Best Practices for HVAC Systems in Cold Climates
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Resiliency

- The ability for a commercial building to withstand an interruption in the function of the heating system
  - Rate of temperature degradation with time
  - High/Low resiliency based on building construction and system design

https://www.explorefairbanks.com/explore-the-area/winter-season/
Alaska, 1989

- 2 week sustained cold snap
- -65F temperatures
- Building maintenance measures
- Monitoring cost
- Building damage
Heating Plants

• Hydronic heating
  • Improved comfort
  • Better heat transfer medium compared to air
• Fuel Oil Cast Iron Sectional Boilers
• Natural Gas Condensing Boilers
• District Steam
  • Steam to glycol shell and tube heat exchanger
Mechanical Space in the Building Footprint

- Consider the location of AHU
  - Fan room
  - Rooftop with heated vestibule
Mechanical Spaces

**General Notes**
1. SUPPORT 4' PINCH, FRV PINCH & CONVERTER VALVE PIPING FROM FLOOR. USE SLIDE PLATES AT FLOOR CONNECTION FOR HOT PIPING.

**Specific Notes**
- HOUSEKEEPING FM, SEE E6/2400.
Heating Systems

• Glycol – performance de-rate and wetted surfaces must be rated for use with % glycol
• Partially or fully redundant equipment
• Multiple heat sources
• Critical infrastructure: N+1 levels of redundancy at all levels of the building systems
• Coordinate building envelope and heat load
Finned Tube Radiators

- Most economical first cost
- Flexible for future remolds
- High output with 180F heating system fluid
- Piping is accessible
- Concern with furniture placement
- Aesthetic concerns
- Lower resiliency compared to radiant slab
Radiant Slab

- Performs well on thermal degradation tests
- Comfortable heat for occupants
- Flexibility limited
- Careful considering for manifold locations
- Return water temperature
- Slower response time
- May need backup heat source for pickup load
Radiant System
Radiant Tubing Installation
Humidification System Design

ELECTRODE CANISTER

STEAM TO STEAM


www.condairgroup.com/know-how/electrode-steam-humidifier
Plumbing Systems

- Route through interior walls or fur out exterior walls
- VTR sizing
- Freeze risks in Mechanical Rooms
- Roof drain and overflow heat trace
- Shoulder season issues
Piping Solutions
Glacier Formations
Glaciers
Remote Sites

• Preventative Maintenance Programs
• Maintenance guide on site and updated regularly
• Improved documentation
• Redundancy
• Stock spare parts
• Robust building envelope
The *Right* Approach

- Consider the building function
- Anticipated maintenance capabilities
- Future of the building
- Cost constraints
THANK YOU

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