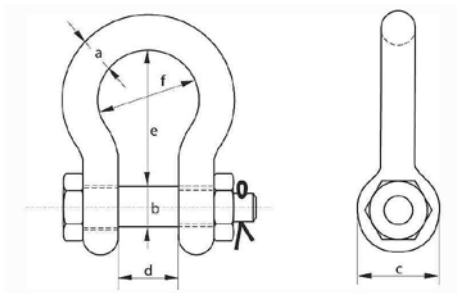


Reliable Bolt Securing For The Prevention Of Dropped Objects



Richard Waddington
Nord-Lock Ltd

1. Shackles, A Design Improvement



2. No Need For Retightening (NNFR) Concept



Drops Booklet Entry

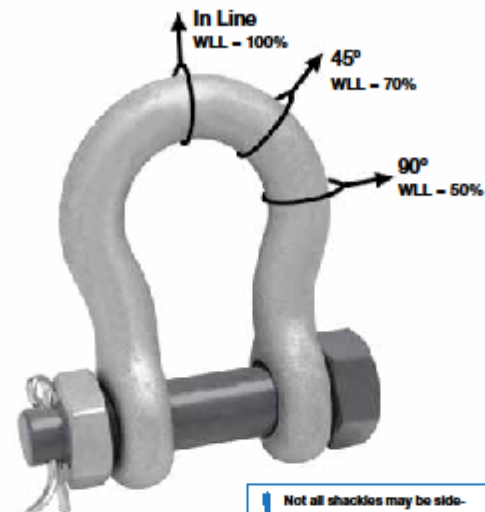
Correct Use of Shackles

Shackles are used in lifting and static suspended systems as removable links to connect wire rope, chain and other fittings.

BEST PRACTICE RECOMMENDATIONS:



- Shackles must be of an adequate WLL (SWL), certified and approved, be designated with the current colour code
- 4-Part Shackles (Safety Bolt type) must be equipped with two barriers: nut and stainless steel split pin / cotter pin
- Split pins / cotter pins should be sufficiently splayed to prevent them from being knocked out or causing injury
- Linch pins, nappy pins or R-Clips should not be used during lifting as these may be knocked out or cause snagging (also see Page 17)
- 2-Part Shackles (Screw Pin or Round Pin type) should never be used for permanent suspension or in any application where the pin can roll under load and unscrew
- Shackles must only be used for their intended purpose and manner
- The user must be familiar with the applicable limitations and guidelines for use (always refer to manufacturer's data sheet)
- Shackles are designed to support the load at the bottom of the hollow torus and evenly across the shackle bolt
- If shackles are exposed to loads in other places, this must be taken into account during use as it will reduce capacity
- Where point loading is unavoidable, ensure load is reasonably centred, never load shackle pin to shackle pin and refer to manufacturer's guidance for further details
- Side loading of shackles should always be avoided as this reduces the WLL factor. If it is completely unavoidable then the figure opposite may be used as guidance although manufacturers' guidance may differ.



⚠ Not all shackles may be side-loaded, eg sling shackles. Always refer to manufacturer's technical data sheets for loading and operational limitations.



⚠ Split pins / cotter pins should be of the correct length. Ensure pins are properly splayed (as shown here) to reduce the risk of snagging and injury.

IMCA Safety Flash 02/15 February 2015

Near Miss: Missing Nut and Split Pin on Shackle



“it was possible that the split pin and nut worked themselves loose as a result of vibration”



Safety Alert

From the International Association of Drilling Contractors

ALERT 02 – 17

OVERHEAD SHACKLE FAILURE RESULTS IN DROPPED TONGS

WHAT HAPPENED:

The drill crew was on the rig floor changing out the rig tongs from type-DB to type-C. The DB tongs had been removed from the make up tong side and the type C tongs were attached to the tong cable. The type C tongs were being lowered by the air hoist and the weight of the tongs was transferred from the hoist line to the tong line. The tongs stopped at about 2.5 feet from the rig floor where one of the floormen was able to remove the hoist line. Once the hoist line was removed, the shackle pin at the counterweight bucket had come out of the tong cable causing the tong to drop to the rig floor.

