Guidelines for tag line use

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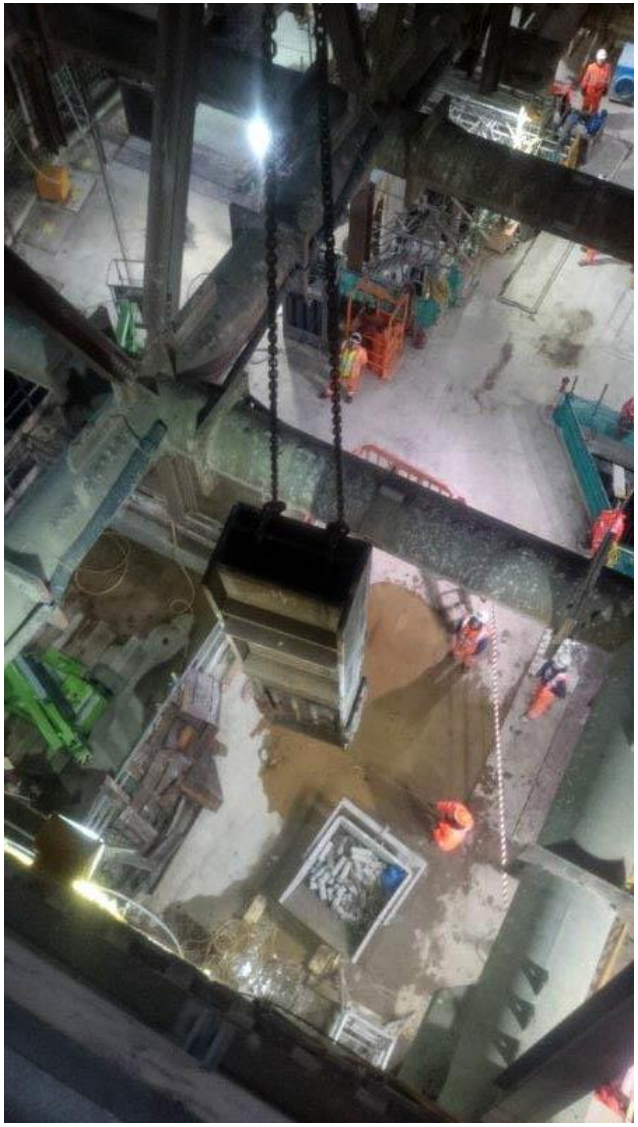
Disclaimer

This instructional document should be considered as best practice for the subjects addressed, though is not exhaustive for all possible work activities related to the installation and use of tag lines. Use the content provided herein, experience and the conditions as presented by the load, the personnel, the work environment and the load handling equipment when determining the best placement and use of tag lines - always comply with applicable legislation.

Guidelines for tag line use

Introduction

- Freely suspended loads are subject to dynamic and wind forces that can cause them to swing or rotate (wind vane) during lifting.
- These tendencies need to be managed and controlled.
- To mitigate these risks, it is a requirement that persons conducting a lifting operation are in control of the payload at all times ensuring that it does not make unintended and uncontrolled movements.



What is a tagline?

A tagline is a rope attached to a load during a lifting operation to allow a rigger to control swinging and/or rotation of a suspended load.

Multiple taglines may be required to exercise full control.

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Purpose of a tagline

Taglines are used to:

- oppose uncontrolled rotation of a freely suspended load as it is lifted and/or maneuvered/relocated under the influence of forces such as wind acting on it
- alter the rotational attitude of a suspended load as it is guided along a path or to position it in a particular attitude
- assist controlling swinging induced in lifting
- avoid the need for persons to put their hands directly on a load to control it where that would pose a hazard, allowing safe distance between them and the load

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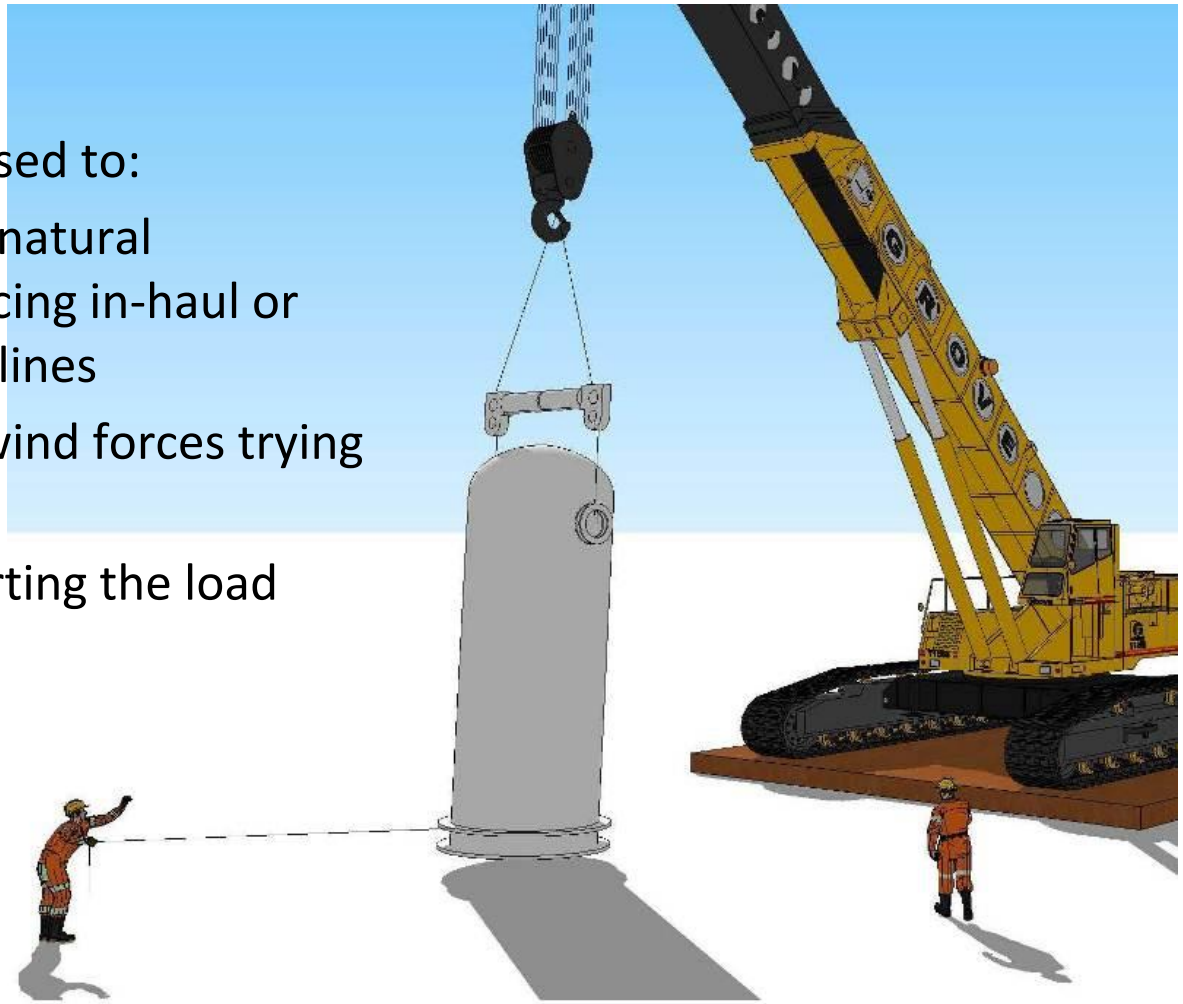
Purpose of a tagline

Taglines are not to be used to:

- pull a load out of its natural suspended line inducing in-haul or out-haul of the load lines
- hold a load against wind forces trying to push it out of line
- contribute to supporting the load



Do not try to pull a load out of plumb to (say) align over holding bolts!

