Instructions for use and maintenance, part 2

(Translation of the original German instructions for use and maintenance (AWA), part 2)

all lifting accessories made of steel and/or steel ropes

CE

machinery directive 2006/42/EC
§ 1.d and .e, annex I, art. 1.7, 1.7.4, 1.7.4.2, 4

EASA CS-27./29.865 / EC Decision 2014/018/R, AMC/GM to Part-SPO - Amendment 9, AMC1 SPO.SPEC.HESLO.100

as well as all lifting accessories, slings and their components, load securing devices and anchor points which are not in conformity with machinery directive 2006/42/EC or EASA CS-27./29.865 (used with/on Annex I helicopters/MIL)

All rights reserved 2007 - 2020 © ® AirWork & Heliseilerei (A&H)

Part	0	1	2	3	4
	Index	Definitions	Maintenance: steel	Maintenance: textiles	Use of specific product

Revision C⌦ ⌫: what is new or has been modified?

C⌦All designations "EG" or "EU" before "Machinery Directive" removed without special identification⌫

1. Maintenance, repair and overhaul (MRO) of steel components and steel ropes

1.1 Lifting accessories as well as slings and their components

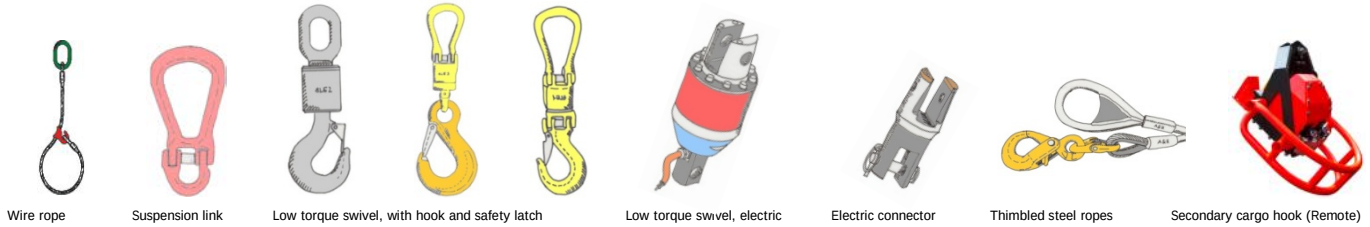
Lifting accessory with manual cargo hook release (example)

Example: manual rope (models TLDS, TLM or TLK) with primary load ring, shock absorber, safety hook, rope, safety hook, stabilisation weight/secondary cargo hook (load element, model SLE1)

Lifting accessory with electric cargo hook release (example)

Example: electric rope (models TLL, TLP or TLPME) with primary load ring, shock absorber, safety hook, secondary load ring, rope, swivel joint (inside Goggel protective casing) and secondary cargo hook

Single leg | 3- and 4-leg sling | Bow shackle | D-shackle | Unilock | Slinging points | Safety hook | Joker hook | Connex | Round sling connex | Special design fitting



Wire rope | Suspension link | Low torque swivel, with hook and safety latch | Low torque swivel, electric | Electric connector | Thimbled steel ropes | Secondary cargo hook (Remote)

This list is not exhaustive. For more information, please contact us or check **www.air-work.swiss**

2. Introduction

2.1 The importance of regular equipment checks by qualified persons.

Based on directive 2009/104/EEC concerning the minimum safety and health requirements for the use of work equipment by workers at work, all working tools must be inspected regularly by a qualified person who is an expert in the field. A routine of at least once a year checks has been proven as best practice.

This EC directive on the safety of work equipment is implemented in the national laws of all members of the European Union and other contract-bound states (such as Switzerland).

ED Decision 2014/018/R on AMC1 SPO.SPEC.HESLO.100(c)(3) to Annex VIII (Part-SPO) states that "The operator should be responsible for maintaining the serviceability of this equipment".

Furthermore, correct maintenance, repair and overhaul (MRO) carried out by qualified persons guarantee constant functioning and enduring usability of a product and consequently also enduring safety.

After the general principles for use described in **part 1**, the following **part 2** (MRO of steel components), **part 3** (MRO of textile components) and **part 4,** containing the instructions for use of the specific product constitute the basis for correct use.

The 4 most frequent factors causing damage to lifting accessories are:

- Dropping of devices from considerable heights (> 3 m above the ground, partly up to 15 m)
- Dragging of devices over the ground
- Overstressing of ropes due to sudden, strong impacts (abrupt hoisting of slack rope, dropping of cargo attached to the rope, absence of shock absorber)
- Performing of applications for which the rope or slinging device is neither intended nor suitable.

