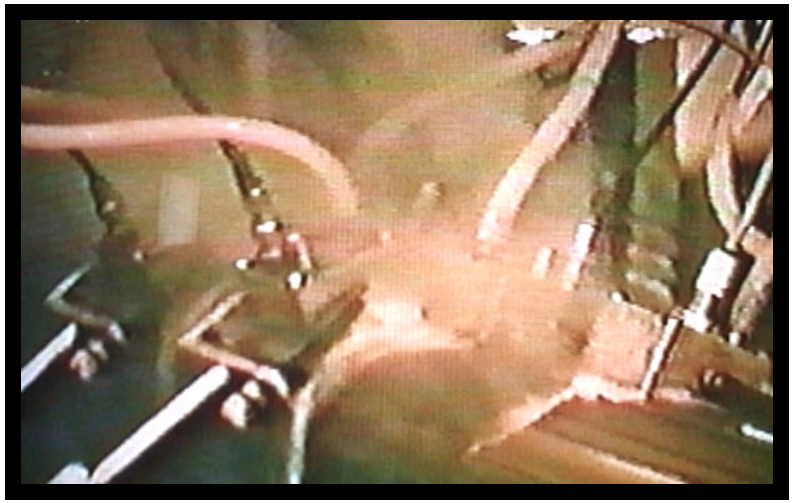
Western Instruments

Established 1965

Ultrasonic Testing Systems

for

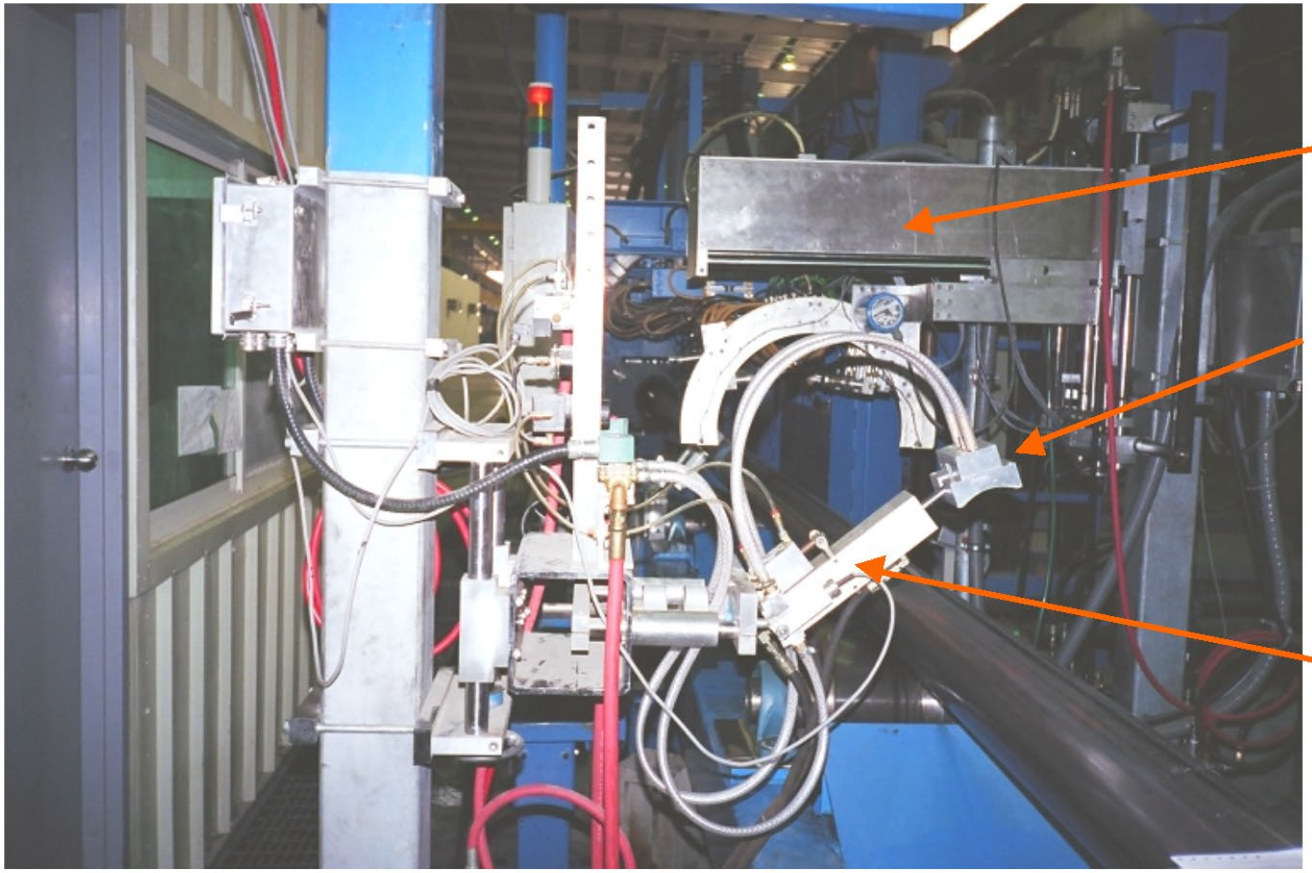
Tube and Pipe Mills



Flash Gauge

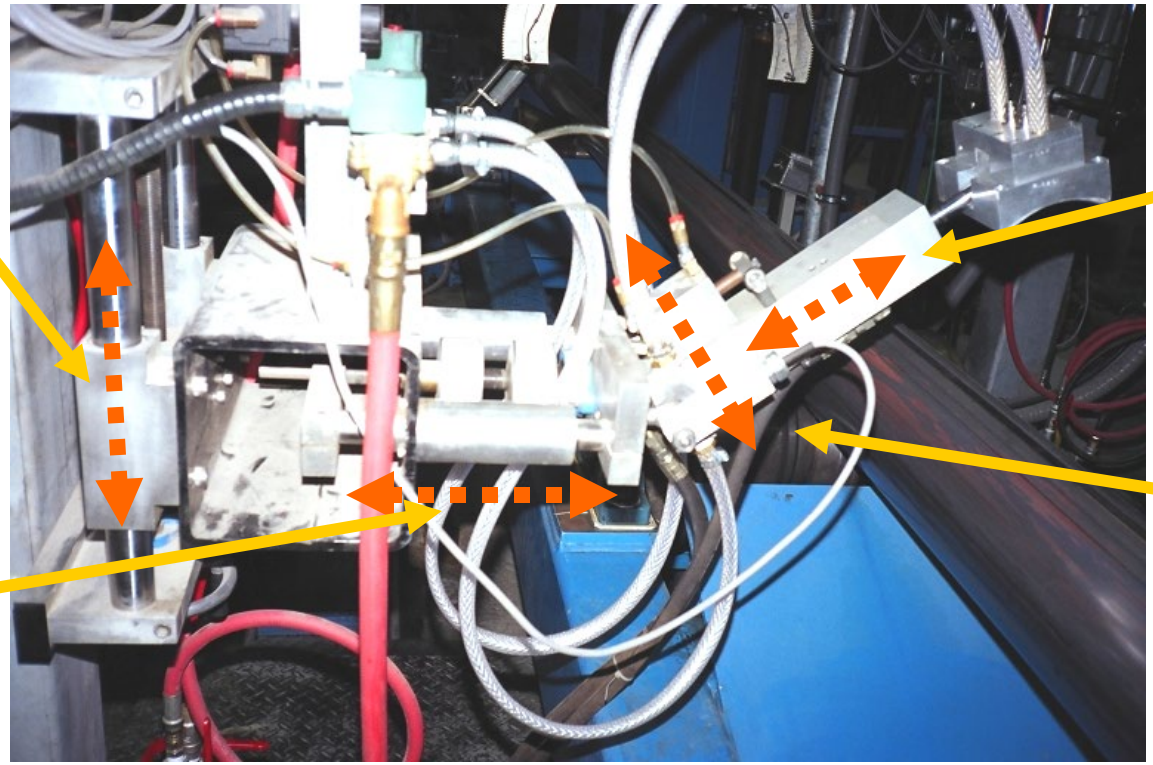
Western Instruments

1997



Flash Gauge installed immediately after welding, upstream of Weld Testing System.

