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# Ecolibrium

# Urge to merge

When science meets artistry.



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What is integrated design, why is it important, and what are we doing about it?

The University of Melbourne's **Brendon McNiven**, **Lu Aye**, F.AIRAH, and **Dominik Holzer** investigate.

Integrated design is the meshing of all disciplinary aspects of a design to work together towards common goals. Conflict is minimised, performance – be it technical, aesthetic or otherwise – is maximised. A common focus of integrated design is the relationship between architecture and engineering.

It has long been recognised that the relationship between the two disciplines can be problematic with Viollet le Duc and Bucknall commenting in *Lectures on Architecture* (1881), that “Architects are not sufficiently scientific, and engineers are not sufficiently artistic”.

Good integrated design improves both the architectural and engineering outcomes in design, and we need it now more than ever. The electricity consumed through HVAC&R in our buildings is responsible for about 24 per cent of all electricity consumed, 13 per cent of Australia's greenhouse gas emissions and represents 50 per cent of our peak electricity demand. The heating and cooling of our built environment is a major battle to be won in our fight against climate change.

## WE KNOW HOW TO DO IT

Getting architecture and engineering in design of buildings to work better together helps on a number of levels. As well as reducing operational costs

during a building's lifetime, integrated design reduces materials and cost outlays at the start of a project. It also results in better functionality in the end building. Everyone has something to gain from the developer improving margins at the front end, through to the tenants benefiting from improved living and working conditions at the user's end.

As an industry, we know how to do integrated design; there are plenty of examples of buildings where this is achieved. It happens far less often than it should, however, for a variety of reasons. These can be anything from the competitive nature of the procurement methods under which designers must operate through to the different ways practitioners from different disciplines think and the way this impacts communication and understanding during the design process.

## DOING SOMETHING ABOUT IT

The HVAC&R industry, led by AIRAH and The University of Melbourne, has decided to do something about it. As a part of a larger initiative known as i-Hub, and in partnership with ARENA, Australia's renewable energy agency, they are setting out to change the way we design. A series of Integrated Design Studios (IDSs)

have been planned to facilitate a study on how architects and engineers interact and progress design. Current best-practice knowledge about integrated design methods and the barriers to it occurring will be tested and further developed.

The IDSs invite clients, along with practising architects and engineers, to join the existing design studio program at the Melbourne School of Design. Using a focus of renewable energy to help achieve zero carbon outcomes, studio participants work on case study projects developing integrated designs from first principles. The lessons learned will inform what we know about implementing integrated design at a high level, and provide a compendium of design ideas that can be incorporated into different building typologies at a project level.

The first two IDSs were commenced in March 2020 and examine the design of data centres and schools. A current best-knowledge integrated design process was formulated and is being implemented in both studios. A high level of interest was shown by both clients and industry participants, suggesting perhaps that a large part of achieving integrated design may simply be consciously setting out to do it in the first place.



## THE EARLY OBSERVATIONS

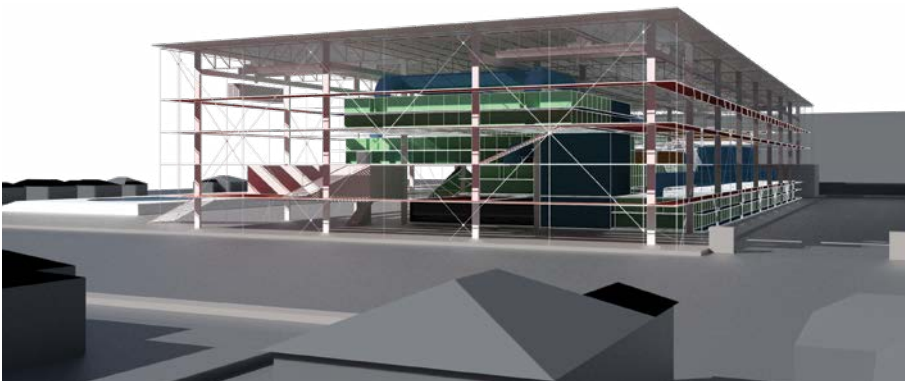
Bearing in mind that the program has just commenced and is still in its early days, a few preliminary observations have already begun to emerge. In addition to what we already know the following was noted:

- The opportunity window for integrated design “ideation” is very narrow. Blink and the opportunity to get integrated design happening on a project may be missed.
- The integrated design process is not “one size fits all”. It needs to be tailored to the buildings and individuals involved.
- Asking designers to consider the extremes of each discipline, i.e., pure architecture and pure engineering solutions, helps establish perspective

by effectively setting the design goalposts at each end of the spectrum.

- Integrated design requires a “co-author” mindset in all participants. There are no consultants in integrated design; everyone is a creator.
- Balance between architecture and engineering requires active curation. Having a third party observing and guiding the process when it strays is a useful addition.

The IDS program is intended to run over several years, with the findings from early studios feeding into later ones, iteratively refining the processes developed and consolidating the new knowledge generated. The IDSs will also be extended interstate, with studios planned at Queensland University of Technology and the University of Wollongong. ■



## Partner organisations

### SCHOOLS STUDIO

- ▲ ACT government
- ▲ Grimshaw Architects
- ▲ Arup

### DATA CENTRES STUDIO

- ▲ NEXTDC Engineering & Design
- ▲ Greenbox Architecture
- ▲ Aurecon

## Would you like to know more?

If you have projects you consider may benefit from integrated design or wish to be involved in the program in other capacities please email [airah@airah.org.au](mailto:airah@airah.org.au) or go to [www.ihub.org.au](http://www.ihub.org.au)

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