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Award Winners - Commercial Buildings

THE RITZ-CARLTON MILLENIA SINGAPORE



Client:	Pontiac Marina Pte Ltd
Main Contractor:	Dragages ET Travaux Publics (S) Pte Ltd
Principal Consultant:	DP Architects Pte Ltd
Structural Engineer:	Meinhardt (S) Pte Ltd
M & E Consultant:	Meinhardt (S) Pte Ltd
Quantity Surveyor:	Davis Langdon & Seah S'pore Pte Ltd
Construction Cost:	S\$232 Millions
Construction Period:	35 mths

The Ritz-Carlton Millenia Singapore is a 32-storey luxury class hotel guestrooms with a 3-storey podium built on two levels of carparks. The first floor is located 30m above street level overseeing the Benjamin Sheares Bridge.

Architectural Features

The facade is clad with white Sardaigan granite with aluminium and glass curtain walls. The podium enclosed the main entrance to the hotel. The high quality lobby complemented by its aluminium and opalescent glass barrel vault cutaway entrance to the hotel.

Key Construction Features

The project features the use of a number of unique construction techniques. The contractor redesigned the facade and structure to enhance buildability, reduce construction cost and time.

As the first floor of rooms start at 30m above street level, the contractor completed the four reinforced concrete cores so that construction of the main structure could proceed. A 1,600-ton steel transfer beam was then used to bridge the gap between the cores.

Steel formwork was used for the facade and internal walls. Facade walls featured accurate openings for windows, and incorporate safety platforms at the top. Precast slabs and industrial slab formwork were used in the corridors/bathrooms respectively. The use of steel formwork allowed a high level of finishing to be made unnecessary the use of cement rendering. A thin skim coat was sufficient for a good finish before painting or paper walling.

To complete the cross-barrel vault at the main lobby, the contractor paid special attention to the procurement of materials and workmanship to achieve a high quality finish for this key area which leads into the main lobby.

The contractor was able to achieve a 6-day construction cycle using the above techniques and successfully handover the hotel and associated works to the client. The Carlton was one of the BCA Buildable Awards winners in 1996.

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Award Winners - Commercial Buildings

REPUBLIC PLAZA TOWER 1



Client:	CDL Poperties Pte Ltd
Main Contractor:	Shimizu Corporation
Principal Consultant:	RSP Architects Planners & Engineers (Pte Ltd)
Concept Architect:	Kisho Kurokawa Architects & Associates
Structural Engineer:	RSP Architects Planners & Engineers (Pte Ltd)
M & E Consultant:	Squire Mech Pte Ltd
Quantity Surveyor:	Rider Hunt Levett & Bailey
Construction Cost:	S\$251.4 Millions
Construction Period:	49 mths

Republic Plaza Tower 1 is a 66-storey office building at a height of 280m with a 10-storey podium carpark. The basement of the plaza is linked to the Ra station through an interconnecting tunnel. The project is also one of the three in Singapore.

Architectural Features

The tapering feature of the building together with composite facade of granite resemblance to a giant cut quartz crystal. The lower part of the building is octagonal. The upper portion is orientated at 45 degree to capture the panoramic harbour view. The building top is in the form of a ziggurat styled crown with blue tinted glass.

Key Construction Features

Republic Plaza is a structural steel building with a reinforced concrete core. In the busy Central Business District, the confined site was surrounded by existing roads. This tight space constraint and irregular layout required stringent project and site control to ensure that the project was completed on time and within budget.

The contractor worked closely with the client and consultant in the early stages, selecting nominated sub-contractors and conducting value engineering exercises to refine the structural system and adopt the most efficient construction methodology. Curtain wall installation was carried out using mono-rails mounted on the building at certain intervals. This allowed the tower cranes to be used for other lift work.

The quality and precision of work is reflected in the 5mm tolerance achieved on a 280m vertical steel structure. A 5-day construction cycle for each floor was achieved throughout the project and the project was successfully completed within the contract period.

Republic Plaza was also one of the BCA Buildable Awards winners in 1996. Benefits include the use of composite metal decking system, prefabricated steel beams and prefabricated curtain wall.

