to marked SWL provided the angle of the load to the axis does not exceed 150 and then a reduced SWL up to 450

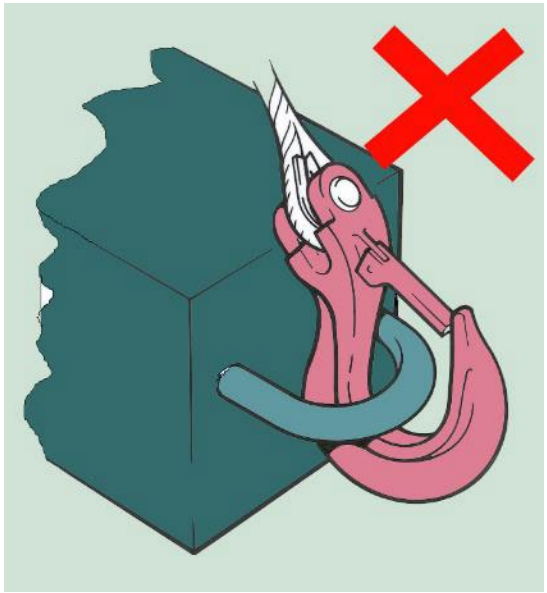
Pre Use Inspection

- *Correct marking (SWL, ID)*
- *Examine threads and check for wear, stretch or impact damage. The threads must be complete (no broken threads) and full (i.e. no. flats on top).*
- *The threads should be concentric and fit neatly in a standard nut. If stretch is suspected remove from service.*
- *Examine the eye of the bolt and check for wear/stretch/distortion and look for hairline cracks at the crown of the rings. This also applies to the link if fitted).*
- *Check squareness of shank against shoulder.*

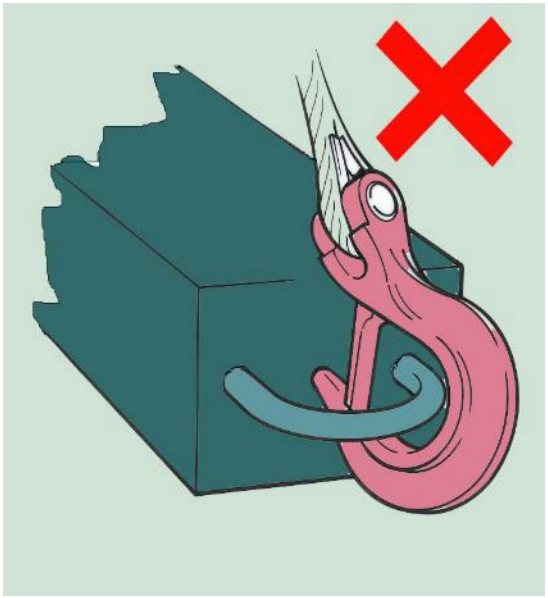
Rejection Criteria

- *Distortion, such as bent shank, deformed eye, reduced diameter at undercut.*
- *Thread worn, corroded, damaged or incorrectly formed.*
- *Damage, such as nicks, cracks, gouges, corrosion.*
- *Safe working load, thread identification and identification marking missing or illegible.*

