

Technical Briefing Note

Subject	Date Issued	Revision
Friction Plate Shock Absorber	25th March 2013	Original

Use of Friction Plates as a Shock Absorber For Industrial Fall Arrest Lanyards

The Working at Height Association of Australia (WAHA) is an organisation dedicated to the dissemination of information to and education of all those with a keen interest in working at height issues. Following the release of some alternative fall arrest lanyard products in the market, the association is issuing this Technical Briefing Note to provide both clarity and facts about friction plate devices being used as a substitute for a shock absorber in fall arrest lanyards.

A typical friction



plate device

Background

Friction plate devices are not new – they have been used in recreational climbing and other applications over many years. The friction plate was originally designed to assist in reducing loads limits that may be applied to pitons in the case of a fall where a mountain climber who has passed the piton in a climb, could potentially fall.

This was typically in the case when they were using dynamic rope, which by design following a fall, decreases the load on the person. Even though this also adds dynamic forces to the pitons holding the rope, the friction plate releases tension/load to the piton to hold the falling climber.

When the device is combined with rope assemblies and connection points, the device is also known as a 'ferrata set'. There are many variations in design, but a typical configuration is shown below:



The friction plate in this type of assembly is typically manufactured from aluminium and is designed to arrest the falling mass by rope passing through the friction plate, crossing over itself in the rope path, allowing the rope to limit and slow the rope movement through the device. The actual energy reduction in this method is however affected by many different factors such as:

- (1) The style of the device being used;
- (2) The number of holes threaded;
- (3) The orientation of the device
- (4) The brand of rope being used;
- (5) The thickness of rope being used;
- (6) The weight of the user;
- (7) If the rope is wet vs dry;
- (8) The age of the rope and how worn it is.

The high number of variables in this product therefore means that there will be a high degree of variability in shock absorption performance. As such these devices are only recommended for use by highly rope professionals and in a recreation or climbing environment.

Use of friction plates as a replacement in industrial fall arrest applications

Given the high volume of technical performance variations in this product indicated above, WAHA does **NOT** recommend that friction plates be used in industrial fall arrest applications.

Some organisations are however promoting the use of ferrata set style designs as an alternative to the tear webbing energy absorbing fall arrest lanyards, in the first instance as they appear to be light weight, with energy absorbing qualities.

WAHA considers this inappropriate however as:

- (1) Workers in most fall arrest applications have training limited to general working at height applications and there are a large number of 'operating/use conditions' required to ensure the device will act correctly in a fall arrest scenario;
- (2) There is a high degree of variability in performance of the device based on the user's weight and other environmental conditions;
- (3) Rope deteriorates over time and worn rope may not perform the shock absorbing action as effectively as when the product is first used;
- (4) Rope lanyards with hooks fitted to the middle section of the lanyard are often positioned using a butterfly knot - which can reduce the strength of the rope by up to 30% depending on the cordage tested (as reported in testing by the Cordage Institute).

To justify this position, WAHA refers to information recently circulated in a press release dated 25th February 2013, by the UIAA International Mountaineering and Climbing Federation (appended at the end of this Bulletin). This release refers to both testing and incidents that have occurred in relation to the use of friction plate devices in fall arrest applications, and the subsequent recall of such products by some manufacturers.

The release explains that following a comprehensive test programme that was conducted on used and aged rope with these friction devices, it found that some sets (rope friction assemblies) can fail in a fall situation. Testing showed that the impact force in a fall may increase and that the tensile strength of the lanyard may also be reduced in such a way that it could result in a full failure of the set.

A worldwide warning was initially issued by UIAA on 13th September 2012 following fatal incident where a climber fell several metres where the energy absorbing system failed. The UIAA Safety Commission organised a meeting on 6th February 2013 with all manufacturers of ferrata sets where they were asked to prepare a statement about the safety of rope friction devices which they had produced and are still producing.



The statement explained that some friction plates give better stability of impact force for brand new sets as well as the used or aged ones, however they found that the solution of tear webbing shows much more stability of results of impact forces and they had stopped production of the rope friction devices.

