Megacolumns Research – Update and First Deliverable
September 2014

LUXEMBOURG - The research “A study on the constructability and the engineering properties of Composite Megacolumns” led by CTBUH, thanks to the financial support of ArcelorMittal, has progressed through the involvement of MKA (Magnusson Klemencic Associates) and the CABR (Chinese Academy of Building Research).

MKA provided a real case study for the test program, by putting the research group in contact with Suning, the developer of a 300+ meter tall tower in Nanjing designed by JAHN. On the basis of the data calculated for the real project’s 1.8 meter large composite megacolumns, an innovative technology has been used to ease and speed up the construction of so large composite columns, by using hot rolled extra heavy profiles instead of on-site welded plates.

As the column is so strong that no laboratory in the world can test a real-scale specimen, the research team has developed the methodology to perform destructive tests on a 1:4 and 1:6 scaled down samples.

The specimens to be tested will be fabricated in Luxembourg by ArcelorMittal and shipped to Beijing, where they will be completed with concrete and tested in CABR’s laboratories.

The scaled down tests will be performed in a static and pseudo-dynamic mode, so as to simulate the column behavior under the action of vertical and horizontal forces, such as those happening in an earthquake.

The research team was challenged with problems of concrete confinement and with the market availability of the steel elements for the production of the scaled-down specimens.

The outcomes of the first 3 months of the research activity (the identification of the case study, the design of the real composite solution, the testing method and the solution of the scaling issues) have been thoroughly described in a 30 pages report that is now being peer reviewed by a group of experts on the design and testing of composite elements.