

**MILITARY COMMITTEE AIR STANDARDIZATION BOARD (MCASB)**

20 January 2010

NSA(AIR)0068(2010)AA/3605

MCASB

**STANAG 3605 AA (EDITION 5) – COMPATIBILITY OF ARMING SYSTEMS AND EXPENDABLE AIRCRAFT STORES**

References:

- A. MAS(AIR)241-AA/3605 of 9 October 1998 (Edition 4)
- B. NSA(AIR)0035(2009)AA/3605 of 14 January 2009 (Edition 5)(Ratification Draft 1)

1. The enclosed NATO Standardization Agreement, which has been ratified by nations as reflected in the NATO Standardization Document Database (NSDD), is promulgated herewith.
2. The references listed above are to be destroyed in accordance with local document destruction procedures.

ACTION BY NATIONAL STAFFS

3. National staffs are requested to examine their ratification status of the STANAG and, if they have not already done so, advise the MCASB NSA, through their national delegation as appropriate of their intention regarding its ratification and implementation

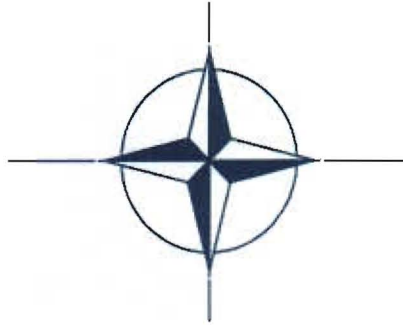
A handwritten signature in blue ink, appearing to read 'Juan A. Moreno', is written over a horizontal line.

Juan A. MORENO  
Vice Admiral, ESP(N)  
Director, NATO Standardization Agency

Enclosure:  
STANAG 3605 (Edition 5)

NATO Standardization Agency – Agence OTAN de normalisation  
B-1110 Brussels, Belgium Internet site: <http://nsa.nato.int>  
E-mail: [air@nsa.nato.int](mailto:air@nsa.nato.int) – Tel 32.2.707.5588 – Fax 32.2.707.5718

**NORTH ATLANTIC TREATY ORGANIZATION  
(NATO)**




**NATO STANDARDIZATION AGENCY  
(NSA)**

**STANDARDIZATION AGREEMENT  
(STANAG)**

SUBJECT: COMPATIBILITY OF ARMING SYSTEMS AND EXPENDABLE AIRCRAFT STORES

Promulgated on 20 January 2010



Juan A. MORENO  
Vice Admiral, ESP(N)  
Director, NATO Standardization Agency

RECORD OF AMENDMENTS

N°	Reference/date of amendment	Date entered	Signature

EXPLANATORY NOTES

AGREEMENT

1. This STANAG is promulgated by the Director NATO Standardization Agency under the authority vested in him by the NATO Standardization Organisation Charter.
2. No departure may be made from the agreement without informing the tasking authority in the form of a reservation. Nations may propose changes at any time to the tasking authority where they will be processed in the same manner as the original agreement.
3. Ratifying nations have agreed that national orders, manuals and instructions implementing this STANAG will include a reference to the STANAG number for purposes of identification.

RATIFICATION, IMPLEMENTATION AND RESERVATIONS

4. Ratification, implementation and reservation details are available on request or through the NSA websites (internet <http://nsa.nato.int>; NATO Secure WAN <http://nsa.hq.nato.int>).

FEEDBACK

5. Any comments concerning this publication should be directed to NATO/NSA - Bvd Leopold III - 1110 Brussels - BEL.

NATO STANDARDIZATION AGREEMENT  
(STANAG)

COMPATIBILITY OF ARMING SYSTEMS AND EXPENDABLE AIRCRAFT STORES

Annexes:

- A. Swivel and Link Assembly
- B. Shear Link/Weak Link Assembly
- C. Arming Wire Safety Clips
- D. 14- Inch Suspension Unit, Arming System Geometric Relationship
- E. 14/30-Inch Suspension Unit, Arming System Geometric Relationship

Related Documents:

STANAG 3575 AA	-	AIRCRAFT STORES EJECTOR RACKS
STANAG 3635 AA	-	AIRCRAFT STORES SUSPENSION UNITS WITH GRAVITY RELEASE CAPABILITY
MIL-STD-2088	-	BOMB RACK UNIT (BRU), AIRCRAFT

AIM

1. The aim of this agreement is to standardize the interface between arming units and expendable aircraft stores to enhance system reliability and interoperability.

