(stator copper loss and stator iron loss).

Now, the rotor has to convert this rotor input into mechanical energy but this complete input cannot be converted into mechanical output as it has to supply rotor losses. As explained earlier the rotor losses are of two types rotor iron loss and rotor copper loss. Since the iron loss depends upon the rotor frequency, which is very small when the rotor rotates, so it is usually neglected. So, the rotor has only rotor copper loss. Therefore the rotor input has to supply these rotor copper losses.

After supplying the rotor copper losses, the remaining part of Rotor input, P_2 is converted into mechanical power, P_m.

Let P_c be the rotor copper loss,

I_2 be the rotor current under running condition,

R_2 is the rotor resistance,

P_m is the gross mechanical power developed.

$P_c = 3I_2^2R_2$

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$P_m = P_2 - P_c$

Now this mechanical power developed is given to the load by the shaft but there occur some mechanical losses like friction and windage losses. So, the gross mechanical power developed has to be supplied to these losses. Therefore the net output power developed at the shaft, which is finally given to the load is P_{out}.

$P_{out} = P_m$ – Mechanical losses (friction and windage losses).

P_{out} is called the shaft power or