TYPES OF CONDUCTORS

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Types of conductors

Solid conductor

Hollow conductor

Stranded conductor

Composite conductor

Bundle conductor

Solid Conductor

* Cheapest
* Constructed from single piece of metal
* Rigid ⟶ less flexible ⟶ can't bend easily
  ↳ more likely to break
* Large skin and Proximity effect
* Ideal for structured wiring in Building

Hollow Conductor

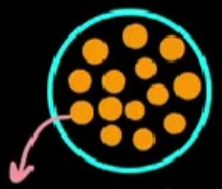
* Diameter of Hollow conductor is large compared to solid conductor for same current capacity. (Amperage)

* Effects
  - Corona ↓
  - Skin and Proximity ↓
  - Inductance ↓

* Easy to cool
* Use in bus-bar / bus-duct at substations.

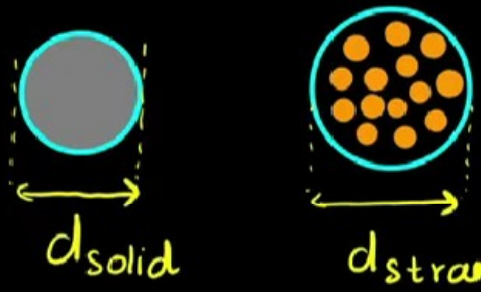
Stranded Conductor

* Use where flexibility required
* Consist of subconductor → touch each other
* For same current capacity

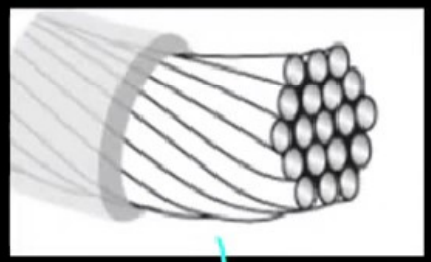


Stranded conductor

$d_{solid} < d_{stranded}$

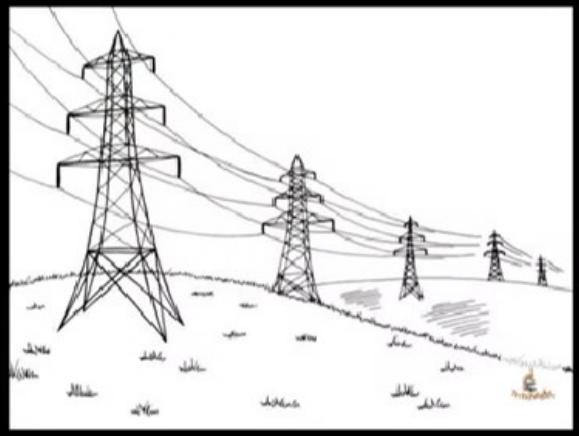


* Effect → Skin effect ↓
  → Proximity Effect ↓



spiraling effect ↑

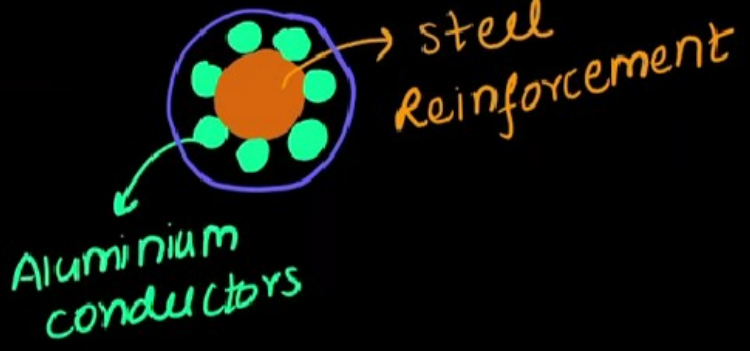
* Used in Transmission line



Composite Conductor

* Sub category of stranded conductor.

