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Framework for Sustainable Development

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A five-point plan puts sustainable buildings, communities and cities

The Green Building Council of Australia (GBCA) has released a five-point plan for sustainable buildings, communities and cities to guide politicians in the lead-up to the federal election on 2 July.

Chief Executive Officer of the GBCA, Romilly Madew, says the plan has been developed to help politicians from all parties understand the policies and programs that drive down emissions while enhancing productivity, liveabilityand sustainability in Australia's cities.

"For the last decade, the Australian property and construction industry has been committed to reducing carbon emissions, delivering cost savings, boosting health and productivity, and creating places that are good for the environment and people too," Ms Madew says.

"The evidence of this evolution is there for all to see. More than 1,060 Green Star projects equate to 14 million squaremeters of Green Star certified space – more than twice the size of the Melbourne CBD.

"Our industry has been ranked the 'global green leader' for five years running by the Global Real Estate Sustainability Benchmark, and Australian companies dominate the annual Dow Jones Sustainability Index.

"But we need to move faster if we are to arrest climate change – and we need to move faster if we are to ensure we can accommodate a growing population in cities that are liveable and sustainable."

The GBCA's five priorities for federal government action are:

1. Move towards net zero
2. Raise minimum standards for buildings
3. Harness the potential of mid-tier buildings
4. Accelerate the advancement of a precinct utilities marketplace
5. Catalyse the sustainable cities movement.

"These policies and programs are important – but strong leadership from our politicians is vital. We'll continue to Workhard overthis long election campaign to seek commitment from all political parties to build a better, more Sustainable future for all Australians," Ms Madew concludes.

The GBCA's five-point plan for sustainable buildings, communities and cities can be downloaded from the GBCA

The GBCA is the nation's authority on sustainable buildings and communities. The GBCA's mission is to accelerate the transformation of Australia's built environment into one that is healthy, liveable, productive, resilient and sustainable. The GBCA works with industry and government to encourage policies and programs that support its mission. The Council educates thousands of people each year on how to design and deliver sustainable outcomes for Australia's buildings and communities. And it operates Australia's only national, voluntary, holistic rating system for sustainable buildings and communities –

Business deals affirm Singapore International Water Week as leading global water platform

The event drew to a successful close with more than 21,000 participants from all over the world and S$15.2 billion in total value of business deals announced

Singapore, 18 July 2016 – Efficient water management, future technologies and talent development emerged high on the global water sustainability agenda at the 7th Singapore International Water Week. Held from 10 – 14 July 2016, the global water conference also concluded on a record-breaking note, garnering S$15.2 billion in total value for the announcements on projects awarded, tenders, investments and MOUs. Held in conjunction with the World Cities Summit (WCS) and CleanEnviro Summit Singapore (CESS), the three co-located conferences attracted more than 21,000 participants from 115 countries and regions.

The record-breaking achievement in total value for announcements on company investments, R&D collaborations and project partnerships reaffirmed the continued vibrancy of Singapore as a global hydrohub and SIWW as the leading global water platform for business networking, solutions and technology. Some of the significant announcements made at this year's SIWW included:

- Call for upcoming tenders for the design and construction of Singapore's Deep Tunnel Sewerage System (DTSS) Phase 2 and the Integrated Waste Management Facility; the design and construction of DTSS Phase 2 is estimated to cost S$6.5 billion;
- A S$200 million funding boost under the Research, Innovation and Enterprise 2020 plan to further R&D in the Singapore water industry over the next five years;
- The construction of a fifth desalination plant on Singapore's Jurong Island that will add 30 million gallons of water per day to the nation's water supply;
- Launch of the Singapore Water Academy, an institute for learning that builds and enhances the capabilities of water professionals in Singapore and around the world;
- Opening of Memstar's Membrane Manufacturing Plant and R&D centre, a new membrane manufacturing facility in Singapore;
- An investment of S$3.5 billion by Korea's Ministry of Environment over the next 12 years to refurbish and build new water infrastructure;
- A research collaboration between ZWEEC and USEPA for the development and implementation of an online toxicity water monitoring programme;
- A five-year agreement between PUB, Singapore's national water agency, and GE Water to explore new research opportunities as well as develop novel water treatment technologies and R&D projects locally

The Water Leaders Summit played host to over 500 water leaders from the government, utilities, international organizations, academia and private companies, including, 14 water-related ministers, water utility leaders from every continent and CEOs of the world's biggest water companies. Distinguished delegates include HE Mohammed bin Abdullah Al-Rumaihi, Minister of Municipality and Environment, Qatar; HE EsbenLunde Larsen, Minister for Environment and Food, Denmark; Dr. Han Seung-soo, UN Secretary-General's Special Envoy for Disaster Risk Reduction and Water, Special Advisor to the High Level Panel on Water, and former Prime Minister of the Republic of Korea; MrBenedito Braga, President, World Water Council; Gerardo Ablaza Jr, President and Chief Executive Officer, Manila Water Company; Mr Peter Brabeck-Letmathe, Chairman of the Board of Nestlé S.A; and Mr Charles O. Holliday-Jr, Chairman of Royal Dutch Shell PLC.

