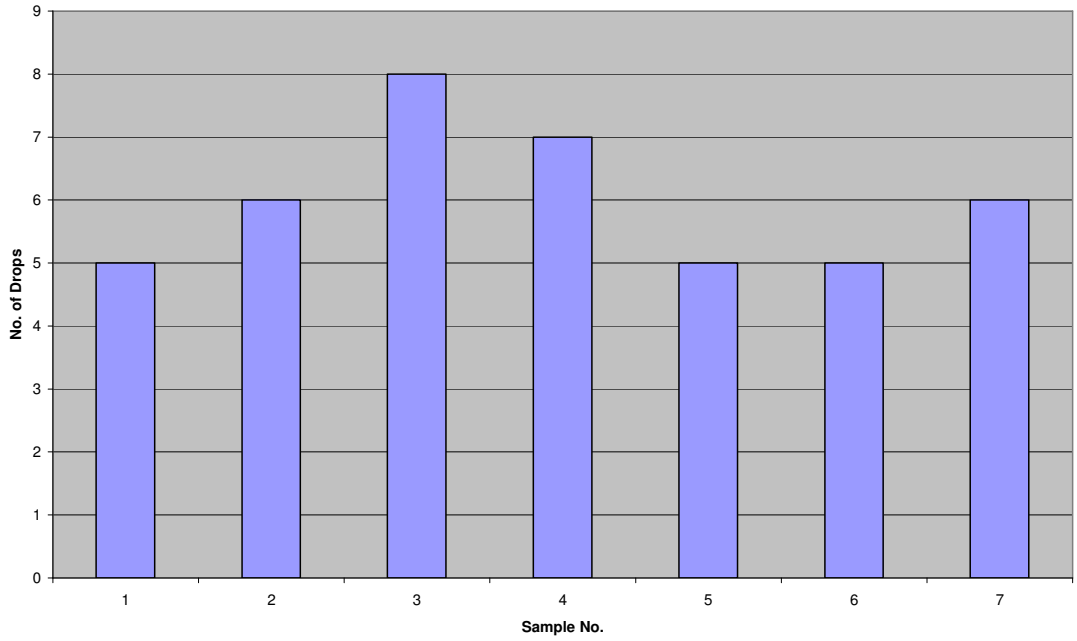
How many drops should your rope survive? - Some Early Results from NCA's Long Term Rope Test

If you ask around, many cavers will say that an SRT rope is good for further use if it survived 2 drops on the NCA's Rope Test Rig. However, the British Standard specifies that the rope, when new, should survive at least 5 drops. Some years ago, NCA purchased a long length of rope to conduct some test on the effect of usage. This length of rope was divided up into seven pieces each of around 30 metre long. Samples for testing were taken from each of these seven pieces for immediate testing. The seven pieces were then loaned to a number of clubs who were to use the rope for a specific number of usages before returning it for drop testing.

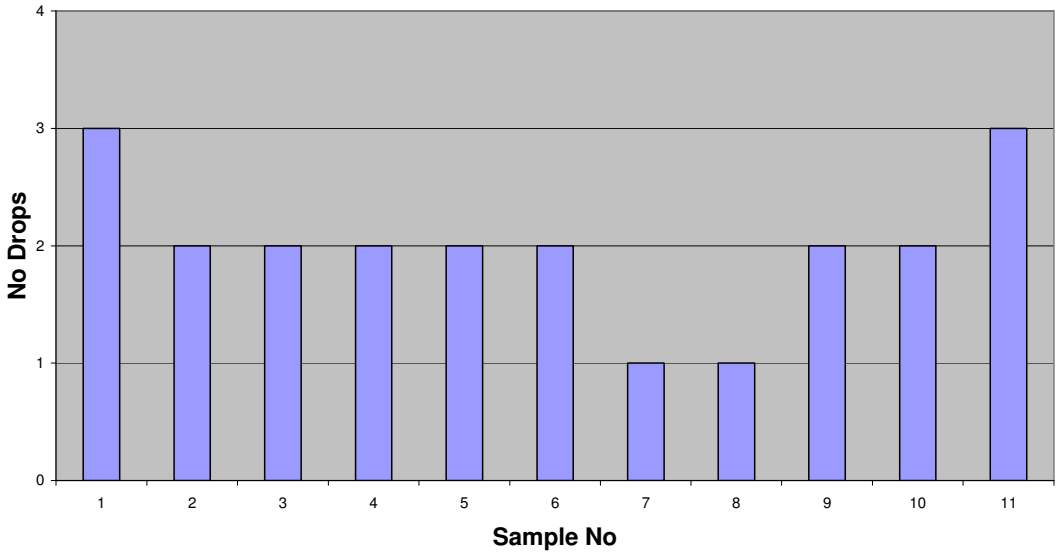
The first results from this work come from the drop tests on the seven samples of the new, unused rope.



Graph 1 - Showing the number of drops survived which the 7 samples taken from the same piece of new manufacture rope

The number of drops survived by these seven samples was between 5 and 8 drops. Whilst the average number of drops survived was 6, the standard deviation which is a measure of reproducibility, was 1 drop. That is, the minimum number of drops which the rope sample could survive at the 99% confidence level was only three!

Tests on one of the returned pieces of ropes have shown moderate variability along its length.



Graph 2 - Showing the number of drops survived by samples of rope taken in sequence from a single 30 m piece of used rope

Whilst the two end samples survived 3 drops, seven of the rope samples only survived 2 drops whilst two samples only survived 1 drop. This variability of between 3 and 1 drops survived is thought to be indicative of the difference of the impact of using the rope along its length.

This brings into question the old advice that surviving two drops was sufficient to continue to use the rope. NCA dropped giving this advice some while ago, on the basis of a warning about the potential liability that might arise. It should be noted that although the NCA test procedure uses different Fall Factors, this is thought to not be relevant to this topic. Further work is required to provide sufficient information for a proper statistical review. The new data indicates that the potential variability of rope is such, that the level of confidence in a result of a rope surviving two drops is beneath that which cavers should be relying on.

The effort of Owen Clark who carried the drop tests on the new rope is acknowledged.

Bob Mehew

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NB this document was written before NCA was taken over by BCA.