

User Instructions

MSA D-Plate™

Anchorage Connector Assembly

**Model Number / Numero de modelo /
Numero de modele**



Order No.: R622898/08
Print Spec.: 10000005389 (F)
CR 800000037743



WARNING!

National standards and state, provincial and federal laws require the user to be trained before using this product. Use this manual as part of a user safety training program that is appropriate for the user's occupation. These instructions must be provided to users before use of the product and retained for ready reference by the user. The user must read, and understand (or have explained), and heed all instructions, labels, markings and warnings supplied with this product and with those products intended for use in association with it.

FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY OR DEATH.



The Safety Company

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1 Safety Regulations

1.1 Correct Use

The D-Plate Anchorage Connector Assembly is primarily a component of a personal fall arrest system, serving as an anchorage connector. It may also be used for work positioning, travel restriction, rescue, retrieval, evacuation and confined space entry/exit operations, depending on the associated system components used together with the D-Plate Anchorage Connector Assembly.

Use of the D-Plate Anchorage Connector Assembly must comply with these User Instructions and, further, is subject to approval under the user's safety rules and regulations and by the user's safety director, supervisor, or a qualified safety engineer. Be certain the selection of a D-Plate Anchorage Connector Assembly is suited for the intended use and work environment. If there is any conflict between these User Instructions and other directives or procedures of the user's organization, do not use the D-Plate Anchorage Connector Assembly until such conflicts are resolved. Consult all local, state, and federal Occupational Health and Safety Administration (OSHA) requirements for personal safety equipment. Also refer to the latest revision of ANSI Z359.18 standard for more information on Anchorage Connectors and associated system components. In Canada, refer to provincial and federal regulations.

See instruction labels on each fall protection subsystem component for the limiting capacity of that system. All systems are designed for a single person, with only one person on the lifeline at any time.

The MSA D-Plate™ Anchorage Connector Assembly is intended for use by trained and qualified personnel.

It is imperative that this manual be read and observed when using the product. In particular, the safety instructions, as well as the information for the use and operation of the product, must be carefully read and observed. Furthermore, the national regulations applicable in the user's country must be taken into account for a safe use.

Alternative use, or use outside this specification will be considered as non-compliance. This also applies especially to unauthorized alterations to the product and to commissioning work that has not been carried out by MSA or authorized persons.

1.2 Compliance

The product may comply with:

- ANSI Z359.18, Type A and / or;
- OSHA requirements

See product label for specific compliance notifications.

Anchorage connectors labeled with ANSI Z359.18 have been tested in compliance with the requirements of ANSI/ASSE Z359.7.

NOTICE

ANSI compliance and testing covers only the hardware and does not extend to the anchorage and substrate to which the anchorage connector is attached.

1.3 Usage Specifications

- The D-Plate Anchorage Connector Assembly has a minimum breaking strength of 5,000 lbf (22.2 kN).
- The mounting plate is constructed of either galvanized steel or anodized aluminum. The D-Ring is forged alloy steel, zinc plated, or stainless steel. D-Rings are 100% proof tested to 3,600 lbf (16 kN).
- The D-Plate Anchorage Connector Assembly is designed for the attachment of a single personal fall arrest system.
- When used as part of a personal fall arrest system, fall arresting forces must not exceed 1,800 lbf (8 kN).

1.4 Usage Limitations

The following applications limitations must be considered and planned for before using the MSA D-Plate Anchorage Connector Assembly:

1.4.1 Physical Limitations

Persons with muscular, skeletal, or other physical disorders should consult a physician before using. Pregnant women and minors must never use the anchorage connectors. Increasing age and lowered physical fitness may reduce a person's ability to withstand shock loads during fall arrest or prolonged suspension. Consult a physician if there is any question about physical ability to safely use this product to arrest a fall or suspend.

1.4.2 Chemical Hazards

Acidic, alkaline, or other environments with harsh substances may damage the hardware elements of the D-Plate Anchorage Connector Assembly. If working in a chemically aggressive environment, consult MSA to determine which D-Plate Anchorage Connector Assembly material is better for your specific conditions. When working in the presence of chemicals, more frequent inspection of the D-Plate Anchorage Connector Assembly is required.

1.4.3 Corrosion

Do not expose the D-Plate Anchorage Connector Assembly to corrosive environments for prolonged periods. Organic substances and salt water are particularly corrosive to metal parts. When working in corrosive environments, more frequent inspection, cleaning and drying of the D-Plate Anchorage Connector Assembly is required. See sections 4 and 5 for cleaning and inspection details.

1.4.4 Electrical Hazards

Use extreme caution when working near energized electrical sources. Metal hardware will conduct electric current. Maintain a safe working distance (preferably at least 10 ft (3 m)) from electrical hazards.

1.4.5 Impact Forces

Any D-Plate Anchorage Connector Assembly which has been subjected to the forces of arresting a fall must be immediately removed from service and marked as "UNUSABLE" until destroyed.

1.4.6 Hazards Identification, Evaluation and Control



WARNING!

DO NOT use the MSA D-Plate Anchorage Connector Assembly unless a qualified person has inspected the workplace and determined that identified hazards can either be eliminated or exposures to them prevented.

Failure to follow this warning can result in serious personal injury or death.

Prior to selecting personal protective equipment, the user must make a workplace assessment of hazards and conditions where the equipment is required. Such assessment must, at a minimum, identify the presence of:

• Hot objects	• Chemicals	• Abrasive surfaces
• Climatic factors	• Weather factors	• Sharp objects
• Sparks	• Electrical hazards	• Moving equipment
• Moving materials	• Confined space hazards	• Slippery surfaces
• Flames	• Heat-producing operations	• Environmental contaminants
• Unstable/uneven surfaces	• Unguarded openings	

Foreseeable changes in any of these conditions, taken individually or collectively, must be identified. The materials and construction of the equipment must be considered in the selection process such that these workplace conditions are suitably addressed and responded to. The equipment must match the work situation and workplace environmental factors.

The workplace assessment must identify all paths of intended user movement and all hazards along such paths. The user must identify the required range of mobility in each hazard zone and note the location and distance to all obstructions in potential fall paths. Lateral obstructions which could be contacted in a pendular fall arrest must be noted. An assembly connecting a harness to an anchorage must be selected which will satisfactorily limit total fall distance and allow for dynamic elongation and activation distance of the assembly. If the D-Plate Anchorage Connector Assembly is to be used for confined space entry operations, the workplace assessment must comply with the requirements of OSHA regulation 29 CFR 1910.146 and ANSI Z117.1.

1.5 Safety and Precautionary Measures to be Adopted



WARNING!

