

2.2 VOLTAGE REGULATION.

When a transmission line is carrying current, there is a voltage drop in the line due to resistance and inductance of the line. The result is that receiving end voltage (V_R) of the line is generally less than the sending end voltage (V_S). This voltage drop ($V_S - V_R$) in the line is expressed as a percentage of receiving end voltage V and is called voltage regulation.

The difference in voltage at the receiving end of a transmission line between conditions of no load and full load is called voltage regulation and is expressed as a percentage of the receiving end voltage.

$$\% \text{ voltage regulation} = \frac{V_S - V_R}{V_R} \times 100$$

2.2.1 Transmission efficiency.

The power obtained at the receiving end of a transmission line is generally less than the sending end power due to losses in the line resistance. The ratio of receiving end power to the sending end power of a transmission line is known as the transmission efficiency of the line

$$\begin{aligned} \% \text{ Transmission Efficiency, } \eta_T &= \frac{\text{Receiving End Power}}{\text{Sending End Power}} \times 100 \\ &= \frac{V_R I_R \cos \phi_R}{V_S I_S \cos \phi_S} \times 100 \end{aligned}$$