



SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

UNIT 4 – Analysis of Insulators and Cables



CONTENTS



- Insulators
 - Types of Insulators
 - Voltage distribution in insulator string
 - Improvement of string efficiency
- Cables
 - Types of cables
 - Parameters of cables
 - Grading of cables

Conductors Insulators



Semi conductors





MAIN PARTS OF OVERHEAD TRANSMISSION LINE



- Support
- **Insulator**
- Conductor
- Bird guards
- Jumpers
- Fuses
- Lighting arrestors
- Cables





INSULATORS- INTRODUCTION



- Materials that do not allow electricity to pass through them are called insulators.
- The insulator provides necessary insulation between the line conductors and supports and hence, prevents any leakage current from conductor to earth.

Good insulators – wood, glass and plastic and rubber

INSULATORS





PROPERTIES OF GOOD INSULATORS



- Should be mechanically strong to bear the conductor load.
- It should have very high insulation resistance.
- Should have high dielectric strength.
- Able to withstand over voltage and normal working voltage.
- Should not be affected by changes of temperature.

TYPES OF INSULATORS



Glass Insulator



Disc Insulator



Post Insulator



Pin Insulator



Shackle Insulator



Strain Insulator



Stay Insulator



Suspension Insulator



TYPES OF INSULATORS



- Pin type insulator
- Suspension type insulators
- Strain type insulators
- Stay insulator
- Shackle insulator



PIN TYPE INSULATORS





PIN INSULATORS



- . Pin insulators is secured to the cross – arm on the pole.
- . There is a groove on the upper end of the insulator for housing the conductor.
- . Pin type insulators are used for transmission and distribution at voltages upto 33KV.
- . Above 33 KV it becomes too bulky and hence economical



SUSPENSION TYPES INSULATORS





SUSPENSION TYPE INSULATORS



- . This type of insulators are used for $>33\text{KV}$, consists of number of porcelain discs connected in series by metal links in the form of string.
- .The conductor is suspended at the bottom end of the string is secured to the cross arm of the tower.
- .One disc is designed for 11 KV.
- .If the working voltage is 66KV , then six disc in series will be provided on the string.



WORD SEARCH



E A H Q Z A T A J J R R D B G
Z J C B X U Q K K T Y E I F W
P T D H R S P I N G Y W M E I
U H F B S D J T Y T G O W X N
A G I X P X Q H I Y J P S A D
Y N E I C I C C M L X O P W F
E G T N Y D I Q P D I V U R A
U Q R F E R E N E W A B L E R
A C X E T R S E D A L B D Z M
F E V C N A A W J B Z N C G W
Q E E F S E C T Y S I B S U Q
G L U W Q X C I O W F J C D R
E P S T O Y H O Y R P U X S C
F B F A K W V B W C N F B Q O
K X H S E G N M S C R V D R N