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Award Winners - Commercial Buildings

SUNTEC CITY PACKAGE 4



Client:	Suntec City Development Pte Ltd
Main Contractor:	Hyundai-Ssangyong Consortium
Principal Consultant:	DP Architects Pte Ltd
Concept Architect:	Tsao & McKownn (Singapore) Ptd Ltd
Structural Engineer:	Maunsell Consultants (Singapore) Pte Ltd
M & E Consultant:	Parsons Brinkerhoff Consultants Pte Ltd
Quantity Surveyor:	Davis Langdon & Seah Singapore Ptd Ltd
Construction Cost:	S\$345 Millions
Construction Period:	32 mths

Suntec City Package 4 comprises two 45-storey office towers w retail/entertainment mall and a main fountain located at the heart of Suntec City

Architectural Features

The office towers are enclosed in stone, aluminium and lightly tinted glass colours and textures. The entrance atrium of the two towers is accentuated with intricate stone murals forming a colourful backdrop to the office entrance.

A 22-m high triangular atrium skylight is located between the two office towers and glass skylight is supported by a prefabricated structural steel truss.

The project includes the largest fountain in Singapore - a 30m diameter fountain standing at 6m high, supported by four pillars. Cladded with bronze cladding from Australia, the fountain is complemented by an arch shaped water-wall of dark granite. An underpass below the water-wall connects Suntec City to Millenia Walk.

Key Construction Features

The contractor's technical inputs were crucial for the project, in particular for the two massive transfer girders of 9.28m x 2m and 9.28m x 1.8 m respectively. They are prestressed, post-tensioned concrete beams which carry the weight of the office column supports.

Concreting of the girders consisted of a 2-stage casting. To ensure the maximum quality of works were carried out strictly to specifications, emphasis was placed on temporary uninterrupted supply of concrete and close supervision of the operations.

For the casting of the fountain's bronze cladding, computer generated casting patterns were developed to manufacture dummy panels from which hand-made moulds for casting were made.

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ASHLEY GREEN



Client:	DBS Realty Pte Ltd
Main Contractor:	Ng Soh Construction Co Pte Ltd
Principal Consultant:	ADDP Architects
Structural Engineer:	Loh Consultants Ptd Ltd
M & E Consultant:	Richard Lok M & E Consultants
Quantity Surveyor:	Rawlinsons Chartered Quantity Surveyors
Construction Cost:	S\$20.7 Millions
Construction Period:	22 mths

Ashley Green comprises of the construction of 14 units of 2-storey bungalows on Sedap Road, each with a swimming pool.

Architectural Features

The development features 10 different layouts, designed to fit into the plot area from 1,420 sq m to 1,667 sq m. Each bungalow features a pitched roof with rafters supported by timber roof trusses, and designed with shady roof overhangs and verandahs. A swimming pool is located next to a garden terrace, with access to the dining room. Several of the units have basement garages while others feature a driveway and car porch.

Key Construction Features

The contractor shown a high level of professionalism and commitment to quality, which resulted in a high standard of workmanship and quality finishing for the complete project.

For example, the contractor maintained consistency in the grain and tone of tiles and dining areas through careful selection and dry-laying of marble and granite

Smooth finish was achieved for key stones, columns and wall trimmings through fibre glass mouldings which reduces construction time and labour costs. Steel used for the casting of reinforced concrete. To minimize disturbances to the property, precast L-shaped slabs were used to reinforce the concrete retaining roof trusses were prefabricated off-site and transported to site for installation time and overcoming the problem of space constraint.

The close coordination by the contractor with the project consultants enabled the project to be completed within schedule.

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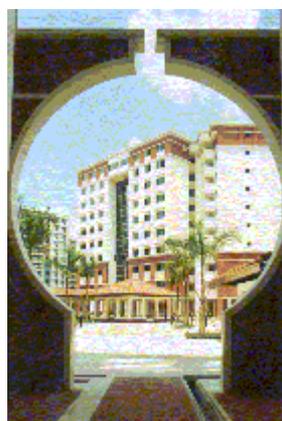
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Award Winners - Residential Buildings (Below \$1000/m²)

TAMPINES N4 C25



Client:	Housing & Development Board
Main Contractor:	Sim Lian Construction Co (Pte) Ltd
Principal Consultant:	Design Link Architects
Structural Engineer:	Engineers Partnership Civil & Structural Consultants
M & E Consultant:	Beca Carter Hollings & Ferner (SEA) Pte Ltd
Quantity Surveyor:	HDB, Contracts & Administration Department
Construction Cost:	S\$97 Millions
Construction Period:	29 mths

Tampines N4 C25 is a Design-and-Build HDB contract which consists of the completion of 10 residential blocks, two blocks of multi-storey carparks, civil and electrical sub-station with associated site works.

