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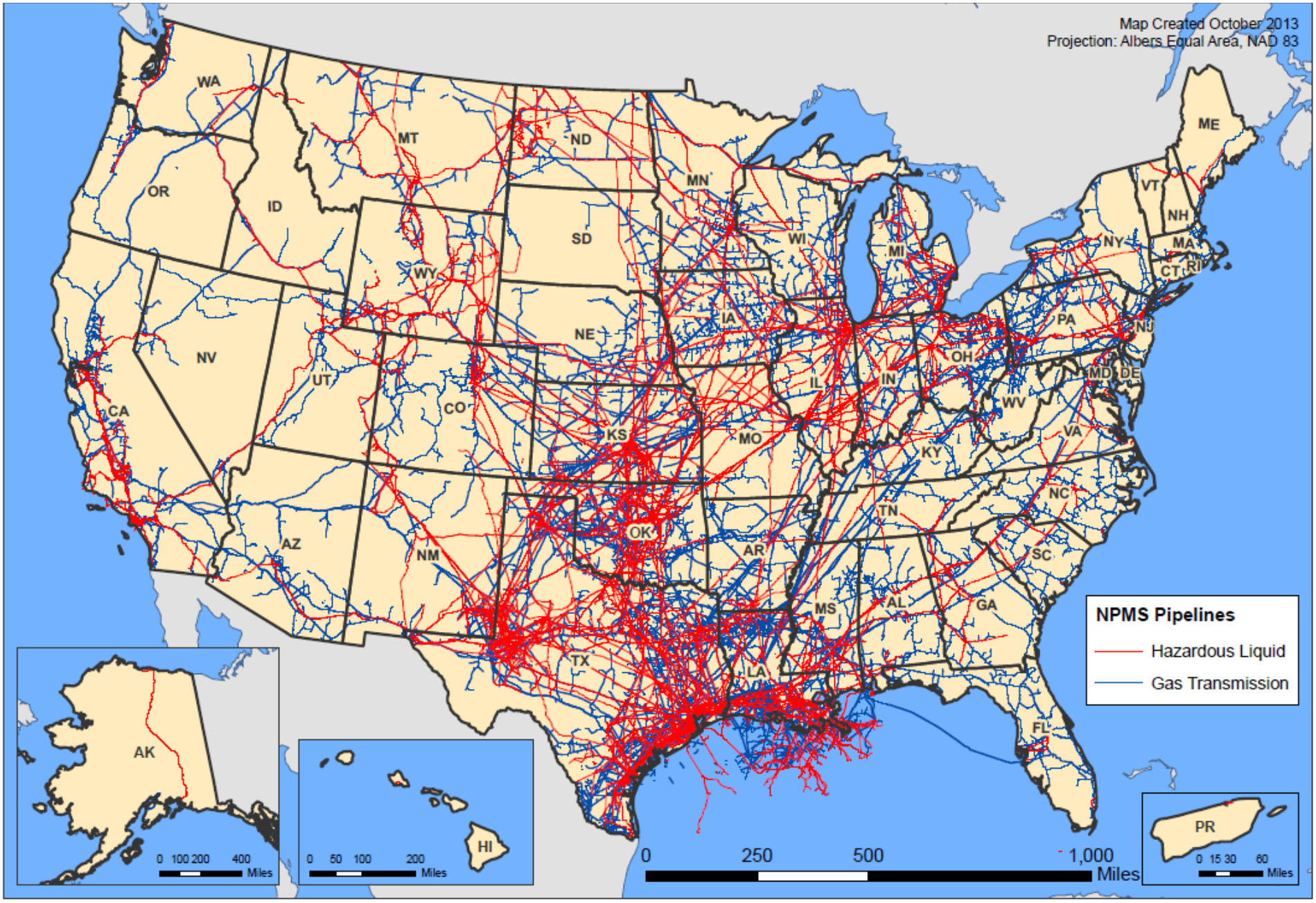
IN-DITCH NDE FOR PIPE STRENGTH AND TOUGHNESS

