

Simpson Pot Slit Pot anchors signs of wear

On 29th October 2024 five anchors were removed and four replaced. There were five anchors on Slit Pot, three high on the left, two before the squeeze and one after and a further two lower anchors that formed a Y hang immediately beyond the squeeze. The two lower anchors appeared to have been pulled tested at some point as both were slightly proud of their holes with the resin. There is significant signs of wear of these two anchors and the other three all had slight rotation, within their holes. None of these anchors had notched holes.

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 1-6. There are two types of extraction marks, drill marks (A) and puller marks (B). The first three left anchors extracted don't show distortion of the head due to extraction. It was noted in drilling down the sides of two of three of these anchors that there was a jump/drop in the drill bit experienced by both installers, believed to be cavity in the resin, other explanations can't be excluded. None of these three anchors show distortion of the head, also no significant wear on the internal curvature of the anchors, most likely due to no being used for pull through and more to aid passing the squeeze.

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. Diameters were measured with Hamilton digital callipers. All anchors appear stamped DMM A92, thus are coded W, Y, Z, X and XX



Figure 1 Anchor W Left side view note drill marking down leg of anchor, 420-425mm and 450-500mm.



Figure 2 Anchor W Right side view note drill marking down leg of anchor, 470-540mm and second drilling 420 then again 460-520mm.



Figure 3 Anchor Y Left side view note drill marking down leg of anchor, 420-500mm and 530-535mm.



Figure 4 Anchor Y Right side view note drill marking down leg of anchor, 490-510mm.



Figure 5 Anchor Z Left side view note drill marking down leg of anchor, 445-485mm.



Figure 6 Anchor Z Right side view note drill marking down leg of anchor, 480-490mm at weld.

Slit Pot Pull through anchors

Both anchors show distortion of the head due to extraction. Figure 7 to 12 show heavily distorted anchor head and more pronounced when compared to figure 1 to 6. Both anchors were drilled to remove resin and appeared to have been subjected to a pull test as some stage as the resin was slightly proud (several mm) of their holes. Unhelpfully both are stamped DMM A92. Figure 7 and 8 show anchor X. Figure 9 and 10 show anchor XX.



Figure 7 Anchor X Left side view note drill marking down leg of anchor, 475-495mm. Note also the brown staining on the legs for the anchor.



Figure 8 Anchor X Right side view note drill marking down leg of anchor, 510-535mm.



Figure 9 Anchor XX Left side view note drill marking down leg of anchor, 495-520mm.



Figure 10 Anchor XX Right side view note drill marking down leg of anchor, 510-520mm.

Wear of the inside curvature of the anchor.

Figures 11-14 show the left and right side of the two anchors that form a pair used to create a Y hang or a pull through just beyond the squeeze at slit pot. Note both anchors can be reached without the use of the anchors higher up on the left. Both anchor were about the same height.

Figure 11 and 12 show deep grooves on the inside curvature of the anchor X, grooves in both sides (opposite threading of the rope) have lead to the formation of a ridge in the middle. Minimum diameter 6.70mm. Average diameter of legs 7.76mm. Giving an 11.5% reduction in diameter.

Figure 13 and 14 show deep grooves on the inside curvature of the anchor XX, grooves in both sides (opposite threading of the rope) have lead to the formation of a ridge in the middle. Minimum diameter 6.87mm. Average diameter of legs 7.78mm. Giving an 13.9% reduction in diameter. The groove/wear mark on the inside up the front of this anchor suggests that it was in fact slightly lower than anchor X.

Based on information from DMM both these anchors are below the recommended limit of use at 10% of nominal diameter (8mm) therefore 7.2mm is the minimum diameter that they should be used at (personal comms I. Walker). Even using the measured average diameter rather than the nominal value the 10% wear would be 6.99 and 7.01mm respectively. Both anchors have minimum diameters below these values.

The iron staining present on these anchors is superficial. The source isn't clear but the weld, impurities adhering to the anchors from production or even a source within the cave are possible.

