

Design through Making

Most architects who build do not make buildings; they make information that makes buildings. Making buildings requires knowledge not only in the world of information exchange, but in the world of making things. Transforming an idea into built form is a delicate, skilled, and somewhat mysterious operation; it relies on a tacit expertise that is familiar with the tactile and the physical. This is an expertise that goes beyond the architectural drawing and an expertise that many designers cannot claim to fully possess or practice.

Firstly, this short paper seeks to illustrate how architects can no longer avoid making as a fundamental aspect of design conceptualization and fulfillment. And secondly to ask, what must they do to address the revolution implied by digital fabrication?

Synthesis

Architectural design has a history of reflecting and being affected by technological progress. The invention of the blast furnace, the development of polymers, textiles and so on, are all familiar chapters within the tale of architectural innovation. 'Innovation' is usually taken as the introduction of something entirely new. In which case, by looking back at these histories, the right of architects to justifiably claim a significant influence on building construction as technologically innovative is open to challenge. They have been invariable reliant upon the resources of other industries and disciplines to be technologically innovative. On the other hand, their work in the realm of communicating and exploring ideas could hardly be more innovative.

Today, both visual literacy and the means of making architectural information are developing at such an explosive rate that our visual appetite for elusive and seductive form appears insatiable. Strangely enough, at this point where the visual (implied) could not appear more distant in outlook from the actual (artefact), it is largely through the implications of advanced drawing techniques that the issue of how things are made has once more become fundamental to design practice.

Drawing, as the product of the practicing architect, is of course a form of making, but typically one quite unlike the form required to manifest the idea represented within as an object. It requires a particular expertise to ensure that the idea is understood and survives. Drawings are expected to be efficient, clear, appropriate, skilful, and expert, yet as transmitted into the tactile and physical world by a process that is subject to negotiation, they must undergo translation. Subsequently, making becomes another form of representation, a responsive act that results in a portrait of ideas and a demonstration of how they were communicated by the information and read by the maker. This mutual exchange between draftsmanship and craftsmanship has, to a great extent, been nurtured through divisions of labour that associate one with a profession and the other a trade.

With the late arrival of CAD/CAM into architectural circles, a technology first developed in the 1950's by the US military and later by the aeronautics and automobile industries, a radical shift is occurring in relation to drawings for making. Firstly, there is the birth of the single drawing file, a parametric file accessed and produced via the web by a network of design and engineering consultants. Secondly, the tools of representation (CAD) have merged with the tools of fabrication (CAM) and machines now challenge the drawing as a direct instruction to make. Drawings can make things and like it or not, those that draw have become makers. Separate drawings such as design drawings, package drawings, specialist drawings, or drawings that refer to superseded content will be abandoned in favour of the single file; albeit it 'manufactured' by remote teams. Consequently, regardless of their proficient skills in making information, makers of this file must accordingly readdress their expertise in making things. The question that is raised is who coordinates the making of the file let alone the making of the building? It might be assumed it should be the architect, yet in what sense are they equipped to take on the role of master filemaker and master builder?

Thesis

Notions that building production is preceded by design and that making is merely the cooking of the raw or the end game where no further design ideas are explored, is outmoded. Whilst CAD/CAM is neither drawing nor making in the familiar sense, it is a hybrid mode where the investigation of ideas is engaged with the tactile and the physical. What is important about CAD/CAM is that it connects the drawing to a machine that makes. It is the drawing that has undergone the greater revolution. Acting as an instruction to make, the drawing must now anticipate the performance and resistance of any given material to fabrication processes. The spring of steel, the splinters and knots of wood, the fragility of some plastics, all matters formerly in the zone of negotiation now lie in the path of the numerically driven tool. The machine can only offer actual feedback once the operation is complete. Previews of fabrication in CAD/CAM software are not a guarantee of the physical outcome as they only preview the path of the tool, not its encounter with the anomalies of real stuff. This is neatly avoided by the common use of 'homogenous' materials in rapid prototyping techniques, such as mdf and perspex.

Rather than look in awe at the marvels of automated fabrication machines, 'Design through Making' is an approach that recognises the re-emergence of making, not merely as an immense resource for ideas, experimentation, and customisation, reinvigorated by new technologies, but as the key to unlock design information in order that it can make buildings with greater effectiveness.

In order to make buildings, architects must learn how to make.

The studio is a familiar term to describe both the working environments of architectural practice and education. The word is associated with a workplace of teaching, learning, practicing and in some circumstances making. For architecture this resonates well with notions of creativity and innovation. Leaving practice aside for the sake of argument, the form of the studio in this traditional sense has changed. Most obviously, this is on account of the predominant use computers. The computer cluster, the laptop, the home desktop, and the web accessed intranet have dispersed the site of producing and divulging information. In addition, space itself has become such a precious commodity that in some circles schools cannot provide enough of it for every student to have an 'academic home'. In tandem these circumstances have led to the reduction of the studio as the main place to view and develop the principal body of representative project work. Such an environment will never return and this can be viewed as positive. We now have an opportunity to reinvent it. The studio can instead take on a broader role as the location to view and test outcomes of representation. It can be a place of intense activity and noise. It can be a place to make architecture.

