

# WELDING PROCESSES: ELECTRICAL RESISTANCE

Patricio F. Mendez  
Professor

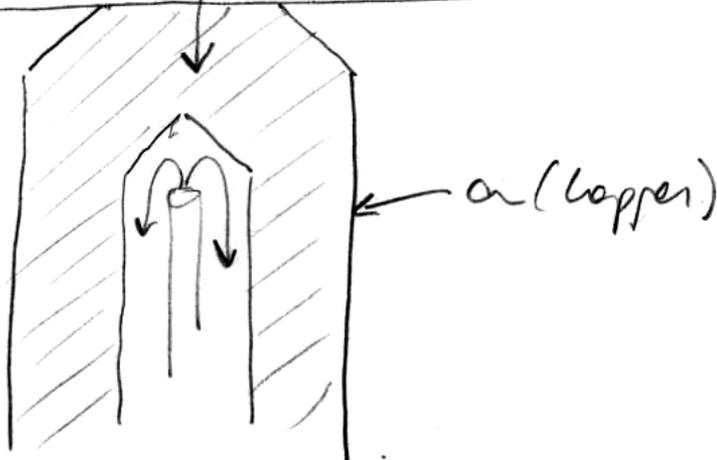
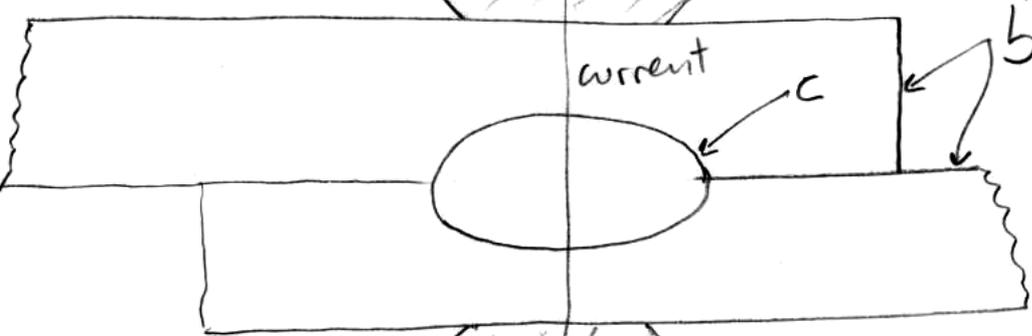
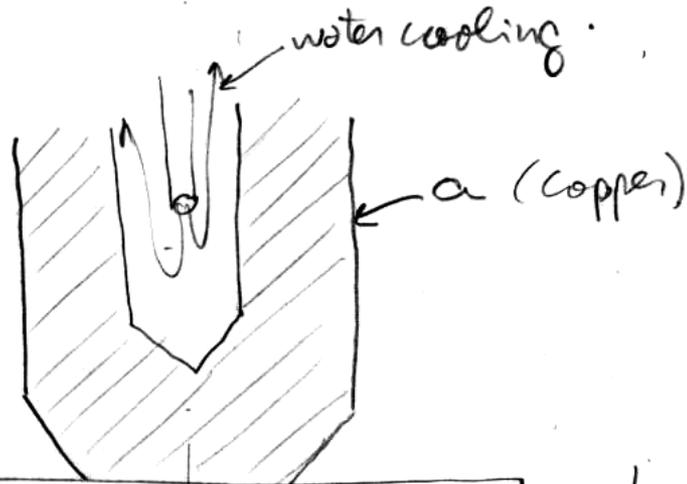
Director, Canadian Centre for Welding and Joining  
Weldco/Industry Chair in Welding and Joining

6.a Electrodes

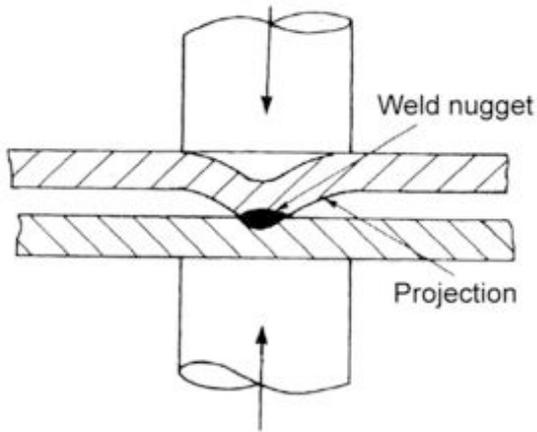
6.b Metal sheets

6.c Nugget

# RSW



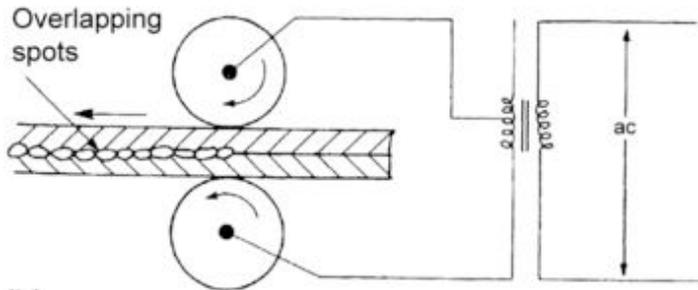
# PW, RSEW



projection welding (PW)



