**Why Welds Crack**

**During Fabrication**

- **Joint Restraint**
- **Improper Bead Shape**
- **High Carbon/Alloy Content**
- **Low Melting Point Contaminants**
- **Hydrogen Pickup**
- **Rapid Cooling Rate**

**Heat Affected Zone Crack** (Underbead Crack)

- **Possible Causes**
  - Excess Hydrogen
  - High Carbon/Alloy Content in Base Metal
  - High Residual Stress Levels
- **Possible Cures**
  - Use Low Hydrogen Consumables
  - Control Hydrogen Content in Weld Metal
  - Increase Pre-Heat
  - Increase Post-Heat

**Crater Crack**

- **Possible Causes**
  - Inadequate Crater Fill
  - Excess Hydrogen
  - Excess Strength in Weld Metal
  - High Residual Stress Levels
- **Possible Cures**
  - Backstep at the End of the Weld
  - Use Lower Strength Consumables (consistent with design requirements)
  - Increase Pre-Heat
  - Increase Post-Heat

**Transverse Crack**

- **Possible Causes**
  - Improper Width to Depth Ratio
  - Low Melting Point Contaminants
  - Concave Weld Surface
- **Possible Cures**
  - Use Width to Depth Ratio of 1:1 to 1.4:1
  - Limit Excess Penetration
  - Decrease Voltage and/or Travel Speed

**Longitudinal Crack** (Centerline Crack)

- **Possible Causes**
  - Improper Width to Depth Ratio
  - Low Melting Point Contaminants
  - Concave Weld Surface
- **Possible Cures**
  - Use Width to Depth Ratio of 1:1 to 1.4:1
  - Limit Excess Penetration
  - Decrease Voltage and/or Travel Speed