

## Session X.1: **YieldPoint Multi-Position Borehole Extensometer (MPBX)**



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International Course on

**G**eotechnical and **S**tructural **M**onitoring

# Presentation Outline

- **Statement of Need**
- **Product Evaluation**
- **New Anchor Design**
- **Prototype Evaluation**
- **Project Implementation**
- **Verification Comparison**
- **Summary**

# Statement of Need

- **Reduce Material Cost**
- **Reduce Installation Cost**
  - Driller time (\$)
  - Engineer time (\$)
  - Traffic control time
- **Reduce Impact to Traffic**
- **Meet 'or approved equal'**
  - Prototype testing
  - Comparison testing

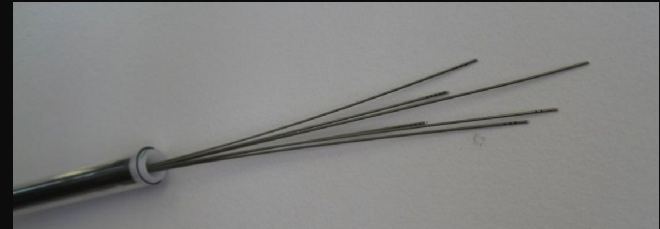
# Product Evaluation

- **d-EXTO Used for Rock (proven)**
  - **1-6 Anchor points**
  - **150 mm Stroke**
  - **Highly accurate**
  - **Robust/Durable**
  - **Small footprint**
  - **Ease of installation**
- **Comes Fully Assembled**
- **Author Has Similar Design Patent (MDD)**
- **Never Used Before – need to evaluate**



# Product Evaluation

- Understand Method of Operation
- Verify Accuracy
- Check for Anchor Independence
- Need Different Anchor Design



# New Anchor Design

- **Original Anchor for Epoxy/Grout**
- **New Anchor for Soft/Medium Grout**
- **Still Provides Hand Adjustments**





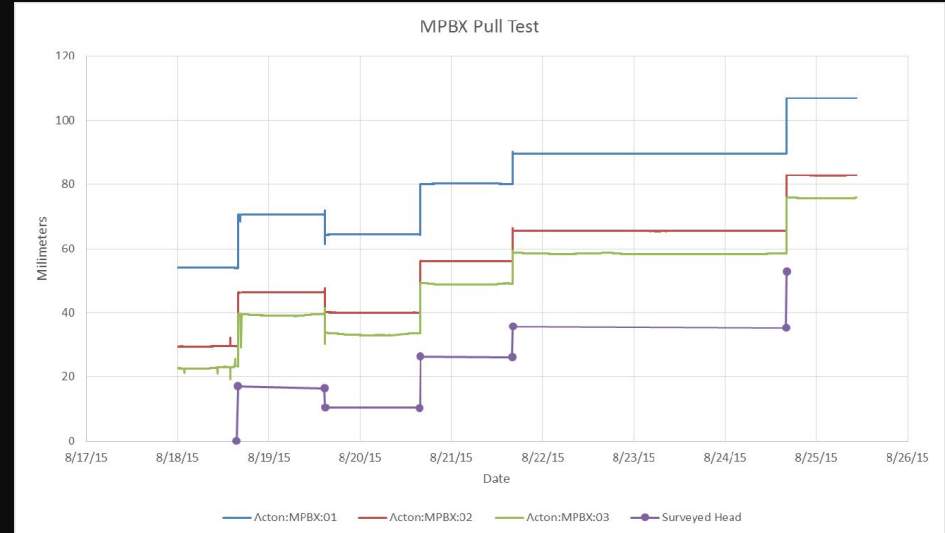
# Prototype Evaluation

- Installed at Geocomp's Acton, MA Office



# Prototype Evaluation

- Long-term (>1 year) Stability
- Pull Test (sleeved tube)



- Generate Report of Findings for Substitution



# Project Implementation

- Crenshaw/LAX LRT – 52, 3 position units
- LA Regional Connector LRT – 66, 4-6 position units



# Project Implementation

- **Pre-placed Directly over TBM Path, Electronics run to Side of Road**





# Project Implementation

- Pre-placed Directly over TBM Path(s)



