Sprawling dealership invites motor sales

McCarroll's Toyota – Waitara NSW

A steel-intensive approach was crucial to bringing to life the complex curved geometry that gives the new home of McCarroll's Toyota of Sydney's leafy northern suburb of Waitara an open welcoming structure close to one of the busiest highway stretches in the country.

Not just pleasing to the eye, the structural approach allowed for generous clear internal dimensions for the showroom to accommodate display of motor vehicles with plenty of perusing space for customers, and clear lines of sight to the building's workshop and office facilities.

The building encompasses a showroom display area for eight vehicles with reception and customer lounge, sales and administration office and workstation areas, and workshop with 24 servicing and detailing bays.

Toyota Motor Corporation Australia's National Manager, Franchise Planning & Representation – Franchise Development, **Paul O'Keefe** said the dealership development is significant within the Toyota property portfolio for its 10-car undercover parking area for Customer Vehicle Servicing adjacent to the workshop and 80-car storage basement, whilst maintaining heavy vehicle access around the perimeter of a tight urban site.

He also cited the extensive use of external louvers on the showroom façade for solar control as another distinctive feature.

Project architect, **David Slade** of SBA Architects said the need to display product and service facilities and to clearly project the company's brand presence and image to the public domain were key aspects of the job brief.

He said that this required some thinking outside conventional building form. This involved development of a design with no common radial set-outs and with extensive use of exposed curved steel elements.

"The showroom façade design was a response to the site context and location in order to maximise exposure to the North and South along the Pacific Highway," Mr Slade said

"This was achieved by articulating the structure in several directions, creating a dynamic and interesting curved shell type façade and roof form.

"The workshop building form is also designed with a large area of glazed openings to the site frontage to enable a visual connection between the vehicle servicing operations and external retail areas."

In fact, large column-free internal areas were core requirements of those two main parts of this structure so a structural steel option was adopted right from the concept stage across the development. The project utilised about 97 tonnes of Australian sourced steel all up.

The building provides approximately 3070sqm of floor space on the ground floor and about 1700sqm at basement level. The distinctive roof area totals around 3200sqm.

ACOR Consultants structural engineer for the project, **Nick Kokolis** said the choice of steel structure for the building meant considerable reduction in the transfer loads as compared to a concrete option resulting in economical transfer structure and foundations.

"The client's brief also required us to allow for future expansion of mezzanine floors and steel columns were ideal for that as new composite floor on steel beams can easily be fixed to existing columns by welding cleats," Mr Kokolis said.

"The use of composite Bondek® slab sported on steel beams at mezzanine levels also helped to maximise storage space underneath.

"However, the deployment of tall portal frames with slender members presented a challenge in controlling deflection so slender steel columns up to 12m centres were used to reduce the impact of the structure.

"Detailed buckling analysis was carried out to minimise the size of these columns and particular attention was paid to the detailing of visible rigid connections in order to make them aesthetically pleasing.

"This approach also provided flexibility in the design of curved roof over the showroom as structural steel members could be easily rolled to achieve the architectural shape."

He said that portal frames provided an ideal solution for the long spans with radial steel beams providing a solid supporting structure for the curved showroom roof. Structural steel was also used as part of façade to give the building a more modern look.

Craig Bennett, Managing Partner of steel fabricator B&G Welding said the core challenge for steelwork was to achieve the aesthetic requirement of minimal visibility of the supporting structure with the needs of the structural engineer, with detailing of the showroom roof structure being the main challenge.

"The first part of the challenge was the main roof structure of the showroom with its profile shaped like a seashell which provided a minimal number of square corners," Mr Bennett said.

"The roof structure is heavily braced as the majority of the building's façade is glazed and this fact combined with the roof shape provided some interesting and complex connections, far from standard joint arrangements.

"So much of the creativity was in the hands of the detailer as it is extremely difficult to foresee each connection at each instance during the design stage."

He said that the second challenge faced was in bringing to life the striking architectural concept of the eaves, curved in plan and in section.

"This presented a challenge to structurally form the required shape, support lining and cladding, all within a minimal space – again the detailer needed to be creative and produce oddly shaped plates and unorthodox connections."

He said the glazed façade posed yet another challenge, especially to detail the above with the constraint of only 2mm tolerance at the bolted connections.

"Larger CHS and RHS sections were used with bulky connections containing up to eight bolts at a time due to large area of glazing and preference for minimal steel to be visible on that part of the building," he said.

He said that the onsite welding post-installation proved to be a hard and complex process.

"The sunshades were constructed in sections that where transported to site and bolted to the showroom structure and then site welded at certain areas that were then patched and repainted onsite," Mr Bennett said.

"The RHS members had a large radius which only increases the amount of welding that was required when RHS members meet.

"More welding produces more heat which can create distortion which all has to be allowed for in the site work, but our site crew did a wonderful job in very trying circumstances."

Project Team

Client: Toyota Motor Corporation Australia

Principal Dealer: Phil McCarroll Toyota

Architects: SBA Architects

Structural Engineers: ACOR Consultants

Builder: Maincon

Steel Fabricator: B&G Welding

Steel Detailer: Prime Steel Detailers

ASI Steel Manufacturers: BlueScope Lysaght (purlins) and OneSteel (structural)

ASI Steel Distributor: Southern Steel (structural)

Surface Treatment: RED Abrasive Blasting and Protective Coatings

Coatings Supplier: Dulux