Simon Bellemare, PhD, PE, CEO

Stress Engineering Services
- TAG Event

Houston NW, TX

2 December 2016


Map Created October 2013
Projection: Albers Equal Area, NAD 83
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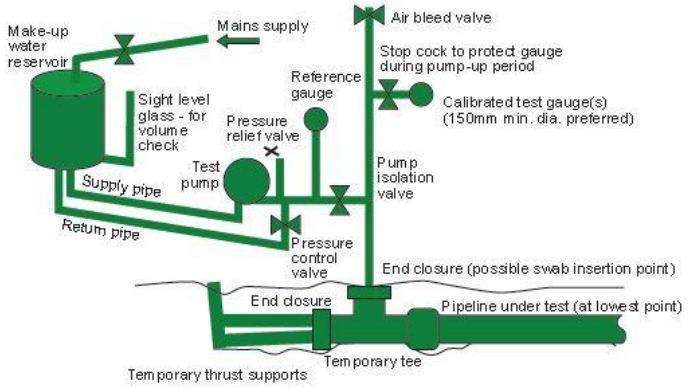
PR
NPMS Pipelines
Hazardous Liquid
Gas Transmission
0 250 500 1,000 Miles
0 100 200 400 Miles
0 50 100 200 Miles
0 15 30 60 Miles

Inspection / NDE of Transmission Pipelines

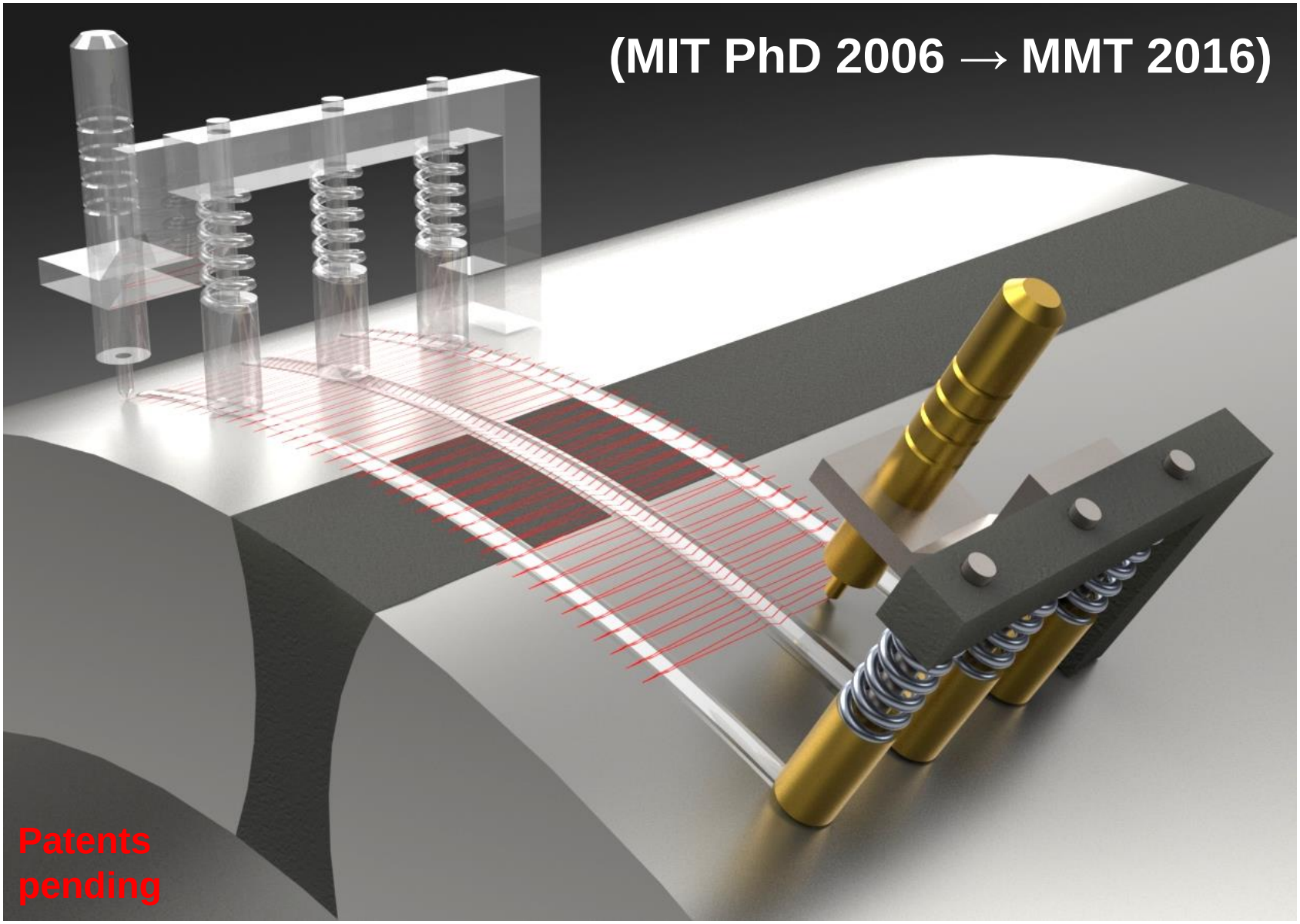


Steel strength and toughness currently wanted.

