Comfortable Performance
Retro-Commissioning Building Operations

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Building owner’s priorities

- Occupant comfort
- Operating cost
- Equipment Condition and Life Cycle
- Environmental impact
Building owner’s challenges

- Occupant comfort
- Operating cost
- Equipment Condition and Life Cycle
- Environmental impact
NRCan - RCx Definition:

• “The main RCx goal is to improve the overall building operation and system interaction while meeting current’s occupant’s needs”
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“The main RCx goal is to improve the overall building operation and system interaction while meeting current’s occupant’s needs”

Comfort + Building Performance = Comfortable Performance
Retro-Commissioning

- Technical
  - System design and installation
  - Control parameters
  - Control strategies

- Operation
  - Operation schedule
  - Set-point adjustments
  - Monitoring and troubleshooting
Operation

- Successful Building Operator requires:
  1. Knowledge
  2. Tools
  3. Time

- RCx will
  - Develop tools
  - Improve knowledge
Knowledge

- Comfort and System problem troubleshooting
- Equipment schedule optimization
- New controls strategies
Tools

- Actuator and system testing
- Sensor Calibration
- Use of Building Automation System trends
- Use of data-loggers
Example 1

• Problem
  ▫ Monday morning “too cold” complaints

• Solution
  ▫ Heating system start-up on Sunday at 11:00 AM
Example 1

Continuous system operation for 20 hours prior 07:00 AM Monday morning.
Example 1

Over the 15 hours of shutdown the space temperature dropped continuously, from a high of 20.6°C to an extreme low of 4.2°C.
Example 1

- **Problem**
  - Monday morning “too cold” complaints
- **Solution**
  - Heating system start-up on Sunday at 11:00 AM

- **RCx Investigation**
  - Tenant MAU running 24x7 with no heat (space temperature dropped to 5°C)
- **Solution**
  - Advise tenant and repair defective unit
Example 2

• Problem
  ▫ Constant indoor air quality complaints

• Solution
  ▫ Increased fresh air volume
Example 2

Night time temperature

26°
Example 2

- **Problem**
  - Constant indoor air quality complaints

- **Solution**
  - Increased fresh air volume

- **RCx Investigation**
  - Overnight over-heating the space to 26°C

- **Solution**
  - Repair faulty heating valves
Example 3

• Problem
  ▫ Indoor air quality failure and too hot complaints

• Solution
  ▫ Increased MAU fresh air volume
Example 3
Example 3

**BAS Values:**
Static Pressure = 1”
DAT = 57F
VFD Speed = 35.7 Hz

**CU Values:**
Static Pressure = 0.18”
Changed to 1” for VFD
Speed = 53Hz
Example 3

- **Problem**
  - Indoor air quality failure and too hot complaints

- **Solution**
  - Increased MAU fresh air volume

- **RCx Investigation**
  - VFD running at low speed, Static Pressure sensor faulty

- **Solution**
  - Replace faulty Static Pressure sensor
Comfortable Performance

- Operator training:
  - Investigation of comfort problems
  - Energy efficient control strategies

- Operator tools:
  - Equipment testing
  - Sensor Calibration
  - BAS trends and Data-loggers
Thank you!
Any questions?

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