As an integrated component across SIWW, WCS and CESS, the inaugural City Solutions Singapore brought together more than 1,000 leading companies and innovative start-ups across 31,000 sqm to showcase new and cutting-edge solutions for urban development, water, and waste and cleaning management. Four country / region pavilions – Turkey, Spain, Scotland and the EU Business Avenues in Southeast Asia Pavilion – made their bow at SIWW 2016, joining 17 other pavilions to provide a gateway for their companies to enter the growing Asian water market.

AkzoNobel furthers its bid to preserve iconic cultural sites in Southeast Asia

SINGAPORE, 14 JUNE 2016 – AkzoNobel is set to play a vital role in restoring the historic Kota Tua (old town) area of Jakarta in Indonesia, with hopes to secure UNESCO World Heritage status for the site. Together with AkzoNobel's ongoing involvement in the refurbishment of icons in UNESCO sites such as Burkill Hall and the Bandstand in the Singapore Botanic Gardens as well as the Stadhuys in Malacca (Malaysia), the company seeks to deepen its mission to preserve iconic cultural landmarks around the region.

These partnerships are established as part of AkzoNobel's global Human Cities initiative that highlights the company's commitment to improving, energising and regenerating urban communities across the world. Since its launch in 2014, AkzoNobel has embarked on a wide variety of projects that uses its key strengths – essential ingredients, essential protection and essential colour – to protect and enhance local communities.

"Heritage is an important aspect of cities as it is what connect people to the place. Given that more than 75 percent of the world's population will live in cities in the 2050s, and 60 percent of our products are in the Buildings and Infrastructure, and Transportation end-user segments, we believe that we have an important role to play in Asia's urban transformation. We want to go beyond the purely functional aspects and help cities and their citizens to connect on an emotional level." says Jeremy Rowe, Managing Director of AkzoNobel Decorative Paints, South East and South Asia, Middle East.

Tropicana Collaborates with Panasonic Group to Build Innovative Eco Homes

Petaling Jaya, Malaysia, 28 June 2016 – Staying true to its mission to build a sustainable and vibrant community, property developer Tropicana Corporation Berhad (“Tropicana”) has entered into a strategic collaboration with PanaHome Malaysia SdnBhd("PanaHome Malaysia"), a local subsidiary of PanaHome Corporation based in Japan, to build 272 semi-detached innovative eco homes at its latest township, Tropicana Aman. The unveiling of Cheria Residences, the third phase of the residential precinct at the 863-acre Tropicana Aman marked the first collaboration between both companies.

Incorporated since 1979, Tropicana is the pioneer of resort-themed developments, with over 42 completed and 16 ongoing developments across Malaysia. Established since 1963, PanaHome has built a total of about 470,000 residences in Japan over the past 50 years. Cheria Residences is a brainchild of both companies, embracing innovative design and concepts that are fitted with Japan intelligent construction technology that aim to improve the quality of lives.

The signing ceremony marked another important milestone for the Group and was witnessed by MrYasuteruFujii, Corporate Advisor of Panasonic &PanaHome Corporation. Tropicana was represented by Dato' YauKok Seng, Group CEO and Dato' Dickson Tan, Deputy Group CEO; whilst PanaHome was represented by Mr Kenji Koyama,Executive Officer and Mr Haruhiko Kuwano, Managing Director of PanaHome Malaysia.

Speaking at the event, Dato’ YauKok Seng said that Tropicana has always been working in sync with the pulse of the local communities to enrich lives and improve the ecosystem. “Building innovative intelligent homes with PanaHome is a sign of our commitment to not just creating harmonious partnerships for the benefit of our customers but ultimately, to also create an ideal and vibrant township that is sustainable and holistic in nature. Going forward, Tropicana plans to build more sustainable homes in each of its townships.”