Flash Gauge Manipulations and Adjustments

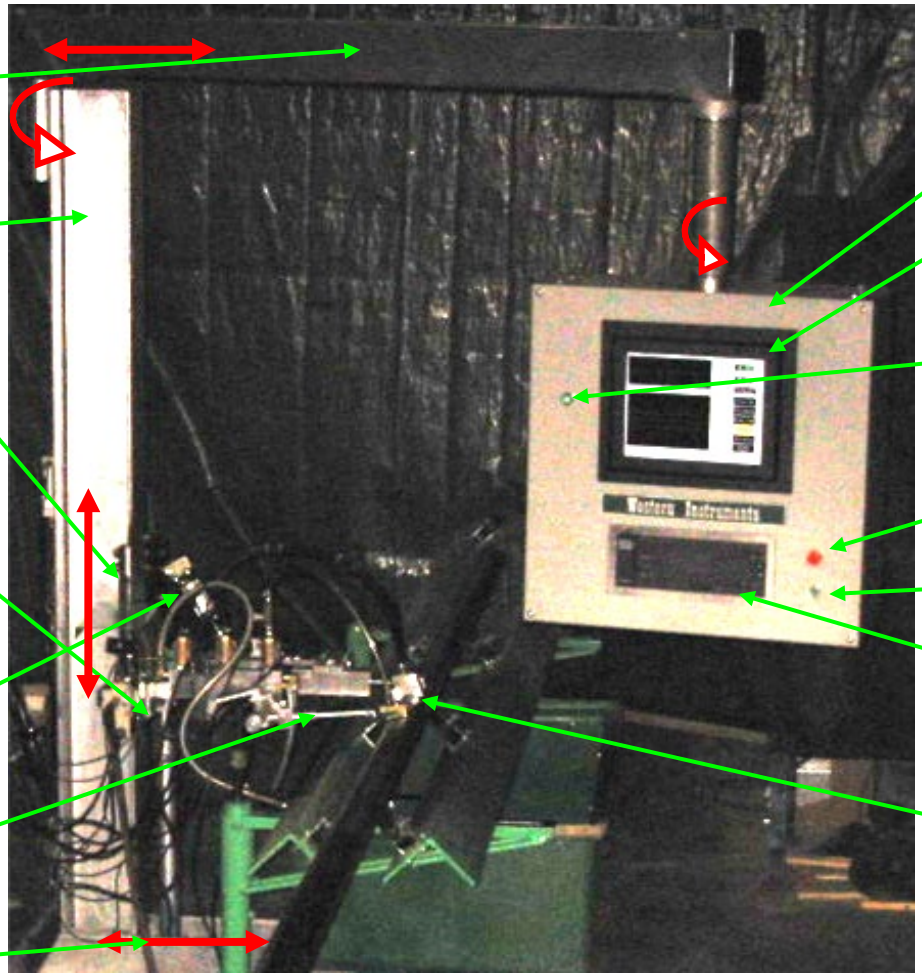


Western Instruments

Flash Gauge - FG7200

Western Instruments

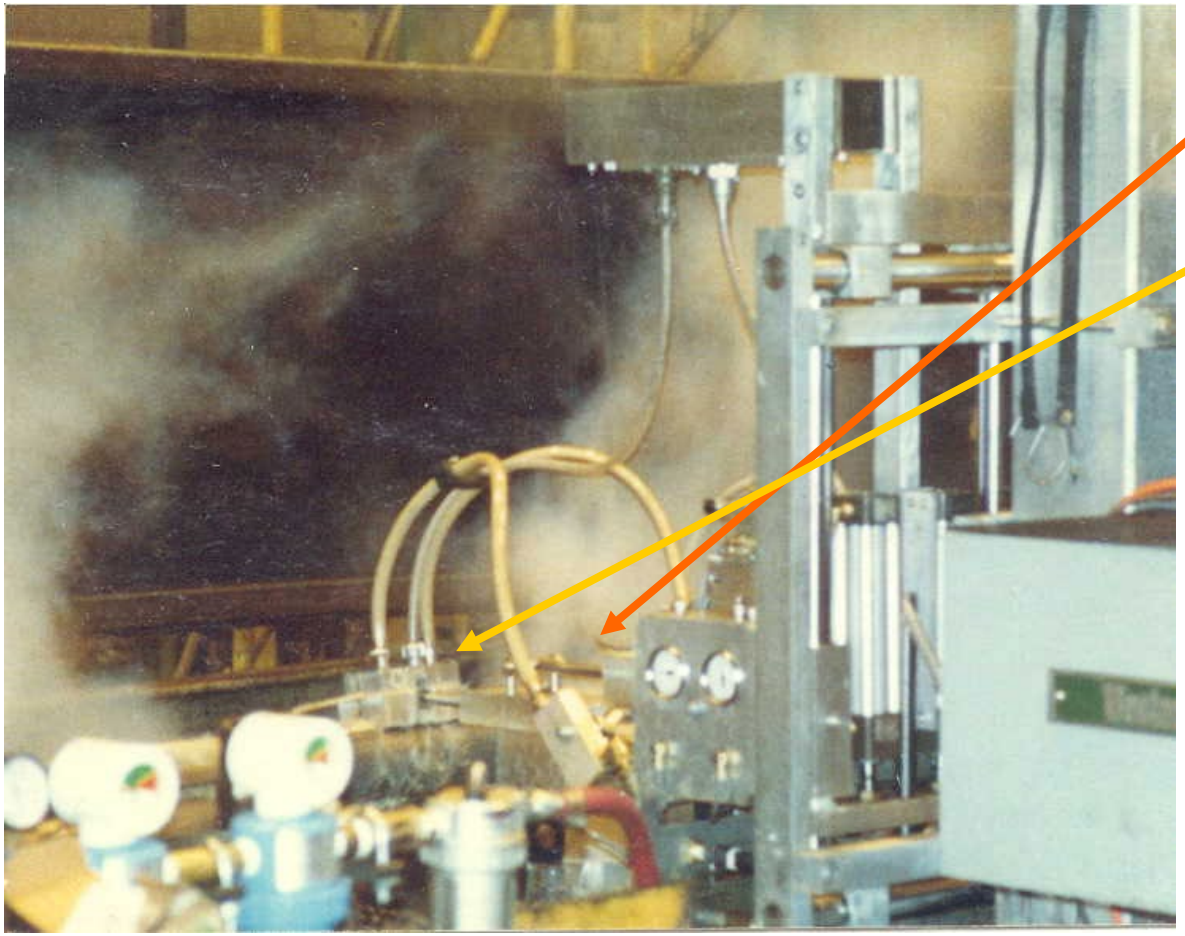
2007



Flash Gauge

Western Instruments

1994

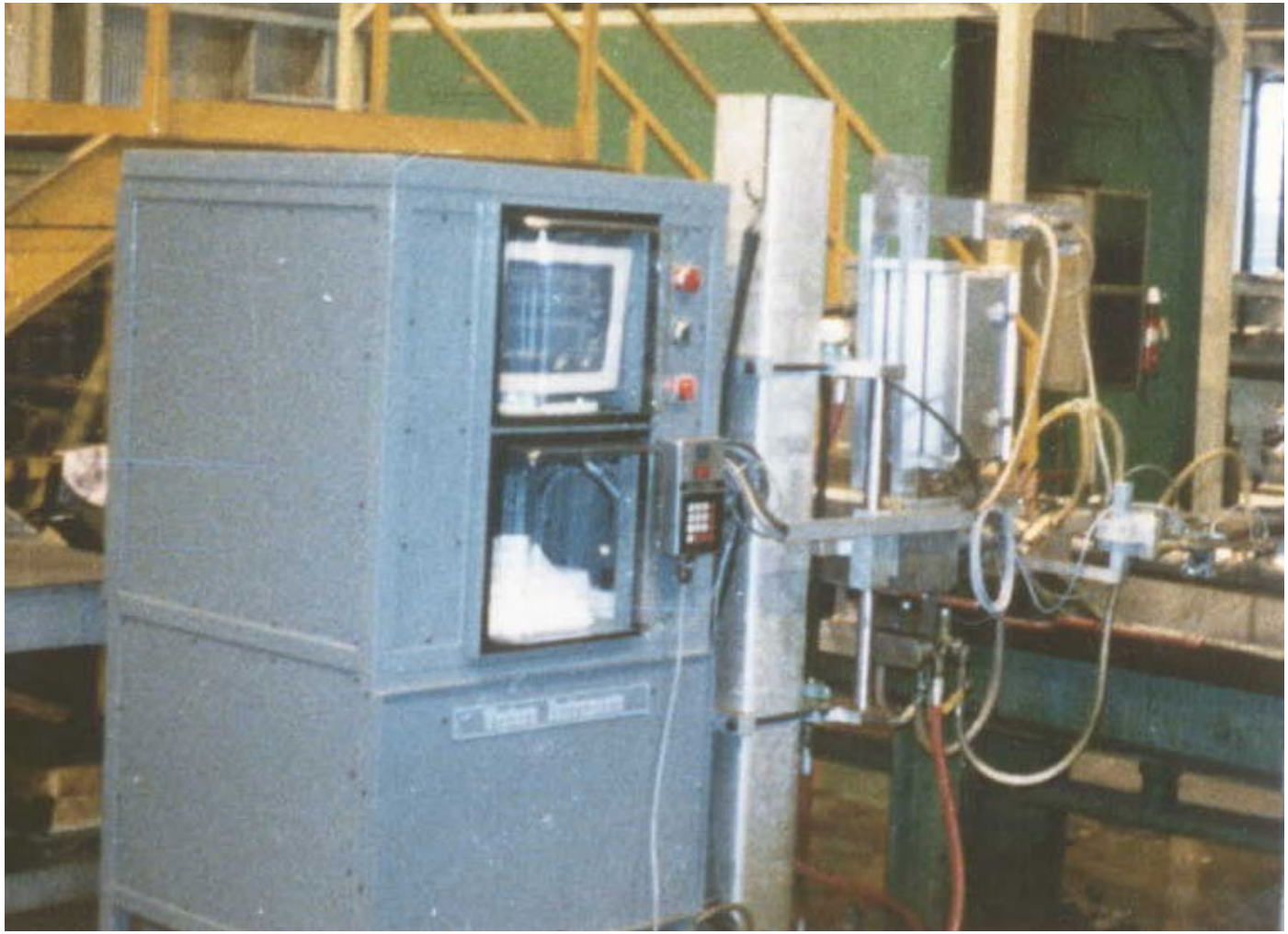


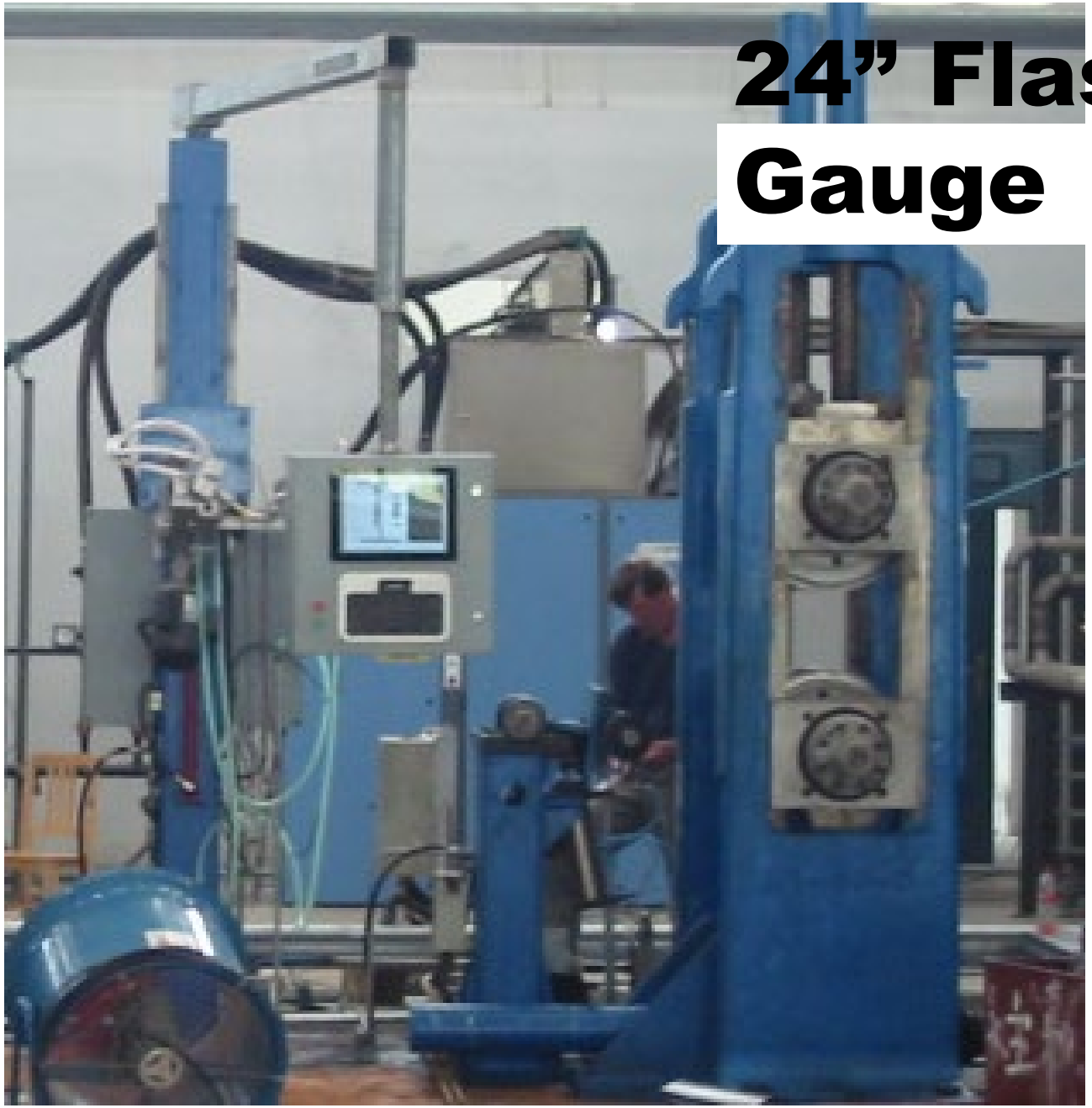
Note Steam from **Proximity Safety Probe** and Downstream of **Testing Probe**

Flash Gauge

Western Instruments

1998





24” Flash Gauge

Western Instruments

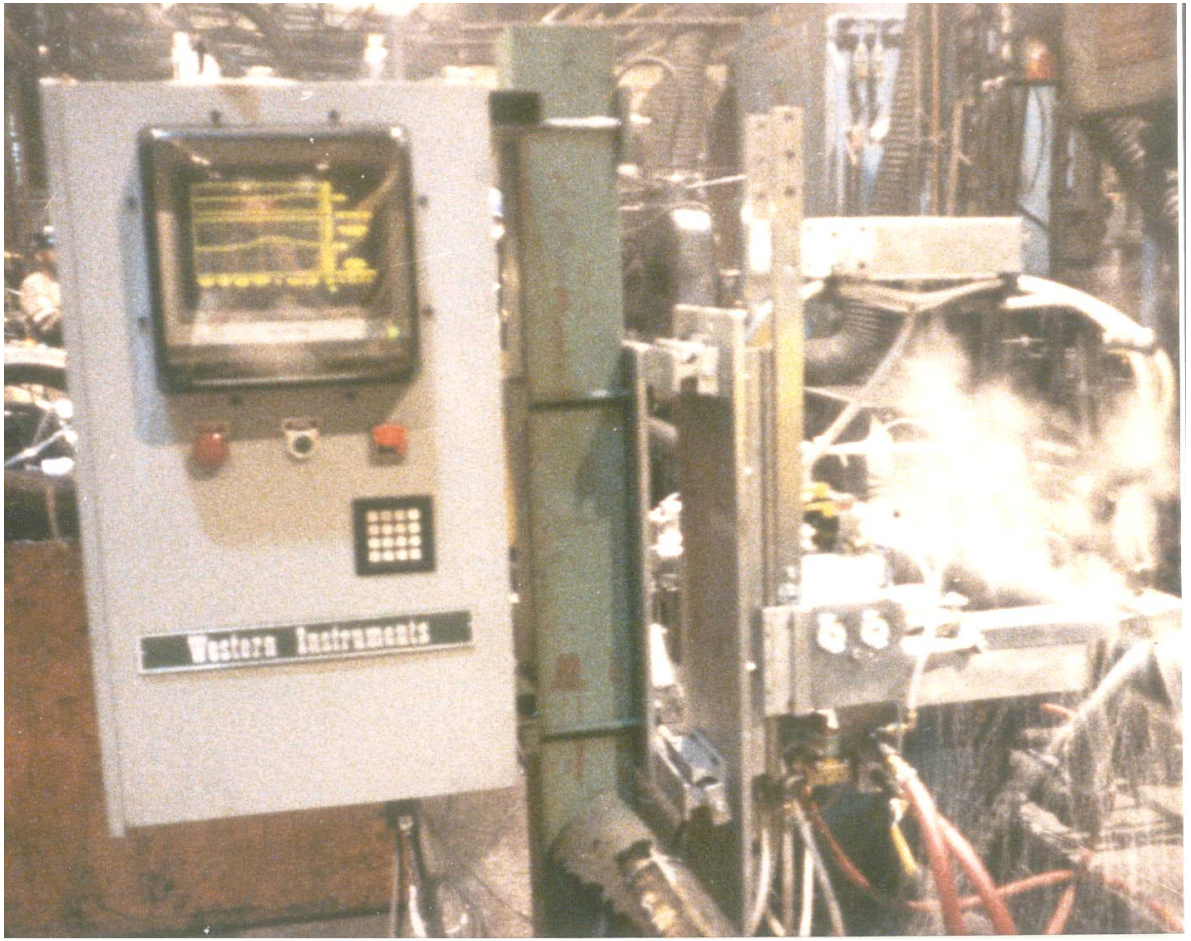
This FG7000 is installed 6 meters downstream of a 1200 kW Welder and 4 meters upstream of Seam Annealers (2000kW).