The term "Correct use" comprises all applications the device has been designed, constructed and tested for.

Personnel performing equipment checks must previously be instructed by **A&H Expert**.

The life time of a steel component covers the time of use and storage and is unlimited (use depending on condition), unless the producer defines a specific time range.
Product life time can only be established by the producer and is assessed according to the clients' operational demands.

For this reason, it can be dangerous to sell, loan or donate equipment to other companies/persons; likewise it is dangerous to accept equipment from other companies/persons and use it without previously contacting the producer.

3. Immediate measures

3.1 Equipment check after every (day of) assignment

Marshallers/task specialists always have "their" work material well in hand. Prior to every use, they automatically check its condition and, in the event of alterations or evident damage, they will remove the sling and/or lifting accessory in question and inform the crew.

Altered or damaged slings/lifting accessories must be handed over to the person in charge of MRO immediately after an assignment or at the end of the working day.

4. Visual inspection

4.1 What should special attention be paid to?

- All steel components should be as free of rust as possible.
- All components must be free of deformation.
- All connections: all bolts with fixing sleeves, all joints, swivels and safety catches equipped with springs must be free of rust and move freely without resistance or jarring noises.
- Low torque swivels: both halves of the swivel must move freely and easily even when under load, the joints must be free of dirt and/or other foreign bodies.
- Safety hooks: the locking distance between the two parts of the hook mouth opening must not exceed a width from 2 mm (size 7/8) to 4 mm (size 16).
- Hooks with safety catches: check if the safety catch is still there and still under strong tension by virtue of the designated spring.
- Heavy duty spring pins must be firmly positioned, undamaged, rust-free and must not protrude.
- Thimbles: thimbles must not be broken at their welded joint. The inner width of thimbles should not differ more than 10% from the original width.
- Chain links: chain links must be free of foreign material (e.g. concrete) and freely move in all directions.
- Steel ropes: steel ropes must be free of wire breakages (protruding pieces of wire) and must not be exceedingly distorted in front of the pressing.
- Logging chokers: the wire rope must not be torn out of the ferrule (knob/nub) on the end of the cable; if the wire rope is equipped with pressing sleeves, these must be free of any protruding wires.
- After the area of the pressing, the rope must be aligned in a straight course.

Annex A2 Lifting accessories/slinging equipment at their original condition (visual inspection)
Annex A3 Abrasion, wear or alterations belonging to category M (Maintenance)

5. Measuring – comparing – testing

The diameter of steel ropes and metal fittings can be assessed with high precision (1/10 to 1/100 mm deviation). Steel ropes and components are standardized and thus exactly determinable by checking the catalogue values.

During inspection, special attention should be paid to ascertain precisely deviations from the original diameter and to detect any mechanical damage (cracks or deformations, wire breakages or fractures of welded seams).

Annex A1 Measuring – Comparing – Testing

6. Maintenance

6.1 Steel components must be periodically cleaned and checked

- Steel ropes (all types and models): Regularly palpate the rope to detect foreign bodies (stones, splinters of wood). In the event of pollution, first let the dirt dry and then remove it with a soft brush.
- Ferrules: check perfect form and positioning, not pressed onto the thimbles, not deformed, bent or split.
- Thimbles: check perfect form and positioning, no “donkey ears” deformation, thimbles must not be twisted, wrongly positioned or diagonally torn, no wobbling at the rope end.

- Remove protruding strands by rubbing them off with a piece of wood. Never nip them off with pincers!

- Any modification to the structure, e.g. following embossing or replacements with not certified parts, will result in the producer immediately disclaiming all responsibility.
- Avoid contact with any abrasive, sharp or pointed object.
- Avoid contact with power lines or power stations.

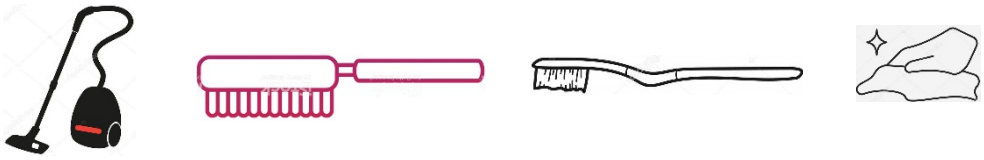
6.2 Correct care and storage

Before storing, steel components should be cleaned, dried and protected against corrosion, for example by applying a small amount of oil.
After washing, mobile steel components are dried with compressed air and then lubricated with WD40 where necessary. They must then be carefully checked to make sure they work perfectly.

