Rope Grooving and SQWUREL Retirement

As the Sqwurel gets used, rope grooves may begin to develop as the rope sliding through the Sqwurel will slowly grind its way deeper and deeper into the surface of the device at the contact / wear zones. Wet and sandy ropes will greatly speed up the rope grooving process. This rope grooving is normal and common to all rappel devices where rope slides over stationary aluminum contact / wear zones. As rope grooves become deeper, the device becomes weaker. If the rope grooves are allowed to become too deep, the device will eventually fail. To remain safe the Sqwurel should be retired well before the grooves are deep enough to cause a failure.

When looking at the rope grooves on your Sqwurel the question is, how deep is too deep? How deep can the rope grooves get before I must retire my Sqwurel? The answer to this question will evolve over time as the Sqwurel sees more use in the real world. This page will be updated periodically as the answer to this question evolves. Feel free to check back to see if the answer has changed and why.

Rope Groove Depth and Sqwurel Retirement

Current Recommendation:
Retire your Sqwurel when any part of the device is worn 33% (one third) of the way through with 66% (two thirds) remaining intact. Do not continue to use your Sqwurel if any part of the device is worn beyond the above stated depth.

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The Sqwurel is just about ready for release and a standard needs to be set for people to follow. Unfortunately this cannot be done with real world testing, since there are no fully worn out Sqwurels running around. Prototypes with a design very close to the final Sqwurel design have been used and worn down well beyond the 50% point and have continued to function safely. However the prototypes are slightly different than the final Sqwurel and no physical testing has yet been performed on the used prototypes. Physical testing will be performed in the future with the intent of updating the recommendation. With safety being a primary concern, BG-Gear will initially set a conservative standard for Sqwurel retirement as a result of rope grooves. Retire your Sqwurel when any part of the device is worn 33% (one third) of the way through with 66% (two thirds) remaining intact.

Physical Testing

The first thought was to use the UIAA 129 testing standard that relates to rappel devices like the Sqwurel. After looking over the UIAA 129 testing standard, it was determined that the standard is configured to determine if a new device can be safely used, but will not provide useful insight about the integrity of a well worn rappel device.

The next thought was to do tensile testing by pulling the Sqwurel apart in a hydraulic press and note the weak points. Unfortunately this tensile test will not provide useful insight about when to retire the Sqwurel. The problem here is that no part of the Sqwurel will experience a tensile load when used properly (with the rope clipped into the carabiner). During proper use, the Sqwurel will experience torsional or compressive stress but not tensile.

So how can the Sqwurel be tested to find the weak points? For testing to be meaningful, the test needs to be configured to simulate how the Sqwurel will be used in the real world. With the Sqwurel rigged for use, there are 3 points where forces are applied; the rope coming into the top of the throat from the anchor, the carabiner hole and the brake strand of rope exiting the Sqwurel. During rappel or belay a stopping force is applied to the brake strand of rope to provide stopping force. If no force is applied to the break strand, the Sqwurel will slide along the rope relatively easy applying very low forces to the Sqwurel. To simulate real world use where the Sqwurel can be subjected to large forces the break strand needs to be locked off.

With the above in mind, the test will be set up as follows. The Sqwurel will be rigged with rope set ready to rappel. The brake strand will be locked off with the hard lock off method as described in the instructions. The rope exiting out the top of the throat will be tied off to a fixed anchor. Then the carabiner in the carabiner hole will be pulled away from the fixed anchor and the system tensioned.

No physical testing has yet been performed. These are quick thoughts about the direction the testing will go. Stay tuned to see how the details of this change and what results are obtained.