Rubble House: A situational learning experience

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Completed rubble house in Haiti (courtesy of Conscience International).

Project overview

- Research project to study an alternative building material being used to construct replacement homes in Haiti.
- Multidiscipline effort representing diverse segments of SPSU student body
- Full scale house used for tests
- Student team responsible for the instrumentation design for field tests
- Instrumentmentation system approached from consultant - client relationship. Client was the SPSU research team and students took role of consultants.

Engineering

- 3 racks required
- Gauge points starting at 12" above
- floor elevation • Spaced 24" OC to top

Proposed options:

- Wood
- Unistrut
- Metal
- Hybrid

Pursued hybrid alternative to reduce instrument package costs

- Major Components
- Instrument mast
- Support frame
- Legs
- Displacement gages
- Deflection gages

Concept

- Key considerations:
- Quick set-up
- Low cost

Project needs

Measure movement

undergoing load

• 1 dynamic (test to

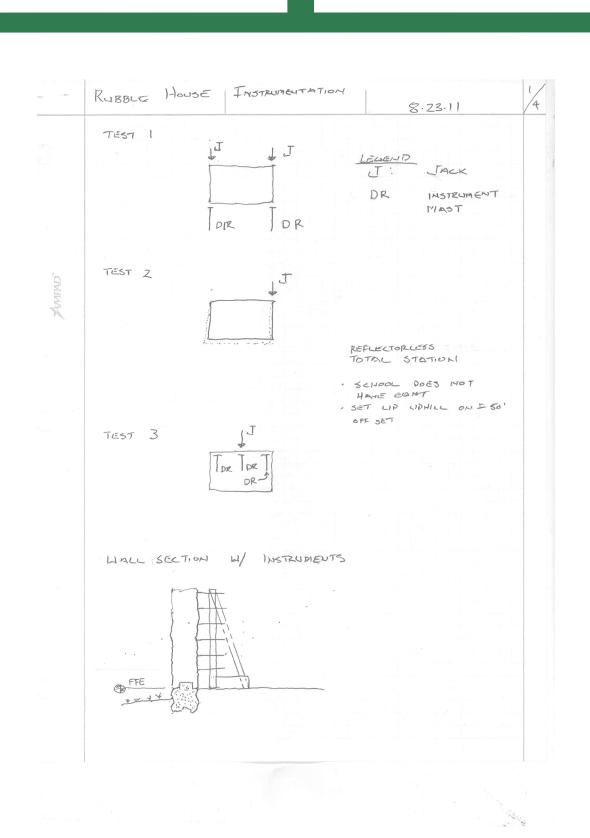
in structure

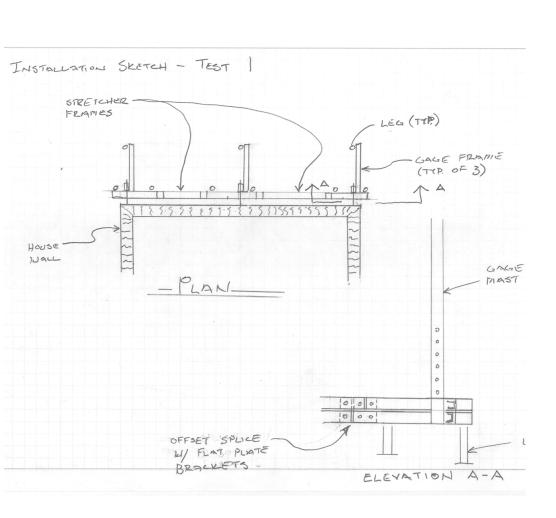
• 3 static tests

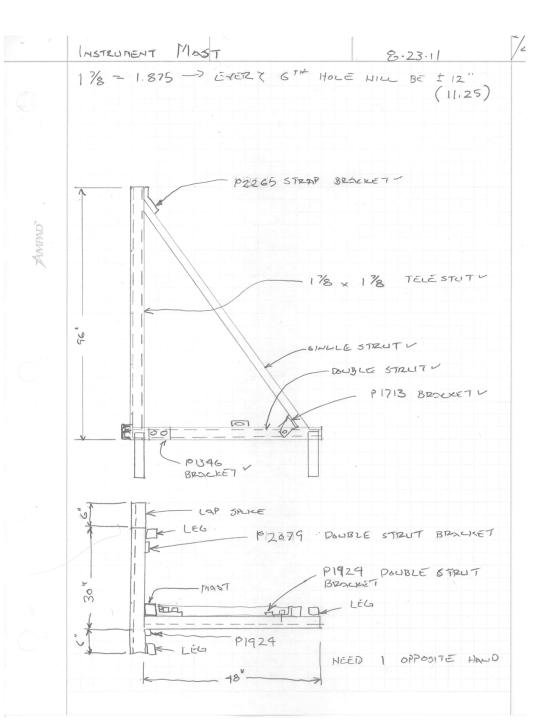
tests.

failure)

- Limited precision
- Accepted concept
- Displacement gage rack system
- Test 2 use total station survey instrument