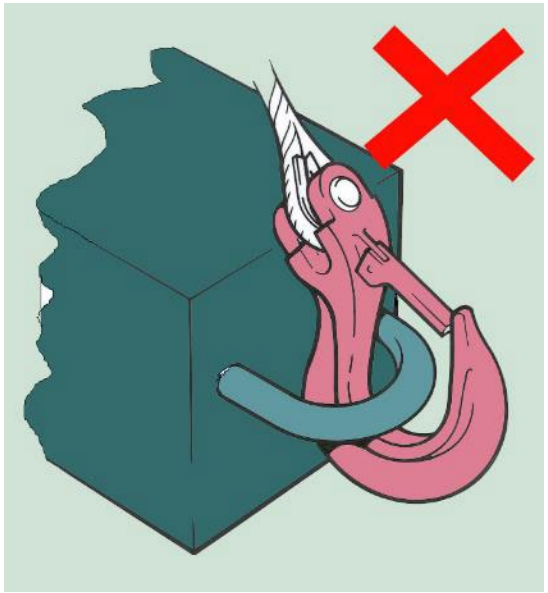

ALWAYS USE A
SHACKLE WITH
AN EYEBOLT



BACK HOOKING



SIDE HOOKING



TIP HOOKING

HOOKING

New Types

Part Code	Thread	 1 0°	 2 0°	 1 90°	 2 90°	 2 0-45°	2 45-60°	 2 unsymm.	 3-4 0-45°	3-4 45-60°	 3-4 unsymm
8-211-003	M 8	0.3	0.6	0.3	0.6	0.42	0.3	0.3	0.63	0.45	0.3
8-211-006	M10	0.63	1.26	0.63	1.26	0.88	0.63	0.63	1.32	0.95	0.63
8-211-010	M12	1.0	2.0	1.0	2.0	1.4	1.0	1.0	2.1	1.5	1.0
8-211-012	M14	1.2	2.4	1.2	2.4	1.7	1.2	1.2	2.5	1.8	1.2
8-211-015	M16	1.5	3.0	1.5	3.0	2.1	1.5	1.5	3.1	2.2	1.5
8-211-020	M18	2.0	4.0	2.0	4.0	2.8	2.0	2.0	4.2	3.0	2.0
8-211-025	M20	2.5	5.0	2.5	5.0	3.5	2.5	2.5	5.2	3.7	2.5
8-211-040	M24	4.0	8.0	4.0	8.0	5.6	4.0	4.0	8.4	6.0	4.0
8-211-042	M27	4.0	8.0	4.0	8.0	5.6	4.0	4.0	8.4	6.0	4.0
8-211-050	M30	5.0	10.0	5.0	10.0	7.0	5.0	5.0	10.5	7.5	5.0
8-211-070	M36	7.0	14.0	7.0	14.0	9.8	7.0	7.0	14.7	10.5	7.0
8-211-080	M36	8.0	16.0	8.0	16.0	11.2	8.0	8.0	16.8	12.0	8.0
8-211-100	M42	10.0	20.0	10.0	20.0	14.0	10.0	10.0	21.0	15.0	10.0
8-211-150	M42	15.0	30.0	15.0	30.0	21.0	15.0	15.0	31.5	22.5	15.0
8-211-200	M48	20.0	40.0	20.0	40.0	28.0	20.0	20.0	42.0	30.0	20.0

New Types

Loadable in any direction

Safety factor 4:1

HAND CHAIN BLOCKS

Identification

- *The following information should be permanently and legibly marked on a suitable part of the block or plate attached to the block*
  - *Identification mark*
  - *Safe working load*
  - *The series of type designation*
  - *Size and grade of the load chain*
  - *Year of manufacture*
  - *Name of maker or supplier*

Pre Use Inspection

1. Ensure the id mark is clear and safety working load is correct
2. Top and bottom hooks – for opening, deformation and swiveling
3. Safety catches missing
4. Signs of damage to the slack end anchor which connects the chain to the block
5. The load chain or hand chain is worn or damaged
6. Free running of the block
7. Check the load chain wheel
8. Check sprocket and chain guides for damage/wear

Lever Hoists

Identification

- *The following information should be permanently and legibly marked on a suitable part of the lever hoist or plate attached to the lever hoist*
  - *Identification mark*
  - *Safe working load*
  - *The series of type designation*
  - *Size and grade of the load chain*
  - *Year of manufacture*
  - *Name of maker or supplier*

Pre Use Inspection

1. Ensure the id mark is clear and safety working load is correct
2. Top and bottom hooks – for opening, deformation and swivelling
3. Safety catches missing
4. The load chain is worn or damaged
5. Free running of the chain trough the lever hoist
6. Check sprocket and chain guides for damage/wear

Jaw Winches (Tirfor)

Lifting Pull Machine (Jaw Winches or Tirfors) with Wire Rope

Uses & Limitations

- *These are lever operated machines which use a gripping action to haul a wire rope. They are self-sustaining and may be use for both lifting and pulling applications.*
- *They may be used in conjunction with pulley blocks either to increase the mechanical advantage or to divert the line of pull.*
- *The wire rope passes through the machine and can be stored on a special coiler separate from the machine. This makes them ideal for extremely high lifts.*
- *They are frequently used for maintenance and construction work*

Pre Use Inspection

Lifting Pull Machine

- *General operation. This will vary with the type of machine, but should generally be smooth, without jerkiness.*
- *Operation of brake or other sustaining mechanism.*
- *Operation of limits and safety devices.*
- *Correct mating of moving parts, e.g. gears.*
- *General condition of materials and anchorages.*
- *Mechanical damage, cracks, distortion, corrosion and chemical attack.*

Pre Use Inspection

Wire Rope

- *Kinks in the rope. Wear in rope.*
- *Change in diameter (increase or decrease) and increase in length.*
- *Lubrication and internal condition.*
- *Broken wires, do not use*
- *Condition of splices, ferrule secured eyes etc.*
- *Corrosion and chemical attack. NB: With some constructions of wire rope, internal corrosion can cause an increase in diameter.*

Beam Clamps / Beam Trolleys

BEAM CLAMP

BEAM TROLLEY

GEARED BEAM TROLLEY

Pre Use Inspection

Beam Clamp

- *The SWL and ID is clearly marked*
- *Examine suspension shackle and check for wear, stretch and distortion*
- *Examine load bar and check for wear, stretch or distortion*
- *Check jaws for deformation*

