Here is what we will be looking at today…….. An outline.

1. Introduction
   A. Welcome and Greeting!
      1. Who has welded?
      2. What welding have you been exposed too?
      3. Who is possibly looking for a career in welding?
   B. Instructor
      1. Background
      2. Experience
III. Careers in Welding
   A. Short video
   B. Various fields that you can make a good living with welding skills.
IV. Photo tour of GFC-MSU Welding Facility.
MY WELDING BACKGROUND

- 20+ years of experience.
- Associate of Arts degree in Welding Technology from CBC in Pasco, WA.
- Completed 5-year apprenticeship program for Pipefitters Union in Local 598.
- Journeyman Welder and Pipefitter.
MY WELDING BACKGROUND
(CONTINUED)

WORK EXPERIENCE:

- FABRICATION SHOPS
- HYDROELECTRIC DAMS
- PAPER MILL
- NUCLEAR POWER PLANT
Young Welders Share their thoughts.

Career Spotlight: Welding

Welding video
Careers In Welding

Various fields that Welding is used in.
GFC-MSU Welding Building
GFC-MSU Welding Shop front entrance
Student Lockers and Storage Bay
Fabrication Bay
Break and Study Area.
Tool, Parts and Filler Metal Storage
Processes that we focus on here at a GFC:

SMAW:
GMAW
GTAW:
FCAW:
An in depth look at the GMAW (Wire feed) process
TODAY'S FOCUS: GAS METAL ARC WELDING

• Better Known as:
  • Wire Feed
  • MIG
History of GMAW

- Development dates to the 1940's
- Battelle Memorial Institute
  - Developed modern form of MIG welding
  - Employed use of constant voltage design power source.
- 1953 introduction of CO2 shielding gas.
  - Helped GMAW process gain popularity
  - Made welding steel faster and more economical.
WIRE TYPES AND MODE OF TRANSFER

Wire Types:
- Solid wire (gas required)
- Self-shielded wire (flux core & NO GAS required)
- Dual Shield wire (flux core & gas required)

Wire transfer modes:
- Short-circuit transfer.
- Globular transfer
- Spray transfer
- Pulse-Spray Transfer
GMAW PROS & CONS

Advantages:

1. Speed in production
2. High quality welds in all positions
3. No slag/less cleanup
4. Machines designed for hobbyists are affordable
5. Easy to learn
6. Great for welding thin metal sections.
GMAW PROS & CONS (CONTINUED)

Disadvantages:

• Less portable if shielding gas is required
• Machines designed for hobbyists are usually limited to 3/8” material thickness
GMAW WELDING CIRCUIT
POWER SOURCE SETUP VARIABLES

**Variables:**
- **Joint Design**
  - F Means Fillet Weld
  - G Means Groove Weld
- **Position of Weld**
  - 1 = Flat
  - 2 = Horizontal
  - 3 = Vertical
  - 4 = Overhead
POWER SOURCE SETUP VARIABLES

• Thickness of metal
• Type and metallurgy of base metal
• Gas composition and flow rate
• Correct polarity (DCEP)
WIRE FEED SETUPS

- PROPER WIRE SIZE AND TYPE
- CORRECT CONTACT TIP
- CORRECT SIZE AND TYPE OF WIRE FEED DRIVE ROLLS (TENSIONED PROPERLY)
CRITICAL VARIABLES: WIRE FEED SPEED

Wire Speed

- Wire speed dial
  - Controls amount of wire exiting the gun, measured in IPM (inches per minute)
  - Automatically adjusts the amperage according to the setting of IPM

- Feed speed
  - Too fast: will produce a high-profile weld with a lack of tie in at the toes of the weld.
  - Too slow: will produce a very flat weld with insufficient build up.

What is Amperage

- In welding terms amperage is heat, which determines the ability of the weld to penetrate the parent metal.
CRITICAL VARIABLES (CONTINUED): VOLTAGE

Voltage: the driving force in the welding process

- **GMAW** is a constant voltage process
  - Once the voltage is set, the machine maintains that voltage while welding.

  - **Voltage to high:**
    - Turbulent arc
    - Seemingly little control of the weld

  - **Insufficient voltage:**
    - Difficult arc starting
    - Excessive spatter
    - Produces welds with a convex profile
What is a Good Weld?

Travel Speed Problems
- Travel too fast. Narrow bead, poor wettability at toes.
- Travel too slow. Bead too wide, arc too hot.

Arc Problems
- Voltage too high: Too much transfer, poor arc control.
- Voltage too low: Excessive spatter, poor arc control.
- No gas: Pinholes and porosity in weld.

Amperage Problems
- Amperage too high: Wide bead, excessive spatter; possible run-through.
- Amperage too low: Narrow, high crowned bead.

A Good Weld
Proper bead size and height.

MillerWelds.com
HORIZONTAL FILLET WELD (2F) POSITION
WHERE THE GUN MEETS THE METAL (GUN CONTROL)

- Gun Angle
- Push vs. Pull
- Gun Manipulation
- Tip to Work Distance (Arc Gap)

For lap and T-joints, Fillet Welds
- Manipulating the gun to create a series of small ovals provides good welding coverage.
- Be careful not to move too far back into the weld puddle or else fusion problems may occur.
ANALOGIES

• **Applying Caulk**
  - Too slowly makes fat beads
  - Too quickly makes narrow skinny beads

• **Painting**
  - All welders create unique welds
  - Welds must have certain properties, but may look different
  - The learning and results are always changing and improving
PARTING THOUGHT:

Nobody cares what you know......

Until they know that you care!