AGREEMENT

2. Participating nations, when utilizing those arming system components described in STANAG 3605, agree to apply the design criteria herein to that equipment which is required to perform the arming of expendable stores.

GENERAL

3. The arming system, in this instance, connects the expendable store to the suspension equipment and includes the following components:
  - a. Arming unit(s) fitted to the aircraft or to the suspension unit
  - b. Arming wire(s)
  - c. Swivel and link assembly [Annex A]
  - d. Shear link/weak link assembly [Annex B]

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- e. Positive arming latches fitted to the suspension unit
- f. Arming wire safety clips [Annex C]

4. The function of the arming unit(s) when used in conjunction with an arming wire is to enable stores to be dropped in a "SAFE" or "ARMED" condition. This option should be available by in-flight selection.

5. No component of the arming system should cause damage to the aircraft or munition at any time during the mission.

### ARMING UNIT (AU)

6. Categories. There are two categories of arming units.

- a. Non-Zero Retention Force (Non-ZRF) Units. These AUs, used in conjunction with the suspension units of STANAGs 3575 and 3635, are electrically operated solenoids which can be activated remotely from the aircraft cockpit. They provide a minimal retention force (generally produced by a ball-on-spring assembly) when in the unenergized (SAFE) mode, allowing the loop of the swivel and link, or loop of other link assemblies, to be extracted during a weapon/store release without initiating weapon arming. In the energized (ARMED) mode the AU is electrically activated and provides sufficient retention force to retain the loop and initiate weapon arming.
- b. Zero Retention Force (ZRF) Units. These are relatively complex devices for use in the more demanding store ejection environment. The ZRFs can be activated from the aircraft cockpit and will have zero retention force on the arming wire/lanyard when the store is released in the unenergized (SAFE) mode. If electrical power is lost or if other electrical problems occur, the AU will function as if in the "SAFE" mode. In the "ARMED" mode, the AU is electrically activated and provides a minimum retention force to retain the loop of the swivel and link, or loop of other link assemblies, and initiate weapon arming. The AU may be designed, functionally, to be either directly coupled to the suspension unit hook linkage, hook surface or coupled to the weapon/store movement during release. Design of this type of arming unit will require knowledge of the particular Ejector Release Unit (STANAG 3575) or Non-Eject Release Unit (STANAG 3635) for which it is intended.

7. Location.

- a. A datum axis and a datum point shall be used in positioning AUs:
  - (1) The suspension unit longitudinal axis is the line passing through the center of the bearing surfaces of the suspension unit's hooks (with the hooks in the closed position).

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- (2) The suspension unit hook midpoint is the point on the suspension unit longitudinal axis which is equidistant from the center of the bearing surface on each hook.

8. For each suspension unit a minimum of three AUs (one forward, one center and one aft) must be provided to control the weapon/store "SAFE/ARM" status. Each AU must be independently selectable in flight.

9. The location of the AU will to some extent be influenced by the design of the suspension unit. It is important to minimize any deviation from a given optimum position as this would require longer arming wires which in turn would increase the risk of interference between the arming wire and suspension equipment during store release.

10. Wherever possible, access shall be provided to permit insertion of the swivel and link assembly into the AU after the store has been loaded to the suspension equipment.

11. The positioning of AUs shall meet the following criteria:

- a. Vertically. The AUs are to be positioned such that the center is between 15.9 mm (0.625 inches) above the suspension unit's longitudinal centerline to 6.35 mm (0.25 inches) below the suspension unit's longitudinal centerline. [See Dimension A<sub>1</sub> and A<sub>2</sub> of Annexes D and E].
- b. Longitudinally. The longitudinal positioning of the AU shall be as follows:
- (1) The forward AU shall be between 76.2 mm (3 inches) and 177.8 mm (7 inches) forward of the suspension unit forward hook bearing surface for a 14 inch suspension unit [see dimension B of Annex D] and between 203.2 mm (8 inches) and 279.4 mm (11 inches) forward of the suspension unit forward (14 inch) hook bearing surface [see dimension B of Annex E] for a 14/30 inch suspension unit.
- (2) The center AU for both the 14 inch and 14/30 inch suspension units shall be between 101.6 mm (4 inches) and 254.0 mm (10 inches) aft of the forward 14 inch hook bearing surface [see dimension C of Annexes D and E].
- (3) The aft AU shall be between 431.8 mm (17 inches) and 584.2 mm (23 inches) aft of the suspension unit forward hook bearing surface [see dimension D of Annex D] for a 14 inch suspension unit and between 558.8 mm (22 inches) and 635.0 mm (25 inches) aft of the 14 inch suspension unit forward hook bearing surface [see dimension D of Annex E] for a 14/30 inch suspension unit.
- c. Transversely. The AUs are to be located between 0 and 38.1 mm (1.5 inches) laterally on either side of the suspension unit longitudinal axis [Dimension E of Annexes D and E].