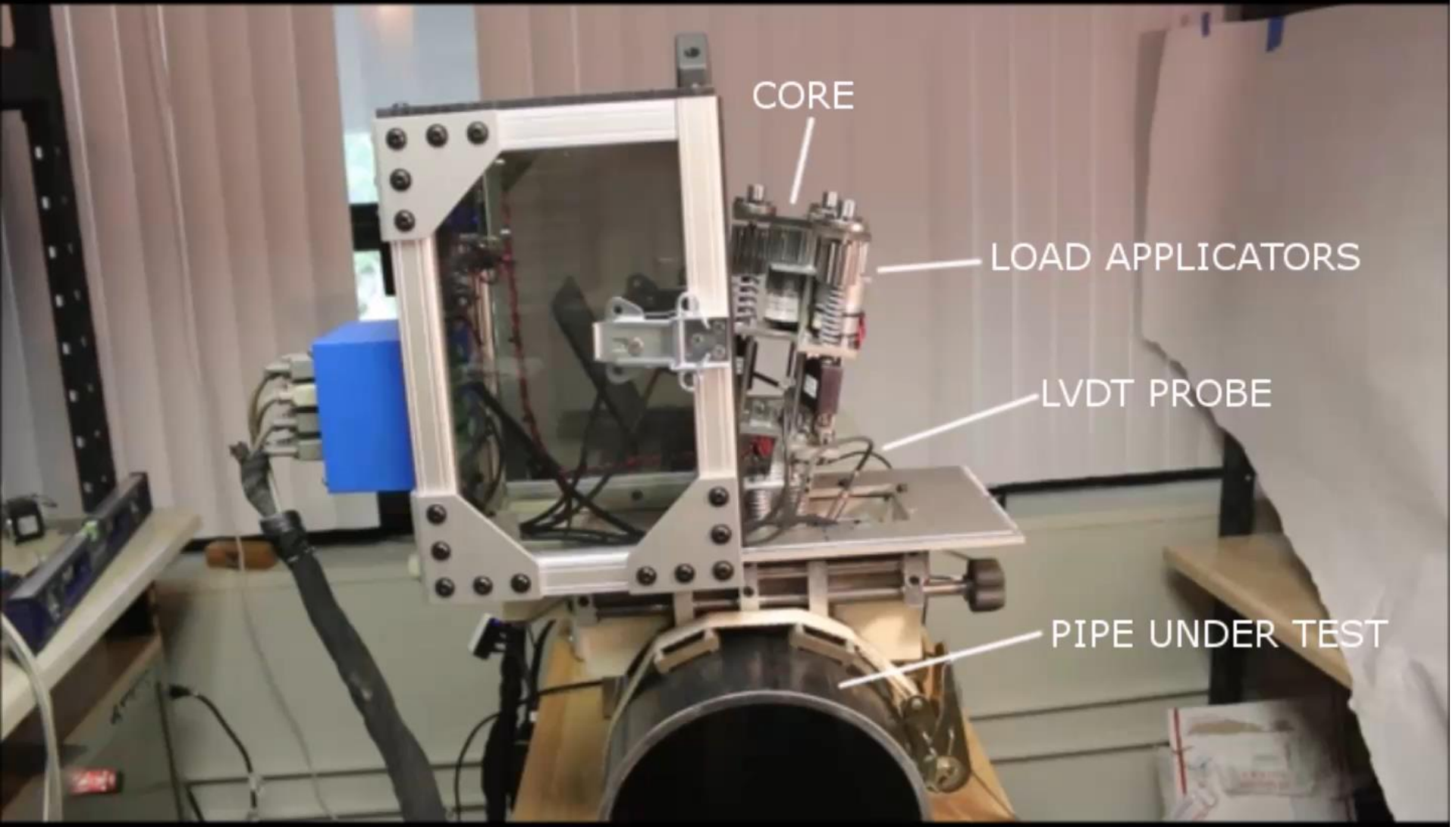
MMT's Solution: HSD Tester

"Better Cheaper Faster"