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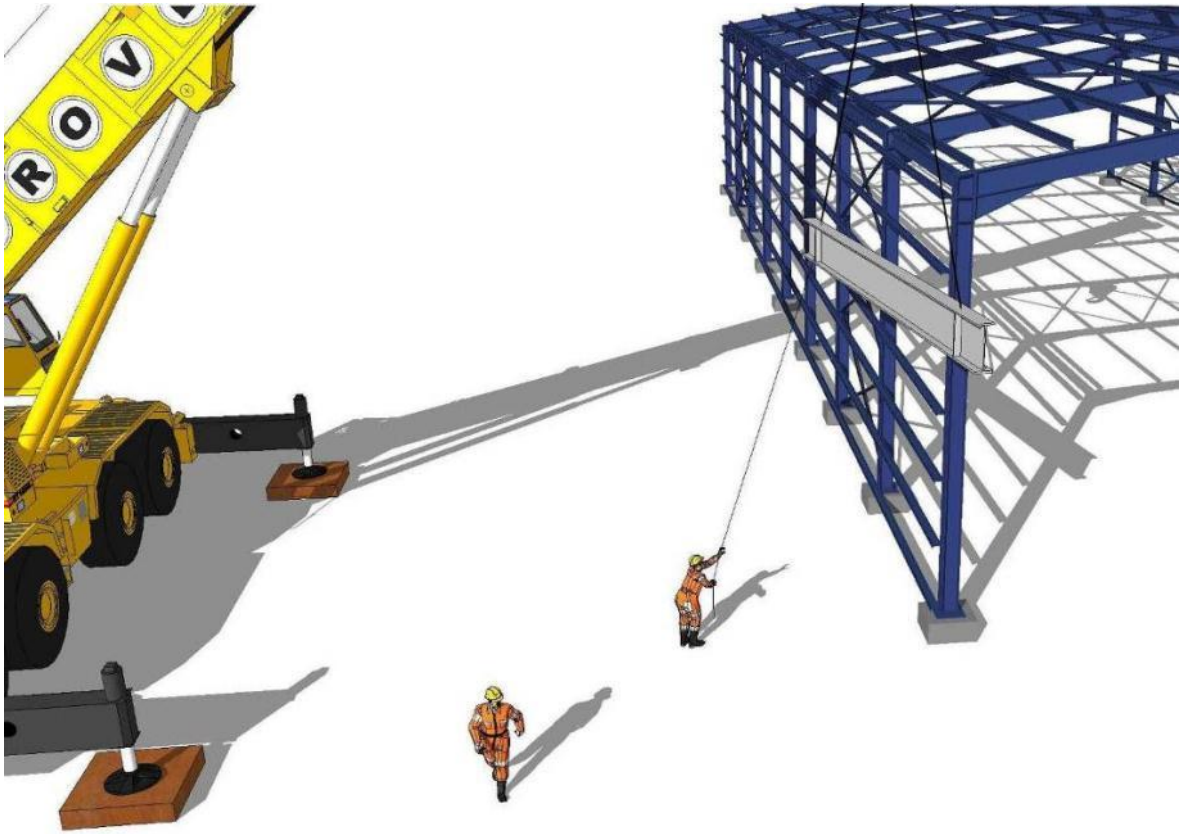
Exercise

Is this load under control? What thoughts do you have regarding this set-up?



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Types of tag lines

Ropes used for taglines should be manufactured for soft fibers, i.e. synthetic (plastic) or natural fibers that don't present the manual handling hazards of wire rope. They should be semi-stiff or coated so as not to easily tangle and be in single lengths (continuous without joins).

Types of rope

- Natural (twisted or braided)
  - Hemp
  - Cotton
- Synthetic (twisted or braided)
  - Nylon
  - Polyester
  - Polypropylene

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Terminations

- Mechanical Terminations
  - Hooks (may be non-load bearing)
  - Clips (like the ones on safety lanyards)
  - Carabineers

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Terminations

- Eye Terminations
  - Twisted Rope
    - Braided eye (thimbled or soft)
    - Turn Back eye

  - Braided Rope
    - Turned back
    - Mechanical eye

Note that using a tagline with a braided eye in one end allows you to choke it around steel for easy control and removal by personnel at heights.

- Knots
  - The rope may of course be knotted to the load – see later.

Retractable tag lines

Note also that retractable taglines are available. http://tagattach.net/

Insulating links

Note that a number of companies manufacture insulating links that will help protect tag line personnel from risk of electrocution when operating in proximity to high voltage power lines. These links are incorporated in the length of the tag line using knots. See below a link made by Insulatus.

Note that although the use of insulating links is recommended as an additional safeguard (over and above other safety requirements such as maintaining stipulated clearances) when working near power lines, there is no perfect assurance that electrocution can be avoided by their use.

Why would a load want to rotate?

There are a couple of reasons why a load may rotate on the hook as it is lifted and maneuvered.

- The main reason why a load would rotate as it is lifted is the action of wind forces. Unless a load has the same area to the wind regardless of rotation (e.g. a vertical cylinder), it will want to rotate in a wind to present it's least area to the wind (principle of a weather vane). So for instance a vertical, cylindrical, chemical vessel may show little or no tendency to rotate in a wind, whereas a long flat-sided steel beam of the same area may show a pronounced tendency to rotate at the same wind speed. Understanding this is a key factor in deciding whether or not tag lines are required to control rotation.
- Secondly, the load lines may tend to spin up some as the load is lifted. Using tag lines, the load can be held static allowing the spin-up to shake out at the bearing in the hook block.

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Why would a load want to rotate?

Not liable to rotate much.

Quite liable to “vane” in the wind

Wind speed, wind pressure and forces induced

The magnitude of the forces and rotational effects acting on a load when that load is subject to the wind is often not well understood; underestimation can cause big problems. So, time to look at some theory.

When a static object is subjected to a flowing stream of air, pressure is created acting on that object.

Pressure is given by the formulae (you pick your units of choice):

$P=0.00256Vs^2$ lb/ft^2 or approximately **$Vs^2/400$ lb/ft^2**, where Vs is in mph

or **$P=0.613Vs^2$ N/m^2** (or Pa); equivalent to **$P=0.0625Vs^2$ kg/m^2**, where Vs is in m/s

or **$P=0.0473Vs^2$ N/m^2** (or Pa); equivalent to **$P=0.00482Vs^2$ kg/m^2**, where Vs is in km/hr

Note that the pressure is directly proportional to the square of the wind speed e.g. twice the wind speed, four times the pressure.

Wind speed, wind pressure and forces induced

Wind pressure acting on the projected area of the object gives rise to a force acting on the object.

The Wind Force F is given by the formula:

F = P x A x Cf, where P is the wind pressure, A the projected area and Cf, a shape factor or drag coefficient.

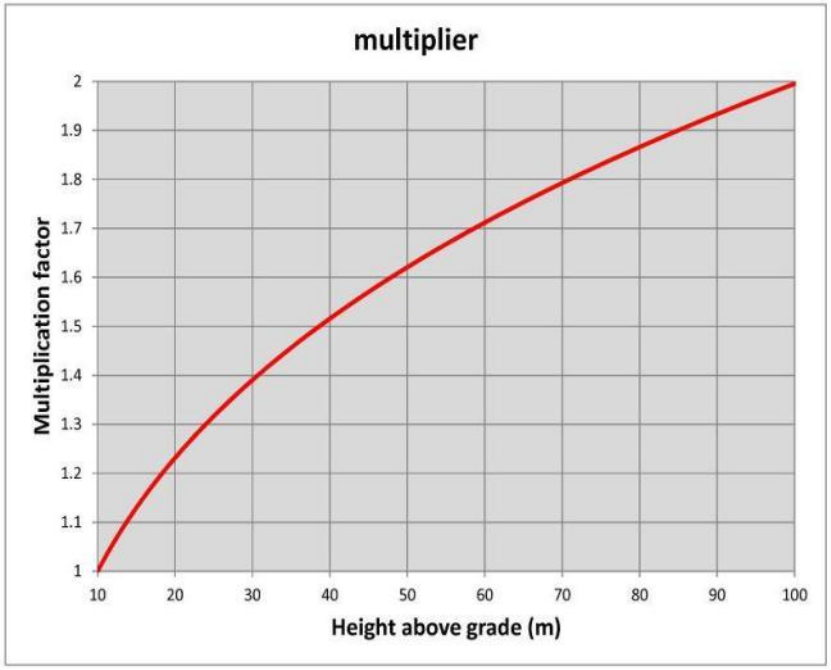
Note that the shape of the object also affects the magnitude of the force.
Typically Cf = 1.2 for long round pipes, 0.8 for short round pipes, 2.0 for long flat plates or 1.4 for short flat plates.

Wind speed is often referred to using the Beaufort scale on a scale of 0 - 12. e.g. Beaufort 6 is a strong breeze that would sway large branches and equates to 25-31mph or 40-50km/hr or 11-14m/s.

