ClarkDietrich

UNIVERSITY OF CALIFORNIA

RIVERSIDE NORTH DISTRICT 2

INNOVATIVE USE OF COLD-FORMED STEEL FRAMING IN MID-RISE CONSTRUCTION

This project employed cold-formed steel (CFS) framing for all walls, floors, and roofs of the building's upper five stories, showcasing the material's structural efficiency and adaptability in mid-rise construction. Leveraging CFS's high strength-to-weight ratio significantly reduced the overall structural load, thereby minimizing the impact on the concrete foundations and podium slabs below.

From the outset, the design team prioritized using the building's required walls as the main structural system. This approach eliminated the need for additional concrete or steel columns, allowing for a more efficient use of space and resources.

Value engineering played a key role in optimizing the project's design and execution. The lateral system was carefully engineered to reduce the number and placement of shear walls, helping to simplify construction and conserve materials. Where possible, shear wall lengths were standardized in smaller increments, a deliberate choice to minimize material waste during fabrication.

Further efficiencies were achieved through strategic orientation of framing members, which helped reduce the need for mineral wool insulation. Floor panel systems were also engineered for constructability: most connections could be made from above the floor, limiting the number of connections required from below. This not only improved construction efficiency but also enhanced safety for field workers.

A fully coordinated Building Information Modeling (BIM) system was developed for the project, integrating all MEPF (Mechanical, Electrical, Plumbing, and Fire Protection) trades. The use of BIM significantly reduced the likelihood of field rework and streamlined construction planning. Additionally, the model was used to generate panel tickets, enabling all framing materials to be precut-further reducing material waste and improving installation speed.

This project highlights how thoughtful structural planning and modern construction technologies can converge to deliver a high-performing, resource-efficient building.

- 3 BUILDINGS, 15 STORIES
- 5,300 PANELS; 75 PANELS INSTALLED PER DAY
- 100 MILES OF FRAMING MATERIAL
- +300 TRUCKLOADS

EFFICIENT INSTALLATION OF PREFABRICATED PANELS UNDER A COMPRESSED TIMELINE

Over the course of five months, a total of 5,300 prefabricated wall and floor panels were delivered and installed using three mobile cranes operating in tandem. The construction team achieved a project milestone by setting a record 129 panels in a single day—highlighting both the efficiency of the process and the coordination of the field crews. Each level was equipped with D-rings and full perimeter fall protection to ensure worker safety.

The project was executed on a fast-track schedule aligned with the academic calendar, requiring aggressive production rates and the ability to adapt quickly to evolving site conditions—all without compromising quality or safety standards. Adding to the complexity, tight site logistics demanded just-in-time delivery of 8 - 12 truckloads of panels per day to maintain the pace of installation.

Interior Prefab Hallway

OFFSITE PANELIZATION TO SUPPORT ACCELERATED SCHEDULE

All wall and floor panels were prefabricated offsite, a strategy that aligned with and supported the project's aggressive timeline. Panel fabrication was carried out concurrently with foundation and slab work onsite, enabling parallel progress across multiple phases of construction.

To streamline logistics, the project team procured cold-formed steel and other framing components by construction phase—for example, Level 2 walls, Level 3 floors, Level 3 walls, and so on. Materials were packaged and delivered in coordinated, phase-specific releases, ensuring a steady flow of resources to both the fabrication facility and the jobsite.

This sequenced, just-in-time delivery approach allowed fabrication operations to continue without interruption, contributing to the project's overall efficiency and schedule adherence.

HIGH-QUALITY FRAMING EXECUTION WITH MINIMAL FIELD ADJUSTMENTS

The completed framing system delivered outstanding results in alignment, finish, and overall adherence to the design intent. Precision offsite fabrication, combined with a well-structured installation process, minimized the need for field adjustments. Minor alignment issues were quickly identified and corrected during or immediately after panel placement, ensuring a smooth and efficient construction workflow.

Nevell Group / Standard Drywall Joint Venture

Architect: Solomon Cordwell Buenz - SCB Architecture Interior Design Planning
Engineer: DCI Engineers
General Contractor: McCarthy Building Companies
Panel Fabrication & Install: Nevell Group / Standard Drywall Joint Venture

NGI/SDI
a joint venture

STRUCTURAL REDESIGN FROM WOOD TO COLD-FORMED STEEL (CFS) FRAMING

The project was originally designed as a five-story wood-framed structure. To better meet project goals, the design team—initially responsible for the wood structure—was re-engaged to redesign the building using cold-formed steel (CFS) framing. The CFS specialty contractor played a key role in collaborating with the design team to deliver a cost-effective solution that could be panelized and installed within the tight project timeline.

The switch to a CFS structure resulted in several notable benefits:

1. **Accelerated Construction Schedule**
   The use of prefabricated CFS panels enabled the structure to be erected much more quickly, significantly reducing the overall construction timeline.

2. **Improved Building Code Classification**
   Changing the structural system allowed the construction type to shift from Type IIIA to Type IIA. This change reduced the fire rating requirement for exterior bearing walls from two hours to one hour, simplifying construction and lowering costs.

3. **Lower Builder's Risk and Construction Costs**
   Builder's risk insurance premiums for the CFS structure were substantially lower than those for the original wood design. Additionally, security costs were reduced, as the fire risk during construction was significantly diminished.

4. **Reduced Long-Term Insurance Costs**
   The use of non-combustible CFS framing is expected to lead to lower insurance premiums over the life of the building.

5. **Elimination of Common Wood Framing Issues**
   CFS framing eliminates risks commonly associated with wood structures, such as shrinkage, mold, and termite damage, resulting in a more durable and lower-maintenance building.