

PCT: Sand, composites and architecture

Realising the designs of some of the most famous and cutting edge architects working in the world today, PCT, or Premier Composite Technologies, is the leading global supplier and manufacturer of lightweight, advanced composite structures.

WATCH: Video footage of PCT's impressive portfolio of urban Arabian architecture – plus an interview with Snøhetta's Thomas Fagernes. Simply click on the thumbnail image beneath the movie icon to the right.

The PCT team, founded in 2006, has built up over 20 years of experience of building composite components for the architectural, boatbuilding and automotive markets. Based in Dubai, this internationally renowned solutions company has built up an impressive local portfolio, including: 118 composite domes for the Emirates Palace hotel in Abu Dhabi, that are up to 42m in diameter; 250 huge composite umbrellas in Mecca, Saudi Arabia, that bring shade to an area 625m² when open and the DOKAAE Tower in Mecca, the second tallest tower in the world telling the time for the city with four of the largest clock faces in the world.

PCT has revolutionised the architectural industry by



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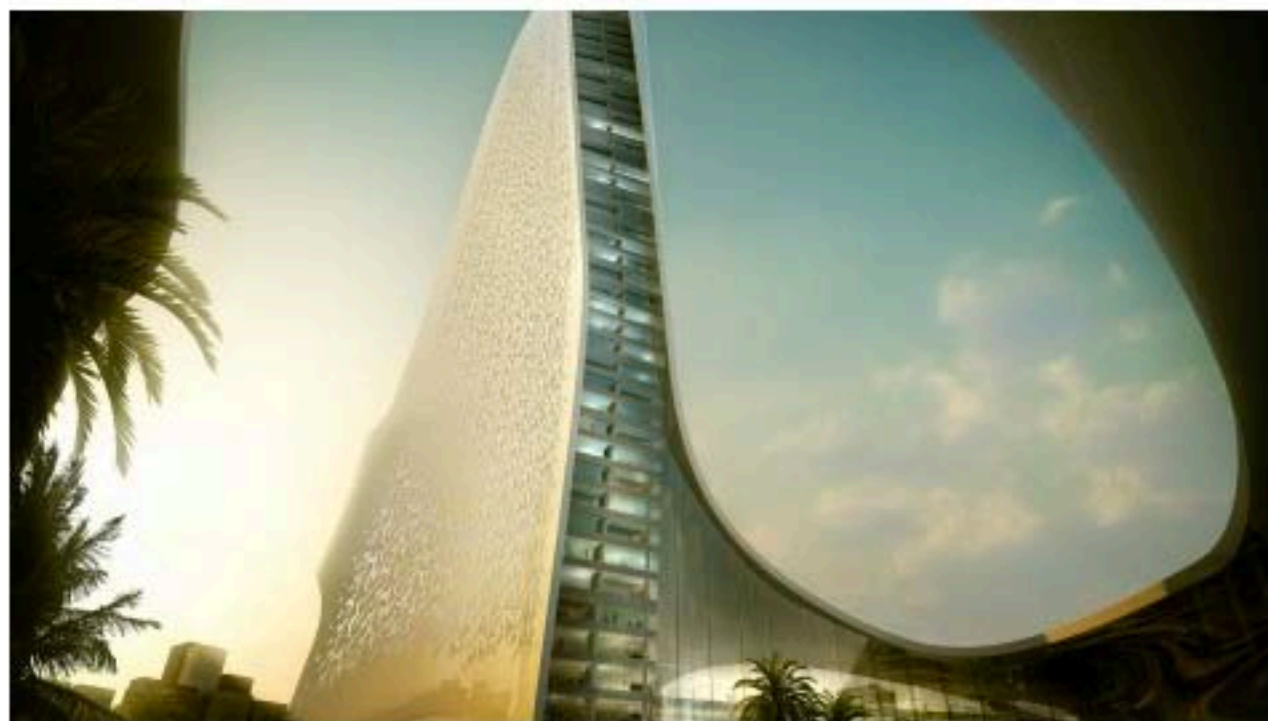
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PCT has revolutionised the architectural industry by replacing traditional structural materials such as steel and concrete with advanced composite materials, that offer a range of properties and advantages over traditional materials. They have vast new aesthetic possibilities, allowing the architect to mould complex, fluid and creative 3-D forms that are synonymous with contemporary architectural thinking. There are also huge weight savings: the weight of a PCT dome in comparison to its concrete equivalent can be up to 85 per cent lighter. The materials also allow the integration of any type of finish or effect desired.

What's more, composite materials are also suitable for any architectural application, for roofs and external façades, as well as self-supportive structures such as domes and interior building linings.

