Laboratory Safety

Safety considerations are extremely important when working around electric machinery. The voltage sources associated with this type of machinery (110 V, 220 V, 440 V, etc.) are capable of delivering particularly high values of current and should be treated with caution and respect. An individual must know what is to be done and must be consciously thinking about it while doing it. It is easy enough to make mistakes while thinking, but failure to think will all but guarantee serious mistakes.

The following list of safety precautions, although undoubtedly not complete, covers the basic safety procedures.

1. **Connect Load to Source:** When making connections, it is important to make all “cold” side connections first and to the actual source of power last. One reason for this is to avoid taking a chance on having a hot lead sitting around or being handled while other connections are being made.

2. **Disconnect Source to Load:** Make sure all power is off before starting to disconnect equipment. Then the leads should be disconnected at the power source. Do not hand someone a hot lead! Most accidents happen when a long experiment or the laboratory practical test is over. Students relax since all they have to do is disconnect the equipment and clean up.

3. **Never open circuit the secondary of a current transformer.**

4. Open the line switches on the test table when changing load configurations or other machinery connections. Do not work with hot leads, even though they are insulated. It is possible for insulation to have cracks in it or for rivets to be sticking out. **Always open the polarity switch and remove the ammeter insertion plug when connecting or disconnecting or changing scales on instruments.**

5. It is important to be familiar with all the switches and circuits on the test table and to understand their purpose. Everyone in a group should know exactly where the circuit breakers are.

6. Avoid touching part of a circuit while pointing at it with your finger. It is surprising how easy it is to do this when discussing the experiment with laboratory partners.

7. Do not lean on equipment such as load banks, transformers, starting boxes, test tables, power panels, etc. It is easy to accidentally place a hand on a “hot” electrical connection.

8. Be careful around rotating machinery. Loose clothing or long hair could get caught in the moving parts.
9. A group should follow one diagram when making connections.

10. Be familiar with artificial respiration.

11. If you accidentally open another laboratory group's circuit breaker, do **not** reclose it. Tell them about it and let them reclose it when they are ready for power again.

12. Metal objects such as watch chains, rings, bracelets, tools, pencils, etc. can make dangerous contacts with a circuit.

13. Insure that all equipment is compatible. Do not use a 120 volt starting box with a 240 volt circuit, for example. Read the nameplates. Nameplates include rating information for electrical power, mechanical power, voltage, current, and RPM.

14. As a matter of safety and good laboratory procedure, it is always a good idea to know where you are going with an experiment. Read the nameplates and be aware of the capabilities of the equipment you are working with. Make a “dry run” where you observe, but do not record, the range of the data you are going to collect. Check to see if your results are going to come out about right. Does the experiment work? If not, why? This procedure can save time as well as provide an extra margin of safety.

15. Wear good solid shoes with insulating soles, stay on your feet, and keep one hand in your pocket when working with circuits.

16. Emergency stop buttons are located throughout the lab. Pressing these red buttons will remove all power from the AC and DC Distribution Panels. Pressing the Emergency stop buttons will **not** remove power from the 120 VAC wall outlets located throughout the lab.

17. Insert **Safety Covers** into all Supercon recepticles that will be energized and do not have Supercon plugs with cables inserted into them. For example, on the AC Distribution Panel when planning to use only one or two phases, insert Safety Covers into the unused phase(s) that will be energized by the same breaker. **Safety Covers** are the blue Supercon plugs without cables located in the box to the left of the AC Distribution Panels.