

# APA Frame Welding Issues

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# Ash River Installation Prototyping



# Primary Issue

- Recently, we had been investigating some small differences in APA frame welding procedures in the US and UK
- As part of this investigation, the original calculations done to verify the strength of the frame welds were re-visited
- It was noticed that for four particular welds on the frame, the original calculation was based on a four-sided weld whereas the frame drawing specified a three-layer weld plus stitch welds on the fourth side

# Primary Issue (cont.)

- When we re-did the calculations for these four welds, utilization ratios above one were found for several load cases
- However, because the original calculations gave utilization ratios well below one several conservative assumptions had been applied
- We now have two new sets of independent calculations for these welds indicating that the utilization ratios are below one for all of the load cases

# Additional Issue

- As part of this investigation, it was noticed that the quality of the stitch welds on the fourth side of the frame had not been performed consistently
- In particular, the thickness of these welds on some frames did not meet the drawing specifications
- To make sure that this is not an issue for us, we re-did the new calculations assuming complete removal of the stitch welds on the fourth side of the frame
- Even in this extreme case, we still obtain utilization ratios below one (albeit with smaller margins)

# Next Steps

- Since these welds have utilization ratios closer to the limits than expected, we want to check to make sure that there are no other hidden issues
- We plan to x-ray all welds on the two APA frames that we have been using to conduct installation prototyping activities at Ash River
- The goal will be to evaluate the “hidden” chamfer welds made on the other three sides of the APA frame

# APA Testing at CERN

- Based on updated calculations, we have received permission to resume manipulations of APAs in the NP04 clean room
- We need to arrange for APA testing to get back underway after the start of the New Year
- First step is to get team from Daresbury to CERN to repair broken wire