**Notes:**

- (1) Combinations of these dimensions shall be such as to give the minimum possible angle of pull between the longitudinal axis of the fuze arming mechanism and the arming wire (less than 20 degrees).
- (2) In all cases the forward and aft AUs shall be located outside of the outermost suspension equipment interface feature, e.g. sway braces, ejector rams.

12. Loadings

- a. Retention in Flight. The AUs, when in the unenergized state, must retain the swivel and link assembly under a load of at least 44.48 N (10 lbf) to prevent premature disengagement prior to arming selection for release.
- b. Safe Release. To enable the stores to be dropped in the "SAFE" condition, the AUs, when in the unenergized state, must release the swivel and link assembly at:
  - (1) A loading not greater than 66.72 N (15 lbf) for Non-ZRF Units.
  - (2) Zero (0) loading for ZRF Units.
- c. Armed Release. To enable the stores to be dropped in the "ARMED" condition, the AUs, when in the energized state, must retain the swivel and link assembly at static loadings of not less than:
  - (1) 1556.8N (350 lbf) for Non-ZRF Units.
  - (2) 2668.8N (600 lbf) for ZRF Units.

ARMING WIRES

13. Arming wire shall be wrapped and packaged at manufacture such as to preclude wire deformation and kinking.

14. Various arrangements of arming wire assemblies exist and the majority are capable of complying with this standard. One system provides for independent arming wires for the nose and tail fuzes respectively. These wires are supplied with excess length to permit connection in a manner which allows securing and length adjustment of the wire at the fuze end to suit arming unit position. Another method connects the nose fuze and tail fin together with the arming wire. The swivel and link assembly is free to be positioned along the arming wire to permit a selection of arming units.

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15. For higher performance aircraft it is desirable that the arming wires depart with the weapon on release to prevent subsequent damage to the aircraft by flailing arming wires. Separation of the arming wire can be accomplished by placing the arming wire through the swivel and link assembly such that it "runs through" following the store arming and departs; or alternatively, by incorporating a shear link/weak link assembly in the arming wire.

16. For the purpose of STANAG 3605 AA, the term "lanyard" is synonymous with "arming wire".

### SWIVEL and LINK ASSEMBLY

17. The loop of the swivel and link assembly [Annex A] connects to the AU. The loop and swivel must be manufactured from  $2.03 \pm 0.025$  mm (0.080 inch) diameter single strand wire. The minimum size of the loop shall be such as to accept a mandrel of 16.0 mm (0.630 inch) diameter, and the maximum size such as to be enveloped in a 25.4 mm (1.000 inch) inside diameter circle.

18. The outside diameter of the link of the swivel and link assembly shall be  $31.75\text{mm} \pm 0.38\text{mm}$  ( $1.25 \pm 0.015$  inch).

19. The swivel and link assembly should be capable of withstanding a minimum load which is compatible with the requirements of arming units as specified in paragraph 12.c.

### SHEAR LINK/WEAK LINK ASSEMBLY

20. A shear link/weak link is designed to break at a specific load, during release of a store from its suspension equipment. It is positioned as close as possible to the suspension equipment to ensure that the minimum fitting possible is left attached to the suspension equipment (or AU) after the store, complete with arming wire(s), has been released. Several different types of links may be used. Typical examples are:

- a. Link Arming Wire Assembly. The link arming wire assembly consists of a U-shaped swivel link wired to a flat, rectangular link [see Annex B]. At the extreme end of the tongue is a hole through which the arming wire is threaded for the bomb arming operation. The wired connection between the link and the U-shaped swivel link is designed to break when the assembly is subjected to a given load. Two different link arming wire assemblies are generally used; a 400.3 N (90 lbf) link arming wire assembly, and a 712.0 N (160 lbf) assembly. The difference between the two is the strength of soft copper lockwire used as the weak link.
- b. Shear Link Assembly. The shear link assembly consists of a loop attached, via a swivel base, to a block [see Annex B]. A shear wire is used to attach the loop to the block. The loading required to break the shear link assembly is 400.3 N (90 lbf) or 712.0 N (160 lbf).