ANSWERS



RENEWABLE
TURBINE
WIND
SPIN
BLADES
GENERATOR
ENERGY



STRAIN TYPES INSULATORS





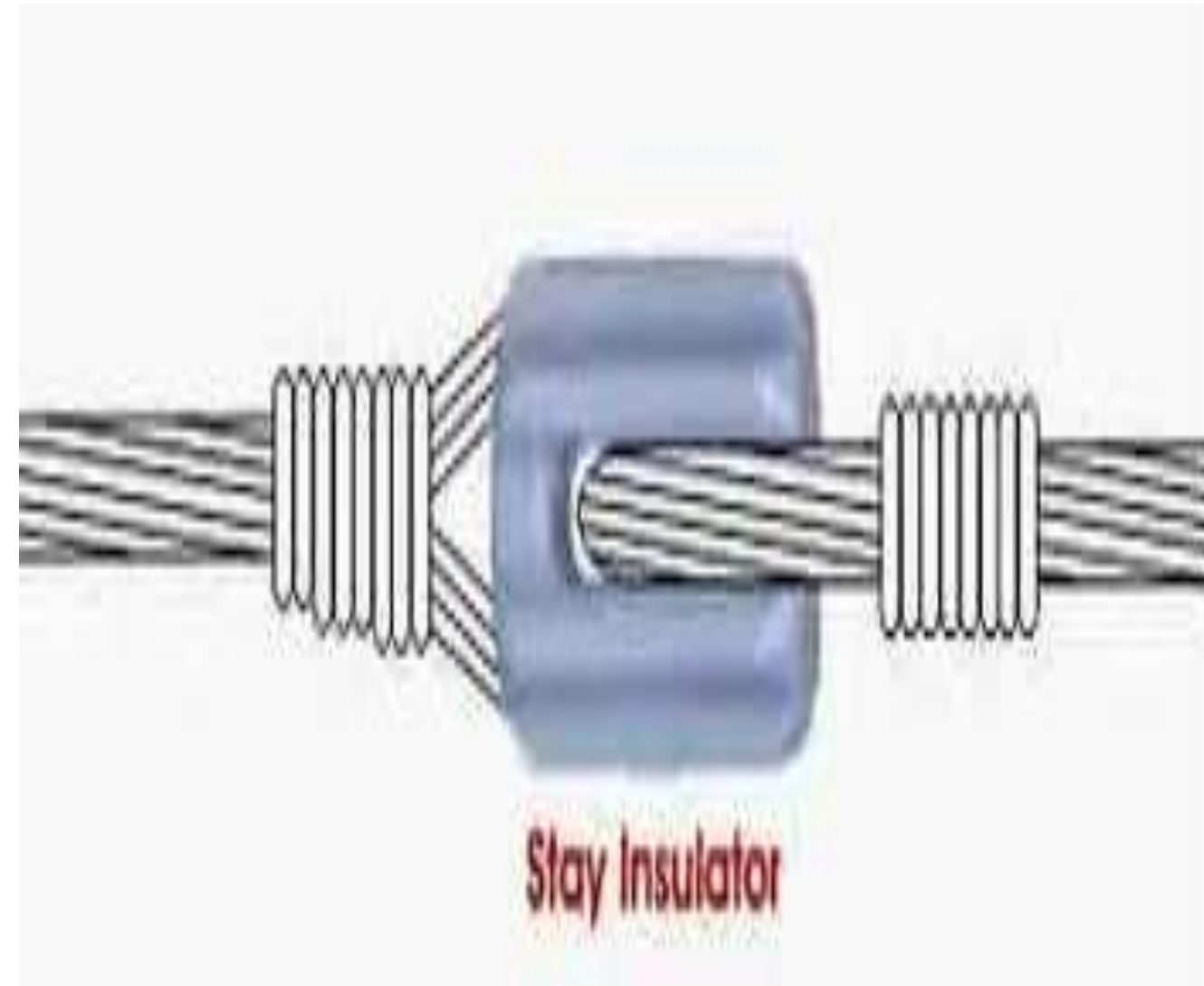
STRAIN TYPE INSULATORS



- .When there is a dead end of the line or there is a corner , the line is subjected to greater tension.
- . Low voltages <11 KV
- .In early days, strain insulators were used as shackle insulators.
- .These are frequently used for low voltage distribution lines.
- .Used in both horizontal and vertical position.