Snøhetta-designed RAK Gateway Project

Requiring materials with these properties for their latest design, award-winning architectural firm Snøhetta approached PCT for a composite façade solution for the new Snøhetta-designed Gateway tower that will mark the



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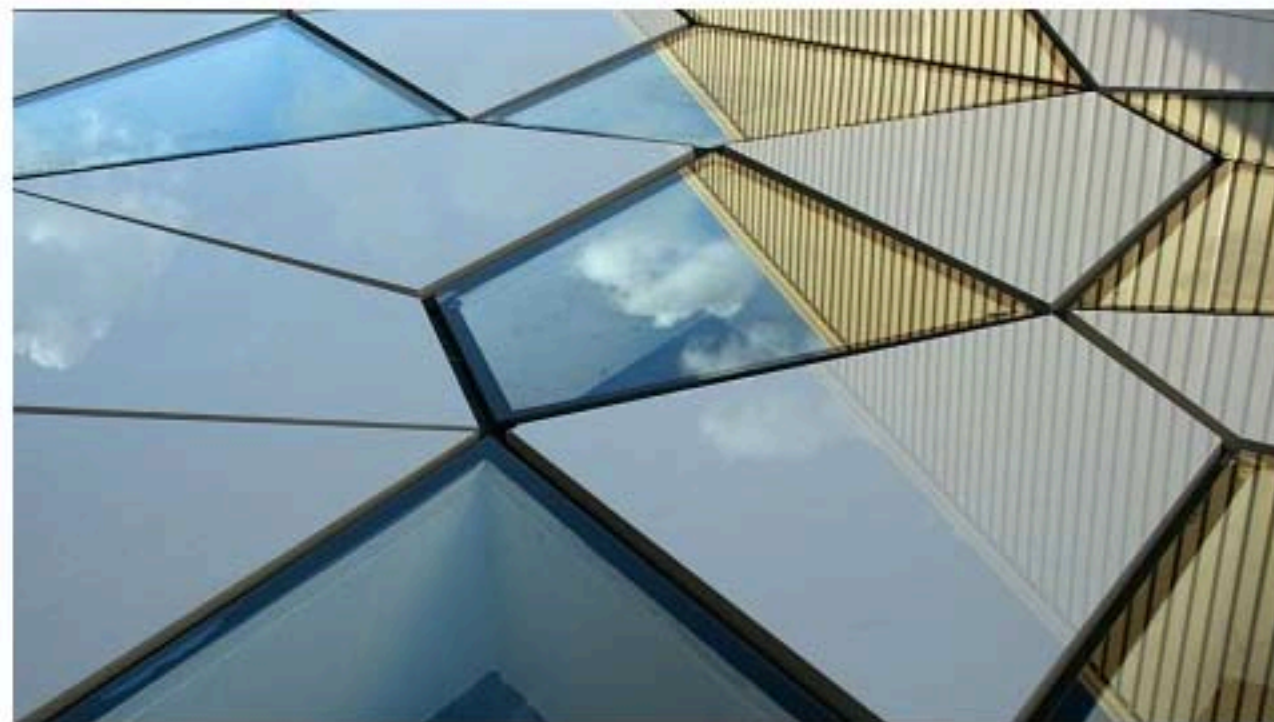
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design, award-winning architectural firm Snøhetta approached PCT for a composite façade solution for the new Snøhetta-designed Gateway tower that will mark the entrance of the UAE emirate, Ras Al Khaimah.

Being constructed in 2011, the tower will be delivered using an innovative building envelope that is brought to site as an "all in one" pre-fabricated unit that is attached to the building slabs, attached using nothing more than specially designed hangers. Each exterior panel will be fully insulated and incorporate all external structural skin and surface finishes, all components such as doors and windows and the fixing grid for the plasterboard interior fit-out.

The prototype façade panel built by PCT measures 8x4m and is just one of over 1,000 required to clad the entire building. Each panel has a complex bi-axial curved shape and is made from a sandwich of glass fibre and epoxy resin composites with a structural foam core and is fully insulated to achieve optimum U-values.

Structural bonded glass windows are built into the façade and each panel is decorated in contemporary ceramic slabs in a repetitive geometric arabesque pattern.



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To construct the entire tower façade, the panels will be hoisted up by crane and will be connected to each other with a watertight bolted, panel-to-panel connection, allowing significant cost and timesavings. All of this will be achieved using 32m² panels, weighing no more than 1.5 tonnes.