(a)

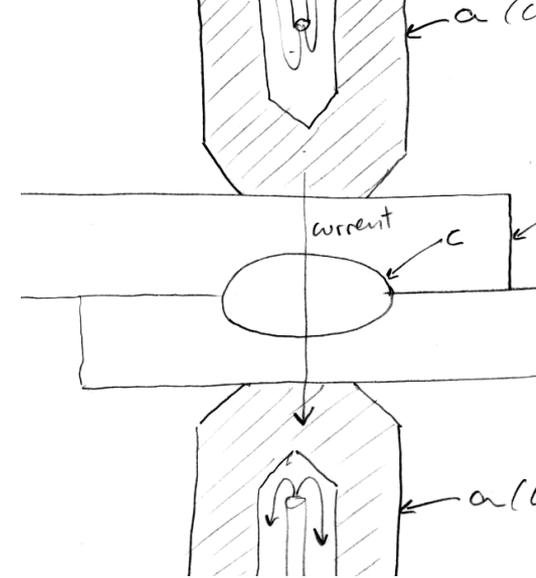


resistance seam welding (RSEW)

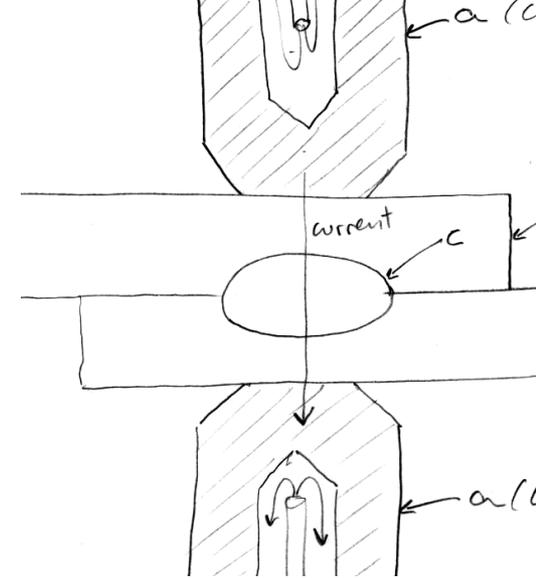
(b)

# RSW, RSEW, PW

- Protection of the melt
  - none
  - melt is between sheets and solidifies very fast
- Filler material
  - none
- Polarity
  - typically AC