- In the event of normal pollution, first let the components dry and then remove the dirt with a soft brush.
- In the event of heavy pollution, wash the components with water or maybe with a light alkaline solution at a max. temperature of 30°C and then let them dry in a well-ventilated room.

With a view to prolonged storage, steel components should be removed from their transport bags or other containers and kept uncovered. You can also let them hang loose from a hook.

C⌦ **Better than chemicals: vacuum cleaner and soft brush; for small parts: toothbrush and cloth**



Also check AWA instructions, part 3, MRO maintenance textiles

The following tools and/or substances must NOT be used for cleaning:

- **Heat > 20°C (hairdryer, lighter, Bunsen burner, radiator, tumble dryer, radiant heater, etc.)**
- **Chemical cleaners such as detergents, curd soap**
- **Caustic or corrosive substances such as stain removers**
- **Volatile substances/hydrocarbons such as ethyl alcohol, fuel, gun oil (only exception: WD40 for the lubrication of mechanical components, where necessary)**
- **Tools such as screw drivers, files, knives, etc.**
- **Compressed air or water pressure as occurring when using nozzles, high pressure cleaners, etc.**

Schäden sind dem Hersteller zu melden. Siehe auch Appel am Schluss dieser AWA
The manufacturer must be notified of all damages. Also see “Appeal” at point 15 of these AWA instructions.⌫

NEVER clean steel ropes with high pressure cleaners or apply too much pressure while brushing!
NEVER clean steel ropes with solvents such as acetone, benzine or strong household detergents!

If you have any doubts or questions, please contact the producer or the supplier.

Annex A2 Lifting accessories/slinging equipment at their original condition (visual inspection)
Annex A3 Abrasion, wear or alterations belonging to category M (Maintenance)

Always observe the legal prescriptions for occupational safety when working with compressed air (goggles and ear protection, use of standard compliant nozzles)!

7. Repair

Steel ropes and components must only be repaired by the producer. For exceptions to this rule, see annex 5. In the event of repairs that can be carried out by the users, a qualified person must undergo appropriate instruction by **A&H Services**.

7.1 Spare parts

Spare parts can be ordered by specifying both their serial number (S/N, if any) and their part number (P/N).

The bolts and clamping sleeves of connecting links, as well as the hooks' safety catches and springs can be disassembled or assembled by an experienced technician following the producer's instructions.

The use of self-made parts or wrong assembly leads to immediate warranty exclusion and the disclaiming of any responsibility.

7.2 Repairs that can be carried out by the users (only after consultation with and following training by the producer)

As a principle, users are not allowed to carry out repairs, since they do not possess the expert knowledge, experience and tools necessary. Moreover, incorrect repairs could result in faulty or unreliable operation and thus constitute a high risk for the users themselves.

A&H distinguishes 3 damage levels:

1. Superficial alterations of the finishing or coating and/or scratches. Damage of this type can be provisionally fixed or permanently repaired by the users.
2. Deep scratches, notches, excessive clearance in mechanical parts (e.g. the safety catches of self-locking hooks) or grooves can partly be repaired after inspection, testing (maybe applying tensile load) and assessment by **A&H Services**. However, notches, grooves or excessive clearance at bolt connections are criteria for withdrawal from service, whereas small parts can usually be replaced.
3. Damage like hairline cracks, deformed hooks, crooked bolts, broken springs, etc. to load-bearing parts cannot be repaired.

7.3 Special repair procedures

Annex A2 Lifting accessories/slinging equipment at their original condition (visual inspection)
Annex A3 Abrasion, wear or alterations belonging to category M (Maintenance)

8. Overhaul

Metal components can partly be overhauled; **A&H Services** will be happy to provide you with a quotation (in some cases, testing is more expensive than new parts).

FLUX and ultrasound testing or any other non-destructive testing procedure (NDT) must be carried out by a qualified person with appropriate instruction on how to use these testing systems.

Complex devices (swivel joints, electric cargo hooks) must be overhauled according to the producer's instructions (please consult the producer's AWA). During a major overhaul all components of the structure must undergo an adequate test procedure in order to detect cracks.

Simple fittings such as oval rings, connex links and safety hooks can be used "on condition" (see "Situations in which the product has to be removed from service"). Screws, springs, bolts or clamping sleeves must be substituted when necessary. All these components should be adequately checked for cracks.

Steel ropes cannot be overhauled.

Repair and overhaul must be carried out exclusively by the producer.