- Gage rack: instrument mast sub assembly with related support frames
- Displacement gage: tell tale gage
- Deflection gage added at request of research team









Data Collection

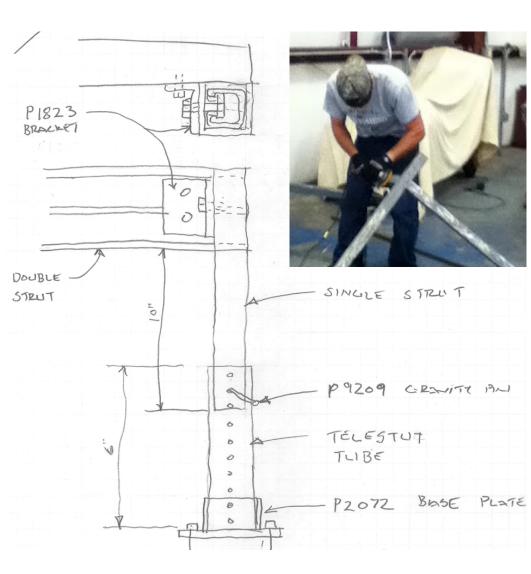
- Dispalcement gages measured with digital micrometers
- Data recorded on test record sheet





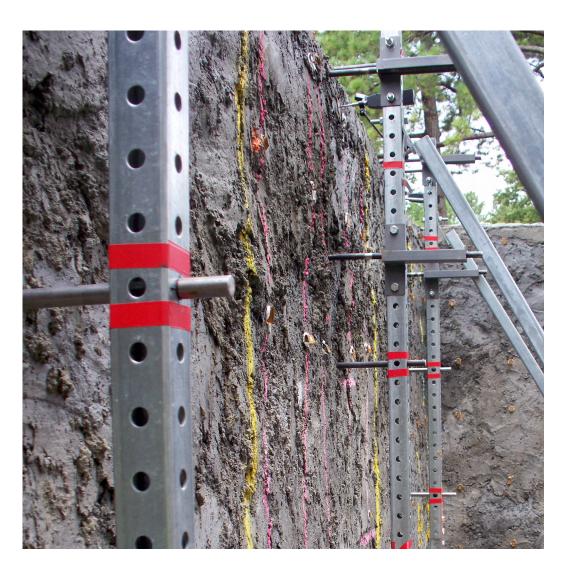
Gauge # Distance from Founc Level (in)







Installation



SPSU SOUTHERN STATE UNIVERSITY

Project challenges

- Limited budget
- Evolving performance criteria
- Destructive testing means only one chance to collect data

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Conclusions

- process

Future research

Triangulation

Additional resources used to triangulate displacement gage measurements

- Total station surveying
- 3-D laser scanning







Data Comparison

- Comparision of displacemnt gage and 3-D laser scan data
- Displacement gages had sufficeint accuracy and precesion for use by research team

 Student built gages provided sufficient accuracy for data to be used by research team Situational learning is

effective way to teach design

 Students enhanced communication skills by working within constraints and evolving performance requirements

 Gage system for measuring large deflections Quantitative study to see participation in situational learning scenarios predicts academic and professional SUCCESS

