



WILLIAM & MARY  
CHARTERED 1693

# Update on restarting the tooth strip attachment at W&M

Nelson, Dar  
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# outline

- Current status
- Actions taken to restart the process
- Next steps



# Procedures

- After the procedures reviews, Anthony delivered revised procedures on Friday of the collaboration meeting
  - We are working on adding our local version of the epoxy loading, strip trimming, and cleaning
  - Delivery of draft for comment this week
- Last week, we prepared a new video of our implementation based on the new UK procedure document
  - This will be circulated to Anthony for he and his team to review for suggestions
  - Then a follow-on virtual site visit session with Anthony to show the way whole process

## Status

- Step of adding tooth strips is on a production work stop
  - Recent issues include excess epoxy remaining on boards
  - Adhesion of older strips to boards (before Sept-23)
- We are implementing the revised UK procedures
  - Following on from the procedure review sessions, we made some demonstration boards, including 2 during Brian's site visit

# Addressing issues – revised procedures

- The revised UK procedure has two things we were not aware of
  - Adding extra epoxy to the ends of the strips beyond the weight specifications
  - Using a brush on a Dremel tool to remove stray epoxy on, for example, the strips
- Both of these are crucial for solving the issues we'd been having

# Addressing issues - Epoxy loading

- The loose strips in early production had the correct epoxy loading, but didn't have enough epoxy to near the ends
  - Initially we address the adhesion issues by added more epoxy uniformly along the strips
    - This lead excessive squeeze out
  - UC's observed that boards with adhesion issues had voids on the ends, which is consistent with the UK's solution manually adding loading the board ends
  - Our revised procedure reverts to the original loaded (with a back-n-forth slide) and extra loaded on the ends
- Remediating the older boards that were processed in between June 2023 to Sept 2023
  - Boards having adhesions problems at least in part due epoxy loading near the ends of the ends of the strips
  - All the boards that had loose tooth strip belong to this period of processing
  - Idea is to test each of them and load extra epoxy on the ends to remediate them
- During the DUNE meeting, visited Chicago, and carried some boards for show-n-tell
  - Some boards assembled with the revised procedures
  - Some remediated boards (boards from June 2023)
  - Chicago tested those boards in our presence and approved them

# Addressing issues – excess epoxy

- The revised procedure (reverting to less overall loading) naturally reduces the amount of squeeze out and reduced this problem
  - Often the issues that remain are from getting epoxy on one's gloves
- Epoxy on tooth strips
  - Dremel tool was tested on a few boards where the strips that had visible epoxy on tooth strip; it worked nicely
  - We will check all boards for any epoxy on tooth strips and remove it when possible
- Some boards surfaces in this “excess loading” era have a thin layer of epoxy that was left during the cleaning process
  - In general this isn't a dimensional issue
  - Concern is the epoxy on the pads might impact solder (strength or conductivity)
  - Dremel cleaning the surface of the board is not a good idea; could consider it on the pads
  - Not planning to send boards with visible epoxy on pads – is there a good criterion?

# Actions

- Currently, preparing some boards to be sent to UK for QC testing there
  - Will include the V boards as the replacement for the shipment that was sent to Chicago from UK directly
  - Plan is to send at least 30-40 boards
- Documents in progress to discuss the issues that occurred during the early production that led to work stop
  - This will include the issues based on the timeline and the actions that were taken to address it
  - Once ready, will send it around to the consortium for the approval
- The action plan for restart includes
  - Approved revised joint US/UK procedures
  - Process review by Anthony (and report)
  - After-action documents
  - UK QC report on new example boards
- Once we get the approval from the consortium, we will resume production restart



# Production status/schedule

- Given we get the approval, we should be able to process one complete APA is two weeks
- UK sent a shipment that includes the boards we require for the critical path
  - With this shipment, the current inventory will be sufficient for at least two more APA's
- All the boards that were sent to Chicago are coming back to us this week
  - Document issues to confirm the timeline documents
  - We will test and remediate as possible
  - Will complete an inventory based on the results of those tests
- A new student tech (Erin) was onboarded last week