

**Notes from Prelim. Detailed Design Review**

- ❖ Look into dial probes for the mechanical response time for the deflection, which means our values could be more than we thought
- ❖ Would think we need a sensor with a better response time for gathering data
- ❖ Sound overpressure not high, so what could be causing the damage?
- ❖ As of right now, we do not know but something is definitely affecting and flexing the window
- ❖ Probe was located in the bottom corner and in the center of the pane, should consider adding a diagram of this for clarity on the EDGE page
- ❖ Lam: How close to the edge & is the sash moving to determine if movement is all just glass or part of the sash moving
- ❖ Juilee: drawing would be helpful for sensor placement on windows, add to EDGE page for different test locations
- ❖ Borkholder: have we looked into blast wind? Won't think it'll be over super sonic but high explosive / construction for the blast wind may cause damage would be a pressure in a building
- ❖ Borkholder: unsure how to measure that from here, guess is the shock front is too small to matter
- ❖ Juilee: What are we doing for the plaster damage
  - Qualitative results from the pictures taken at the first location
- ❖ Borkholder: will run conwep software of a powder charge at a specified distance to get a rough idea / baseline
  - Unlikely for us to get access to it and will need to ask Stephen for modern glass test with conwep at specific charge and for distances we tested at
- ❖ Lam: could be movement of the air causing the deflection or the really slow sound wave
- ❖ Lam: sensors & frequencies, magnitudes of low frequencies being too large
- ❖ Need to know all the specs & limits of all our sensors
- ❖ Eztech only had an A and C rating for the frequency
  - Would say C would be better for the next test that we conduct lol
- ❖ Acoustics vs vibrations
  - Lam: transmissibility curve & normalizing at a distance away from the cannon, however need the frequencies in order to tell
  - Need to look into acoustic or vibration book for transmissibility then plot over frequency plot
- ❖ Hope to see the frequency & have the highest deflection rating
- ❖ Glazing falls out of accelerates other maintenance issues of the windows
- ❖ Sash & pane flexibility allows survival for items moving forward, is this something that we can measure or check for?
- ❖ Lam: think it's a long low frequency wave, that is her gut reaction to this problem
- ❖ Everything moving slightly, table & probes & windows from the test
- ❖ Lam: if done again, borrow accelerometers from the vibrations lab to test the sash / panes movement

- It can go on the low end to get a constant signal and to also get acceleration & deflection of the window
- Accelerometer can be put on the window and on the frame, can overlap collected data & get continuous measurement or a trigger for the deflection
- Recommend that we talk to Prof. Gomes about this cause he is the Vibrations Lab person to talk to and we could reach out to PCB company in Buffalo
- When attaching accelerometers, use wax instead of glue because it will cause less interference
- These sensors would be better than a mechanical solution
- PCB would have out of spec accelerometers, but would be more than enough to help us with our project
- ❖ Need to reach out to PCB for future testing / questions
- ❖ Won't need a triaxial accelerometer, want to sync the pane in future tests
  - Need an indicator on the sash or pane moving and if they move in sync with each other
- ❖ Lam: Gut feeling is a low pressure sound wave, which would have the largest magnitude & is what you end up feeling
- ❖ Peter: observation from our presentation is that the focus has been on windows, have not addressed the concerns to plaster
  - Land office would have plaster concerns
  - Rochester hour and orchard house too
  - Only location 1 has the biggest concerns for plaster damage
- ❖ Brian: find a way to measure frequency
  - Got input from Reynolds for placement of guns in various locations, they do want to be in the village for the civil war reenactment
  - Repeated testing for fatigue
  - In April, team will have a month to get another test so have everything nailed down
  - Confederates have 1 or 2 similar concerns
- ❖ Will not have overlap of multiple cannons in a location
- ❖ Cannones won't move during the siege and the fire / move of troops will mimic the sieging of the village towards the village square
- ❖ 140th infantry - local reenactment group for potential events to record / look into

***Action Items After Prelim. Detailed Design Review***

- 1) Finish going through data collected from the high speed camera
- 2) Review photos from test day for potential plaster damage
- 3) Prepare and propose designs for testing window sashes
- 4) Review notes & prepare for the Detailed Design Review (final review of MSD for the semester)