Dato’ Yau added, "Tropicana Aman is set to be an idyllic place where one can slow down, breathe in the fresh air, find the balance in life and live in a walk and bike-friendly environment. PanaHome Malaysia aims to make a difference by creating an "EcoNation" where one can work, live and play in a healthy environment. We share the same vision to create a better community with our future smart homes and thus, this is a very strategic partnership.”

Speaking on behalf of PanaHome Malaysia, Mr Haruhiko Kuwanosaid,"With Tropicana’s vision to redefine the art of living and its commitment to building luxurious, resort-themed developments, I believe together, we can create a more vibrant township in Tropicana Aman. The synergy between Tropicana’s master-planning and PanaHome’s Japan intelligent construction technologies will definitely add more value to Cheria Residences precinct at Tropicana Aman.”

The newly unveiled Cheria Residences is expected to launch in mid-July 2016 and expected to complete in 2019. Seated on a lush 38.5 acres land, the capacious double-storey semi-detached homes boast 3,200 to 3,670 square feet with wide car porch that could fit three cars side-by-side. Future residents of this gated and guarded precinct will also enjoy their own private 4.73-acre central park and linear garden, 3-km pedestrian and jogging track and a dedicated community hall.

On the innovative and Japanese-quality technologies front, each Cheria Residence is designed to be energy efficient and environmentally-friendly. Construction methods utilising reinforced concrete panel technology ensure high and consistent quality building structure.

PanaHome also offers air ventilation and heat insulation technology that supplies effective flow and circulation of natural cool air whilst at the same time, minimises the heat transmission from the ceiling unlike the issue faced in conventional buildings. The unique PanaHome’s PURETECH structured embedded ventilation system filters out dust and air pollutants and the special filter can remove up to more than 95% of harmful air particles. The thermal heat insulation materials will be incorporated behind the ceiling to help to reduce heat conduction to keep the living space naturally cool and clean for the inhabitants without the need for excessive air-conditioning, hence reducing energy consumption.

On the scope of fitted electronics equipment and security front, PanaHome will incorporate the video intercom and home network system to deter crime. With the built-in video intercom, residents will be able to see the face of their visitors without the need of opening the door. The Panasonic security systems are connected to the smartphone to monitor the status of your home remotely even when you are out of the house.

About Tropicana Aman

Set next to the growing affluent neighbourhood of Kota Kemuning, Tropicana Aman encompasses 863-acre of idyllic setting offering both residential and commercial components. The township also boasts an 85-acre Central Park with a central community clubhouse. Tropicana is also building a 10-acre Tenby International School campus and is expected to have its first intake in September 2018, offering international student-oriented programmes for students aged from 3 to 18 years old. Access-wise, Tropicana Aman is linked to six major highways - Lebuhraya Shah Alam (KESAS), the Federal Highway, LebuhrayaKemuning Shah Alam (LKSA), Expressway Lingkaran Tengah (ELITE), South Klang Valley Expressway (SKVE) and the up-and-coming West Coast Highway.

Since its launch in May 2015, Arahsia Residences, the first phase of Tropicana Aman recorded an overwhelming success with all the 432 units of link homes 100% taken up. The second phase, Bayan Residences was launched in August 2015 and has since recorded over 90% take up. Cheria Residences, the third phase will be launched in mid-July 2016. Interested purchasers are encouraged to contact 1700 81 8868 or visit the Tropicana Aman Property Gallery which is open daily from 9.30am to 6.30pm.

Heliatek deploys with Kandil Steel its first large BIOPV project on African continent

Dresden, Germany - 23 June 2016 - Heliatek has implemented, with its partner Kandil Steel, its first Building integrated Organic Photovoltaic (BIOPV) pilot project in Africa. HeliaFilm®, Heliatek's organic solar film, is at the core of this installation in Egypt, which represents a first test project for further steel applications by Kandil Steel.

"I am happy that we are progressing on our global roll out," states Thibaud Le Séguillon, CEO of Heliatek. "It is a key step forward in our strategy of providing de-centralized energy generation solutions used directly on buildings all over the world."

The project was funded and managed by Kandil Steel, the leading steel provider in Egypt. The company is working on new solutions for distributed energy generation because of rising energy prices and declining government subsidies. The company plans to establish the combination of its steel panels with HeliaFilm® as a new product for the BiPV market.

Installation Heliatek and Kandil

Installation of HeliaFilm® onKandil Steel panels

© Kandil Steel

Egypt's hot and sunny weather conditions are ideal for HeliaFilm® due to its excellent high temperature performance, leading to outstanding energy harvesting results. Moving to renewable energy sources is inevitable and this is supported in Egypt by both the government and Community. Moreover, this project emphasizes Kandil's vision to provide innovative solutions to its customers as well as keeping its responsibility towards the Environment.

