SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

UNIT – II
Short Circuit Studies
Symmetrical Components

FAULTS

FAULTS

- Electrical power systems are growing in size and complexity in all sectors such as generation, transmission and distribution.
- Types of faults like short circuit condition in power system network results in severe economic losses and reduces reliability of the electrical system.
- Electrical faults is an abnormal condition caused by equipment failures such as transformers and rotating machines , human errors and environmental conditions.
- These faults case interruption to electric power flows and equipment damages.

Types of Fault

- **Electrical Faults:**
  - Deviation of Voltage and current from nominal values.
  - It causes excessively high currents to flow which causes the damage to equipments and devices.
  - Fault detection and analysis is necessary to design a suitable switchgears , relays and protection devices.

There are mainly two types of faults in electrical power system:

Symmetrical

Unsymmetrical

Symmetrical Fault

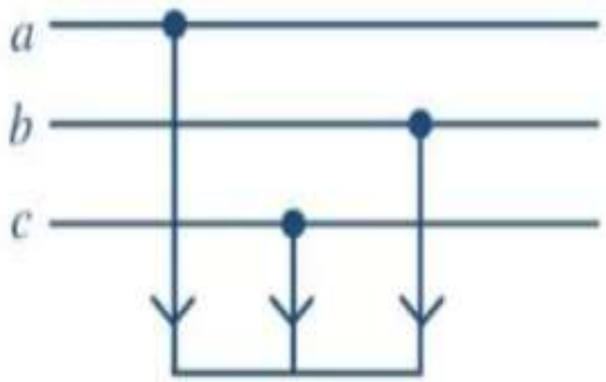
- These are very severe faults and occurs infrequently in the power system.
- These are also called a balanced faults and are of two types namely

  Line – Line – Line – Ground (L-L-L-G)

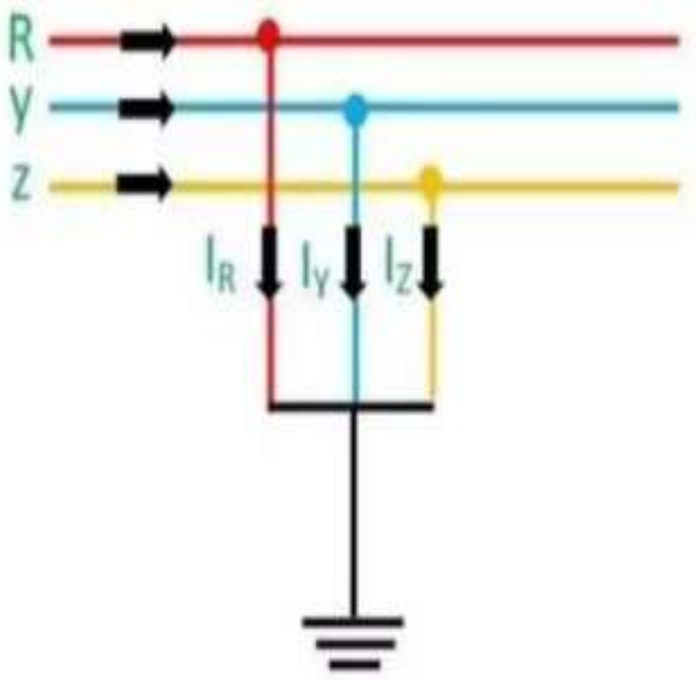
  Line – Line – Line (L-L-L)

If these faults occur system remains balanced but results in severe damage to the electrical power system equipments .

Symmetrical Faults



LLL Fault

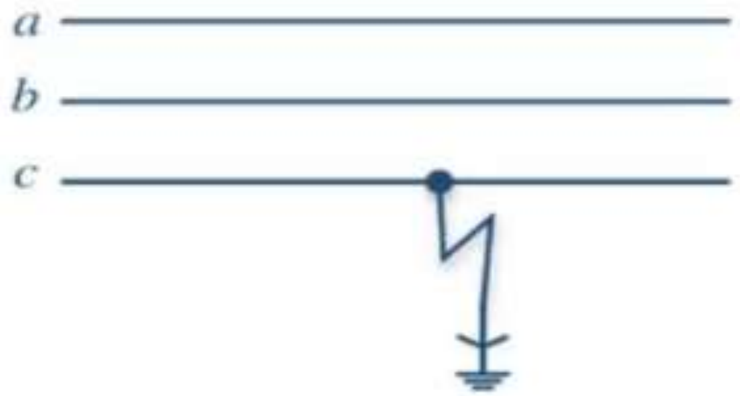


UNSYMMETRICAL FAULTS

- These are very common and less severe than symmetrical faults.
- These are of three types
  - Line – Ground (L-G)
  - Line – Line (L-L)
  - Double Line – Ground (LL-G)

LINE – GROUND (L-G) FAULTS

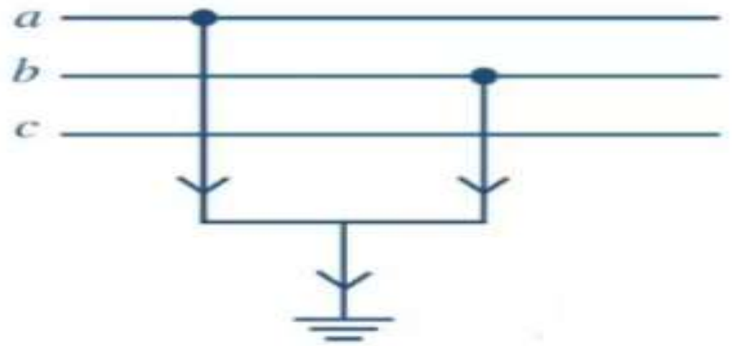
- This is most common type of fault and 60 to 70 % of fault are of this type.
- It causes the conductor to make contact with earth or ground.



L-G Fault

DOUBLE LINE – GROUND (LL-G) FAULTS

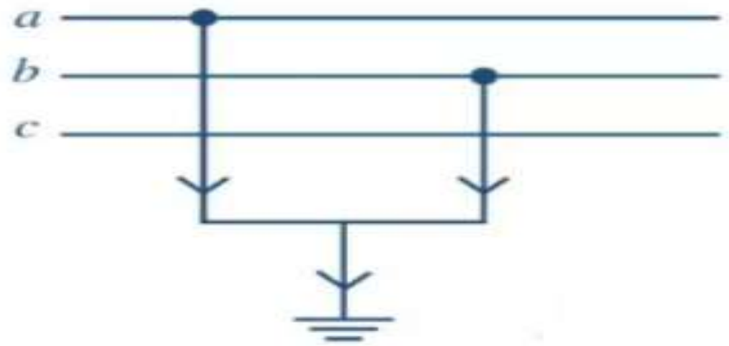
- 15 to 20 % faults are of this type.
- It make 2 conductors to contact with ground.



LLG Fault

LINE – LINE (L-L) FAULTS

- 5 to 10 % faults are of this type.
- When two conductors makes contact with each other , especially while swinging of lines happens.



LLG Fault

Causes of Faults

- Weather Conditions
- Equipment Failures
- Human Errors
- Smoke of Fires

Effects of Electrical Faults

- Over Current Flow
- Danger of operating personnel
- Lost of equipment
- Disturbs interconnected active circuits

ASSESMENT

1. **What percentage of fault occurring in the power system is line to line fault?**

   5%

   30%

   25%

   15%

ASSESMENT

2. What happens to the value of the fault current in case of SLG fault, if fault impedance is introduced?

a.The fault current increase

b. The fault current remains same as in case of SLG fault.

c. The fault current becomes zero

d. The fault current is reduced


thank
you