

IOWA STATE UNIVERSITY

Department of Electrical and Computer Engineering



BLACK & VEATCH

115/34.5kV Solar Plant & Substation

Senior Design Project

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| Senior Design Team 41

| 02/03/2025

AGENDA

- Safety Moment
- New Technology
- AutoCAD Drawings



Safety Moment

Stay Alert. Stay Alive.

- Always assume equipment is energized — even if it looks off.
- Use proper PPE (gloves, face shield, arc-rated clothing).
- Be cautious of step and touch potential—especially near substations.
- Maintain clear communication with team members on site.
- Respect minimum approach distances for your voltage level.

NEW TECHNOLOGY

Intelligent Electronic Devices (IEDs)

What are IEDs?

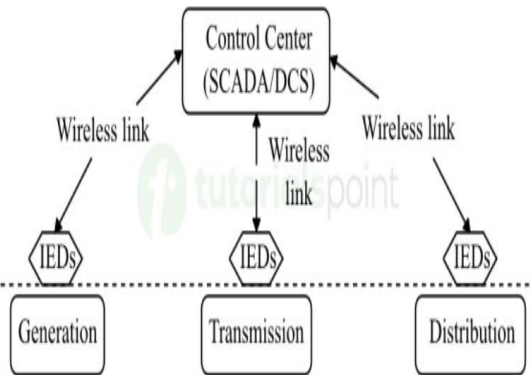
- Microprocessor-based control devices for automating and managing power system components
- Transformers, circuit breakers, capacitor banks, isolators, etc.

How Do They Work?

- Receive data from sensors across the grid
- Process data using built-in microprocessors
- Generate real-time control signals to operate field equipment
- Enhance grid stability and operational efficiency

Key Applications

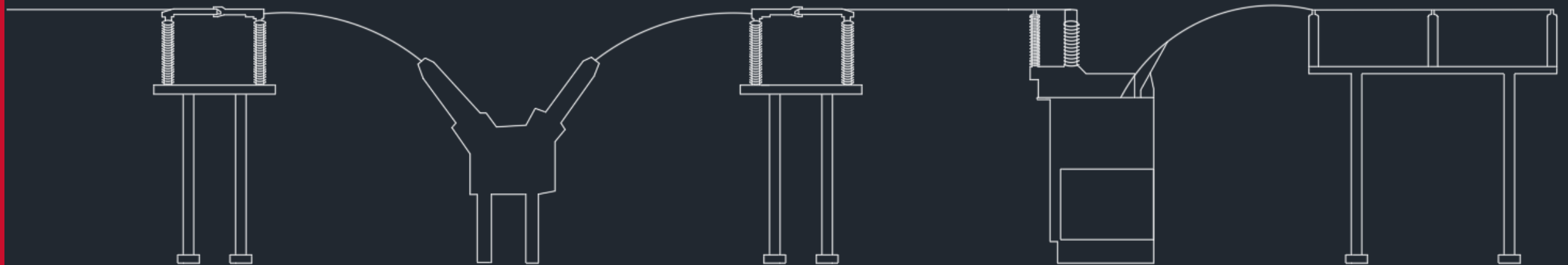
- Substation automation
- Fault detection & isolation
- Voltage control & load balancing
- Remote monitoring & data communication



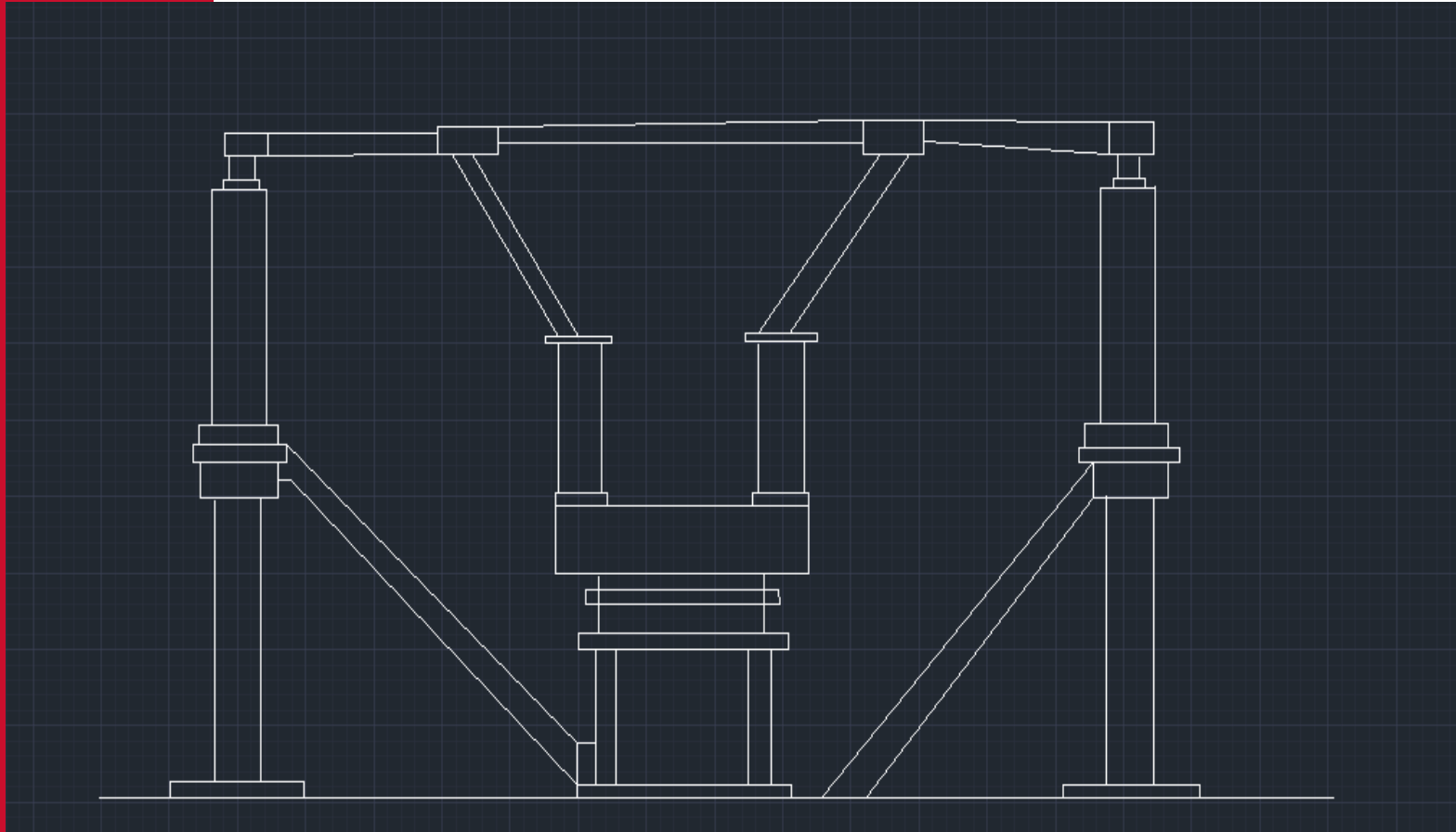
Section View A

Section A

Not to scale



Section View B



Section View C

- Still a work in progress
- Will update switches, add the connecting lines, and add where the solar farm feeds come in

Section C

Not to scale



AC Panel Drawing

- Making progress but CAD file didn't save
- Sizing wires and breakers according to NEC standards
 - Ex. NEC 310-16 – Allowable Ampacity of Insulated Conductors
- Using the AC load study to make sure all components are accounted for

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THANK YOU

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