Note that these wind speeds are quoted at a standard 10m (33') above grade.

Where is the wind force measured?

The wind speed that you are actually interested in is, of course, the wind speed that is actually blowing on the suspended load; that wind speed can be a lot different to the wind speed at ground level. Wind speeds are quoted (by say a weather station) by convention at 10m (33') above grade; note that wind speed increases logarithmically with height according to a curve similar to the following.



What that curve actually looks like depends on whether it is stable, neutral or unstable air, whether over water or land, whether the site is disturbed by human habitation and so on. In this instance, the wind speed at 100m (330') is twice that at 10m (33'). (This means of course that the pressure is four times that at 10m). So you need to be aware of this!

For lifting purposes, the wind speed indicated by the anemometer mounted on the boom head should be used as that is what is actually happening at height.

Why would a load want to swing?

A load typically takes to swinging when the wind is gusting or when moving a load with the crane. Once started, it can be difficult to stop. Ideally you want to prevent swinging starting or at least limit its amplitude before it gets out of hand.

If an unrestrained suspended load is subjected to a sustained lateral wind force, it moves sideways inducing an out-of-plumb angle in the suspension. Forces balance when the lateral (horizontal) component of the tension in the suspension equals the wind force and the load will reach equilibrium at a slight out-of-plumb so long as the wind continues to act in a constant manner.

Why would a load want to swing?

Example (U.S. customary units)

If for instance a 10’ x 10’ cladding panel is lifted in a 20mph breeze (with its face to the wind), assuming a shape factor of 1, there will be a 100lbf wind force acting on the panel. If the panel weighs 1000lbf, the load will move horizontally approximately 1/10th of the suspension height until the forces balance. If you have a suspension length of about 50’ say, the load will therefore move 5’ or so sideways. If the wind drops, it will tend to return back to plumb and swinging will be induced.

Example (metric units)

If for instance a 3m x 3m cladding panel is lifted in a 9m/s breeze (with its face to the wind), assuming a shape factor of 1, there will be a 5kg/m^2 pressure acting on 9m^2 = 45kg of “force” acting on the panel. If the panel weighs 450kg, the load will move horizontally approximately 1/10th of the suspension height until the forces balance. If you have a suspension length of about 15m say, the load will therefore move 1.5m or so sideways. If the wind drops, it will tend to return back to plumb and swinging will be induced.

Why would a load want to swing - inertia

When you move a load with a crane, the crane moves forwards (say) but the load initially stays where it is (inertia) until accelerated by the horizontal component of the tension in the (now) slightly inclined suspension. If the crane suddenly stops moving, the load's momentum keeps it moving and it will swing like a pendulum until it eventually comes to rest. To minimize this, an operator should gently accelerate and decelerate the crane so the load keeps up with the crane without swinging wildly.

Note: There is a natural frequency to the swing (which is independent of weight and is related to the suspension length). If you are really unlucky wind gusting can reinforce this natural swing ever increasing the amplitude of the swinging (how much the load moves between extremes).

You can see from this that light loads with large sail areas can be particularly problematic.

The take-away is don't lift light loads with large sail areas in high winds; if loads start to swing, attempt to damp down the movement; if that is problematic, possibly turn the load to rotate to present its least area to the wind, wait until it stops swinging, then turn it back and try again with improved control.

When to use tag lines and when not to

OSHA 29CFR 1926.953(d) requires taglines on any load “where hazards to employees exist” in order to keep the loads under control.

LOLER: “Appropriate measures should be taken to prevent a freely suspended load from moving in an uncontrolled manner where the risks justify it. Tag lines may be necessary to stop the load swinging (example overhead crane).”

BS 7121: “If one or more hand-lines/taglines are required to give more control of the load, the appointed person should designate persons to handle the lines.”

i.e. A common theme is that where tag lines are required to control a load they must be used.

On the other hand where they are not required to control a load, they are not required to be used. I would recommend that they are used unless they would serve no useful purpose and could potentially create a snagging hazard. How many taglines you would need, where they should be located and what their purpose is needs to be evaluated as part of the lift planning exercise and should come out of the risk assessment. Tag lines may for instance not be required to stop rotation but may be required to receive, steady and finally position the load, keeping people at a distance.

TAG LINES SHOULD BE USED UNLESS THEY WOULD SERVE NO PURPOSE AND COULD CREATE A HAZARD

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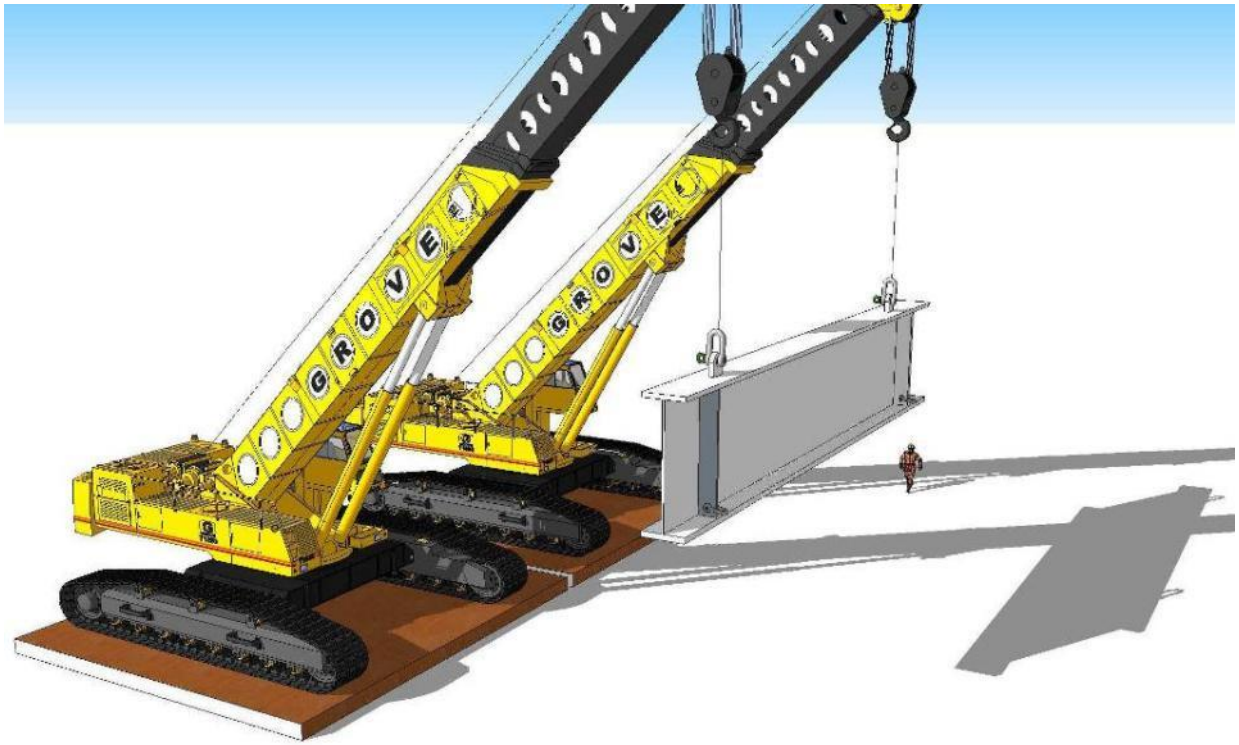
Loads suspended from two or more lifting devices (tandem lifts) will not freely rotate in the wind but may swing a little. Trying to use tag lines to rotate a load suspended from two cranes is a bad idea.



This tandem lift will not need to be controlled against rotation but taglines may be required to control swinging of the suspended load!

Guidelines for tag line use

Manual Load Control (Hands on the Load)

There may be instances when it is necessary for one or more persons to put hands on the load to, for instance, fine align a vessel over its holding down bolts. Trying to do this with tag lines could prove impossible.

- Never reach above shoulder height to access a load.
- Place hands on the surface and never in the or on the end of a load.
- Maintain an arm's length away from the load.
- Walk the load down, reaching down moves you closer to the load.
- Dynamic effects on the load (wind, pendulum actions & swinging) will put you at risk.
- Never place any part of your body in between a load and another object (pinch point).
- Make sure that good communication is always maintained especially when hands are on the load.

Keep toes, fingers etc well away from pinch points; lowering is only to be initiated on the command of the person-in-charge on confirmation all is clear.

