Building for People and Performance.
Achieving Operational Excellence.

Darryl K. Boyce, P.Eng.
2019-20 ASHRAE President
Growing Up

All You Need to Know
ASHRAE HANDBOOKS
Why Should We Care About Operational Performance?

We “own” the buildings we design, build and operate...

THAT’S MY BUILDING!

ASHRAE®

It’s good for the planet!

Alice Turner Branch Library
Saskatoon, Saskatchewan, Canada

E: Energy and Emissions

- Building energy use intensity for all operating uses
  - Predicted: 240 kWh/m²/year
  - Actual: 380 kWh/m²/year (58%)

- Greenhouse gas from delivered energy for all operating end uses
  - Predicted: 103 kg GHG/m²/year
  - Actual: 155 kg GHG/m²/year (50%)

Red bar indicates typical industry performance for the region.

Roblin Centre - Red River College
Winnipeg, Manitoba, Canada

E: Energy and Emissions

- Building energy use intensity for all operating uses:
  - Predicted: 280.36 kWh/m²/year, 69%
  - Actual: 440.29 kWh/m²/year

- Greenhouse gas from delivered energy for all operating end uses:
  - Predicted: 52%, Actual: 4.6 kg GHG/m²/year

Red bar indicates typical industry performance for the region.

Surrey District Education Centre
Surrey, British Columbia, Canada

E: Energy and Emissions

<table>
<thead>
<tr>
<th>Building energy use intensity for all operating uses</th>
<th>Predicted: 80</th>
<th>203%</th>
<th>Actual: 242 kWh/m²/year</th>
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</thead>
<tbody>
<tr>
<td>Greenhouse gas from delivered energy for all operating end uses</td>
<td>Predicted: 3.5</td>
<td>Actual: 1.1 kg GHG/m²/year</td>
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Red bar indicates typical industry performance for the region.
Why Are Great Designs Not Always Delivering Great Operations?
Designers are Not Always Focused on Operability During the Design Process

Buildings are More Complex

Operators are Lagging Behind
How are buildings falling short?

- Feature-packed, but not always functional
- Unmanageable, complex control systems
- Insufficient Commissioning
- Energy Consumption much higher than benchmarks

The PROBE Project 1996-2001
“We believe that mastering the ‘digital age’ means applying new forms of technology, both to enhance the management of facilities and to create new kinds of work experiences.”

Raising the Bar: From Operational Excellence to Strategic Impact in FM, 2017
IFMA Research Study
Let’s Talk About Solutions!
Include the Building Operations Team

Include the building operations team at the beginning of the design process – not just at the end

- Design buildings for the occupant operators — *All design decisions should be evaluated for their impact on Indoor Environmental Quality*
- Develop training strategies to prepare operators
- Establish an effective turnover and training process
- Use data effectively
- Remember humans are the best sensors of comfort
• We must learn about the use of Analytical/Fault detection software and apply it to enhance the operation of building systems

• A comprehensive study by the National Research Council in Canada determined that with today’s building automation systems we have more than enough data, we just need to use it effectively
Consider a Digital Building Twin to improve the understanding of the building operations as a base model.
In the UK, a program called Soft Landings, was developed to support a building delivery process which runs through the project from inception to completion and beyond. The process ensures all decisions made during the project are based on improving operational performance of the building and meeting the client’s expectations.
How Is ASHRAE Helping The Industry Achieve Operational Excellence?
Multidisciplinary Task Group: Effective Building Operations

Created to coordinate the activities of multiple Technical Committees, Task Groups, Technical Resource Groups, and other stakeholders

- Suggestions for research
- Development of technical programs and special publications on Effective Building Operation to Achieve Excellent Indoor Air Quality while not wasting energy
What does the building owner and operator bring to the design discussions?

We are going to learn first-hand!
What Can ASHRAE Members Do?

Learn

Engage

Act

ASHRAE®
Get a copy of the new ASHRAE guideline: "Designing for Effective Building Operations" 

Available June 2020

Review the Centre for the Built Environment

Understand the perspective of the building occupant – what they see and feel
Engage with building operators at the ASHRAE Chapter and Society level

- Improve our understanding of their problems
- Develop educational and training programs to reduce the gap between design, construction and operations
- Listen to what they are saying
- Have at least one meeting this year to talk about operational challenges
Follow the principles: “Designing for Effective Building Operations”

- As building designs become more computerized, add computer assisted building operations enhancements into the design program
- Transfer the as designed operational concepts to the operations team
- Learn and apply well-building fundamental principles to the design
We Can Achieve Operational Excellence!

It’s **good** for the building.

It’s **good** for those who live and work within our buildings.

It’s **good** for the environment.

It’s **good** for us!