Manufacturer views

Kong (Italy), a recognised manufacturer of friction plates, show the use of the friction plate in one direction only in their literature and advise that when used with wet rope, the friction plate will slow the movement of rope through the friction plate. This may cause higher impact loads. Kong also state that the length of the rope to be paid out may vary with the weight of the user and the condition of the rope, and that the user must decide on the appropriate way to use the friction device.

Manufacturers of these friction plates therefore recognise the limitations of these devices in the industrial field as can be seen by the recent recall notices and comments within user manuals.

Local (Australia/New Zealand) Testing Requirements

When the friction plate adjusters in fall arrest lanyard assembly configuration are being tested in Australia to AS/NZS1891.1, the Standard requires these products to deliver a resultant load of 6kN or less when tested using a 100kg test weight. (Appendices H - dynamic test). If any lanyards being sold are purported to pass the requirement of AS/NZS1891.1:1995, this standard has now expired. All tests should therefore reflect on the standard to year 2007 - Appendices G & H, which includes test criteria across the energy absorber to ensure the lanyard can support a load if bypassing the energy absorber.

Industrial users of this equipment often weigh more than the 100kg, especially when fitted out with equipment needed to carry out work at height. Testing for weights higher than 100kg is not required in the standard, though the industry has recognised the potential for higher user weights and has responded with product designs that support workers up to 160kg.

We recommend that potential purchasers of ferrata sets should check with manufacturers to ensure devices for fall arrest have been tested above 100kg if they require such a rating.

Additional Information

Additional information with respect to product recalls can be found at the links below:
<http://www.climbland.com/en/news-climbing/item/98-recall-vie-ferrata-sets-with-older-shock-absorber-from-different-manufacturers.html>



Second wave of via ferrata set recalls within six months

25 Feb 2013

Press Release

Second wave of via ferrata set recalls within six months Considerable deficiencies found in many via ferrata sets

25 February 2013, BERN, Switzerland: A group of manufacturers has issued a recall of certain via ferrata sets following a meeting of the UIAA (International Mountaineering and Climbing Federation) Safety Commission in Munich, Germany.

Following a comprehensive test programme conducted on used or aged rope friction based via ferrata sets, the climbing industry has found that some of these sets can fail in a fall situation.

The testing showed that the impact force in a fall may be increased and that the tensile strength of the lanyards may also be reduced in such a way that it could result in a full failure of the via ferrata set.

Severe injury or death may be the consequence.

The level of the risk is dependent upon the specific model. Therefore each rope friction based via ferrata set owner should consult the information provided by the manufacturer of the set.



Rope-friction based via ferrata set (Source: Deutscher Alpenverein DAV)

[Please Click Here to View List of Affected Models](#)

The recall is the second alert about via ferrata sets in the past six months.

There was a worldwide warning issued by the the UIAA on 13 September 2012. It followed a fatal accident on 5 August 2012 on a via ferrata in the vicinity of Walchsee in Tirol, Austria where a climber fell several meters and both lanyards on the energy-absorbing devices (EAS), also known as klettersteig sets, broke.

Changes have now been proposed to UIAA standard 128 for via ferrata sets. These will be up for a discussion and approval at the next UIAA Safety Commission meeting in May 2013.

About the UIAA Safety Commission

The UIAA Safety Commission is made up national delegates from alpine clubs, manufacturers who submit to the UIAA Safety Standard and UIAA laboratories which conduct safety tests on behalf of the commission. The commission maintains a database of certified equipment and recalls. The UIAA was founded in 1932 and has 80 member associations in 50 countries representing about 1.3 million people.

The organization's mission is to promote the growth and protection of mountaineering and climbing worldwide, advance safe and ethical mountain practices and promote responsible access, culture and environmental protection.

The UIAA operates through the work of its commissions which make recommendations, set policy and advocate on behalf of the mountaineering community. The UIAA is recognized by the International Olympic Committee for mountaineering and natural surface climbing.

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