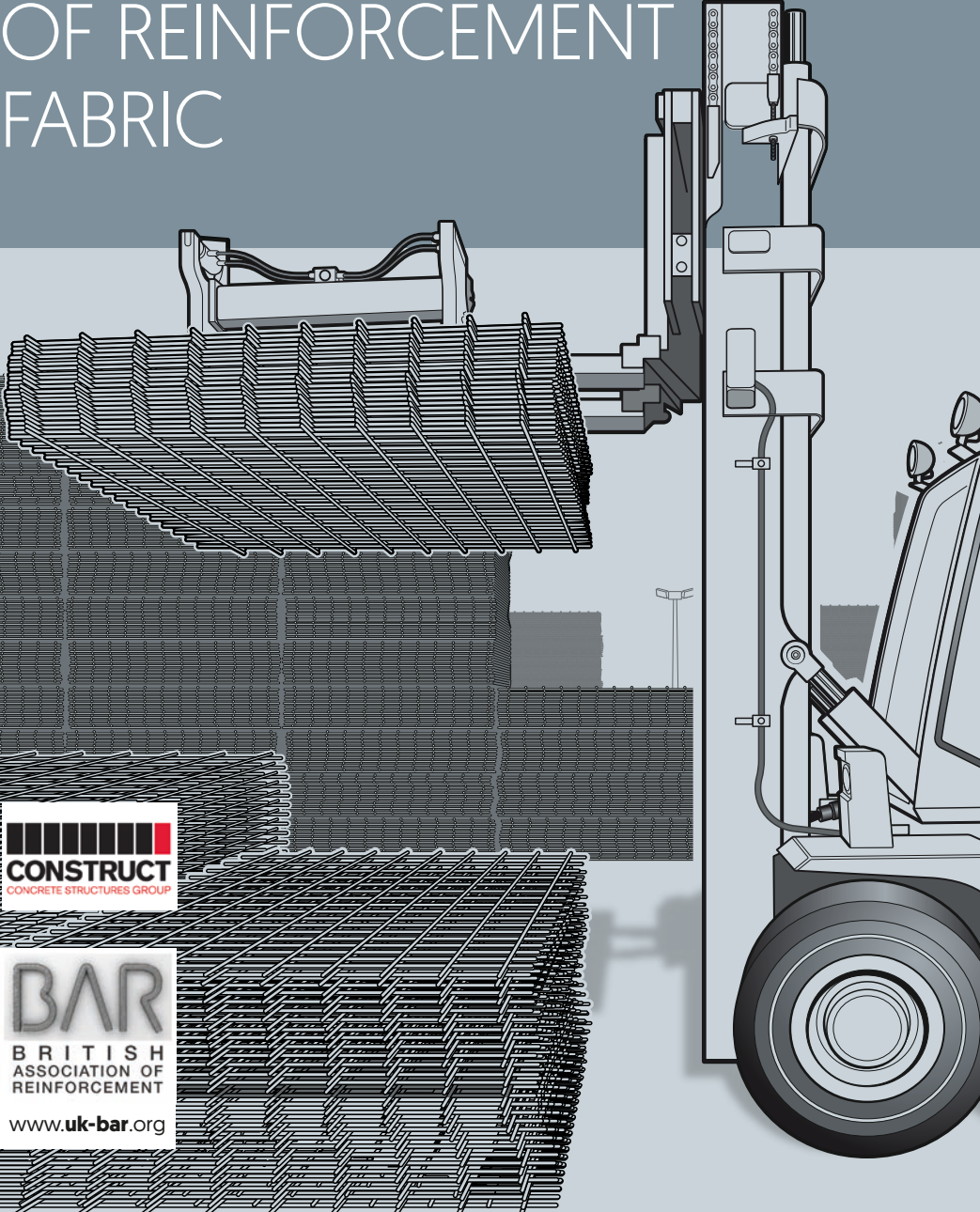


BEST PRACTICE GUIDANCE

# THE SAFE OFF-LOADING OF REINFORCEMENT FABRIC



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## Disclaimer

This document has been prepared by the British Association of Reinforcement [BAR] to provide best practice guidance for the safe off-loading of reinforcement fabric. All advice and information herein is intended for those who will evaluate the significance and limitations of its contents and take responsibility for their use and application. No liability (including that for negligence) for any loss resulting from such advice and information is accepted by BAR. Readers should note this publication is subject to revision from time-to-time and they should, therefore, ensure that they are in possession of the latest version.

