



COMMENDATION: ARCHITECTURAL

The University of Pretoria: Engineering 1 Study Centre

Hatfield, Pretoria, Gauteng

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Photography: Aurecon

Due to the country's ever growing demand for engineers, the University of Pretoria has the continual challenge to expand their engineering facilities. The existing Engineering 1 Building didn't have any facilities to accommodate students working afterhours and on group projects. Thus the decision was made to upgrade this facility with a new Engineering Study Centre.

The new structure was planned and designed to utilise a previously unexploited space of the existing Engineering 1 Building's street level. Adding an additional 3 000m² to the existing building, it consists mainly of an arched roof and mezzanine floor, and is able to accommodate approximately 800 students.

One of the main reasons for selecting steel as the structural medium was to reduce the additional load that would be added to the existing structure. Modifying the existing building foundations to accommodate the new structure was not an option. To limit the amount of additional weight, the team used the principal of compression. This insured that a large portion of the roof's own weight would be transferred to the outer, and independent, pile foundations. The steel roof has spans up to 40m and covers a total area of 1 700m². Similarly, steel was used as the primary structural element supporting the mezzanine floors.





Steel also played a crucial role in achieving the required aesthetic shape and appeal of the final building facade as much of the structural steelwork would be visible to the public after completion of the project. With steel it was possible to roll large sections to create the visually appealing dome-type roof.

Environmental considerations also contributed to the use of steel as the the study centre is built in the middle of the UP's botanical garden with numerous endangered plant species growing virtually against the building's footprint. Steel erection was the least intrusive construction method because the steel sections were fabricated off-site, minimising the amount of construction activities on site.

A 100 kilolitre rainwater storage tank also contributed to a more sustainable building. The system was designed to harvest the 1 700m² roof's rainwater by first discharging the water into the botanical garden and the surplus to be stored in the tank. Numerous other energy saving elements were also incorporated in the building.

Due to restricted work space and weight limitation on the existing reinforced concrete slab, large mobile cranes could not be used during construction. The contractor had to revert to manual labour or a combination of manual labour and smaller lifting machinery to erect the structure.


Tubular sections were utilised on both the interior and exterior facades of the structure. The roof is supported by six internal circular hollow section columns and also braced by aesthetically pleasing tubular sections. The western canopy roof and facade is supported by rectangular hollow columns. The entire roof and louvre support frame is finished with a circular hollow rail.

The steel fabrication and erection was finished on time and in budget. The client commended the team for not only creating a space where engineering students could thrive and work optimally day-to-day, but also on transforming the landscape of the Hatfield campus of the University of Pretoria.

JUDGE'S COMMENT

by Johann Nel representing the South African Iron and Steel Institute (SAISI)

This project is an example of where old meets new, where good engineering meets good architecture, complimenting each other in addressing the aesthetics with the steel arch design of the entrance to the study centre. This makes me proud to be associated with such an esteemed entity.

The creation of space under the old engineering building in answer to accommodate the number of students at the university speaks of architectural and engineering ingenuity. 

project team

Developer/Owner:

The University of Pretoria

Architect:

ARC Architects

Structural Engineer:

Aurecon

Quantity Surveyor:

Pentad QS

Project Manager:

ARC Architects

Main Contractor:

Robenco Construction

Steelwork Contractor/s:

Cicon Projects & Management

Detailers/Detailing Company:

X-Tech