2004

Flash Gauge

Western Instruments

Note: Computer Profile, and Steam around the Probe



1989

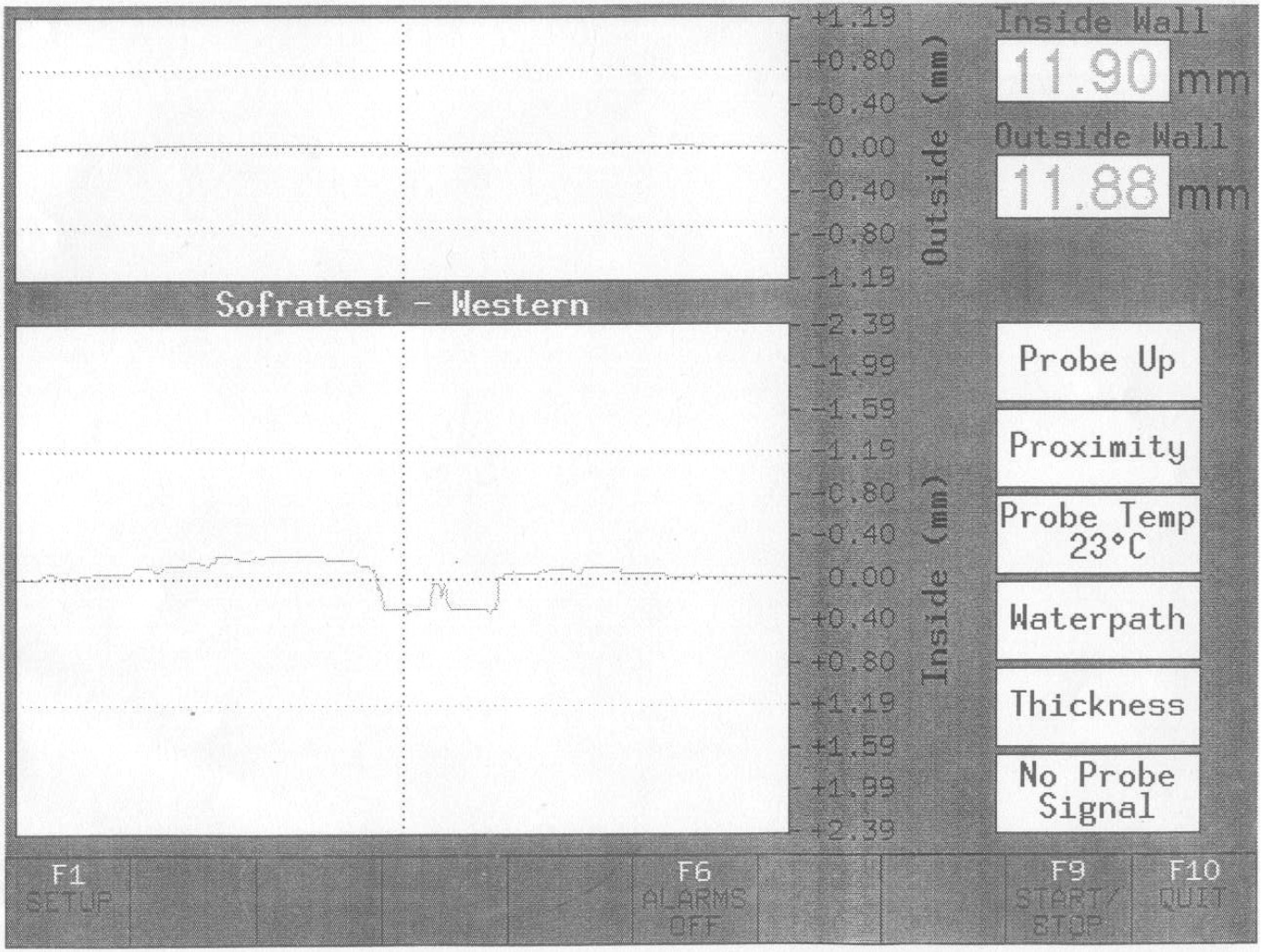
Arvedi's Flash Gauge

Western Instruments

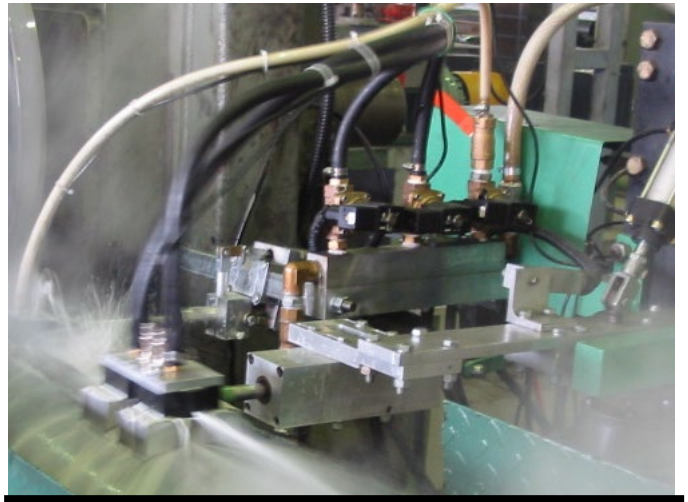
1987

Western Instruments

Flash Gauge Profile



Flash Gauge - FG7200



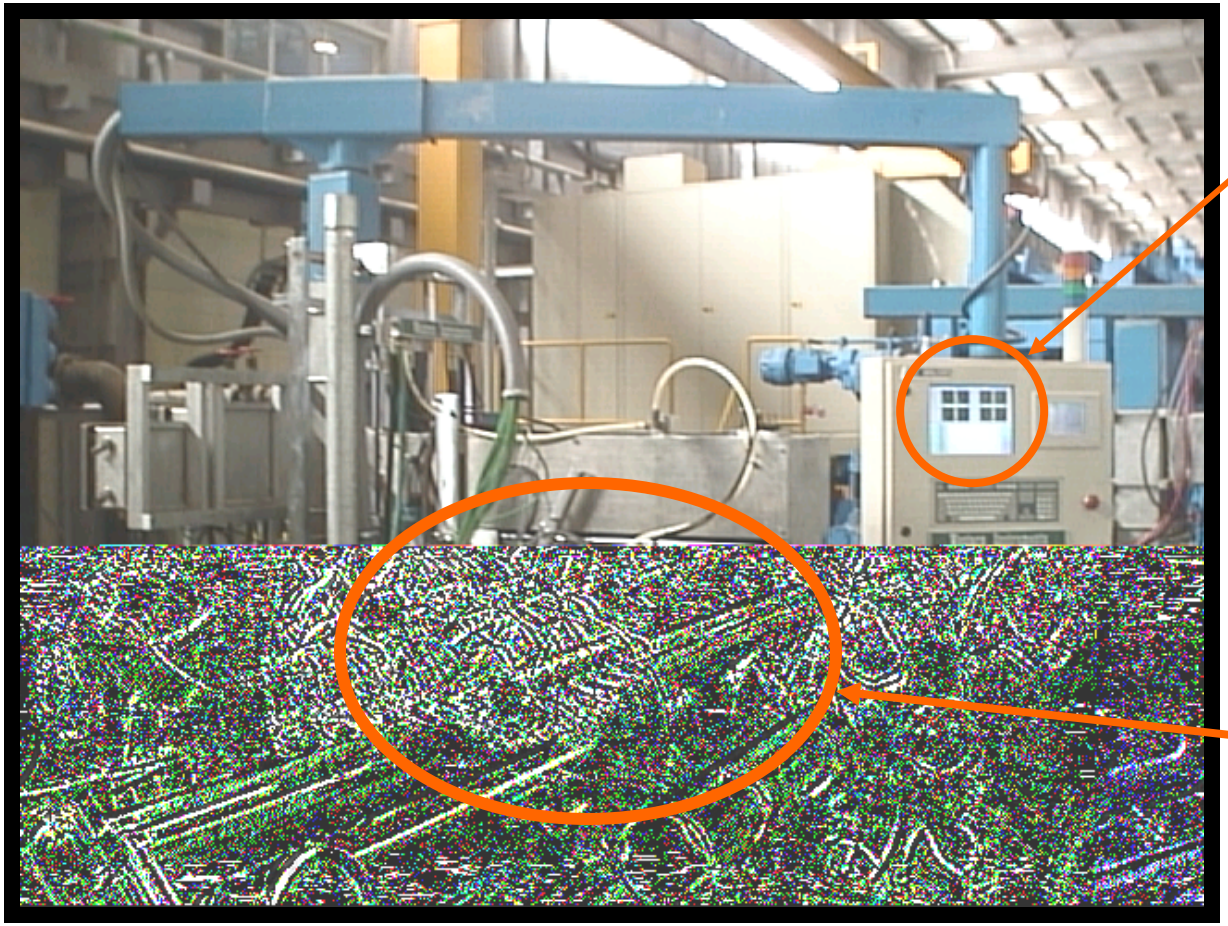
Flash Gauge Probe on Hot Weld, 4 meters downstream of Welder, and 4 meters upstream of Seam Annealers

Flash Gauge Pendant Cabinet on 14” Mill.

2006

16” Mill Line Testing System

Western Instruments



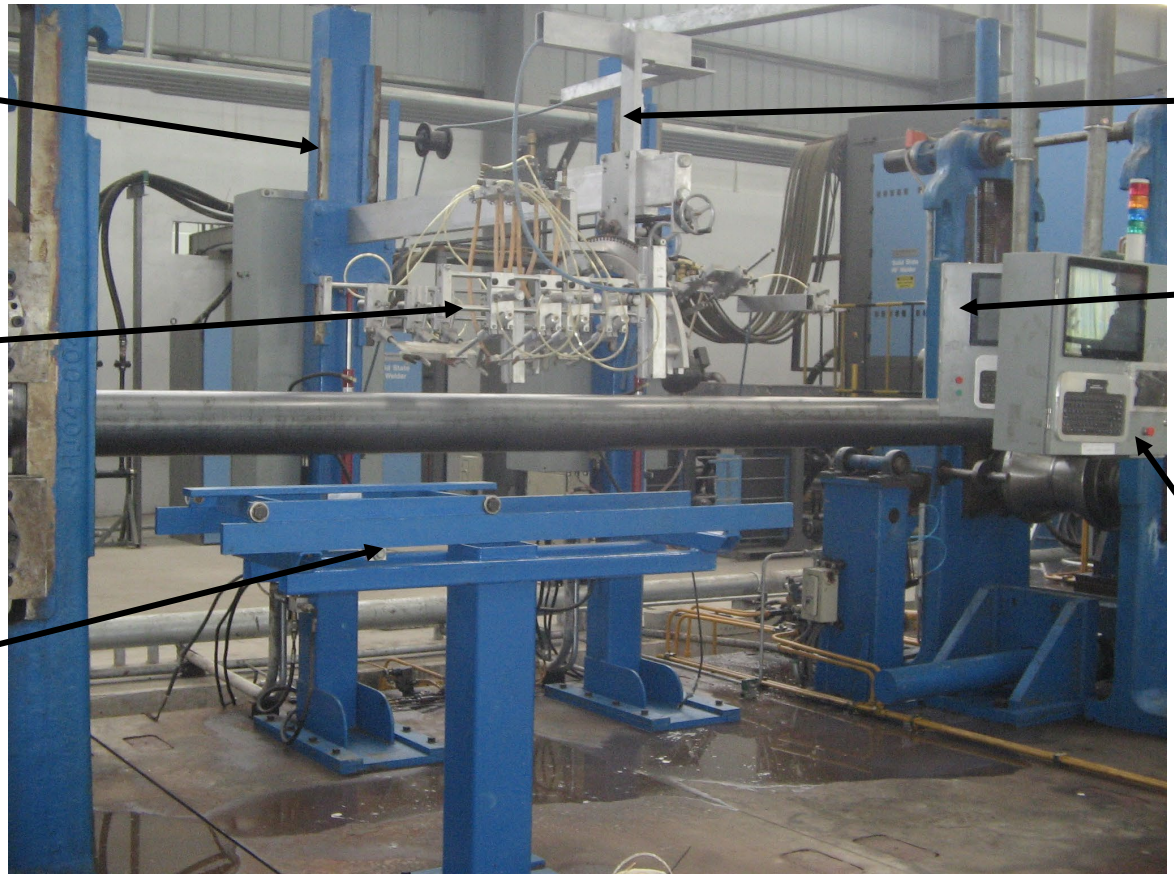
8 Channels
(Note A-Scans)

Test Head

Western Instruments

24” Mill Line Testing Zone

(Flash Gauge Hidden by 6 Channel UT)

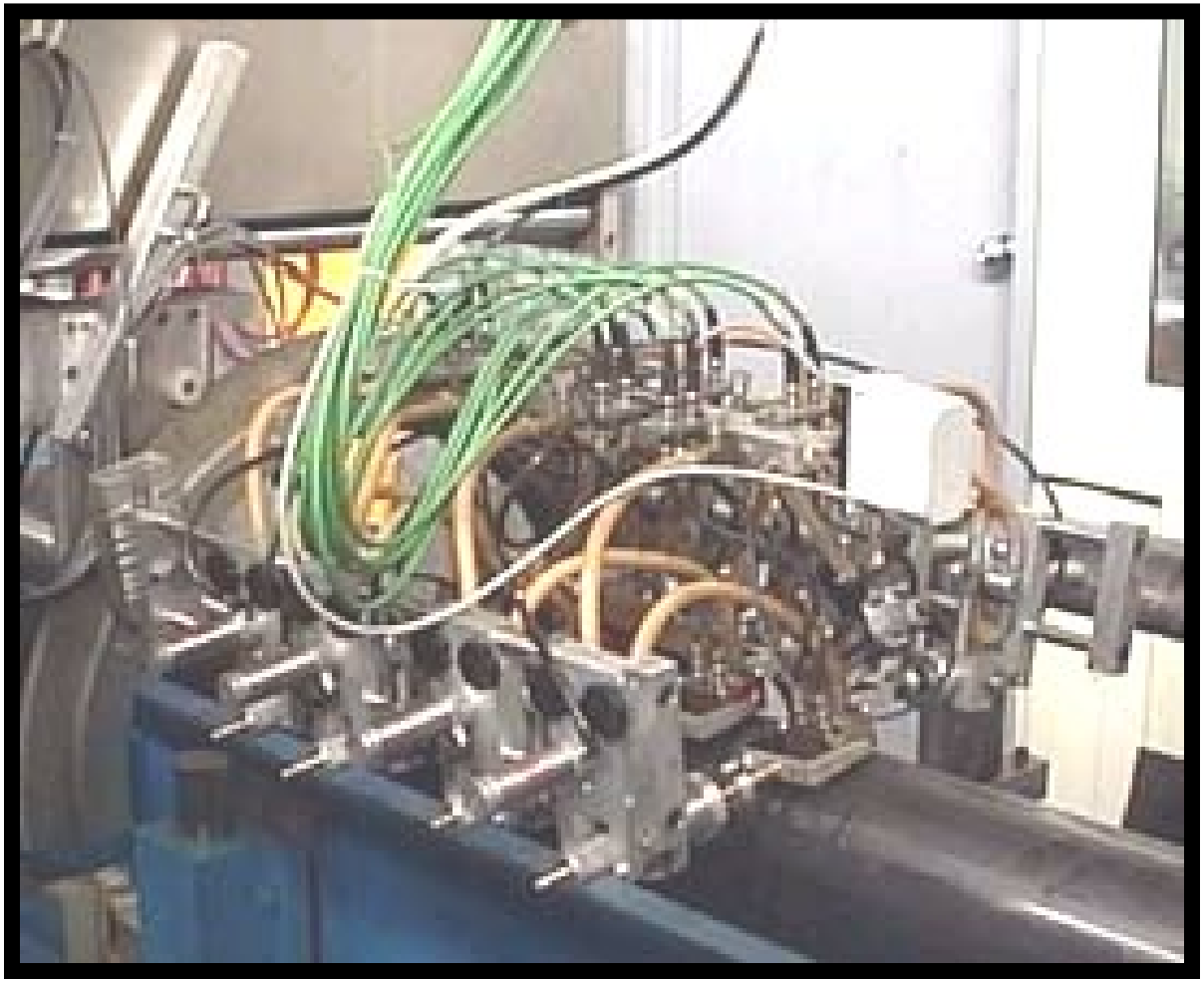


Western Instruments

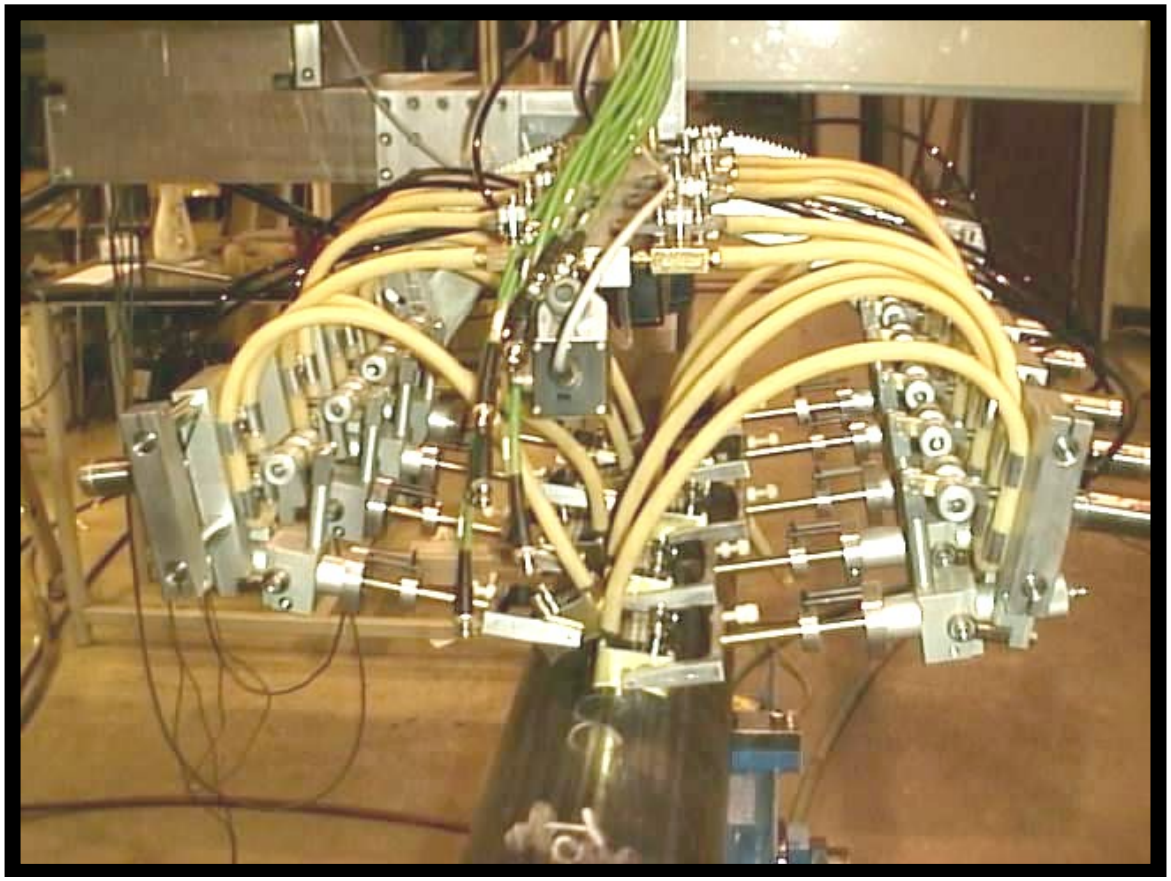
24” Mill Line Testing Zone
(6 Channel UT & Flash Gauge)

Western Instruments

Test Head (16”)



