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## Documents

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**Structural performance of hybrid tall buildings designed using ultra-lightweight floor slabs**
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**Abstract**
The main objective of this study is to investigate feasibility of using Ultra-Lightweight (ULW) slab in floor system of tall building in combination with rigid steel frame and Reinforced Concrete (RC) shear wall as the lateral load resisting systems. The main vehicle is numerical case studies of forty story buildings in which their floor systems constructed using conventional (RC slab) only, non-conventional (ULW slab) only, and hybrid between these two slabs. In the hybrid floor cases, combinations of lower story RC slabs and upper story ULW slabs will be conducted. For example, the first twenty five floor levels will be designed using traditional composite action between RC and steel floor framing, while the upper fifteen story floor levels will be designed using ULW slab in composite action with steel floor framing. In addition to dead and live loads, major lateral load considered will be extreme wind and earthquake loads suited for middle-east region. The outcome will be comparison of structural performance amongst these floor systems including: total drift, inter-story drift, inter-story shears, base reactions, and structural dynamic performances. Also steel demand on the main steel skeleton will be compared to each other. The ULW slab could be made of lightweight materials having high vertical and lateral stiffness. In this study however, the ULW floor slab will be made of high strength Cross Laminated Timber (CLT). Within last two decades, CLT slabs have been used widely in Europe for low-rise building applications. In combination with steel and/or reinforced concrete frames, CLT has potential application to be used in a very demanding tall building industry in the middle-east areas due to its strength, lightness, low demand on foundation, architecturally appealing, and green or environmentally friendly. The outcome of this study is intended to give structural engineers and architects alternative in designing floor systems of tall buildings. © 2016 Taylor & Francis Group, London.

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