Architectural Features

The use of modularised window size provided a uniform and distinct facade. A full height window located at the living room for four-room units and at the master bedrooms for executive apartments present an aesthetically finished facade which gives a pleasant external view. The entrance arch to each block provides a distinctive focal point for each individual block. The main focal point of the entire precinct was a beautifully landscaped central stand located at the heart of the precinct.

Key Construction Features

The close coordination with the client together with good project management supervision by the contractor enabled the timely and successful completion of high level of workmanship.

The contractor also proposed an alternative design to the use of curtain wall height windows and clad the beam with glass panel to achieve the same design

The contractor initiated the use of steel cage reinforcement instead of links fabric. Precast components such as centralised refuse chutes, sun breakers were extensively utilised. Modular formwork was used to enhance site efficiency

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Award Winners - Civil Engineering Projects

SAFTI LINK BRIDGE



Client:	Ministry of Defence, Lands & Estate Organization
Main Contractor:	Sato Kogyo Co Ltd
Principal Consultant:	T Y Lin South Asia Pte Ltd
Structural Engineer:	T Y Lin South Asia Pte Ltd
M & E Consultant:	Squire Mech Pte Ltd
Quantity Surveyor:	Davis Langdon & Seah Singapore Pte Ltd
Construction Cost:	S\$5.5 Millions
Construction Period:	15 mths

The Safti Link Bridge is a 100m long by 14.5m wide dual carriageway with pedestrian link linking the Safti Military Institute and the training ground across the Pan-Islamic Park (PIE).

Structural Features

This is the first cable-stayed bridge with the longest single span flyover in Singapore world in respect of the independent inclined pylon as well as the 180m radius girder which is wing tip shape and curved having grooved feature at its soffit. The bridge is supported by nine bridge stay cables from a pylon inclined at 66 degrees. The pylon is held in position by six back stay cables.

Key Construction Features

The most difficult part of the project was the fabrication of the steel pylon which

particular the installation of guide tubes for the stay cables. The complicated pylon head structure required three-dimensional CAD analysis to ensure orientation of the guide tubes.

The construction of the pylon was planned by introducing a bracket system back stay which allows the construction of the bridge girder to proceed without deflection of the inclined pylon was totally controlled by the temporary back stays until the permanent back stay cables are installed. The installation of the cables was taking into account safety, speed and quality of work.

Casting of the bridge girder started at mid-span and worked towards both ends. Casting was conducted using two sets of travelling steel formwork which yielded a 17m span temporary staging was erected across the PIE by the contractor to ensure no disruption to the traffic flow.

The pro-active approach taken by the contractor in the management of the project, working with the structural consultant and specialist contractor enabled the successful completion of this aesthetically pleasing bridge.

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ORCHID COUNTRY CLUB PHASE 2



Client:	SLF Leisure Enterprise Pte Ltd
Main Contractor:	Greathearth Constructions Pte Ltd
Principal Consultant:	RSP Architects Planners & Engineers (Pte Ltd)
Structural Engineer:	RSP Architects Planners & Engineers (Pte Ltd)
M & E Consultant:	Squire Mech Pte Ltd
Quantity Surveyor:	Davis Langdon & Seah Singapore Pte Ltd
Construction Cost:	S\$56 Millions
Construction Period:	18 mths

Phase 2 of Orchid Country Club consists of the erection and completion of a social clubhouse, guestrooms block, bowling alley centre, 2-storey carpark and associated

Architectural Features

The grand staircase in the social clubhouse which curved in two directions requiring advanced forming techniques and precise workmanship to ensure total symmetry. The replication of special precast forms for the orchid motifs on pillars eliminated labour-intensive craftsmanship. Consistency in the grain and tone for the marble ballroom was achieved through efficient co-ordination and quality control by the

Key Construction Features

There was potential pollution to the Catchment Area as the site was located near Sungei Seletar reservoir which necessitated tight and effective control over dust, noise pollution and waste discharge. The site also required ground strengthening due to poor accessibility and soil condition. Special pre-fabrication procedure was used

the ground fabrication of the structural steel roof which spans 48m and weigh roof was installed using a 350-ton crane. The contractor also worked out the e M&E details for the individual floors before work commencement.

The coordination and good relationship between the contractor, architects numerous sub-contractors involved ensured that the project was delivered on budget, and the quality of work was to the owner's satisfaction. The contractor maintain an accident-free record.