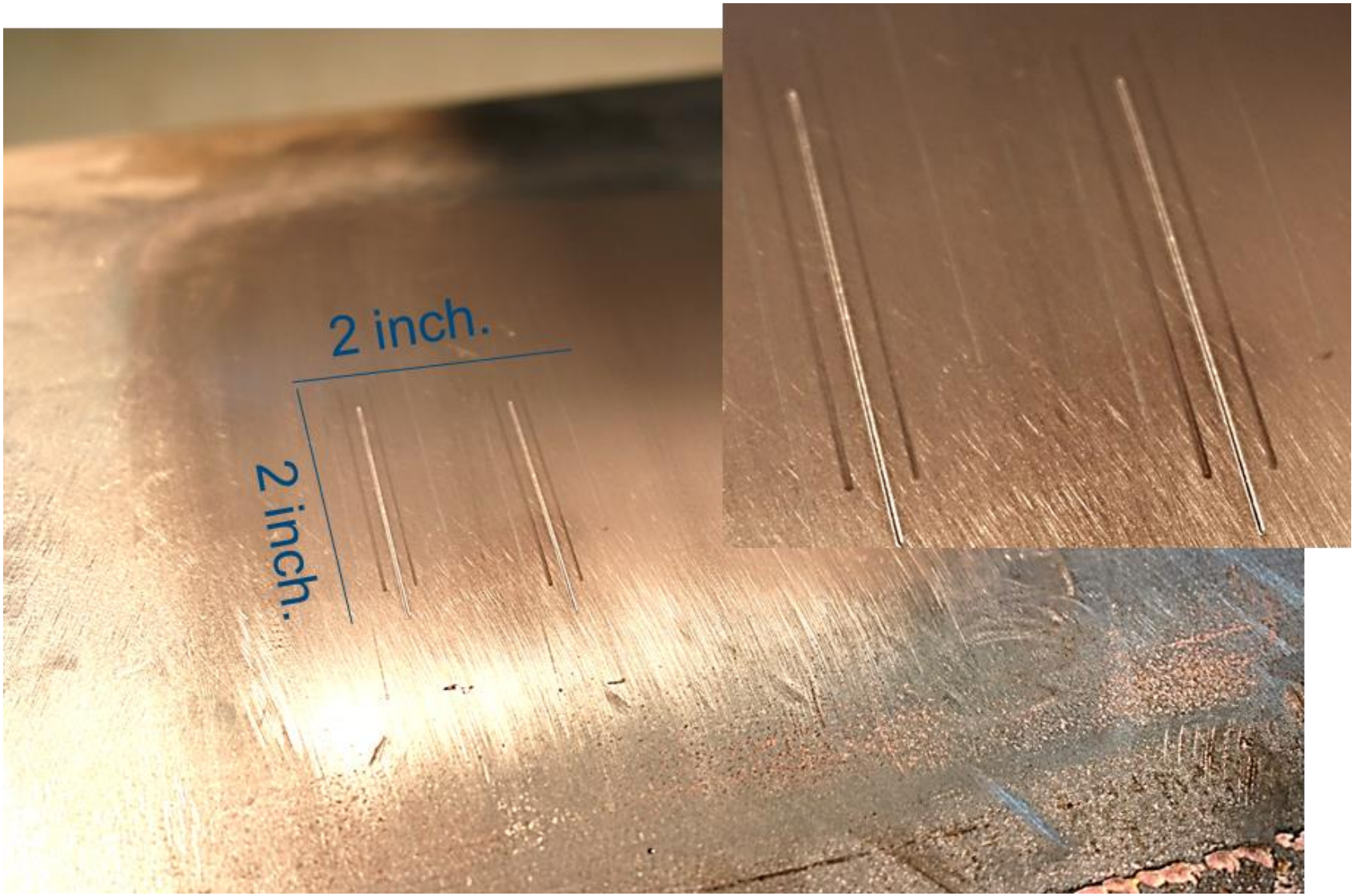
Hardness, Strength and Ductility (HSD) Tester