Pre Use Inspection

Beam Trolley

- *SWL and ID is clearly marked*
- *Examine side plates for wear, distortion and cracks*
- *Examine wheels, axles, bearings, wheel treads and flanges*
- *If geared travel, check gear teeth on wheel flanges and drive sprocket of hand chain wheel shaft for alignment, broken teeth etc*
- *Check hand chain and hand chain wheel (Geared type)*
- *Examine load bar and adjustment bar for distortion and cracking*

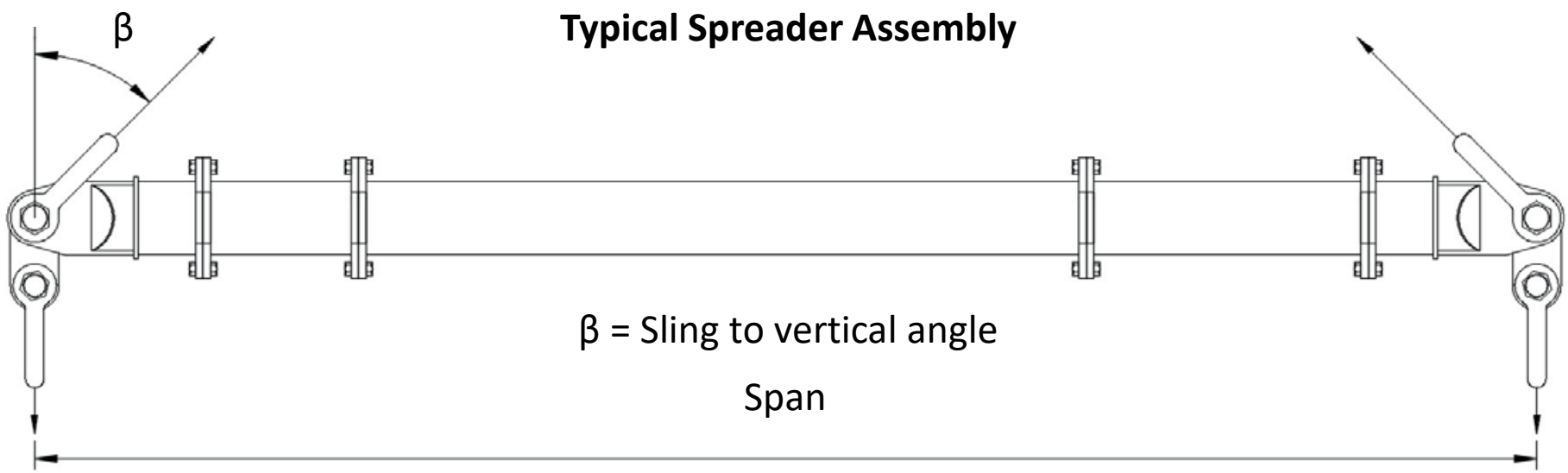
Spreader Beams

Modular Spreader Beams

Uses & Limitations

- *Spreader beams are a versatile system of interchangeable components which are assembled to provide a wide array of lifting solutions from simple 2 point spreader beams to complex multi-beam lifting rigs.*
- *They can be assembled to form virtually any span or configuration of lifting rig allowing for a cost effective lifting solution for a wide range of lifting and handling applications*

Assembly Procedure



PROCEDURE

1. *Lay out the Struts and End Units in the correct configuration*
2. *Check that all pairs of flanges are clear from debris, sand etc. before connection.*
3. *Bolt the components together using bolts, nuts & washers provided. Tighten the bolts to a torque as shown overleaf, 4 bolts per connection. The number and grade of bolts is critical for the safe use of the spreader particularly at longer spans.*
4. *Place drop link inside the jaw of an end unit, with the larger hole of drop link lined up with the End Unit hole.*
5. *Place a top sling onto the body of a top shackle, and put jaw of top shackle over the end unit jaw.*
6. *Put top shackle pin through shackle, end unit jaw and drop link, and repeat for other spreader beam end.*
7. *Attach free ends of top slings to crane hook.*
8. *Attach lower slings and shackles to lower holes of drop links, and attach them to the load to be lifted.*
9. *The assembled spreader beam and lifting rig must be thoroughly checked by a competent person prior to lifting.*

Pre Use Inspection

Modular Spreader Beams

- Attachment points for shackles used for lifting the beam or attaching the load should be inspection for wear and elongation of holes.
- Bolted connections need to be checked for tightness
- The beam should be checked for distortion
- Particular attention should be given to the hollow sections which man have dents of localised buckling and to the flanges of structural steel sections.