



SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NAAC – UGC with 'A' Grade

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

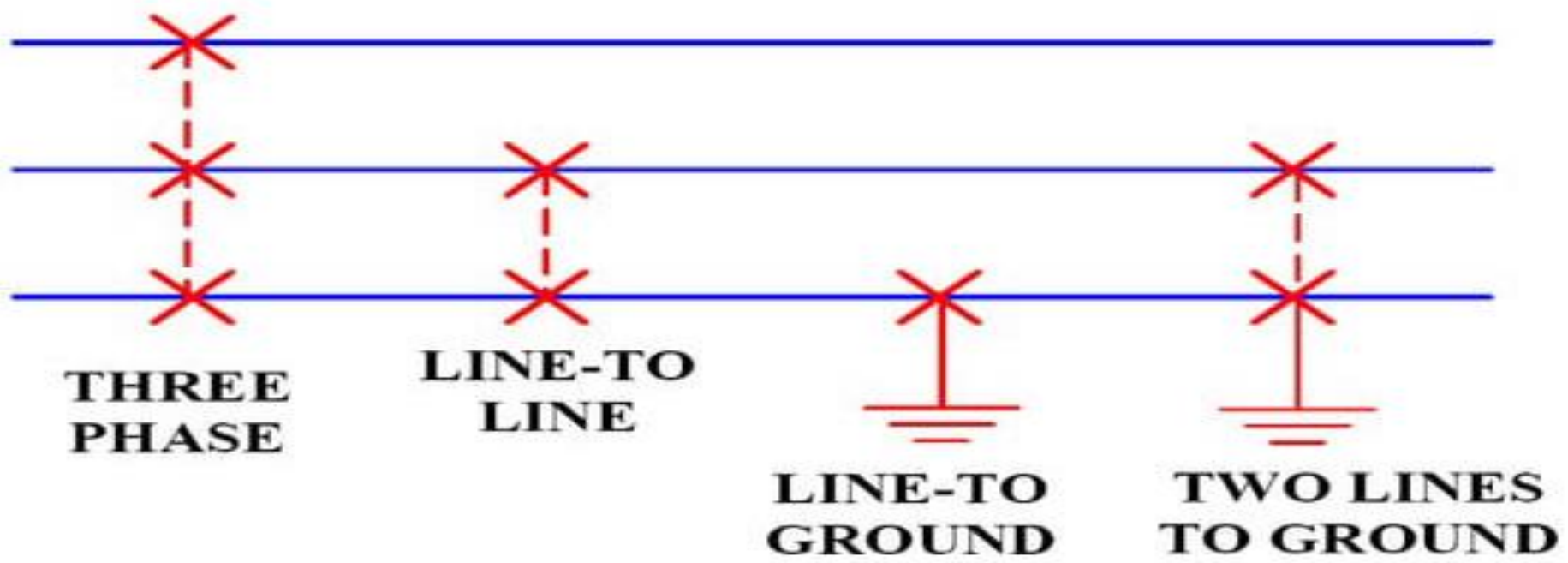
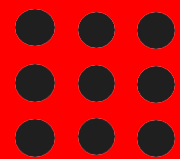
COURSE NAME : 19EE605-PROTECTION AND SWITCHGEAR

III YEAR /VI SEMESTER EEE

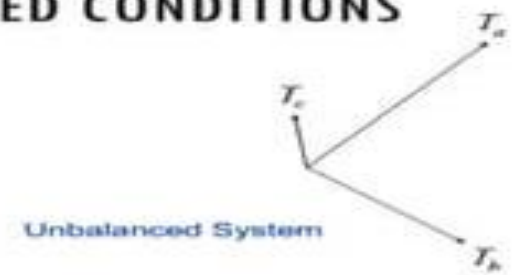
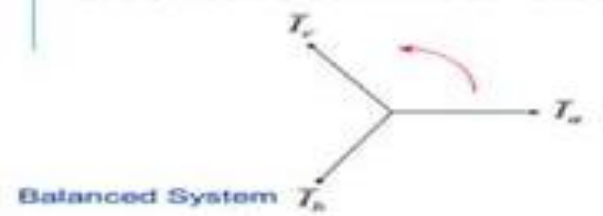
TYPES OF FAULT

