Main-Line (HIGHLINE) Failure- Vivian Quarry Saturday 7th March 2015

Following this dramatic event here is a few conclusions we came to of highlining in the Slate Quarries and a reminder of good rigging procedures. Below is details and a review of the highline failure and reasoning behind these conclusions.
No doubt many of you already follow these principles, but some may appreciate a little reminder following this incident!!

-NEVER USE SLATE A-FRAMES (even when padded) use a proven A-frame if needed or raise with a bouldering pad
-A ROPE BACK UP IS MUCH SAFER
- TRY TO EXTEND ANCHORS OVER THE EDGE (spansets and rope are much more durable than webbing)
-MAKE SURE LINES ARE SUFFICIENTLY PADDED (tree pro is not sufficient padding)
-IF YOU SEE A LINE YOU ARE NOT HAPPY WITH, MENTION IT AND CHANGE IT (do not just stand by as you may regret it)

Details:
This weekend just gone there was a mainline failure on the 25 meter (beginner) highline at the Vivian Quarry Rig Off. It was rigged with EQB Element threaded with EQB Bounce, and a static rope as a back up. This line had been walked on and whipped on a number of times before the mainline failed. Laura was walking along the line when she fell and caught the line, then the line failed and she fell onto the back-up rope.

The conclusion we came to is that as the line absorbed her fall it must have moved a considerable amount on the A-Frame, before rubbing/ passing over a sharp edge and cutting through both the outer and inner webbing. The line was ocasionally observed to move entirely off the A-frame during a leash fall, which supports this. Furthermore the rope had magically moved underneath the A-frame at somepoint during the mainline failure (despite the A-frame still being in good condition) (see photo's below).
Not only did the back-up rope not fail, but there is very little visible damage to be found. The only visible damage identified is a little bit of extra fluffing on the outer rope sheath (see the pictures below).
Both the webbing and the rope back-up were extended about 7m from the tree line to the quarry edge over an A-frame. As you can see in the photo's (below) the A-frame was padded with carpet

(though not sufficiently enough) and the line had some tree pro wrapped around it, a good meter before and after the A-frame, and also at the edge of the cliff. I personally checked the padding no more than 15 minutes before this happened and after it had taken the majority of the leash falls. There was no sign of any wear or damage then.

Slate A-frame used.

Rope beneath the A-frame

Severed parts of webbing

Damage done to the rope

<u>How to avoid this happening a second time:</u>

After a long discussion we came to a few conclusions that should stop this from happening a second time. The first one is that A-frames made out of slate should never be used at all in highline rigs. The razor sharp nature of slate combined with the extensive movement of the line on an A-frame during a fall, makes it very unsuitable for this purpose. The same goes for A-frames made out of other rocks and branches. These are generally uneven and as seen here the line can move off these structures before getting abraded. Boundering mats should not be put on top of either of the above mentioned styles of A-frames, as they were also observed to move off these structures during a fall. You can however use them on their own to lift the line up slightly and cover the edge of the cliff if placed correctly. If you do need to raise it higher, use a well constructed A-frame, of a proven design which allows very little movement of the line on the A-frame. Also make sure the A-frame is strong enough and does not move itself.

A great quote from the weekend is that 'rigging on slate is like rigging on knives' and its something

that should be remembered when padding lines.
Tree pro is not sufficient padding for edge protection on highlines and should not be used for this purpose. Generally it is only made out felt which is not very durable. Thick pieces carpet, fire hose or padded bags can be much better and bouldering pads even more so. Tree pro is still needed if you are slinging trees with spansets or rope though.
As there was no visible damage to tree pro, the conclusion we came to is that the tree pro separated in various places allowing the rock to reach the webbing and sever it. This can also emphasize the need to check anchor points and padding regularly, especially if they have had many people whip on them.

Also in a situation like this a rope back-up is highly recommended as it is much more durable than webbing. The damage done to the rope can hardly be seen, especially when compared to the damage done to the webbing (see photo's above). I believe this can attributed to the outer sheath of the rope being more durable. The outer sheath of the rope also protects the inner core, which holds most of the strength of the rope. Both pieces of webbing look like they got cut simutanously, before continuing to unravel themselves. Had this been rigged using double webbing (as was originally planned) one of us might not be here right now. It is also worth considering the tension of the back-up, had this been under a higher tension then we may have seen more damage done to the rope (some tension was removed from the rope before it was first walked, compared to what was originally put in).

Another point to consider is that anchors should generally be extended just over the edge if possible, if not as close to the edge as you can get them. Spansets and ropes are a lot more durable than webbing, and there is a lot more to go wrong with multiple anchor legs than a single piece of webbing and a back-up line. So if possible try to extend them rather than the webbing. Another advantage to having the master point over the edge is that if you are equalising from two places that are not really close together you will have an angle, this will stop the master point from being able to move laterally anywhere near as much. Moving the masterpoint forwards can also reduce the angle, obviously if the angle is too high then vector forces are an issue.

Finally one important lesson I think many of us there have learnt; if you are not happy with the rig of the highline, or question a part of it, then mention it to the riggers or change the rig yourself. It is much better to irritate someone/ people than to keep quiet and regret it later.

Oh and please try to test your anchors before using them. One very skinny tree was almost fully pulled out of the ground in this rig. If you wouldn't rig a slackline off it, don't use it in a highline system.

Lets all take something positive from this lucky event and rig safe and happy.

Peace and love