[www.uk-bar.org](http://www.uk-bar.org)

The British Association of Reinforcement [BAR] is the trade association of UK manufacturers and fabricators of steel reinforcement products including cut and bent bar and mesh.

BAR aims to add value to the reinforcement industry through market and product development, promotion of good industry and health and safety practices and forwarding the development of the reinforced concrete industry as a whole.

BAR is a member of CARES and all BAR members are CARES approved.

# INTRODUCTION

This best practice guidance is intended for the use of reinforcement suppliers, hauliers (and drivers) and customers (stockists and construction sites) in order provide a safe working environment for those involved in the off-loading of bundles of reinforcement fabric from delivery vehicles.

The guidance is provided to avoid the potential for accidents while off-loading at stockists and construction sites. The procedures outlined cover off-loading using a range of equipment known to be in regular use.

The best practice guidance includes:

- Preparation of the load for off-loading by the delivery driver,
- Various alternative safe working procedures for site staff when off-loading bundles of reinforcement fabric from the delivery vehicle.

Due to the potential risks involved, the movement of reinforcement fabric should be subject to risk assessments and safe system of work appraisal. Whilst this document provides guidance for the safe off-loading of reinforcement fabric, is not a substitute for risk assessment as many important factors will vary between off-loading locations.

This best practice guidance has been compiled by representatives of the following BAR members:

- ArcelorMittal Kent Wire Limited, Chatham,
- BRC Limited, Barnsley,
- ROM Limited, Lichfield,

and peer reviewed by CONSTRUCT.

## **DIRECTORS/MANAGERS RESPONSIBLE FOR HEALTH AND SAFETY: TAKE NOTE**

This guidance is aimed at those with the responsibility for health and safety within a company to enable them to meet their obligations to complete risk assessments and provide a safe working environment. Copies of this guidance are available as free downloads from [www.uk-bar.org](http://www.uk-bar.org) or printed copies may be requested by emailing the contact section on the website.

The guidance covers lifting equipment and attachment methods only. Other statutory safety requirements will also apply, these include: never lift over people, wear suitable PPE. A minimum of which includes safety boots, gloves, helmets and hi-viz clothing.

Please note, the safe procedures as described in this guidance prohibit the use of bundle ties for lifting with the exception of raising a corner of the bundle to insert dunnage.

If reinforcement fabric bundles are to be moved from the original delivery point, placing dunnage between the bundles as they are stacked will facilitate the fitting of chains/slings for subsequent lifts.

## HAZARDS

The handling of reinforcement fabric carries the risk of serious injury if safe working practices are not adopted. Key hazards are persons falling from vehicles while preparing loads for lifting, for example, placing dunnage or attaching lifting slings.

Other potential hazards include:

- Loss of bundle integrity due to lifting using bundle ties,
- Unsafe lifting equipment such as a crane of insufficient lifting capacity, lift truck with inadequate fork span/length or defective slings,
- Unsafe lifting methods,
- Being struck by a swinging load or site transport/lift trucks,
- Puncture wounds from bundle wire ends and musculoskeletal injuries from twisting bundle tying wire.
- Manual handling.

The hazards highlighted above can be avoided with proper training and well-planned lifting operations.

- Services: Above and below ground.