* Consist of two or more strands of different metal

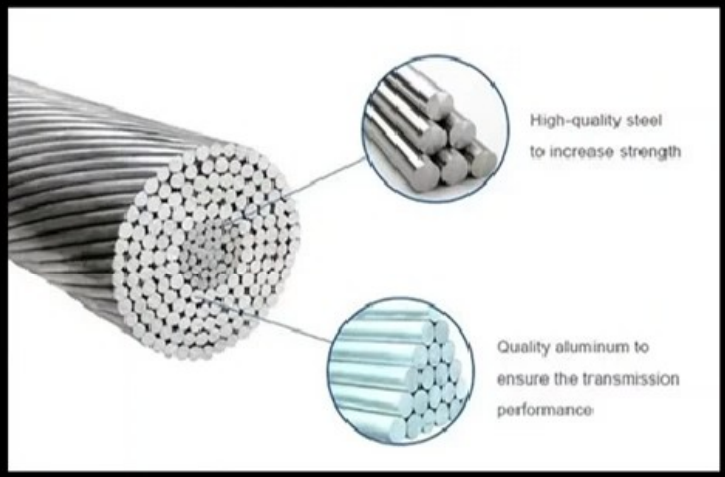


Aluminium-steel (ACSR) → 1266 A, 100°C (capacity)

* New Trends → composite core Conductors

ACCC → 2376 A, 200°C (capacity)

(Aluminium conductor composite core)



BUNDLE CONDUCTORS

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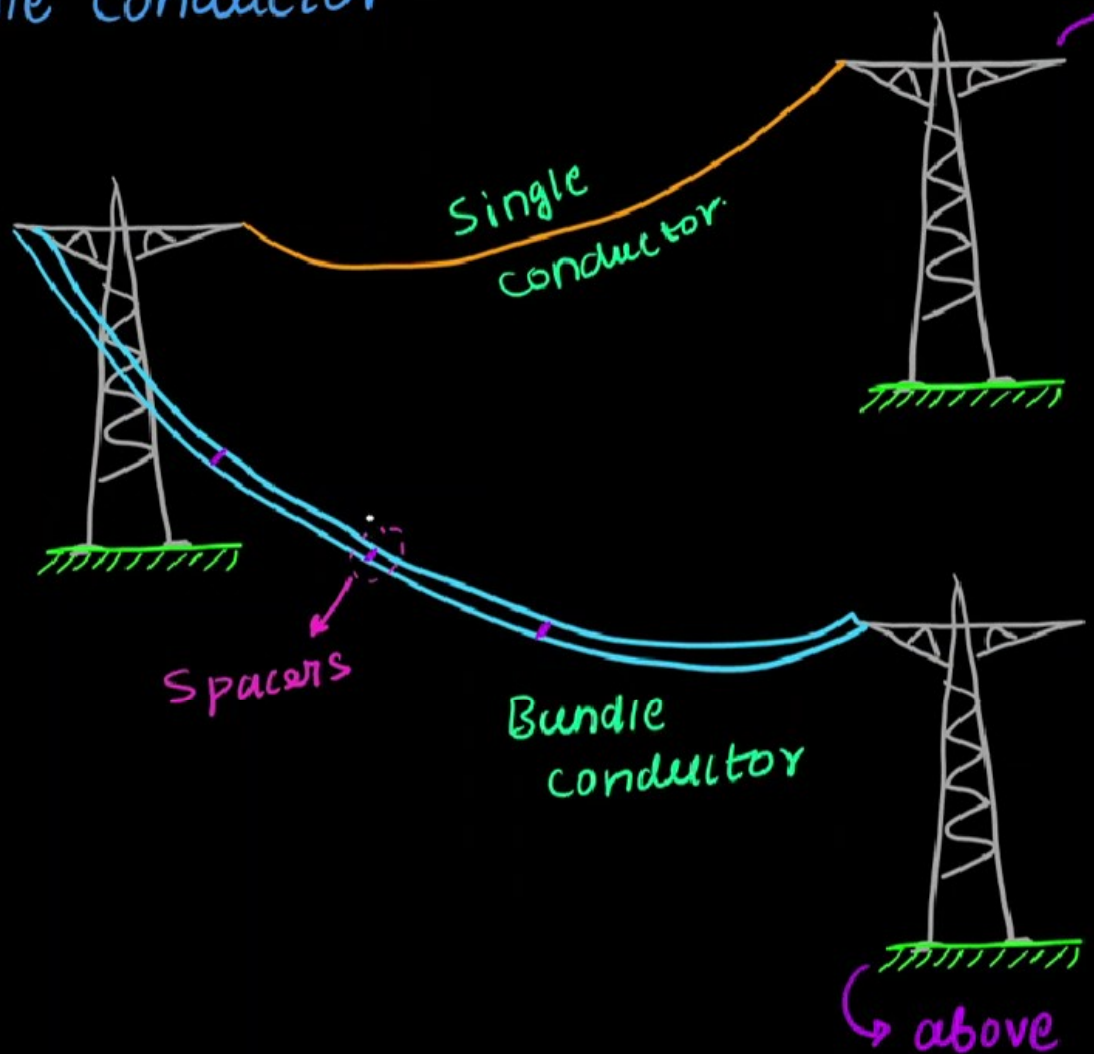
Bundle Conductor

