EXPERIMENT - 1

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Short Circuit Analyzer

1.Research -

A Short circuit analysis is used to determine the magnitude of short circuit current, the system is capable of producing, and compares that magnitude with the interrupting rating of the overcurrent protective devices.

Short-Circuit Currents are currents that introduce large amounts of destructive energy in the forms of heat and magnetic force into a power system. A short circuit is sometimes called a fault. It is a specific kind of current that introduces a large amount of energy into a power system. Basically, it is a low-resistance path of energy that skips part of a circuit and causes the bypassed part of the circuit to stop working.

2.Analysis -

A short circuit current can be very large. If unusually high currents exceed the capability of protective devices (fuses, circuit breakers, etc.) it can result in large, rapid releases of energy in the form of heat, intense magnetic fields, and even potentially as explosions blast. The heat can damage or destroy wiring insulation and electrical components.

Short Circuit Analysis is performed to determine the currents that flow in a power system under fault conditions. If the short circuit capacity of the system exceeds the capacity of the protective device, a dangerous situation exists.

3.Ideate -

- **Equipment Upgrades:** Replace components like cables, transformers, or switchgear that are rated below the expected fault current with higher-rated equipment.

- **Protective Device Coordination:** Adjust the settings and characteristics of fuses, circuit breakers, and relays to ensure they will quickly and selectively

disconnect the faulty section of the circuit, minimizing damage and preventing wider outages.

● **Improved Maintenance:** The protective devices should be maintained properly. The faulty wires should be replaced immediately.

4.Build -

Flowchart -
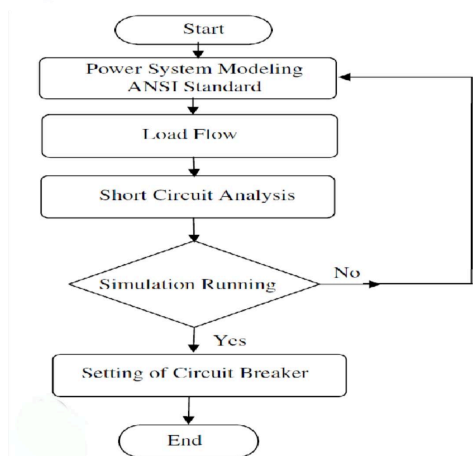

```c
#include <stdio.h>

int main( ) {
    float current;
    float limit = 5.0;

    printf("Enter current value (in Amps): ");
    scanf("%f", &current);

    if (current > limit) {
        printf("Short Circuit Detected\n");
    }

    else if (current < limit){
        printf("Short Circuit Detected\n");
    }

    else {
        printf("System Normal\n");
    }
```

```
    return 0;
}
```

5.Testing -

Output:

Case 1:

Enter current value (in Amps): 6.5
 Short Circuit Detected

Case 2:

Enter current value (in Amps): 3.5
  Short Circuit Detected

Case 3:

Enter current value (in Amps): 3.2
 System Normal

6.Implementation Steps:

1. Connect sensors to measure voltage and current.

2. Interface the sensors with the microcontroller.

3. Program the microcontroller to detect abnormal values (overcurrent/voltage drop).

4. Connect the relay for automatic disconnection and buzzer for alert.

7.Reference -

1. https://www.geeksforgeeks.org/electrical-engineering/electric-switch/

2.https://carelabz.com/what-short-circuit-analysis-done-why/

8.Conclusion -

The short circuit analyser emphasize safety, system reliability, and equipment protection by determining fault currents to properly select and set protective devices

like circuit breakers and fuses. This system helps to prevent the dangerous situations.