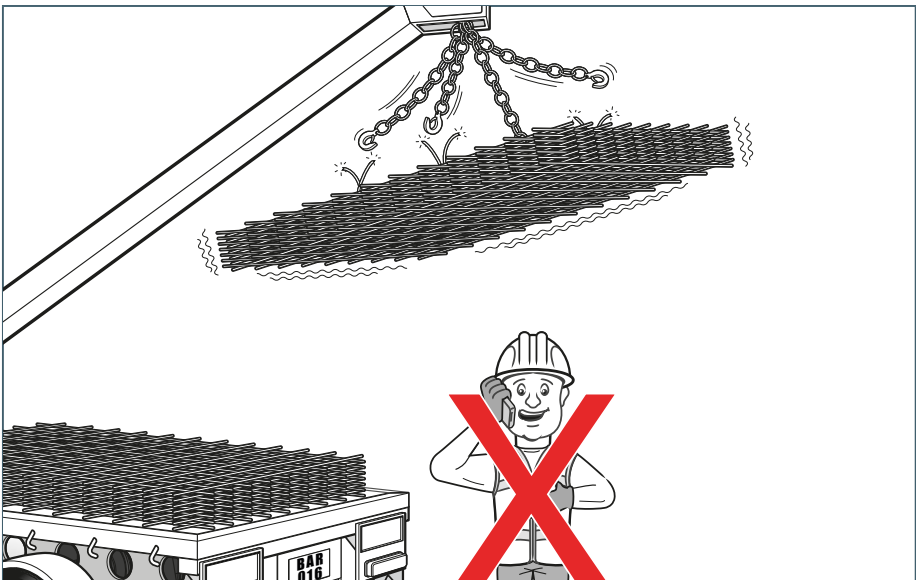
**DO NOT LIFT BUNDLES USING THE BUNDLE TIES. THEY ARE NOT CLASSED AS LIFTING EQUIPMENT AND ARE THEREFORE UNSAFE FOR LIFTING PURPOSES.**

# ACCIDENTS

The risk of potential accidents may be avoided by following the guidance below:

- Cordoning off an area should prevent accidents such as personnel being struck by vehicles,
- Falls from load/lorry due to unsafe methods of access. Prevent by avoiding working at height where possible,
- Sharp edges – puncture wounds from exposed bundle wire ends. Preventable by wearing appropriate PPE equipment such as gloves and safety glasses,
- Ties snapping can be avoided by following the lifting instructions on the warnings carried on bundle labels,
- The cause of the most severe accidents is not lifting from four secure points. Prevent this by using correct lifting equipment and adhere to the off-loading plan,
- Poor planning of lift/inadequate supervision – no risk assessment or clear plan of action,
- Bad practice – people under load, unstable ground, poor environment, for example poor lighting,
- Lack of training – resulting in incorrect use of lifting equipment and/or any of the above errors.

**ALL ACCIDENTS ARE PREVENTABLE IF BEST PRACTICE WORKING PROCEDURES ARE ADHERED TO, SUITABLE PPE IS ISSUED, AND PROPER TRAINING AND CORRECT SUPERVISION ARE PROVIDED. THESE COMBINED WITH A 'THINK SAFETY' ATTITUDE CAN SUBSTANTIALLY REDUCE THE LIKELIHOOD OF ACCIDENTS.**



# WORKING AT HEIGHT

Working at height means work in any place at or below ground level where, if measures are not taken, a person can fall a distance that is liable to cause personal injury.

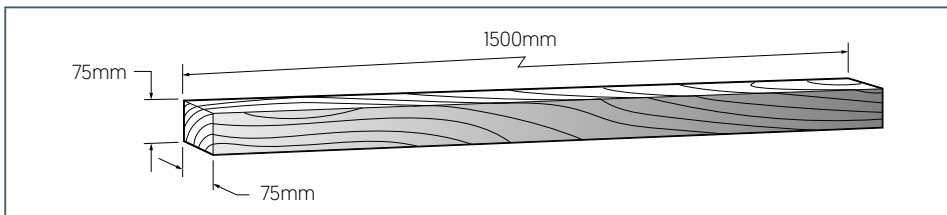
There is a hierarchy of control measures for determining how to work at height safely in the Work at Height Regulations 2005. This hierarchy has to be followed systematically and only when one level is not reasonably practical may the next level be considered. The Health and Safety Executive's *HSG150 Health and Safety in Construction* offers practical advice on the measures that should be followed.