9. Modifications to the original condition upon delivery

It is compulsory that any modification of a lifting accessory's or sling's original condition upon delivery must be carried out by the producer or a qualified person after appropriate instruction by **A&H SERVICES**.

Example of modifications to a product's condition upon delivery:

- Replacement of a self-locking cargo hook, LHW-7/8-10 model, with a self-locking cargo hook of the OBK-8-8 model (different producers, different quality classes and different payloads WLL).
- Assembly of components made by different manufacturers (divergences in capacity, geometry, steel grade)
- Assembly of components done by use of force.

10. Situations in which the product has to be removed from service

10.1 Life span (EXP.) and prolongation of life span

If not worn out or damaged in other ways, products can be used in accordance with the indications shown on the producer's label. However, wear or other damage could nullify the products' functionality even from their first use. Life = storage time + operating time.

- The production date is shown at "PROD:" on the producer's label.
- The expiry date is shown at "Exp." on the producer's label.

- The expiry date is shown at „Exp." on the producer's label.
- Authorisation to prolong the expiry date, because the product has only been stored and never used, can only be obtained from the producer.
- Damages of structural components due to overloading cannot be repaired (plastic deformation).
- Prolongations of the maximum life can only be granted after an inspection of the components by the producer.

Damaged components should be made available to the producer for evaluation. Any further use of damaged components will result in the producer immediately disclaiming all responsibility.

10.2 Ageing times of steel and steel ropes (normal weathering)

- Ageing of steel components is rather unascertainable unless they are stressed by loads exceeding the indicated „safe load“.
- One of the criteria for withdrawal from service is mechanical wear (grooves, notches, etc.).
- The greatest enemies of steel ropes and components are rust, excessive heat and continuous, fatiguing stress (such as torsion, bending, etc.).
- Solid steel components are not affected by rust. The only exceptions are bolts and shafts undergoing continuous motion, where corrosion can accelerate wear and sometimes lead to the bolt being driven out (rust corrosion = jammed bolts).
- Apart from stress caused by torsion or bending, steel ropes are mostly affected by rust which constitutes one of the most treacherous ageing processes, since rust corrosion inside a steel rope cannot be seen from the outside!

10.3 Criteria for the removal from service

- Life time has expired (if indicated)
- Prolongation of life time has expired
- Any event described in AWA part 1, Basic principles, chapter **PROHIBITIONS/FORBIDDEN**
- Any product condition described in AWA part 2, MRO steel, annex A4
- Any product condition described in AWA part 3, MRO textiles, annex A4
- Any use different than the appropriate use described in AWA part 4 causing consequential damages (in serious cases, inappropriate use).

Annex A4, category S (Scrap)

11. Pay attention to special risks

- Steel rope ends: Repeated dropping of ropes at > 2 m from the ground can cause damage to both the thimbles and the rope.
- Steel ropes in general: Strong impacts (shock loads) cause fatigue on the rope structure. Such damage is not visible.
- Wire ropes/logging chokers: Rigging of ropes that are twisted or overturned can severely damage their structure.
- All slings: Rigging of slinging devices onto narrow spaces or components with excessively small radii, in combination with friction and increasing pressure, can severely damage the equipment due to plastic deformation.

- Also in the case of equal diameters, the ropes' load bearing capacity may vary considerably.
- In principle, even if there is the slightest doubt regarding safety, products must be immediately removed from service and checked.

12. Absolutely forbidden!

- The application of shrink hoses on damaged parts by the user is strictly forbidden. Shrink hoses prevent moisture from evaporating and thus may cause the formation of rust;
- The application of rope clamps, cable straps and/or other constricting devices on the free rope length (impairment of rope structure);
- Knots;
- Any application of metal parts by means of drilling/screwing, welding or riveting.

See AWA part 1, Limits of definition

13. Special properties

13.1 Resistance to chemical substances

Steel components of grade 8 quality or higher are resistant to acids, alkaline solutions, nitrates, fuels etc. Please also pay attention to the information provided by the fittings producer.

13.2 Temperatures

Temperature tolerances vary considerably according to materials. Any material treatment, such as the application of shrink hoses, must only be carried out by the producer.

Jerky shifting of slinging equipment, ropes gliding along obstacles (power lines) or the formation of knots lead to excessive heat with extreme temperatures which may cause rope glazing. The appearance of “pig tails” (curly deformations) is an indicator for immediate removal from service.