In this installation, the HeliaFilms® have a custom length of 2.5m and are combined with steel as an integrated building material. Kandil Steel has chosen opaque and blue HeliaFilm®. The development of HeliaFilm® is carried out by Heliatek in Dresden, Germany and the target is to establish a high volume manufacturing line by 2018.

Opaque HeliatekHeliafilm on steel

Opaque HeliaFilm® on steel application

About Kandil Steel:

Kandil was founded in 1865, starting by manufacturing manual agricultural machinery. Passing through several phases, Kandil focused on flat steel in the 1950s and became a genuine steel player in building the Egyptian industries. Moving on in the 1990's, Kandil started its industrial activities with a modern Steel Service Center, followed by up-stream integration to build the first Cold Rolling and Coating Complex, and acquired Galva Metal in 2007 to become the leading re-roller and coater in Egypt. Kandil built its name as a reliable Cold Rolled, Galvanized & Coated flat steel supplier in both the European and Middle Eastern markets.

Er. Edwin Khew to assume Presidency of The IES

Renewable energy and Cleantech guru to lead IES as Golden Jubilee Year President to support Singapore’s future growth through engineering

The Institution of Engineers, Singapore (IES) announced today that Engineer (Er.) Edwin Khew, Managing Director of Anaergia Singapore Pte Ltd, will be taking over the reins of IES Presidency from Er. Chong Kee Sen. Er. Khew will be officially inaugurated as the IES President for a term of two years (Sessions 2016/17 and 2017/18) at the 50th IES Annual General Meeting (AGM) to be held on 28 May 2016 at the Suntec Singapore Convention & Exhibition Centre.

For his new appointment, Er. Khew has set three key thrusts in collaboration with the IES Council: to deliver greater value and relevance to IES members, to raise the profile of engineering as the profession of choice and to steer IES towards becoming the focal point and strategic partner for all present and future engineering initiatives in Singapore.

“It is a huge responsibility to be the IES President during its Golden Jubilee Year especially as Singapore crosses into its second 50 years of development. This is a critical juncture that will determine the success of Singapore’s future growth into the high tech sector and being a smart nation, as engineering will be one of the key professions required to drive these areas of growth. I do hope to steer IES to strengthen its engineering excellence through the development of strong and active technical committees (TCs) covering all sectors of engineering in IES and in enthusing the young to take up an interest in STEM (science, technology, engineering and mathematics). We hope that by showing students how they can be part of this exciting future growth of Singapore, they will be encouraged to take up engineering after they leave school,” said Er. Khew.

In addition, Er. Khew will also focus on the softer aspects of engineering, especially in promoting social and environmental responsibility amongst IES members and in encouraging young engineers to be more enterprising.

“My Council and I would also place greater emphasis on using our engineering knowledge and skillsets to help the needy in the society and to make their lives better; and to promote environmental consciousness amongst our members. This will be very much in line with the mission of IES which is to enhance the well-being of mankind through engineering,” added Er. Khew.

Er. Khew has made significant contributions to Singapore’s Cleantech, sustainable energy and manufacturing industries. He played a leading role in the establishment of the first Cleantech Incubator/Accelerator for Singapore start-ups and foreign companies in 2013. He was also the former President of the Singapore Manufacturers’ Federation, the current Chairman of the Sustainable Energy Association of Singapore (SEAS) and Chairman of the Singapore Standards Council. ErKhew served as a Nominated Member of Parliament between 2006 and 2008 and was awarded the Public Service Medal (PBM) by the President of Singapore during Singapore’s National Day in 2014.

Town Hall

Design Aspects :

The brief was to use the largest area in the centre of Khan Market in NCR, and design a place for the community amidst an existing structure, where a lot of people can meet and come together.This was a unique opportunity, to design an extremely large space with multiple challenges in the heart of the posh market in central Delhi. Adopting a contemporary design approach for an independent nation within the domain of the colonial heritage and enlivening the resurgent industrial spirit of a newly independent country as Nehru envisioned, an array of spaces is designed through different sections, both for individual spaces and sizable sections for larger gatherings. Planned in a dynamic manner, the space recreates the post-independence era which is when the market was built. The look and spirit for the restaurant cum bar is therefore of an independent India and the brief included the intent to keep the colonial past alive while bringing out the fun and contemporary look of modern India.