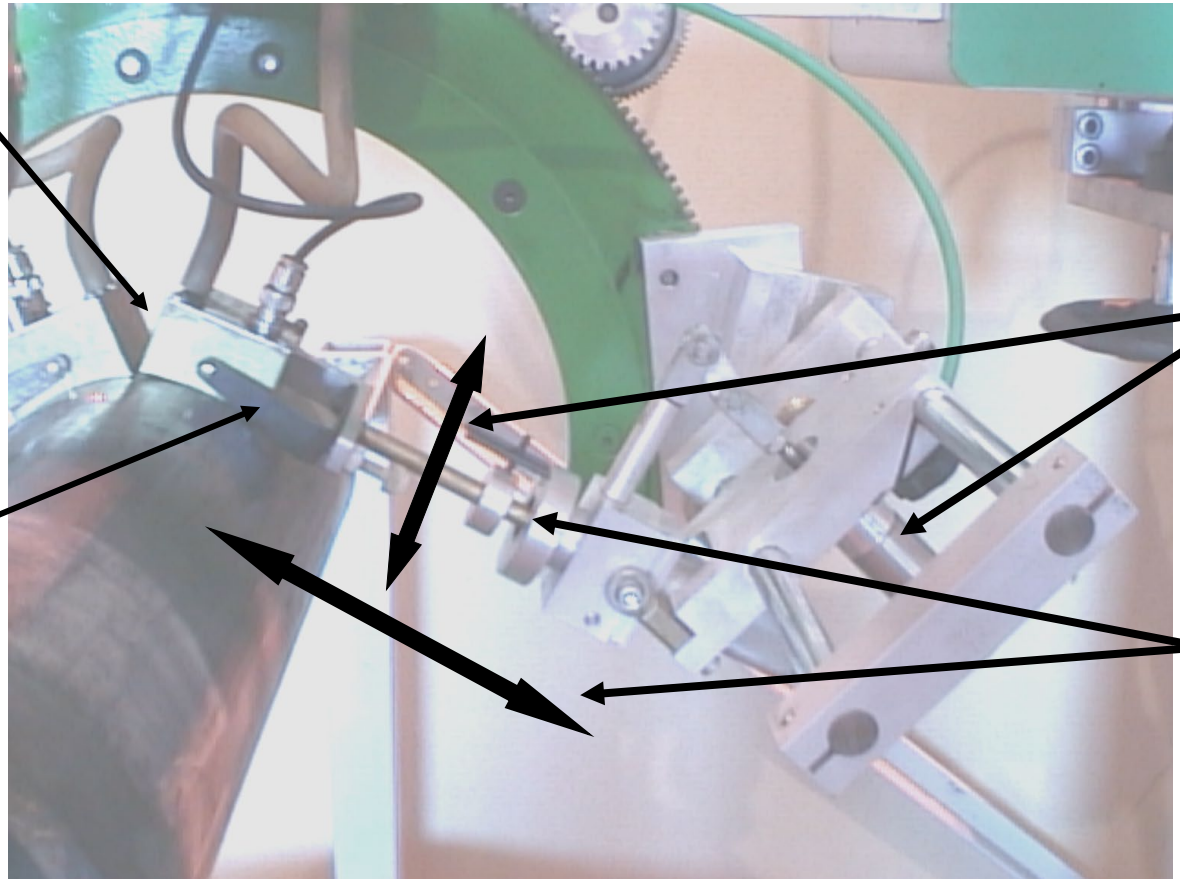
10 Channel Mill Line Test Head



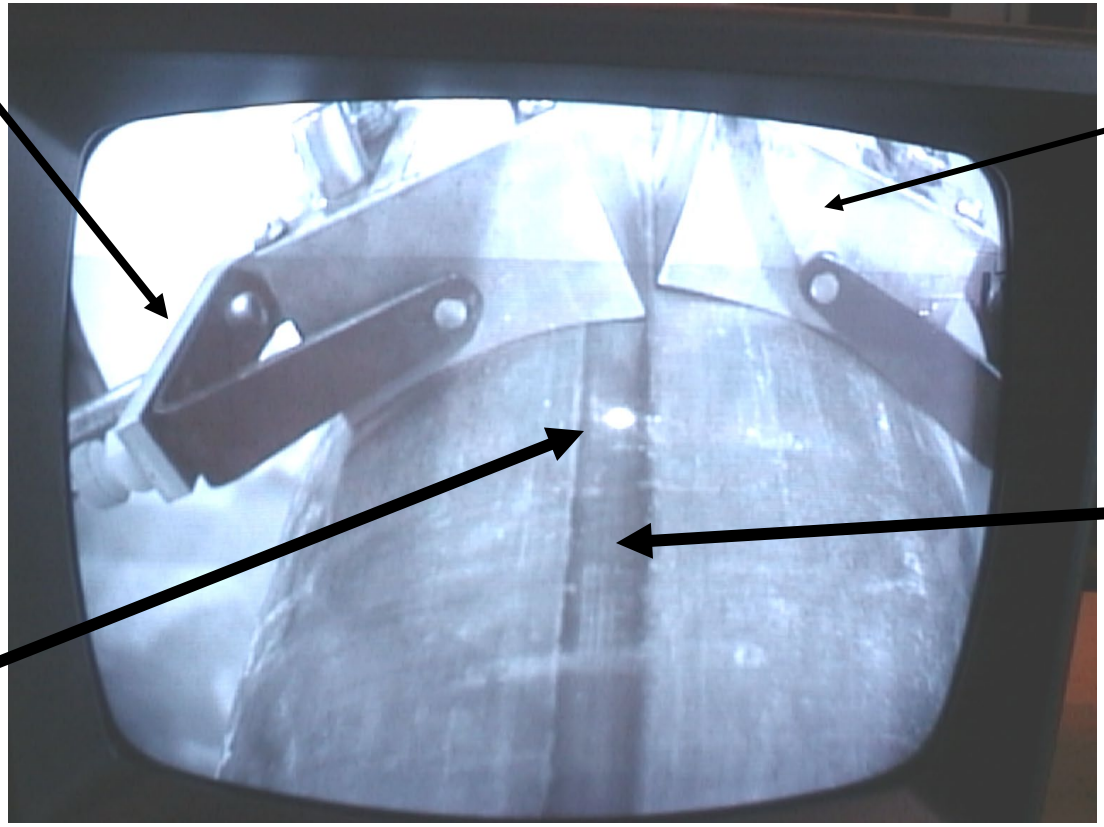
10 Probes, & 1 Proximity Safety Probe.

Probe Suspension (12” Unit)

Western Instruments



Operator's View of CCTV



Western Instruments

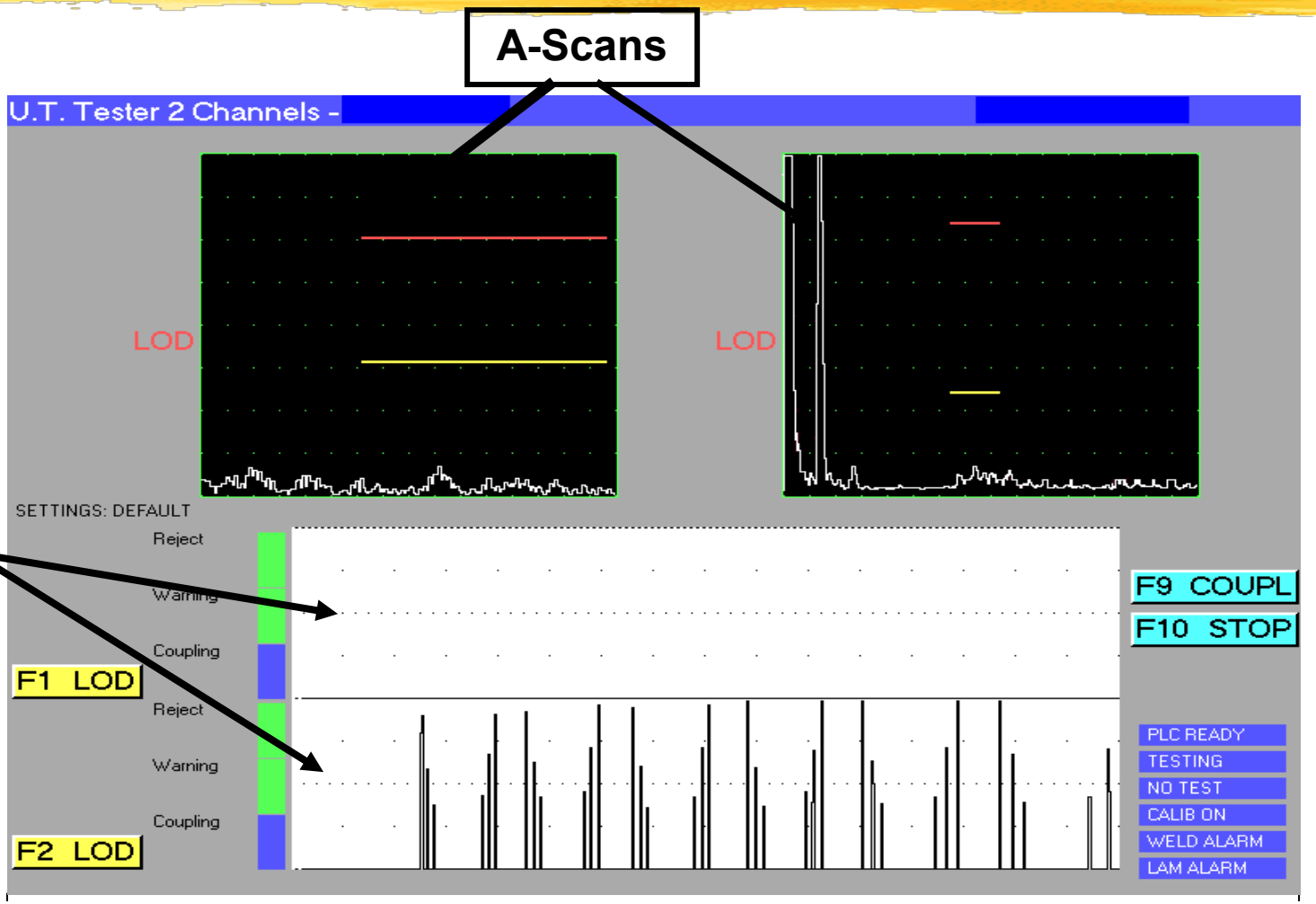
Typical 2 Channel Display

DOS Based System.

(circa 1997)

2 Channel Event Envelop

(Digital Chart Recorder)



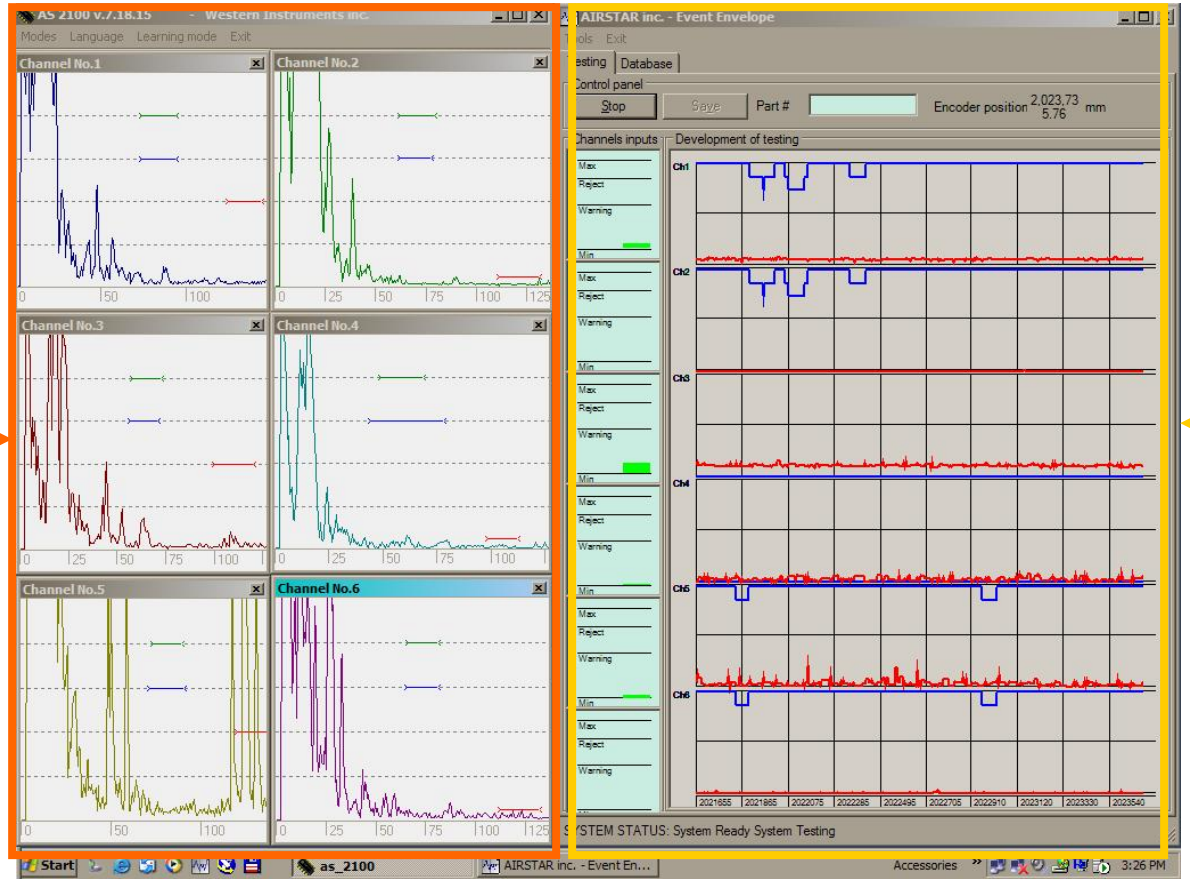
Western Instruments

Typical 6 Channel Display

Windows Based Program

(Circa 2001)

A-Scans



Event Envelop (Digital Chart Recorder

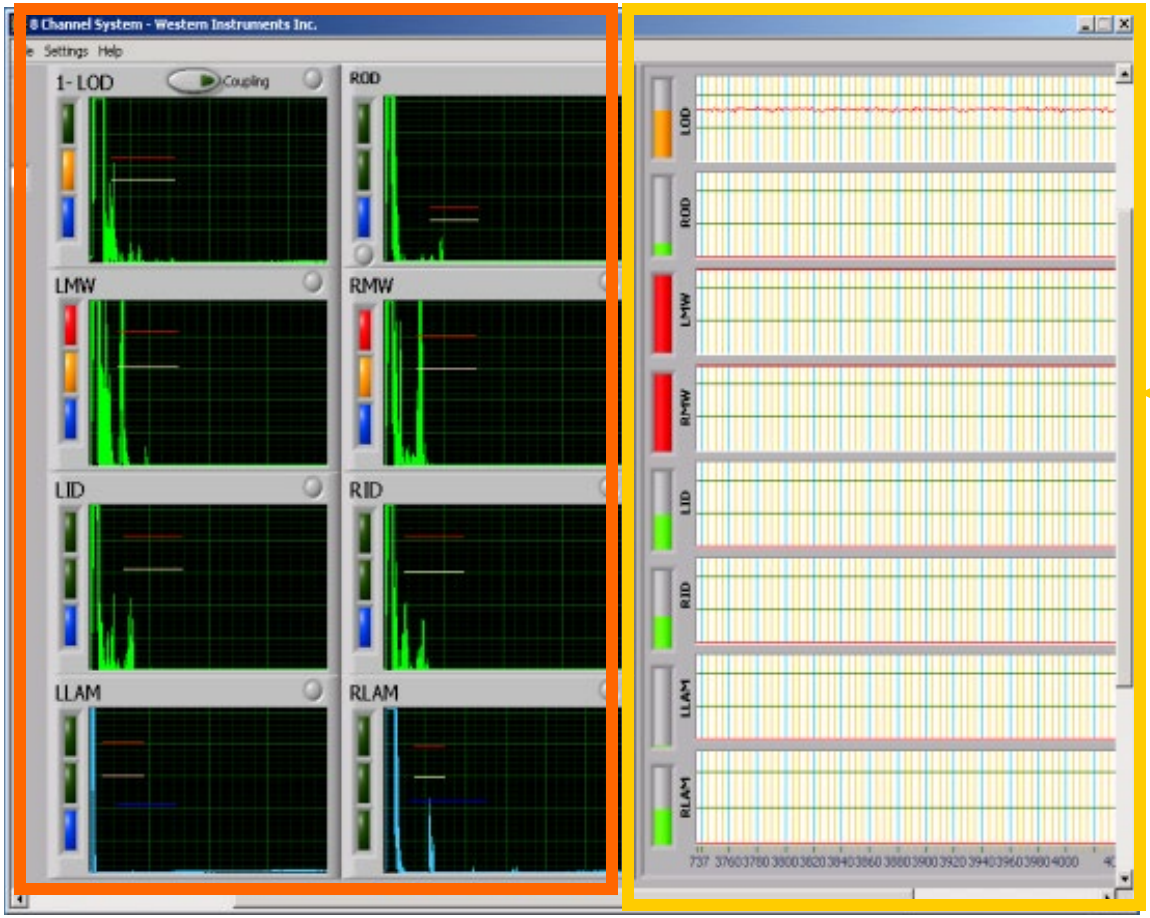
Typical 8 Channel Display

(6 Weld, 2 Edge/End Lamination)

Windows Based Program

(Circa 2005)