14. Regulations

AWA part 1 = Legal assumptions

Annex 6 Non-compliances and critical conditions

Servicepartner

AirWork & Heliseilerei GmbH (A&H)

A&H Services

Bahnhofweg 1, CH-6405 Immensee

FON 0041 41 420 49 64

E-Mail: office@air-work.com, Internet: www.air-work.swiss

ISO 9001:2015, SQS Nr. 32488

EASA Part 21 G POA, CH.21.G.0022

NATO NCAGE SAC17

Question to the persons responsible for training and work materials:

Have you read, understood and given instructions on parts 1 to 4?

A&H Services offers an extensive inspection and testing service for all its in-house products.

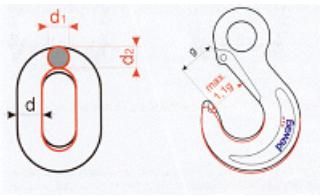
15. Appeal

If you have questions, if a component is damaged, seems to have changed or might be damaged, whenever you have any observations or suggestions to make, please take a photograph and send it to us via email, MMS or SMS (no messages via WhatsApp, Facebook or similar).

In 90% of all cases we can answer immediately, thus saving you time and postal charges. Having an image will help us greatly and, together with your short description of the problem, it can usually be identified very quickly.

A&H Engineering – A&H Equipment – A&H Services – A&H Expert

Annex A1 Measuring – Comparing – Testing

Maximum dimensional changes allowed for metal accessories of quality grade 8 and 10				Picture
Component	**Dimension, unit**	**Admissible tolerance**	**Note**	
Chains	d m t	- 10% + 5%	**Please pay attention to the instructions for use and maintenance issued by the components' producers A&H Engineering can deliver these instructions).** **The present instructions (AWA) depict only a fractional amount of all information possible.** **Whenever components become permanently distorted and thus lose their functionality, when bolts and heavy duty spring pins suffer deformation and thus block the mobility of connections and whenever bolts are driven out of their appropriate positions, this constitutes an immediate call for action:** - **The components must be immediately withdrawn from service.** - **The intended operation must be re-examined.** - **The size and strength of the components must be checked to ascertain suitability for the intended application.**	
Rings	d t	- 15% + 10%		
Hooks	e d_2 and h g	+ 5% - 10% + 10%		
Connecting links	Components not free to move e c	None + 5% - 10%		
Shackles, Unilock	Bolt not free to move e c	None + 5% - 10%		
Coupling and connex bolts	d	- 10%		

Note

All information on original conditions (size, dimensions, admissible tolerances or indications regarding service temperatures) can be provided by the producer of the original components.
Generally, A&H only provides information on their own products as well as information on conditions, criteria for withdrawal from service or inappropriate uses experienced throughout A&H's long-term activity.

Source of illustrations: pewag gmbh

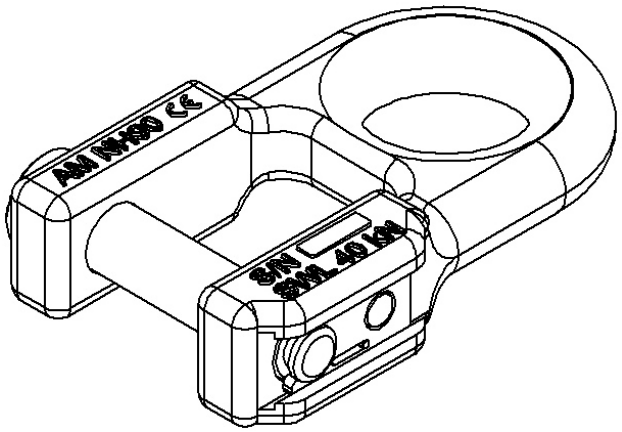


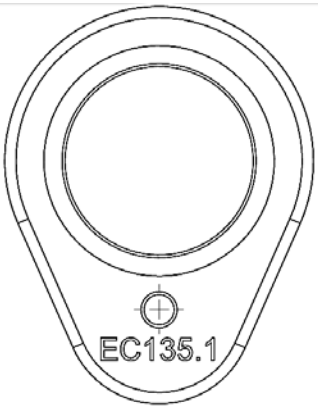
Fig.: Slinging device P/N AM_NH90, in conformity with EN 1677-A1 (size 13), used with NH90 (Annex I) helicopters
Engineering: A&H Engineering, Design: Felix Muheim Formenbau Altdorf, Forging: pewag austria

Annex A2 Lifting accessories / slinging equipment at their original condition (visual check)

Basic principle: The correct sizes, dimensions, denominations and payloads, as well as the appropriate use and maintenance of standard accessories, are depicted in the catalogues issued by their producers and/or suppliers.