- c. Shearwire Assembly. The shearwire assembly consists of a loop connected to an arming wire by a housing containing a copper shearwire; the housing is covered by a plastic sleeve [see Annex B]. The loading required to break the shearwire is 712.0 N (160 lbf) or 845.0 N (190 lbf).

#### POSITIVE ARMING LATCHES

21. A minimum of four positive arming latches shall be provided. They may be located on both sides, or one side, of the BRU along its entire length (longitudinal axis), parallel to the axis of the store, as shown in Annexes D and E. The location of the positive arming attachments with installed arming wires shall not interfere with the BRU functions such as the operation of the mechanical fuze AUs, ejector pistons, and swaybraces.

22. The positive arming attachments shall be positioned in a manner to preclude opening in flight from aerodynamic loading.

23. The axis of the latch shall not be more than 38.1 mm (1.50 inches) off the longitudinal-centerline of the suspension unit [see dimension H of Annexes D and E]. The arming latches shall be compatible with the swivel and link assembly.

#### ARMING WIRE SAFETY CLIPS

24. Three types of safety clips are used to provide the retaining forces necessary to keep the arming wire from being inadvertently extracted from the fuze, retarder, or other devices during captive flight. The clips impose a force which must be overcome to extract the arming wire for armed drops, and must retain the arming wire for "SAFE" drops. Clip types are:

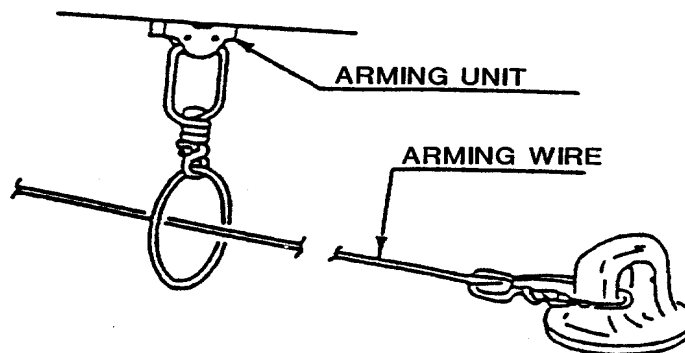
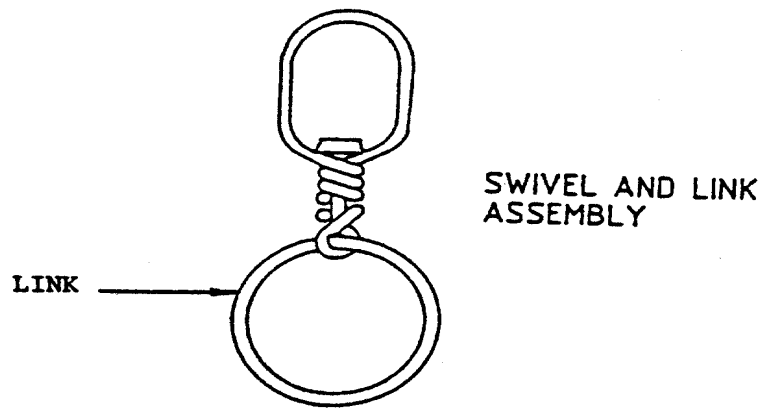
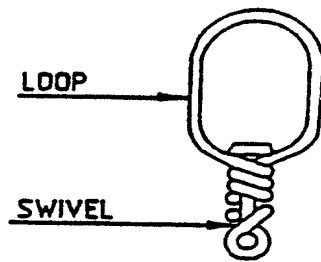
- a. Fahnestock Clips. Fahnestock clips [see Annex C] are attached to the arming wire under their own retention. Multiple clips may be used to retain the arming wire in a particular fuze. The clip consists of a single piece of formed plate metal (Phosphor Bronze) with a tab formed in the center to create a retaining capability of 8.9 N (2 lbf) pressure. A stripping force required to strip one safety clip from an arming wire 1.63 mm (0.064 inches) in diameter is 17.8 N to 66.7 N (4 to 15 lbf).
- b. Copper-Beryllium (CuBe) Clips. The CuBe clip is attached to the arming wire under its own retention. Because of its retaining force, a single clip is, generally, used. The CuBe clip is similar in shape and size to the Fahnestock clip, but consists of a single piece of formed Copper Beryllium alloy with a tab (larger tab than the Fahnestock clip) formed in the center to create a retaining capability of 89 N (20 lbf). The stripping force required to strip one safety clip from an arming wire is nominally 93 N to 125 N (21 to 28 lbf).