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PANTECH 21 COMPUTER CENTRE



Client:	City Condominiums Pte Ltd
Main Contractor:	Shimizu Corporation
Principal Consultant:	APCO Architects & Town Planners Collaborative
Concept Architect:	Nikken Sekkei International Ltd
Structural Engineer:	Sim Bee Teck & Associates
M & E Consultant:	Squire Mech Pte Ltd
Quantity Surveyor:	Davis Langdon & Seah Singapore Pte Ltd
Construction Cost:	S\$29 Millions
Construction Period:	19 mths

Pantech 21 is an industrial building located at Pandan Loop which consists storey block and the associated works. The building is designed to house c companies.

Architectural Features

The external walls of the building was cladded using flourocarbon finished alu embossed design to avoid problem of waviness in flat panel. The unique featur is the free standing column which runs all the way up to roof level at the entra incorporated intelligent building features such as raised floor, integrated secu building automation system which controls the M&E system. The comprehensi provisions resulted in complex layout of the roof plant area which is aesthetica

a 5.5m high roof fascia wall at perimeter of the building.

Key Construction Features

The site is surrounded by factories and neighbouring construction sites and is by a long and narrow access road. This site accessibility problem is further excavations below the accessway for the running of numerous services and other external works such as culverts and boundary walls under a tight schedule. Careful planning and efficient co-ordination by the contractor was required to ensure site at all times.

The large volume of M&E work required careful planning and coordination typical industrial building. The contractor's good construction management and attention to high quality work and timely completion of project.

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Client:	National University of Singapore
Main Contractor:	Wee Hur Construction Pte Ltd
Principal Consultant:	DP Architects Pte Ltd
Structural Engineer:	Oscar Faber Consultants Pte Ltd
M & E Consultant:	Parsons Brinckerhoff Consultants Pte Ltd
Quantity Surveyor:	Davis Langdon & Seah Singapore Pte Ltd
Construction Cost:	S\$25.8 Millions
Construction Period:	13 mths

The Institute comprises of six blocks of two/three storey research cum office b a basement carpark, service roads, landscaped areas and other associated ext

Architectural Features

The main architectural feature of the project is the cylindrical shape atrium and aluminium canopy at main entrance which blends well with the external facade. The building is designed to accommodate the high content of M&E services, building automation system network, half of the office and research area are covered with heavy duty raised access flooring. The entire office and research area is laid with carpet tiles and vinyl flooring res

Key Construction Features

The project encompassed relatively large volume of M&E and architectural work. The project was completed within a period of 11 months. The tight schedule is further aggravated by the

that the work started and ended just before and during the Chinese New Year subcontractors and Malaysian workers are taking a long holiday break.

Planning for the project started early, two months before commencement selection of sub-contractors for the various trades coupled with efficient control monitoring of their work by the contractor and consultant are key factors successful completion of the project.

Overall, the contractor's commitment and close monitoring of the progress by the management team resulted in timely delivery of high quality work.

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CENTRAL GREEN CONDOMINIUM



Client:	Winwell Investment Pte Ltd
Main Contractor:	Obayashi Corporation
Principal Consultant:	Architects 61 Pte Ltd
Structural Engineer:	CP Lim & Partners
M & E Consultant:	PCR Engineers Pte Ltd
Quantity Surveyor:	Northcroft Lim Consultants te Ltd
Construction Cost:	S\$75.3 Millions
Construction Period:	26 mths

Central Green Condominium consists of 412 apartments units within two blocks and two blocks of 12-storey building, a podium block over a half basement car hall, swimming pool and tennis courts.

Key Construction Features

The site was very tight in terms of building setbacks due to the non-standard the site and level differences between the site and adjacent ground level diff from 3-9mm. Setting out and alignment was therefore very critical.

The landscape structure was fairly complex due to the number of curves and layout. Thorough execution and co-ordination on the part of the contractor ensures a good finish for the architectural and external works. Great care was taken to match

sizes and align the grout lines in the tiled areas.

Undertaken on a Design & Build basis, close coordination with the architects M&E engineers minimised construction errors and assist to solve site problems. The high finishing standard demanded a well-organised management team to ensure and completion of the project within time and budget.

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HILLVIEW HEIGHTS CONDOMINIUM



Client:	City Development Limited
Main Contractor:	Hytech Builders Pte Ltd
Principal Consultant:	Team Design Architects
Structural Engineer:	Sim Bee Teck and Associates
M & E Consultant:	Parsons Brinkerhoff Consultants Pte Ltd
Quantity Surveyor:	Northcroft Lim Consultants te Ltd
Construction Cost:	S\$72.3 Millions
Construction Period:	29 mths

Hillview Heights comprises three 10-storey tower blocks made up of 360 residential units, a clubhouse, two tennis courts and swimming pools. Six tunnels link the tower blocks to the basement carpark.

