KISH P&I CLUB

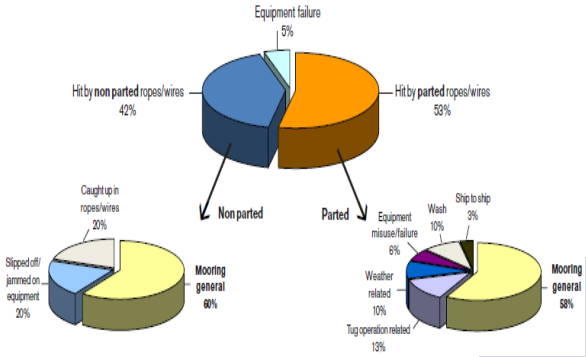
KISH P & I LOSS PREVENTION CIRCULAR KPI-LP-42-2012

(Mooring Accidents Analysis & Lessons to be Learnt)

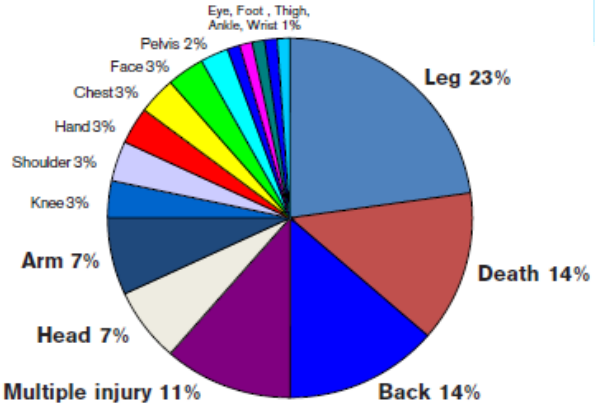
➢ Introduction:

In an accredited & professional claims research it was deduced that most of the accidents occurred during the handling of ropes/wires, where ropes/wires have parted (53%) or where ropes/wires have jumped/slipped off drum ends/bitts (42%) with 5% caused by actual equipment failure.

Parted ropes/wires normally occur during general mooring, tug and ship to ship operations with equipment failure, misuse, wash damage and weather also playing a role. Injuries from non parted ropes/wires normally occur due to crew being caught up in ropes/wires and ropes wires slipping off and becoming jammed on drum ends during normal mooring operations.



The break-down of the various injuries as per the parts of the body affected:



➢ Risk assessment of mooring stations:

Referring to the ISM code requirements; a risk assessment should be made for all mooring areas on board as they are prone to accidents & various risks; looking at the space with a view of purposely searching for hazards that may cause injury. Mooring areas naturally contain many trip hazards, and highlighting these is a good starting point.

➢ Hazard highlighting:

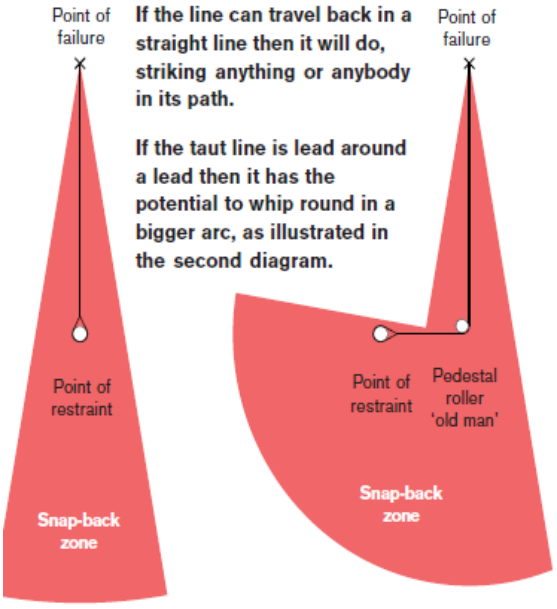
Physical hazards to be highlighted should not be limited to bulkhead frames, mooring bits, pedestal fairleads and cleats. It should also include structures such as platforms at the windlass and hawse pipe covers.

➢ Maintenance shortcomings:

- ✓ The mooring area dirty and all surfaces may be in need of maintenance.
- ✓ All surfaces painted the same colour, hiding trip hazards such as save-alls, windlass platforms, forecastle access hatch and bitts.
- ✓ There are no hazard high-lightings or warning markings. Highlighting hazards is particularly important for the safety of crew that are new to the vessel, cadets and other trainees, and visitors. It is also important for the benefit of experienced crew who easily become complacent, tired, or too busy in their work to not notice a hazardous situation developing.
- ✓ There may be many moving parts with lack of lubrication. Do not forget to include in the maintenance schedule the checking of all grease nipples on mooring equipment (deck machinery) to ensure the nipples remain usable. It is a good idea to highlight grease nipples in order to prevent them from being painted over or overlooked.

➢ The condition of the mooring equipment:

Mooring equipment that has suffered severe wastage will not perform to the certified standard. This also applies to the steel to which the equipment is welded. The first image shows mooring bitts that are badly wasted. The deck is in equally bad condition and there is a danger of the bitts being torn from the deck. The other two images show very badly maintained old (dead) man pedestal fairlead.



