

Heat Conduction: Steady-State, Transient

3.044 February 7, 2005

- Heat conduction with generation
- Multilayered wall, convective BC
- Transient conduction: erf, Gaussian

Mechanics:

- Tests March 9, April 20: lecture portion
- Handouts: ABET Objectives and Outcomes, PS #1
- Lecture: ASM Dinner with Yet-Ming Chiang at the Faculty Club, Students \$8, RSVP Sam Davis

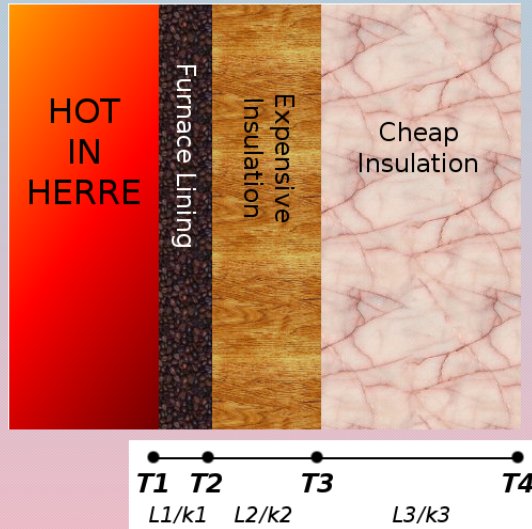
Heat generation and conduction

Motivating "process": pebble bed nuclear reactor

Figure removed for copyright reasons.

Multi-layered wall

Typical furnace wall:



Steady-state:

- Same heat flux everywhere
- Different conductivities, slopes
- Temperature is continuous (gaps...)
- Like current through multiple resistors in series
- "Voltage" = temperature
- "Resistance" = L/k
- "Current" = flux (or flux x area)