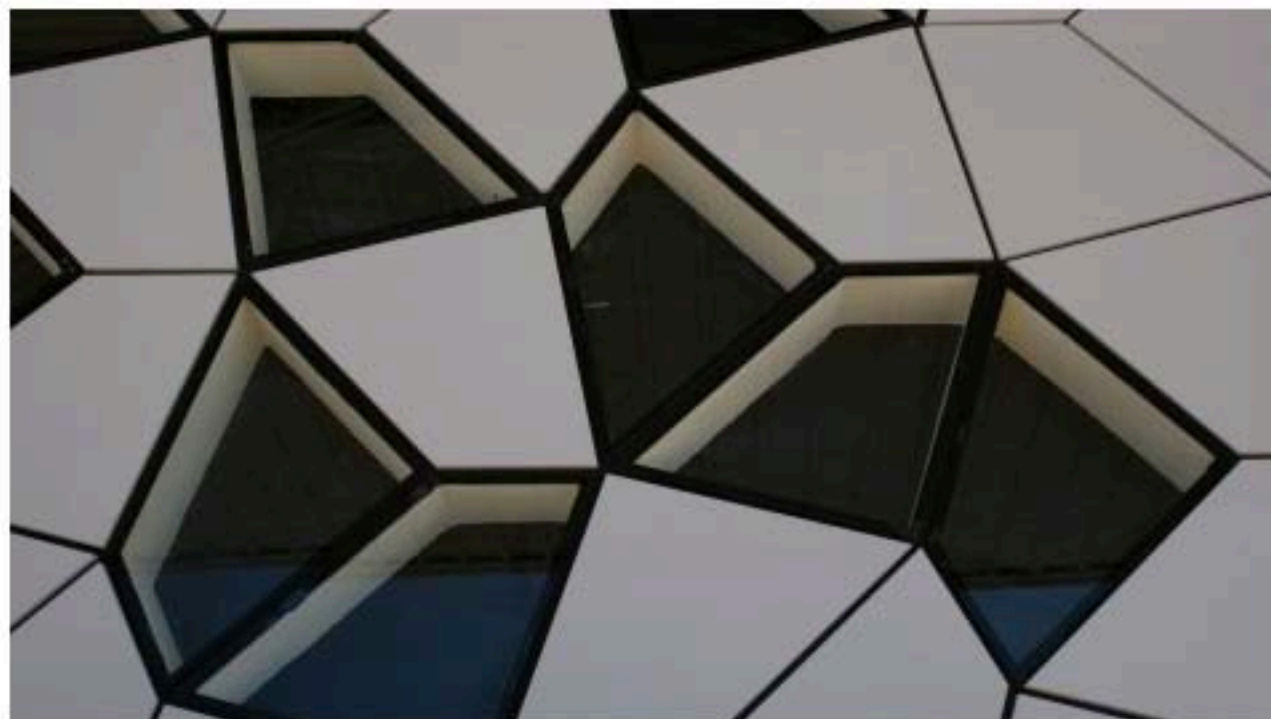
Production process

The PCT manufacturing process for these panels began with conceptual designs developed by the architects and PCT's design engineers.

3-D images were then generated for detailed design and structural analysis before proceeding to the model and mould construction.

The CAD-CAM approach to design and manufacture enables design data to be fed directly into the production equipment, realising programme timesaving and panel accuracy.

The design elements are subdivided into large pre-fabricated panels that are laminated on CNC-milled moulds and oven-cured under vacuum.



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PCT's impressive 5-axis CNC milling machine is used for mould making and complex 3-dimensional forms can be generated with a high degree of precision. This makes it possible to produce surfaces that are curved in two directions, as well as much more complex architectural elements.

The position of all holes for the attachment of fixing details is transferred from the CNC-milled mould to each laminated element.

Parts produced in this way not only achieve millimeter accuracy in the tolerances in their overall size but are guaranteed to fit each other perfectly.

PCT can preassemble up to 100,000m² in-house before transporting to site for final assembly, saving significant time when it comes to on-site installation.

100% Design, London

A section of the Snøhetta prototype panel was featured as a showpiece and a part of the Premier Composite Technologies stand at 100% Design in London.



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DOKAAE Tower, Saudi Arabia

Another example of composites in construction is the mighty DOKAAE Tower that PCT is currently installing in Mecca.

The clock tower that also features a 7-star hotel, is an incredible 601 metres in height and PCT will supply the uppermost 251 metres of the tower, a construction that involves 50,000m² of intricate cladding made from glass fibre composites.

PCT is also producing and laminating the epoxy glass fibre foam sandwich clock faces that each measure 43m in diameter. The massive clock hands, measuring 23m in length, are being produced entirely from carbon fibre preregs.

The DOKAAE Tower will be covered in Italian mosaic tiles, 13,000 of which are made from real gold. 700,000 LED lights will also be integrated into the composite cladding to light up the clock face by night.

PCT has been engineering and manufacturing the composite cladding, clock faces and clock hands for the DOKAAE Tower for over 18 months now. And, since one of



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PCT has been engineering and manufacturing the composite cladding, clock faces and clock hands for the DOKAAE Tower for over 18 months now. And, since one of the clock faces, built in the Dubai desert earlier this year, was signed off, production has been in full swing. Currently, three quarters of the tower is complete and the full tower is expected to be finished in May 2011.

These are just a few examples of the uses to which Premier Composite Technologies can be applied. As building costs rise, insulation demands become more onerous and speed of construction becomes more of a priority.

Imagine the benefits and opportunities that PCT can bring to realising your dream designs.



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