

Superyacht

INTERIOR DESIGN

EXTERIOR SPACE

CREATIVITY AND ARCHITECTURE



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PERSPECTIVES

AMALGAM



MAKING MINIATURES



Established 30 years ago by four young model makers, Amalgam Modelmaking has been building models for everyone from Dyson to Rolls-Royce and Redman Whiteley Dixon. *SuperyachtDesign* speaks to Chris Conlon, director of architecture and marine projects at Amalgam, about making miniatures.

Since its founding in Bristol, UK, in 1984 by model makers Leo Saunders, Trevor Parsons, Sandy Copeman and Tony Pallanca, Amalgam Modelmaking has used a passion for 3D design, architecture model-making, electronics and visual effects to become one of the top names for precision small-scale model making. The team's ability extends to the creation of oversize exhibition sculptures, interactives, rapid prototyping, metalwork and complex engineering.

"Our breadth of skill means we can make virtually anything," says Chris Conlon, who has been at the company since 1999. "Our first introduction into the world of marine model making was probably twelve years ago when we were recommended to Martin Francis by Foster + Partners. We produced a couple of the 70/70 tender models as well as a huge model of *Crystal Ball* for Francis Yacht Design." Since then, the company has created models for the likes of Claydon Reeves, Dubois Yachts, Devonport Yachts, Redman Whiteley Dixon and global boat shows spanning from Bahrain to Monaco.

Making yacht models is nothing new, indeed there are replicas of Royal Navy vessels in Britain that date back to the 17th century, but with advances in technology and increasingly complex designs, model making has become a high-tech art. Typically working from 3D CAD data in the form of digital models produced using programmes such as Rhino or SolidWorks, Amalgam takes the data, scales it and begins to remove and add details required for the CNC machining process. "Essentially we want to remove material from a block of dense foam material using a computer-controlled cutter to leave us with a kit of parts that we will assemble and finish to a point that we can apply paint to



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get the exterior finishes," says Conlon. "This can then be mounted on a base as either a 'full hull' or 'waterline' model, for example."

According to Conlon, the use of CNC machining and new advances in 3D printing means that they are able to work to very fine tolerances; to within fractions of a millimetre. "It achieves a higher accuracy in the symmetry of the models," he adds. "Differences in symmetry can be made more obvious when there is a high gloss finish applied. So careful sanding and self-scrutinising are essential skills all the way through a build."



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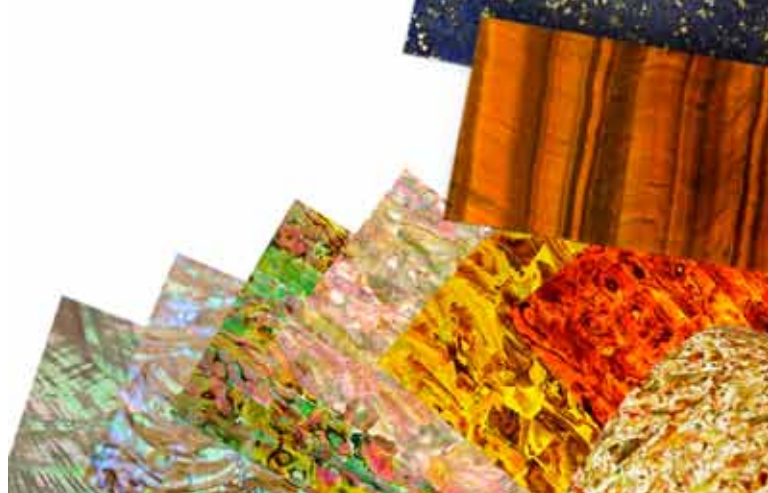
While the company can work with 2D sections—the first ICON 62 models Conlon ever worked on were carved by hand using lines and sections—and has the ability to use 2D lines and sections to create its own 3D CAD data for machining, 3D CAD has become the norm. However, this ability required a significant investment in CAD programmes, as Amalgam's customers, who are predominately from the prototyping and product industries, use it. "This then has a spillover into the other departments such as marine and architecture," says Conlon. "With a lot of the complex designs such as the Zaha Hadid architecture—and increasingly superyachts—which use computers to generate the geometry, it is only CNC machining or 3D printing that can turn it into a physical object in the time required and to the degree of accuracy expected."

He admits that there is still a common misconception that if the correct type of 3D CAD is supplied, it can be fed into a computer and you can press 'go'. "3D printers are pretty fussy pieces of equipment," Conlon says. "Your CAD model has to be extremely well drawn with no holes or gaps in it. The software involved does not like reversed faces in your CAD model, which you will inevitably end up with in yacht design as designers will draw one half on the computer and then mirror it." ►

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AMALGAM

Amalgam uses a large Objet Eden 3D printer that operates on the same principles as a household inkjet printer but, rather than ink, it prints with a resin at 600dpi. A UV lamp follows the printer head, curing the resin, and after each phase the platform that holds the part drops by a fraction of a millimetre, 16 microns to be exact, enabling the machine to print the next sliver of the model.

When asked if yacht designers could make more use of models during the concept and build phase, Conlon suggests that the use of small 3D printed models could help the client and team better visualise how the yacht is evolving.

"I enjoy the early concept stage of the design where the focus is on the pure lines and not at the point where necessary equipment has to be included to make it functional," he says. "I think that there is an obvious tendency not to want to spend money on something which hasn't been resolved though." However, he is convinced that with the widespread use of 3D CAD at all the stages of design, it should be straightforward for a well equipped model-making studio to convert the data into something that can be 3D printed or CNC machined. "With some skilled finishing and painting you would end up with a very presentable little model," he asserts. For him, low-detail, small models can be a nice extra touch for clients who are able to hold their design in the palm of their hand and take it home.

Something else that Conlon feels could be more of an asset in the design phase is the half hull model. Typically associated with traditional sailboat and shipbuilding, half hull models were an easy way of explaining hull form to clients but have fallen out of favour with advances in technology that enable more complex models to be created. "There is still a place for the half hull model," says Conlon. "There is potential to reinvent it with some clever use of materials and machining, making use of the 3D CAD data. We have had some recent success with this idea on some of our naval models

for BMT Defence Services which, at 1:144, were smaller scale than most of the naval concept model types we are known for but were made to the same exacting specifications and tolerances."

The model included brass-etched elements, which were able to capture detail at finer tolerances than would be achievable in other materials. Considered use of simple detailing, such as cargo and navigational components, also added interest to the models which would otherwise have been simple silhouette forms.

As advances in technology take models to the next level, they also introduce new alternatives to the physical model. "There are exciting technologies out there that can both threaten and work alongside the physical model," says Conlon. "Augmented reality, for example, is starting to grab people's interest. I have been commissioned to produce a physical model and a matching digital model for use on a stand at an exhibition. The physical model initially attracts the audience to the stand then a member of the sales team draws their attention to the tablet or handheld device next to the model."

Conlon explains that a tablet runs a preloaded app that can determine where it is in relation to the physical model with the use of a 'marker' image that is under the model. "The digital model then appears on the screen as an overlay to the image of the physical model," he says. "The viewer can walk around the model with the tablet and the digital image will rotate accordingly. With pre-programmed 'hot-spots' already loaded, the viewer can tap the screen to start animations, and control pop-up images and information panels."

Conlon predicts that this new technology could even extend to clients scanning a code in event programmes and downloading an app that enables them to see animations of tenders being launched or helicopters landing on helipads as onscreen overlays on the physical model at company stands. The idea brings life to the design and could become a powerful sales tool. ■