## Those overseeing the off-loading operations should:

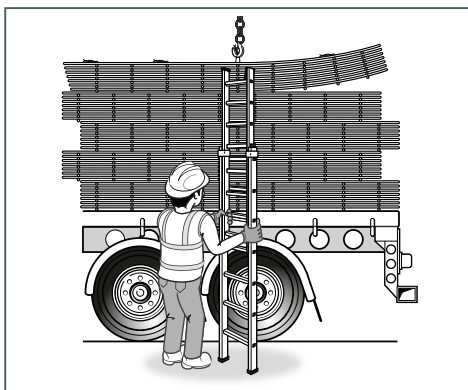
- Be competent in lifting operations themselves,
- Only use trained, competent workers,
- Avoid working at height if possible. If the load can be unloaded without climbing onto the lorry then do so,
- Always use suitable equipment to prevent falls where working at height cannot be avoided,
- Where the risk of a fall cannot be eliminated, use suitable equipment to minimise the distance and consequences of a potential fall,
- Cordon off the work area and erect appropriate warning signs,
- If a Mobile Elevating Working Platform [MEWP] is to be used, consider the space that the vehicle will require and the ground conditions that it to be used on,
- Always consider collective measures that will protect all those at risks, such as nets, gantries and scaffolds, before considering measures that protect only the individual, for example a harness,
- Ensure that work is carried out only when weather conditions do not jeopardise the health and safety of workers,
- Have emergency and rescue procedures in place should someone fall and require aid,
- Ladders are at the bottom of the hierarchy because they do not prevent or mitigate a fall. If ladders are the final and only method to be used, refer to the advice given in the HSE documents INDG401 and INDG455.
- Always inspect ladders before use. Ensure that workers have suitable footwear.



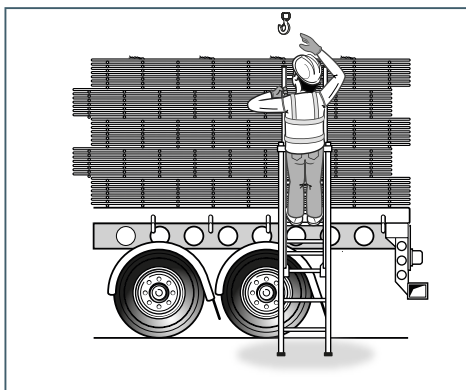
# DUNNAGE



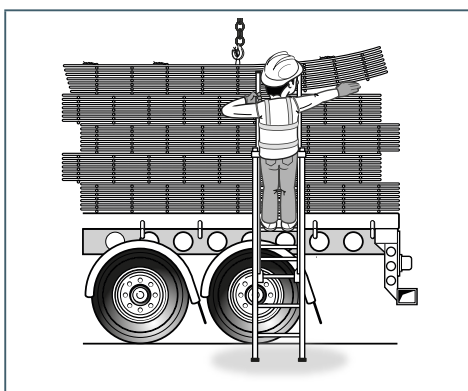
**Bundle ties should only be used for raising the load to facilitate insertion of dunnage. The bundle ties must not be used to lift bundles but may be used to raise one corner of a bundle at a time for the placement of dunnage to provide clearance for chains/slings to be looped through the reinforcement fabric.**



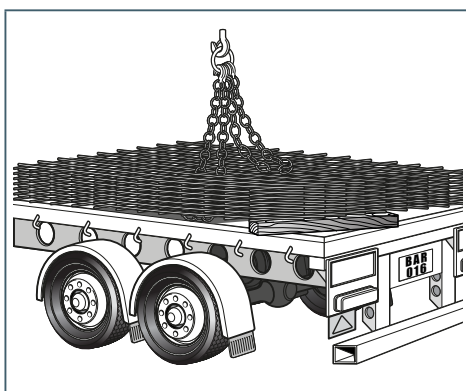
Move the ladder away from the vehicle before lifting the bundle to place the dunnage



Reposition ladder to place dunnage under corner of bundle



Lift one corner at a time at sufficient height to allow dunnage to be placed under bundle. Never put hands under the raised bundle.