HARDNESS, STRENGTH, AND DUCTILITY (HSD) UNIT



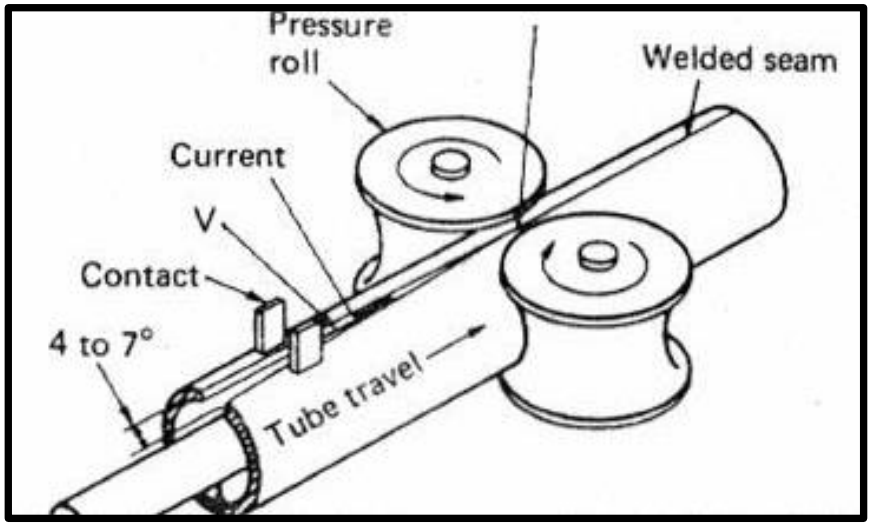
Styluses are Scribing then Collecting Groove Info

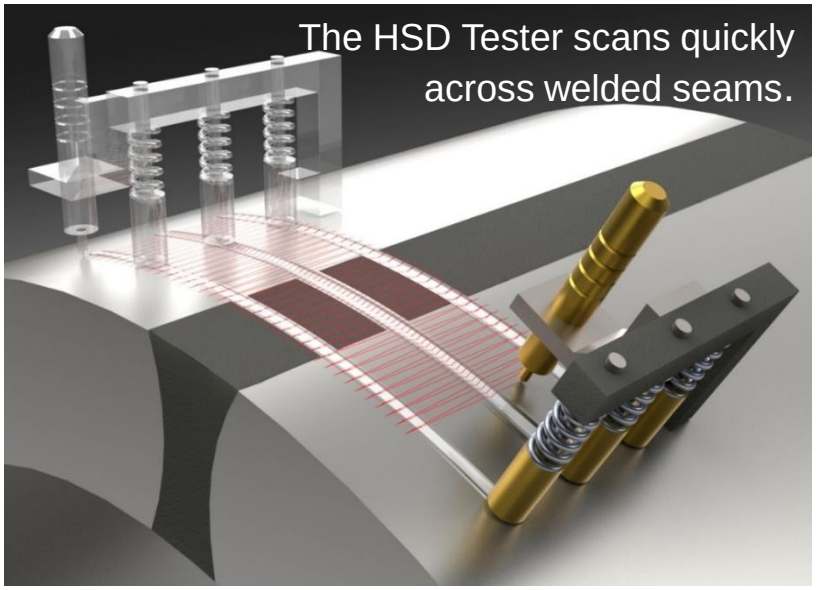


Imprint < 1% of wall thickness

MMT's Solutions are Better

Longitudinal welded seam from pipe making is a weak link for strength and toughness. There is no current in-ditch method for measuring it.





In-Ditch Instrument Competition

- Cannot measure the seams
- **Is not as accurate (+/- 15 to 20%) v HSD is +/- 5 to 10%** (Pending regulation requires +/- 10% with 95% confidence)
- Sets a price at $10,000 / day that we have been using

MMT's Solutions Help Reduce Costs

- **No expensive extraction of material ($40,000-$80,000 "hot tap").**
- **Reduces need for hydro testing ($500M spent / year expected to grow 3 to 5 times; HSD data will reduce need for re-tests > 20%)**
- **Avoids replacement cost of $1M+ per mile by identifying local repairable defects**

Pipeline section with composite wrap repair.

Effective repair for "odd balls": pipe sections outside of required strength.

Solutions as a Path to Efficiency / Safety

Where In-Line Inspection tools are used in addition to in-ditch, build a robust database for each 40 ft long joint of the pipeline as follows:

In-Ditch Direct Assessment

In-Line Inspection Tools

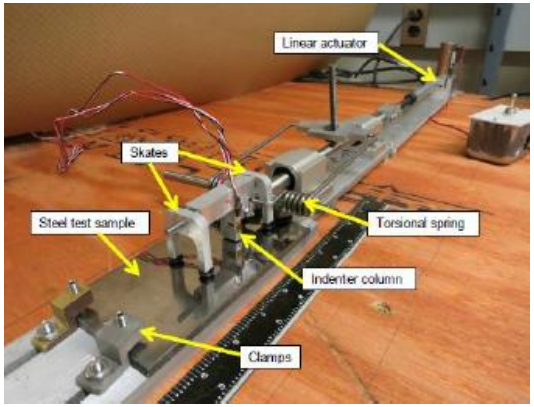
Pipe joints in batches of original manufacturing