How much can I pull?

How much force can one person pull? The Ergonomics Center reckons a man can be expected to be able to pull (horizontally) a sustained force of between 75-90lbs (34-41kg), with the rope at elbow height and allowed free position.

Note that the surface on which the person is standing can affect this.

You can imagine that even with two or more tag lines on the load, you won't be able to do a lot to directly oppose wind forces on larger loads in even modest winds but you may well be able to prevent the load rotating on the hook.

Guidelines for tag line use

How much can I pull?

We thought we would test this out.

Weighing the handler

Approx 200lbs (91kg)

Lateral pull (max and sustained force) on rough concrete with rubber soled shoes.

Stance

90lbs (41kg) maximum

75lbs (34kg) sustained

Guidelines for tag line use

How much can I pull?

Lateral pull (max force) polished concrete with rubber soled shoes

Stance

81lbs (37kg) maximum

Our practical test confirmed that this 200lb man can pull about 90lbs max when allowed free stance and when standing on a rough surface; this reduces to about 75lbs sustained. On smooth concrete (where the friction is less), he could pull less. It is reasonable to project that a lighter man could pull less than this. As a rule of thumb, a man might pull a maximum of about 45% of his weight and sustain a pull of about 35% of his weight. This is a bit subjective but gives some measure to work from. If your boots cannot get a good grip on the ground the figures could be a lot less!

Guidelines for tag line use

Factors affecting the effectiveness of the “pull”

- Pull to be as effective as possible.
- Make the moment arm as great as possible
- Imagine (in plan view), a line from the crane hook to the point of attachment of the tag line, aim for a 90 degree angle to that line.

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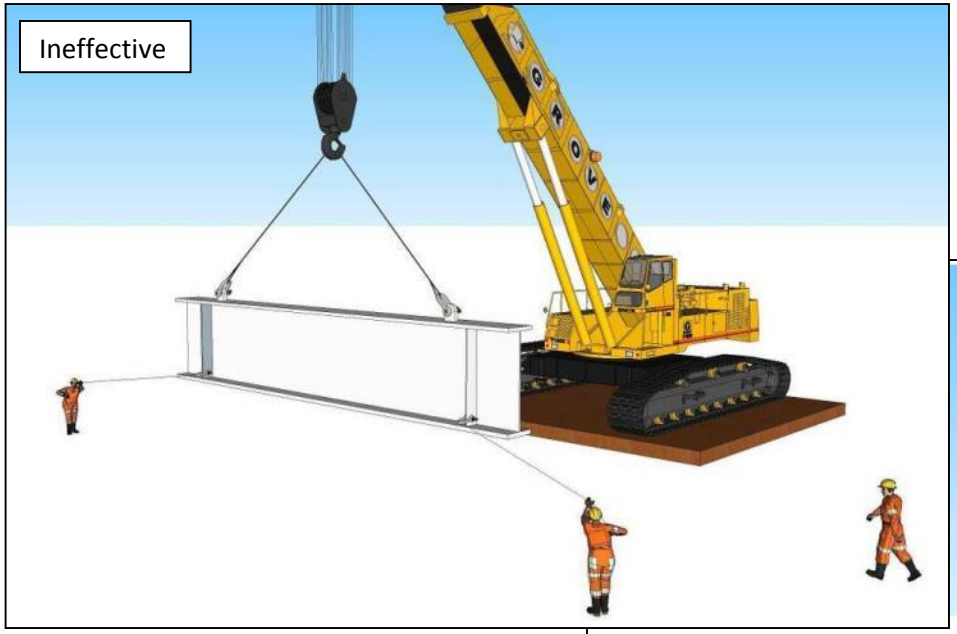

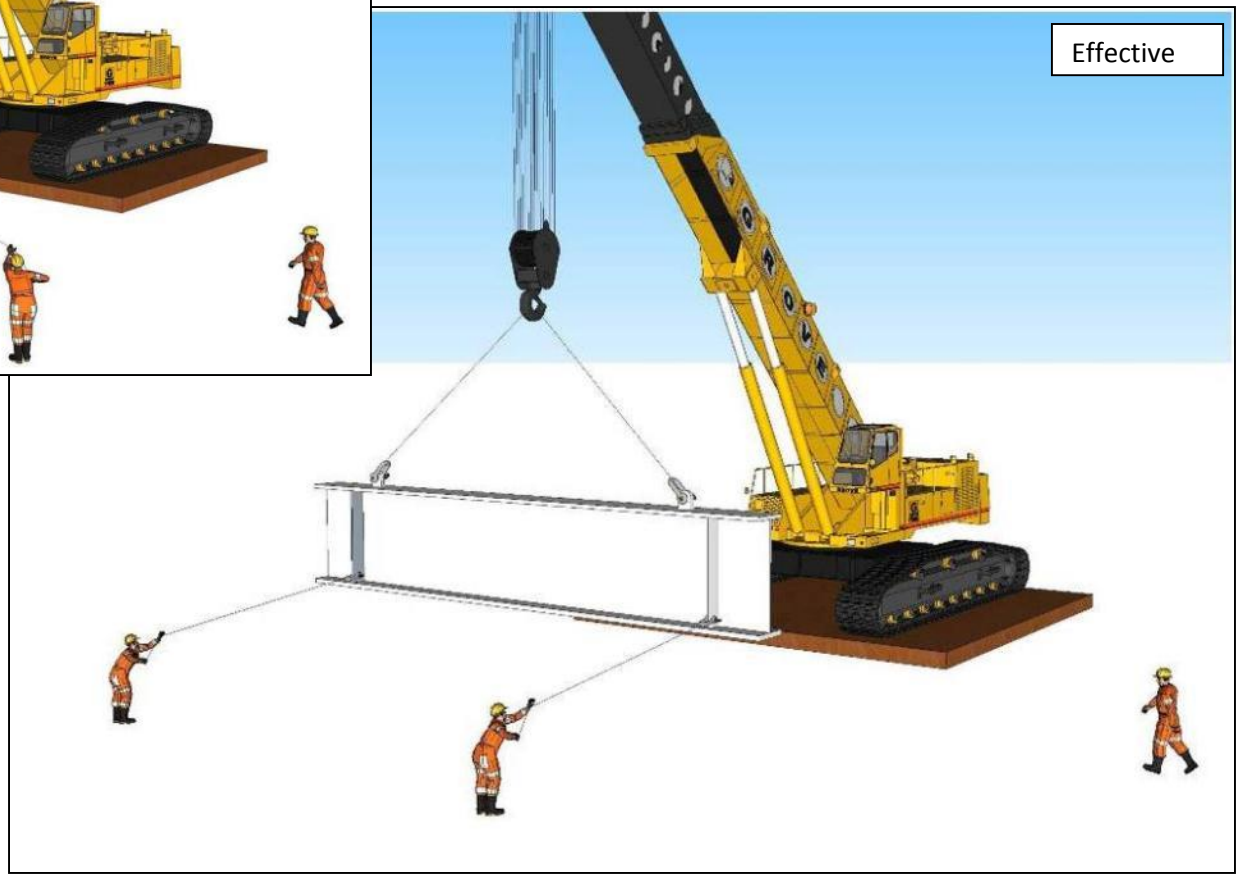

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- Pull is most effective when the tagline is near horizontal
- At 45 degrees to the horizontal, the pull is only 71% effective
- Note that as the angle to the horizontal increases, you are pulling down on the load
- If nearing vertical with the tag line, the pull is all vertical and contributes nothing to rotating (or preventing rotation of) the load
- When lifting to height, you may start in control of the load but get progressively less able to control it as the lift progresses