Pass the chain through the bundle and put the hook back into the master link [or pass a strop through and attached the eyes to the crane hook]

# PLANNING FOR A SAFE DELIVERY

Safe delivery is the joint responsibility of the customer, haulier and supplier. There should be agreement between all parties in advance of the delivery as to the system of work, the equipment needed, who will supply this and management arrangements. This information should form the basis of a delivery plan where responsibilities are clear to all parties and all site specific issues and solutions are identified. Key responsibilities include:

## Supplier:

- Provide access to information and instruction on safe handling procedures,
- Ensure that each bundle is securely tied and well presented in accordance with the manufacturer's safe tying system,
- Ensure that each bundle has a product information label attached which details the bundle weight.

## Haulier:

- Ensure the safe planning, positioning and securing of the load for transit to site,
- Prepare the load on site for safe unloading.
- Provide suitable and sufficient dunnage for use when raising the bundle corners prior to off-loading. See page 7.
- Vehicle is roadworthy and Hiab in date inspection/examination. Driver competent.

## Customer:

- Carry out a risk assessment for the unloading operations,
- Prepare a basic lifting plan in accordance to BS7121-1: 2016: Code of Practice for Safe Use of Cranes in order to assist with the safe off-loading on site. This includes:
  - Ensuring availability of suitable off-loading equipment,
  - Ensuring availability of safe access to the site,
  - Identifying the suitable location for depositing the load
  - Ensuring the availability of appropriately trained personnel to unload the vehicle,
  - Providing safe access to the load for placing dunnage under the lifted corners to facilitate the fitting of chains/strops,
  - Providing adequate training for personnel who will plan and undertake the lifting operations,
  - Providing emergency rescue procedures where necessary.

**THE DRIVER SHOULD NOT BE INVOLVED IN THE LIFTING OPERATIONS RELATED TO THE OFF-LOADING OTHER THAN WHEN A DRIVER OPERATED ATTACHMENT, SUCH AS A HIAB, IS TO BE USED OR WHEN PREPARING THE LOAD FOR OFF-LOADING, SUCH AS REMOVING THE LOAD SECURING STRAPS. DRIVERS SHOULD MOVE TO A SAFE AREA AWAY FROM THE OFF-LOADING OPERATIONS.**



## SUBSEQUENT BUNDLE MOVEMENT

If bundles are to be moved around the site after delivery, then the customer should note the following advice:

- Store the fabric with dunnage with dunnage between each bundle to facilitate future lifts,
- Plan the lifts before moving bundles including risk assessments and provision of correct equipment and trained personnel,
- Ensure that the bundle ties are tied correctly, particularly where the bundles have been split.

**DO NOT USE BUNDLE TIES TO LIFT FULL OR SPLIT BUNDLES.**

## SAFE SYSTEM OF BUNDLE TYING

Bundle ties hold together sheets of reinforcement fabric as a bundle. Bundles ties are NOT to be used for lifting, other than for the placement of dunnage, as there is a risk of injury if the bundle ties fail during a lift.

**BUNDLE TIES ARE NOT LIFTING EQUIPMENT.**

Bundles requiring re-tying should be tied in accordance with the information provided on page 10.

### Bundle tying wire

All bundle tying wires should be a minimum of 5.5mm diameter round mild steel rod as originally supplied by the fabric manufacturer.

### Bundle tie positions

**Type A & B Fabric:** Locate the tie at the intersection of the fifth (5th) cross wire and outside line wire.

**Type C Fabric:** Locate the tie at the intersection of the second (2nd) cross wire and outside line wire (for added stability on type C fabric a fifth (5th) tie may be located through the centre of the reinforcement fabric at the intersection of the sixth (6th) and twelfth (12th) line wire).

### Method of tying

The wire should be wrapped around the intersection of the cross and line wires and twisted five (5) times. Each twist being turned a full 180°.