- ▶ DO NOT exceed the allowable free fall distance or exceed the maximum fall arrest forces as specified by governing standards or subsystem components.
- ▶ The anchorage to which the MSA D-Plate Anchorage Connector Assembly is attached must be rated in the direction of intended use. See sections 2.4.3 "Anchorages and Anchorage Connectors" and 3 "Use" for details on anchorage strength and loading details.
- ▶ When installing or removing the MSA D-Plate Anchorage Connector Assembly, limit exposure to fall hazards. A separate independent fall arrest system may be required.
- ▶ Ensure that fall clearance is sufficient to meet governing standards or subsystem component requirements.
- ▶ Prevent swing falls and impact with objects in or adjacent to the fall path. Always remove obstructions below the work area to ensure a clear fall path. Keep work area free from debris, obstructions, trip hazards, spills or other hazard which could impair the safe operation of the fall protection system. DO NOT use the MSA D-Plate Anchorage Connector Assembly unless a qualified person has inspected the workplace and determined that identified hazards can neither be eliminated nor exposures to them prevented.
- ▶ Work directly under the anchorage/anchorage connector at all times. A full body harness is the only acceptable body holding device that can be used in a fall arrest system.
- ▶ DO NOT rely on feel or sound to verify proper snaphook or carabiner engagement. Ensure that gate and keeper are closed before use.
- ▶ If the MSA D-Plate Anchorage Connector Assembly is damaged or is subjected to fall arrest forces or impact forces, it must be immediately removed from service and marked as "UNUSABLE" until it has been destroyed.
- ▶ DO NOT leave the MSA D-Plate Anchorage Connector Assembly installed in environments which could cause damage or deterioration to the product. Refer to sections 4 "Cleaning, Maintenance and Storage" and 5 "Inspection" for care and inspection details. Do not leave unattended loads on the MSA D-Plate Anchorage Connector Assembly.
- ▶ DO NOT use where lanyard or shock absorber may be exposed to sharp or abrasive edges or sheared, expanded metal, or frame cut steel. Sharp edges may cut a lanyard or shock absorber during a fall. Cover all sharp or abrasive edges with padding or sheathing before working above edge.
- ▶ Chemical hazards, heat and corrosion may damage the MSA D-Plate Anchorage Connector Assembly. More frequent inspections are required in these environments.
- ▶ DO NOT use MSA D-Plate Anchorage Connector Assembly adjacent to moving machinery, electrical hazards, or in the presence of excessive heat, open flame or molten metal.
- ▶ DO NOT use fall arrest or rescue equipment in environments with temperatures greater than 130°F (34°C) or temperatures lower than -30°F (-34°C).
- ▶ DO NOT use the MSA D-Plate Anchorage Connector Assembly near energized equipment or where contact with high voltage power lines may occur. The metal components may provide a path for electrical current to flow, resulting in an electrical shock or electrocution.

- ▶ Remove any surface contamination such as, but not limited to, concrete, stucco, roofing material, etc that could accelerate cutting or abrading of attached components.
- ▶ MSA D-Plate Anchorage Connector Assemblies are to be designated and used solely for approved applications.
- ▶ Unauthorized alterations, relocations, or additions to the MSA D-Plate Anchorage Connector Assembly are not permitted.
- ▶ DO NOT alter this equipment or intentionally misuse it. DO NOT use fall protection equipment for purposes other than those for which it was designed. DO NOT use fall protection equipment for towing, hoisting or material handling.
- ▶ If PPE is resold, it is essential that instructions for use, maintenance, and periodic examination are provided in the language of destination.
- ▶ DO NOT use MSA Fall Protection products if under the influence of drugs or alcohol.
- ▶ MSA or persons or entities authorized in writing by the manufacturer, shall make all repairs to the equipment. No unauthorized repairs and/or modifications are permitted.
- ▶ RESCUE AND EVACUATION: The user must have a rescue plan and the means at hand to implement it. The plan must take into account the equipment and special training necessary to effect prompt rescue under all foreseeable conditions. If the rescue be from a confined space, the provisions of OSHA regulation 1910.146 and ANSI Z 117.1 must be taken into account. Although a rescue plan and the means to implement it must always be in place, it is a good idea to provide means for user evacuation without assistance of others. This will usually reduce the time to get to a safe place and reduce or prevent the risk to rescuers.

Failure to follow these warnings can result in serious personal injury or death.

1.6 Liability Information

MSA accepts no liability in cases where the device has been use inappropriately or not as intended. The selection and use of the device are the exclusive responsibility of the individual operator.

Product liability claims, warranties and guarantees made by MSA with respect to the device are voided, if not used, serviced or maintained in accordance with the instructions in this manual.

1.7 Warranty

Express Warranty – MSA warrants that the product furnished is free from mechanical defects or faulty workmanship for a period of one (1) year from first use or eighteen (18) months from date of shipment, whichever occurs first, provided it is maintained and used in accordance with MSA's instructions and/or recommendations. Replacement parts and repairs are warranted for ninety (90) days from the date of repair of the product or sale of the replacement part, whichever occurs first. MSA shall be released from all obligations under this warranty in the event repairs or modifications are made by persons other than its own authorized service personnel or if the warranty claim results from misuse of the product. No agent, employee or representative of MSA may bind MSA to any affirmation, representation or modification of the warranty concerning the goods sold under this contract. MSA makes no warranty concerning components or accessories not manufactured by MSA, but will pass on to the Purchaser all warranties of manufacturers of such components. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AND IS STRICTLY LIMITED TO THE TERMS HEREOF. MSA SPECIFICALLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Exclusive Remedy - It is expressly agreed that the Purchaser's sole and exclusive remedy for breach of the above warranty, for any tortious conduct of MSA, or for any other cause of action, shall be the repair and/or replacement, at MSA's option, of any equipment or parts thereof, that after examination by MSA are proven to be defective. Replacement equipment and/or parts will be provided at no cost to the Purchaser, F.O.B. Purchaser's named place of destination. Failure of MSA to successfully repair any nonconforming product shall not cause the remedy established hereby to fail of its essential purpose.

Exclusion of Consequential Damages - Purchaser specifically understands and agrees that under no circumstances will MSA be liable to Purchaser for economic, special, incidental, or consequential damages or losses of any kind whatsoever, including but not limited to, loss of anticipated profits and any other loss caused by reason of the non-operation of the goods. This exclusion is applicable to claims for breach of warranty, tortious conduct or any other cause of action against MSA.

For additional information please contact the Customer Service Department at 1-800-MSA-2222 (1-800-672-2222).

1.8 Training

Purchasers of MSA D-Plate Anchorage Connector Assembly must ensure that users are familiar with the User Instructions and are trained by a competent person in:

- workplace hazard identification, evaluation and control
- selection, inspection, use, storage and maintenance
- usage planning including calculation of free and total fall distance; maximum arresting force compatibility and selection of anchorage/anchorage connectors including connection to help prevent accidental disengagement (rollout)
- proper lanyard/harness connection locations
- evacuation and rescue planning and implementation
- consequences of improper use

For Confined Space applications:

- See OSHA 29 CFR 1910.146 and ANSI Z117.1.

Periodically (at least annually) assess effectiveness of training and determine the need for retraining or additional training. Contact MSA for training information.

2 Description

The MSA D-Plate Anchorage Connector Assembly is a component designed specifically for coupling a single personal fall arrest system to an anchorage. The MSA D-Plate Anchorage Connector Assembly is a permanent, overhead anchorage connector intended for use on such anchorages as beams or girders.

	Model Number	Material	Length		Approximate Weight	
			in	cm	lbs	kg
With Mounting Plate	506669	Galvanized Mounting Plate & Zinc Plated Steel Hardware	8.0	20	5.9	2.7
	506672	Anodized Aluminum Mounting Plate & Zinc Plated Steel Hardware	8.0	20	3.9	1.8
Without Mounting Plate	506632	Zinc Plated Steel Hardware	5.75	15	1.3	0.6
	506633	Stainless Steel Hardware	6.25	16	1.3	0.6