STAY INSULATORS





SHACKLE INSULATORS





IMPORTANCE OF INSULATORS

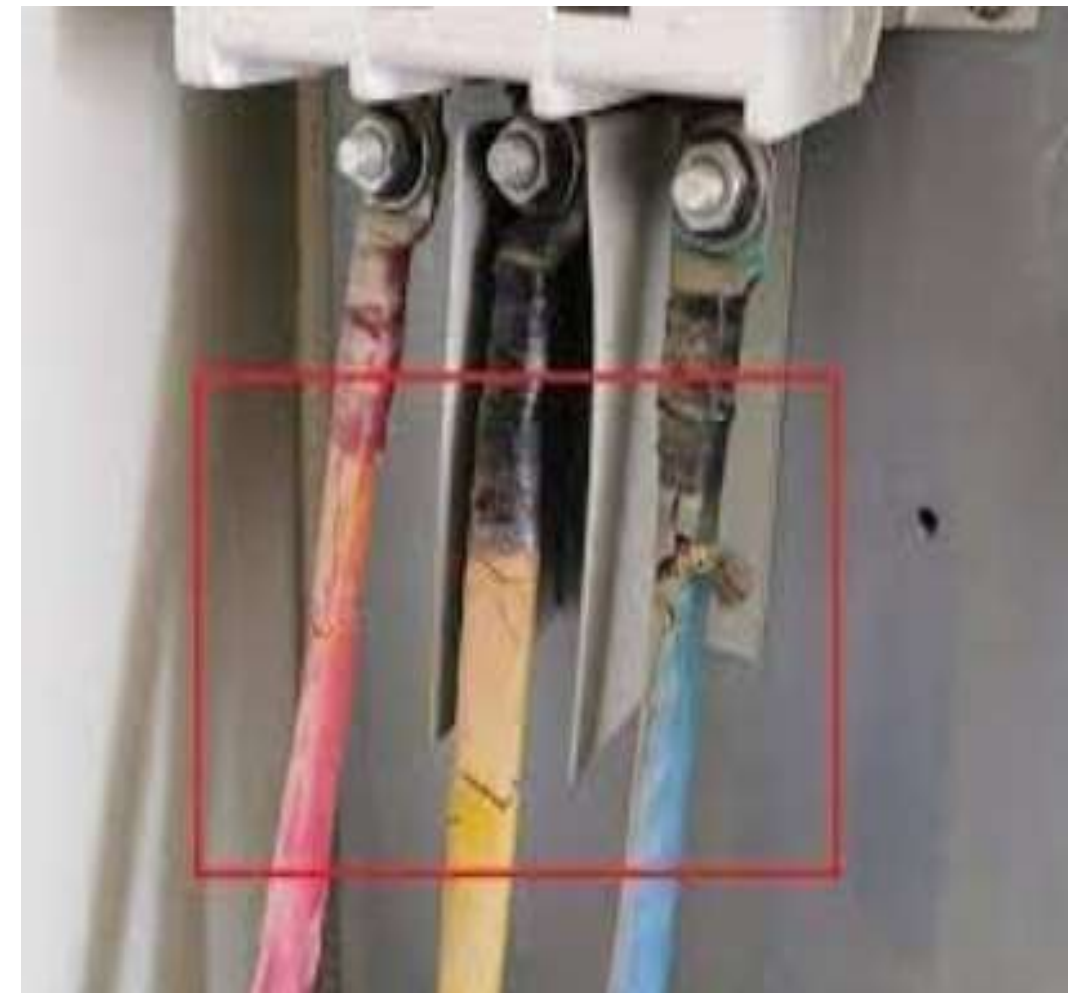
- It prevents the passing of high-voltage in an Electric circuit.
- It helps in reducing the cost of energy.
- It helps in saving the environment by controlling the emission of pollutants.
- It improves process performances.
- It protects from Electric shock or electrocution



Recently in New Delhi.....

- A 35-year-old woman, who stepped onto a flooded street at the New Delhi Railway Station, died by electrocution after accidentally coming into contact with a loose wire from a nearby electrical installation

INSULATION FAILURES





ASSESSMENT



1. Which of the following factors is not a cause of electrical damage?
- A large number of disc insulators connected together
 - Rainy season dust on insulators
 - Variation in temperature and hot and cold seasons



ASSESSMENT



1. Pin type insulators are used for transmission lines

- Up to 33 KV
- Above 33 KV
- Below 33KV
- Up to 66KV