A-Scans



Event Envelop (Digital Chart Recorder

Western Instruments

Channel Set-up Screen

Level 1

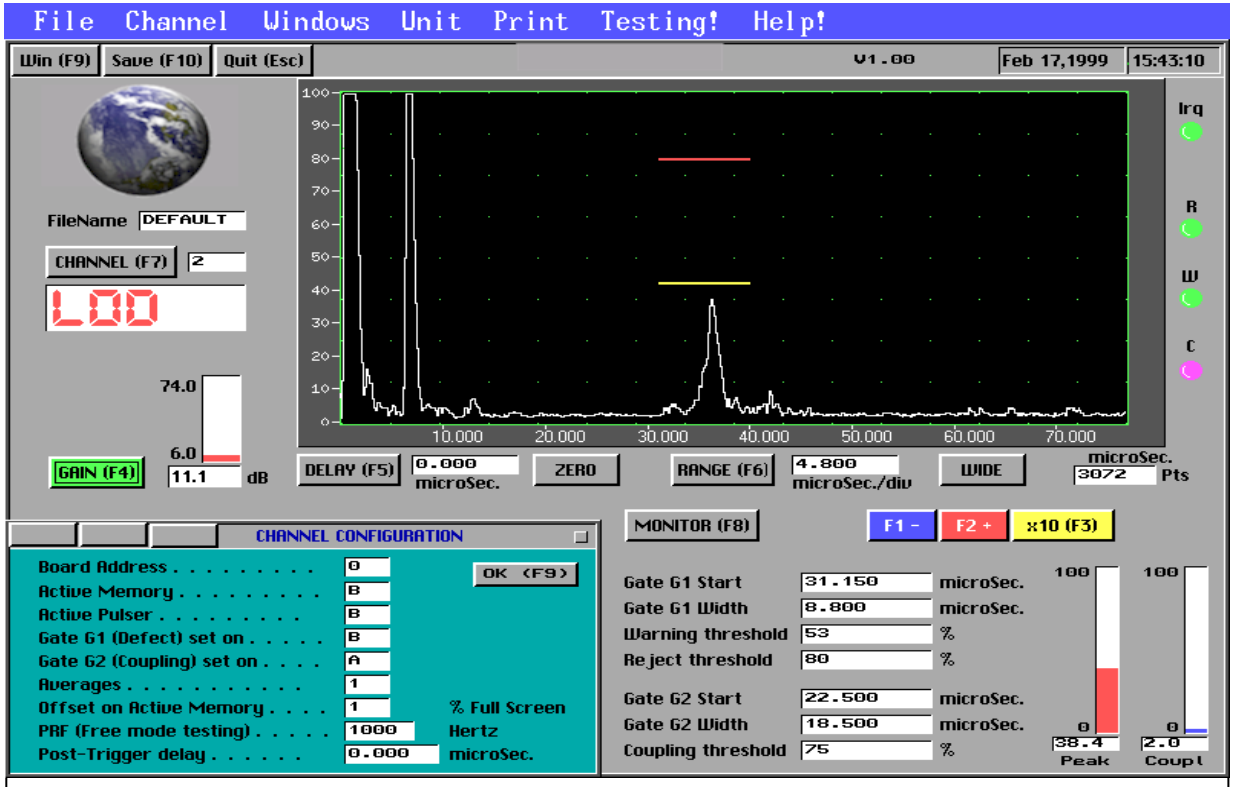
- Gain
- Range
- Delay
- Velocity
- Reject
- Gate Position (x3)

Level 2

- Storage by Size/Number
- Pulser/Receiver
- Alarm Outputs

Level 3

- All of Above
- Selectable Lock-out

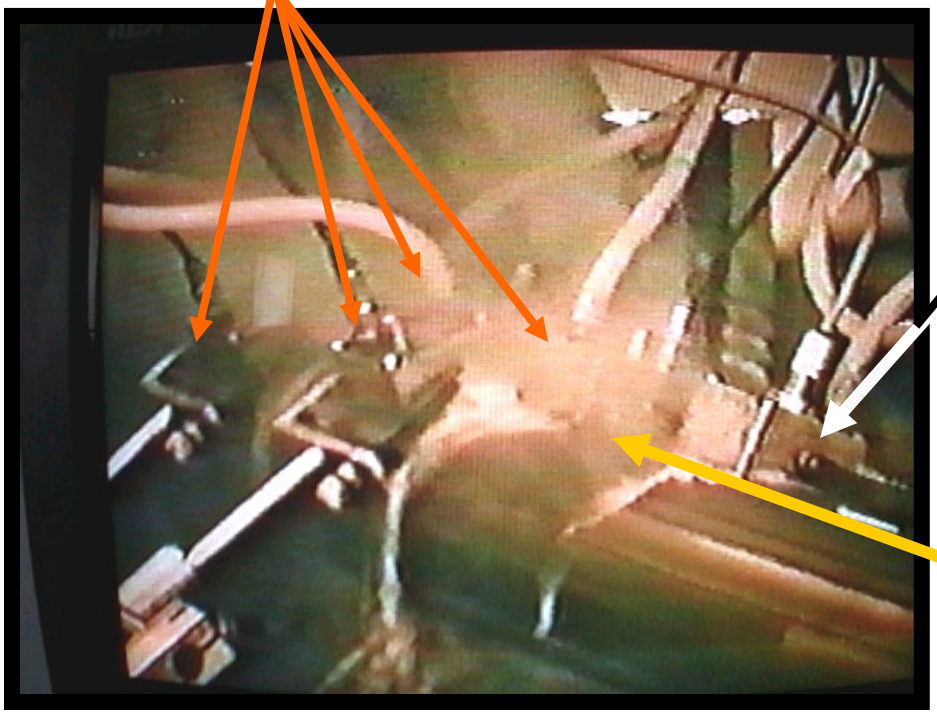


Western Instruments

Hot Mill-Line Testing

Western Instruments

4 Weld Testing Probes



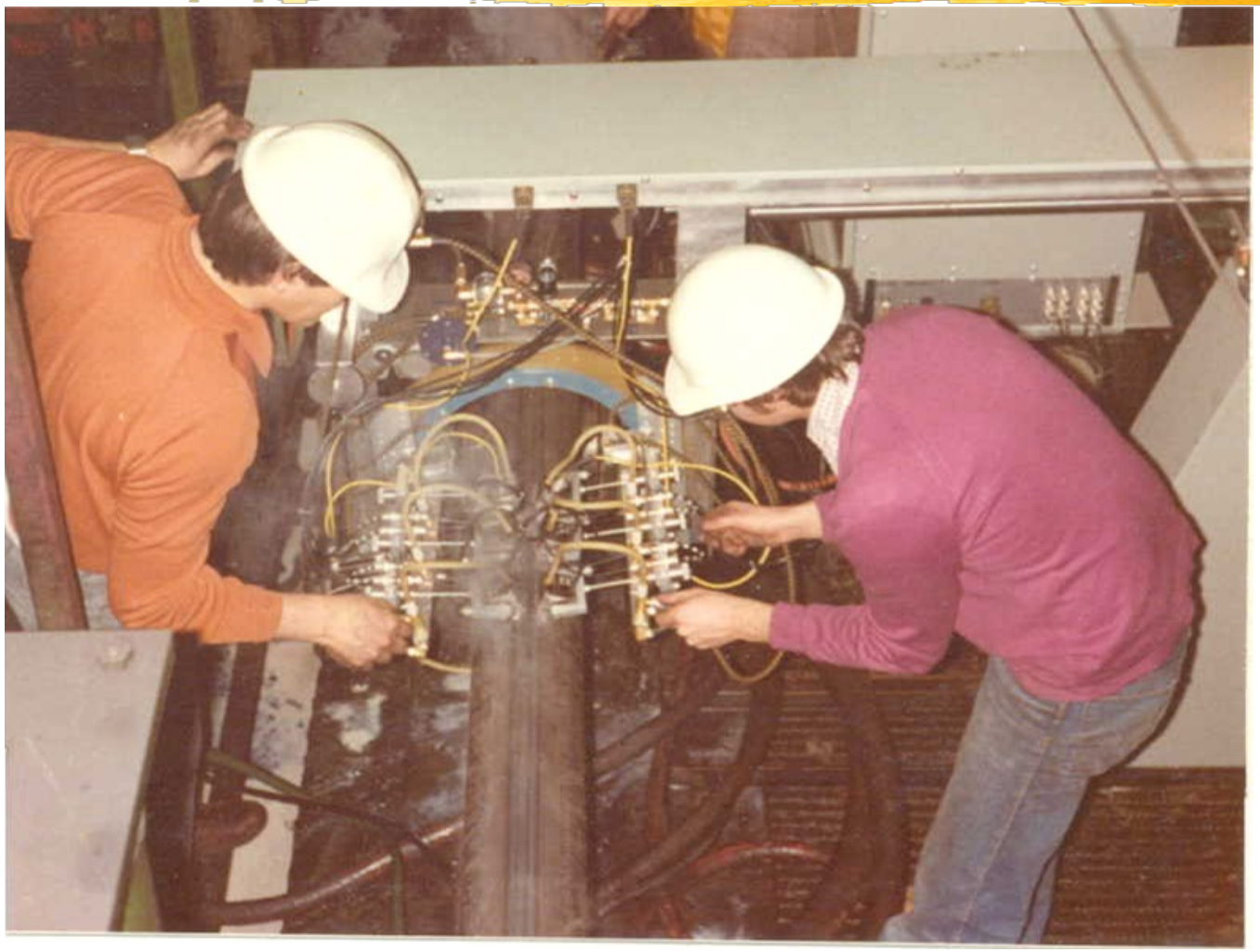
Automatic Proximity Safely Probe, for Automatic Probe Lift-off

Steam, Tube Speed 250ft/min (76m/min)

6 Channel Mill Line System

Installed between Welder and Seam Annealers

1971



Western Instruments

Bleed-Off Shoes

Installed Up-Stream of Annealers

Western's Standard 'Pipe Mill' UT Probe Suspensions.

Grounding Cables

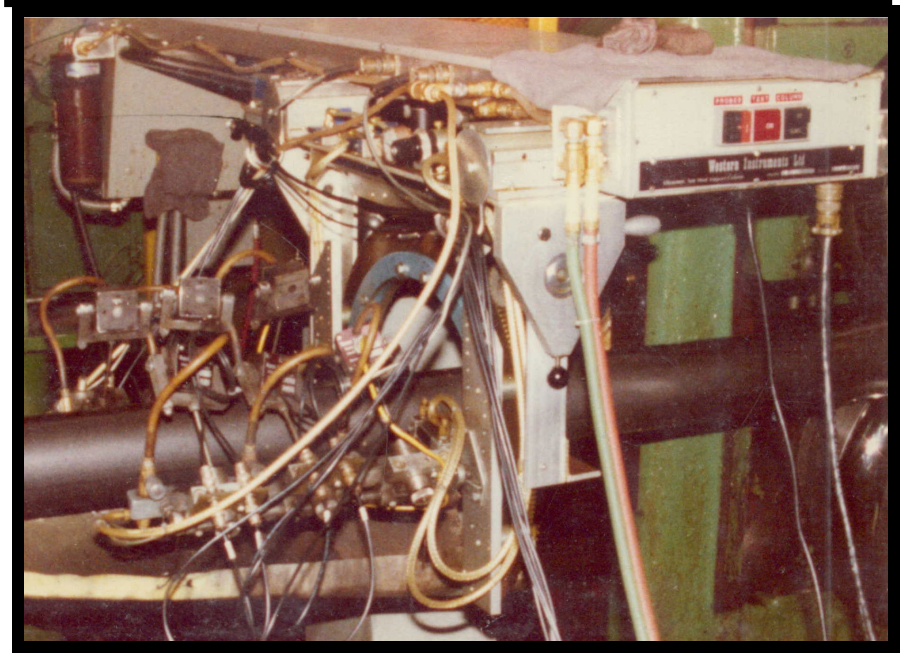
3 and 6 O'clock Shoes Shown.
9:00 Bleed-Off Shoe Hidden from View

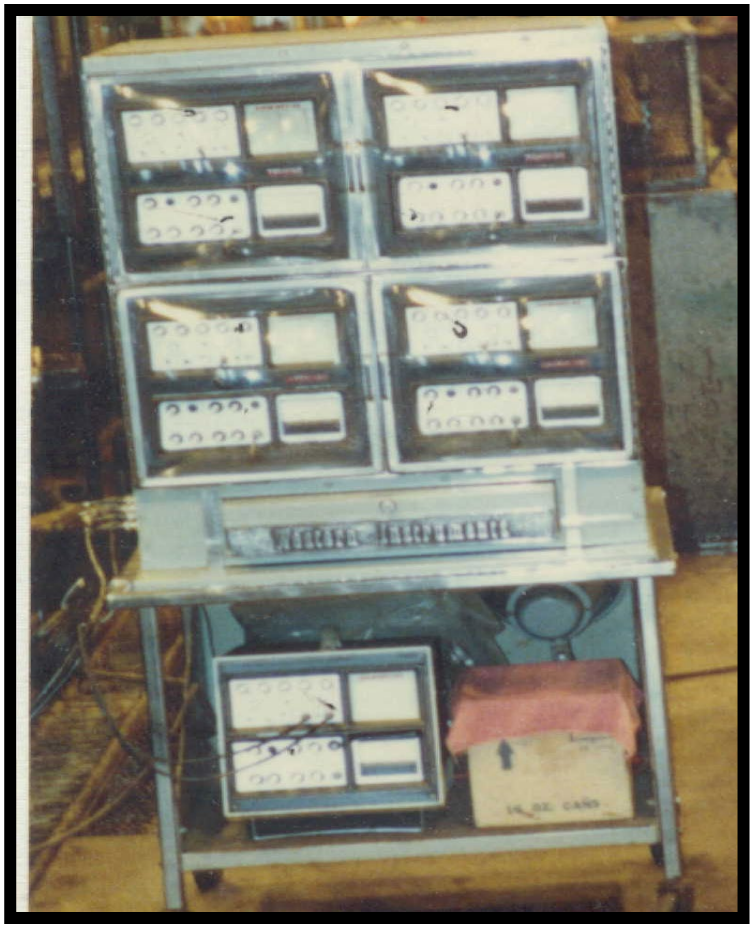
Western Instruments

5 Channel Mill-Line System

Western Instruments

This unit was installed in 1976, and has operated continuously on an Abbey Etna 12K mill, Producing up to 0.750” (19mm) wt.