AirWork & Heliseilerei GmbH always refers to the original producers' information, unless an accessory was manufactured by order of A&H Engineering.

Find below some examples of standard accessories commonly in use at A&H Equipment.

G or 2 x SKT, CARW		Connecting link EN 1677-A1, quality grade 10
LHW		Safety hook EN 1677-A1, quality grade 10
SKLI (low torque swivel) with SKO and SKN		Low torque swivel EN 1677-A1, quality grade 8
HUB		Rescue hook EN 1677-A1, quality grade 8 Type certificate holder: A&H Engineering
AM_KAU_NH90		Special design fitting EN 1677-A1 for NH90 primary lifting hooks and NATO STANAG Medium Type certificate holder: A&H Engineering
AM_KAU_H135		Special design fitting for H135/H135M primary and secondary cargo hooks Type certificate holder: A&H Engineering

These are only examples. Many of the illustrations also apply to other types of constructions.

This list is not exhaustive. For more information, please contact us or check **www-air-work.swiss**

Annex A3 Lifting accessories / slinging equipment, categories M & R (Maintenance & Repair)

Abrasion, wear or alterations: discuss damage with producer. Usually there are no restrictions and repair is possible (after consultation)

If marked with (x) under category “R” see Annex 5 “Repair procedures”, if marked under category “O” please contact A&H SERVICES

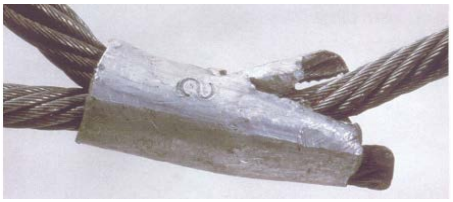
Caption: M = Maintenance, can be used without restrictions; R = Repair, can be repaired; O = can be repaired by the producer; S = Scrap, to be removed from service, repair not possible

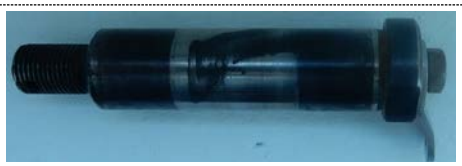
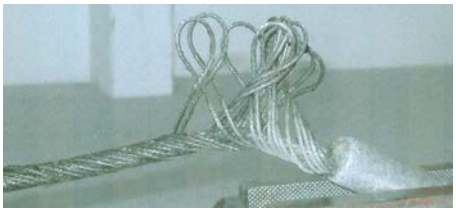
Cat.	Type	Illustration of damage	Note	M	R	O	S
	Connex		Dry! One of the most frequent complaints during inspection is lack of sufficient lubrication. Regular application of a small amount of WD40 on bolts and fixing sleeves is sufficient (Daily maintenance). A lack of lubrication causes accelerated abrasion/wear.	x			
	AM_KAU_MIL		Dry! One of the most frequent complaints during inspection is lack of sufficient lubrication. Regular application of a small amount of WD40 on bolts and fixing sleeves is sufficient (Daily maintenance). A lack of lubrication causes accelerated abrasion/wear.	x			
!	OBK		Excessive clearance at the mouth opening. Cause: worn-out safety catch. Replacement possible.		x	x	
	LHW		Self-locking cargo hook. Apart from signs of wear, hardly any defect can be seen from the outside.				
			Inside: heavy duty spring pin sheared off, safety catch lost!				
			Hook opens irregularly and doesn’t close any more, a defect due to dropping from significant heights. Must undergo non-destructive testing (NDT) and re-measuring. Can possibly be repaired. But: NDT costs more than a new hook!			x	x

Annex A4 Lifting accessories / slinging equipment, category S (Scrap)

Abrasion, wear or alteration: must be withdrawn from service! Repair may be possible, but only by the producer if marked with (x) under category O

M = Maintenance, can be used without restrictions; R = Repair, can be repaired; O: can be repaired by the producer; S = Scrap, to be removed from service, repair not possible.

