

WEEK 1 (BATCH 3)

RECOVERY TEAM REPORT

WEEK OBJECTIVES

- Finalize on piston test system.
- Conduct test.
- Antenna Fabrication

PISTON TEST

PISTON TEST

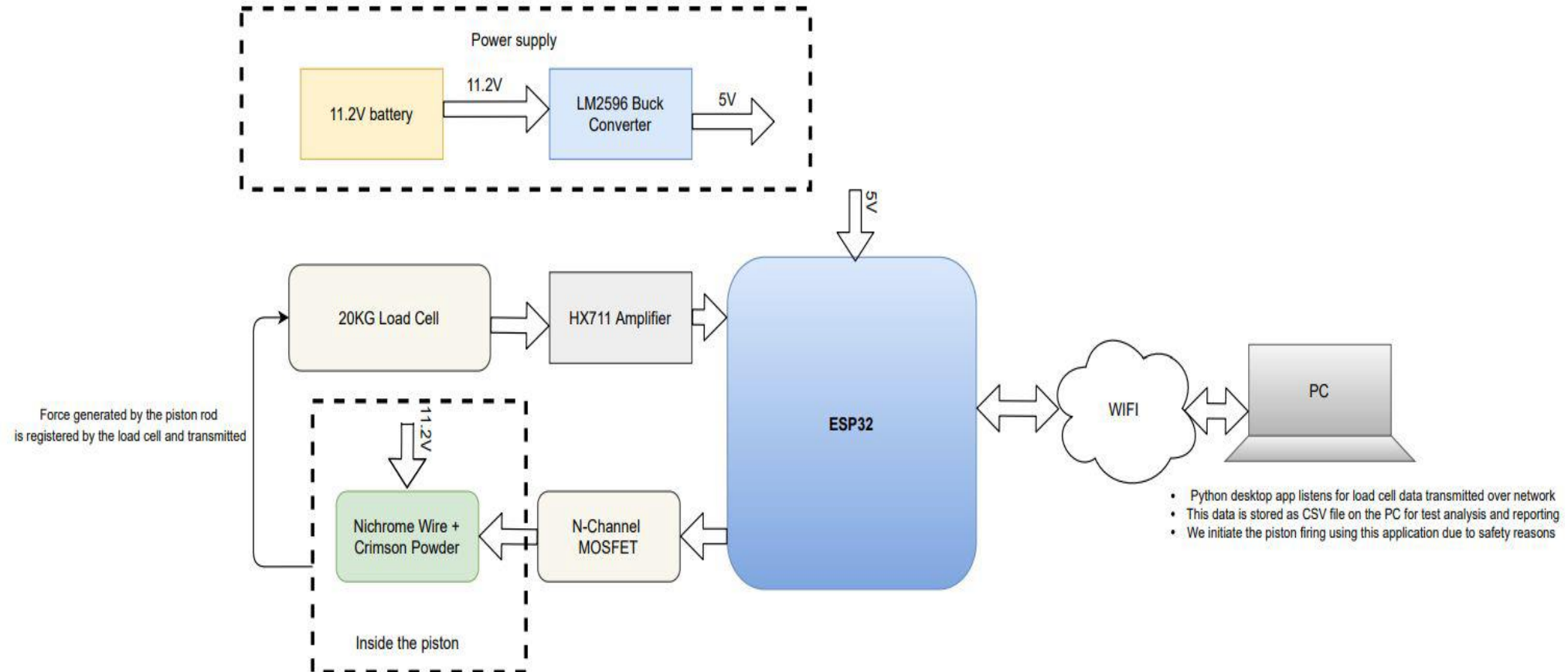
PISTON TEST OBJECTIVES

- Gauge effectiveness of piston test safety cage.
- Determine amount of crimson powder that produces an acceptable amount of force.
- Determine integrity of the PVC piston test chamber.
- Test force delivered by the piston.
- Gauge effectiveness of ejection test web app.
- Determine other unforeseen complications with the setup.

PISTON TEST SETUP

Piston Test System Architecture

Revision 1: April 13th 2023



The entire mechanism is placed in the welded safety cage to minimize risk of injury.



PISTON TEST RESULTS

PISTON TEST RESULTS

Effectiveness of piston test safety cage: The welded piston test cage was gauged to provide adequate protection to the testers.

Amount of crimson powder: Two different detonations were conducted with different amounts of crimson powder: 3 grams and 5 grams. 3 grams did not damage the piston test chamber but produced a lesser amount of force than was acceptable. The agreed upon value was 5 grams of crimson powder or higher (with a higher integrity chamber).

Integrity of the PVC piston test chamber: The PVC piston chamber was incapable of handling 5 gram ordinance even with added reinforcement. A steel test chamber was proposed with threaded endcaps.

Test force delivered by the piston: Unfortunately, the load cell system failed to transmit data over MQTT.

Gauge effectiveness of ejection test web app(issue #31): The ejection test web app was effective at initializing, setting the ON-time for the nichrome wire, and providing the firing sequence.

Unforeseen complications in the setup: The winding of the nichrome wire used may lead to no contact with the crimson powder when the piston chamber is tilted or reoriented.

Another was the MQTT transmit failure.

Video of the 3 gram piston test (Top POV):

<https://discord.com/channels/1062703976711209010/1062705350538698812/1103265956807065742>

Video of the 3 gram piston test (side POV):

<https://discord.com/channels/1062703976711209010/1062705350538698812/1103265014535704597>

Video of the 5 gram piston test (Top View):

<https://discord.com/channels/1062703976711209010/1062705350538698812/1103265593097994390>

Video of the 5 gram piston test (side POV):

<https://discord.com/channels/1062703976711209010/1062705350538698812/1103265302105567263>

AREAS OF IMPROVEMENT

- Piston chamber material.
- Nichrome wire winding.
- MQTT transfer protocol reliability.

Antenna Fabrication

- Antenna fabrication was put on hold on as some Masters and PhD students are using the facilities.
- Currently waiting in line while considering other fabricating options.

NEXT WEEK OBJECTIVES

- Design steel piston cylinder and rod.
- Test the new piston system.
- Test Wifi communication hardware.