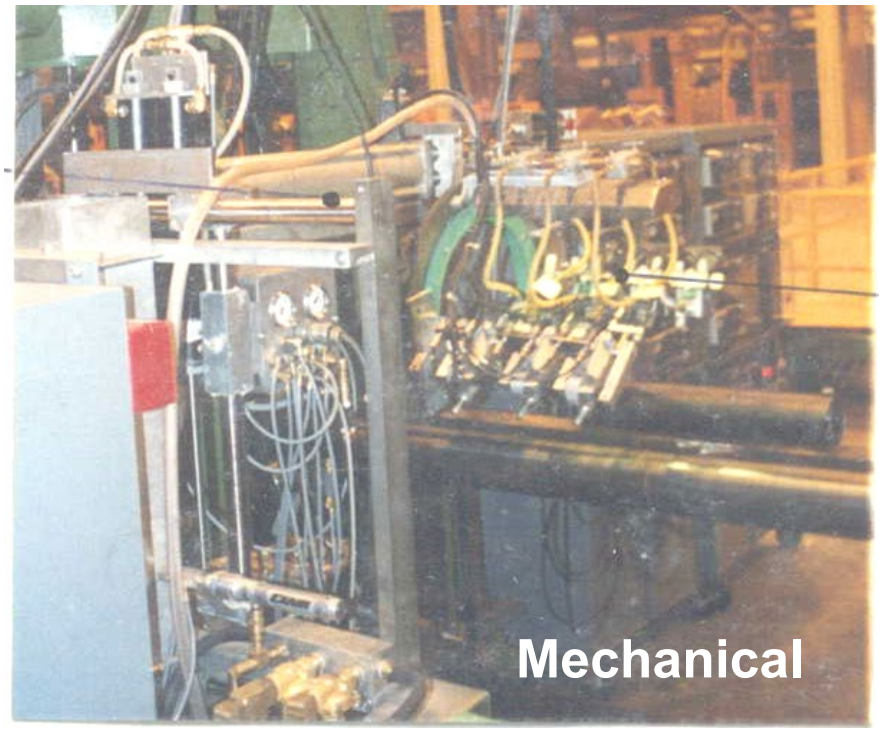




7 Channel Mill-Line System

1992

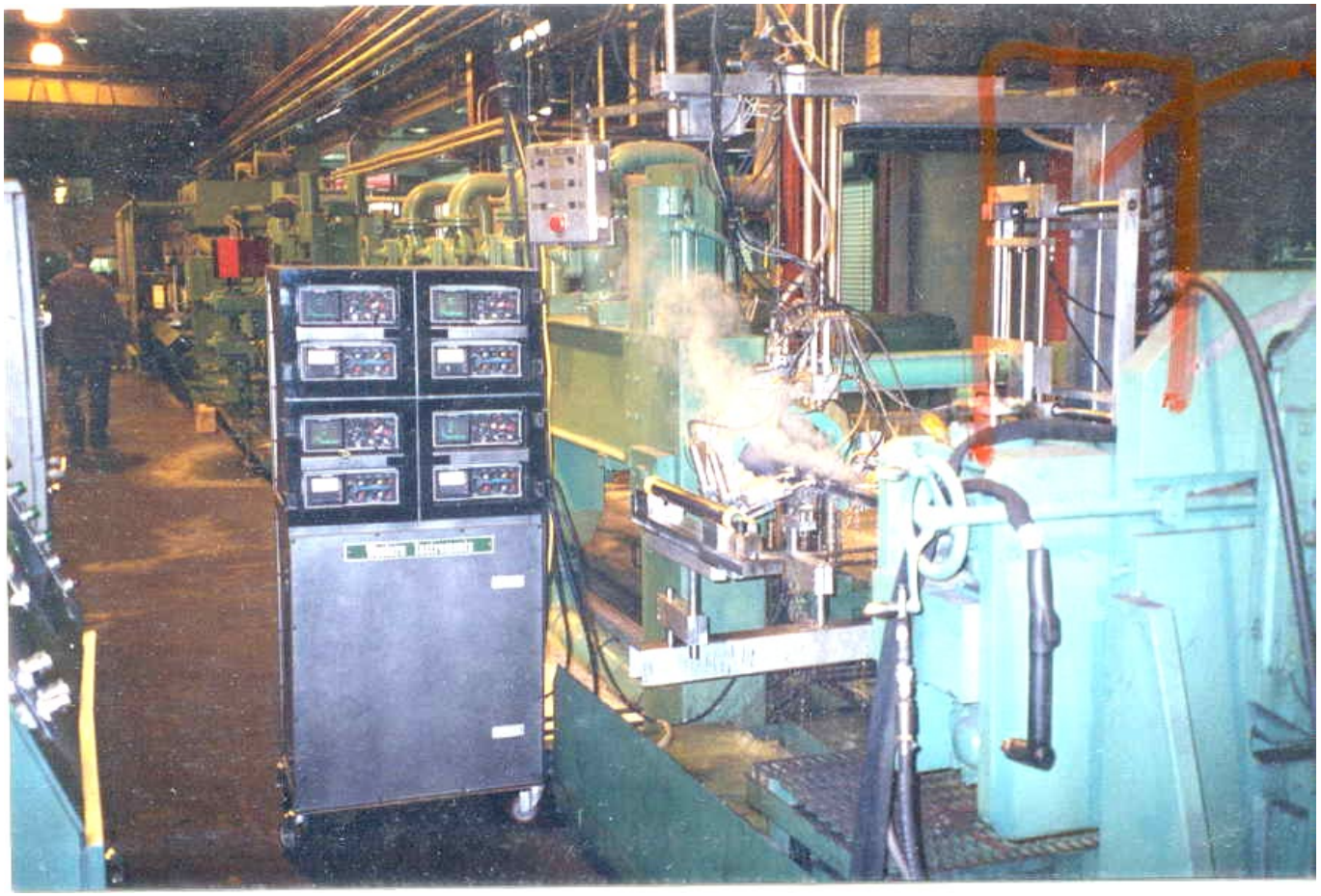
This 7 Channel Mill-Line System (4 Testing the Weld & 3 Lamination Testing) routinely tests wall thicknesses over 0.750” (19mm).



Western Instruments

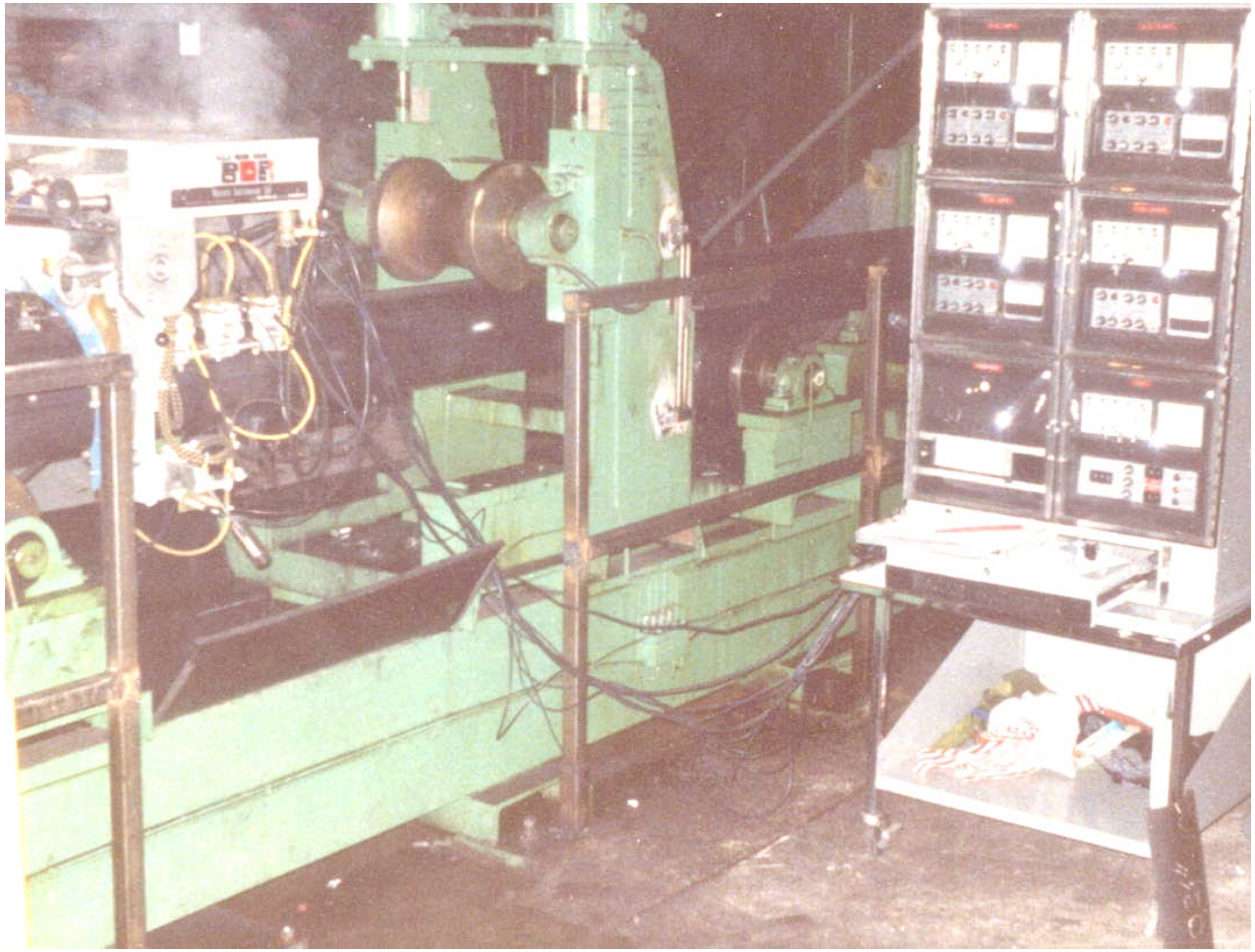
4 Channel Mill-Line System

1996



This unit is installed approximately 3 meters downstream of the welder and runs at speeds over 100m/min (300ft/min)

5 Channel Mill Line System

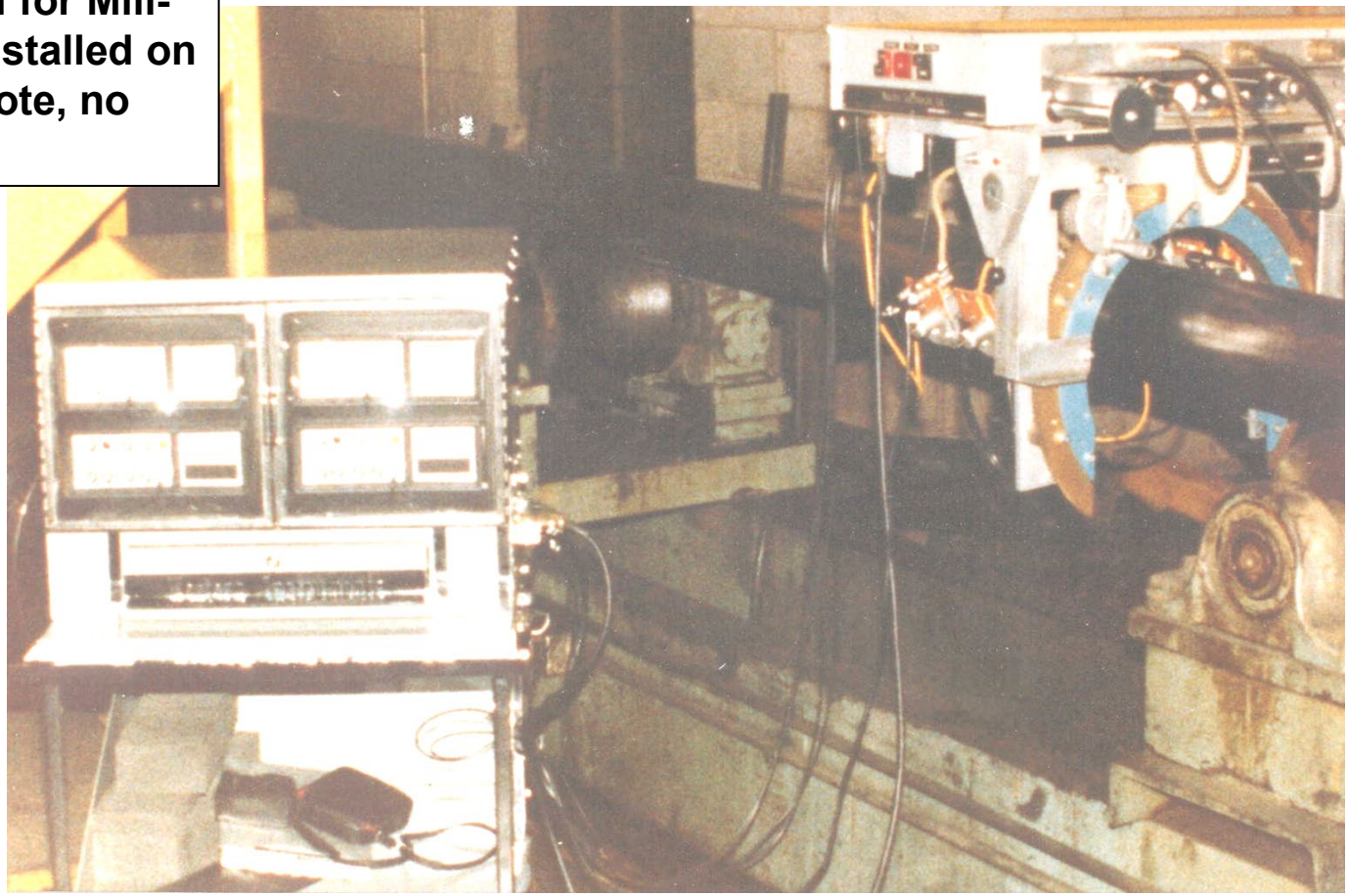


1974

Installed on 12K
Abbey Etna Mill

2 Channel Conveyer-Line Unit

Unit manufactured for Mill-line Testing and installed on Conveyer-Line. Note, no pinch rolls.

