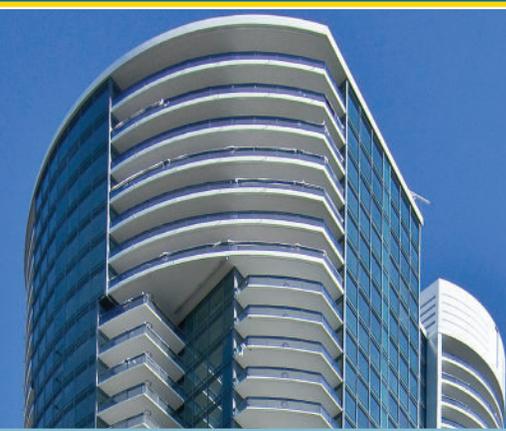


Escala

Seattle, WA



Team

Owner:

Lexas Companies

Architect:

Mulvanny G2 Architecture

Engineer:

Cary Kopczynski & Company

General Contractor:

JE Dunn Construction Company

Reinforcing Bar Fabricator:

Harris Rebar

Total Project Cost:

\$185 million

Total Project Size:

830,000 sq ft

Award:

2012 CRSI Award Winner –
Residential Building Category

Photography:

Kopczynski & Company

STRUCTURAL FRAMING SYSTEM

Escala is a cast-in-place concrete structure features a lateral force resisting system of concrete shear walls, combined with ductile moment resisting space frames (DMRSF). This dual system integrated perfectly with the architectural layout, without compromising the open and spacious unit plans that were key to the Escala vision. Since the building does not have a central core, the combination of shear walls around stair cores at the building extremities, combined with four DMRSF's located at demising walls was a well received solution to a difficult problem. In addition, the layout of the dual system elements was coordinated with the contractor during schematic design to take full advantage of high production concrete forming systems. This facilitated a rapid structural frame construction schedule, allowing the work of other trades to follow behind more quickly.

UNIQUE DESIGN FEATURES

The unique architectural challenge of creating Escala inspired a similarly unique structural solution. Several of the key aspects of this unique structural system:

- The finely tuned seismic system required high strength concrete of 14,000 psi for columns and shear walls at lower levels of the building.
- Since required seismic confinement reinforcing (column ties and shear wall boundary ties) increases with concrete strength, it was determined that rebar congestion in the 14,000 psi columns and shear walls based on ASTM A615 Grade #60 steel would render them unbuildable. The structural engineer decided to pursue a radical solution to reduce rebar congestion and restore buildability – 100 ksi rebar for seismic confinement reinforcement.
- After nearly two years of research, analysis, discussions with industry leaders, and negotiations with the City, approval was granted. Escala became the first building in North America, and perhaps the world, to use ASTM A1035 Grade #100 reinforcing steel for seismic confinement.
- The use of 100ksi rebar reduced seismic confinement quantities in columns and shear wall boundary elements by 40% when compared to Grade #60 rebar. In addition, 100 ksi steel reduced vertical bar quantities by six to seven percent.
- In summary, 100 ksi seismic rebar significantly reduced steel tonnage, improved constructability, facilitated easier assembly of columns and shear wall boundary elements, required less field labor, and lessened the demand on crane time and hoisting equipment by reducing weight. As high strength rebar becomes more widely used and its benefits more clearly understood, the long-term value to the industry will be enormous.

Escala was inspired by a world-class vision, which was to create large, dramatic open spaces unimpeded by walls and columns. Rather than clustering elevators in a traditional central core, the desire was to locate them closer to the building extremities and create private entries into each unit. The structural design fully accommodated the owner's vision for a unique building with private elevators, spacious units, and large cantilever balconies. Parking is provided in eight subterranean levels, which required the second deepest excavation in Seattle's history.