

Steam Power Plant - Unit I

Steam Power and Jet Propulsion
Lecture Notes

Introduction to Steam Power Cycle

- Definition of cycle
- Steam power cycle concept
- Main components

Rankine Cycle

- Boiler
- Steam Turbine
- Condenser
- Feed Water Pump
- Basic processes

Rankine Cycle Equations

- Turbine Work
- Pump Work
- Heat Added
- Heat Rejected
- Thermal Efficiency

Reheat Cycle

- Principle of reheating
- Advantages
- Increase in turbine work and efficiency

Regenerative Cycle

- Feedwater heating
- Steam extraction
- Improved efficiency

Reheat-Regenerative Cycle

- Combined advantages
- Higher thermal efficiency

Steam Rate and Heat Rate

- Definitions
- Formulae
- Importance

Efficiencies in Steam Power Plants

- Turbine Efficiency
- Pump Efficiency
- Boiler Efficiency

Boilers

- Fire Tube Boiler
- Water Tube Boiler
- Packaged Boilers

Boiler Accessories

- Superheater
- Economizer
- Air Preheater
- Feedwater Pump
- Safety Devices

Boiler Performance

- Boiler Horsepower
- Factor of Evaporation
- Boiler Efficiency

Boiler Heat Balance

- Heat absorbed
- Flue gas losses
- Moisture losses
- Radiation losses

Condensers

- Direct Contact Condenser
- Surface Condenser

Surface Condenser Analysis

- Heat transfer equations
- LMTD
- Cooling water requirements

Geothermal Power Plant

- Working principle
- Resources
- Applications

Numerical Problems

- Steam generator problems
- Boiler calculations
- Condenser calculations

Conclusion

- Steam power plant cycles
- Boilers
- Condensers
- Performance evaluation