

# Non-contact inspection of PV system fasteners

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**Awarded FY23 Core Call**
**Period of Performance: Funding: FY24**

## Contributing to DuraMAT Consortium Goals

This research advances Fielded Module Forensics by pioneering a new non-destructive, field compatible method to evaluate fastener clamping load. Clamping load, if out of design specification, can shorten module deployed lifetime by increasing risks of structural failure and/or module cracking.

**Objective:** Explore and demonstrate use of electro-magnetic acoustic transducer (EMAT) technology to measure bolt clamping load in PV system fasteners.

### Potential applications:

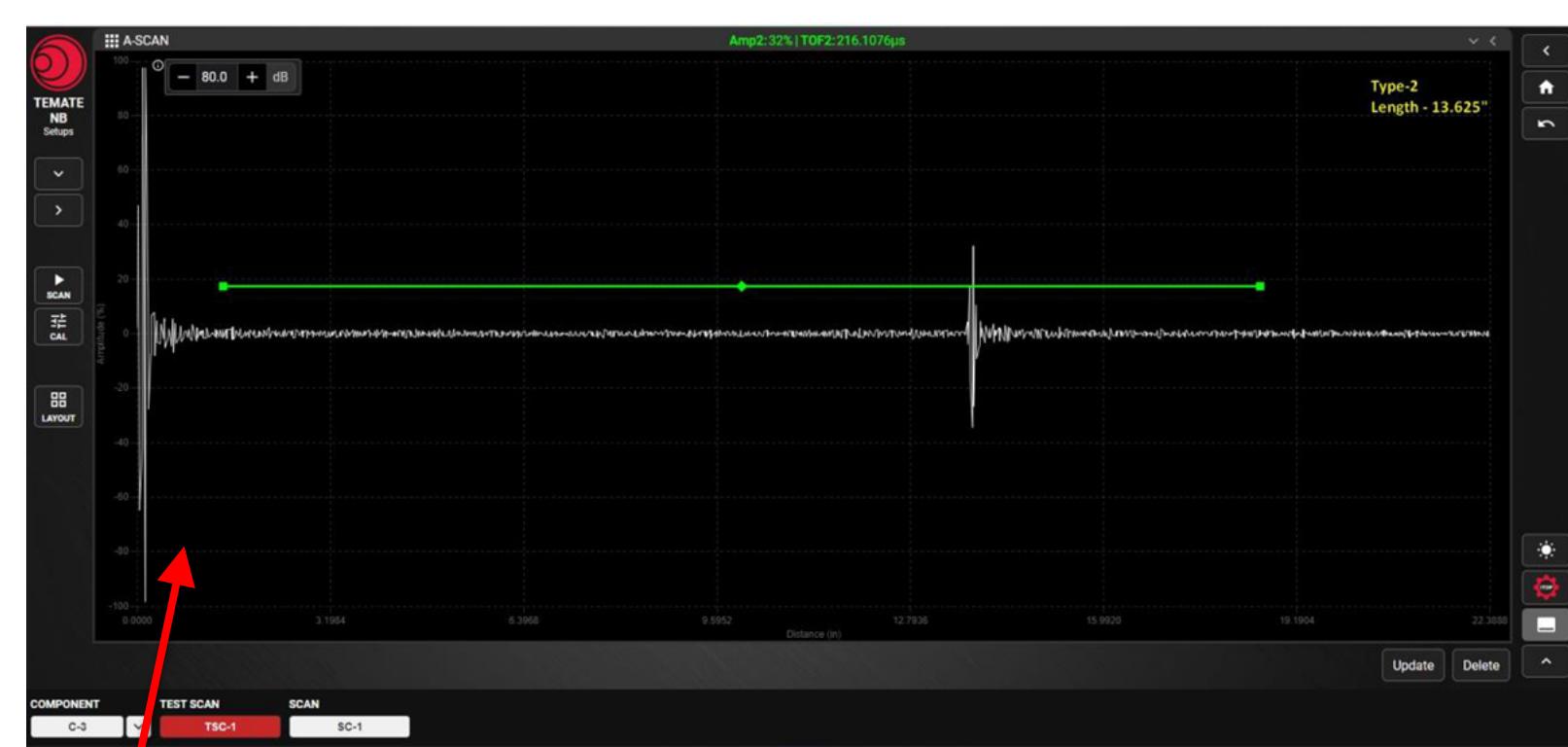
- Inspection for quality of construction.
- Forensic investigation of structural failures.