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- c. Dexter Clips. The Dexter clip [see Annex C] is fastened to the end of an arming wire through the use of a wire ferrule and reforming of the arming wire. The clip consists of a single piece of stainless steel wire 1.63 mm (0.064 inches) in diameter, formed and heat treated for tensile strength. The clip requires a pulling force of over 133.3 N (30 lbf) to strip/withdraw it from a mechanically fused bomb, or to unlock the latch assembly for release of the release band on retarding bomb fins.

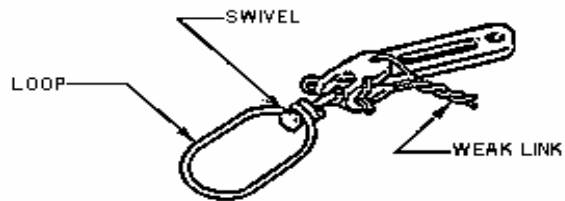
IMPLEMENTATION OF THE AGREEMENT

25. This STANAG is implemented when a nation has issued instructions that all future equipment procured for its forces will be manufactured in accordance with the specifications detailed in this agreement.

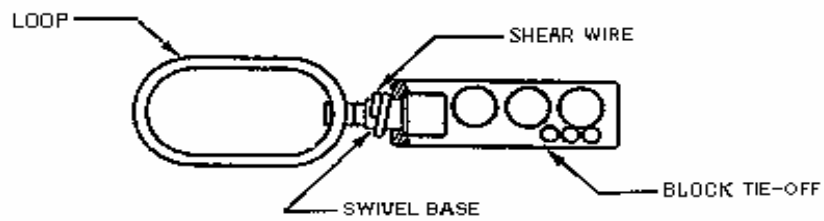


**ANNEX A - SWIVEL AND LINK ASSEMBLY**

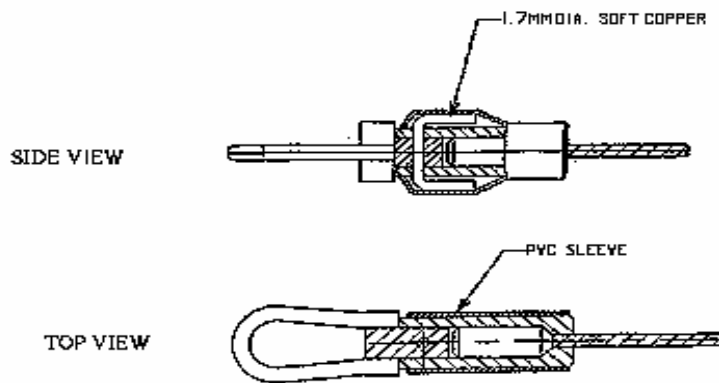
LINK ARMING WIRE ASSEMBLY



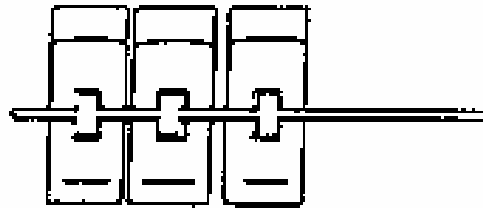
SHEAR LINK ASSEMBLY



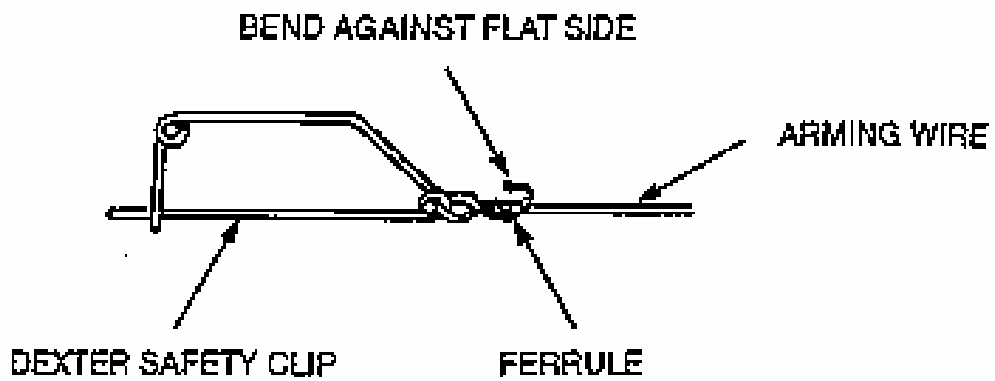
SHEARWIRE ASSEMBLY



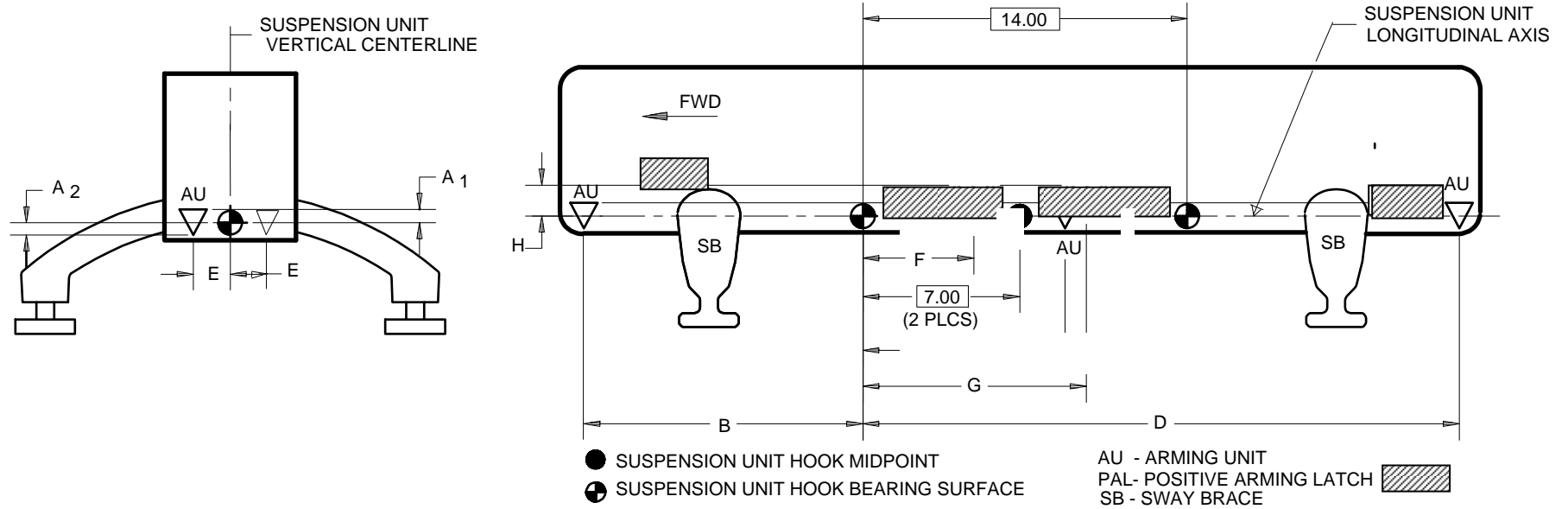
**ANNEX B - SHEAR LINK/WEAK LINK ASSEMBLY**