➢ **Beware of Snap-back zones:**

The majority of serious incidents in mooring areas involve parting lines.

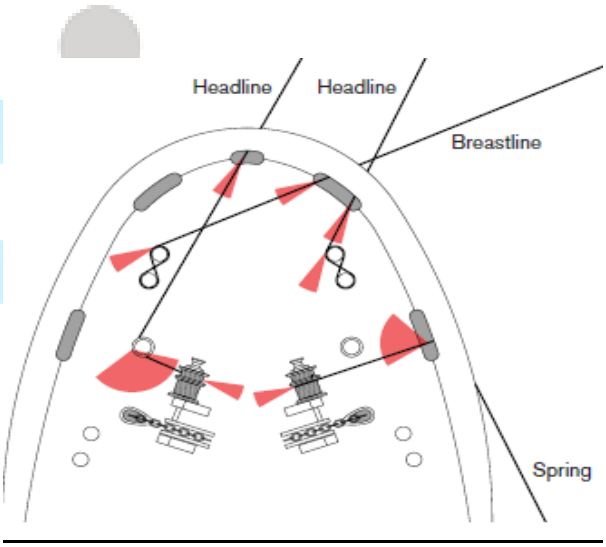
Qualified seafarers are aware of the fact that a snapback zone exists when a mooring line is under tension. It is, however, a rare thing to see crew taking this into account when they are working mooring lines on deck.

If snap-back zones are painted on the deck then crew will be alerted to the danger when they notice they are standing in a highlighted zone.

Painting these areas also helps supervising officers instruct crew to keep clear when lines are coming under tension.

Highlighting mooring line snap-back zones ensures that crew can visibly see the danger areas without having to purposely think about them while working.

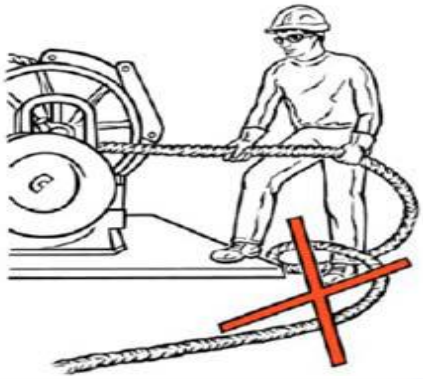
When a line under tension parts, it will whip back to the remaining point of tension.



➢ **Beware of bights:**

Trained deck hands understand the dangers of standing within a bight or coil of rope and it is therefore surprising that a significant number of personal injury incidents during mooring operations involve seamen doing just that.

Bights don't always look like bights. Here a seaman has inadvertently stepped over the line and put himself at risk.



Bights do not just cause injuries in mooring stations anywhere that ropes are used; there is a danger of being entangled within the bights. There is a report of a seaman being dragged down the ship's side while trying to lower the bunkering hose & connections after the operation was finished. The rope was a small diameter manila but carried him over and down to the bunker barge deck, causing severe injuries.

➢ **Avoid too many/too few & unnecessary people at the stations:**

Mooring operations are dangerous to crew on board because of the great loads that the mooring lines will carry, and the danger of them breaking while taking up this tension.

Only personnel involved in mooring operations should be present at mooring stations during mooring operations.

It should be policy on board that inexperienced personnel such as cadets in the early stages of their training, who are to be involved in mooring operations, should be under the supervision and direction of an experienced seafarer. Effectively, someone should be appointed to ensure the safety of the inexperienced person, and both should be aware of who is undertaking that duty.

Everybody on board should be aware that only personnel directly involved in mooring operations may visit mooring stations during mooring operations. This is best done with safety notices and implementation into on board policies.

The number of crew found on board is often the minimum required to safely operate the vessel. Although some ships may find themselves stretched for manpower, mooring operations should never be undertaken with less crew than is considered necessary to do the job safely.

There should always be a minimum of two people to each mooring station along with the Officer in charge and in communication with the bridge throughout the operation.

Even where automatic mooring systems are installed, a second person should always be present in case something goes wrong.

Crew should not be allowed to operate a windlass or capstan and handle the rope at the same time. This is a two person job. Fixing a lanyard to an operating lever and pulling on it from the rope-handling position should strictly be forbidden. If only two crewmembers are on deck for mooring operations then they should work together on the lines at one end of the vessel and then the other.

The matter of short-handed ships is a big problem here. On the other hand some ships with General Purpose ratings are also more prone to accidents. Many of the so called GPs are not experiences in any of the tasks given & the dangers of mooring operations can not be ever overlooked.

➢ **Inadequate/Inefficient mooring arrangements:**

Bad mooring arrangements can also be responsible for claims for damage to cargo handling equipment, docks and other structures. In these incidents it is often the case that the vessel surged extremely or broke her lines because of strong currents or the influence of passing vessels.

The image below shows a vessel considerably overhanging her berth. She is therefore unable to lead any stern lines aft of the ship. The image shows one line in particular being lead an extremely long distance, rendering it pretty much useless.