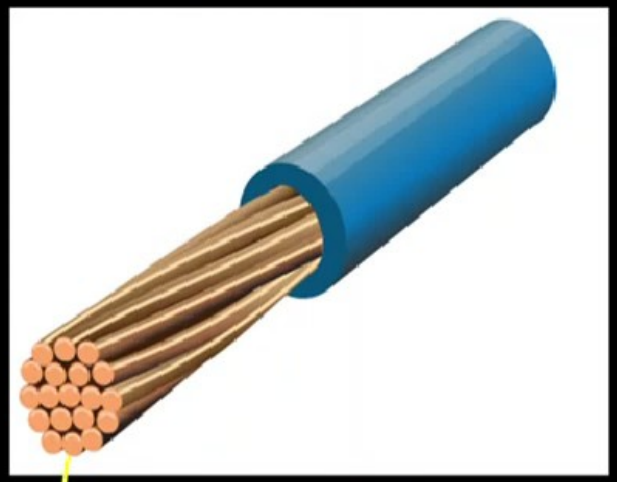


→ upto 220kV line

"The combination of more than one conductor per phase in parallel, suitably spaced from each other is known as Bundle Conductor"

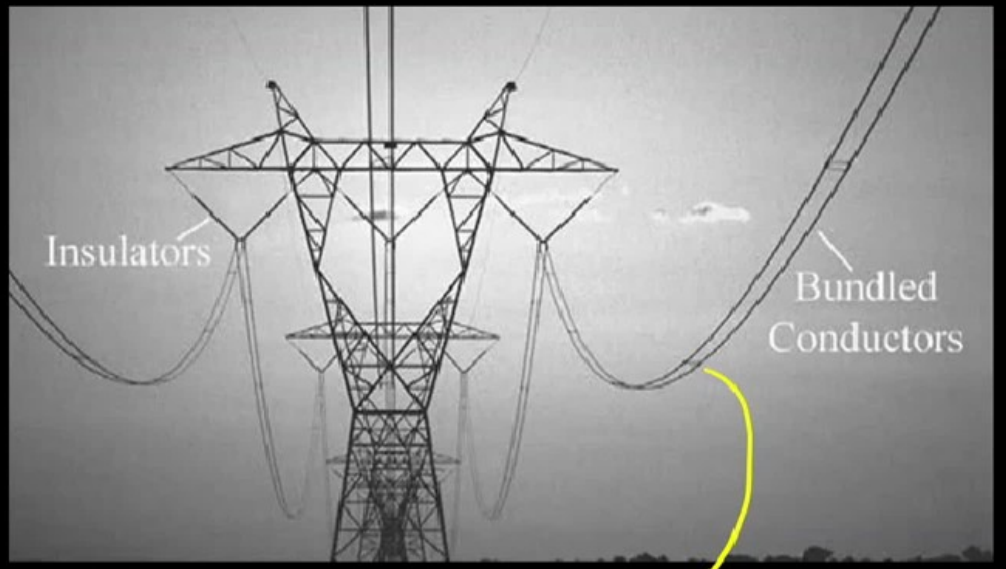
↳ above 220kV line

Stranded Vs Bundle



strands

strands touch each other

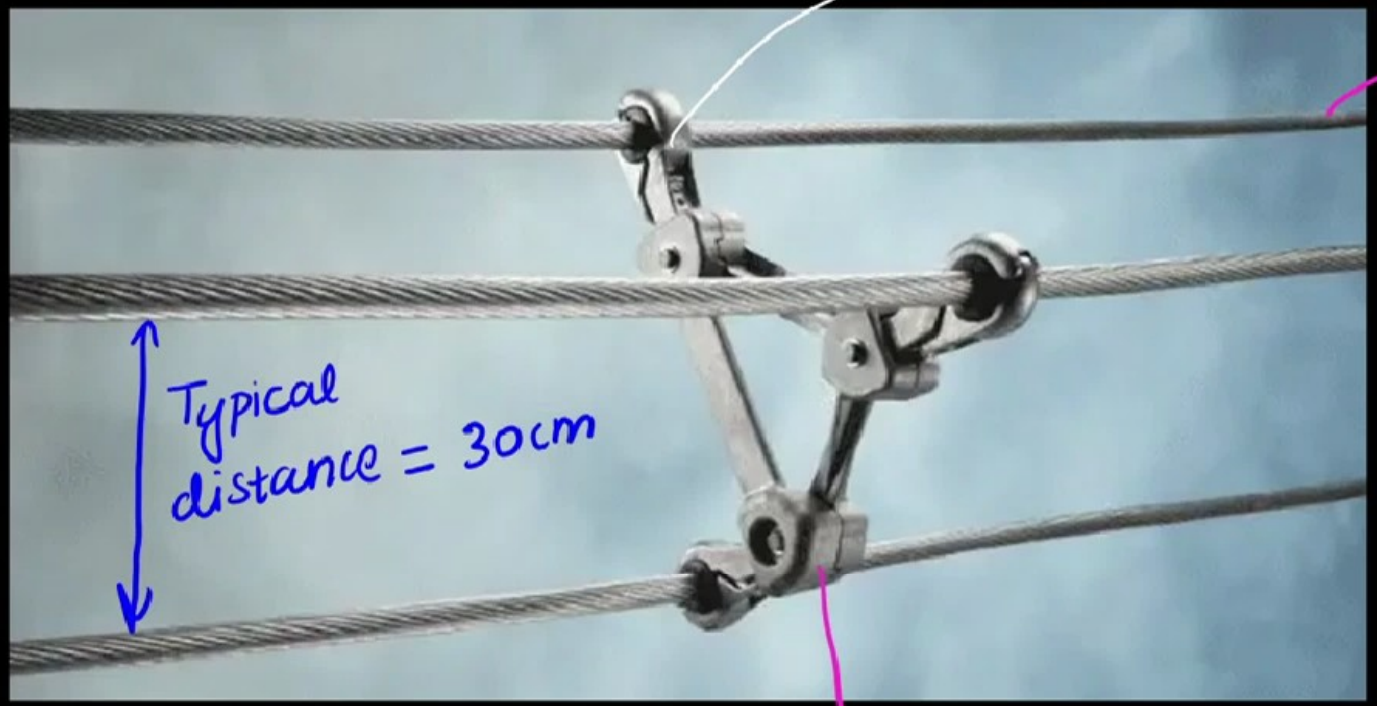


Subconductors

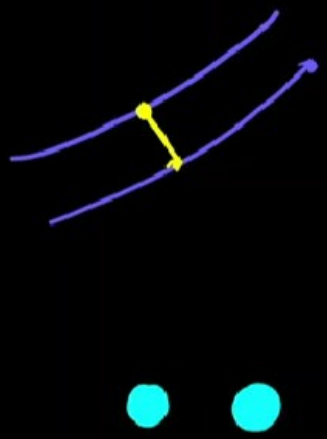
Stranded Conductors

Don't touch each other

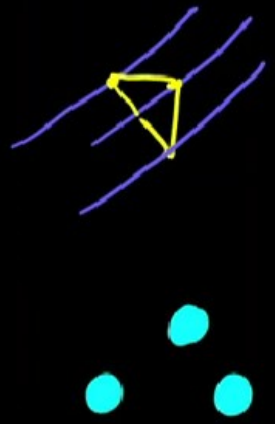
Spacers


Al. Alloy
sub conductors
stranded
Typical distance = 30cm
Spacers
Damp out vibrations
used to keep subconductors apart

Types Of Bundle Conductors



2-Bundle conductors



3-Bundle conductors

4-Bundle conductors

2
Bundle
conductor

3
Bundle
conductor

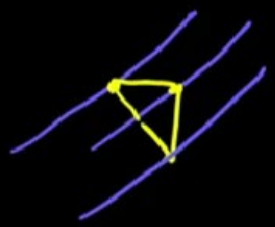
4
Bundle
conductor

#Rule of Thumb:

Bundle cond
- 2 → 220 kV line*
- 4 → 400kV line*

*Violation is expected

#Main Advantage



Bundle conductor

Increases → GMR

- L ↓
- C ↑
- Ampacity ↑
- Corona loss ↓
- Surge Impedance Loading ↑
- surge impedance ↓
- Cooling ↑