

## Simpson Pot anchors signs of wear

On 14<sup>th</sup> October 2024 two anchors were removed and replaced. One from pitch before Storm Pot and one from the pitch after. Neither are long pitches. Unfortunately, the callipers we had taken to use in-situ didn't work. Both anchors were removed due to signs of excess wear on the inside curvature of the anchor.

Anchors extracted by drilling down the side of anchor roughly parallel with the anchor legs. Then the extractor is used to pull the anchor out of the resin. Some marks are made on the anchors by the extraction process. These are shown in Figures 1-4. There are two types of extraction marks, drill marks (A) and puller marks (B). Both anchors show slight distortion of the head due to extraction. Figure 10 and 11 (see appendix) show heavily distorted anchor head and largely undistorted head for comparison, the first was not drilled out and the second was (both DMM anchors are from unrelated work).

Photos refer to the anchor as left and right as the user would look at them when they are in the rock. The leg of the anchors are referred to as long and short. The likely installation date is July 1992, 32 years of use. Heads were not notched, that is where the lower part of the P is embedded into the rock to stop the anchor twisting.

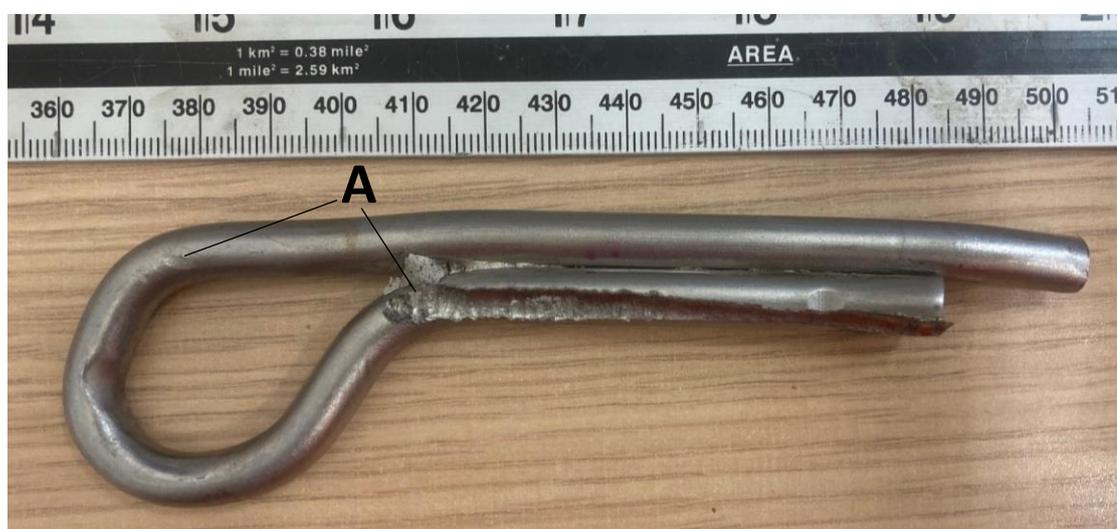


Figure 1 DMM 98A Right side view note drill marking down leg of anchor, 405-485mm.



Figure 2 DMM 98A Left side view. Note drill marking at the end of the leg 395-360mm