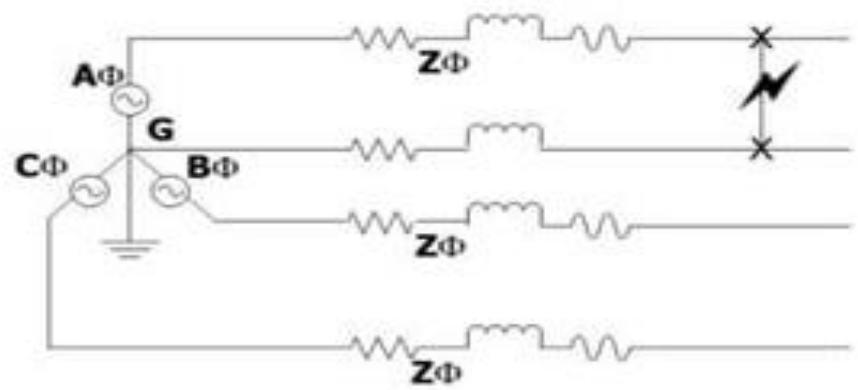
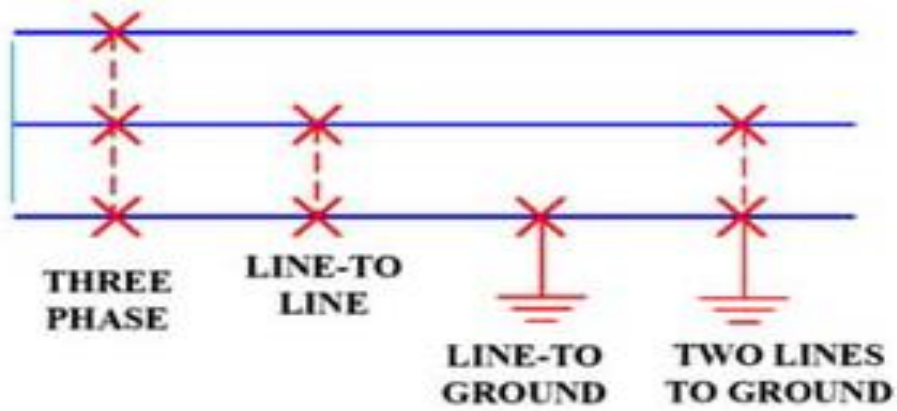


Fault Types (Shunt)