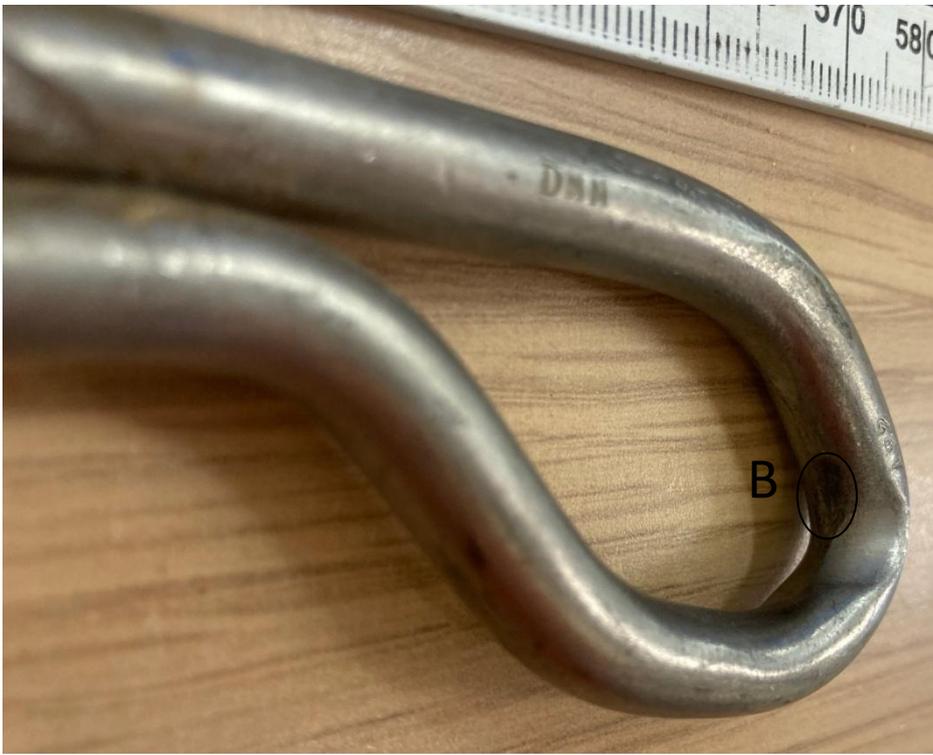


Figure 11 Anchor X Left side view, note small flattening of ridge in the inside curvature by the puller, deep grooves are worn into the anchor.



Figure 12 Anchor X Right side view, note small flattening of ridge in the inside curvature by the puller, deep grooves are worn into the anchor.



Figure 13 Anchor XX Right side view.

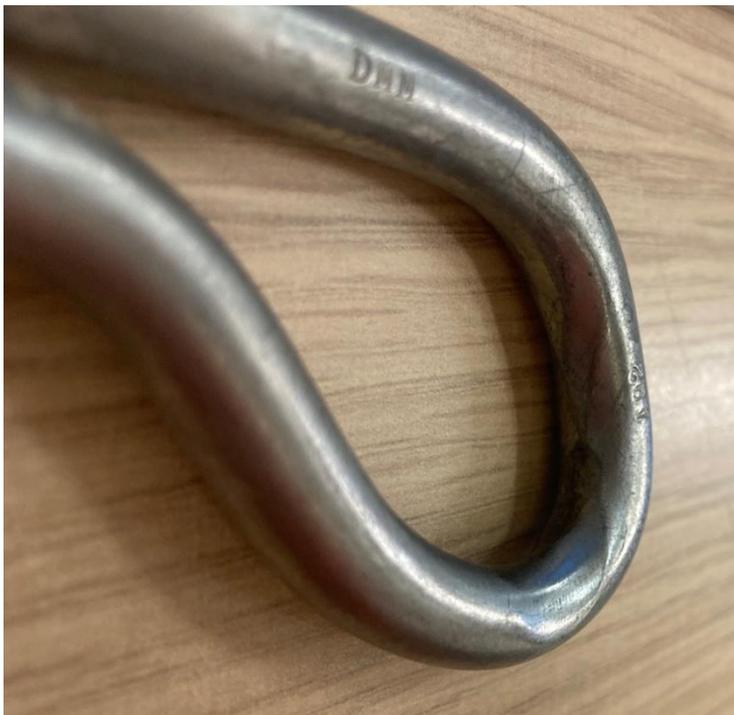


Figure 14 Anchor XX Left side view.

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 11.5 and 13.9%. These add to the previous but still tiny data set. It is difficult to draw conclusions other than anchors wear out. The length of the pitch doesn't appear to significantly increase the wear however this is a pair of anchors on the same pitch whereas before wear had only been noticed as a concern on one anchor at a pitch head.