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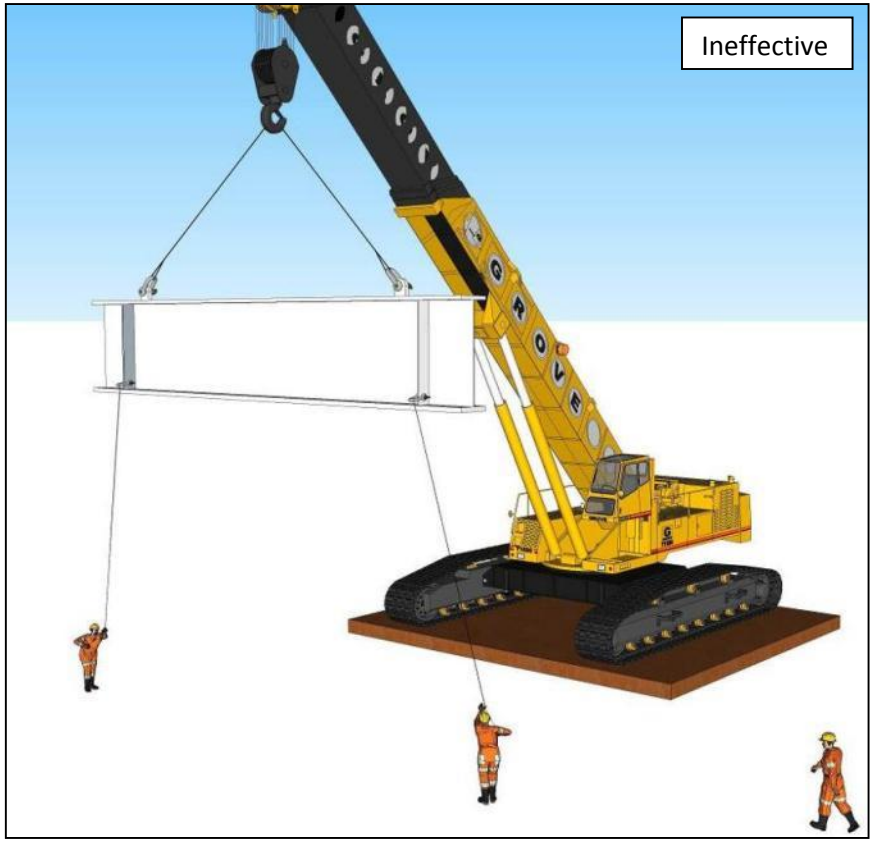
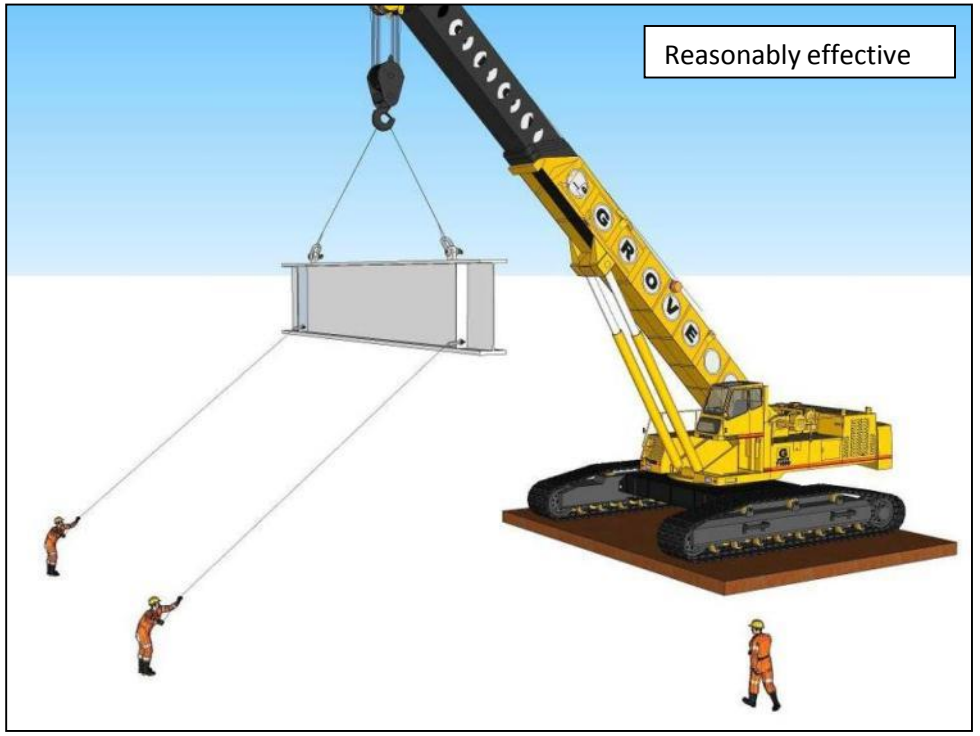


Effect of vertical angle



Rotational effects acting on a load

If the wind pressure is uniform on the load, the wind force can be considered to act through the center of area of the load as presented to the wind.

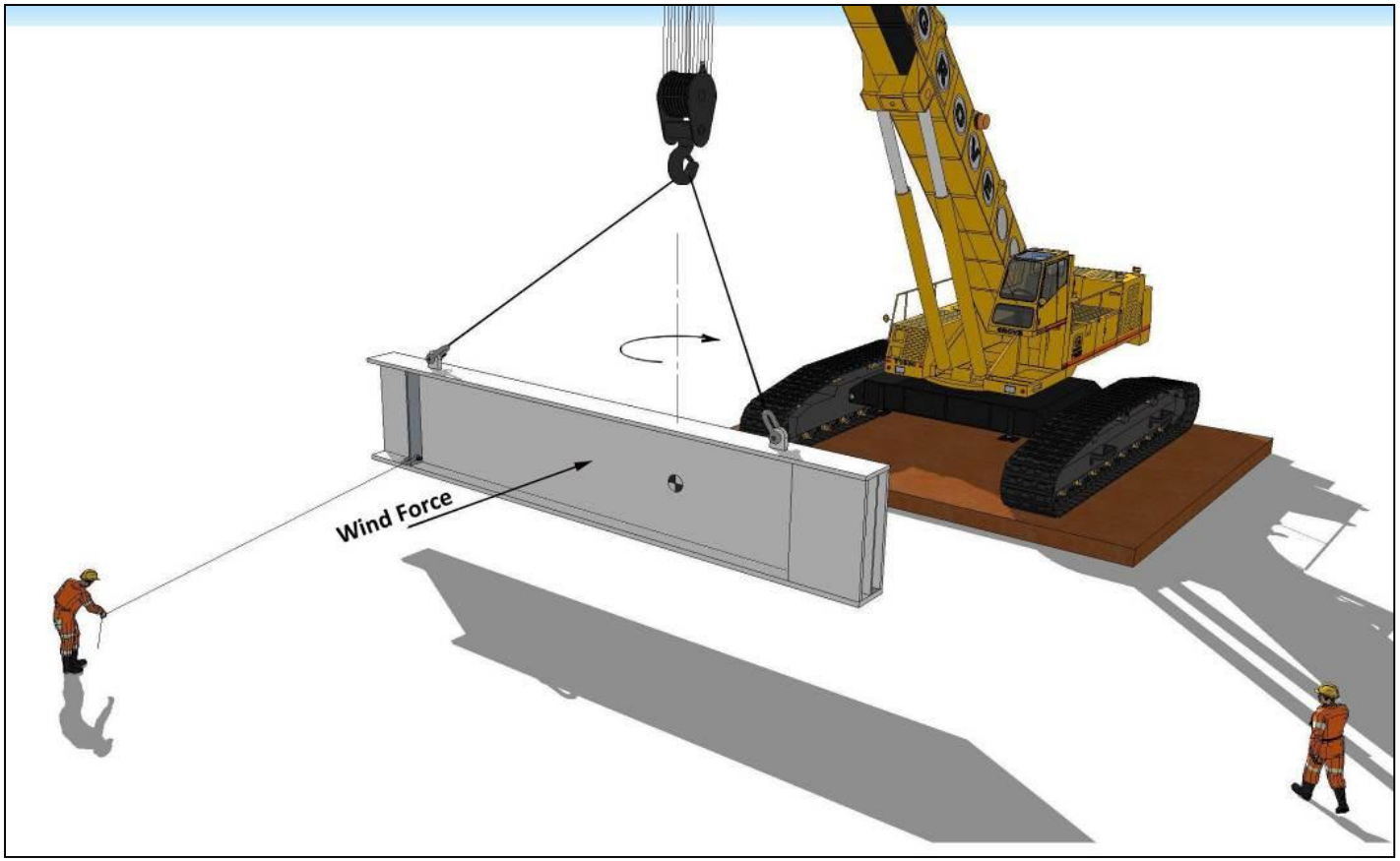
The axis of rotation of a singly suspended load is centered on the crane's hook block bearing and that will naturally lie over the C of G. If the center of area lies on the same line then the wind force has nominally no rotational effect and the tag line forces are nominal.