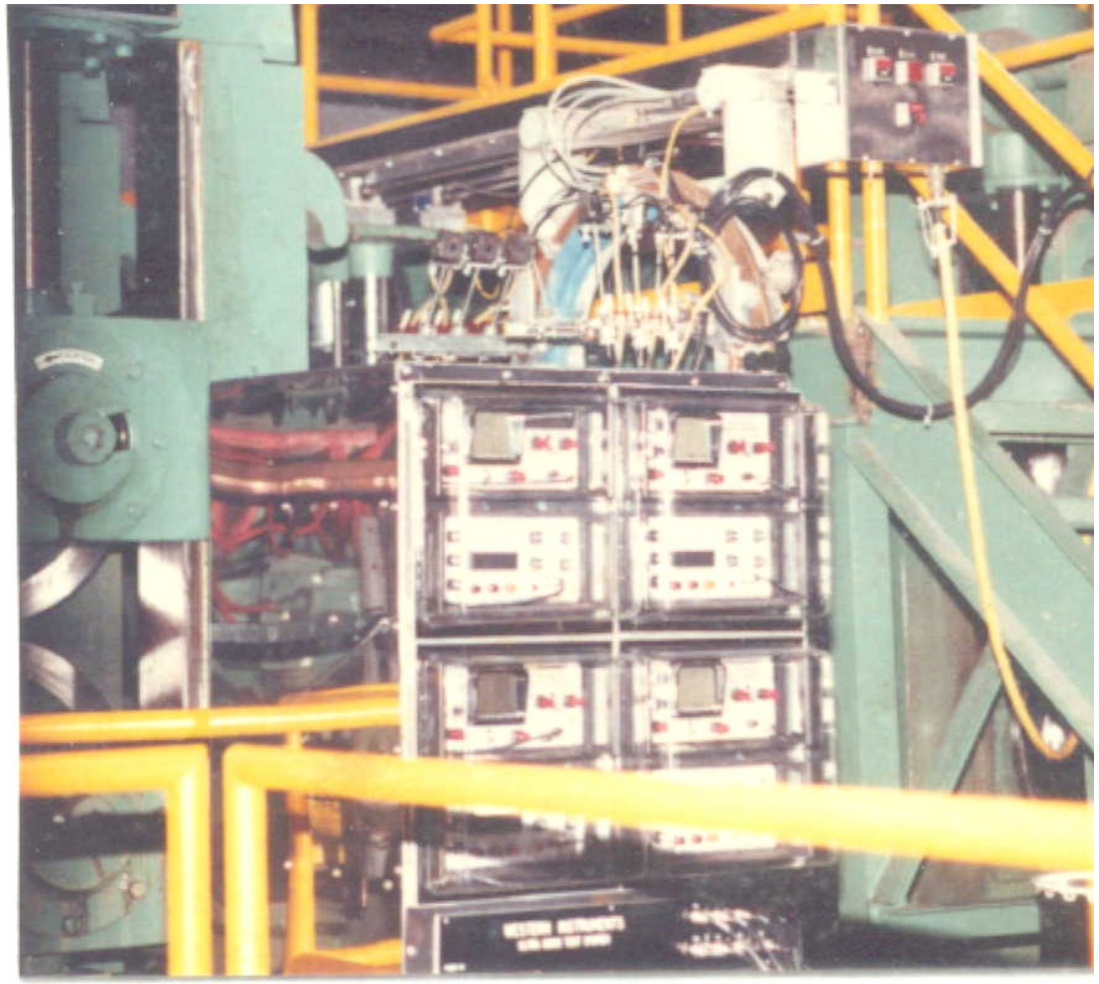


Western Instruments

20”, 4 Channel System

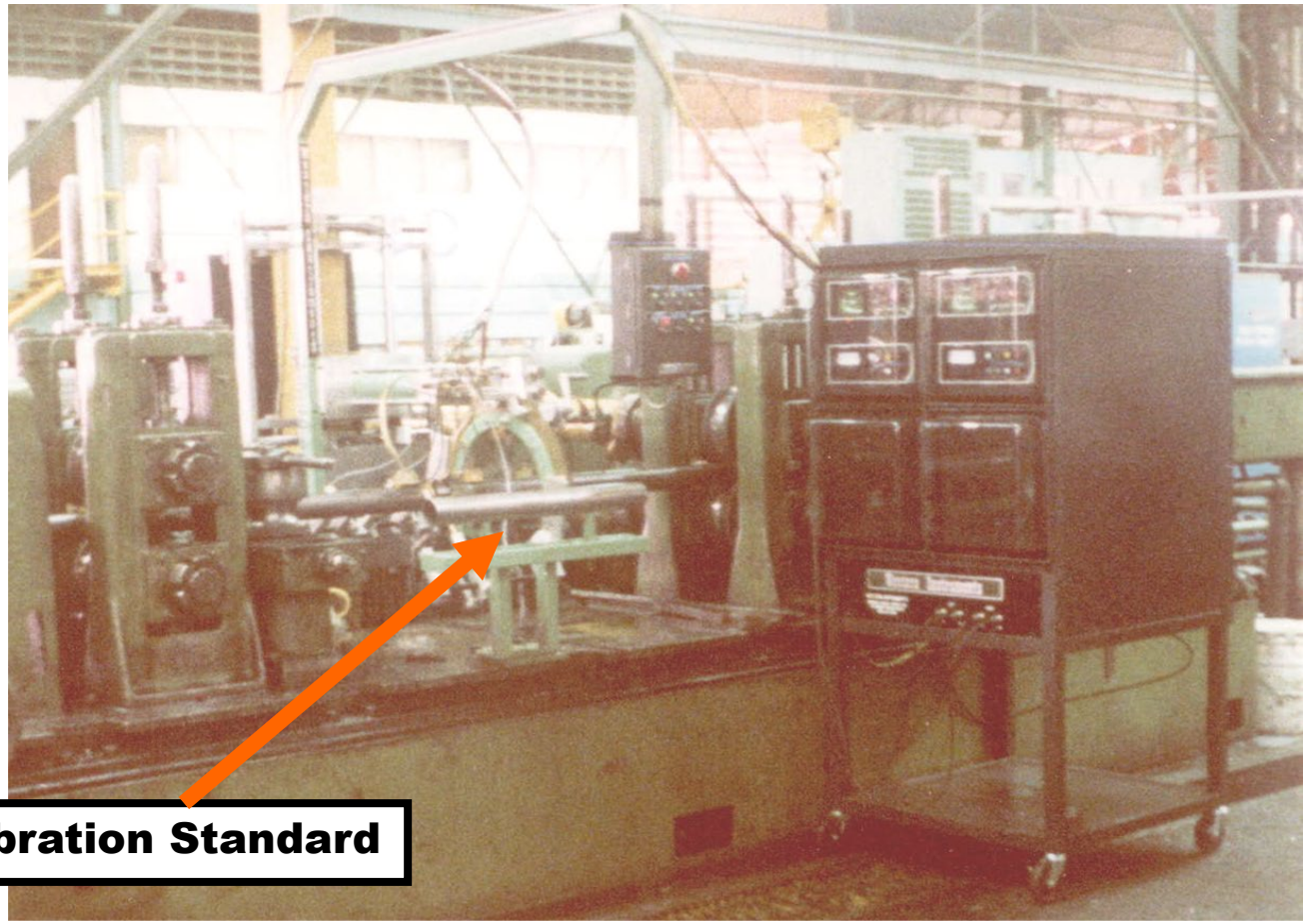
Western Instruments

1984



2 Channel Mill-Line System

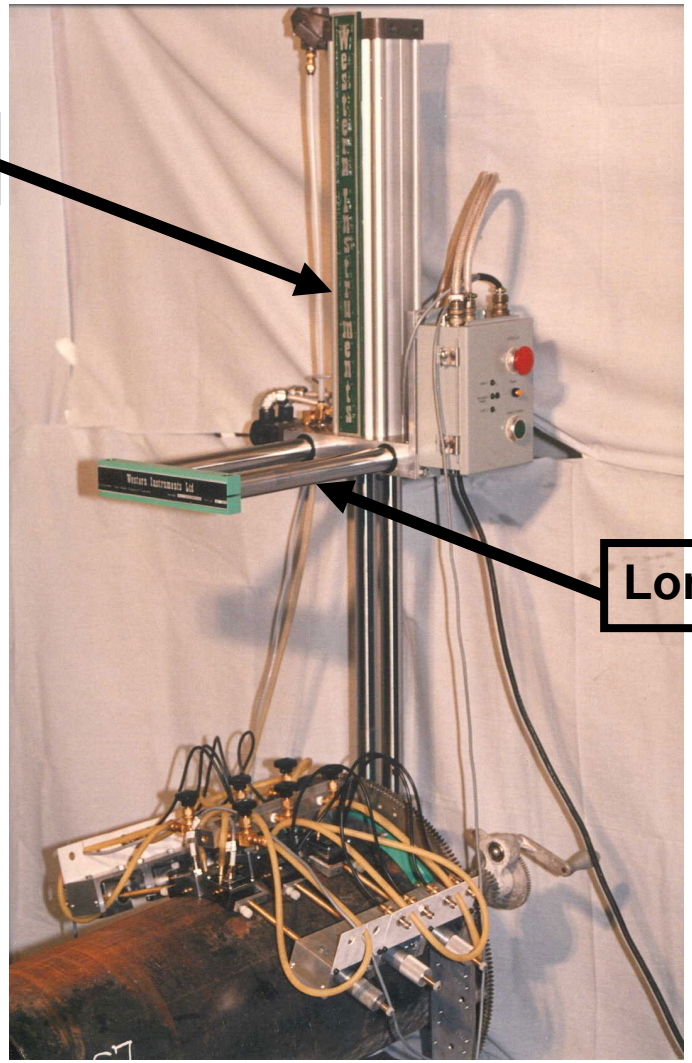
1993



Western Instruments

Western Instruments

4 Channel Retrofit



1988

Defects

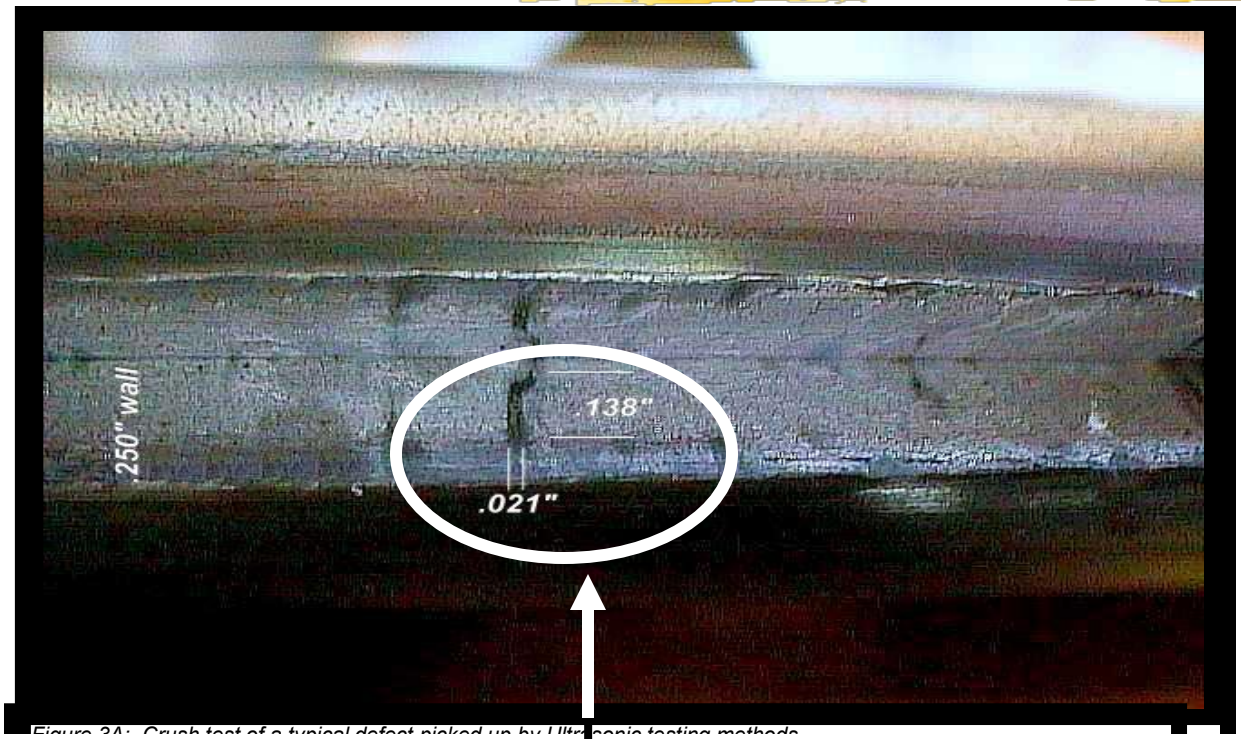
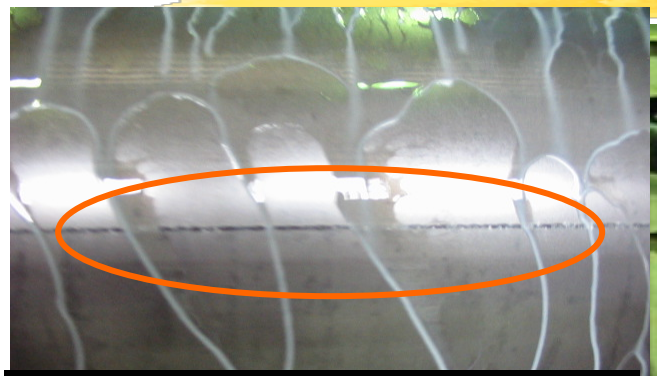


Figure 3A: Crush test of a typical defect picked up by Ultrasonic testing methods

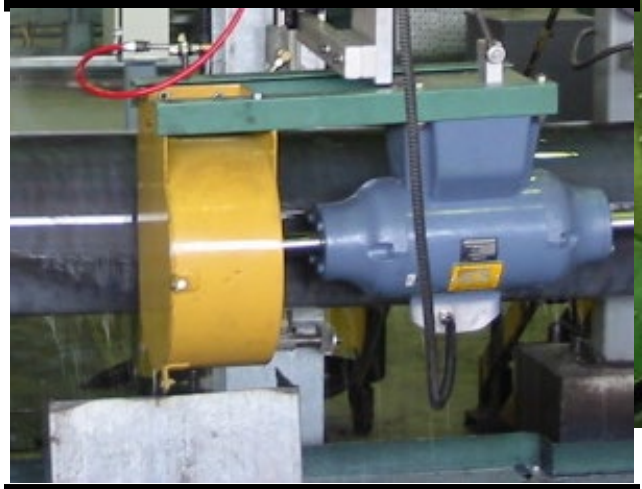
Crushed Sample, with typical Defect

Western Instruments

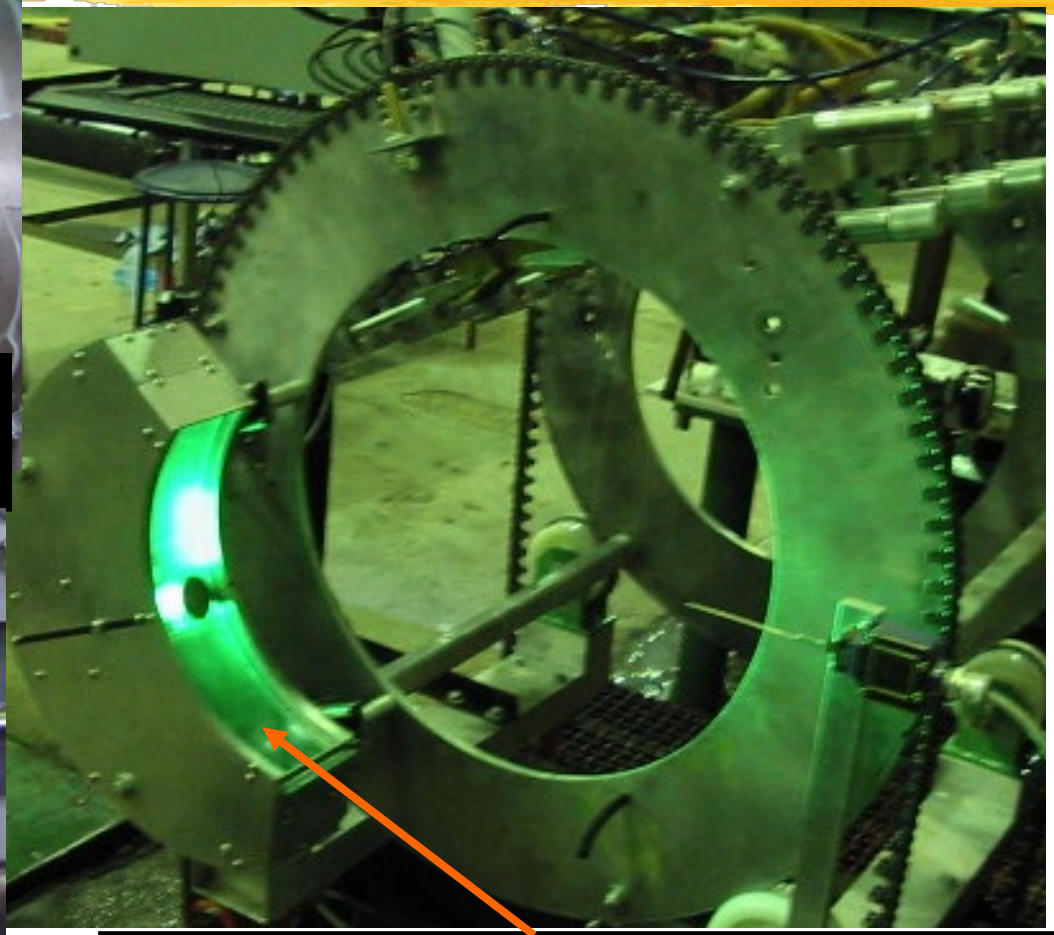
Fuzzy Line® Automatic Weld Seam Follower System



Buffed Line, after application on Mill Line.



Line Buffer Head.

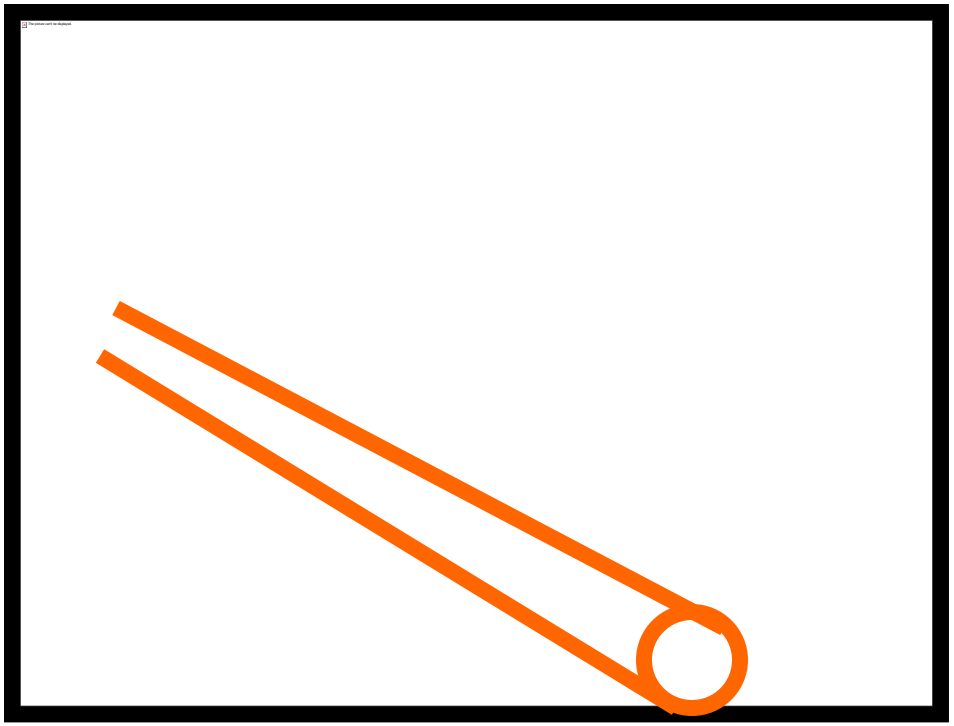


Camera and Light Source Housing on Roller Frame of Conveyer Line Testing System.

