

Lesson Outline: Evaluating Electrical Panels in 4-Point Inspections

Lesson Objective

- Develop the skills to evaluate electrical panels, identify key factors such as panel age, and determine compliance with safety standards.

1. General Panel Information

- **Panel Age:** Understanding risks of older panels (over 30 years).
- **Year Last Updated:** How updates impact safety and compliance.
- **Brand/Model:** Recognizing known problematic brands (FPE, Zinsco, Challenger).

2. Activity: Evaluating Panel Age and Updates

- **Scenario-based question** on assessing a panel from 1985 with no documentation.
- **Multiple-choice options** with explanations for correct/incorrect answers.

3. Panel Types

- **Circuit Breaker Panels:** Standard for modern homes; automatic shutoff feature.
- **Fuse Panels:** Older systems using fuses; potential safety concerns.

4. Total Amperage

- Understanding system capacity and fire hazards.
- **Instructional Video:** Finding system amperage.

5. Service Disconnects ("Throws")

- NEC Section 230.71(A) requirements: Maximum of six disconnects.

6. Circuit Breaker Panels: Key Components

- **Neutral Bus:**
 - Allowed configurations (one neutral wire per screw, two ground wires per screw if permitted).
 - Not allowed configurations (multiple neutral wires per screw, mixing neutral and ground wires).

7. Double Taps

- Definition: Two wires connected to a single circuit breaker terminal.

- Safety concerns: Overheating, arcing, and electrical fires.
- **Exceptions:** Square D (QO and Homeline series) and Siemens breakers.

8. Activity: "Allowed or Not Allowed?"

- Interactive **flip card activity** identifying correct and incorrect wiring configurations.

9. Fuse Panels

- Still found in older homes but often require upgrades.

10. Problematic Electrical Panels

- Panels with known safety issues or insurance concerns:
 - **Federal Pacific Electric (FPE)**
 - **Zinsco**
 - **Challenger**
 - **Bryant (General Electric)**
 - **Murray (Siemens)**
- Common failures: Overheating, loose connections, failure to trip under excess load.

11. Activity: "What's the Problem?"

- **Select all that apply** questions on identifying problematic electrical panels.

12. Lesson Recap

- Key takeaways:
 - How to identify outdated or hazardous panels.
 - Recognizing signs of overheating or corrosion.
 - Providing actionable recommendations for repair or replacement.

13. Next Lesson

- **Modern Wiring Systems:** Materials, installation standards, and safety considerations.