A load whose center of area lies to one side of the C of G will have wind forces acting to one side of the axis causing a rotation. To hold that load static against the wind can require considerable force.

DO NOT UNDER-ESTIMATE THIS!

Assessing forces and rotational effects acting on a load

Wind forces act horizontally on the load and may cause a rotation if the center of area lies to one side of the axis of rotation.



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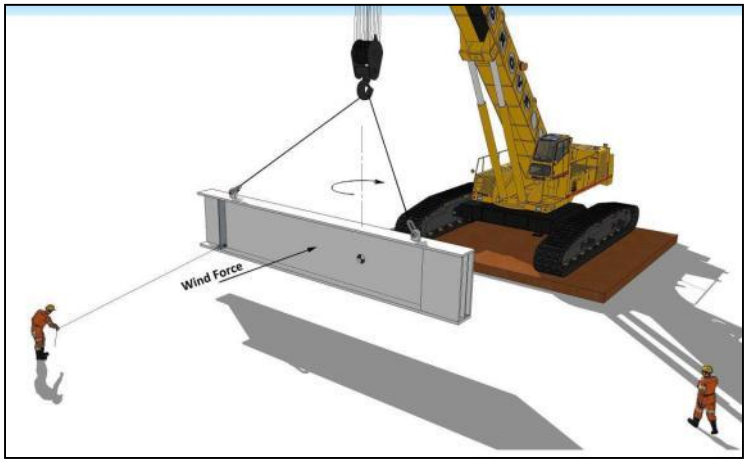

Example (U.S. customary units)

Consider a plate girder 10’ deep x 60’ long. It has thick plates at one end forming a node. The C of G of the girder is 20’ from one end i.e. 10’ off center. The center of area is at mid length. Lateral wind forces thus act 10’ offset from the line of suspension (center of rotation). Let’s consider lifting in a 34 mph wind (measured at boom head).

The wind pressure (lbf/ft^2) is given by P=0.00256V^2 (where V is mph). At 34mph, the pressure is about 3psf. With a projected area of 600ft^2 (assuming shape factor = 1), the force (at 34mph) = 3 x 600ft^2 = 1800lbf. The moment = 1800 x 10 = 18000ft-lbs

If a single tag line is used at the 20’ end (and it is in tension) and it is pulling horizontally at 90deg to the plate girder, the moment arm is 20’ and the tension = 18000/20 = 900lbs.

This is way too much for one person to control. If the wind speed is reduced to say 20mph, the rotation becomes approximately 6200 ft-lbs. If two tag lines are used, one at either end, both resisting rotation in the same direction, the required force each has to provide is about 103lbf, which might just about be achievable. Given that the shape factor is likely greater than 1, and you may not have a perfect 90 degree purchase on the load and the tag line may be inclined vertically, it would be advisable to have two persons on either line. Note also that you may not be guaranteed that the load will always want to turn in the same direction particularly if you have to slew (swing) the crane or that you will not need to correct an over-correction. So it may be necessary to provide 4 tag lines, 2 rotating clockwise, and two counter-clockwise (each with two persons on them).

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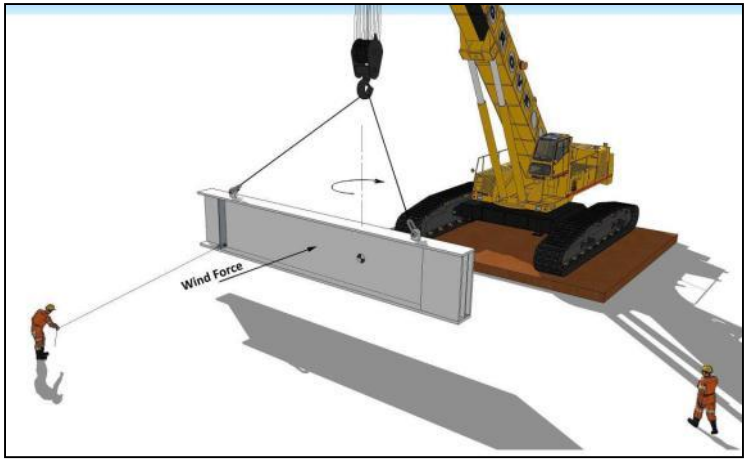


Example (metric units)

Consider a plate girder 3m deep x 18m long. It has thick plates at one end forming a node. The C of G of the girder is 6m from one end i.e. 3m off center. The center of area is at mid length. Lateral wind forces thus act 3m offset from the line of suspension (center of rotation). Let's consider lifting in a 15.3m/s wind (measured at boom head).

The wind pressure (kg/m^2) is given by P=0.0625V^2 (where V is mph). At 15.3m/s, the pressure is about 14.6kg/m^2. With a projected area of 54m^2 (assuming shape factor = 1), the wind "force" (at 15.3m/s) = 14.6 x 54 = 788kg. The moment = 788 x 3 = 2364kg.m

If a single tag line is used at the 6m end (and it is in tension) and it is pulling horizontally at 90deg to the plate girder, the moment arm is 6m and the tension = 2364/6 = 394kg. This is way too much for one person to control. If the wind speed is reduced to say 9m/s, the rotation becomes approximately 818kg.m. If two tag lines are used, one at either end, both resisting rotation in the same direction, the required force each has to provide is about 45kg, which might just about be achievable. Given that the shape factor is likely greater than 1, and you may not have a perfect 90 degree purchase on the load and the tag line may be inclined vertically, it would be advisable to have two persons on either line. Note also that you may not be guaranteed that the load will always want to turn in the same direction particularly if you have to slew (swing) the crane or that you will not need to correct an over-correction. So it may be necessary to provide 4 tag lines, 2 rotating clockwise, and two counter-clockwise (each with two persons on them).

Other considerations

i) Guiding a load in a dead calm only requires overcoming the resistance of the bearing. Forces will be small.

ii) Once a heavy load is moving it has inertia and can take a lot of stopping.

iii) Wind speed increases with height.

iv) Wind funneling can occur around structures, e.g. concrete cooling towers. This can cause localized zones of high wind velocities.

When to lift and when not to lift

As can be seen from the preceding there are a number of factors that come into play when lifting that affect the ability to control the load, they include:

- Prevailing (and predicted) wind speed at the height of the lift when conducting the lift
- Possible wind funneling effects, exposure when clear of structures
- Possible gusting
- Size of load, shape of load, weight of load
- How close to capacity the crane is
- Criticality of clearances between the load and the crane, structures, lines etc
- Whether it is a single crane or a tandem crane lift
- Ability to locate tag lines and tag line handlers to maintain adequate "purchase" on the load during lifting, i.e. maintain effectiveness of tag lines

When to lift and when not to lift

- A limiting wind speed in the crane manual doesn't necessarily mean it's safe to lift a particular load at that wind speed.
- Some capacity charts are based on a particular limiting wind speed and sail area.
- Other charts simply require "operator judgment to be exercised".
- If a load cannot be safely controlled it should not be lifted. That judgment is going to fall on the crane operator ultimately and is necessarily somewhat subjective; it must be respected.

Plan your tag line use

How many tag lines are required?

- All you can achieve with a single tag line is to resist movement of a load away from you (or pull it towards you)
- It is not acceptable to dart across from one side of the load to the other with a tagline to correct an over-correction.
- REMEMBER: YOU CANNOT PUSH ON A LOAD WITH A TAG LINE! If you have to push, push poles may be used.
- Generally two lines will be required to adequately control a load against rotation. To control swinging, both will have to apply load.

Guidelines for tag line use

Remember that if attempting to control a long load at height with the tag line at a steep angle to the horizontal, the force you apply to a tag line has a horizontal component (that you want), and a vertical component (that you don't want) that is trying to drag down the end of the load to which it is attached. Using two tag lines may help balance that.

There are instances as noted above (particularly on large long loads) where 4 tag lines may be required allowing control of swinging in both directions and allowing two persons to control rotation in either direction. Good communication is required in such cases!

Also note that when erecting steel generally only one tagline is used to receive the steel then orientate as needed. The tagline is usually put on the numbered end of the piece so that the connectors know which end of the steel goes where.

Guidelines for tag line use

During steel erection the practice of Xmas-treeing steel presents other hazards. A good practice is to bring the bottom piece of steel in at waist to shoulder height of the personnel and then move into place. This prevents the load from having to be lowered over the top of the personnel. In cases where this is not feasible allowing the personnel to move out of the way then lower the load to the required height then the personnel move in and place the steel in place is another option. This practice requires well trained personnel who are experienced in steel erection (crane operators, ironworkers and supervision).

