CONSTRUIRE LE COURBE 2015

Séminaire de l'École des Ponts ParisTech - départements GCC & GMM

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7 - 11 septembre 2015

Extension voilée

Description

Veiled extension is a fabric structure that evokes the sails of a ship. This tensile structure consists of three pieces of fabric connected to a mast. The total area covered is 30m2, and the average clear story height is 3m.

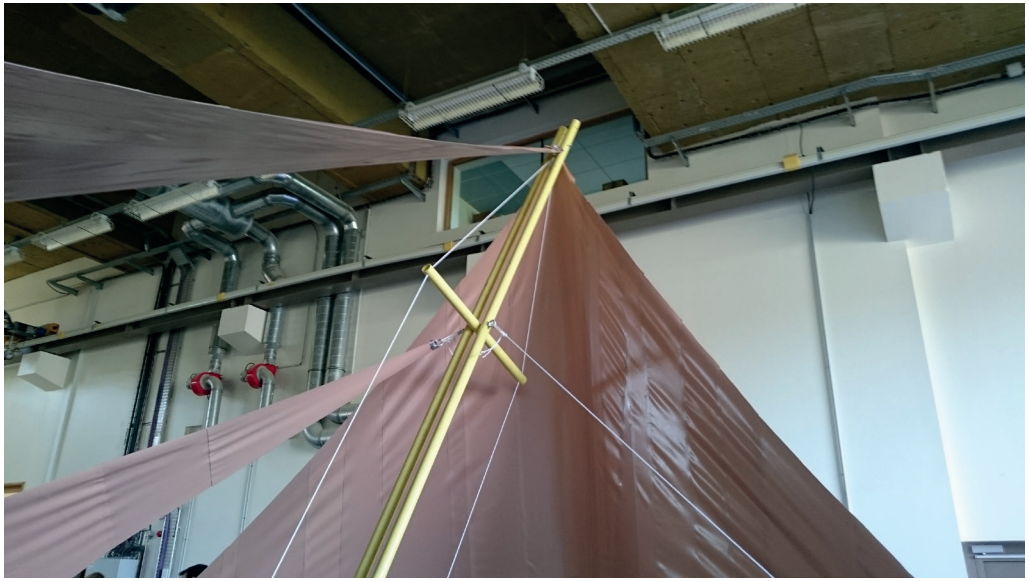
The mast is made of two composite frames parallel to the each other, pinned at their base, and connected at each end with rigid studs. A system of two composite struts and rope, attached to the parallel frames allow the mast to behave as a trussed beam. In doing so, the increased stiffness will allow the vertical element to resist shear and buckling. The mast is 4m high, and inclined some 60° from the ground.

A steel and composite arched member is anchored to the wall in four locations. The arch is pinned at both ends and two connections were designed 2m from the ground and placed symmetrically to anchor the arch to the wall allowing it to resist the pull of the fabric attached to it. The fabric itself is latched onto the entire length of the arch and projected onto the mast at a height of approximately 3.5m. The double curvature of the fabric allows it to behave as a membrane.

