Steam Turbine Series Part 3: Creating Steam Turbine Models in THERMOFLEX – using fundamental building blocks
ST Series - Summary

- **Part 1** – Creating ST models the quick-and-easy way.
  - Aimed at developer (upfront study) tasks
  - ST Assembly Wizard
  - Full automation used to build and compute ST

- **Part 2** – Manipulating ST model to match desired (OEM-provided) performance
  - Aimed at advanced developers/engineering companies
  - Knobs to adjust to dial-in performance

- **Part 3** – ST models built using fundamental building blocks
  - Aimed at OEMs & engineers possessing detailed steam turbine heat balance data, and wanting to exercise full control over all modeling details
ST Modeling with Fundamental Blocks (the 5 W’s)

- **Who:** All THERMOFLEX users (targets OEMs and those with unusual configurations, or desire to control every detail)

- **What:** Fully-flexible method to model steam turbines in detail where virtually every aspect of the model is on the flowsheet

- **Where:** THERMOFLEX—fully flexible modeling environment with > 220 standard built-in components handling 7 fluid types

- **When:** THERMOFLEX 1995, ST Assembly 2003

- **Why:** Employ the (THERMO)FLEXibility inherent in THERMOFLEX to build comprehensive, fully detailed model including user-defined methods to define calculation to match in-house codes
Our Old Example – Solar Rankine Cycle

- New Piece
- Already-built Pieces

[Diagram showing the Solar Rankine Cycle with labeled components and thermodynamic values.]
Example – Solar Rankine Cycle

• “Build” today’s model by walking through waypoints in the build progression:
  1. Schematic overview
  2. Building blocks
  3. Layout turbine groups
  4. Connect primary steam path through turbine
  5. Layout & connect leak streams
  6. Define FWH extractions
  7. Add Sealing Steam Regulator (SSR)

• “Building” complete
  1. Add assembly (remove stop valves & leaks)
  2. ST & Gen Cooling loads
  3. User-defined OD efficiency variation

• Throughout process take note of tradeoff:
  – Flexibility in this approach vs. Ease-of-Use demoed in Parts 1 & 2.
Example – Solar Rankine Cycle

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