*“With any racking system, the most common error is over-torqueing fasteners, which can cause stress on fasteners and module frames.” J. Comstock, Ecolibrium Solar*

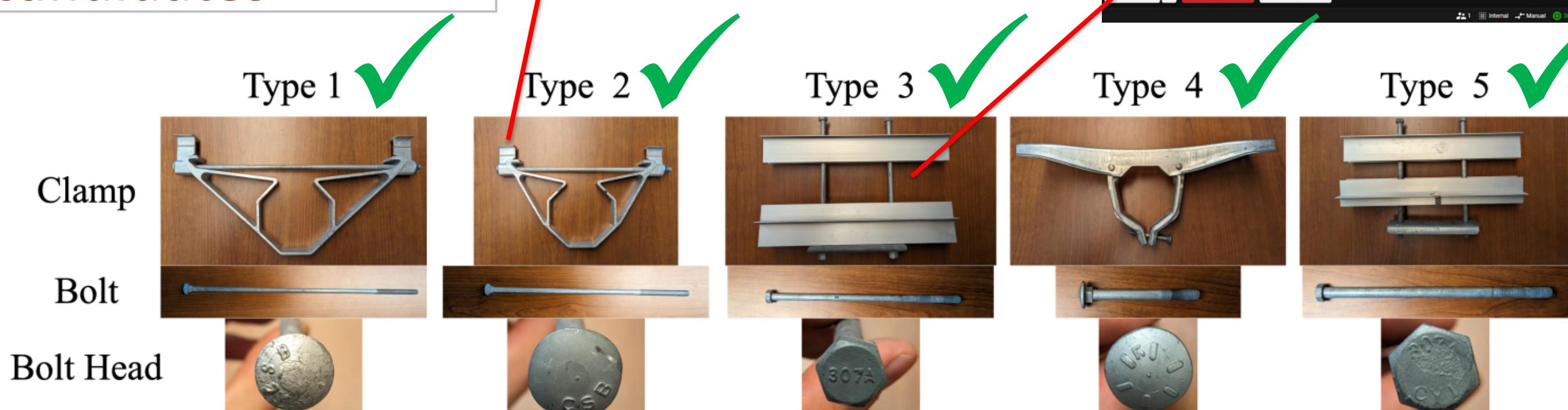
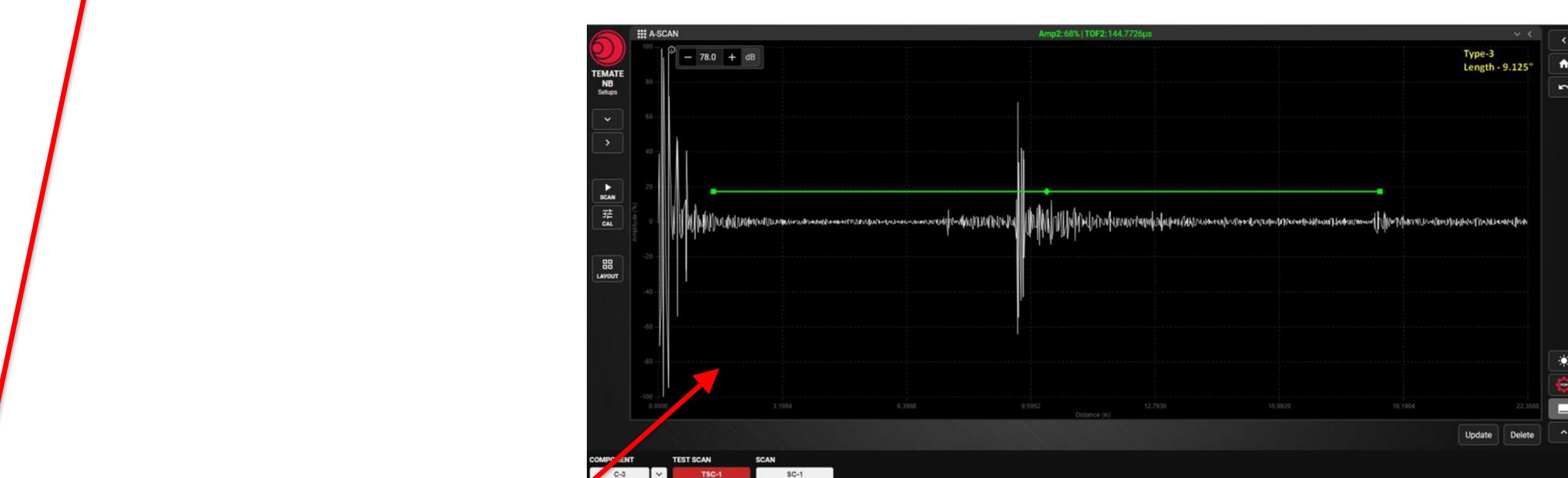


