



illuminating fully functional prototypes

Case Study

Ogle Models + Prototypes produced the highest quality, fully functional working model of the new, state-of-the-art Quantum luminaire solution from Abacus.

The biannual Light & Build exhibition, the leading global trade fair for lighting and intelligent buildings, took place in Frankfurt. One of the highlights (quite literally) of this exhibition was on show at the Abacus Lighting stand where the company launched its latest lighting solution - the Quantum Luminaire.

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World leaders in lighting design and manufacture, the business of Abacus is to support global customers in meeting the growing demand for technically brilliant, yet energy-efficient and sustainable lighting solutions. Abacus, based in Nottinghamshire, UK, has been providing sophisticated lighting solutions throughout the world for more than 50 years and proudly celebrates its British engineering heritage.

The Quantum concept has been developed collaboratively between Abacus and 3form Design around the Abacus remit of using power intelligently and responsibly; incorporating advanced LED systems to provide more light for less power, which ultimately reduces operating costs significantly and the carbon footprint of the installation compared with competitive products. 3form is a UK based product design and development agency renowned for innovative and stylish 3D product design combined with engineering and manufacturing know-how to achieve superior results - every time. A technologically advanced and highly complex product in terms of design and manufacturing, the Quantum Luminaire is an ergonomically attractive, highly effective lighting solution for large areas. Almost one meter square, Quantum is designed to sit on a column 8-10 metres high and provide light in all directions, in contrast to traditional lighting solutions in this genre, which only provide light in one direction. Furthermore, utilising LED lights in combination with the design the ROI offers an impressive comparison to the Quantum's traditional counterparts - both in terms of energy savings and the number of installations required to cover large areas.

3form Design was commissioned to supply a fully functional model of the Quantum for the Frankfurt show, which was a very different prospect to seeing through the engineering of the Quantum for final manufacture. Having worked with Ogle previously on a wide range of product development projects 3form knew exactly where to go with the Quantum project.





According to Austen Miller, Senior Partner at 3form Design, “Ogle was the obvious choice for a model of this quality and with such critical timescales. Over the last eight years, we have learned that you can trust Ogle to deliver on time, every time.”

The requirement was for a very highly detailed, fully functional model to show off the unique features of the Quantum Luminaire and to invite interest at the exhibition in Germany.

Team members from Abacus, 3form and Ogle came together to identify the best approach. Dave Bennion, Director at Ogle, highlighted some of the challenges, “At this time the 3D CAD and engineering data that existed at 3form was for final production of the Quantum and incorporated 100+ component parts. Working together we were able to identify how we could compress the number of parts for the functional model and from this 3form Design was able to generate new 3D CAD models specifically for the model, which would allow us to start producing parts straight away - time was a critical factor.”

In fact, the number of components was reduced to 74 parts. As Dave explained, “We have a range of model making and prototyping capabilities in house, including additive manufacturing (AM) technologies, which we knew could build complex elements of the model in one piece, rather than the multiple pieces required for final production. This would help with meeting the deadline for Abacus. A further consideration was to ensure that the full model structure would be able to withstand the rigours of a photo-shoot and shipment to Germany.” A key advantage of working with Ogle is that the company is neutral in terms of the processes it offers and always utilises the best process for the application at hand.

The Quantum model's component parts were made using a combination of advanced AM techniques as well as traditional subtractive machining capabilities to achieve the best overall result. Due to complexity, more than half of the parts (41), specifically the corner sections, the interface with the column and the wiring housings were laser sintered using Ogle's in-house EOS P730 and P380 Laser Sintering machines. Laser sintering is an accurate ($\pm 0.2\text{mm}$ per 100mm, dependant on part geometry) AM process, which can build complex parts, one layer at a time using materials with good strength and heat resistant properties. The 41 Quantum parts were constructed of two materials: SLS PA2200 and SLS PA3200. Further sections of the Quantum model that were to house the LED lighting and control units were machined out of high density model board to provide good rigidity and tight tolerances.

Once all the parts were produced an early form and fit operation was carried out to ensure that any conflicts could be resolved before any paint or finishing had been applied. When the Ogle team was satisfied with the fit, the individual parts were hand finished to the exacting standards Abacus required including painting to a precise colour match. According to Dave Bennion, “With so many parts in different materials, it can be quite challenging to hand finish all of the components to the same level. But at Ogle we have a dedicated finishing shop and pride ourselves on the consistency of our finishing capabilities.” Finally the finished parts were assembled and the whole unit was successfully tested again with the approval of John Telford, Lighting Design Manager at Abacus.

John's summation of the model build and the results it has brought forth are by far the greatest testimony of Ogle's expertise and approach to model making: “Ogle had come highly recommended to us by 3form Design and our experience with them on the Quantum luminaire model proved that the recommendation was fully justified and that quality is delivered consistently no matter what the project is - Ogle exceeded all our expectations. Our stand at the International Light + Building Exhibition in Frankfurt displayed the full-size working model and the many visitors to our stand saw it as a finished, manufactured product because the quality was so good. Our experience with Ogle throughout the build of the Quantum model was one of total professionalism, attention to detail and ingenuity. This, even despite the fact that the deadline we gave them was very tight.”

FOR MORE INFORMATION PLEASE CONTACT:

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