

Timber construction of a place of worship

Leading Swiss timber construction company **Blumer Lehmann** offers comprehensive sector expertise encompassing consultancy, design, production, erection and project management. Its most recent 'Free Form' structure, the Marks Barfield-designed Cambridge eco-mosque, shows all of that in the very best light. Project manager Jephtha Schaffner explains what made the award-winning build such a success.

Buildings are more than their materials, and forests aren't simply collections of trees. According to Canadian ecologist Suzanne Simard, woodlands are "complex systems with hubs and networks that overlap and connect trees, and allow them to communicate,

and they provide avenues for feedbacks and adaptation". Trees flourish in forests because they can behave as if they were a single organism.

Looking at the 30 Free Form timber columns that support and sprout into the lattice roof of Europe's first eco-mosque, you wouldn't think they

had travelled almost 1,500km to be planted there. You wouldn't think their constituent parts, along with the rest of the structure's 3,800 timber elements, had come in 80 just-in-time truckloads, nor that each of those precisely choreographed journeys took seven whole days. And yet these East Anglian woods exist because of a logistical organism that linked 50 carpenters across 10 production buildings in Gossau, Switzerland with a 10-person construction team on-site in Cambridge, in the UK, via the ports in Rotterdam in the Netherlands and Hull in the UK. That organism was the work of Swiss timber expert Blumer Lehmann, the contributions of which to the mosque's production and construction also won it the 2019 Offsite Award for the best use of timber technology. Blumer Lehmann understands wood.

Open to collaboration

It's an expertise the company is more than willing to share. The mosque's architects at Marks Barfield originally contacted Blumer Lehmann to seek support and advice for developing the project in 2012. Blumer Lehmann worked with the London firm to perfect the 3D model, which originally called for segmented branches rather than the smooth curves seen in the

mosque today, optimising the cross-section of the beams in the process. From there, it helped Marks Barfield explain and clarify all the material specifications and details required to put the project out to tender.

As project manager Jephtha Schaffner explains, "Architects always like small cross sections, and if you want to achieve the small cross sections, then you need to optimise the structure. We took the architects' plans and then we slightly adjusted the master surface to have the perfect geometry for design and structure to work hand in hand. We couldn't have achieved the final result without this collaboration, which we found very satisfying." Marks Barfield obviously felt the same, as, in 2015, Blumer Lehmann was awarded the order for the final design, production and erection of the timber construction.

So began an intense six months of further collaboration. "We had to approve all the details, so we had a meeting with the architects and the main contractor in London almost every second week," says Schaffner. "That was always the basis for our 3D model. And the point is that it was almost half a year before we were on-site. We had already fixed almost everything, because if you have the discussions before, you can assemble



Blumer Lehmann's expertise in Free Form timber was used to create arabesque branches that curve and weave into a canopy of geometric designs.



The eco-mosque has 30 Free Form timber columns that support and sprout into the lattice roof.

the building on-site without stopping and starting over and over again.”

Given the power of Blumer Lehmann's Free Form drawing software, CNC machinery and in-house expertise, bad planning and communication might be the biggest threats to a project's success. With the precision to draw perfect curves and surfaces in 3D models, and the ability to machine those surfaces to accuracies of $\pm 1\text{mm}$, it would be easy to look past the importance of mutual understanding. By getting deeply involved as early as possible and explaining everything as clearly as possible to all stakeholders, Blumer Lehmann ensures communication issues never arise.

Indeed, the Swiss company is committed to consulting with clients and contractors as closely as possible, particularly as timber projects have to account for the material's unique properties, which include shrinkage, moisture and movement. In this case, Blumer Lehmann produced a sample tree column for the architects, clients, main contractors and even UK timber specialists to examine. “There was a long discussion about the appropriate timber quality,” Schaffner recalls. “If you have a small sample, people see each crack and knot, but if you assemble a whole building, then nobody will talk about one crack. There are cracks in timber – it's a natural product – and you have to guide them a bit about that.” Even if it doesn't exist yet, you need to be able to see the wood for the trees. That's an expertise all of its own.

The Cambridge eco-mosque project

It's also a vital consideration, as that wood and those trees weren't mere



Exterior of the Cambridge eco-mosque: a flourishing network and meeting point for Cambridge and its Islamic community.

decoration, but Marks Barfield's answer to the question of how to build a European mosque for the 21st century and beyond.

“Mosques in China and in Saudi Arabia are completely different buildings,” explains Schaffner, taking just two geographical examples. “There is no one design.” For the eco-mosque, Marks Barfield looked to the thicket of 856 columns at the Great Mosque of Córdoba, as well as the vaulted ceiling of Cambridge's own King's College Chapel for inspiration. The final result uses Blumer Lehmann's expertise in Free Form timber to support the structure with arabesque branches that curve and weave into a canopy of geometric designs. In their absorbing beauty and complexity, these traditional Islamic art forms, which are far more regular than mosques themselves, are often thought of as windows

onto the infinite. They serve a dual purpose in the Cambridge mosque, framing and supporting glass windows that reveal the sky and suffuse the space with light.

Blumer Lehmann hadn't worked on a religious building before the Cambridge mosque, but as the head of the project management team, Schaffner always has his mind on more earthly concerns. First among these is working relationships. “Everybody is always motivated to assemble a nice building, whether it's straight or curved,” he says. “A team in which the main contractor and all those involved are angry or dislike each other changes the mood and motivation much more than the type of structure.”

Keeping that in mind, Schaffner's role on Blumer Lehmann's projects is to collect and share all the important information, getting the right people to focus on the right priorities at the

right times, all while coordinating the ongoing delivery schedule.

“We had to work out how to manage the just-in-time logistics,” he explains, “making sure the guys on-site weren't getting bored and that production was continuing. Everything has to be in the right place at the right time. It doesn't matter how long the delivery time is – some components take months and others come in days – but for each material, for each product, for each piece of data, for everything, you have a deadline.”

Now all of them have been met, Schaffner believes both Cambridge and Islam have another historic building, a flourishing network and meeting point that's unparalleled in how much it communicates about both the city and the religion today. ●

For further information

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