As the name 'town hall' suggests, this whole zone i.e. the main hall is developed as a community space for the purpose of interaction, casual meetings and to express and share ideas, views and thoughts.The old style of the structure is restored and enhanced to fulfill the present requirements with the whole space being divided into different zones.Existing walls and levels have been tweaked and modified in a creative and innovative manner. The high ceiling height of the main hall is further extended as an opportunity to be exploited, with enhanced usage of the central space at the heart of the restaurant. The old fanlights were restored and exploited to establish a visual connection to the terrace above.

Plenty of cornices existed inside as well as outside, almost all of which have been recreated, modified and enhanced in order to rebuild the colonial character while endowing it with an industrial spirit in a novel manner. A bridge overlooking the passage of the Khan Market is enhanced In order to maximize the location potential; this is where theSushi bar corner is placed at the first floor to add interest and rests at one corner,while on the other corner there is a gallery and a verandah, painted yellow, next to the windows, further highlighted with veranda lighting. On the terrace level, A Semi-open kitchen in the centerwithin the erstwhile location of the clock room adds drama. A huge square clock facing the main square is placed as it was there traditionally, reminiscing of the old clock tower.The main bar is located at the upper level on the terrace level above the sushi bar.

Terraces existed on multiple levels; the big terrace is laid out in an interactive manner with an open seating plan on the other side, while the small terrace has its own intimacy and privacy. Being outward facing, it gives one a chance to enjoy the fabulous views of the location. Every table on the terrace has a table lamp that enables guests / visitors to adjust their lighting level and set their own mood.The whole seating is designed in an outgoing manner to provide a specific appeal to each nook and corner; a variety of wooden furniture with specific characteristics has been used to provide privacy and private space to those who wants to stay away from the crowd.

Lighting Design :

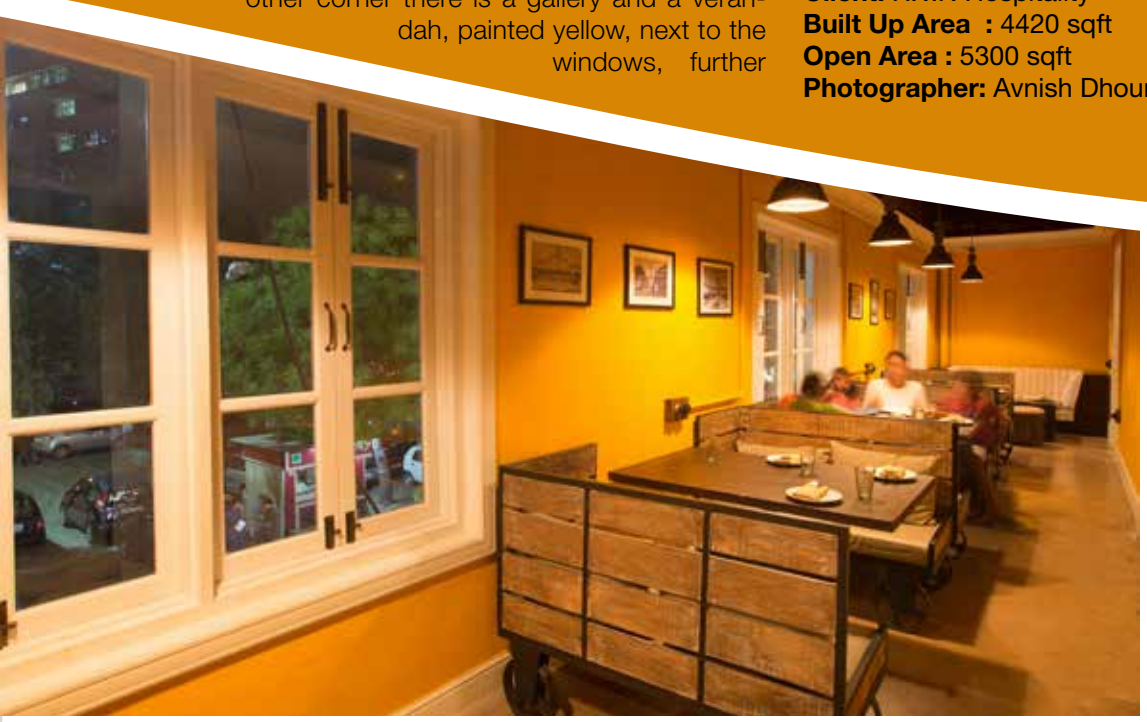
For the lighting, table lamps and peanut lights are used along with lamp shades and broadly, industrial hanging lights augment the overall look and feel.