2.1 D-Plate Anchorage Connector Assembly with Mounting Plate Components

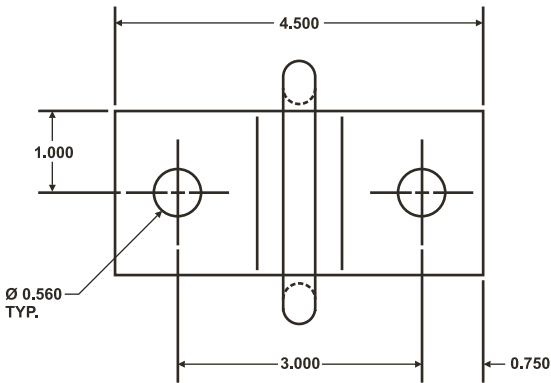


Fig. 1 Plate

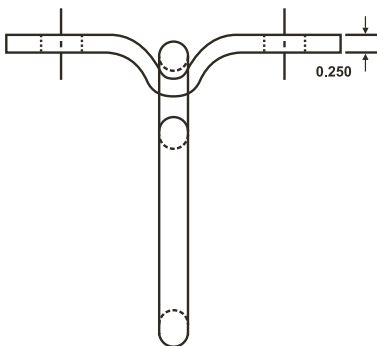


Fig. 2 D-ring

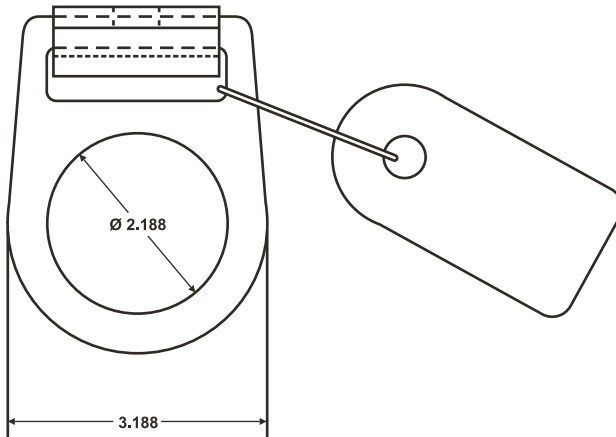


Fig. 3 Labels

2.1.1 D-Ring

The MSA D-ring is a connection element that is compatible with MSA snaphooks and carabiners. The D-ring is attached to the anchorage beam or girder by use of the mounting plate. When installed the D-ring will swivel freely in one axis to accommodate user movements.

2.1.2 D-Plate

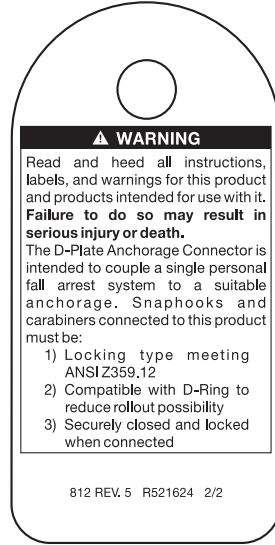
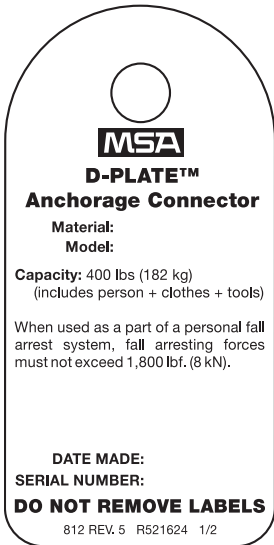
The D-Plate is a steel plate that is formed to accept the MSA D-ring and has been drilled to allow the user to install the plate and D-ring to a pre-drilled beam or girder with user-supplied fasteners. Refer to section 3.3.3 for a list of user-supplied fasteners required for installation.

2.1.3 Mounting Plate

The Mounting Plate is steel or aluminum designed to attach to the D-Plate to a predrilled wall or column. Refer to section 3.3.3 "User Supplied Fasteners" for a list of user-supplied fasteners required for installation.

2.2 Markings and Labels

The following labels must be present, legible and securely attached to the D-Plate Anchorage Connector Assembly. The formal inspection grid must be punched with a date (month/year) within the last six months. If not, remove the D-Plate Anchorage Connector Assembly from use and mark it as "UNUSABLE" until a Formal Inspection is performed in accordance with section 5.6. See section 2.1 for location of labels.



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2.3 System Requirements

The D-Plate Anchorage Connector Assembly is one component of multi-component systems. Without the other necessary components, the D-Plate Anchorage Connector Assembly serves no useful purpose. There are several different types of systems for use at heights and in confined spaces.

2.3.1 System Types

Systems are classified according to their intended purposes. There are six classifications of systems which may be used individually or in combinations. The six basic systems classifications are:

Fall Arrest	Personnel-riding	Evacuation
Climbing protection	Restraint	Rescue

2.3.2 Fall Arrest Systems

A fall arrest system is an assembly of components and subsystems, including the necessary connectors, used to arrest the user in a fall from a working height and suspend the user until rescue can be effected. A fall arrest system must always include a harness and connecting means between the harness and an anchorage or anchorage connector. Such connecting means may consist of a lanyard, energy (shock) absorber, fall arrester (rope grab), lifeline, self-retracting lanyard or suitable combinations of these.

Lanyard Connecting Subsystem is the term applied to an assembly, including the necessary connectors, which is comprised of a lanyard and a shock absorber. The lanyard and shock absorber are usually permanently coupled together along with self-locking snaphooks at each end. The subsystem is attached between the fall arrest attachment (back D-ring) of the harness and an anchorage or anchorage connector. The MSA D-Plate Anchorage Connector Assembly identified in section 2 are compatible for use with fall arrest lanyard connecting subsystems equipped with locking snaphooks up to 0.75 in (20 mm) gate opening size.

Fall Arrester Connecting Subsystem is the term applied to an assembly, including the necessary connectors, which is comprised of a fall arrester (rope grab) and a vertical lifeline. Sometimes a lanyard or lanyard with integral shock absorber, including the necessary connectors, is connected to the rope grab. The vertical lifeline must have a lifeline tensioner (counterweight), a connector for anchoring it, and may have a shock absorber. The subsystem is attached between the fall arrest attachment (back D-ring) of the harness and an anchorage or anchorage connector. Fall arrester connecting subsystems are sometimes suitable for use in climbing protection systems. See section 2.3.3. MSA D-Plate Anchorage Connector Assembly identified in section 2 are suitable for use in fall arrester connecting subsystems.

Self-Retracting Lanyard Connecting Subsystem is the term applied to an assembly, including the necessary connectors, comprised of a self-retracting lanyard only or a self-retracting lanyard and added shock absorber at the point of attachment to the user's harness. The subsystem is attached between the fall arrest attachment (back D-ring) of the harness and an anchorage or anchorage connector. These subsystems are sometimes suitable for use in climbing protection systems. See section 2.3.3. The MSA D-Plate Anchorage Connector Assembly identified in section 2 are suitable for use with self-retracting lanyard connecting subsystems.

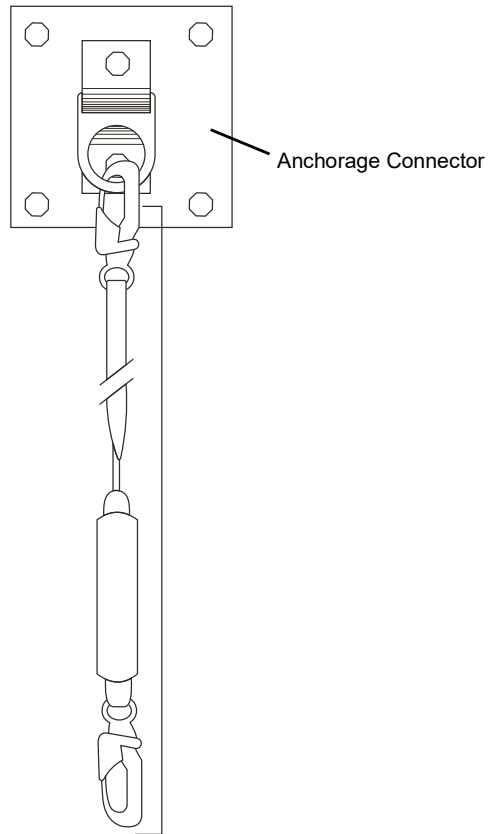


Fig. 4 Lanyard Connecting Subsystem

2.3.3 Climbing Protection Systems

A climbing protection system is an assembly of components and subsystems, including the necessary connectors, used to arrest the user in a fall from a working height and suspend the user until rescue can be effected. Such systems are used for climbing ladders and structures that are designed for climbing. They may either be temporary (portable) or permanent. Temporary climbing protection systems are described in section 2.3.2. Permanent climbing protection systems are ones of the rigid rail type such as the MSA Dyna-Glide™ systems. In those systems, a rigid rail is permanently attached to the structure to be climbed. A fall arrester device is attached to and glides on the rail to permit ascent and descent. It quickly locks in case of a fall. The Dyna-Glide fall arrester is attached between the front attachment (chest D-ring) of a MSA Pullover harness and the fall arrester by use of a carabiner. Contact MSA for more information about Dyna-Glide climbing protection systems. The MSA D-Plate Anchorage Connector Assembly identified in section 2 are suitable for use in temporary climbing protection systems.