Guidelines for tag line use

Where to attach

Tag lines should be:

- attached to the load towards it's (lateral) extremes to get best "purchase" against rotation
- attached to a lug, nozzle, structural member or other substantial and solid member capable of taking a significant force without being deformed or damaged or moving

Tag lines should not be:

- attached to the rigging supporting the load (unless that is the only option and is assessed to be safe to do so)
- attached to door handles, valves or items of equipment
- attached where they could slip off as the operation proceeds

Guidelines for tag line use

How long should the lines be?

You first need to decide what control is required:

- Is it required only during uplift and receipt?
- Is control required throughout the entire operation?
- Will control have to be handed off to (say) height during a lifting operation?
- Will I have to let go of the tag line(s) at some point? If so, will they be a hazard?

The lines need to be:

- Long enough to keep your body parts out of harm's way
- Long enough to reach the load from where it will be to where the handler has to stand (with some reserve) considering the load height
- Long enough so that the handler can be positioned so that the angle of the tag line to the horizontal does not get so steep that control becomes impossible as the lift proceeds
- Not so long as to create a snagging hazard

There should always be a clear line from the handler to the point of attachment so that the tag line does not have to pass over or under or around parts of the load as the operation proceeds.

Where to stand

As noted earlier, tag lines are most effective if their line of action forms a 90 degree angle (in plan view) to an imaginary line from the C of G to the attachment point. Tag line handlers should aim to position themselves as close to that as possible, consistent with being in sight of each other. As a load is turned (rotated), this angle will depart from 90 degrees and the pull becomes less effective. It may be necessary for handlers to relocate to regain better “purchase” on the load.

Moving with a load

As much of lifting involves relocating a load either by hoisting, swinging, booming out, crawling or some combination thereof, tag line use needs to reflect this.

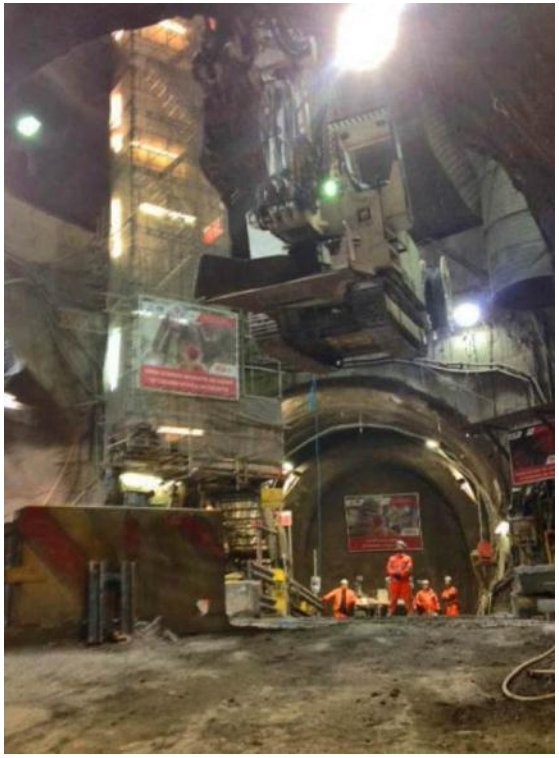
- Persons handling tag lines will either need to move with the load and/or be able to pay out the tag line.
- Note extent of correctional rotation required between start and finish and plan for it.
- Plan for guiding the load between obstructions.
- Plan a clear foot path for handlers.
- If duplicate tag lines are required, plan hand over of control.

Guidelines for tag line use

Lowering down shafts

When lowering loads down shafts it may only be possible to effectively control rotation at the shaft opening before lowering and on receipt at the bottom. Rotational control may not be possible down the entire shaft and the risks that may or may not pose should be considered.

Tag lines may need to be released at the top and retrieved at the shaft bottom. The potential for snagging of the tag lines needs to be addressed.



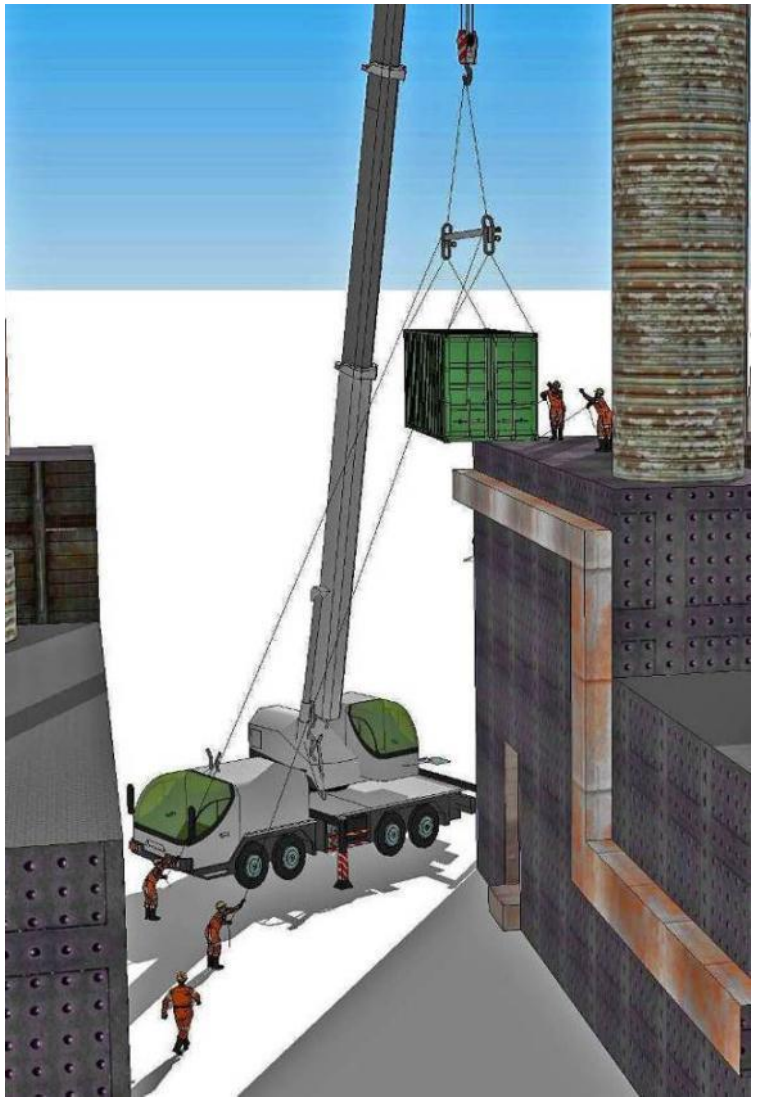
Points to consider in preparing a tag line plan for lowering down a shaft:

- What rotational / swing control or adjustment of attitude is required from uplift to shaft opening?
- How many tag lines are required?
- How long do they need to be?
- Where can handlers stand?
- How critical is rotational control as the load enters and is lowered down the shaft? Can that be controlled if required?
- At what point should tag lines be released (if that is necessary)? Will they cause a snagging hazard?
- Are tag lines required for receipt at the shaft bottom? How many, how long, how are they safely retrieved?
- Hand-over and signaling protocols.

Guidelines for tag line use

Lifting to height

- Loads may suddenly be subject to wind when clear of surroundings
- As the lift progresses the increasing vertical angle may render the control ineffective.
- Loads lifted high onto structures may require a two sets of tag lines (long and short), a protocol for transfer of load control must be established.
- The potential for tag lines to snag on the surroundings when lifting / lowering / manipulating the load must be addressed and managed.



Guidelines for tag line use

Receiving a load

If persons receiving a load need to retrieve a suspended tag line from the load they are receiving, a boat hook or similar should be used to avoid having to get close to or under the load.

Receiving a load

TAG-EX

The key element of this Australian made and owned invention is that it allows a dogman or rigger to get a hold on the tagline without having to walk into the load shadow, or directly underneath the load.