WHAT CAUSED IT:

The investigation revealed that about a month earlier the tong line was removed from the weight bucket to rig up casing tongs. When the tong line was reattached either the reused cotter pin broke and fell out or the pin was not put in place.

- The shackle pin at the counter weight bucket came out, allowing the tongs to drop.
- The JSA did not call for an inspection of the shackles in the mast.
- The safety shackle with the missing pin was not identified during safety & compliance audits.
- It is possible that the shackle pin cotter key was not put back in place after being removed during a previous job or it was reused and weaker than a new one allowing it to break which permitted the nut to back off.

CORRECTIVE ACTIONS: To address this incident, this company did the following:

- A complete inspection of the mast and substructure was performed looking for pins that might have missing or weak cotter keys.
- The JSA was revised to contain a safety precaution to check overhead shackles and all associated tong hardware and connections, whenever tongs are to be changed out, including after every casing operation.

The Corrective Actions stated in this alert are one company's attempts to address the incident, and do not necessarily reflect the position of IADC or the IADC HSE Committee.

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Issued April 2002





Safety Alert

From the International Association of Drilling Contractors

**NO NEED FOR
RETIGHTENING**

Secured by
Nord-LockTM

ALERT 07 – 09

DROPPED OBJECT RESULTS IN SERIOUS NEAR MISS

WHAT HAPPENED:

An extremely high potential Near Miss occurred when the safety retracting lifeline (SRL) block which weighs 15 KG (30 pounds), was installed above the monkey board fell approximately 90 feet down to rig floor. The SRL block landed 8 feet away from the driller's console. Fortunately, no one was hit by the falling object and there was no equipment damage with the exception of the SRL block.

WHAT CAUSED IT:

- Poor inspection practices conducted on the Rig
- Safety pin may not have been installed on the four-part shackle, as required.
- Safety procedures for proper installation of equipment were not followed.

CORRECTIVE ACTIONS: To address this incident, this company did the following:

- Rig Managers and Safety Officers are required to acknowledge in writing to the Area HSE Department that only four-part shackles are being used on the rig floor and on the mast.
- Weekly rig inspections must be carried out and documented on all shackles, as well as any other potential dropped object.
- Routine visual inspections can eliminate the potential hazard of equipment and fixtures from coming loose and falling.
- Do not use shackles that are damaged or missing any of the four parts.



Incorrect Shackle



Correct Shackle



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Issued March 2007





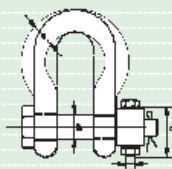
**NEW: Fixed Nut
Shackles!!**

Van Beest introduces an addition to the Green Pin® shackle program:
Fixed Nut Shackles.

Sometimes shackles are not used for lifting applications but for more permanent constructions. These can be subject to dynamic loads and/or extreme vibrations. In such applications there is a risk that, over time, the nut starts moving over the thread. To avoid this risk we offer our range of Green Pin® Fixed Nut Shackles.



G-4143



VAN BEEST B.V. Manufacturer
and Supplier of wire rope
and chain fittings. Reg. trade marks
'Green Pin' and 'Excel'



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3981 HU Sluiterrecht
Telephone: +31 184 41 33 00
Telefax: +31 184 41 49 59
E-mail: sales@vanbeest.com
Internet: www.vanbeest.com



**NEW: Fixed Nut
Shackles!!**

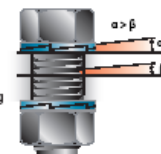
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Green Pin® Standard, Polar and Super shackles can be equipped with a feature that consists of an extra AISI 316 securing bolt which is drilled through the nut and shackle pin. This securing bolt is fastened with two sets of Nord-Lock® washers and a securing nut. This will keep the shackle nut in position. The Nord-Lock wedge-locking washers lock when subjected to extreme vibration or dynamic loads.

Green Pin® Fixed Nut Shackles will be available on request only.