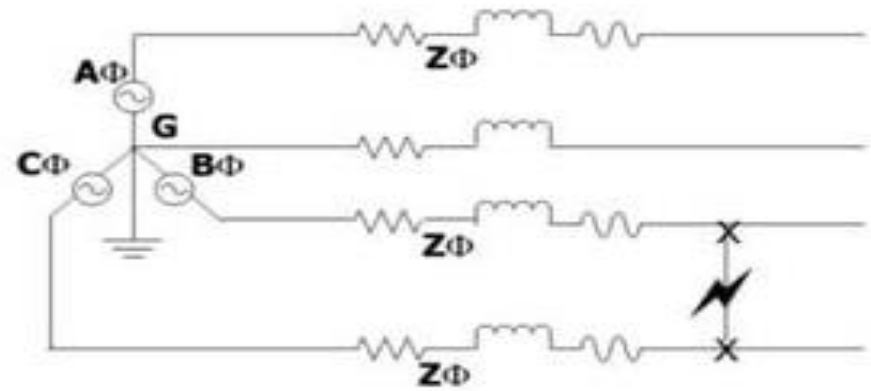


BALANCED VS. UNBALANCED CONDITIONS

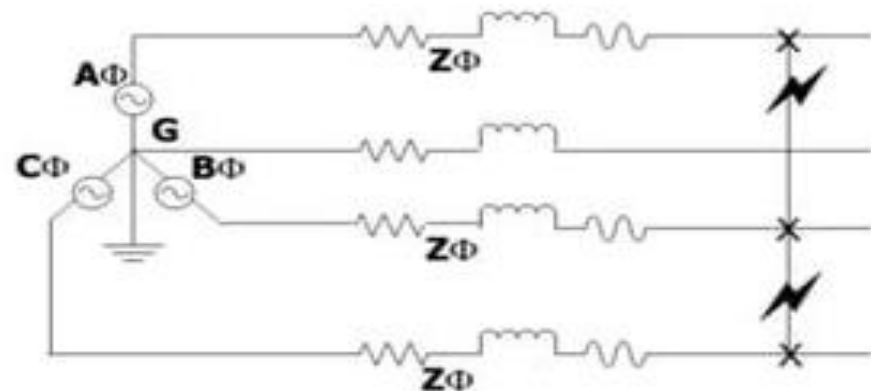




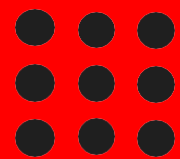
Short Circuit Calculation
Fault Types – Single Phase to Ground