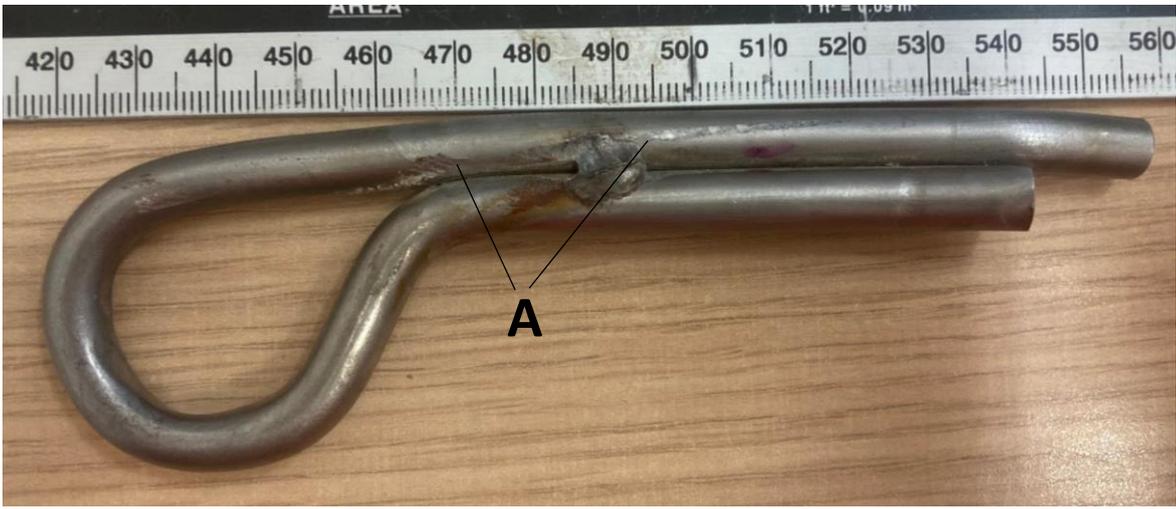


Figure 3 DMM A92 right side view. Drill marking 430, 465, 480-510mm,

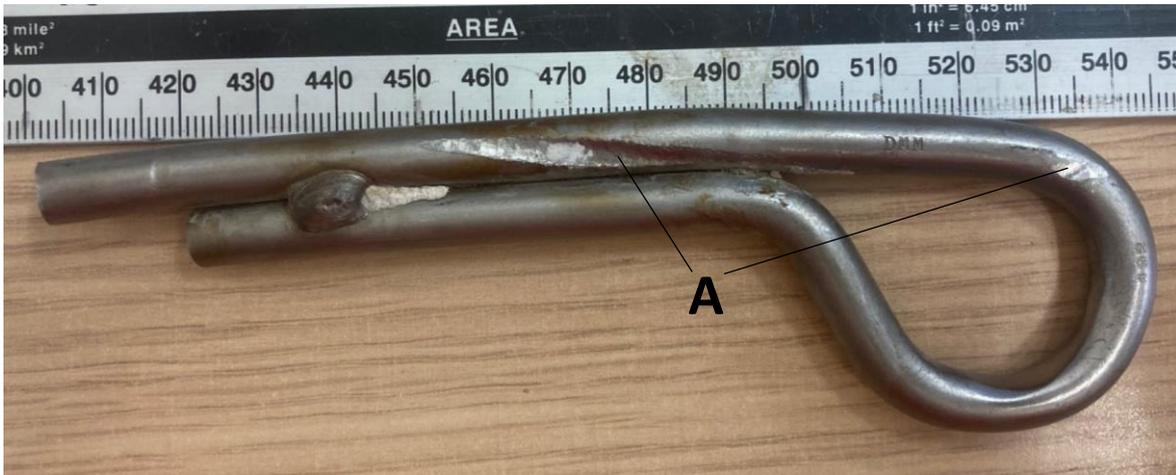


Figure 4 DMM A92 left side Drill marking 535, 500-450mm.

Figure 1 and 2 show drill marking on left and right side and some wear on the inner curvature of the anchor. Figure 1 shows groove on the inner curvature. Slight polish and flattend area of the round bar shown in figure 2.

Figure 3 and 4 again have drill markings. Wear isn't as clear until looking at Figure 4 where there is a flatter area.

Wear of the inside curvature of the anchor.

Figure 5 and 6 show the inside curvature of DMM 98A. There was a partner anchor, that would be used to form a Y hang in the opposite wall to this anchor.

