



## *Glamorous geometry*

Fabric Architecture liberates fantastic forms with Advance Steel software from GRAITEC and ATI FirePro™ V7800 professional graphics





## AMD Firepro™ & Fabric Architecture Case Study



If you have not already played, socialized, walked or driven under a tensile structure then you've probably seen one floating in the distance. As stylish shelters and stunning showpieces, they are a feature of airports, sports arenas, commercial buildings, educational centers and public spaces across the world. The beguiling beauty of such panels of lightweight material can conceal extremely complex geometry and their seamless integration into existing environments often demands comprehensive engineering analysis.

From entrances and walkways to public art and street lighting, Fabric Architecture has been creating tension fabric structures since 1984. Recent projects include Ferrari World Abu Dhabi, the world's largest indoor park; the Saddle Bar at Aintree Racecourse, a triple conic shape; and the frontage of the IKEA store in Southampton which incorporates a 75-meter undulating curve over a major road.

With its headquarters in the UK and offices in North America and the Middle East, the company provides a complete bespoke solution from initial sketches through design, engineering and project management to installation and maintenance. It also has a range of popular products: long lasting, easy to install tensile fabric canopies that are both striking and economical.

### Floating fantasies

Design briefs and specifications vary tremendously and the team at Fabric Architecture often develops a concept from little more than an aspiration. Designer Chris Gyngell describes the process. "Architects tend to think in terms of covering a space and may draw sweeping shapes to represent the desired outcome. We have to be very practical and think about nuts and bolts. We utilize primitive shapes such as cones and barrels; we also create fairly free forms. Either way we are designing a steel framework with a tensile stretcher. It is important that our clients understand engineering requirements - these structures are not umbrellas or awnings."

One of the earliest stages is to calculate the weight of the fabric itself. Chris and his colleagues then need to consider how the structure will match the rest of the scheme, how it will fit into the location and whether it will be exposed to wind and snow. "In some parts of America where snowfall is regular and heavy, the load can be colossal. Once we have worked out the potential loading, we can determine the type of fabric, the size of the structural support system and the nature of the foundations that will anchor the structure."

### Practical and profitable

Fabric Architecture is usually employed by the main contractor on a project and wins work through tender processes. "Whilst we only give conceptual ideas at the tender stage, a lot of detail needs to be thought about," explains Chris. "We do as much analysis as we can upfront so that we offer a workable solution. In such a specialised industry, with two major competitors bidding against us regularly, we have to be fastidious about attention to detail, gaining advantage through economic design and by going the extra mile. Creativity and productivity at this stage are vital in order to preserve our own margin of profitability."

It was at this key point in the tender process that Fabric Architecture's team faced one of its biggest challenges. The company was using AutoCAD for concept work, 3D modelling and analysis; and Mpanel, a specialist application for designing with tensile fabric, on computers designed for general office use. With strange angles and quite complicated geometry on screen all the time, lack of processing power was slowing down the regeneration of models. "We'd achieved a great deal on our computers," comments Chris. "However the company had been growing steadily and we'd taken on a heavier workload. By 2010 we were struggling on our old machines; one even failed completely."



Recognising that it was time to invest in both hardware and software, Fabric Architecture decided to buy GRAITEC Advance Steel, specialist software for detailing structural steel, that would enable Fabric Architecture to produce models and drawings quickly. Charles de Voile of GRAITEC UK LTD picks up the story: "Our consultants undertook to specify workstations to meet the company's particular needs and after thorough testing confirmed that AMD FirePro™ professional graphics gave the best possible price / performance option."

### Increased productivity without a bigger headcount

In January 2011 Fabric Architecture took delivery of four new workstations. Chris again: "We moved from 2GB to 8GB memory incorporating ATI FirePro™ V7800 professional graphics. We immediately saw a significant improvement in productivity. We have the modelling ease and speed of Advance Steel coupled with real-time feedback from the graphics card. I now have a system where I can pan around with virtually undetectable regeneration – previously I had to wait whilst the screen went blank."

The ability to analyse conceptual models quickly is also important. Mpanel software will take various primitive shapes and mould them together, then Chris and his team add stress inputs in order to see how the fabric 'relaxes'. "For the analysis process we give a command and the processing power of the machine determines the time taken. Previously we sometimes had to wait for one hour. Now, even the most complex shapes take just five minutes. This is where we particularly notice the extra power we have gained."

Speed of production also contributes to Fabric Architecture's competitive advantage and both Advance Steel and AMD FirePro™ professional graphics play a key role here. "We detail all our steelwork and create canopy patterns for cut. If someone spends a day on a particular complex project and

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*Chris Gygell, Designer, Fabric Architecture*

the regenerating process is stuttering, they probably lose 20% of their time. That was sometimes the case for us but with our new hardware, time lost is minimal and we have a clear preview of models before production." In addition, Advance Steel calls on the extra processing power of the graphics to automate the production of detailed drawings. This replaces time consuming, manual effort and is particularly beneficial when late changes are requested. Advance Steel simply recalculates and produces updated drawings at the press of a button.

As Fabric Architecture has grown its business, there is time pressure every day and increasing office space pressure. Chris concludes "AMD FirePro™ professional graphics have helped to speed up our processes and increase productivity without extra overheads. We also have much better visual results and this really assists in communication with customers."





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