# Verification Comparison

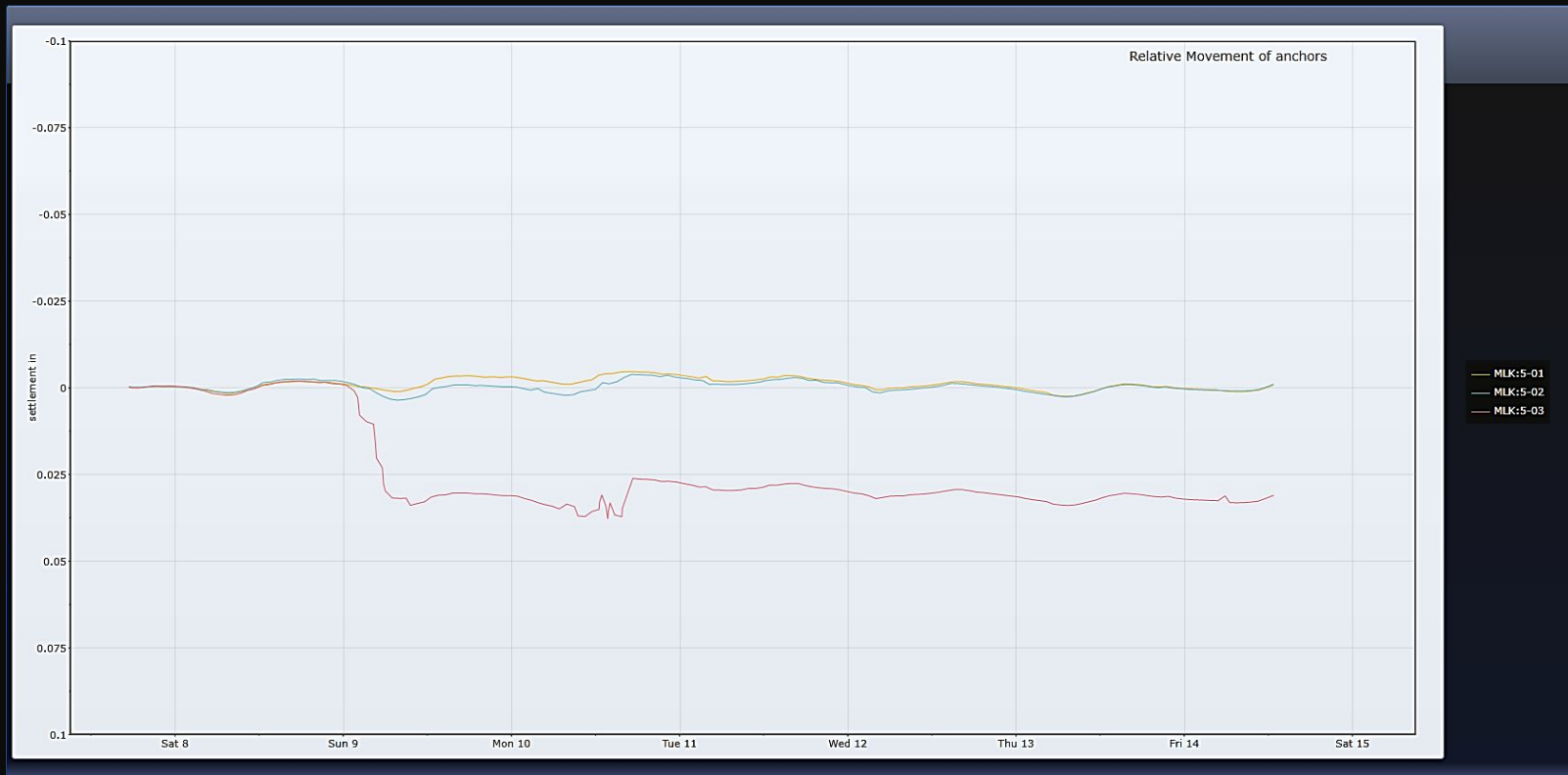
- Comparison with VW MPBX (YieldPoint)





# Verification Comparison

- **Comparison with VW MPBX (VW MPBX)**



# Summary

- **YieldPoint MPBX;**
  - **Met accuracy requirements**
  - **Passed laboratory evaluation**
  - **Anchor design for soft grout performed well**
  - **Passed Prototype performance testing**
  - **Project Implementation (as expected)**
    - **Easy Installation**
    - **Saved approximately 40% in costs**
  - **Passed comparison testing**
  - **Further design improvements made**

# Questions/Discussion