2.3.4 Restraint Systems

A restraint system is an assembly of components and subsystems, including the necessary connectors, used to:

(a) stabilize and partially support the user at an elevated work location and allow free use of both hands. This type of restraint system is referred to as a work positioning system or, simply, a positioning system.

(b) restrict the user's motion so as to prevent reaching a location where a fall hazard exists. This type of system is referred to as a travel restriction system.

A positioning system includes a harness and connecting means between the harness and an anchorage or anchorage connector. Such connecting means usually consists of a positioning lanyard which is connected to both hip D-rings and wraps around or connects to an anchorage or anchorage connector. A positioning system must always be backed up by a fall arrest system. A travel restriction system consists of a harness and a fixed-length or adjustable-length lanyard connected between any one of the harness D-rings and an anchorage or anchorage connector. The MSA D-Plate Anchorage Connector Assembly described by these instructions are suitable for use in restraint systems.

2.3.5 Personnel-Riding Systems

A personnel-riding system is an assembly of components and subsystems, including the necessary connectors, used for lifting and lowering a worker to and from a work station which is not accessible by other preferred means, and potentially for positioning the worker while at that work station. Personnel-riding systems are of two general types, namely: (a) the mobile supported aerial platform type (e.g. manually- and self-propelled platforms and vehicle-mounted platforms), and (b) suspended personnel hoisting type (e.g. suspended scaffolds, suspension seats, and suspension harnesses). A harness must be used in both of these different systems; however, the way it is used will differ. When working on mobile supported aerial platforms, the user should use a restraint system (see section 2.3.4) anchored to the platform to provide restraint against falling from the platform. When working with the suspended personnel hoisting type of system, the user must employ a fall arrest system of either the self-retracting lanyard type or the fall arrester (rope grab) type. It is permissible to use a harness as a suspension harness for making access to the work station if the access time is of very short duration and the use of a suspension seat is not possible. The MSA D-Plate Anchorage Connector Assembly identified in section 2 are suitable for use in personnel-riding systems. Do not use a harness for fully suspended work positioning. Contact MSA for separate instructions on the associated equipment used in personnel-riding systems.

2.3.6 Rescue Systems

A rescue system is an assembly of components and subsystems, including the necessary connectors, used for moving an incapacitated or isolated person from a hazardous place to a safe place under alert or emergency conditions. An isolated person is one who has no available means of access to a safe place or is physically stranded or trapped. Rescue systems require actions of specially trained rescuers to effect the rescue of the incapacitated or isolated person. When rescuing a person who is wearing a harness, it is generally best to connect the rescue line to the chest D-ring. Alternatively, it is acceptable (but less desirable) to connect the rescue line to both of the shoulder D-rings using a "Y" retrieval lanyard. If the harness being used by the person being rescued has neither a chest D-ring nor shoulder D-rings, the back D-ring may be used as a last resort to connect the rescue line. MSA strongly recommends that the user select a harness with a chest D-ring to provide for rescue. The MSA D-Plate Anchorage Connector Assembly identified in section 2 may be used in certain rescue applications.

2.3.7 Evacuation Systems

An evacuation system is an assembly of components and subsystems, including the necessary connectors, employed by the user to move, unassisted by others, from a hazardous place to a safe place under alert or emergency conditions. An evacuation system consists of a harness and connecting means between the harness and an anchorage or anchorage connector. See the separate instructions for this equipment. The MSA D-Plate Anchorage Connector Assembly identified in section 2 are suitable for use in evacuation systems.

2.3.8 Combinations of Systems

Systems for fall arrest, restraint, climbing protection, personnel-riding, rescue and evacuation are often used in combination. For example, positioning type restraint systems must be backed up by a separate and independent fall arrest system. Hands-on training is required to obtain the necessary information and skills needed to work with combinations of systems. Refer to the separate instructions accompanying the several components and subsystems necessary to make up these systems.

2.4 Compatibility of System Parts

2.4.1 Compatibility of Components and Subsystems

MSA D-Plate Anchorage Connector Assembly are designed to be used with MSA approved components and connecting subsystems. Use of the D-Plate Anchorage Connector Assembly with products made by others that are not approved in writing by MSA may adversely affect the functional compatibility between system parts and the safety and reliability of the complete system. Connecting subsystems must be suitable for use in the application (e.g. fall arrest, climbing protection, restraint, rescue or evacuation). MSA produces a complete line of connecting subsystems for each application. Contact MSA for further information. Refer to the manufacturer's instructions supplied with the component or connecting subsystem to determine suitability. For fall arrest applications using MSA D-Plate Anchorage Connector Assembly, the maximum fall arrest force must not exceed 1,800 lbf (8 kN). Contact MSA with any questions regarding compatibility of equipment used with the MSA D-Plate Anchorage Connector Assembly.

2.4.2 Compatibility of Connectors

Connectors, such as D-rings, snaphooks, and carabiners, must be rated at 5,000 lbf (22 kN) minimum breaking strength. MSA connectors meet this requirement. Connecting hardware must be compatible in size, shape, and strength. Non-compatible connectors may accidentally disengage ("rollout"). Always verify that the connecting snaphook or carabiner and the D-ring on the harness or anchorage connector are compatible. Use only self-closing, self-locking snaphooks and carabiners (as defined and required by ANSI Z359.12).

2.4.3 Anchorages and Anchorage Connectors

Anchorages for personal fall arrest systems must either: (a) have a strength capable of supporting and withstanding at least 5,000 pounds (22.2 kN) in the directions permitted by the system without failure, or (b), must be certified by a professional engineer as having the required strength for fall arrest or travel restraint, as applicable. See ANSI Z359.18 for definition of certification. When more than one personal fall arrest system is attached to an anchorage, the anchorage strengths set forth in (a) and (b) must be multiplied by the number of systems attached to the anchorage. This requirement is consistent with OSHA requirements under 20 CFR 1910, Subpart F, Section 1910.66, Appendix C. Do not proceed with installation and use of the anchorage connector if an assessment of strength cannot be made.

3 Use

3.1 Planning the Use of Systems

Perform the hazard identification and evaluation described in section 1.4.6 of these instructions. Then plan the system(s) before starting work. Consider all possible paths of user movement and all factors that could affect the user's safety before, during, and after a fall anywhere along these paths. A qualified person must select the components, materials, anchorage and anchorage connectors to match the system application, the work, workplace hazards, and the environment. Consider the following points when planning the system(s).