Short Circuit Calculations
Fault Types – Line to Line

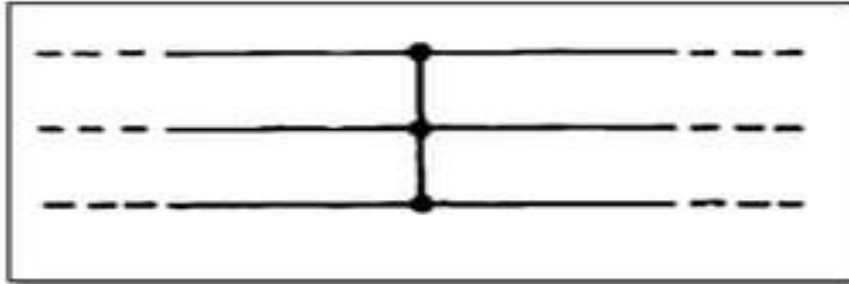


Short Circuit Calculations
Fault Types – Three Phase

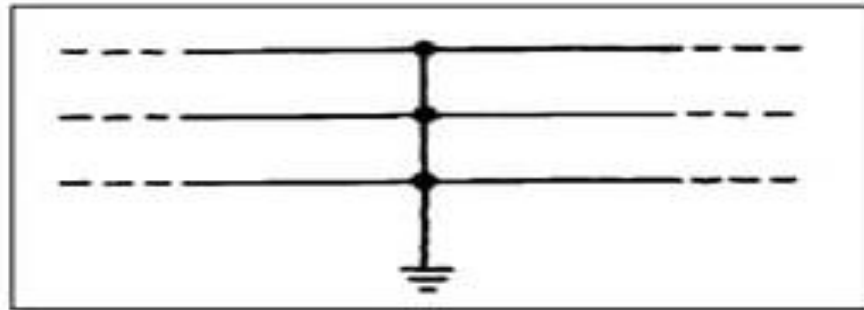




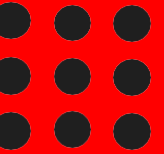
SYMMETRICAL FAULT



THREE- PHASE FAULT

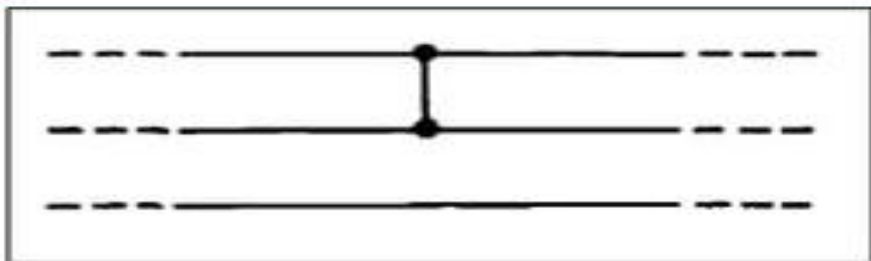


**THREE PHASE - EARTH
FAULT**

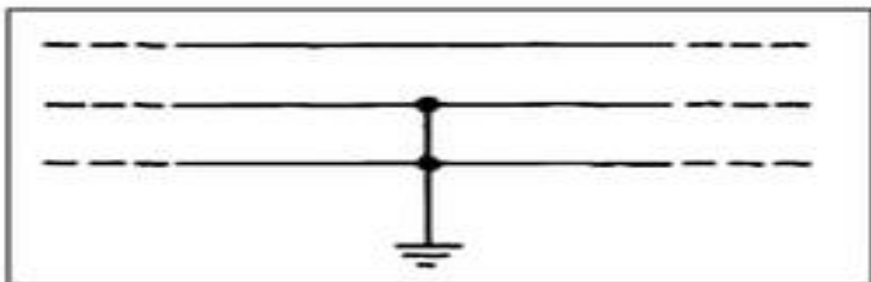




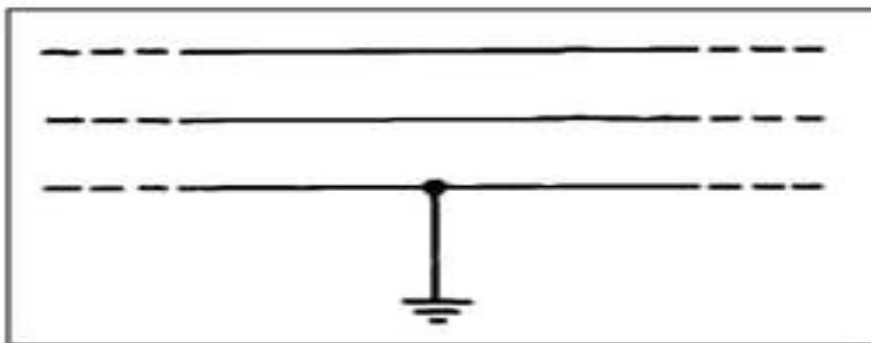
UNSYMMETRICAL FAULT



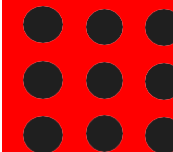
PHASE – PHASE FAULT



**TWO PHASE – EARTH
FAULT**

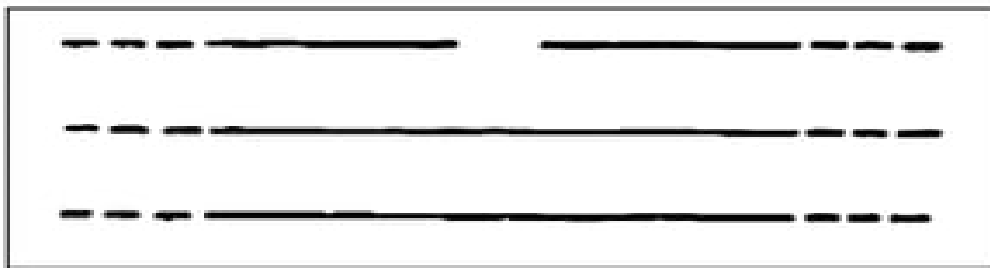


**SINGLE PHASE - EARTH
FAULT**

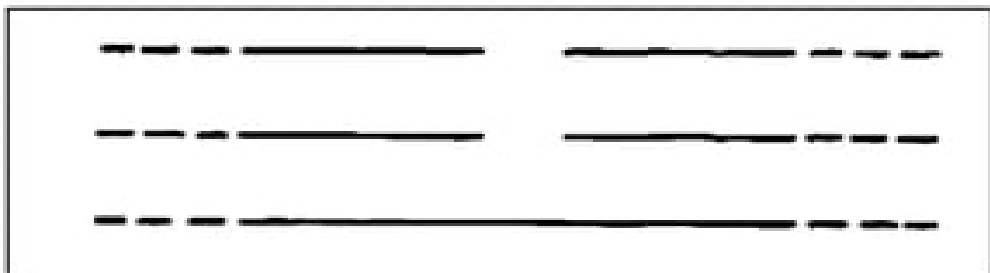