(TYPICAL) FAHNESTOCK  
(SAFETY) CLIP INSTALLATION

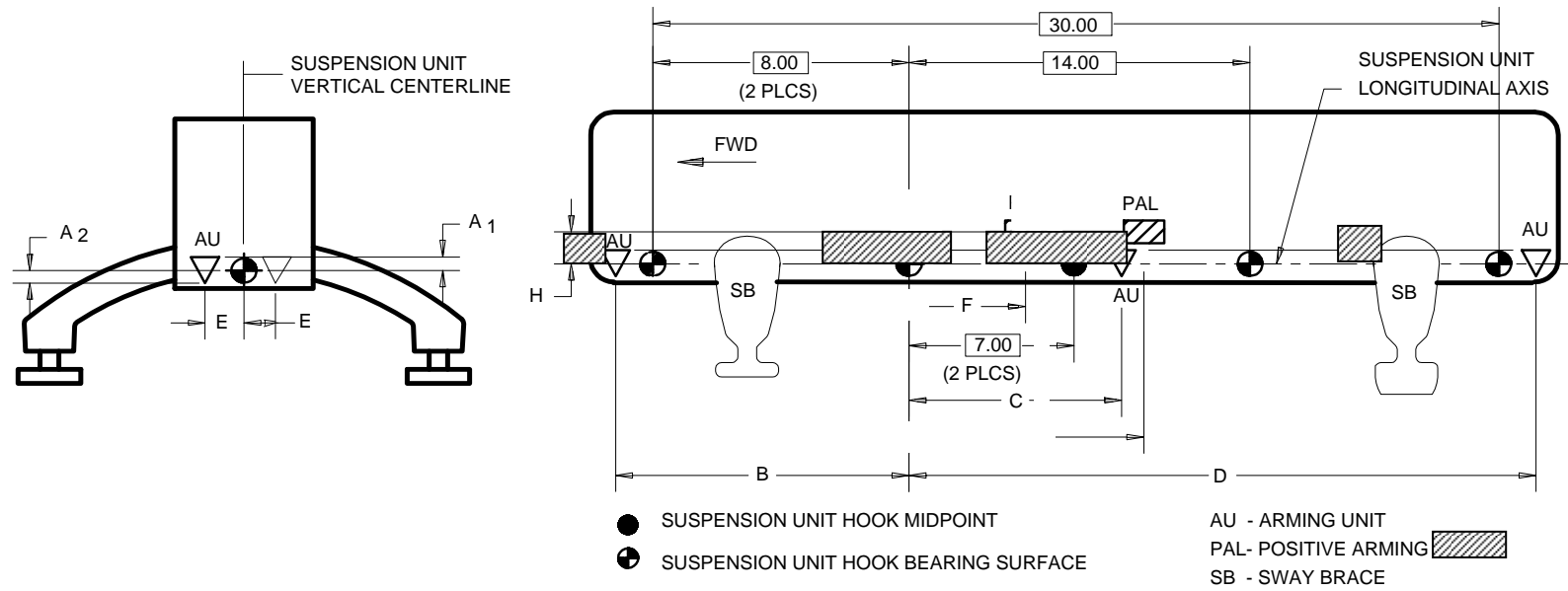


**ANNEX C - FAHNESTOCK AND DEXTER SAFETY CLIPS**



14 - inch Ejector Rack			
DIMENSION	PARAGRAPH NO.	INCHES	MILLIMETERS
A <sub>1</sub>	11.a.	0.625	15.9
A <sub>2</sub>	11.a.	0.250	6.4
B	11.b.(1).	3.00 - 7.00	76.2 - 177.8
C	11.b.(2).	4.00 - 10.00	101.6 - 254.0
D	11.b.(3).	17.00 - 23.00	431.8 - 584.2
E	11.c.	0 - 1.5	0 - 38.1
H	23.	0 - 1.5	0 - 38.1

ANNEX D. - 14-INCH SUSPENSION UNIT, ARMING SYSTEM GEOMETRIC RELATIONSHIP



		14 / 30 - inch Ejector Rack	
DIMENSION	PARAGRAPH NO.	INCHES	MILLIMETERS
A <sub>1</sub>	11.a.	0.625	15.9
A <sub>2</sub>	11.a.	0.250	6.4
B	11.b.(1).	8.00 - 11.00	203.2 - 279.4
C	11.b.(2).	4.00 - 10.00	101.6 - 254.0
D	11.b.(3).	22.00 - 25.00	558.8 - 635.0
E	11.c.	0 - 1.50	0 - 38.1
H	23.	0 - 1.50	0 - 38.1

ANNEX E. - 14/30 - INCH SUSPENSION UNIT, ARMING SYSTEM GEOMETRIC RELATIONSHIP