Materials Used :

The terrace is laid out in Fire brick flooring, while the lower floors are planned in a Combination of Cement & terrazzo flooring.The demographics and the social behavior are always kept in mind even though the basics are same, but the behavior and social aspects vary from place to place. The local clientele, age groups and Preferences are respected for the entire place-making exercise to become successful. Being true to the language and approach, the patterns and textures adopted are very classical in order to give an authentic character to the space along with an old world Charm as it was there in fifties. The restaurant design is hence, a quaint mix of colonial heritage and inherent spirit of the post-independence era that is modified and tweaked to contemporary times in Modern India today. **RFA**

Project Credit :

Architect : DCA Architects
Client: R.V.N Hospitality
Built Up Area : 4420 sqft
Open Area : 5300 sqft
Photographer: Avnish Dhoundiyal



Hotels

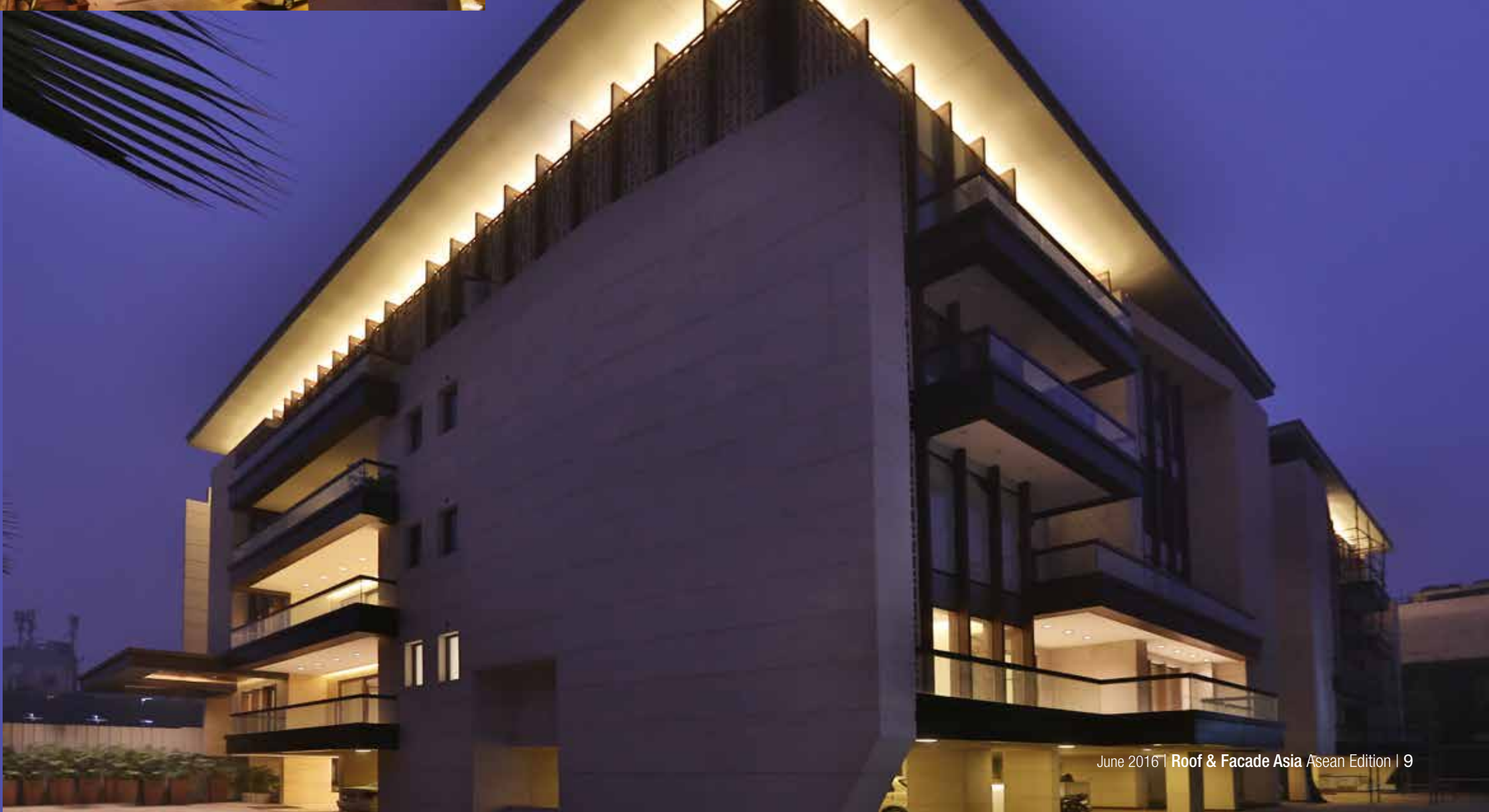
Botanica

New Delhi, India

Inspired by nature, the name Botanica was derived for the lavish development that focused itself around the serene green oasis at its heart. It attempts to create a landmark development within the contemporary residential building typology through spacious, high-onluxury,four-side open apartments located in the heart of Delhi.