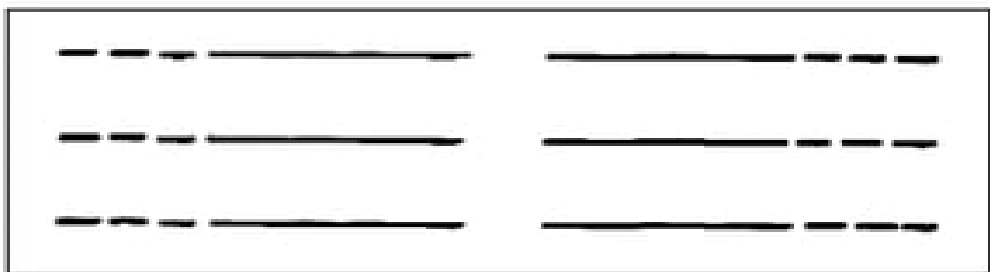
OPEN CIRCUIT FAULT



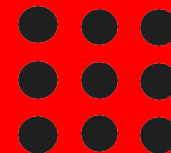
**SINGLE- PHASE OPEN
CIRCUIT**





**TWO- PHASE OPEN
CIRCUIT**

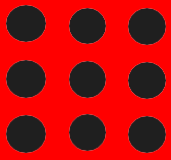


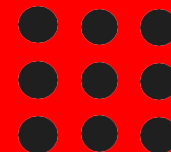
**THREE- PHASE OPEN
CIRCUIT**






Equipments & % of total fault	Causes of Faults
Over head lines (50%)	<ul style="list-style-type: none">•Lighting Stroke•Earthquake•Icing•Birds•Tree branches•Kite Strings•Internal Overvoltage 
Under ground Cable (9%) 	<ul style="list-style-type: none">•Damage due to digging• Insulation failure due to temperature rise•Failure of Joints
Alternator (7%)	<ul style="list-style-type: none">•Stator & Rotor faults