3.1.1 Anchorage and Anchorage Connector Selection

Determine the necessary locations of anchorages to assure that the user will be continuously connected when exposed to hazards of falling. Select anchorages that are stable and have the strength required by section 2.4.3 of these instructions. Carefully select the locations of the anchorages to: (a) reduce possible free fall distance, (b) prevent swing fall hazards, and (c) provide clear space in the potential fall paths to avoid striking an object. Do not select anchorage locations that will require the user to work above them as this will increase the potential free fall and total fall distances. Plan the types of anchorage connectors that will need to be selected and refer to these instructions.

Free Fall Distance

**WARNING!**

DO NOT climb above anchorage.

Failure to follow this warning can result in serious personal injury or death.

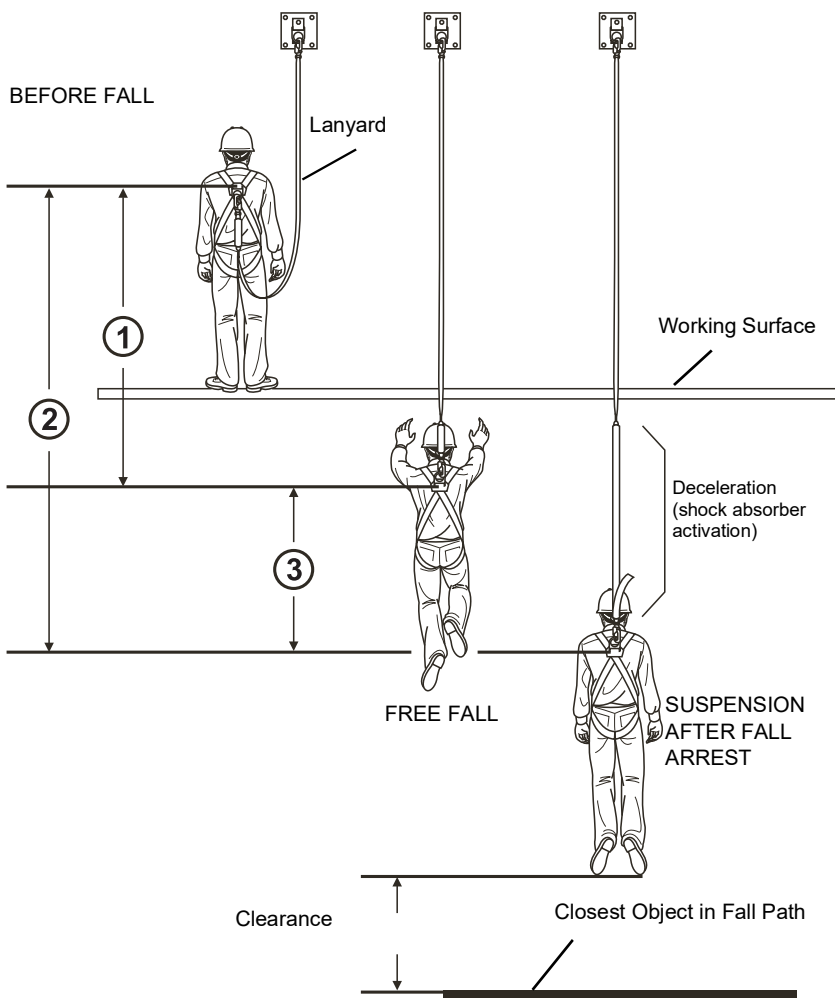


Fig. 5 Free Fall Distance

- (1) Free fall distance.
- (2) Total fall distance. The sum of the free fall distance and deceleration distance.
- (3) Deceleration distance. Must not exceed 3.5 ft (1.1 m).

Swing Fall Hazard



WARNING!

Prevent swing falls and impact with object in or adjacent to the fall path. Work directly under the anchorage/anchorage connector at all times.

Failure to follow this warning can result in serious personal injury or death.

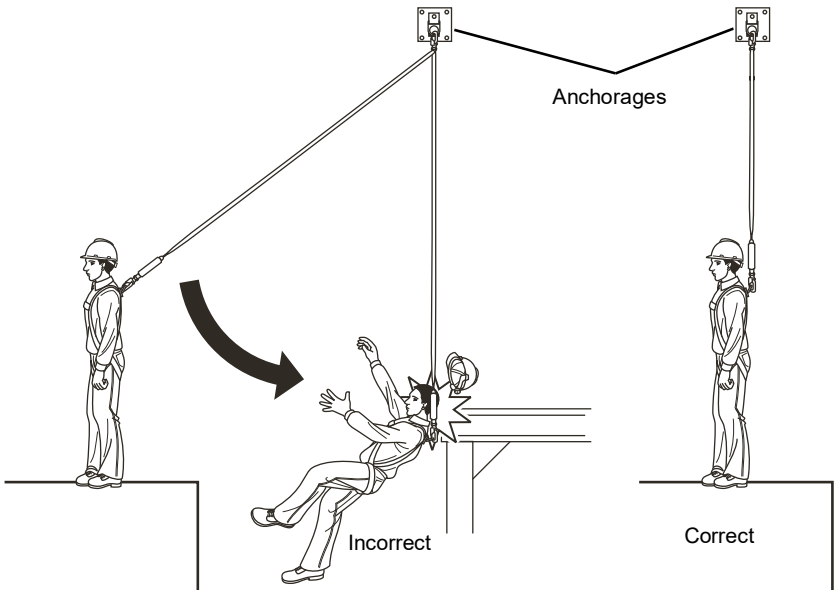


Fig. 6 Swing Fall Hazard

3.1.2 Free Fall Distance, total Fall Distance, and System Elongation

See separate instructions for connecting subsystems to determine allowable free fall, as well as the deceleration distance and dynamic elongation which must be allowed for in the space of potential fall paths. Total fall distance is the sum of free fall distance and deceleration distance. Dynamic elongation of the system (temporary elastic stretch of connecting components and subsystems) must be added to total fall distance and clearance allowed.

3.1.3 User Movements

Identify all necessary movements of the user and the materials and equipment needed to perform the planned work. Plan for avoidance of the crossing or tangling of connecting subsystems of two or more workers. Anticipate user movements that might introduce hazards of the connecting subsystem passing under, about or between body parts or invite the user to clamp, knot or otherwise prevent the connecting subsystem from functioning properly. Establish controls to prevent these occurrences.

3.1.4 Pendulum (swing) Falls

Swing falls can occur when the system is not anchored directly above the user. The force of striking an object in a pendular motion can cause serious injury. Always minimize swing falls by working as directly below the anchorage point as possible.

3.1.5 Anchorage Loading

The specific application will determine potential directions of loading. Perform a workplace assessment in accordance with section 1.4.6 and limit exposure to swing falls in accordance with section 3.1.4 to avoid side loading situations.



WARNING!

The D-Plate Anchorage Connector Assembly is not suited for supporting side loads. Installation must be planned so that potential fall arrest loads are applied vertically and directly below the anchorage connector.

Failure to follow this warning can result in serious personal injury or death.

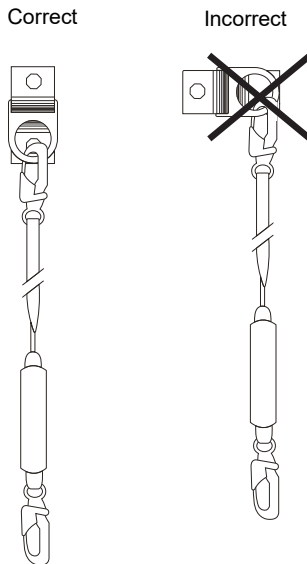


Fig. 7 Loading direction

Fall Arrest

In fall arrest applications, the D-Plate Anchorage Connector Assembly should be mounted to the underside of a horizontal beam or girder with the D-ring hanging straight down when properly assembled to the anchorage. In this position the D-ring is free to swing from side to side about the long axis of the D-ring slot. Care should be taken to mount the D-Plate Anchorage Connector Assembly so that user movement does not cause loading other than straight down from the point of attachment.