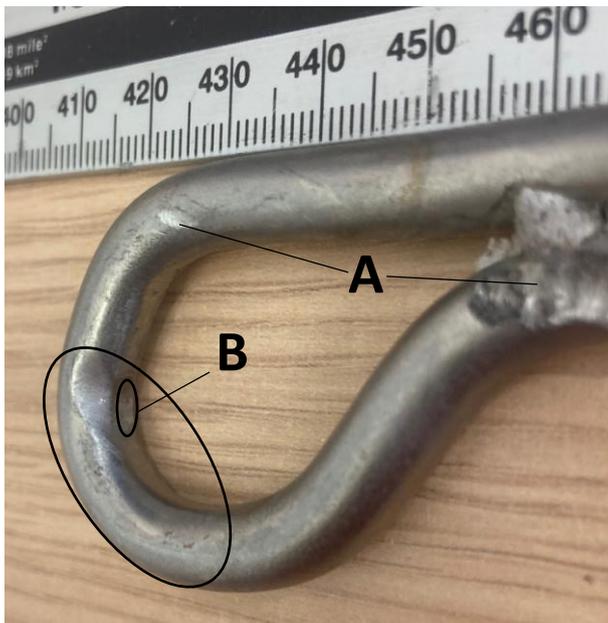


Figure 5 DMM 98A right inside curvature, Note B is only the small highlighted section, the rest of the groove is wear.

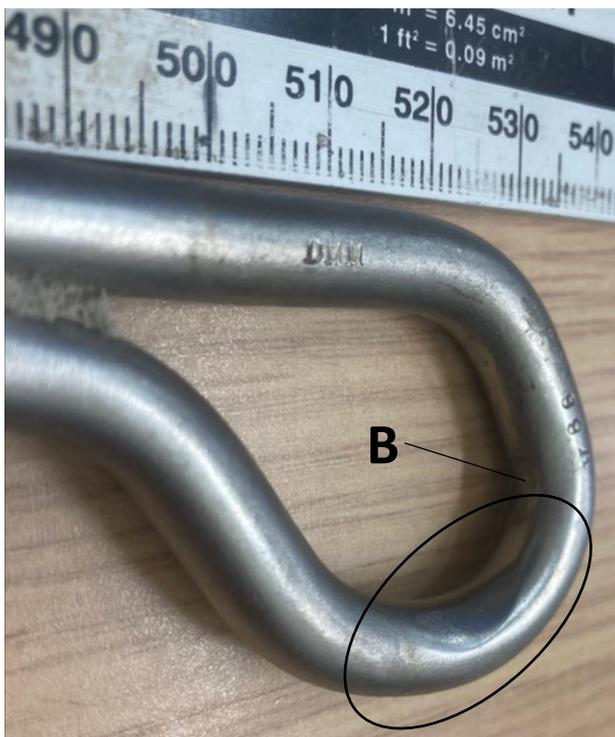


Figure 6 DMM 98A left inside curvature.

Using Hamilton digital callipers an average diameter along the length of the undamaged leg was 7.85mm. The minimum diameter measured in the region of wear was 7.28mm. Giving a reduction in diameter of 7.3%.