Overhead Beam System

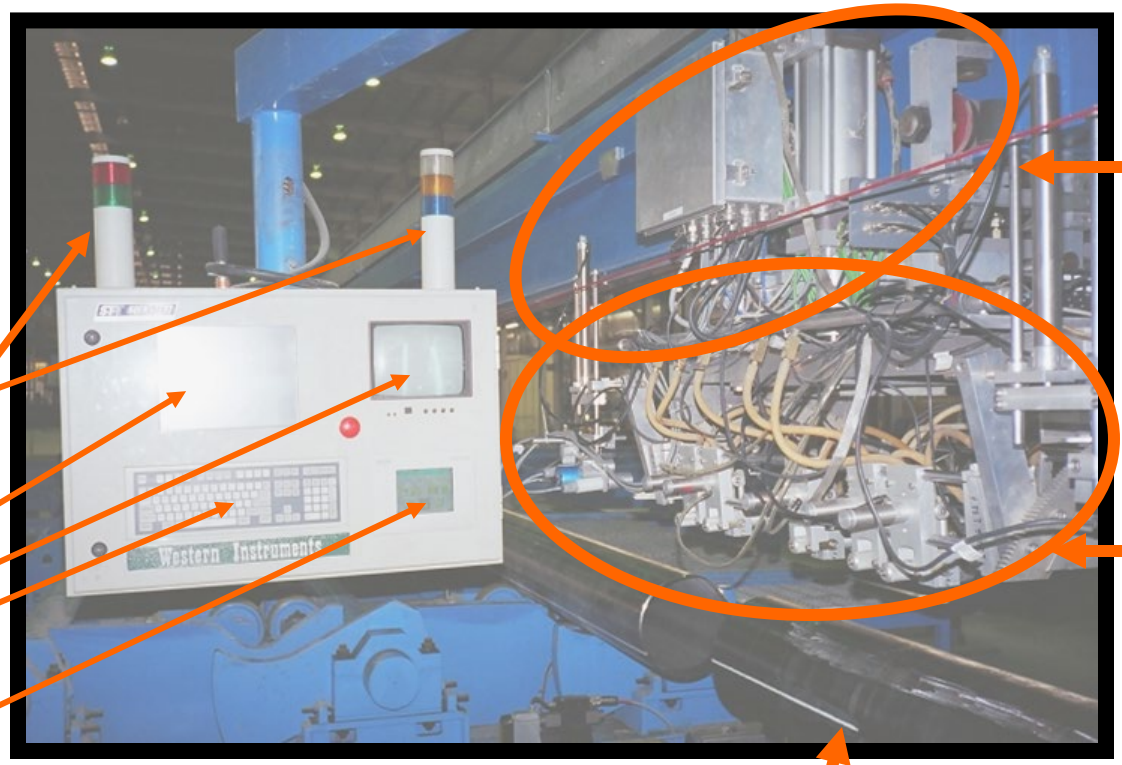
Western Instruments

2000



The Overhead Beam, on this specific unit, was 67’ Long. The system was designed to test pipe, up to 16 meters long (6 5/8” - 16” OD), for Body, End, Weld Edge Laminations and Weld Interface Defects. Maximum cycle time of 69 seconds per piece

Full Body Test Head



Operator *Station* Controls;

- Alarm and Status Lights/Horns
- Computer Monitor
- CCTV Monitor
- Key Board
- Touch Panel Controls

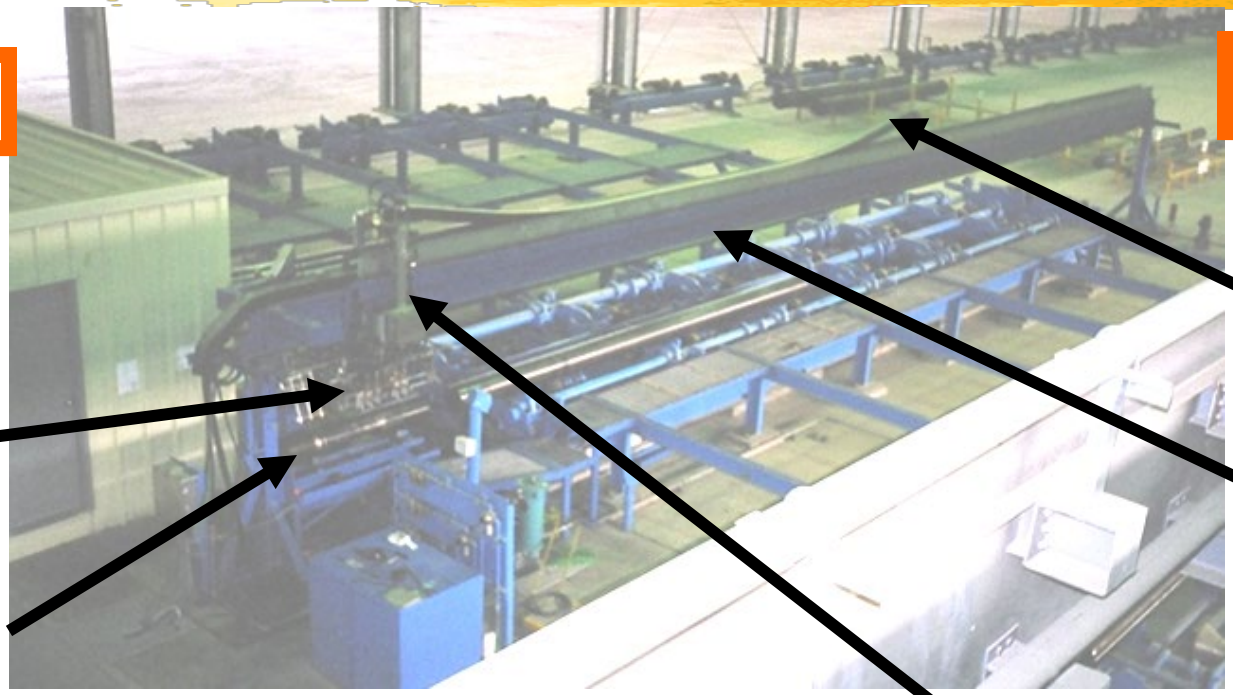
Longitudinal Travel Carriage

Test Head

Calibration Standard

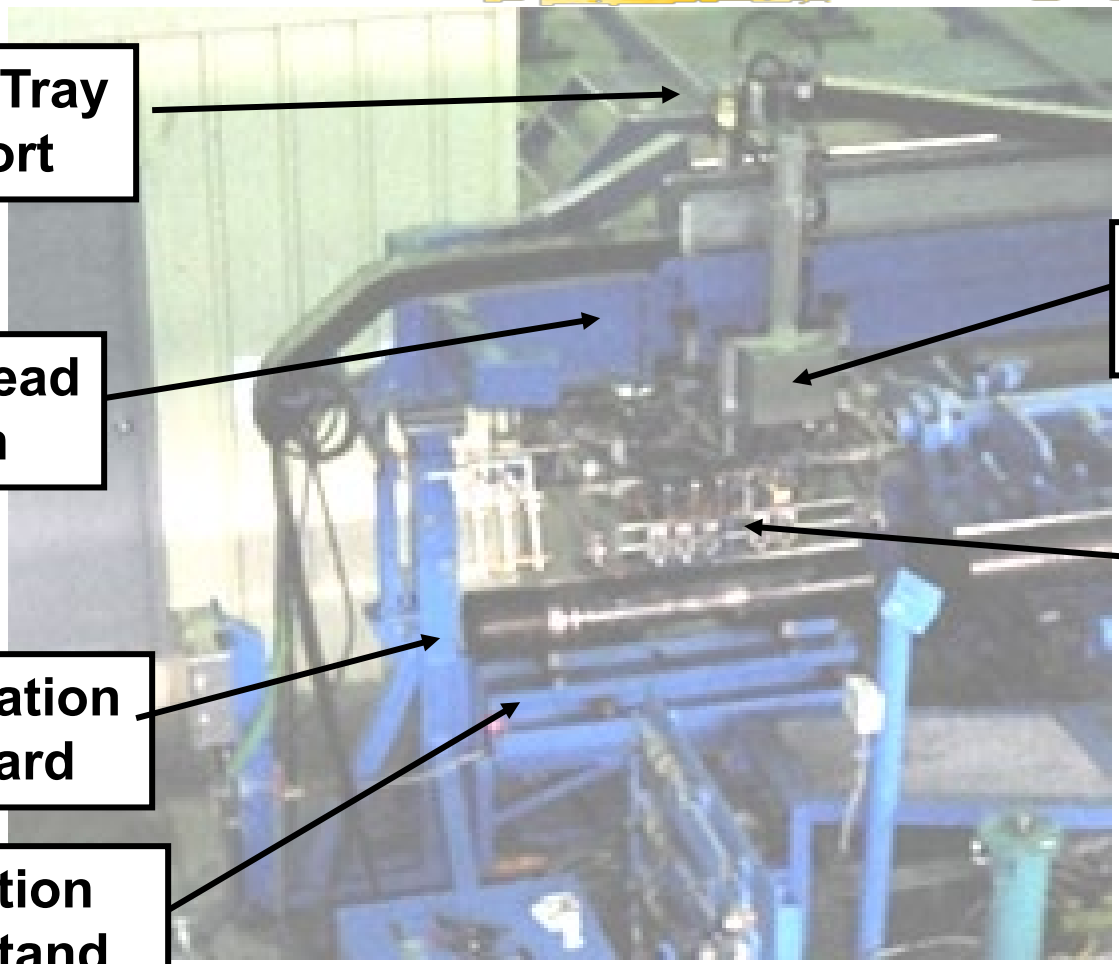
Western Instruments

Overhead Beam System
Overall View



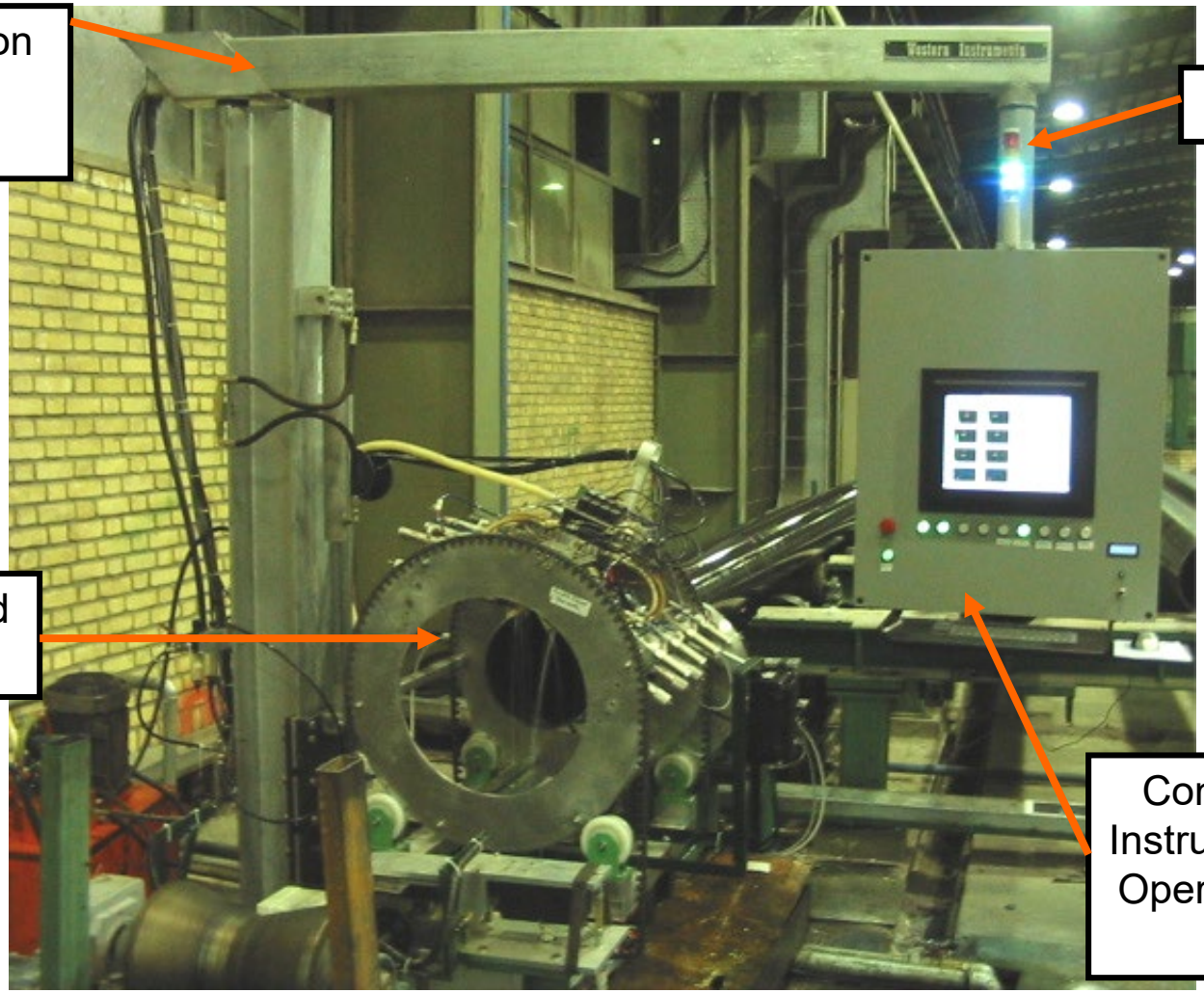
Western Instruments

Overhead Beam System
Home-End View



Western Instruments

8 Channel Conveyer-Line Ultrasonic Testing System.



Interconnection Riser, with Swivel Arm

Alarm Tower

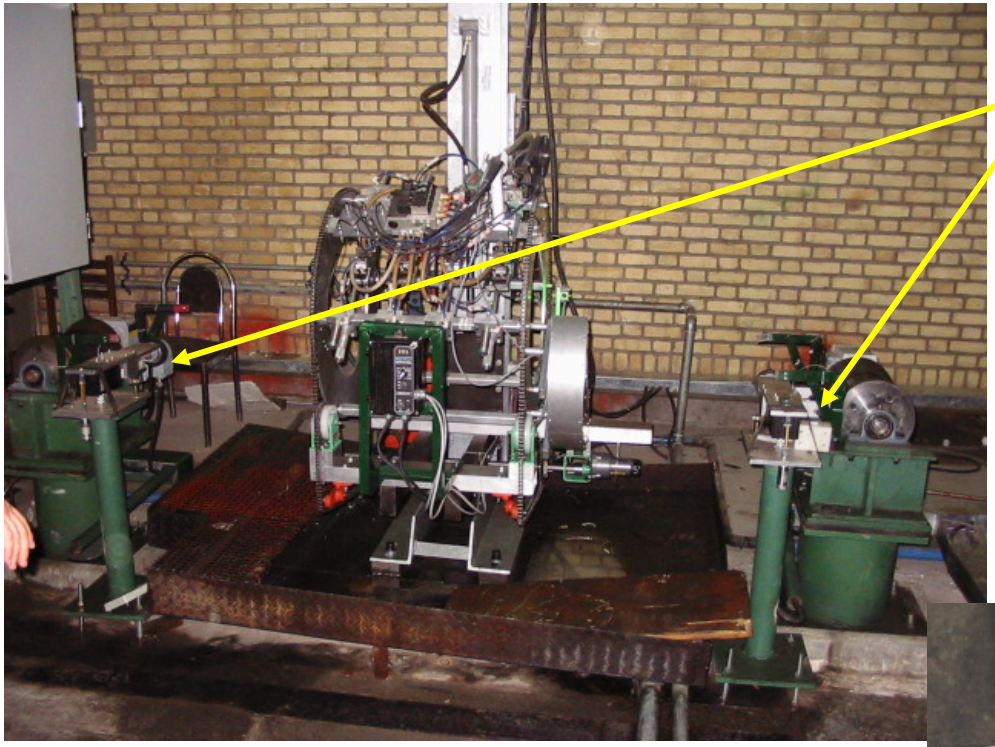
Test Head and Roller Frame

Computer Based Instrumentation, and Operator's Pendant Cabinet

Western Instruments

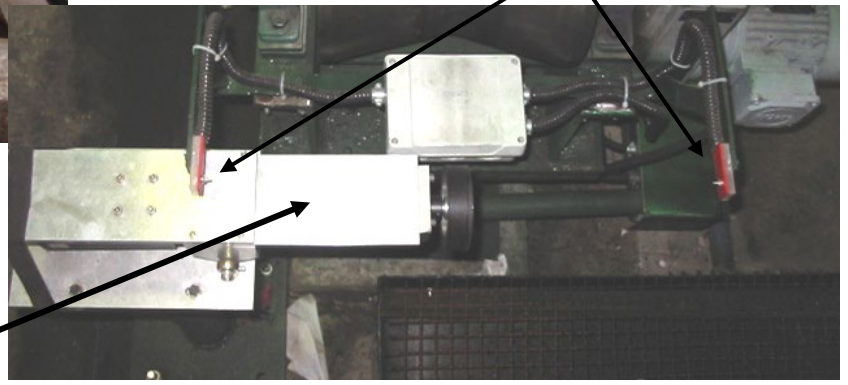
Off-Line Encoder Details

Western Instruments



Lead/Trail End Encoder Stations

Lead/Trail End Sensors



Encoder Detail