Architectural Features

The configuration of the three tower block elevation is enriched by introducing projecting fly beams, decorative grilles and panels on the balconies. A distinctive facade is achieved through careful selection of the external painting colours. A four-metre landscaped wall is provided along the east and south elevation to overcome the height differential in ground levels while providing a friendly interface with the external environment. The cascading pool area is decorated with nine sets of sea lions sculpture and illuminated by embedded fiber optics.

Key Construction Features

Due to two different foundation systems for the tower blocks (pilecaps) and (piling and footing), a movement joint designed by the contractor was provided at the interface between these two major reinforced concrete structures to cater for differential

The contractor provided design inputs in the project which include changing the walls within the tower blocks from L-shaped to U-shaped due to the close proximity of the tower blocks.

The "Enkadrain" sub-soil drainage system was used to speed up backfilling of the tower blocks with layered backfilling with aggregates. Plastering machine and screed pump were used to improve efficiency on site.

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ORCHARD PARKSUITES



Client:	Orchard Parksuites Pte Ltd
Main Contractor:	Buildspeed Construction Pte Ltd
Principal Consultant:	TAA Architects
Structural Engineer:	KTP Consultants
M & E Consultant:	Meinhardt (S) Pte Ltd
Quantity Surveyor:	KPK Quantity Surveyors
Construction Cost:	S\$61.3 Millions
Construction Period:	33 mths

Orchard Parksuites is a 26-storey tower block and a 6-storey podium with basement carpark, with 225-unit high quality service apartments.

Architectural Features

The symmetrical design of the 26-storey tower block has a modern classic volumetric stepping of its mass which blends with the surroundings. The exterior has a brick effect, textural coated finish and vertical planes of curtain wall system with decorative motifs, ledges and other architectural elements. The pyramid roof is made of aluminium sandwiched panels in fluorocarbon finish to screen off M&E services to allow light and ventilation. A steel mast sits on top of the penthouse level. The archway constitutes the main entrance to the main lobby of the tower block.

Key Construction Features

The site is located close to the Orchard MRT station and within the Mas Railway Protection Zone where two underground tunnels are just three metres from the site boundary. This was a key challenge to the contractor. Hence, construction of the carpark was carried out under stringent controlling requirements. The contractor had to isolate the segment of the project site which had the most influence on the tunnels in terms of deflection.

A reinforced concrete plate stiffener was cast to isolate the corner of the building from the Orchard MRT station. The contractor adopted a top-down construction for this segment and build the 26-storey tower block using the island method. Continuous monitoring of the tunnels and surface ground were undertaken and verified through manual surveying.

The contractor's successful implementation of these two construction techniques completed the project, and at the same time meeting the strict compliance of the regulatory requirements.

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THE COUNTRYSIDE PHASE I & II



Client:	Seletar Properties Pte Ltd (A member of OCBC group)
Main Contractor:	Chiu Teng Construction Co Pte Ltd
Principal Consultant:	Architects 61 Pte Ltd
Structural Engineer:	Chan Chee Wah Constructions
M & E Consultant:	Woo & Associates
Quantity Surveyor:	Rider Hunt Levett & Bailey
Construction Cost:	S\$57.7 Millions
Construction Period:	46 mths

The Countryside development comprises of 48 units of two storey semi-detac 182 units of part two/ part three storey terrace dwelling houses and associated Chu Kang/Lentor Avenue area.

Architectural Features

The main roof and carporch roof were made from pre-fabricated timber roof tr fabricated galvanised steel frame were installed to support the marble vanity the conventional reinforced concrete slab. The good off-form concrete finish and pre-fabricated galvanised steel grilles were distinctive features on all t houses. Pre-fabricated GRP gable end panel were utilised in this projec conventional gable end brickwall at roof level.

Key Construction Features

The location of the site necessitated the diversion of an open monsoon drain to which hindered the earthworks operation. The diversion and enlargement of a further complicated the earthwork and piling operation. Well planned work and co-ordination of site activities by the contractor helped to alleviate the degree of site. The use of pre-fabricated timber truss enabled the roof to be erected in 4 3 weeks if reinforced concrete trusses were used.

The contractor's wide adoption of precast and pre-fabricated components has the high standard of finishing work for the project.

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