Restraint

In restraint applications, the D-Plate Anchorage Connector Assembly may be mounted on a vertical surface such as a vertical column of sufficient strength as defined in section 3.1.1.

3.1.6 Clear Space in Fall Path

Make certain that enough clearance is available in all potential fall paths to prevent striking an object. The amount of clearance needed depends upon the type of connecting subsystem used, and the location of the anchorage. Consult the manufacturer's instructions for the particular connecting subsystem or component for clearance needed.

3.1.7 Hazards Identified in Workplace Assessment

All hazards of the type set forth in section 1.4.6 of these instructions must be addressed and suitable controls planned and implemented. For example, if work must be performed near unavoidable sharp edges, plan to protect against cutting by use of heavy padding or other means of covering the sharp edge.

3.1.8 Rescue and Evacuation

The user must have a rescue plan and the means at hand to implement it. The plan must take into account the equipment and special training necessary to effect prompt rescue under all foreseeable conditions. If the rescue be from a confined space, the provisions of OSHA regulation 1910.146 and ANSI Z117.1 must be taken into account. Although a rescue plan and the means to implement it must always be in place, it is a good idea to provide means for evacuation without assistance of others. This will usually reduce the time to get to a safe place and reduce or prevent the risk to rescuers.

3.2 D-Plate Anchorage Connector Assembly Inspection Before Each Use

Inspect the D-Plate Anchorage Connector Assembly to verify that it is in serviceable condition. See section 5 for inspection details. Do not use D-Plate Anchorage Connector Assembly if inspection reveals an unsafe condition.

3.3 Installation of the D-Plate Anchorage Connector Assembly

3.3.1 Anchorage Preparation

Begin by preparing the anchorage (e.g. beam, girder, etc.). The anchorage should be clean and dry before installing the D-Plate Anchorage Connector Assembly. Holes must be drilled into the flange of the anchorage that match the pattern of the D-plate or mounting plate and the diameter of the mounting plate holes and the size of the user-supplied bolts. See sections 1.4.6 and 3.1 for considerations in locating the anchorage connectors for the work to be performed. See section 2.1 for the mounting plate hole pattern.

3.3.2 Installation Diagram



WARNING!

When installing or removing the D-Plate Anchorage Connector Assembly, limit exposure to fall hazards. A separate independent fall arrest system may be required. Failure to follow this warning can result in serious personal injury or death.

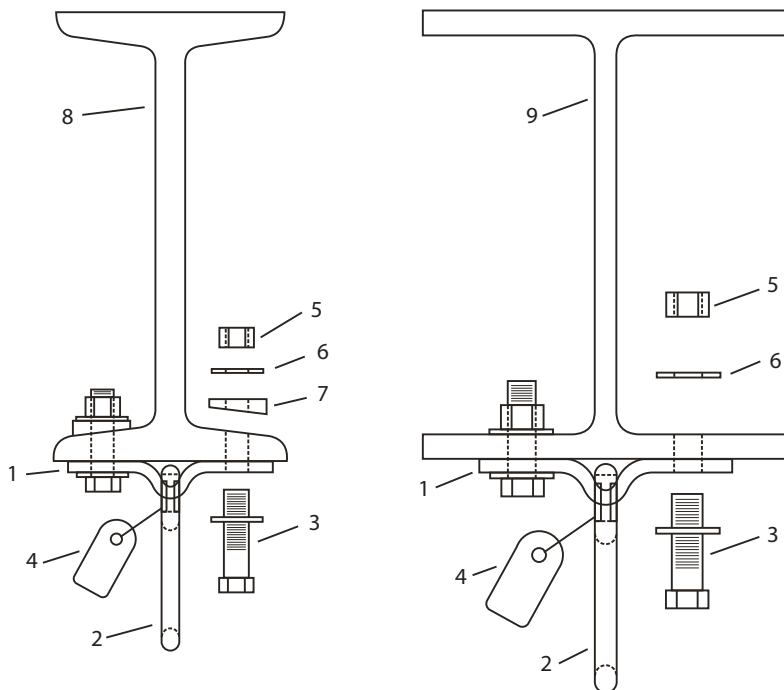


Fig. 8 S-beam Installation

- 1 D-Plate
- 2 D-Ring
- 3 Bolt
- 4 Labels (2)
- 5 Lock Nut

- 6 Flat Washer (4)
- 7 Tampered Washer
- 8 S-beam Anchorage
- 9 W-beam Anchorage

US

3.3.3 User Supplied Fasteners

The user must select and obtain the appropriate fasteners to attach the D-Plate Anchorage Connector Assembly. Refer to the illustrations in section 3.3.2.

For W-beams	For S-beams
Two (2) Grade-5 bolts, 0.5 in (13 mm) diameter, of length sufficient to reach through the plate, beam flange and lock washer.	Two (2) Grade-5 bolts, 0.5 in (13 mm) diameter, of length sufficient to reach through the plate, beam flange, tapered washer and lock washer.
Four (4) SAE-type flat washers, 0.5 in (13 mm) nominal inside diameter.	Two (2) tapered (angle) washers, 0.5 in (13 mm) nominal inside diameter.
Two (2) lock nuts, 0.5 in (13 mm) with threads to match the Grade-5 bolts.	Four (4) SAE-type flat washers, 0.5 in (13 mm) nominal inside diameter.
	Two (2) lock nuts, 0.5 in (13 mm) with threads to match the Grade-5 bolts.

3.3.4 Installation Sequence

- (1) Hold the mounting plate (when provided) and D-ring assembly in position and aligned to the pre-drilled holes in the vertical anchorage.
- (2) Assemble a bolt up through the D-plate, mounting plate (when provided), flange, angle washer (when needed for S-beam installations), lock washer and nut. Hand tighten the nut onto the bolt. Repeat this process for the other bolt. Be sure there is a bolt, washers and nut for every hole in the mounting plate.
- (3) Tighten each nut to 7 ft lb (9 Nm) torque.
- (4) Inspect the installation. Verify that all components are present and correctly mounted. The D-ring must move freely on the mounting plate.



WARNING!

- ▶ DO NOT leave the MSA D-Plate Anchorage Connector Assembly installed in environments which could cause damage or deterioration to the product. Refer to sections 4 "Cleaning, Maintenance and Storage" and 5 "Inspection" for care and inspection details.
- ▶ DO NOT leave unattended loads on the D-Plate Anchorage Connector Assembly.
- ▶ DO NOT use on cinder block walls
- ▶ DO NOT use unless a qualified person has designed and inspected the system. Failure to follow these warnings may result in serious injury or death.

3.3.5 Installation of Mounting Plate to Concrete

MSA requires that the mounting plate be attached to 3,000 psi (20.7 MPa) solid concrete, to a minimum depth of 4.5 inches, at least 6 inches from any edge using the Hilti product described below. Users must follow installation instructions provided by Hilti.

Approved anchors: Hilti HY-150 injection adhesive anchor including:

- 1/2 inch diameter x 6.5 inch long stainless steel (SST) ANSI 316 anchor rods
- 1/2 inch SST nuts, washers, and lock washers

Inspect the installation to verify each bolt is in the correct position and properly tightened, and verify the mounting plate is fully seated before continuing onto operation of the system.