Type	Illustration of damage	Note	M	R	O	S
Steel rope, low torque		Transport rope, ROTEX type (low torque crane lifting rope, inner rope layer left-laid, outer rope layer right-laid). Breakage of inner rope layer due to fatigue; thimble angled. Cause: repeated dropping from significant heights, age > 20 years, maybe underdimensioned (previously used with SA 315 b, now with AS 350B3 helicopters).				x
		Close-up of picture above.				x
		A 6-strand right laid rope is not suitable as a lifting accessory. Angled rope outlet behind pressing. Cause: repeated dropping from significant heights.				x
Steel rope 6-strand right laid (not low torque)		Angled thimble. Risk of hand injuries. The “donkey ears” deformation can be adjusted.			x	
		Ferrule torn up as a result of strong bending. The damage might be caused by the “tying“ slinging technique with excessively small radii.				x
Logging choker		Wire breakage close to the ferrule of a logging choker. Cause: maybe strong friction against the rail of a Nubbin Hook tray or against the choker hook/bell.				x
Swivelling hook		Swivelling hook with weld-on blocks. Although the blocks prevent jamming of the thimble, the welding process alters the structure of forged, hardened and tempered fittings. Risk of stress cracks, decrease of WLL.				x
Steel rope, low torque		Transport rope, ROTEX type (low torque crane lifting rope, inner rope layer left-laid, outer rope layer right-laid). Due to the rigging of the rope onto accessories or cargo hooks the multilayer rope structure is altered and squeezed. Decrease of WLL, risk of wire rope breakage.				x
3-leg sling attached to concrete bucket		Strongly deformed thimble resulting from a harsh impact against a natural obstacle (also see indentation on the yellow bucket). Distinct “donkey ears” deformation. Mobility strongly impaired.				x

Type	Illustration of damage	Note	M	R	O	S
Label affixed to steel rope		Label existing but affixed by means of two wires. Risk of injuries to the fingers (jamming), risk of getting caught. Manufacturers data must be available and legible.		x	x	
OBK safety hook		Edge loading of safety hook. Risk of loss of payload (due to hair cracks). Cause: misaligned slinging onto excessively narrow eyes.				X
4-leg sling		1 of the 4 hooks is bigger than the others. Unqualified changing of accessories. Can be replaced after having assessed which hook size is actually necessary.		x	x	
SKT welded onto a shank		Connex link, model SKT-7/-8, welded onto a steel shaft. Non-compliant modification of a forged, hardened and tempered fitting of quality grade 8.				x
SKLI-7/8-8, approximately 20 years old		Fairly large clearance on the longitudinal axis. Instructions for use and maintenance lost (the sample was manufactured around 30 years ago while today's equivalent has a different design). Original parts no longer available, new parts not compatible.				x
Bolt belonging to AM_KAU_MIL		Grooves and rust corrosion on the bolt indicate negligent maintenance and/or excessively high loads.				x
Steel rope, low torque		Bird-caging on a low torque steel rope. Cause: low torque swivel jammed, cargo rotating very fast.				x
SKR Connex		Bolt belonging to a connex link. Visible grooves of the spring inside the clamping sleeve which, due to the lack of lubricant, has driven out the bolt. Bolt and clamping sleeve must be disposed of while the links can be provided with a new bolt.				x

A&H Services offers an extensive inspection and testing service for all its in-house products.

Annex 5 Repair procedures, category R (Repair)

Repairs that can be carried out by the users (only after consultation with and following training by the producer)

Several examples of damage belonging to level 1 and how to repair it:

Cat.	Type	Illustration of damage	Note
	Advice	As a general rule, steel ropes and components have very few or almost no parts which can be repaired. - Ropes can be cut and newly pressed. Connex bolts can be replaced. - Safety catches, the springs thereof and spring pins can be replaced. - The same applies to safety catches of so-called “snap hooks”. In most cases, however, the repairing costs exceed the costs of new components.	
	Basic principle	Whenever components become permanently distorted and thus lose their functionality, when bolts and heavy duty spring pins suffer deformation and thus block the mobility of connections and whenever bolts are driven out of their appropriate positions, this constitutes an immediate call for action: - The components must be immediately withdrawn from service. - The intended operation must be re-examined. - The size and strength of the components must be checked to ascertain suitability for the intended application.	
	FORBIDDEN	- Striking bolts or hooks on the anvil in order to make them suit one’s needs. - Welding forged components. - Riveting or screwing together broken-off pieces. - “Trimming” oversized components by means of a file or an emery wheel. - Making knots on rope ends. - Joining rope ends by means of clamps.	
		This list is incomplete. Please also check the instructions for use and maintenance issued by the producers of the original components and the generally acknowledged rules of technology.	

Only use original parts for the replacement of components (e.g. bolts, safety pins, screws, etc.).

It is forbidden to modify the shape of slinging equipment, for example by bending, grinding, cutting-off parts, welding, drilling, etc. It is also forbidden to heat up components over 200°C. Never remove safety parts such as locking devices, safety pins, safety catches, etc.

