

Calculation of Line Loss

1. Calculation of the line loss from Taojiang to Xinfeng power grid

Line: Taojiang hydropower station to Datang substation

Distance: $L=16.5\text{Km}$

Type of the line: LGJ-150

Annual average power of transportation: $P=8000\text{kw}$

Power factor: 0.9

Resistivity of the aluminum line: $\rho =31.5 \Omega \text{ mm}^2/\text{km}$

Rating voltage of transportation line: $U=35\text{kv}$

Resistance of line: $R=16.5*31.5/150=3.465 \Omega$

Line loss: $\Delta P=(8000/0.9)^2/35^2/1000*3.465=223\text{kw}$

Line loss rate: $\Delta P/ P=223/8000*100\%=2.79\%$

2. Calculation of the line loss from Taojiang to Ganzhou power grid

Line: Taojiang hydropower station to Gaoqiao substation

Distance: $L=9.3\text{Km}$

Type of the line: LGJ-70

Annual average power of transportation: $P=12500\text{kw}$

Power factor: 0.9

Resistivity of the aluminum line: $\rho =31.5 \Omega \text{ mm}^2/\text{km}$

Rating voltage of transportation line: $U=110\text{kv}$

Resistance of line: $R=9.3*31.5/70=4.185 \Omega$

Line loss: $\Delta P=(12500/0.9)^2/110^2/1000*4.185=66.72\text{kw}$

Line loss rate: $\Delta P/ P=66.72/12500*100\%=0.53\%$