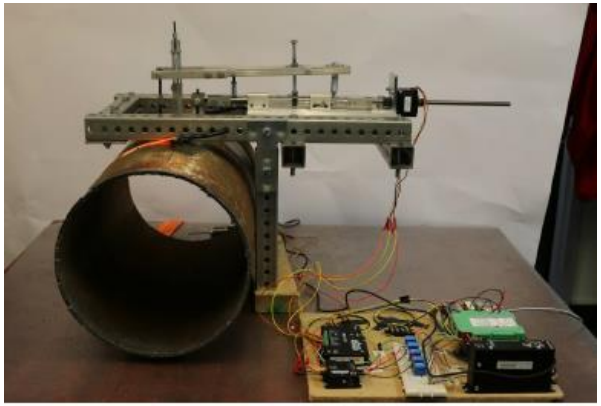
MMT's In-Ditch NDE strength, ductility and toughness for each batch

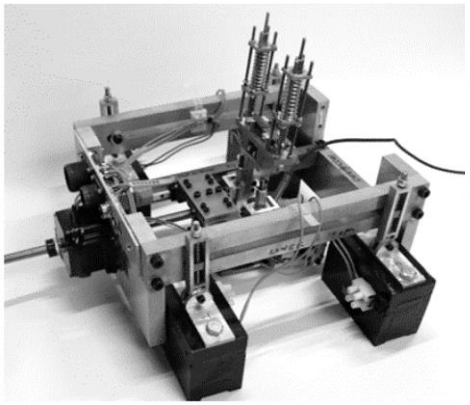
A complete strength inventory allowing:

- **Prioritize repairs**
- **Reduce being over-conservative**

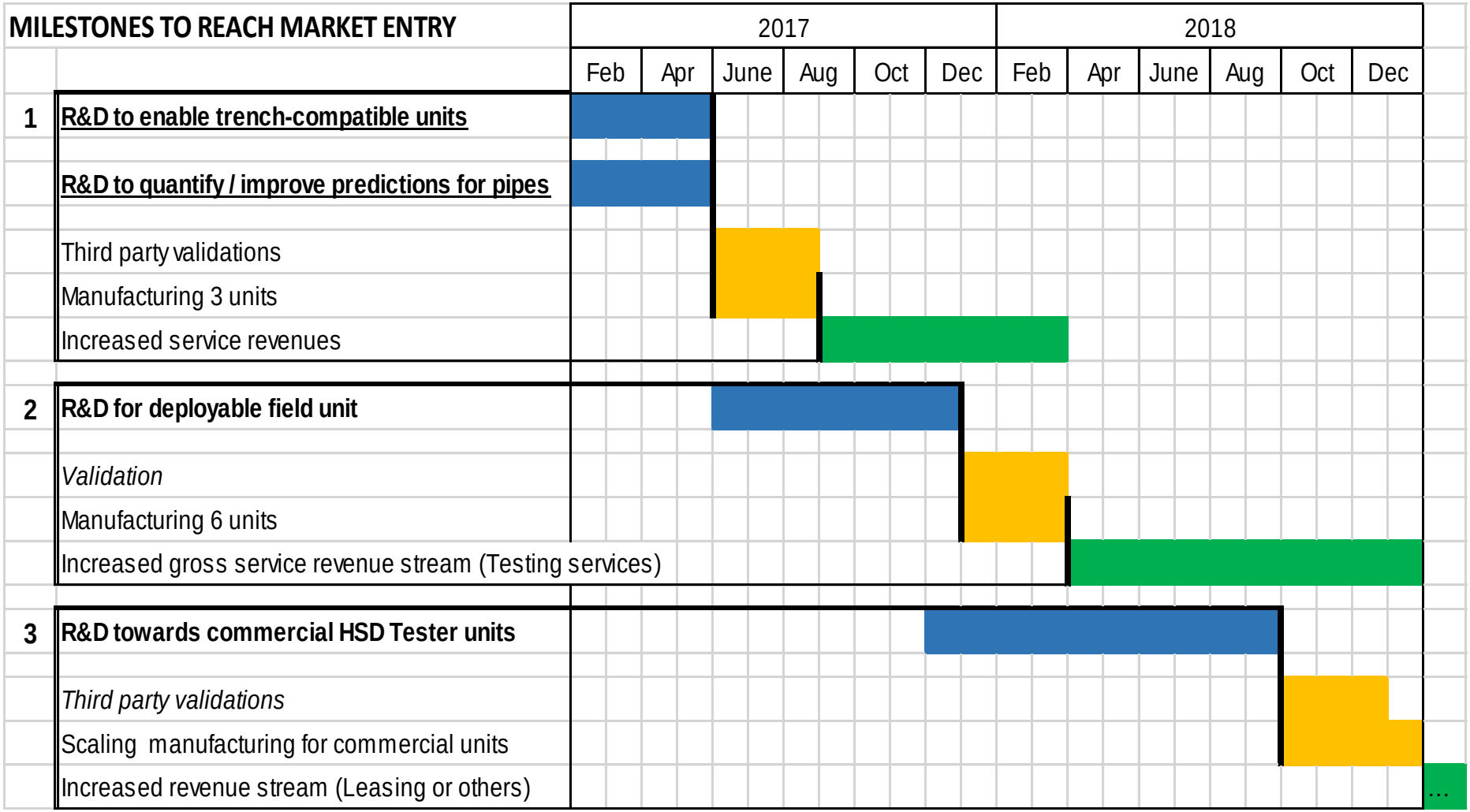
Working on It







Aug 2016 workplan to NSF

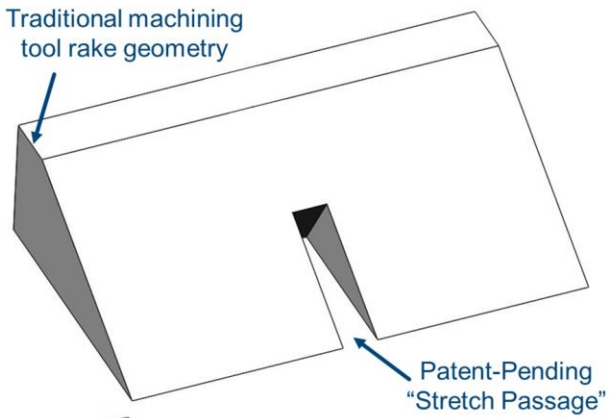


TOP 10 STARTUP MISTAKES

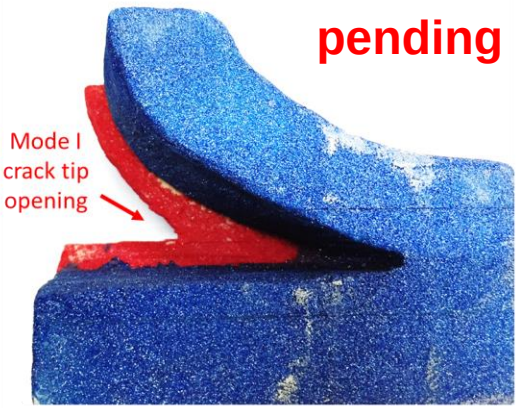
100 First Hits™
www.100FirstHits.com

8. Spending Too Much Money 18 (2,1%)
9. Failing To Ask For Help 12 (1,4%)
10. Ignoring Social Media 6 (0,7%)
5. Not Having The Right Co-Founders 66 (7,9%)
6. Chasing Investors, Not Customers 45 (5,4%)
7. Not Making Sure You Have Enough Money 28 (3,3%)

Fracture Toughness Tester (FTT)