3.4 Making Connections

When using a snaphook or carabiner to connect to an anchorage or when coupling components of the system together, be certain accidental disengagement ("rollout") cannot occur. Rollout is possible when interference between a carabiner and the mating connector causes the carabiner's gate or keeper to accidentally open and release. Rollout occurs when a carabiner is snapped into an under-sized ring such as an eye bolt or other non-compatibly shaped connector. Only self closing, self-locking snaphooks and carabiners should be used to reduce the possibility of rollout when making connections. Do not use snaphooks or connectors that will not completely close over the attachment object. Do not make knots in a lanyard. Do not hook a lanyard back onto itself. Snaphooks and carabiners must not be connected to each other. Do not attach two snaphooks or carabiners into one D-ring. Do not attach snaphooks or carabiners directly to a horizontal lifeline. Always follow the manufacturer's instructions supplied with each system component.

3.5 Removal of the D-Plate Anchorage Connector Assembly

Before attempting removal of the D-Plate Anchorage Connector Assembly, disconnect all loads and attachment elements from the Anchorage Connector D-ring. Return the D-Plate Anchorage Connector Assembly to the appropriate person in the user's organization for cleaning, inspection and storage.

4 Care, Maintenance and Storage

4.1 Cleaning Instructions

Clean the D-Plate Anchorage Connector Assembly with a solution of water and mild laundry detergent. Dry hardware with a clean cloth and hang to air dry. Do not speed dry with heat. Excessive accumulation of dirt, paint or other foreign matter may prevent proper function of the D-Plate Anchorage Connector Assembly. Questions concerning D-Plate Anchorage Connector Assembly conditions and cleaning should be directed to MSA.

4.2 Maintenance and Service

Equipment which is damaged or in need of scheduled maintenance must be tagged as "UNUSABLE" and removed from service. Corrective maintenance (other than cleaning) and repair, such as replacement of elements, must be performed by MSA. Do not attempt repairs.

4.3 Storage

Store the D-Plate Anchorage Connector Assembly in a cool, dry and clean place out of direct sunlight. Avoid areas where heat, moisture, light, oil, and chemicals or their vapors or other degrading elements may be present. Equipment which is damaged or in need of scheduled maintenance should not be stored in the same area as usable equipment. Heavily soiled, wet, or otherwise contaminated equipment should be properly maintained (e.g. dried and cleaned) prior to storage. Prior to using equipment which has been stored for long periods of time, a Formal Inspection should be performed by a competent person.

5 Inspection

5.1 Inspection Frequency

The D-Plate Anchorage Connector Assembly must be inspected by the user before each use and, additionally, by a competent person other than the user at intervals of no more than six months. The competent person inspection is referred to as Formal Inspection. See section 5.6 for Formal Inspection procedures.

The program administrator shall maintain documentation of equipment inspections. This documentation shall include, at a minimum, the identify of the equipment, inspection date, name of the competent or qualified person conducting the inspection and the result of that inspection.

The program administrator shall set inspection criteria for the equipment. Such criteria shall equal or exceed the most restrictive of the criteria established by the ANSI Z359.18 standard or the manufacturer's user instructions. Keep inspection criteria current in relationship to changing patterns or conditions of use.

5.2 Procedure for Inspection

- (1) Inspect the D-Plate Anchorage Connector Assembly labels to verify that they are present and legible. See section 2.1 for location of labels for each model. See section 2.2 for the specific labels that should be present and the information contained on those for the model number shown on page one (1) of these instructions. Check the Formal Inspection Grid to be sure a Formal Inspection has been performed within the last six months. If the Grid does not indicate that a Formal Inspection has been performed within the last six months (by being punched), or if any labels are missing or illegible, remove the D-Plate Anchorage Connector Assembly from use and mark it as "UNUSABLE" until a Formal Inspection is performed by a competent person.
- (2) Inspect the D-ring, D-plate, Mounting Plate and user supplied fasteners (bolts, washers, angle washers, and nuts) for deformation, damage, fractures, cracks, corrosion, deep pitting, sharp edges, cuts, deep nicks, evidence of excessive heat or chemical exposures and inadequate maintenance of equipment, alteration, excessive wear, or any condition that calls to question the suitability of the equipment for its intended purpose.
- (3) Inspect the anchorage wall or column for evidence of cracking, fracturing, breakdown of concrete structure.
- (4) Inspect the plastic labels for their presence and legibility.
- (5) Inspect each component and subsystem of the complete system in accordance with the associated manufacturer's instructions. See section 2.3 for a description of the make-up of the different types of subsystems and systems.

5.3 Corrective Action

When inspection in accordance with section 5 "Inspection" reveals any of the identified conditions, the MSA D-Plate Anchorage Connector Assembly must be immediately removed from service and marked as "UNUSABLE" until destroyed or subjected to corrective maintenance by the user's organization in accordance with this user instruction. Damage, excessive wear, malfunction, and aging are generally not repairable. If detected, immediately remove the D-Plate Anchorage Connector Assembly from use and mark it as "UNUSABLE" until destroyed. For final disposition, submit the Bolt D-Ring Anchorage Connector to a competent person who is authorized to perform Formal Inspection. If there is any question as to reparability, contact MSA or a service center authorized in writing by MSA before further use of the product.



WARNING!

- ▶ Unauthorized alterations, relocations, or additions to the anchorage connector are not permitted.
- ▶ MSA or persons or entities authorized in writing by the manufacturer, shall make all repairs to the equipment. No unauthorized repairs and/or modifications are permitted.
Failure to follow these warning can result in serious personal injury or death.

5.4 Formal Inspection Frequency

The D-Plate Anchorage Connector Assembly must be formally inspected by a competent person other than the user at intervals of no more than six months. (The qualifications of a competent person are established by OSHA.) If the product is exposed to severe working conditions, more frequent formal inspections may be required. The frequency of inspection by a competent person should be established by the user's organization based on such factors as the nature and severity of workplace conditions, modes of use, and exposure time of the equipment. The competent person should perform a methodical and thorough visual and tactile inspection by following the inspection procedure in section 5.6. The inspection results should be recorded in the Formal Inspection Log and retained for reference. In addition, if the D-Plate Anchorage Connector Assembly passes Formal Inspection, the competent person, using a ballpoint pen, should punch the date (month and year) of Formal Inspection on the grid supplied with the labels on each product. The user should never punch this grid; however, the user should check it before each use to be sure a Formal Inspection has been performed within the last six months.

5.5 Control of Equipment

The user's organization should establish and enforce a policy and procedure whereby any D-Plate Anchorage Connector Assembly that is found to be defective, damaged, or in need of maintenance be immediately removed from use, marked as "UNUSABLE" and immediately thereafter submitted to custody of the competent person responsible for Formal Inspection.

This has the benefits that:

- 1) defective equipment is secured from further use until proper action is taken;
- 2) uniform standards are applied for determining whether the equipment is acceptable or not acceptable for further use;
- 3) uniform methods of cleaning and other maintenance are applied; and
- 4) there is a central point for evaluation of conditions that may be recurring and require preventive measures such as coordination with the equipment manufacturer, selection of alternate equipment, additional training of equipment users, or changes to the workplace conditions.

5.6 Formal Inspection Procedure

The Formal Inspection Procedure is similar to the user's inspection before each use described in section 5. However, it differs in three important respects, namely:

- 1) it is performed by a competent person other than the user who is trained and authorized to perform Formal Inspection for the user's organization;
- 2) it is more detailed and is methodically recorded on a Formal Inspection Log that is kept on file for future reference; and
- 3) it results in final disposition of the equipment as either "acceptable" or as "not acceptable" followed by destruction of the product.

There are three forms that are important to the Formal Inspection Procedure. They are the Formal Inspection Diagram ("DIAGRAM"), the Formal Inspection Log ("LOG"), and the Formal Inspection Checklist and Codes ("CHECKLIST"). These forms relate and refer to each other so it is necessary to understand their purposes and uses before discussing the inspection procedure.

