Bodycote

Testing
Thermal Processing

The Four Point Bend Test Validity

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The Four Point Bend Test

- **History**

- ASTM G39
- ISO 7539-2
- Homogeneous Prismatic Samples
- Loaded by Deflection
- Elastic Region only.

The Four Point Bend Test

- History
- EFC 16
- Shows weld root intact sample.
- **Longitudinal** and Transverse.

Mentions Strain Gauging

The Four Point Bend Test

History

EFC 17

Implies root intact sample

Provides Strain Gauge Formulae.

The Four Point Bend Test

- NACE TM0177

- Mentions Four Point Bends as an supplementary test.
- **WG085f**
- **Tasked with writing a test procedure.**

The Four Point Bend Test

- Reality

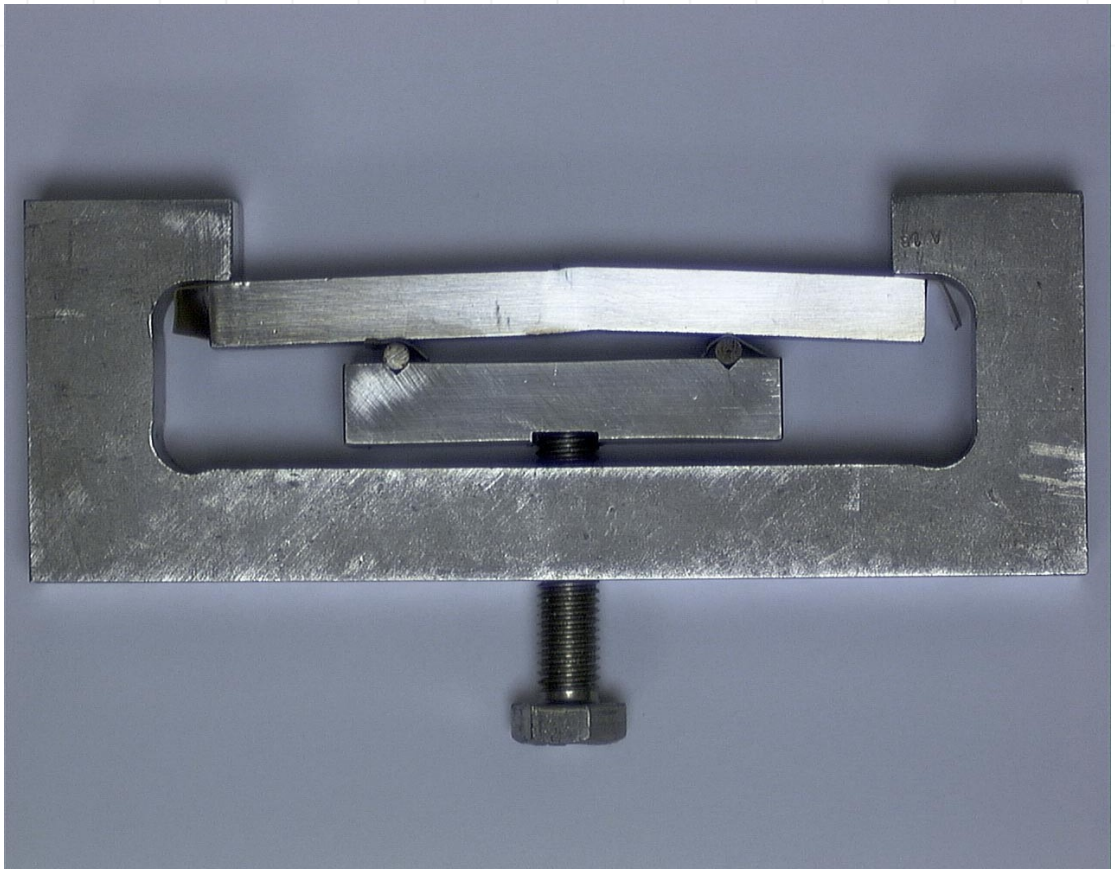
- Weld Root intact
- NON Homogenous
- Curved
- With miss-match
- Thickness (FEA)

The Four Point Bend Test

- Reality

- Carbon Steel v CRA's
- Ambient Temperature
- High Temperature

The Four Point Bend Test



The Four Point Bend Test

The Four Point Bend Test

- Loading Issues (1)

80% & 90% AYS!!!

Compensates for loss of Residuals?

NOT ALL IN THE SAME DIRECTION

What is the AYS?

Tensile data or Flexural 4pt bend?

The Four Point Bend Test

- Loading Issues (2)

- Strain Gauge Location
- Strain distribution across width and length
- Miss-match
- Load Stability

The Four Point Bend Test

- Evaluation

- No standard practice.
- No section in EFC 16
- Not covered by either TM0177 or ISO 15156

The Four Point Bend Test

- **Historically**
- Loaded 72% SMYS
- Elastic Region
- **Now**
- Used as Weld Qualification
- At high % AYS
- Possible Plastic Zone

The Four Point Bend Test

- The Way Forward

- Scrap the Test!
- Recognise the Test limitations
- Write a comprehensive test procedure.
- Review LOADING LEVELS.

The Four Point Bend Test

- Volunteers
- &
- Data required.