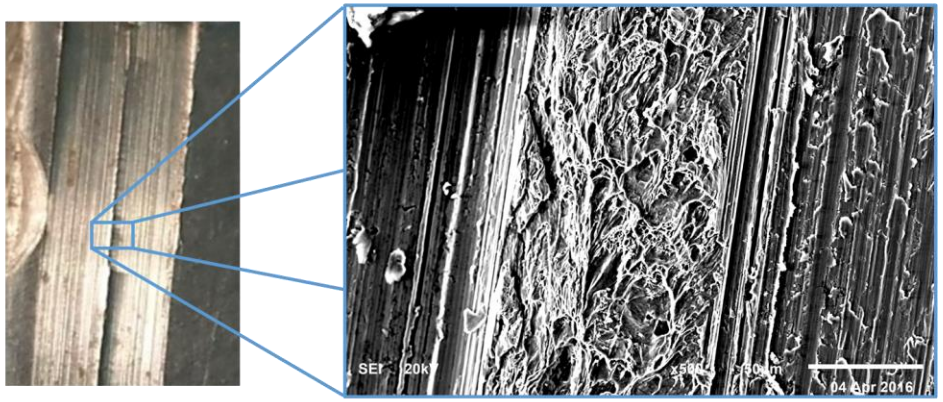
Patents pending



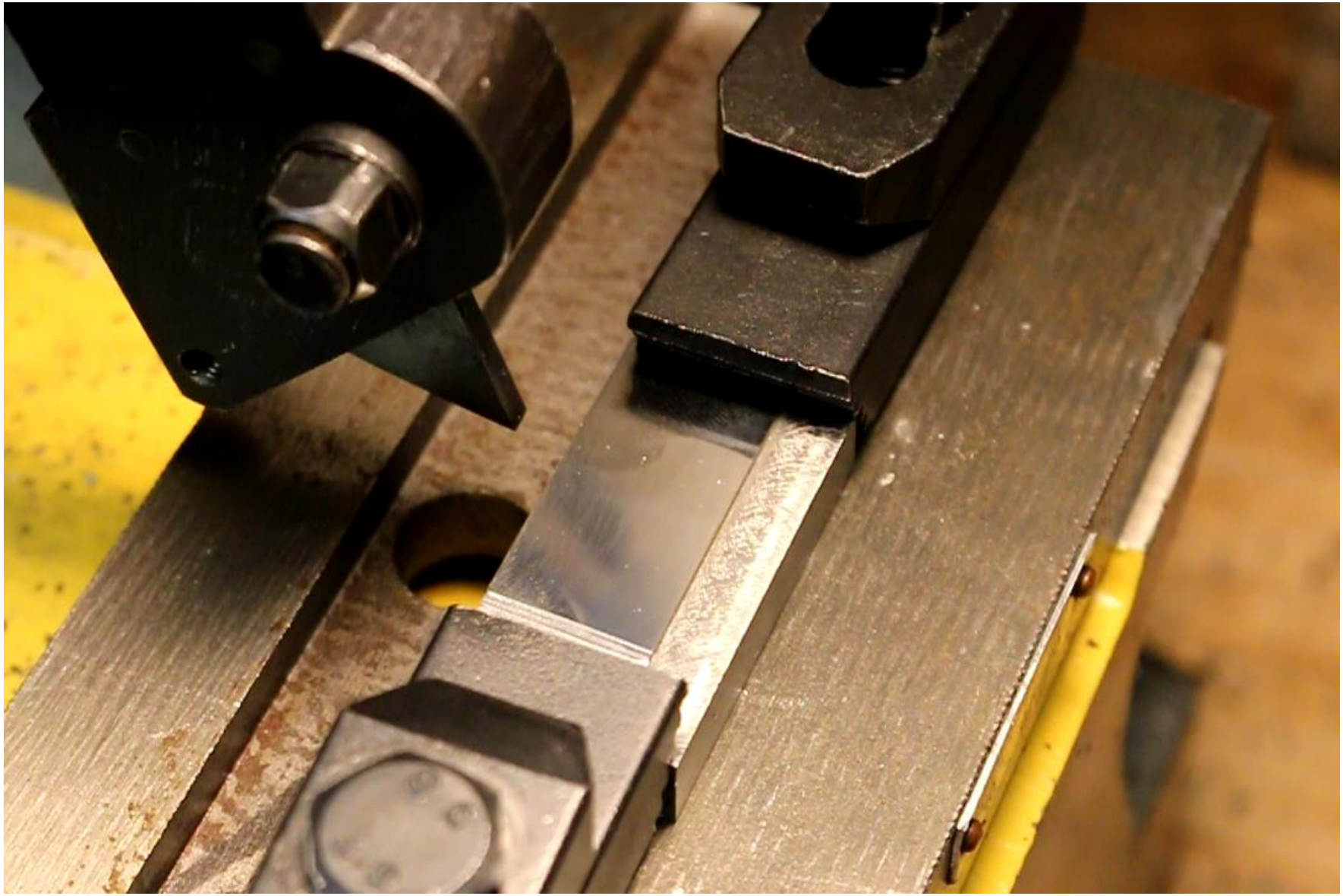
With only 0.003 inch removed

- Local / controlled fracture
- Measurement of toughness
- Profile across welds

No need for detailed surface prep!



Worked the Very First Time Tried!



MMT Core Team

- Steve Palkovic
- Brendon Willey
- Kotaro Taniguchi
- Phillip Soucy
- Veronica Hunt
- Rich Howe
- Simon Normand
- Jayne Shelton
- CJ McLaughlin

- Parth Patel

- VP – Sales and Marketing

…

Too many acknowledgements to make

Other Promising Markets – NDE for Strength / Toughness

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MMT GET IT DONE