### Quick look at applicability

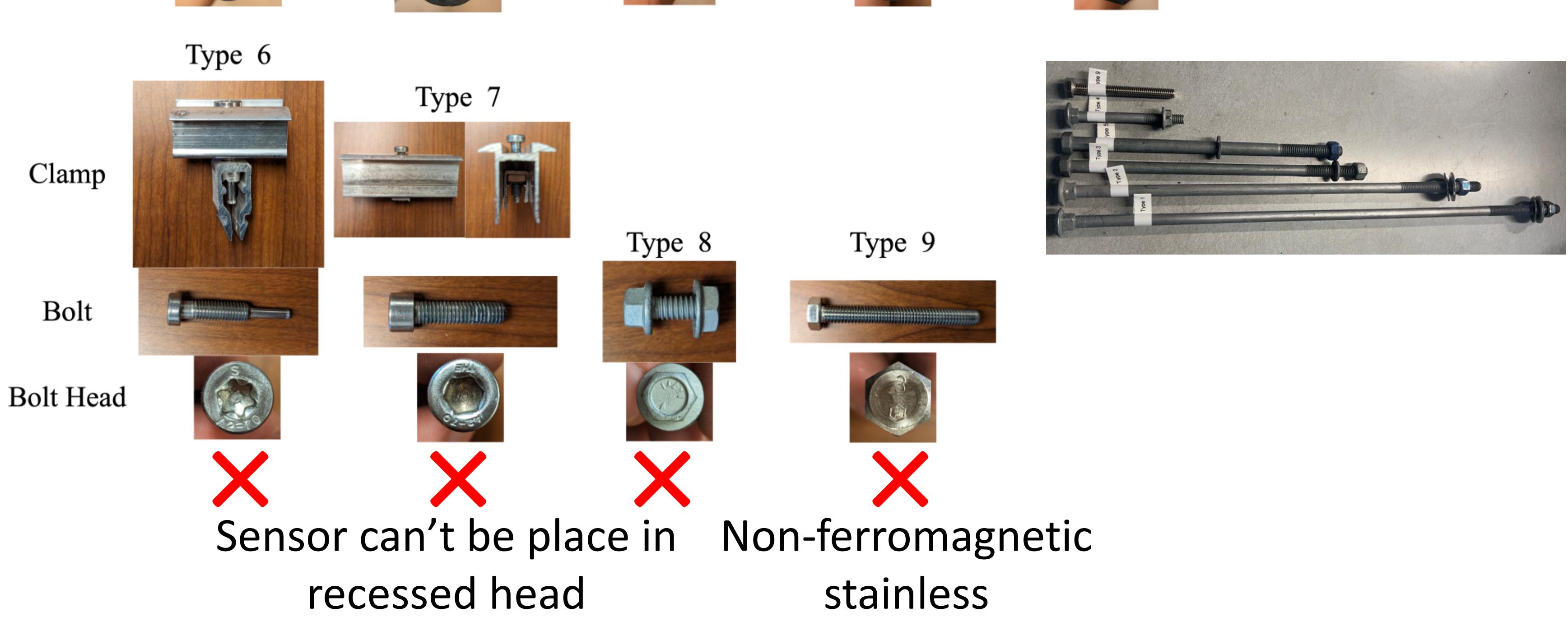
- Sample of tracker/racking/module clamp fasteners provided to InnerSpec
- Measurements show which fasteners are candidates



Carriage-head bolts from tracker clamps are measurable.



- EMAT is a non-destructive method of measuring fastener length.
- Sensor is placed close to the fastener to couple a wave into the fastener. Physical contact is not required.
- Change in fastener length can be correlated with clamping load.



### Next steps:

- Compare variance in fastener length before installation with change in length after installation
- Investigate variation in fastener length after several years in the field