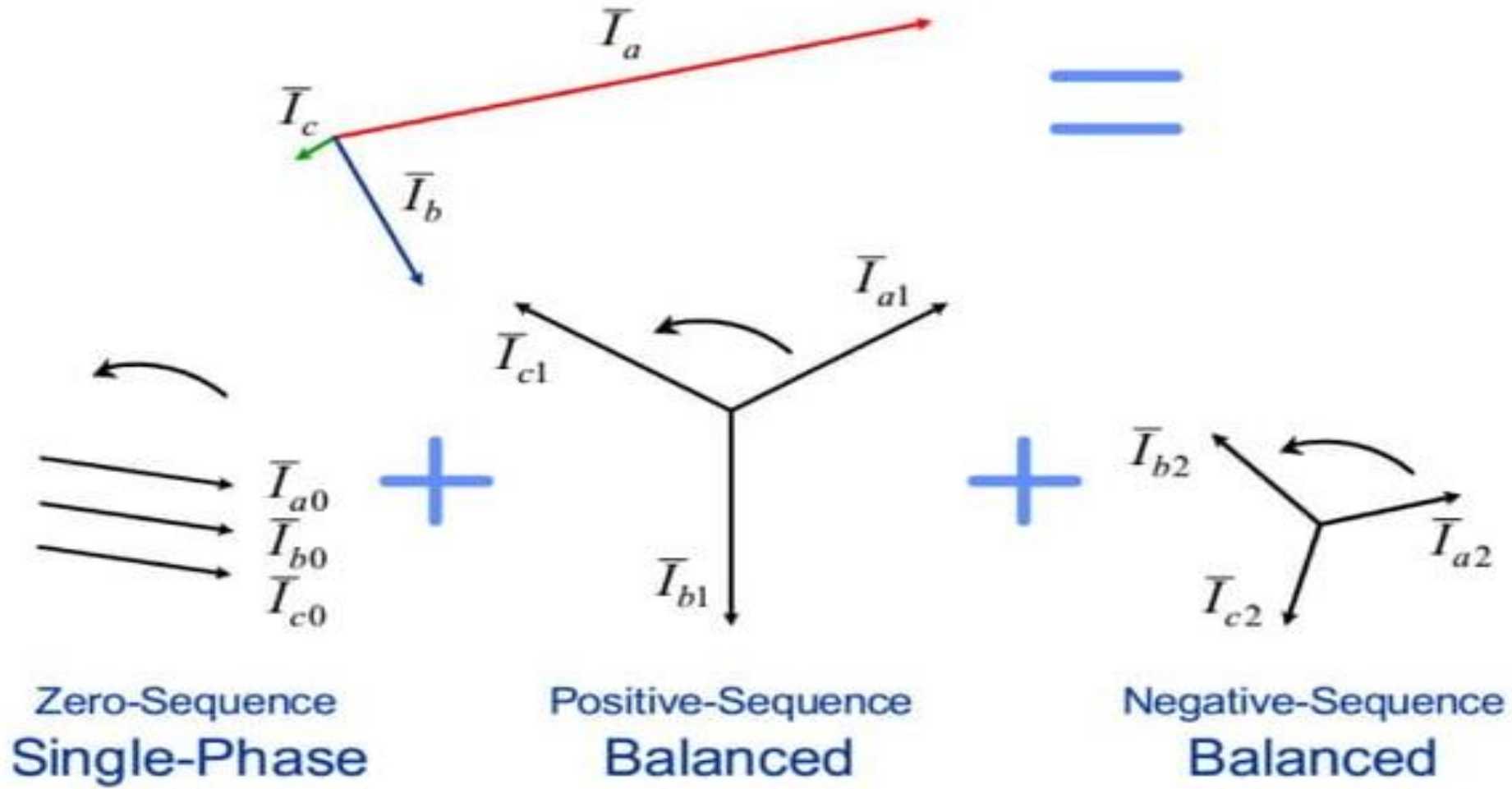


Equipments & % of total fault	Causes of Faults
Transformer (10%)	<ul style="list-style-type: none">•Insulation Failure•Faults in tap changer•Overloading 
Current Transformer & Potential Transformer (12%)	<ul style="list-style-type: none">•Overvoltage•Insulation Failure•Break of Conductors•Wrong Connections
Switch Gear (12%)	<ul style="list-style-type: none">•Insulation failure•Leakage of air/oil/gas•Mechanical defect•Lack of Maintenance





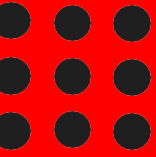
DECOMPOSITION OF AN UNBALANCED SYSTEM

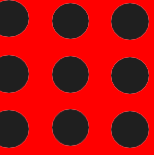




Fault Minimization

- ***Improving the quality*** of machines, equipments, installation etc., by improving the design techniques.
- ***Adequate & reliable*** protection system control
- ***Regular maintenance*** by trained professionals
- ***Effective management*** of electrical plant





Merits of Fast fault clearing

- Helps to avoid *permanent damage to equipment & components of the apparatus*
- *Reduces* the chances of risks like *fire hazards*
- Maintains the *continuity* of the power supply
- Brings back the power system to the *normal state sooner*