5.6.1 Diagram

This is a set of line drawings of the D-Plate Anchorage Connector Assembly. Each has numbered callouts of the parts. The numbers called out in the DIAGRAM correspond to those shown on the column titled "INSP. POINT" (inspection point) on the LOG.

5.6.2 Log

This is the form to be used to record observations made during the Formal Inspection. The Model No., Serial No. and Date Made are recorded by the inspector from the label set. The formal inspector's name and the inspection date are entered by the inspector. The "Disposition" entry is the last entry made on this form after all observations have been recorded. The entry is either "Acceptable" ("PASS") or "Not Acceptable" ("FAIL"). The columns on the LOG are as follows:

- **Insp. Point** - Inspection point. The D-Plate Anchorage Connector Assembly part designated in the callouts on the DIAGRAM.
- **Description** - Name of the D-Plate Anchorage Connector Assembly inspection point.
- **QTY/DP** - Quantity per D-Plate Anchorage Connector Assembly. The quantity of each D-Plate Anchorage Connector Assembly inspection point that must be inspected.
- **Cond.** - Condition. The condition of the D-Plate Anchorage Connector Assembly part is indicated here by entry of the appropriate Condition Code shown on the CHECKLIST (e.g. M0, P2, etc.). Alternatively, the inspector may simply enter "FAIL" if a defective condition exists and make no entry if no defect exists.
- **Overall Assess.** - Overall assessment. The inspector's evaluation of the overall acceptability or non-acceptability of the part category (e.g. webbing, stitching, metallic, plastic). The appropriate Overall Assessment Code defined on the CHECKLIST is entered here (e.g. MA, PN, etc.). Alternatively, the inspector may simply enter "FAIL" if a defective condition exists and make no entry if no defect exists.
- **Comments** - Indicate pertinent inspector observations here.

5.6.3 Checklist and Codes

This is a table which categorizes the different types of D-Plate Anchorage Connector Assembly parts. For each of these categories that are applicable to a specific product, the formal inspector checks the D-Plate Anchorage Connector Assembly parts for each of the associated conditions (e.g. deformation, corrosion, etc.). The codes for the detected conditions are entered in the Condition column on the LOG (e.g. M1, P0, etc.). Overall assessment codes are given, along with the criteria for assigning them, so the inspector can decide if the D-Plate Anchorage Connector Assembly is acceptable or not acceptable for further use (e.g. MA, MN, PA, PN). Alternatively, instead of using these codes, the inspector may simply enter "FAIL" if a defective condition exists and make no entry if no defect exists.

5.6.4 Formal Inspection Procedural Steps

- (1) Record on the LOG the Model No., Serial No. and Date Made information shown on the product label set. Record the inspector's name and inspection date.
- (2) Arrange the D-Plate Anchorage Connector Assembly so the parts to be inspected are readily visible.
- (3) Starting with the parts shown on the LOG, inspect each part (inspection point) one at a time. Refer to the DIAGRAM for identification of each inspection point. Each part must be inspected for the possible presence of the conditions shown on the CHECKLIST. Enter in the Condition column on the LOG the proper Condition Code (listed on the CHECKLIST) or "FAIL" if a defect exists. If there is any question whether the product condition has materially changed since the last Formal Inspection, retrieve and review the prior Formal Inspection records for the specific product.
- (4) Determine whether the part (inspection point) is acceptable or not acceptable. If an inspection point has a defective condition, enter in the Overall Assessment column of the LOG the proper code taken from the CHECKLIST or simply "FAIL."
- (5) Determine disposition of the D-Plate Anchorage Connector Assembly. If in step 4 it has been determined that the D-Plate Anchorage Connector Assembly is not acceptable, enter "N" or "FAIL" in the Disposition space on the LOG. In addition, a notation should be made in this space as to whether the D-Plate Anchorage Connector Assembly is to be destroyed, returned to manufacturer/distributor, etc.
- (6) If in step 4 it has been determined that the D-Plate Anchorage Connector Assembly is acceptable for further use, enter "A" or "PASS" in the Disposition space on the LOG.
- (7) File the LOG for future reference.

5.7 Formal Inspection Checklist and Codes

Type of Part Inspected	Condition			Cond. Code	Overall Assessment Code
Metallic	Deformed/fractured			M1	MA - (Metallic acceptable) MN - (Metallic not acceptable)
	Corroded/deep pits			M2	
	Missing/loose			M3	
	Heat exposure			M4	
	Chemical exposure			M5	
	Burrs/sharp edges			M6	
	Cuts/deep nicks			M7	
	Malfunction			M8	
	Other			M9	
	No visible change			M0	
Structure	Chips			S1	SA - (Structure acceptable) SN - (Structure not acceptable)
	Cracks/fracture			S2	
	Missing/Loose			S3	
	Burns/heat exposure			S4	
	No visible change			S0	
Plastic	Cut/broken/deformed			P1	PA - (Plastic acceptable) PN - (Plastic not acceptable)
	Wear damage			P2	
	Missing/loose			P3	
	Burns/heat exposure			P4	
	Chemical Exposure			P5	
	Other			P6	
	No visible change			P0	

Legend

Disposition:

A - (Acceptable) **N** - (Not acceptable)

Enter "A" (or "PASS") or "N" (or "FAIL") in Disposition blank on Formal Inspection Log.

Criteria for disposition of "**N**" (Not acceptable):

If there is one or more Overall Assessment Code of "N" type (e.g. WN, SN, MN, PN).

5.8 Inspection Log

Example:

Model No.: 506632	Inspector:	J.W.Doe
Serial No.: 12345	Inspection Date:	6/4/12
Date Made: 1/12	Disposition:	N - See item 1, Destroy D-Plate Anchorage Connector Assembly.

INSP. POINT	DESCRIPTION	QTY/DP	COND . (a)	OVERALL ASSESS. (a)	COMMENTS
<i>METALLIC PARTS</i>					
1	D-ring	1	M1	MN	D-ring is elongated, has experienced load
2	D-Plate	1	M0	MA	
3	Mounting Plate	1	M0	MA	
4	Anchor-Screw (user supplied)	4	M0	MA	
5	Flat Head Screws (user supplied)	2	M0	MA	
6	Nut	6	M0	MA	
7	Washer	6	M0	MA	
<i>STRUCTURED PARTS</i>					
8	Anchorage Structure	NA	S0	SA	
<i>PLASTIC PARTS</i>					
9	Labels	2	P0	PA	

US

Blank

Model No.:	Inspector:
Serial No.:	Inspection Date:
Date Made:	Disposition:

INSP. POINT	DESCRIPTION	QTY/DP	COND. (a)	OVERALL ASSESS. (a)	COMMENTS
<i>METALLIC PARTS</i>					
1	D-ring	1			
2	D-Plate	1			
3	Mounting Plate	1			
4	Anchor-Screw (user supplied)	4			
5	Flat Head Screws (user supplied)	2			
6	Nut	6			
7	Washer	6	M0	MA	
<i>STRUCTURED PARTS</i>					
8	Anchorage Structure	NA	S0	SA	
<i>PLASTIC PARTS</i>					
9	Labels	2	P0	PA	

- (a) Optional simplified PASS/FAIL inspection format: Whenever an acceptable condition is found, the entry in the COND. and OVERALLASSESS. columns may be left blank. Whenever a defective condition is found, enter "FAIL." The inspection may end upon detection of a single defective condition.
- (b) Blank copies of this LOG, with associated CHECKLIST and DIAGRAM, are available from MSA. Call Toll Free 1-800-672-2222.

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