It consists of a simplistic layout that is vaastu-enabled with a butterflyshaped form that is typically not available in customary plotted developments in Delhi.

Botanica successfully unifies the lush green landscape concept that is typically integrated with plotted singular homes only, with entertainment facilities of a group housing, while offering privacy, indulgence and comfort of a private home.



Capital Place is a new integrated business development prominently located in the heart of Jakarta's international commerce, entertainment and financial district that heralds a new era of luxury for conducting business in the city. Designed as a city within a city, Capital Place provides 90,819m2 of Premium Grade office space alongside The Four Seasons Hotel and retail podium with specialist gourmet selections. With a leading global real estate investor as the building landlord, Capital Place will become the benchmark against which future business hubs in Jakarta will be measured and is a premier workplace for professionals at the top of their fields attending to all of their needs – business and social.

"Capital Place is the culmination of our vision and our commitment to elevate the ordinary work environment where business is conducted into a prestigious, luxury business lifestyle destination," said Shirley Tan, CEO Rajawali Property Group."This is also the first development in Jakarta where the legendary Four Seasons services are extended from the hotel to the office tower in a fully integrated fashion."

Design :

Representing a new landmark of contemporary architecture by Pelli Clarke Pelli Architects, Capital Place is a light-filled, modern classic, which signifies the waves flowing around the Indonesian archipelago and is inspired by the Indonesian principles of transparency; seamlessly connecting the interiors with the outdoors. The combination of an office building, retail and dining outlets, and a Four Seasons Hotel will ensure intensity of life and will take place within a world of greenness.

Green Elements:

In a dynamic, fast-paced metropolis such as Jakarta, connection to nature is important. Capital Place, with its dramatic sky gardens, is an oasis surrounded by luxurious green landscapes. Lush, tropical outdoor spaces are created by renowned Landscape Architect Bill Bensley, who has weaved various artistic elements into each green space. Each of the Office Building's outdoor spaces have a strong identity and are rich in details, inspired by Indonesian art, sculpture, music and history.

Capital Place enjoys a superb location in the financial heart of Jakarta, sitting strategically between SCBD and Mega Kuningan, providing a base for the city's business elite, deal makers and doyens and attracting global business to this global city. The developmentis a focal point for leading international and Indonesian companies to come together, creating an epicenter for business in Jakarta; a place where leaders in business meet.Capital Place represents the future of business in the Asian region; making an emphatic statement regarding Jakarta's position as a business hub to rival other great Asian cities.

The development is served by multiple public transport options including TransJakarta, buses, taxis and the upcoming LRT station. The development benefits from both a frontage on GatotSubroto, as well as a direct connection to SCBD via a specially created access road.The important business of meeting and socializing after hours is made easy, in a city known for its thriving nightlife, by the proximity of Capital Place to Jakarta's top dining, lounge and cocktail establishments as well as the outstanding venues within Four Seasons Hotel Jakarta. Access to the Concierge at Four Seasons Hotel Jakarta guarantees the best table in the house.

Symbolizing the cutting edge of high-end office development in Jakarta and the region, Capital Placehas truly premium level specifications.It is a Premium Grade office with 150mm height of raised floor and large, rectangular floor plates between 1,800 and 2,600m2 semi gross. This is coupled with extremely large, open, column-free spaces, a raised floor to ceiling height of 2.8m and a 4.25m maximum floor-to-floor height. Designed for a density of 9.3m2 per person, Capital Place has a floor loading of 250kg/m2.Working conditions are unparalleled at Capital Place with efficient air conditioning and 8 destination-control lifts in each of three zones – as well as one executive and two service lifts. There are male, female, executive and disabled toilets on every floor and approximately 1,350 car parking spaces, plus parking for bicycles and motorcycles.High security standards are prevalent throughout Capital Place and a retail podium joins the office tower to the Four Seasons Hotel Jakarta tower offering a multitude of food options.

