Stefan Riegas und Michael Drobnik vom Design Technologie Department bei Herzog & de Meuron
im Gespräch mit Anh-Linh Ngo und Alexandra Nehmer
Komplexitätsmanagement, 2018.
In: *Arch+*, 233 (2018), 80–87.

"Standardization today means structuring of information and work processes"

The 16-member Design Technologies Department of Herzog & de Meuron supports the office's project teams in the application of digital technologies. The field of activity includes BIM and CAD programs as well as visualization and digital fabrication. The team consisting exclusively of architects not only uses existing software, but also develops its own applications and tests new the potential applications of new technologies. Anh-Linh Ngo and Alexandra Nehmer spoke with two members of the department, Steffen Riegas and Michael Drobnik, about the impact of BIM on the architectural production.

Anh-Linh Ngo: How long has Herzog & de Meuron's Design Technologies Department been working with BIM?

Steffen Riegas: Since 2012 at the latest, it has become an integral part of our work and has become increasingly important. However, we had experimented with it much earlier, the first pilot projects we had already started ten years earlier, at the turn of the millennium.

Michael Drobnik: These were not successful at the time because we still lacked the knowledge and experience to apply it to real projects. Today, we plan about one third of our projects with BIM, but about 60 percent of our staff are working on them.

…

In some projects, we even want to avoid BIM as much as possible, while in others we suggest its use ourselves. For example, in the new construction of the children's hospital in Zurich, we advised implementation with BIM due to the complexity of the project.

ALN: Complexity in what sense?

MD: In this case, it concerned the function, typology; in other projects, it can be the geometry.

SR: The building size determines the number of of components and documents, so the amount of information that needs to be handled - that also plays an important role. An important decision criterion is the planning phase we are in and which presents us with different tasks. For each phase there is the right tool. A good example is the pavilion for the Serpentine Gallery in London. In the early design phase, one of the tools used to experiment with a wax model, among other things. With a digital tool, the design team would not have come to this result. The design was transferred to a digital model of the building. The structure of columns and and roof, its topography, may look complex, but it can actually be quickly and accurately digitally modeled. To document the result of a design process, to communicate and further elaborate the result of a design, BIM is a valuable tool for us.

MD: Particularly in the early design phases working with a BIM model can also be can also be a hindrance, because it is not a blank sheet, but rather a strongly pre-structured system. Other digital systems function like blank paper, without horizontal and vertical organization or levels to which I have to adhere. I can develop ideas out of out of nothing. In BIM, on the other hand, a wall is already a wall, even if it is the design phase, it is sufficient to represent it as a line or a surface that can be can be dragged. The analogy of digital clay and digital LEGO©, illustrates the difference very well to discuss BIM as a digital building block system. LEGO can be useful in a late phase, but in the beginning we rather need the clay.

ALN: Does the need to collaborate and create transparency in turn mean that you have to rely heavily on standards so that so many designers and trades can design together? You once said that when you work with BIM, you carry a "typological backpack" with you and that the categorized and typified components contained in it sometimes mean more ballast than support. Does this mean that typological design is coming back through the digital back door?

SR: In the past, standardization was primarily about standardizing the components, which also had an effect on the form. Today, it relates much more to the structuring of information and work processes. We are no longer necessarily dependent on standardized components. Many people compare BIM with Lego or Minecraft, with a modular system from which I select and assemble modular objects. To a certain extent, that is also true. But with Lego, to take the comparison further, I can only use the repertoire of building blocks that is already available to me in the construction kit. We are instead able to design these components ourselves - as if we were

using a 3D printer to make curved building blocks, for example. So actually, that shouldn't have any influence on the design at all. The question is also what the goal of standards is. The standardization of building components was about industry-compatible production, which should speed up the construction process and thus reduce costs. For us, the added value in structuring information through tools like BIM is that we can communicate better, within our office, but also with all the other parties involved in construction. Because if everyone uses the same protocols that define what values make up an element and how they are described, everyone can read, display or edit this information.

ALN: Are the differences to earlier technologies really that small? When CAD came along, there were great expectations attached to it. There were whole issues of ARCH+ discussing how digitization would change architecture. Then they quickly became disillusioned with the fact that it was really just a translation of drawing tools into digital. Today, BIM is seen by many as an actual paradigm shift, because it means a change from drawing to simulation and modeling. How do you assess that?

SR: A CAD drawing is obviously more information-rich and agile than an analog one, which means changes can be made much faster and easier. But it remains the same process, just done with a different tool, and the result is also the same. 3D modeling is indeed something different. However, we have been creating 3D models with other software long before BIM, some of which were extremely complex and powerful, and for which we have programmed routines ourselves before. For facades with curved surfaces and thousands of different components, for example,

digital tools have always been essential. Digital tools are also ideal for tasks like stadiums, because they are geometrically complex - everything is round in plan and section - but at the same time very rule-based, so much can be formulated as an algorithm. Similarly, pure size can justify the use of technology. No one wants to draw 80,000 seats by hand in a soccer stadium, either with a pen or a mouse.

MD: And above all, nobody wants to change it.

ALN: What proportion of special elements do you have to create yourself? How do you ensure their reusability across projects?

SR: To illustrate this with the example of the door: There are many parameters that all doors share. A door is an opening in a wall and it has a height and width. If I create a generic door like that, I can use it in a project in any country. However, the more specific a component becomes during the design process, the more information is attached to it and the less interchangeable it becomes. This can go so far that even if we have two construction sites in Basel right next to each other, even with the same clients and the same function, we can't exchange the components because the projects are different and are being worked on by different teams. There, they each decide for themselves what information they need and how they structure it.

…

SR: At the moment, communication with planning partners is still hampered by the lack of common standards. For each project, it has to be

redefined who can expect which information from whom and when, and which file formats and communication channels are used to exchange it. Right now, we often send our model as a file that someone else can open again. As long as we use the same software, this is not a problem. But of course, not everyone uses the same software. The exchange formats we have so far, for example Industry Foundation Classes (IFC), always have a friction loss. But software vendors are working on cross-product standards and powerful protocols for exchanging information at a very low hierarchical level. That would make it easier for everyone to work with whatever software they want, as long as it's able to understand a common protocol.

ALN: So those protocols would still be proprietary, whereas IFC is an open standard.

SR: But it's also highly limited for that.

MD: Open standards bring certain difficulties, but it can still work. For example, we are implementing the Children's Hospital Zurich as an Open BIM project. For international projects, we are usually contractually required to use a proprietary format.

SR: We assume that in the future, more and more processes will move to the cloud, so models will no longer be located on our premises. Instead of regularly sending a copy of the entire model, from which all those involved in planning then have to find out what has changed since the last version, this would allow only references to individual coordinates or components to be exchanged.

ALN: How will this development change our understanding of software?

MD: Software that is bought in a small box, as before, and then owned forever, will probably no longer exist. The future will be to buy in services.

SR: At the moment, software is still expensive, but in the future we may get it for free. The business model of the software companies will be to offer platforms on which we can work together; we will then be charged according to data volume. Some of the game engines we work with already have such licensing models.

MD: This raises the question of whether more data is really better. You also have to distinguish between data and information. The challenge is not to send too much data that the planning participants can't do anything with. On the other hand, there is the danger of overloading the processes with too many specifications. The right balance still has to be found here, also on the part of the clients.