Coronavirus Guidance Webinar
26th May, 2020
Architect fined £1,500 after designing house which did not fit on site
All slides and a recording of the webinar are available on the website later this afternoon

- CBI Update
- Statutory Sick Pay Rebate Scheme – Jane Williams
- HSE Statement
- The Importance of Commissioning in Maximising Energy Efficiency & Extending Life
- Cycle Expectancy in HVAC Systems – Richard Jones
- Continuous Commissioning – Dr Tony Day
- Q&A
The Importance of Commissioning in Maximising Energy Efficiency & Extending Life Cycle Expectancy in HVAC Systems

The Manufacturers View

Richard Jones
Technical Director

EDPAC UK
The Importance of Commissioning - General

• Commissioning verifies whether a unit is working within its design parameters.

• Ensures compliance with legislation (Building Regulations, ErP, EcoDesign)
  • Optimises energy consumption.

• Reduces / Eliminates stress on components operating outside of design intent.
  • Reduces / Eliminates system failure and downtime.
  • Less inconvenience to the end user.

• Reduced reputational damage to the manufacturers brand.
  • Decreased level of reactive service calls.
  • Less warranty claims.
The Importance of Commissioning - Operational

• Design air volume, static pressure and specific fan power are key to achieving overall system efficiency.

• All components are selected around the design air volume and static pressure.

• When design conditions aren’t achieved it’s not just fan power that suffers.

• Heat recovery, heating and cooling circuits will also suffer reduced efficiency.
The Importance of Commissioning - Environmental

- Increased energy consumption.
- Potential effects on indoor air quality and comfort.
- Direct increase in carbon emissions from increased energy consumption.
- Indirect increase in carbon emissions from additional service visits to site etc.
- Environmental impact from disposal / recycling of parts and equipment.
The Importance of Commissioning – Warranty & Life Cycle

- Operating components outside of design reduces life and increases failure rate.
- Higher level of warranty failures drives up cost of sale and market prices.
  - Reduction in lifetime of the equipment.
- Significant increase in life cycle cost resulting from increased energy costs and cost of equipment replacement ahead of time.
  - Reduction in potential of repeat business for the manufacturer.
The Importance of Commissioning – Doing It Right

• Adopt a system wide approach to achieve compliance with the system design.

• Teamwork, ensuring the AHU commissioning engineer, controls engineer and balancing engineer work together to achieve the optimum system efficiency.

• Ensure the AHU achieves all key performance data set out in the manufacturers data sheet.

• Use controls and technology to make key efficiency data easily accessible to the end user and engineers, benchmarking specific fan power and other key data can give you an overview of efficiency in seconds.

• Maintain to manufacturer recommendations.

• Include a refresh maintenance and re commissioning regime during the lifetime of the equipment.
The Importance of Commissioning in Maximising Energy Efficiency & Extending Life Cycle Expectancy in HVAC Systems

Richard Jones
Technical Director

EDPAC UK

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Continuous Commissioning

Dr Tony Day
The need for continuous commissioning

• The performance gap between actual energy use and design intent is largely unexplained
• Is it the fault of the design models, or the building occupants?
• Or the set up of the plant in the first place?
• And if commissioning is properly carried out, how long is performance sustained?
• Energy management standards talk of ‘continuous improvement’
• This is unattainable if we do not manage ‘continuous degradation’
• Control drift, component wear and failure, and external factors influence on-going performance of plant
• Why tolerate underperformance of expensive assets?
Why monitor performance?...
Monitoring PV array outputs

<table>
<thead>
<tr>
<th>Array</th>
<th>Actual Output kWh</th>
<th>Actual Yield kWh/kWp</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV Demo 1</td>
<td>379.3</td>
<td>723</td>
</tr>
<tr>
<td>PV Demo 2</td>
<td>442.7</td>
<td>820</td>
</tr>
<tr>
<td>PV East</td>
<td>861.2</td>
<td><strong>615</strong></td>
</tr>
<tr>
<td>PV South</td>
<td>1,208.3</td>
<td>863</td>
</tr>
<tr>
<td>PV West</td>
<td>1,194.6</td>
<td>853</td>
</tr>
</tbody>
</table>

- Good yields on south and west arrays
- Demo1 and Demo 2 use different cell types
- PV East poor performance due to moss growth and crow damage
PV monitoring using CUSUM techniques

Regression against solar irradiation

Cumulative sum of the difference between actual and predicted performance

Performance starts to degrade

Rapid degradation (crow strike!)

Cumulative lost output
Example of consistently well-performing system

PV South

\[ y = 0.0012x + 0.0712 \]

\[ R^2 = 0.9827 \]
SuperHomes 2.0

- Deep retrofit
- + Heat pump
- + PV array
- + Battery storage
- + Solo controller
Commissioning heat pumps

- 2 years of operational data on 20 existing systems
- Re-commissioned based on flow temperatures and control set-points
- The project found heat pump COP improvements post re-commissioning of 10-15%
- Typically a rise from ~2.3 to 2.7
- Cycling rates fell dramatically
- Actual COP better matched calculated expectations
- Residential ASHP commissioning guide in preparation
Ground Source Heat Pumps

- London South Bank University 500 kW reverse cycle for heating and cooling
- Ground source in the structural piles
- 22 –25 m deep to avoid ground water
- 173 piles to provide required thermal mass
Commissioning is not carried out for the range of conditions met throughout the life of the plant.
Heat Pump Coefficient of Performance

COP

Jan | Mar | May | Jul | Sep | Nov | Jan | Mar | May | Jul | Sep | Nov

COP

COP target (£)

COP target (CO2)
Q&A

covid19@thebesa.com
Webinar Programme

Coming Up:

**Wednesday 27th – De-mystifying Insolvency.** If the worst happens, what is the process, how to make it as pain free as possible and how do you recover. Gareth Roberts, Partner - KRE Corporate Recovery

**Thursday 28th – What’s Happening in the Sector?** Neil Edwards, CEO – Builders Conference. Jason Hemmingway – BESA Membership Director will also share the results of the Q1 State of Trade survey conducted in association with the ECA, Select and SNIPEF, sponsored by Scolmore.

**Friday 29th – Admiral Bob is Back!** By popular demand, Rear Admiral Bob Tarrant returns to give us his thoughts and advice on leadership and how to deliver projects effectively.
AIR AND DIRT SEPARATION

Theory use and application of air and dirt separation equipment, the principles of operation, theory behind air release and common symptoms of sealed system equipment containing too much air and dissolved air.

Rob Clemson, Flamco

Thursday 28 May 10am - 11am

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