

## Basic Arc Flash Study Steps

- A. One Line Diagram Work
  - 1. Identify Nodes (locations) to be analyzed
  - 2. Determine which nodes are “in the box” or in open air
  
- B. Short Circuit Model Work
  - 1. Identify all node voltages
  - 2. Identify all transformers including
    - a. Primary and secondary voltage
    - b. Connection type, i.e. delta-wye, wye-wye, etc.
    - c. Impedance
    - d. Method of grounding primary and secondary windings
  - 3. Identify feeder properties
    - a. Ferrous or nonferrous raceway
    - b. Copper or aluminum conductor
    - c. Gauge
    - d. Length
  - 4. Motors
    - a. At each node sum all small motors less than 50 HP, model as 1 motor
    - b. For all motors over 50 HP, add to model as a separate item
  - 5. Utility power source
    - a. Contact utility company about system characteristics
  - 6. Enter all collected data into short circuit modeling program
    - a. Hand check a few nodes to verify software is working correctly
    - b. Do a reality check, are these currents what you would expect?
  
- C. Protective Device Characteristics
  - 1. Collect time-current curves for all protective devices
    - a. Fuses
    - b. Protective relays
    - c. Low voltage circuit breakers

- d. Reclosers
    2. For each node studied, plot time vs current curves
- D. Arc Current Calculations
  1. At each node, compute arc current using equations found in 1584 standard or integrated software package.
  2. Enter the time-current curve with the arc current, determine fault clearing time
  3. Using IEEE equations in 1584 determine arc flash boundary for a given cal/cm<sup>2</sup> PPE. e.g. 8 cal/cm<sup>2</sup>, 25 cal/cm<sup>2</sup> or 40 cal/cm<sup>2</sup>.
- E. Documentation
  1. Short circuit listing
  2. Update one line drawings adding node ID to the drawing to help the reader relate the short circuit listing to the location in the network.
  3. Utility information
  4. Time-current curves
  5. Arc current calculation
  6. Energy levels at each node
  7. Name plates at each location with energy information per NEC

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