The ship has correctly put out as many lines as possible but should also consider the use of the anchor and mooring lines running aft from either the main deck or other suitable areas.

In situations like this it is important to analyse local tidal and weather patterns in order to predict how the vessel will be affected. The owners should be informed and cargo operations stopped (or not commenced) if conditions do not appear safe.

There are also conditions that inadequate number or spacing of the bollards ashore makes it nearly impossible to utilize directional ropes like springs or breasts. The ship staff should be able to improvise plans for the best possible use of leads & rollers in order to make fast warps in the closest practicable angles to the ship & wharf.

- **Proper Use of the Personal Protective Equipment (PPE):**

When struck on the head by a parting mooring line, the wearing of a hard hat will be the life or death deciding factor. A hard hat should be worn at all times when involved in mooring operations, as well as appropriate safety footwear and boiler suit (or other protective full-length clothing).

It has been the general opinion on some vessels that the wearing of gloves when handling mooring ropes is an unsafe practice. This is due to concern that loose gloves may become trapped under a line on a windlass drum and haul the crewmember over it. Gloves should be worn but crew need to be aware of the dangers associated with ill-fitting gloves when handling ropes.

- **Proper Mooring Practices:**

Professional seafarers must be monitored during mooring operations to ensure they do not become complacent in their work; putting themselves and others in a dangerous situation.

Deck officers monitoring mooring operations must be actively watching for hazards and give instructions to ensure hazards are controlled.

Mooring operations should be conducted in a safe manner so that:

● The line on the windlass drum is being handled safely. The crewmember at the drum must keeping his hands clear of the turns and positioned so as not to become fouled in coils of rope.

● The crewmember operating the windlass should have a good line of sight of the rope and the man handling it.

● The involved crew should appropriately attire in correct personal protective equipment.

1-Correct use of stoppers:

It is often observed that stoppers have been left on lines after they have been secured. This bad practice puts unnecessary strain on the stopper as the line continues to tighten on the bitts. It may also result in the stopper rope tightening to the point where it can't be released.

It is important to check that a chain stopper setup for use with polypropylene ropes are not permitted. Only rope stoppers should be used with rope mooring lines; chain stoppers are for use with wires. It is also advisable to consult an on board seamanship manual for proper seamanship practices.

2-Wire to rope:

A rope mooring line should never join a metal line without the use of a thimble.

The condition of the rope and wire in this example is poor and the lack if a thimble increases the likelihood of the rope breaking.

Incorrect type of stopper

Incorrect rope/wire connection

3-Making an eye on wire warps:

If it is necessary to create an eye in the end of a wire, then it would be worth investing in crimping equipment. Many ships prefer the use of bulldog-grips for creating an eye in the end of a wire rope, but there is a correct way of doing this:

● An allowance of 150 mm should be made between the last bulldog grip and the end of the 'dead' wire. It is important to ensure that the lashing wires are not cut short immediately next to the bulldog grips.

● Bulldog grips have a grooved surface in the bridge piece which is suitable for a standard wire of right-hand lay having six strands. Crosby grips have a smooth surface in the bridge piece. The grips should not be used with ropes of left-hand lay or of different construction.

● The first grip should be applied close to the thimble or at the neck of the eye if a thimble is not used. Other grips should be placed at intervals of at least one clear grip (albeit a distance of six rope diameters apart is suggested) between each other.

● The grips must all face in the same direction and must be fitted with the saddle or bridge applied to the working or hauling part of the rope. The U-bolt must be applied to the tail or dead-end of the rope. If the grips are not applied as indicated above, the effectiveness of the eye can be seriously affected.

WRONG

RIGHT (but rusty old wire)

4-Making Fast the Mooring Ropes:

Windlass drums are not designed for taking the weight of mooring lines for a long period of time. If windlass drums are used for this purpose then over a period of time they will suffer damage and be in need of repair.

Once ropes have been hauled tight they should be secured to bitts.

Bad practice

Result of Bad practice

Good Practice

➢ **Proper Care for the Mooring Lines:**

In order to preserve the usage life of ropes, ensure they are protected from the elements and not subjected to unnecessary chaffing.

Do not store ropes on wet decks. Over time, ropes and wires will suffer wear and damage and the general condition will be evident in the rope as a whole. But a part of the rope may become particularly damaged at any time and it is important to check the rope at every opportunity.

It is a general practice to place the forward ropes in the forward stores but the aft ones usually remain outside. This is not a good housekeeping. The ropes which are laid in open air; will be affected by sunlight and possible water sprays. They may come in contact with various chemicals like deck-wash which in the passage of time will cause degrading of the ropes.

On the other hand the soot blown from the funnel have at occasions caused damage to the mooring ropes aft both in the chemical effects as well as small spot fires, etc.

A visual inspection should be performed every time before, during and after a rope has been used. Flaking a rope on the deck ready for running is a good opportunity to look for damage which a part of the rope may have suffered, causing a weak point in the rope.

A general visual inspection can also be performed by the person handling the line on a windlass drum as it is received, hand over hand.