

Steel Frame Vs Concrete Frame for high rise buildings **A Case Study of a project in Larnaca, Cyprus**

Comparatives of Steel Frame Vs Reinforced Concrete Construction

- **Time gain** – Perhaps the most important aspect of using steel frame construction as compared to reinforced concrete is the element of time for the on-site erection of the steel frame. Reduced time presence for the Contractor on site translates to a shorter construction time for project delivery and this leads to reduced overheads during project construction. On multi storey buildings the time gain can be substantial.
- **Quality Control** – Off-site prefabrication of steel members in isolated factory conditions means better quality control of manufacturing compared to pouring concrete frames in situ whilst exposed to the weather elements and with reinforcement and formwork works subject to labour intensive construction processes that may affect quality. Furthermore, offsite prefabrication increases the overall speed of construction and facilitates enhanced safety.
- **Design flexibility** – Longer spanning structural metal frames create column free areas that offer greater flexibility and functionality of floor layouts thereby facilitating sales or lettings of the completed buildings. Pipes and ducts can run easily through steel members and can also be inspected in the future whereas no such flexibility exists with concrete members.
- **Sustainability** – Steel is 100% recyclable without any loss of quality, whereas concrete is not recyclable. In the UK, when buildings using metal frames come to an end of their useful lives, approximately 86% of the steel sections are recycled to create more steel products and 13% are reused in their existing form. Recycling rates for reinforcement bars used in reinforced concrete frames are negligible.
- **Construction Costs** – Construction costs for steel frame high rise buildings that are above 10 levels compare favorably with reinforced concrete frame high rise buildings. Although a cost premium in the order of 10-15% may be evident initially for high rise steel frame buildings, this is usually offset by the substantial reduction in the erection time of steel frame high rise buildings on site and the associated substantial overheads charges by main contractors for prolonged stay on site when slower concrete methods are used.

The specific project in consideration in Larnaca is a 13 level tower (superstructure) plus one level basement (substructure). The off-site fabrication of the steel frame started in June 2009 in the steel factory and the steel frame was delivered in stages to the site from August until November 2009. The erection of the 13 levels started around mid August 2009 and was completed by Christmas 2009. This meant an erection time of approximately 4 ½ months for a 13 level tower as compared to approximately 12 -14 months that a reinforced concrete frame would have required for casting 13 levels on site.

The chronological sequence of the erection of the steel frame can be closely seen from the attached series of photos.

Phevos G Georgiades
Director

18 January 2010

August 2009



19 August 2009



19 August 2009



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September 2009



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