JEC COMPOSITES MAGAZINE - Mai 2010

First French composite heliport

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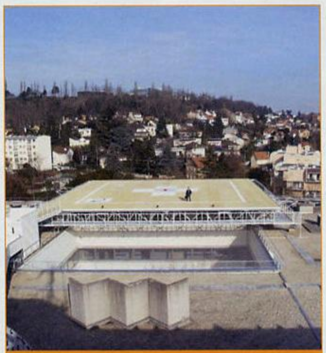
At the request of the Marie Lannelongue surgery centre, TH Composites designed and built France's first heliport made of composite materials, in compliance with the new ICAO and ITAC 13 civil aviation regulations on transporting people by helicopter. The composite helipad sits on a steel space-frame structure that is attached to the building by twelve elastic, vibration-damping supports.

The specifications and the location on the terrace required two 7-m overhangs and a minimum design load to avoid the need to reinforce the building's foundation with piles. Also, in order to minimize the nuisances inside the clinic, the construction lead time had to be very short.

The construction process

To create the platform, interlocking pultruded composite box beams (500 mm x 150 mm) were used, with two pre-mounted intumescent, bi-material joints for seal tightness.

The weight of the 700-m² heliport platform includes 30 metric tons of composites and 35 metric tons of metal space frame. The platform was entirely pre-mounted. It took two weeks to mount the space frame structure on site, and four weeks for the composite platform. See completed heliport.



The Marie Lannelongue surgery centre's rooftop heliport

Main characteristics of the composite floor

- Substantially greater fire resistance than aluminium or steel (very low thermal conductivity)
- Low weight
- Corrosion resistance
- Resistance to marine environments
- Greater fatigue strength than metals
- Integrated de-icing system
- Rapid assembly
- Floor totally seal tight, even in case of fire (no deformation of the material's structure)

Standards and materials

CSTB, the French scientific and technical centre for the building industry, carried out load and leak tests on the profiles (test report EEM 08 2601 2624) and fire behaviour tests (test report RA04-00882) to guarantee the structure's durability.

The type of composite beam used was pultruded by Top Glass, and weighs 42kg/m². The acrylic resin was modified with fillers to improve the fire resistance (class M1 F0). The intumescent bi-material joints can expand to up to 20 times their volume at temperatures starting at 300°C.

Design and performance

Composite Advantage has extensive knowledge about the fabrication and design of large structural FRP products. Leveraging their existing bridge products, which have a proven performance track record on US roads, was an important aspect in making sure this new product would meet the design requirements.

For use in bridge applications, the company subjected its FRP composite bridge system to a structural test programme that validated both design and performance. Specimens and panels were tested in the following areas: laminate (material properties), deck (bending, shear), integral deck/beam section static bending (full scale), fatigue of the integral deck/beam section for 2M cycles, residual strength of the integral section, and joint beam section static bending.

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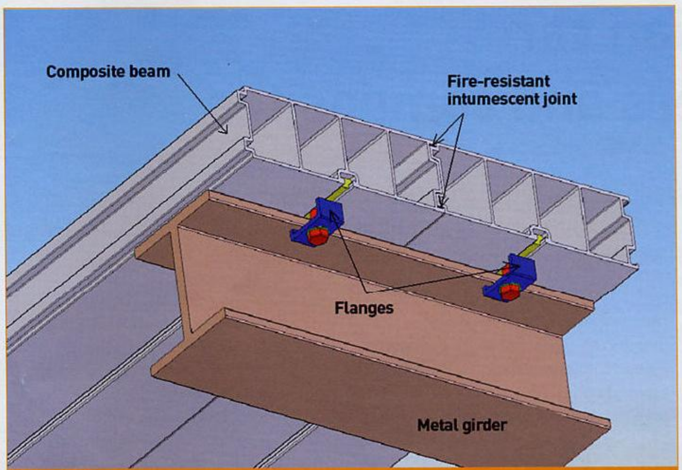

Assembly diagram

The RDP was built to HS20 vehicle specifications which dictate a 9 metric ton (MT) concentrated tyre load (a US bridge design code governing bridge capacity) and can accommodate drilling rigs up to 680 MT. The composite panels (7.60 m long, 2.30 m wide and 56 cm deep) can accommodate any type of walking rig design. The composite RDP elevates the entire drilling operation above ground, including trucks and equipment, thereby eliminating its impact on fragile ecosystems. Stronger than conventional materials (wood, steel and concrete), the fibre composite RDP is so lightweight, the panels (just under 98 kg per m²) can be lifted by helicopter. For some extreme locations, helicopters are the only option for transporting panels to the exploration site. The large surface area of the platform can also be shipped to location at a minimal cost. For example, 205 m² of platform can be shipped on one flatbed.

Cost savings

RDP's composite construction also allows the platform to be supported by a surprisingly small number of pilings. Common steel pilings can be used. Since the decking is sealed for containment, the steel piles and beams underneath the decking are shielded from corrosion.


Lifting of a semi-structure

Weathered steel is used for added corrosion resistance. But the light weight of the composite panels means the number of support pilings or legs can be reduced by 50%. This represents a substantial cost savings for customers. Half the number of pilings means installation costs are also reduced by half.
When operators determine the specific drilling location on the composite platform, the appropriate panel can be quickly removed to create an opening for the drill operation. The RDP offers containment from oil spillage in the event of an accident. A cross slope provides water run-off in heavy rain. A railing system around the platform's perimeter ensures personnel safety, yet permits sections to be moved for easy snow removal. RDP panels are static dissipative to eliminate the build-up of electrical charges.


Composites beams are fitted together

Different flame retardancy levels are available based on customer requirements. RDP panels are unaffected by freeze/thaw cycles or high moisture areas like swamps, bogs or muskegs where water absorption can cause rot in conventional material. The need for maintenance or repair is minimal. The composite RDP also delivers a life span of up to 40 years. ■

More information:
www.helistop.net

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