

Low cost, low rise construction

A two storey office and retail complex, recently completed in the Perth suburb of East Victoria Park on the Albany Highway, demonstrates the benefits of time and cost economies which can be achieved by using steel for low rise construction.

Standing in a prominent location opposite a shopping centre, the complex is impressive in appearance, with an external feature of the facade being the sand finish rendered over the brick piers and window frames.

Lit by natural light, the central arcade invites entry inside the complex where double leaf brick walls create four office and retail compartments.

The architect's criteria for the project were:

- rapid construction required to meet an occupancy deadline for a major tenant;
- the design to be functional and commercially viable for offices and shops whilst being compatible with the surroundings and streetscape, and
- the design to maximise the building envelope and incorporate a ground level carpark at the back of the property.

Speed in construction

With the tight timeframe, a steel structure supporting precast planks was chosen primarily for its ease and speed of construction. The architect, Erwin Biemel confirmed that construction was fast. "Once brickwork reached first level, the steel columns and beams were erected in a day." A 15 tonne capacity mobile crane was used to lift the steelwork from the carpark behind the building.

The precast planks needed to be erected from the highway as site access restrictions prevented erection from the back of the building. The roadway was closed on a Sunday and the precast planks were lifted into place straight from the truck. The planks are topped with a 60 mm slab reinforced with F62 fabric.

The benefits of using steel were also demonstrated in the construction of the second storey frame. The columns, roof beams, bracing members and purlins had to be erected in a confined construction space where it was not feasible to stockpile materials. The fabricator engaged a 30 tonne capacity crane which lifted bundles of steel members to the suspended deck. The crane was on rollers, enabling it to travel along the 28 m building length. As steel was being erected on the upper storey other trades started work in the wet areas on the ground floor.

The small internal columns (150 x 150 x 6 SHS on the lower level and 100 x 100 x 4 on the



upper level) were encased in a 500 x 500 mm gyprock box, providing sufficient space for running services.

A canopy of Colorbond Custom Orb® roof sheeting and galvanised pipe frames was installed once the brickwork was complete.

The accuracy of off-site fabrication assisted the fast erection of the two storey frame, resulting in further substantial time and cost savings. By using prefabricated building components, the contractor reduced construction time by about five weeks. This was reinforced by Erwin Biemel who stated: "The main advantage in choosing a steel frame, was that not only did it suit the design criteria, but it was also economical and fast."

Structure

The key to the structural design was its simplicity, with standard connections being used to minimise both off-site and on-site labour costs.

Internal steel columns are located at the centre of each of the four building compartments and were included in the design to reduce the depth of the floor. In each case, a 530UB92 beam spanning 9.3 m runs continuously over the internal capped column.

The slab comprises precast 7 strand 200 mm thick planks spanning 6.5 m from the 530UB92 beam to walls.

19 mm diameter x 225 mm high shear studs at 1000 mm spacings along the centre of the top flanges provides restraint to the steel beam.

The top level comprises two separate portal-framed roofs with columns located at the centre of each compartment supporting 250UB25.7 roof beams. Lateral loads are resisted by the roof bracing. The roof consists of Colorbond Trimdek® at 3° pitch and Z15016 roof purlins.

All steelwork was designed, fabricated and erected in accordance with AS4100-1990.

No fire spray

In accordance with the Building Code of Australia, fire protection to the steelwork was not necessary.

Project participants

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| Client: | Lukman Enterprises |
| Architect: | Erwin Biemel & Associates |
| Engineer: | Marocchi & Robinson |
| Contractor: | W & C Sammons |
| Fabricator/ Shop Detailer/ | |
| Erector: | Mitchell-Willy Engineering |