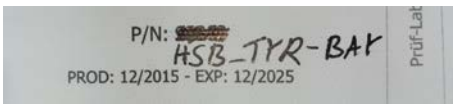
Slinging equipment must not be coated by hot-dip or electrogalvanising. The treatment with spent lye or pickle also constitutes a dangerous procedure and must previously be discussed with A&H Services.

Any material documenting inspections and tests, particularly the results thereof, as well as all repairs or modifications to the original condition upon delivery, must be preserved for the entire service life of slinging components.

In case of need, please do not hesitate to ask **A&H Services** for advice.

Annex 6 C⌦Misuse, ⌫ non-compliances and critical conditions

Several examples of C⌦Misuse,⌫ non-compliances and critical conditions, entailing the immediate withdrawal from service (it is forbidden to use devices of the kind depicted below)

Type	Illustration of damage	Note	M	R	O	S
Label		Hand-written modifications on labels are not allowed.			x	x
All lifting accessories/ slings		It is forbidden to cover labels or paste them over with other tags.			x	
All lifting accessories/ slings		It is forbidden to use lifting accessories or slinging devices not provided with labels. WLL, date of manufacture, producer not retraceable.				x
Steel rope, 6-strand right laid		A 6-strand right laid rope is not suitable as a lifting accessory. WLL, date of manufacture, producer not traceable.				x
SKT Connex		Non-compliant modification of a forged, hardened and tempered accessory of quality grade 8.				x
4-leg sling		Different hook sizes, replacement with unqualified components, different hook models, different geometrical shape, different lengths of the sling legs.			x	
Connex link with low-torque swivel		Combined use of 2 incompatible components made by different manufacturers; assembly done by use of force. Also see AWA SKA-CBHW. The low-torque swivel is mounted upside down as its narrow part must be positioned at the bottom of the rope construction.				x

Type	Illustration of damage	Note	M	R	O	S
SKA clamping sleeve		Damage of clamping sleeve during assembly/disassembly. The pointed end of the spring top was being pushed through the washer by the pin, thus blocking a connex link. Damage caused by mounting the pin from the wrong side of the bush and, most likely, the pin was not lubricated before mounting. Also see AWA SKA-CBHW. Entire bolt set must be replaced!			x	x

If you use **A&H** products, we can discuss the possibility of label replacement.

Several examples of applications which are not in conformity with the acknowledged rules of technology

Cat.	Illustration of damage	Note	M	R	O	S
		Bolt thread rests on the load area (typical phenomenon with cargo hooks produced in the USA).				x
		Bolt too short, 1.5 to 2 thread grooves must be protruding.				x
Steel rope, 6-strand right laid (not low torque)		Steel rope, 6-strand right laid. Not suitable as a load rope. Can only be used for slings such as logging chokers up to approximately 6 m of length.				x
Swivelling hook		Swivelling hooks should only be used to compensate for the rotation of lashing chains or multiple-leg slings but they are not suitable for continuously rotating cargo.				x
CIX Connection		Unqualified connection with a Maillon Rapide. To make matters worse, the Maillon is neither completely closed nor locked. Extreme risk of overloading! Maillon rapide connecting links are made of aluminium, steel or INOX steel. With PPE-proof Maillons, the indication of kN equals the ultimate breaking load (UL). The breaking load (UL) does NOT equal the WLL indicated on the LongLine's label! Calculation of Longline UL: WLL x safety factor = breaking load. Calculation of Maillon Rapide WLL: breaking load : safety factor = WLL.				x

Cat.	Illustration of damage	Note	M	R	O	S
Connection		INOX shackle with screw and fokker pin. The EN 362 karabiner may become wedged, as shown in the photo, causing strong shunt loading and buckling stress. The fokker pin protrudes like a meat hook and, although it has been «secured» with a cable strap, it may get lost.				x
Connection		Makeshift connection: 2 round sling coupling links attached to the eye of a safety hook. This kind of home-made configuration is not permissible.				x

Lifting accessories and slinging equipment which are damaged or show traces of inappropriate use cannot be repaired.

Member of ...

Internation Commission or Alpine Rescue

DE Bundesverband des Seiler- und Netzmacherhandwerks

Schweizer Textilfachschule

Swiss Textiles Textilverband Schweiz

Hubschraubermuseum Bückeburg e.V

Swiss Aerospace Cluster

Swiss Helicopter Association

Technologiezentrum Schwyz

www.air-work.swiss