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Innovative Buildings: The CSA View

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Keith Barker highlights some of the best examples of innovative buildings and their impact on the occupant's experience

Is the current trend in today's commercial buildings simply to 'use less energy' or are there other aspects of life that need to be taken into account?

Of course, there are still, and always will be, those architects and designers that strive to produce signature buildings that stand out from a visual perspective and possibly pay only lip service to efficiency. There are also likely to be some buildings that strive towards the nirvana of net carbon zero.

Perhaps not all of them have paid or will pay sufficient attention to the internal environment and its effect on the people who inhabit those buildings. Most of us will likely accept that the ideal is a building that is visually stunning, provides an internal environment that engenders enthusiasm in the occupants and does it in a way that minimises the carbon footprint and costs of both the construction phase and the ongoing operations of the building.

Throughout last year, the Commissioning Specialists Association (CSA), as part of its annual awards programme, invited members to submit projects that they had worked on for the Project of the Year category. Each of the entries was carefully considered by the independent judging panel against a set of pre-defined criteria, with the associated scoring being applied in secret.

What was striking, however, was the wide array of entries, the different approaches taken in the designs and the innovative solutions that came about. It was also clear that, as might be anticipated, the local environments had a significant influence on the direction of the design of the building services.

Looking at some of the key elements of the finalists – bearing in mind that there is no judgement or

evaluation here – we leave it to the reader to decide which entry is most worthy of the award.

The list of last year's winners can be found at www.csa-awards.co.uk.

The entries are presented below in no particular order.

One Za'abeel in Dubai: Yes, it does have visual impact and the cantilever effect is striking. But it also reflects the local environment in that it focusses on energy and water efficiency – quite important in a desert locale.

The latest phase of Battersea Power Station in London: This iconic listed building has graced the London skyline since the early 1930s. Obviously, the listed status has some limitations on what innovations can be brought to the building. There is a focus on efficiency, not just in terms of energy use in operation, but also in terms of construction.

University of Salford's School of Science, Engineering and Environment achieves a BREEAM 'Excellent' standard through, amongst other things, the use of natural light, low-power lighting and photovoltaic panels along with air source heat pumps.

University College London's PEARL (Person-Environment-Activity Research Laboratory) is out of the ordinary in that it is a very flexible building designed to permit almost infinite variations in the environment to study the effects on people housed within them. The use of a 'circular economy' approach guides the building towards a net carbon zero classification.

Birmingham's Alexander Stadium East Stand redevelopment is intended to provide flexible space so that one or more events can take place at the same time and spaces can be used intermittently. To achieve this, some services use small local systems or larger plants with local control units for specific spaces.

T Zone, Kings Cross, London has a particular focus on local biodiversity and occupant wellbeing. The initial shell and core achieved BREEAM Outstanding, while the fit-out is to LEED Platinum standard. Ten % of the overall area is dedicated to roof gardens and terraces promoting biodiversity. Along with other initiatives. this results in a carbon-neutral building.

Soho Place is a development alongside the Tottenham Court Road tube station that has a number of innovations worthy of note. It uses a 'plug and play' energy centre and bio-diverse roof areas. Embodied carbon has been offset using verified schemes. The target is for BREEAM Outstanding, LEED Gold and EPC B energy standards.

Project Jupiter in Leamington Spa is a state-of-the-art, high-capacity laboratory complex built to provide quality COVID testing facilities using cutting-edge technologies. The carbon footprint was minimised by re-using an existing warehouse building, along with some of the electrical infrastructure within the building.

These buildings used a variety of methods to become environmentally friendly, including photovoltaic panels, off-site modular construction, recycling of wastewater, CHP engines, district heating and cooling systems, careful selection of materials, attention to access and maintenance strategies to help reduce running costs.

The overall picture from this sample of quality projects is that the UK construction industry employs a wide

range of high-tech, innovative solutions aimed at reducing carbon footprints and environmental impacts, increasing energy efficiencies, and improving the occupant's experience.

With that wide range of high-tech solutions come the potential pitfalls related to making them all work together. The design engineers on any project will start out fully intending that all of the systems are fully integrated and work together seamlessly and, on paper, they almost certainly will. However, every project is a dynamic entity that changes over time. This might be due, for example, to variations in the client's requirements, or manufacturer's developments in the equipment being used. Occasionally there may also be just a simple mistake.

All of a sudden, two systems that should have worked seamlessly together cannot even recognise each other; a control valve does not have sufficient authority over a revised flow rate or two items of equipment turn out to have different types of Modbus communication protocol. Even something as simple as normally open versus normally closed contacts or mismatched baud rates can cause unexpected problems that take time and effort to resolve.

There is no doubt that buildings with this level of sophistication, requiring a high degree of integration, need a significant input of commissioning and commissioning management expertise to knit the constituent parts together, even without any of the problems mentioned. There is already a marked element of systems engineering thinking needed and the impression that this aspect of a construction project will become more and more important grows by the day.

It is fortunate, therefore, that some of the forward thinkers in the building services sector are rising to the challenges that these developments pose. The Chartered Institution of Building Services Engineers (CIBSE) has recently undertaken a comprehensive review and update of its Commissioning Code M: Commissioning Management. It is also updating other codes, such as Code A for air systems and Code W for water systems.

The CSA helped to finance this exercise and provided some of the members of the steering group that contributed to and oversaw the process. It is also important that the CSA has itself instigated the Introduction to Commissioning Management training course alongside its existing commissioning engineer training material and now has a commissioning management path of development in place.

It is further understood that BSRIA is looking closely at revisions for some of its applicable guides such as BG 49/2015 Commissioning Air Systems. Again, the CSA stands ready to contribute to this initiative.

The conclusion is that there has undoubtedly been a significant increase in the complexity of the services integration in buildings and indications are that this is likely to continue. It will require a corresponding shift in the skill set of the testing and commissioning function and this is already being reflected in the progress shown in available training material from major industry bodies.

And just one final thought. The projects mentioned above that made the finalists list in the CSA awards were all more than worthy of that accolade and were prime examples of a successful approach to commissioning; perhaps it is no surprise that all of them employed CSA member companies to achieve that.