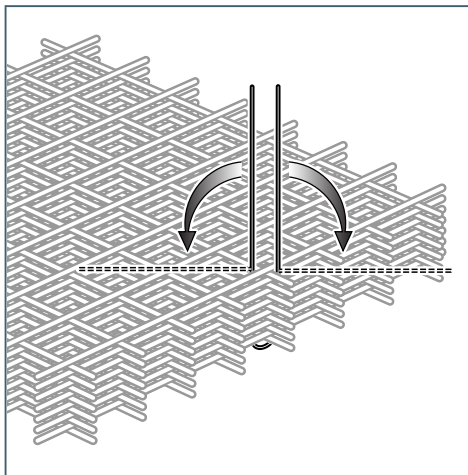
Care must be taken to ensure that both ends of the wire are rotated when carrying out this operation.

After twisting, the ends of the wire should be folded in a downward manner towards the reinforcement fabric.

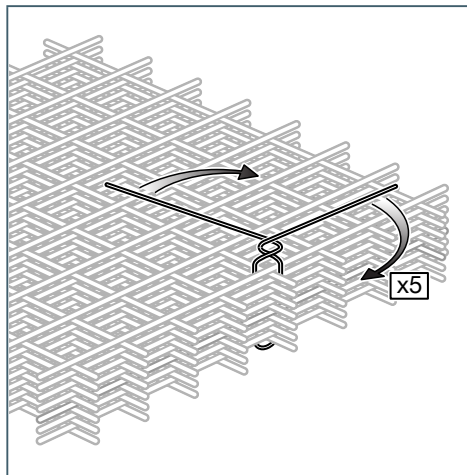
The resulting twisted tie wire should then be pushed down and folded inwards towards the centre of the reinforcement fabric.

Gloves must be worn when bundle tying

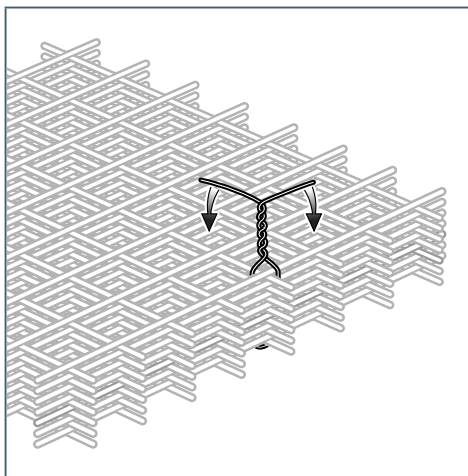
Bundle ties must be applied as described below:



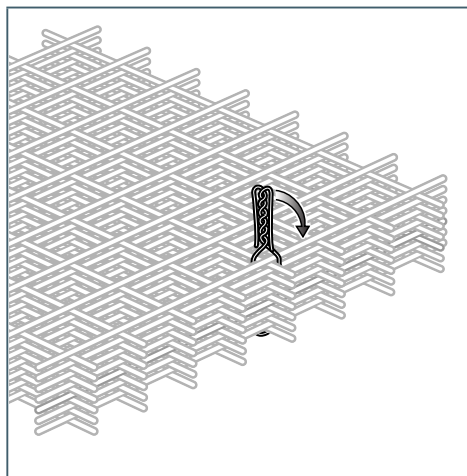
Loop tying wire through bundle at intersection of first line wire and fifth crosswire. Bend ends down.



Apply five twists, each twist being 180°



Bend the ends of the wire down towards the fabric



Push the twisted wire down and inwards towards centre of fabric

# RECOMMENDED SAFE OFF-LOADING PROCEDURES

It is recognised that some end users/hauliers will have specialised light equipment such as overhead cranes and/or spreader beams designed for off-loading on site and that other end users/hauliers will have non-specialised equipment. To reduce the risk of accidents occurring whilst removing reinforcement fabric from vehicles, the following recommendations should be adhered to – whether on site or in a stockists yard.

## Safety matters

Before lifting or moving reinforcement fabric, users of lifting equipment must be competent to undertake the task and the use of the lifting equipment required. The lifting equipment should be suitable for the site conditions. In all cases, before lifting visually check the bundle ties to ensure that they are secure. Each must have a minimum of five twists (including split bundles) and be folded down and inwards towards the centre of the bundle.