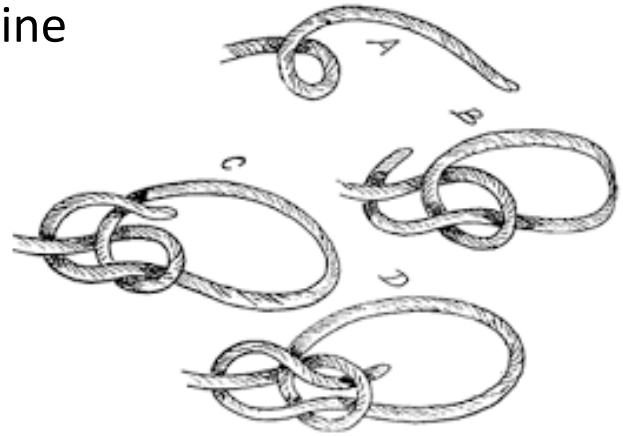
It is an extension point for locating a tagline and it can be permanently or temporarily attached to any load that has the potential to be lifted.

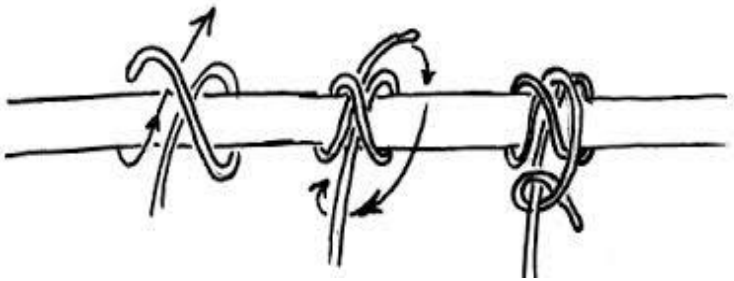
Remember to stay downwind when retrieving a tagline.

Attaching Taglines – practical considerations

Basic Knots

- Bowline





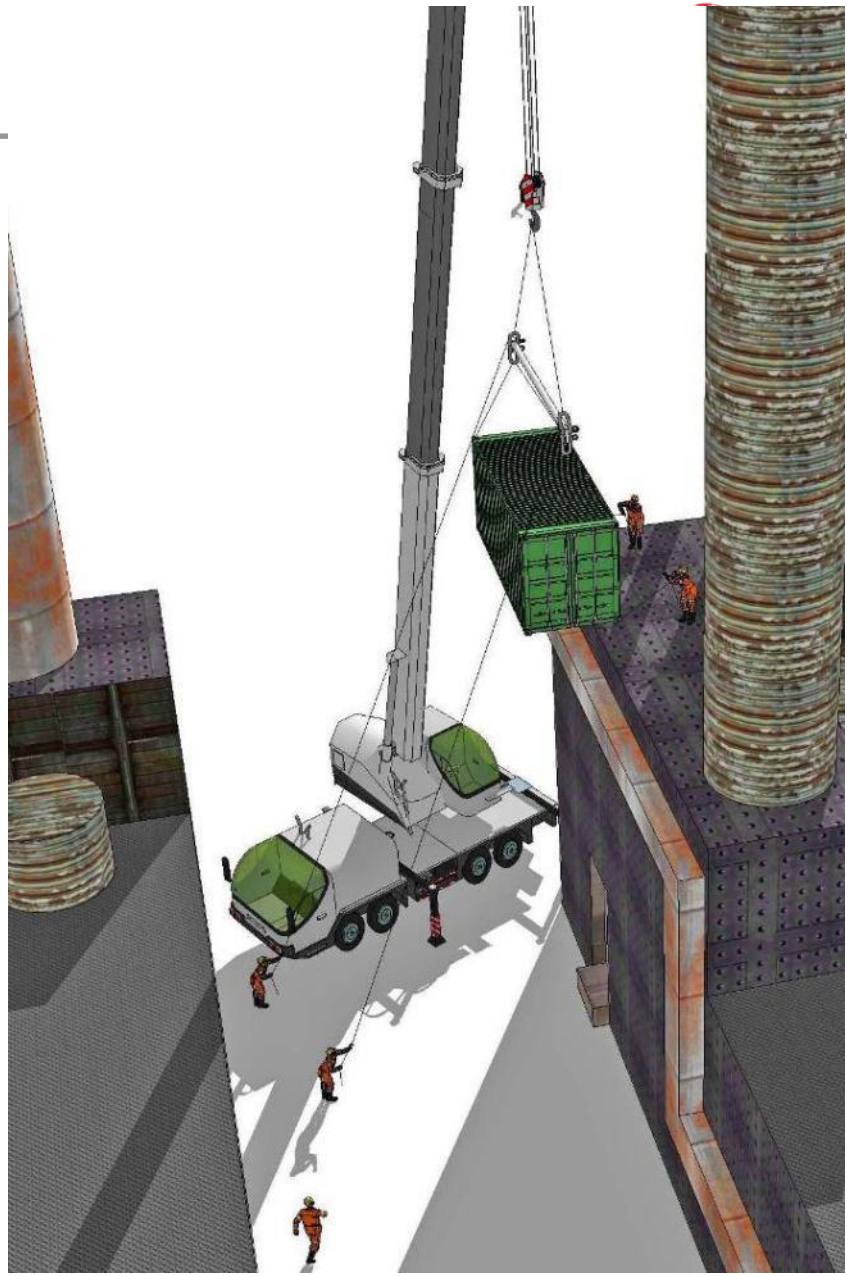
- Clove Hitch

(Right hand view with stopper)

Guidelines for tag line use

Where to attach the Tagline

1. As close to the end of the load as feasible for ease of control as explained earlier; also for ease of retrieval when accepting a load.
2. To the rigging assembly when setting loads with complex rigging arrangements at heights for control of the rigging assembly back to the ground. Shorter taglines may be needed for the personnel at heights to take over the control of the load once near the setting point. This would also be advantageous when setting loads over power lines (this would need to be planned carefully).
3. At the corners of loads with large sail areas and pieces of equipment that may require more than two taglines.



Guidelines for tag line use

How to attach taglines to the load

1. Use of a bowline or mechanical hook to a fixed point

Attachment point to be:

- Structural and sufficiently substantial for the forces envisaged
- Secure such that the tag line will not slip and come off in use or the attachment point move relative to the load
- Not likely to be damaged by this use
- Not likely to significantly damage the tagline

Guidelines for tag line use

2. Use of a clove hitch (without and with a stopper knot)

3. Use of a choked loop (with a tied bowline, a braided eye and a mechanical hook)

Guidelines for tag line use

4. Connected to the rigging assembly or the rigging assembly and the load for control by personnel at heights

Guidelines for tag line use

5. Use of a figure 8 knot for heavy loads at extreme heights (such as wind turbine generators and propellers), used with a dead man and/or capstan hoist. The figure 8 knot only reduces the capacity of the rope by 15%.

Guidelines for tag line use

Key Tag Line considerations

- Type of load
  - Small Short loads (beams & straight run pipe)
  - Long Light Loads (rebar or bundles of small bore pipe)
  - Large Light Loads (sheet steel, form panels & or wall panels)
  - Large Heavy Loads (compressors, lube oil skids & or generators)
- Loads at Heights (steel erection, setting equipment in or on structures & or wind turbine work)
- Wind Conditions (shape of load)
- Travel Path (clear or congested)
- Orientation to Boom (will it need to be turned during lift)
- Hand Off to Other Personnel (at height or in excavation)
- Power Lines (going over or working close to)
- Number of Personnel Needed (their lines of sight to operator and each other)
- No knots in the body or on the tail end of taglines
- Mechanical Assistance (capstan hoist) required?

Guidelines for tag line use

Tagline Safety

- Always use a rope intended and recommended for tagline use
- Wear gloves when handling the tagline
- Never wrap the tagline around an arm or leg in an attempt to stop a load's swing.
- Keep the "spare" end of the tagline tidy so as not to be a tripping or snagging hazard and to allow unimpeded "paying out" as required
- Never step into a loop in a tagline.
- Never place yourself between an immovable object and a load that is not firmly on the ground
- Do not position yourself where you could be trapped as the operation proceeds
- If you must, you should release the tagline to avoid becoming trapped or pinched.
- Be very aware of power lines in the proximity of the lifting operation. Even synthetic slings can conduct an electrical charge if damp.

http://www.kbassociates.org/store3-385/KBATrainingSeries/POSTERNSLSafetyAwareness/HandsFreeLiftingSafeUseofTaglines12postersinset

Guidelines for tag line use

Exercises

Is this load under control? What thoughts do you have regarding this set-up?