This information is reproduced make it widely available to Petzl Shunt users to show the likely results of extreme tests.
Although not carried out under totally reproducible conditions detailed measurements were taken**.** IRATA is not responsible for the accuracy of the results and that readers should make their own conclusions

IRATA Assessors workshop 21st April 2007

Tests on backup systems under rescue loads to replicate risks encountered during routine training.

Introduction

The tests were proposed by SpanSet, then discussed to finalise what was carried out in agreement with the group in attendance.

The idea for appraisal was that - “we may be happy to accept higher risks during an actual rescue compared to during normal working, but during training which is a “normal” activity there are actually higher potential risks that we are not necessarily fully aware of”.

It is quite possible that during training we have a low incident occurrence due to the effectiveness of the main working system rather than the back-up system. The back-up system is rarely if ever used, but should it be used it may prove ineffective. Irata is also in possession of a large amount of recorded data to support the working systems, but there is very little recorded data that supports the effectiveness of back-up systems.

The tests we carried out do not question working issues on site and we do not feel that rope access activities on site will necessarily be affected. We do however expect training organisations to consider the potential risks of some of the activities they routinely request trainees to undertake, as the tests do question these areas. It may be that changes in the way we carry out training activities may well be sufficient to resolve some of the issues identified.

Parameters of the Tests

Rope used- 11mm Mammut “performance static” EN1891 semi static rope
Belay knots - double figure of eight on a bight
Back-up device - Petzl shunt (latest version as at 04/07)
Cows tail 11mm Mammut “Flex” EN892 dynamic rope
Cowstail knots- Shunt end = barrel knot, User end = fig eight on a bight
The Cowstails were 1metre long apart from one in test 8 which was 0.5m. This measurement was from the bearing point of the figure of eight to the far end of the karabiner attached to the barrel knot (i.e. the length includes the karabiner)
All knots were tensioned by hand therefore not exceeding body weight.
Mass used - one steel mass with weight variation

Test no.	Impact force	Total travel of Mass	Knot elongation	Shunt slippage	Cows tail elongation
1	3.43kN	Hit floor after more than 4.7m	10mm	4.7m still travelling	220mm
2	4.19kN	Hit floor after more than 4.7m	190mm	4.65 still travelling	310mm
3	3.46kN	0.71m	60mm	0.46m	190mm
4	3.63kN	Shunt detached from rope and mass hit floor	N/A	1metre down to knot before detaching	190mm
5	Impact not recorded	Shunt stopped before base of re-belay loop	Not recorded for this test	440mm	Not Recorded
6	2.42kN on opposite side of re-belay	Stopped in base of loop	Not recorded for this test as the knots on both sides of the re-belay share the loads.	1metre down into the base of the re-belay loop.	150mm
7	3.13kN	Stopped in base of loop	Not recorded for this test as the knots on both sides of the re-belay share the loads.	1metre down into the base of the re-belay loop	140mm
8	6.13kN	3.71m	Not Recorded	3.71m inc knot elongation	

Test 1

- New shunt
- New rope
- New cowstail.
- 200kg Mass
- Fall factor one

Summary; this test simulates a two person rescue where the main system fails and the back-up system is called into play. The Shunt is on a 1 metre cowstail in a fall factor 1 and is positioned at the top of the rope so that the rope provides the minimum stretch making the
No shunt damage, but mass travelled into floor still moving quite significantly.

Test 2

- Used shunt
- Used rope
- New cowstail
- 200kg Mass
- Fall Factor one

Summary; this test is as per test 1 but using components that had been used. The condition of the rope should have increased the friction, which it did. The knot was more difficult to tension due to the stiffer rope and so under load it elongated more as it tightened. The result was better than test 1, but the mass still did not stop before the floor, it was simply travelling slower before it hit!

Test 3

- Shunt from test 1
- New rope
- New cowstail
- 100kg Mass
- Fall Factor one

Summary; this test was just a standard test drop with a single person mass as a comparison to form a benchmark for the other results. The result is no different to many test carried out in the past and confirms that the other tests do not contain any major differences in test parameters or procedures.

Test 4

- Shunt from test 1 and 3,
- New rope
- New cowstail
- 200kg Mass
- Fall factor one
- Alpine Butterfly tied in the rope 1 metre below the Shunt

. Summary; The load came onto the shunt which then began to slide on the rope until it came to the knot. The Shunt then opened and detached from the rope. There was very little deformation in the Shunt, but when you compared both sides of the body more closely it was obvious which side was used in the test. There was no rope damage visible.

Test 5

- New shunt
- New rope
- New cowstail
- 100KG Mass
- Fall Factor one
- The Shunt was positioned 1 metre above the base of a rebelay loop

Summary; the shunt was able to stop before the base of the rebelay and therefore the test is really a replica of test 3.