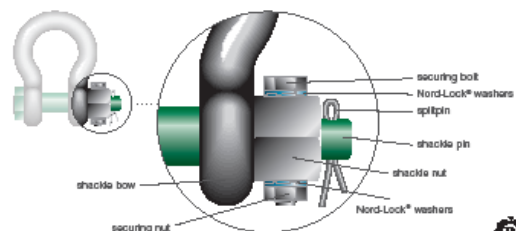
Please find herewith the latest Van Beest product information including details of these shackles.
For more information please contact us: sales@vanbeest.com



Green Pin® Fixed Nut Shackles

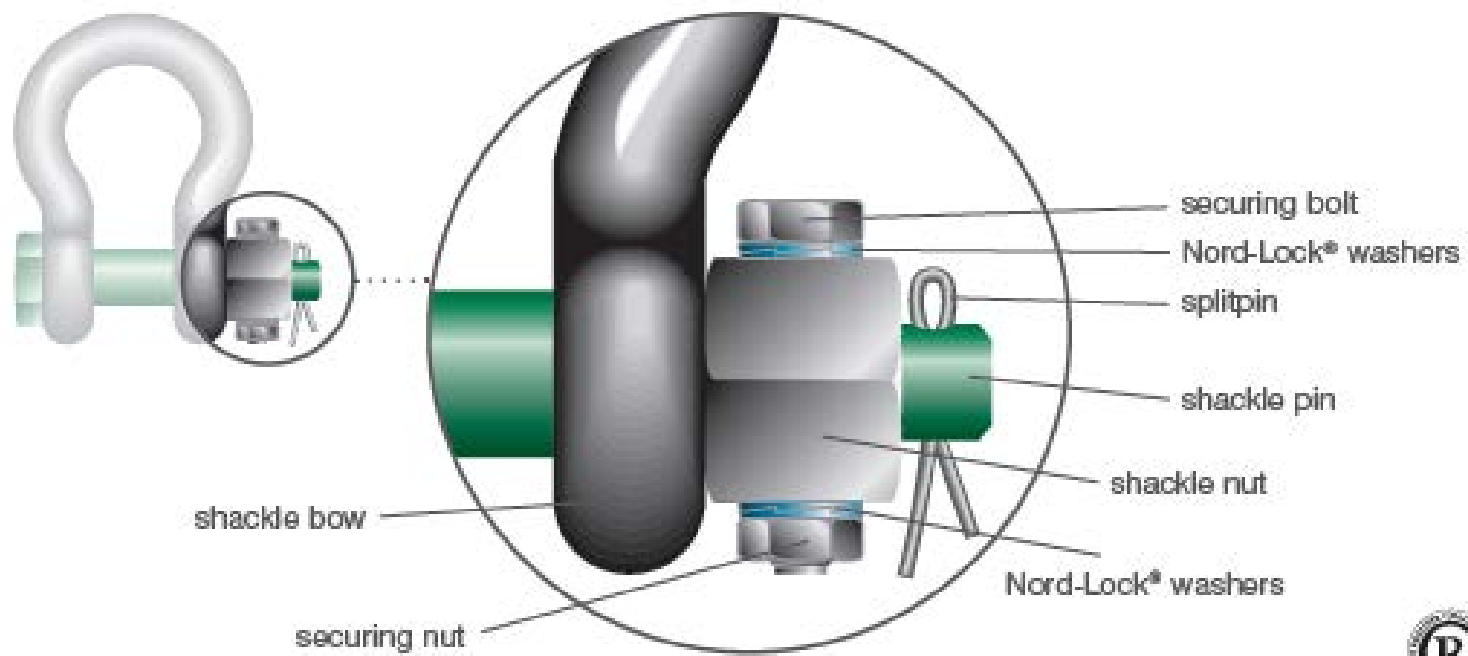
G-4143 - Green Pin® Fixed Nut Standard Shackles, bow shackles with safety bolt and fixed nut
G-4193 - Green Pin® Fixed Nut Standard Shackles, dee shackles with safety bolt and fixed nut
G-5143 - Green Pin® Fixed Nut Polar Shackles, bow shackles with safety bolt and fixed nut
G-5243 - Green Pin® Fixed Nut Super Shackles, bow shackles with safety bolt and fixed nut

