ELECTRICAL AUTOMATION SYSTEMS TOWARDS INTELLIGENT AND ENERGY EFFICIENCY APPLICATIONS

Musse Mohamud Ahmed

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APPLICATIONS

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CHAPTER 32

APPLICATION OF FAN MOTOR ENEGY EFFICIENCY

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32.1 Application of Energy Efficiency

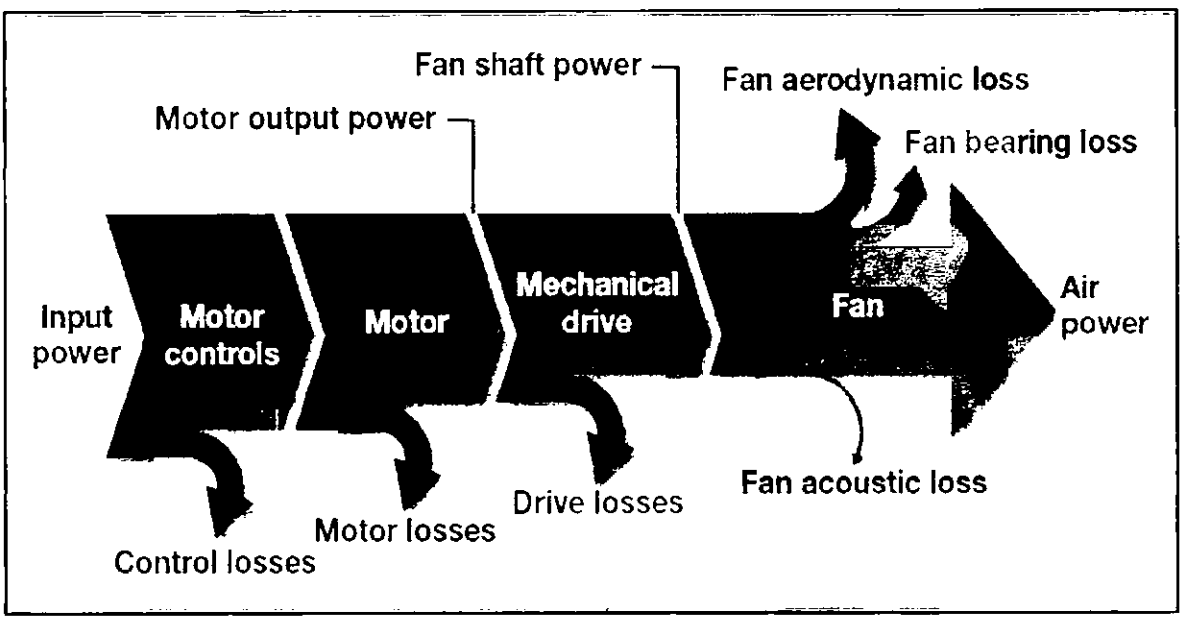

Figure 32.1: Fan Energy Flows from Left to Right through a Typical Fan System

Fig 32.1, a Sankey Diagram is showing the energy flow through a fan system. A typical fan system consists of a motor controls, motor, mechanical drive and the fan. Power flows from left to right, with each component rejecting a portion of the input energy because of inefficiencies. Energy efficiency of each component is the ratio of the output power to the input power. The fan imparts energy to the air stream by converting mechanical power at the fan shaft to air power at the outlet. Some of the input energy is rejected due to aerodynamic losses, mechanical losses (bearings) and to a much lesser extent of acoustic losses. Therefore, the total efficiency of the fan is given by the ratio of air power to fan shaft power.
Thus, the air power may be defined in two ways depending on the test method and application.

1. Air volume flow rate * total pressure
2. Air volume flow rate * static pressure