Test 6

- Shunt from test 5
- Rope from test 5
- New cowstail
- 200KG Mass
- Fall Factor one
- The Shunt was positioned 1 metre above the base of a rebelay loop

Summary; The Shunt was unable to stop before the bottom of the rebelay loop. When it hit the bottom of the loop it arrested with the rope around the base of the pin, so no real load came onto the body. The Shunt remained on the rope, but deformed and there was no obvious rope damage.
The load cell was placed on the side of the loop returning up into the rebelay and not on the descent side. This would mean that it in theory recorded half of the load exerted when the Shunt hit the loop, but did not record the loads of the Shunt whilst it slipped down to the base of the loop.
Shunt deformed

Test 7

- New Shunt
- New Rope
- New cowstail
- 200KG Mass
- Fall Factor one
- The Shunt was positioned 1 metre above the base of a rebelay loop

Summary; This test was carried out to see if the way the Shunt came to rest with the rope under the pin was a one off or was more common. When setting up we did try to get the shunt to load so that it hung off the base of the loop from the body, but we failed.
The results were similar to test 6 in every way, suggesting that the shunt may always orientate this way.

Test 8

- New shunts X 2
- New rope
- New cowstails
- 200kg mass
- Cowstail one was 1 metre with a fall factor 1
- Cowstail two was 0.5 metre with a fall factor 2 (almost due to the shape of the mass)

Summary; The test was set up to see what would happen if during a rescue the casualties shunt was used as well as the rescuers. We rigged it so that they were both on the same rope, but were kept apart from each other. They were also set so that both shunts received approximately the same force and came under tension at the same time.
Both shunts came under load as illustrated by the high impact force. However as the lower once came under load and tensioned the rope the upper shunt detached from the rope. This was possibly aided by the reduction in diameter of the now loaded rope.
They did however stop the mass far more effectively than the examples in test 1 and 2.

Recommendations
Further testing is advisable and suggestions would be welcome for areas that may not have been addressed during these tests.
The height at which rescues are carried during training is important. Free space below for travel will be required.
Care must be taken near knots especially.
The rebelay test did not load the body side of the shunt, it wrapped under the pin, but were we lucky or is this always the case?
Should the knot passing rescue be removed from the assessment as being unrealistic and rare in normal work, but creating unnecessary risk?
Can we be inventive and create assessment situations that cover the technique, but remove the specific risk that some scenarios include?
Will using a mannequin be better as we will halve the risk, but we will still have 50%?

Finally
SpanSet would like to suggest that the testing is continued and that assessor's workshops are more practically based. In the future we recommend that workshops carry items from one to the next rather than being unrelated. This would allow debate to continue after a workshop and influence the agenda for next time as well as those who miss one being able to catch up next time.

Report prepared by P Ward
Date 25th April 2007

Attendees
Paul Ramsden – Paul Ramsden
Shaun Ainley – Vertical Access
Tim Allen – ind member
Marcus Masior – Ind member
Chris Fox – Pro rope services
Michael Brushneen - Talon
Pete Ward - SpanSet
Simon Mitchell - SpanSet

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Crolles, May 12th 2009

N. réf. :

V. réf. :

To whom it may concern

Re.: Petzl statement on a special use of the Shunt

The Shunt is designed as a back-up safety device for use in conjunction with a descender. It is primarily designed for use on double rope, but will operate on a single rope. In addition to its use as an abseil security device, it is also certified to EN567 as an ascender. Normally, Petzl recommends ASAP as the back-up device in rope access.

In specific situations, PETZL recognises that the Shunt is widely used in rope access as a back-up device mounted on a secondary single safety rope, attached to the user by a lanyard or cow's tail. Because of the need for special training, this use falls outside the scope of the general instructions issued with the Shunt. The required skills are the field of the professionally trained and qualified rope access operative. The way in which the Shunt operates allows the user to pull it down the rope without prior de-weighting (exactly like a prusik loop). This is a major advantage in normal use, but special training is required to ensure that this feature is not mis-applied in an emergency.

In specific situations, professional operatives may choose to use the Shunt as a rope-access and work positioning back-up safety device **if they have received and mastered IRATA training**. Responsibility for such use remains with the employer and the user.

We remind you also that in this application SHUNT is not covered by EN 353-2 and EN 12841 standards. For your information, the instructions for use are also available on our web site.

Yours faithfully,

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Crolles, May 25th 2009

To whom it may concern

N. réf. :

V. réf. :

Re. : Petzl statement on continued use of the Petzl SHUNT (B03) in professional rope access work

The Shunt was designed as a back-up safety device for use in conjunction with a descender. It was primarily designed for use on double rope, but will operate on a single EN1891 low stretch rope. In addition to its use as an abseil security device, it was also certified to EN567 as an ascender.

PETZL has recognised that the Shunt is widely used in rope access as a back-up device mounted on a secondary single safety rope, attached to the user by a dynamic lanyard or 'cow's tail'. Because of the need for special training, this use falls outside the scope of the general instructions issued with the Shunt. The required skills are the field of the professionally trained and qualified rope access operative. The way in which the Shunt operates allows the user to pull it down the rope without prior de-weighting, similar to a prusik loop. This is a major advantage in normal use, but special training is required to ensure that this feature is not mis-applied in an emergency.

The use of the Shunt as a back-up device for loads greater than one person requires careful consideration. Other devices are currently available which are more suited to this task.

Professional operatives who choose to use the Shunt as a rope-access and work positioning back-up device must have received, and mastered, appropriate training. Responsibility for this remains with the employer and the user.

In 2005 Petzl introduced the ASAP mobile fall arrester for use on a single EN1891 low stretch rope. This device is appropriate in many rope access situations, including 2 person rescue, and is type approved to EN353-2 and EN12841 type A.

Yours faithfully

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