# RSW, RSEW, PW

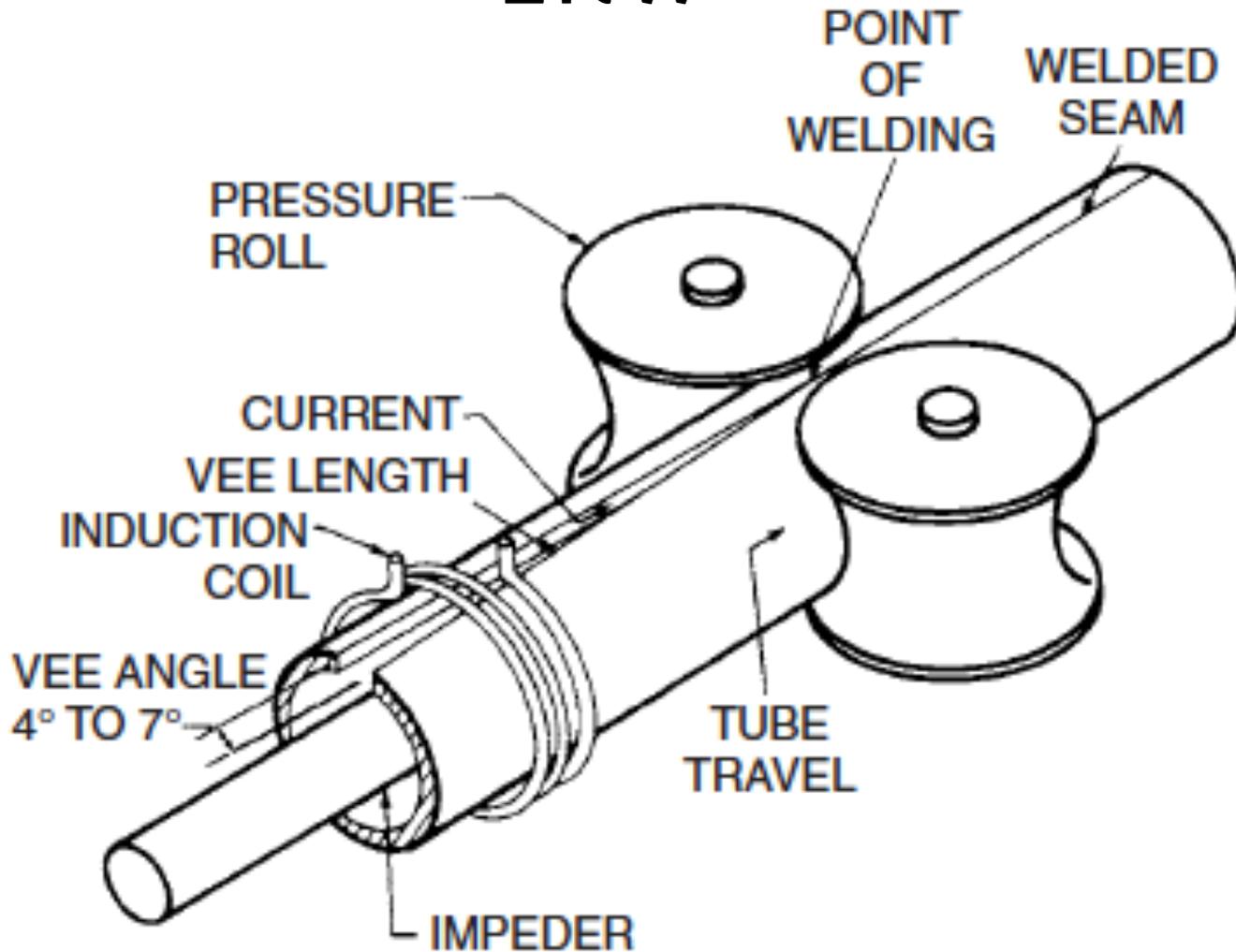


- Characteristics
  - very low cost per weld
  - needs expensive equipment
    - current runs in the thousands of A
  - works well with steel, but not so well with aluminum
    - Al has too low electrical resistance, the oxides are difficult to dislodge, and aluminum often reacts with the electrodes, wearing them very fast
  - typical joint is the lap joint
  - can join multiple sheets at the same time
  - no problem out of position
  - can be performed manually
  - very easy to automate and use with robots
  - welds often have low quality, and are compensated by having more.
  - if there is translation (electrodes are wheels): RSEW
- Applications
  - automotive!
  - also HVAC, white goods, small appliances

- SME Video Ch. 33-39

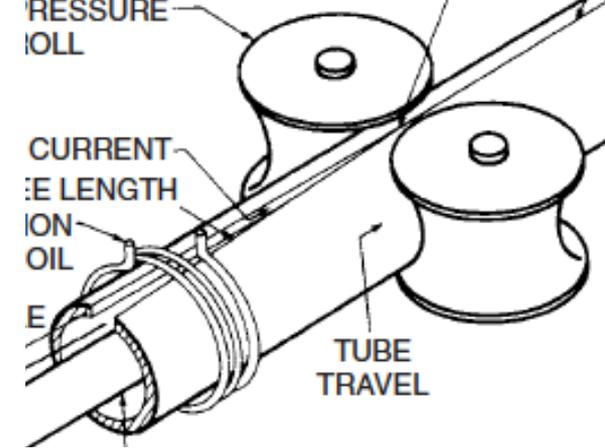
RSW

# ERW

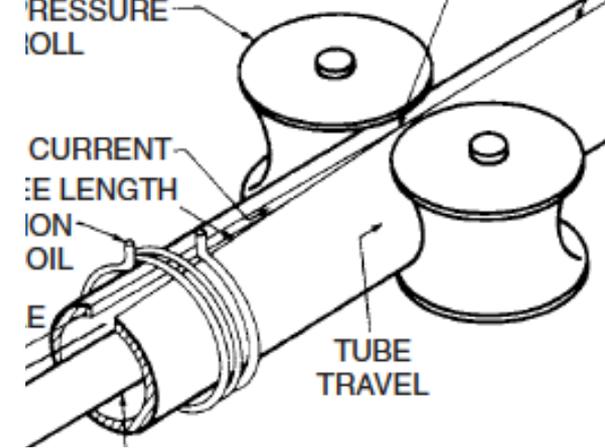


# ERW

- Protection of the melt
  - none
  - molten metal is expelled
- Filler material
  - none
- Polarity
  - HF induction
  - DC electrical contacts



# ERW



- Characteristics
  - very low cost per weld length
  - needs expensive equipment (high currents and sometimes high-frequency)
  - typically for making tubes
  - typically used in carbon steels
  - typically butt joint
  - can work with high frequency or DC
  - typically considered a low-quality low-cost process
- Applications
  - pipes for oil, electrical conduit, pipes for hydroforming in automotive

ERW