## DO NOT LIFT BUNDLES USING THE BUNDLE TIES

The bundle ties must not be used to lift bundles but may be used to raise one corner of a bundle at a time for the placement of dunnage to provide clearance for chains/slings to be looped through the reinforcement fabric.

Reinforcement fabric should be lifted using one of the recommended methods detailed following all applicable safety precautions.

## Use of chains or slings

1. An **overhead crane, vehicle mounted crane** or a **fork lift** fitted with four each of either chains, full steel wire sling or web slings may be used for the safe off-loading or movement of reinforcement fabric. But, whether using a crane or a fork lift truck and whichever type of sling is used, the chains/sling must be looped through the bundle at the intersection of the 5th cross wire and the 3rd line wire to give an equally balanced lift weight distribution.
2. The chains, full steel wire slings or web slings must be of sufficient and equal length to allow an appropriate angle between the legs when lifting the reinforcement fabric and must be rated at an appropriate safe working load [SWL].

## Use of hydraulic grabs

1. A **fork lift truck** or a **vehicle mounted crane** fitted with certified lifting equipment with four lifting legs that is specifically designed for lifting reinforcement fabric may be used for the safe off-loading or movement of fabric. With the grabs located as centrally as possible in the bundle an equally balanced lift is possible with the assurance that the reinforcement fabric is being held securely.

## Use of forks

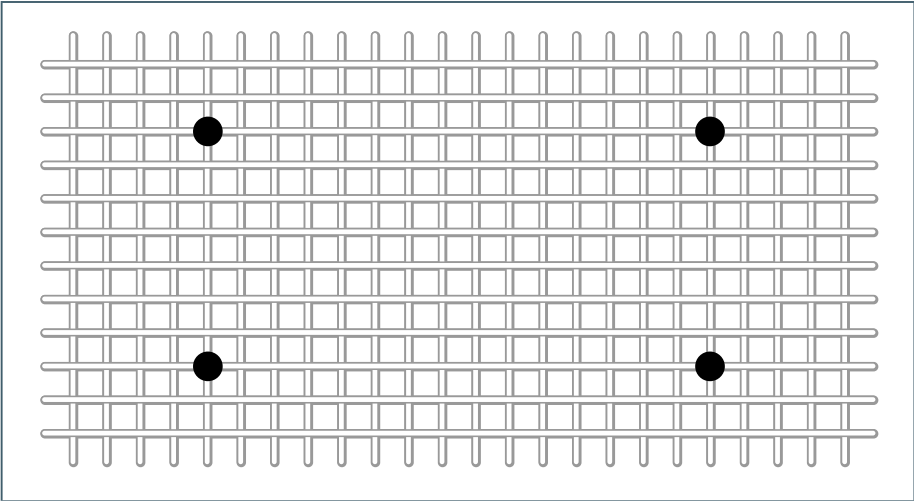
1. A **fork lift truck with forks** of adequate length and width may lift a bundle provided that the forks are located under the bottom sheet of the bundle, therefore, the fork lift truck is lifting the whole bundle. When lifting bundles, the forks should be of a suitable length to ensure that stability is maintained when lifting and when moving the load. Lifts should be in line the guidance laid down by the Fork Lift Truck Association.
2. Dunnage may be placed between bundles by lifting each corner of the reinforcement fabric to a suitable height thus allowing the fork lift truck driver to place the vehicle forks under the bottom sheet.
3. The above method is suitable **only** for off-loading reinforcement fabric for a short distance, and, where possible, in an unloading exclusion zone where the ground is as level as possible.

## Split bundles

The above procedures also apply when working with split bundles.

Split bundles delivered from reinforcement fabric manufacturers should be treated the same as full bundles where the bundle ties have five twists and are folded down and inwards towards the centre of the bundle.

Users of the reinforcement fabric, when they open a bundle, must retie the bundles following the procedures outlined on page 10 of this guidance.