G-4143 Safety bow WLL	G-4193 Safety dee WLL	G-5143 Polar WLL	G-5243 Super WLL	diameter body	diameter pin	securing bolt thread	securing bolt length	torque
t	t	t	t	a mm	b mm	c mm	d mm	Nm
2	2	2	3.3	13.5	16	M6	35	0.2
3.25	3.25	3.25	5	16	19	M6	45	0.2
4.75	4.75	4.75	7	19	22	M6	50	0.2
6.5	6.5	6.5	9.5	22	25	M6	50	22
8.5	8.5	8.5	12.5	25	28	M6	55	22
9.5	9.5	9.5	15	28	32	M10	65	43
12	12	12	18	32	35	M10	70	43
13.5	13.5	13.5	21	35	38	M10	75	43
17	17	17	30	38	42	M6	80	22
25	25	25	40	45	50	M6	100	22
35	35	35	55	50	57	M10	110	43
				57	57	M10	110	43
42.5	42.5	42.5		57	65	M12	120	75
55	55	55		65	70	M12	130	75
			85	70	70	M12	130	75
85	85	85		75	83	M12	150	75
			120	83	83	M12	150	75



Date: October 2013, Update: 2013-10-03

Product Update



NO NEED FOR RETIGHTENING



**NO NEED FOR
RETIGHTENING**

Secured by
Nord-Lock™

NORD-LOCK®
Bolt securing systems

**A CONCEPT THAT MAKES ANNUAL
RETIGHTENING AND TORQUE CHECKS ON
BOLTED CONNECTIONS UNNECESSARY:**

**NO NEED FOR
RETIGHTENING**

Secured by
Nord-Lock

TM

The Cost Of Bolt Retightening

- A conventional semi rig is typically held together by 300,000 bolted joints.
- Classification societies oblige operators to carry out annual torque checks on at least 20% of the bolts related to drilling structures.
- This represents an estimated annual cost of **£644,000** per rig.



NNFR Is The Combination Of; -

- **A reliable, certified bolt securing method**
- **Quality assured fasteners**
- **Proper training for fitters**
- **Support from certifying authorities**

The NNFR Hardware Kit



Who Is Backing NNFR?

- DNV-GL
- Rig Owners & Operators
- Inspection Companies
- **ONS2014** NOMINATED
INNOVATION AWARD



What's The Problem?

- **Poor or no protection against bolt loosening**
- **Poor quality fasteners in the supply chain**
- **Lack of suitable training for fitters**
- **Retightening only addresses the symptom rather than solving the problem**

Loose Nuts & Bolts 1



Dropped Nut & Bolt

Dropped Object - Bolt from Dolly Track - Fell 15m to Rig Floor

On 6th June 2013 at 04:45 a sheared bolt with a nut fell in the red zone. Upon investigation, it was found that it was from the dolly track flange 15m from rig floor. All personnel were out of the Red Zone at the time of the incident.



Loose Nuts & Bolts 2



Poor Quality Fasteners



**FPSO SKARV was shutdown to replace 3,000 Bolts and Nuts because of poor quality fasteners.
Estimated cost in excess of £25,000,000.**

**NO NEED FOR
RETIGHTENING**

Secured by
Nord-Lock™

Loose Nuts & Bolts 3



**NO NEED FOR
RETIGHTENING**

Secured by
Nord-Lock™

**NO NEED FOR
RETIGHTENING**

Secured by
Nord-Lock

TM

**No Need For Retightening would allow
rig owners and operators to apply to
classification societies for exemption from
annual torque checks of bolts.**

The Benefits Of NNFR?

- **For HSE; -**

A significant reduction in dropped objects, incidents and accidents

- **For operators and engineers; -**

Reduced lost time incidents and increased production

- **For owners and accountants; -**

A potential saving of £644,000 per year per rig



**For more information about
No Need For Retightening
please go to; -**

www.nord-lock.com

**NO NEED FOR
RETIGHTENING**

Secured by
Nord-LockTM

Focus On Improving Safety And Reducing Costs

No Need For Retightening (NNFR)



Hardware



Training



Certification

A concept consisting of the hardware, the knowledge and the routines required for an amendment in the inspection and torque check routines, implemented across the entire Oil & Gas industry.