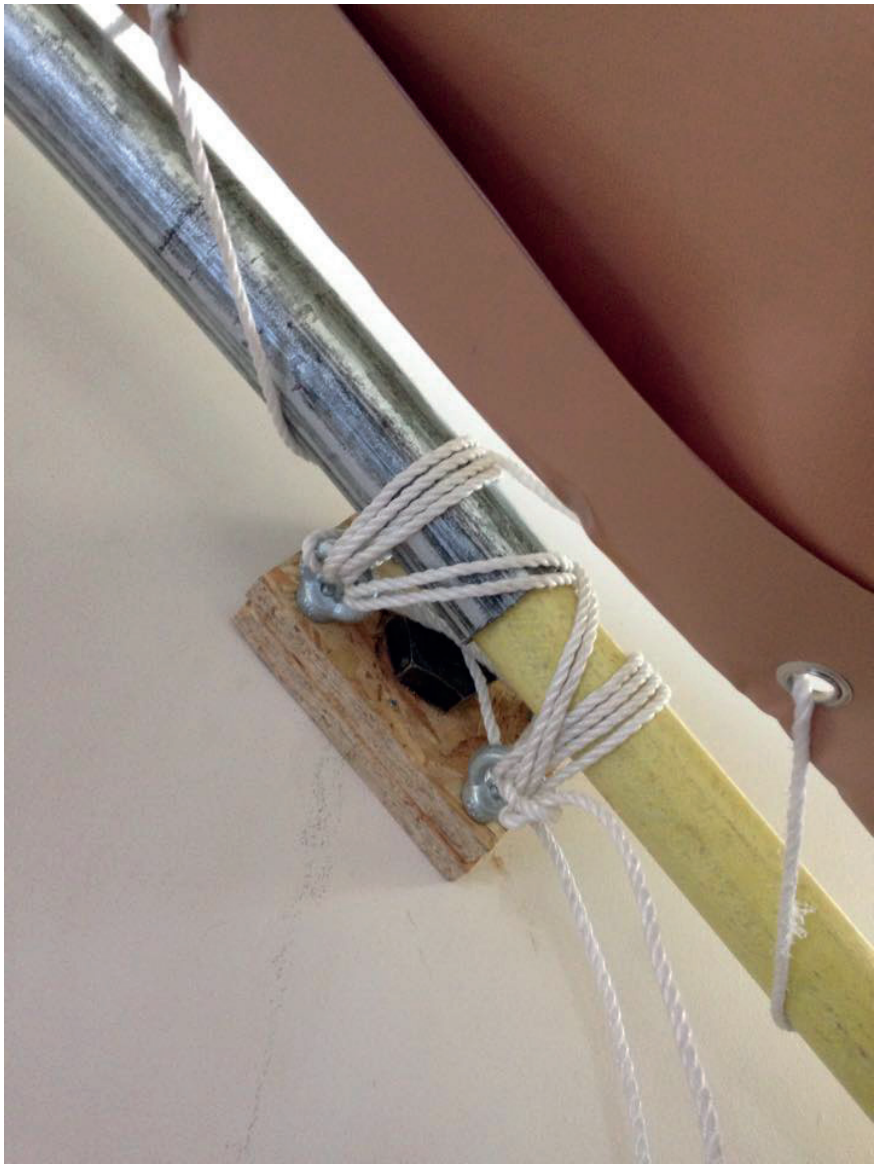
Two other sails are connected to the mast and oriented in different directions to create an enclosed space. The first one oriented East-West is connected to the base of the arch and to a lower point on the mast. The second, oriented North-South plays a crucial part in the good behavior of the structure as it is taking the tension of the entire structure to the foundation. It is attached to two supports on the ground and to the mast, which is also its axis of symmetry. A cable is attached to this last sail and fixed to the ground to counteract the tension induced in the mast by the two first sails.

Détails d’assemblage

Toile principale attachée par des oeillets et de la drice à une arche fixée au mur



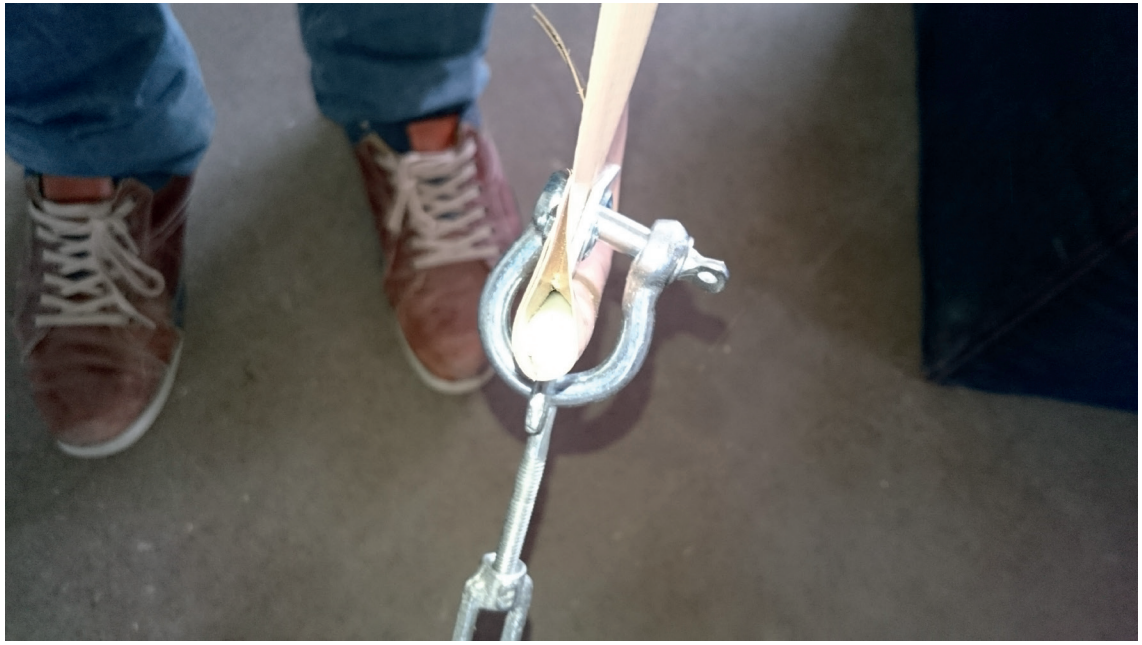
Mât principal, moisé et avec des contre-flèches en composite et drice.



Fixation de l’arche au mur par de la drice

Fixation de l’arche au mur par le même dispositif

Pointe de toile avec un jonc en tube composite et des platines en aluminium



Photos d’ensemble