Typical sheet of fabric – circles indicate the lifting position of the intersection of the 5th cross wire and 3rd line wire



Lift from all corners with chains positioned as indicated. The legs of the chains should be of adequate length to permit an acceptable chain angle as detailed in the site lifting plan.

# THINK SAFETY:

## SUMMARY OF THE GUIDE

This guide describes the methods which should be followed for the safe off-loading of bundles of reinforcement fabric.

In addition to following your chosen method, you should continue to observe routine safety precautions for:

- Working at height
- Working with cranes and lifting equipment
- Handling steel
- Safe construction site work including:
  - Stand clear of the lift
  - Never lift over people
  - Always wear appropriate protective equipment
  - Never exceed the safe working load of your equipment

**REMEMBER, BUNDLE TIES MUST NOT BE USED FOR LIFTING OR FOR MOVING BUNDLES AROUND THE SITE**

## LEGISLATION

Several areas of Health and Safety legislation, codes of practice and guidance notes are applicable to the addressing the potential risks associated with off-loading reinforcement fabric.

These include\*:

**Health and Safety at Work etc. Act 1974; Section 2** – General duties of employers to their employees

**Management of Health and Safety at Work Regulations 1999;**  
**Regulation 3** - Risk assessment

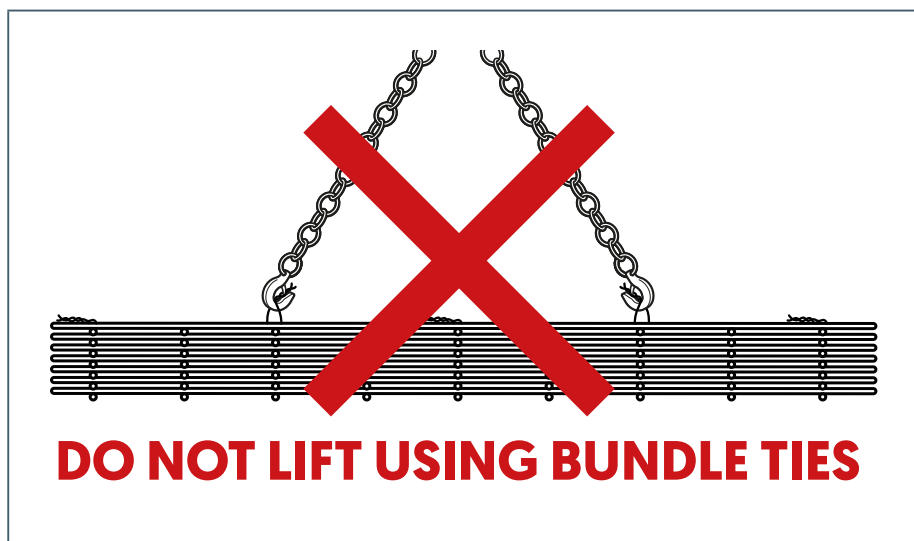
**Lifting Operations and Lifting Equipment Regulations 1998 (LOLER);**  
**Regulation 4** – the suitability of lifting equipment;  
**Regulation 8** – the organisation of lifting operations

**Provision and Use of Work Equipment Regulations 1998 (PUWER II),**  
**Regulation 2** – 62e Provision of suitable ancillary equipment such as ladders which are maintained in an efficient state of repair

**The work at Height Regulations 2005;**  
**Regulation 3** - these regulations apply where there is a risk of fall liable to cause personal injury

*(\* current at the time of publication)*

## EXAMPLE OF SAFETY LABEL ATTACHED TO BUNDLES OF REINFORCEMENT BUNDLES BY THE MANUFACTURER



# RAISE THE BAR



FOR REINFORCED SUCCESS CHOOSE A MEMBER OF  
THE BRITISH ASSOCIATION OF REINFORCEMENT

- CARES APPROVED
- COMMITMENT TO HEALTH AND SAFETY
- COMMITMENT TO SUSTAINABILITY
- DELIVERING QUALITY AND ADDED VALUE
- RAISING STANDARDS
- PRODUCT INNOVATION AND PROCESS DEVELOPMENT