

# Steam Engineer School Topics

- Properties and Power of Steam
  - Temperature of Steam and Water under Pressure
  - Energy in Steam vs. Water
  
- Boiler Construction
  - Parts of a Boiler
    - Firebox
    - Smoke Box
    - Water Legs
    - Steam Dome
    - Tubes/Flues
    - Crown Sheet
    - Flue Sheets
    - Wet Bottom vs. Dry Bottom
  - Types of Boilers
    - Locomotive - Return Tube - Upright
    - Fire Tube vs. Water Tube
    - Lap vs. Butt Strap Seams
  - Horse Power of a Boiler
  - Stay Bolts
  - Hand Holes
  - Tapered Studs
  
- Boiler Safety Devices
  - Fusible(Soft) Plug
  - Safety Valve
  - Water Level Gauge
  - Try Cocks
  - Steam Gauge
  - The Operator
  
- Boiler Testing
  - Visual Method
  - Thickness Method

- Hydro Method
  
- Water Feed Devices
  - Piping Basics - Valves/Check Valves/Pipe
  - Simplex Pumps
  - Duplex Pumps
  - Injectors
  
- Boiler Explosions
  - Weak Boiler
  - Metal Breakdown
  - Low water level
  
- Basic Boiler Operation
  - Start Up Procedure
  - Checking Water Level
  - Firing
  - Holding Pressure
  - Blowing Boiler Down
  - Shut Down
  - Priming/Foaming
  - Emergency Shut Down
    - Blowing a Hand Hole Gasket
    - Breaking a Water Glass
    - Blowing a Fusible Plug
    - Low Water Level
    - Pulling the fire
  
- Basic Boiler Maintenance
  - Replacing Tubes/Flues
  - Installing New water Glass Gaskets
  - Installing New Water Glass
  - Installing Hand Hole Gaskets
  - Boiler Compound
  - Water Treatment

- Washing
- Preparation for Winter Storage
- Preparation for Spring Steam Up
  
- Steam Engine Construction
  - Basic Engine Operation
  - Valve Cutoff
  - Inside/Outside Valve Lap
  - Reverse Gears
  - Simple vs. Compound Engines
  - Basic Governor Operation
  - Horsepower Calculation
  - Finding Dead Center
  - Centering the Piston
  - Engine Timing
  - Engine Lubrication
  
- Steam Engine Operation
  - Starting/Stopping/Reversing the Engine
  - Use of Clutch
  - Belting Up
  - Operating Under Load