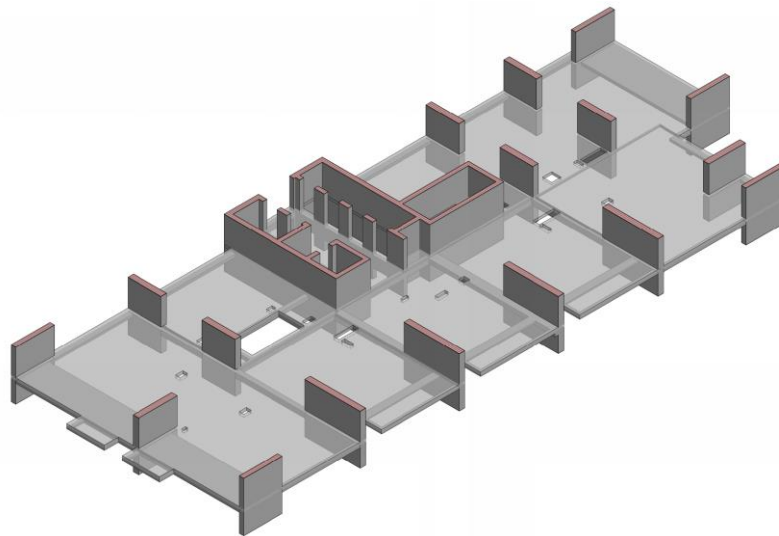


# INCREASED REVENUE FROM STRUCTURAL DESIGN

## Executive Summary

A well-considered structural design can not only provide the client with a safe asset, but it can also contribute to the commercial success of the project. Through innovative and collaborative structural design, Indochine Engineering Vietnam (ICE) is saving one of its Vietnam clients several hundred thousand dollars in construction cost while increasing revenue by a possible seven-figure sum due to substantial structural member size reductions from the client's previous structural design.



*Figure 1 – Typical floor (from Revit)*

## Benefits to Projects

As an outcome of an ICE peer review and subsequent re-design of this 40-storey residential tower, ICE has been able to achieve the following:

- 17% reduction in concrete volume;
- > 500m<sup>2</sup> additional net sellable area (due to column/wall size reductions);
- Deletion of a transfer level; and
- Proportionate reduction in foundations.

## Process

The original structural design by others included substantial shear walls (up to 900mm thick and 10m long) and rectangular columns (eg. 3m x 2m). To reduce the size of these and other substantial structural elements, ICE, working collaboratively with the developer and architect,

incorporated a number of items to improve the efficiency of the structure and increase net sellable area. These included:

- Critical analysis of the tower’s seismic response;
- Introduction of post-tensioned floor plates
- Re-configuration of the central core;
- Introduction of outrigger beams;
- Increased concrete strength in columns/walls.

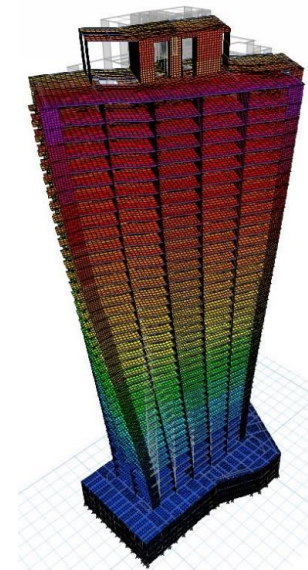
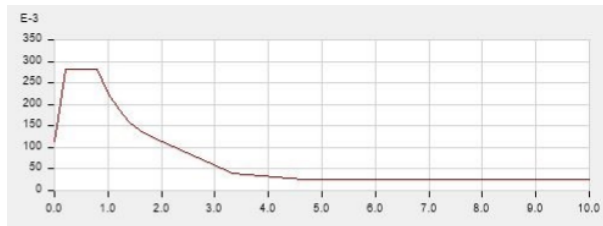


Figure 2 – Extracts from seismic analysis

The net reduction of 17% in the structural concrete volumes across almost 40,000m<sup>2</sup> of floor area has been realised by reducing shear wall thicknesses and lengths and eliminating the requirement for a transfer level within the podium level.

CONCRETE QUANTITIES COMPARISON (m <sup>3</sup> )				Reduction	Saving
Floors	ICE scheme	Previous	Difference	%	\$/m <sup>2</sup>
<b>Podium</b>	1,496	2,443	947	63.3%	30.00
<b>Lower Tower</b>	10,191	11,136	945	9.3%	5.00
<b>Upper Tower</b>	7,132	8,485	1,353	19.0%	8.50
<b>Total</b>	18,819	22,064	3,245	17.2%	8.20

### Conclusions

- Savings from refinement of structure = US\$325,000<sup>1</sup>
- Additional revenue from increased net saleable area = US\$1.5M<sup>2</sup>

There will be additional benefits to the client such as reduced foundation costs, while improving architectural design efficiency with more planning flexibility. Such structural design enhancements significantly contribute to the commercial success of the project and increased asset value.

<sup>1</sup> Assumed concrete cost of US\$100/m<sup>3</sup>

<sup>2</sup> Assumed sales revenue of US\$3,000/m<sup>2</sup>