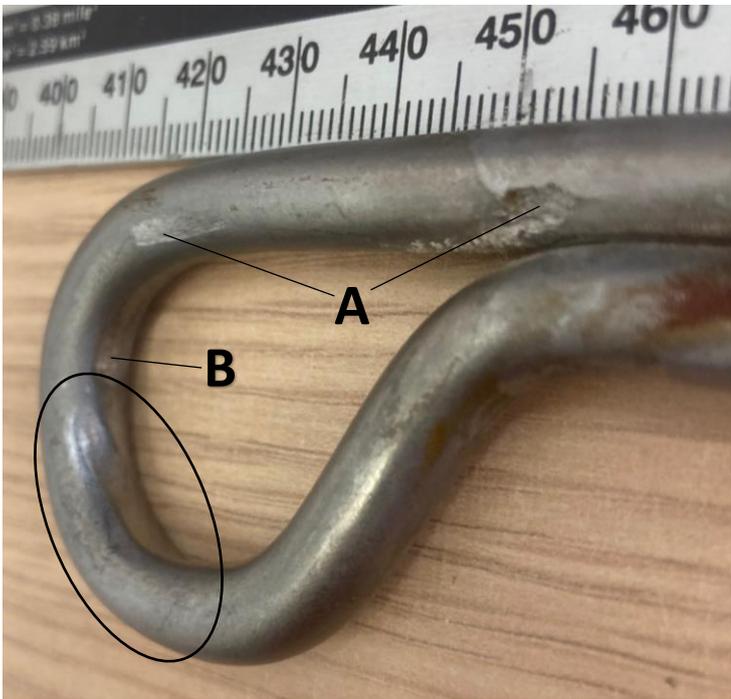


Figure 7 DMM A92 right inside curvature.

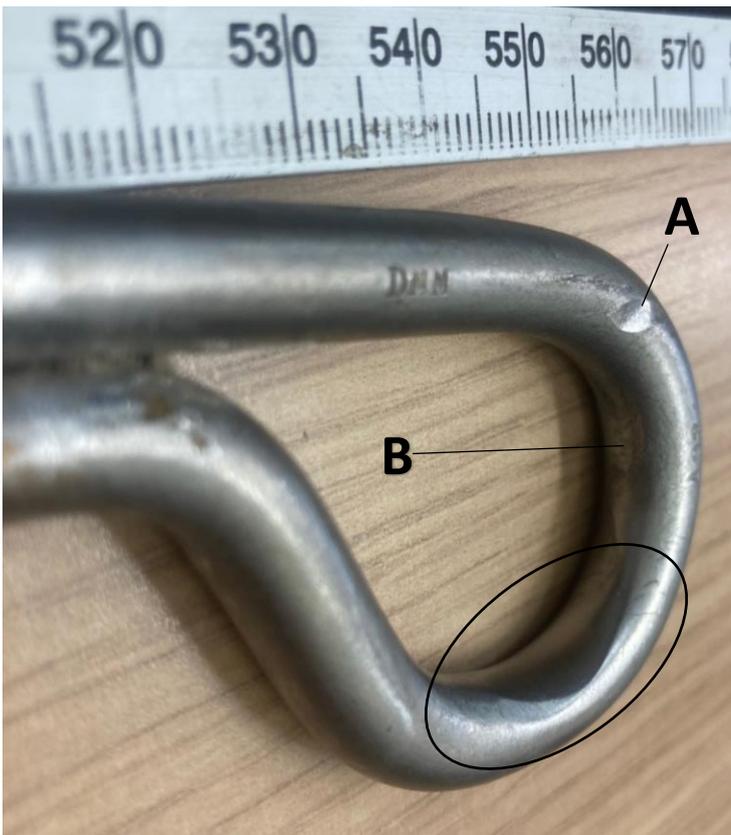


Figure 8 DMM A92 left inside curvature.

The same method was used on DMM A92 to determine the average diameter of 7.79mm. The minimum diameter measured in the region of wear was 6.74mm. Giving a reduction in diameter of 13.5%.



Figure 9 DMM 98A with 6mm cord laid into the grooves in the inner curvature of the anchor.

Figure 9 shows anchor with cord laid into the grooves in the anchor. This is consistent with the anchor being paired with its Y hang partner on the opposite wall, in a pull through situation. It is not as easy to determine the rope configuration on anchor A92, but this anchor clearly has had a greater degree of wear due to the larger reduction in diameter.

### Conclusions

Anchors used for pull through are subject to wear. After 32 year a significant reduction in the diameter of an anchor can occur, in this case measured at 7.3 and 13.5%. This is an extremely small sample set and the anchors on Slit Pot are likely to be the most useful in understanding the wear on anchors. In both cases anchors were removed and replaced with IC anchors into the same hole.

### Appendix



Figure 10 DMM Anchor with distorted head due to extraction, without drilling.



Figure 11 DMM anchor without much distortion of head but lots of drill damage.