Sustainability Features Leading to Green Mark Award:

Setting the standard for sustainability in corporate development in Jakarta, Capital Place complies withBCA GreenmarkGold-plus standards and consistently operates at an over 85% floor efficiency ratio.Daylight and motion sensors on all interior lighting, including toilets and staircases ensure optimal electricity consumption, alongside energy efficient light fittings and the latest energy saving technology in lifts and escalators whilst variable load air conditioning units are complemented by a double-glazed façade with advanced ETFE coating. Recycled water is used for irrigation of all green areas and cooling towers and this is paired with utilization of Singapore PUB's 'Very Good' fittings throughout.

Capital Place and Four Seasons Hotel Jakarta jointly provide a prestigious, luxury business and lifestyle destination.Leveraging Four Seasons' absolute focus on the luxury consumer, as well as the experience and flexibility gained in similar mixed-use projects around the world, the Capital Place development will have Four Seasons legendary hospitality and services integrated seamlessly throughout. This is the first development in Jakarta where the legendary Four Seasons services are extended from the hotel to the office tower with a vision of elevating the ordinary working environment into a prestigious, luxury business lifestyle destination.

The concierge service of Four Seasons Hotel Jakarta will seamlessly integrate with the business center and offices, further heightening the sense of service and luxury whilst the superb lifestyle of Four Seasons is proudly represented on the go by Dolcetto, the Hotel's grab-and-go destination located in between the Hotel and the Capital Place office tower, where tenants and guests can choose from an array of healthy and indulgent foods to go, all prepared by the Four Seasons culinary team. Meanwhile, experienced barristas craft specialty Illy coffees and TWG teas for a daily pick-me-up. Dolcetto also offers catering services with the Four Seasons touch for meetings and business gatherings. **RFA**

About The Rajawali Group

The Rajawali Group is one of Indonesia's largest investors. Driven by the philosophy of value creation, the Group has successfully engaged across a wide range of industries, including hotel and property, agriculture, mining, infrastructure, transportation, and media. Over the last three decades, the Group has built a solid reputation for strategic investments as wells as philanthropy, including poverty reduction programs, the establishment of the Rajawali Foundation Institute for Asia, and the Harvard Kennedy School Indonesia Program to enhance research, education in public policy and governance issues.

Project Credit :

Architect& Landscape:
C.F. Møller& C.F. Møller Landscape
Client: Slättö Förvaltning AB
Extent: approx. 18,000 m2
Year: 2016

CAPITAL PLACE
REDEFINES BUSINESS IN THE BOOMING METROPOLIS OF JAKARTA

Buildings and Infrastructure

Construction is one of the most important steel-using industries, accounting for more than 50% of world steel production. Buildings - from houses to car-parks to schools and skyscrapers - rely on steel for their strength. Steel is also used on roofs and as cladding for exterior walls.

According to the UN's latest forecast dating July 2015, world population will reach 8.5 billion in 2030 and 9.7 billion in 20501..This will be accompanied by rapid urbanisation. As the need for buildings and infrastructure continues to grow worldwide, reducing consumption of natural resources and associated emissions is crucial for future sustainability.

Steelmakers around the world are increasingly providing construction solutions that enable energy-efficient and low-carbon-neutral buildings. These solutions reduce the environmental impact over the structures' life cycle and help to extend their life span through design for disassembly and reuse.

Steel can provide the solutions to infrastructure and construction needs in developing countries and in climate resilient cities through enabling protective coastal and wind-resistant designs. While buildings currently account for about 20% of global greenhouse gas emissions, they also present many opportunities for reducing emissions and mitigating climate change.2,3

Not only is steel affordable, readily available and safer, its intrinsic properties, such as strength, versatility, durability and 100% recyclability allow for improved environmental performance across the entire life cycle of buildings.

The advanced high-strength steels used in steel-plate applications also find uses in a number of related industries. Offshore oil rigs, bridges, civil engineering and construction machines, rail carriages, tanks and pressure vessels, nuclear, thermal and hydroelectric plants – all these applications benefit from the attributes of modern steels.

How steel is used in buildings and infrastructure

The possibilities for using steel in buildings and infrastructure are limitless. The most common applications are listed below4.

For buildings

Structural sections: these provide a strong, stiff frame for the building and make up 25% of the steel use in buildings.

Reinforcing bars: these add tensile strength and stiffness to concrete and make up 44% of steel use in buildings. Steel is used because it binds well to concrete, has a similar thermal expansion coefficient and is strong and relatively cost-effective. Reinforced concrete is also used to provide deep foundations and basements and is currently the world's primary building material.

Sheet products: 31% is in sheet products such as roofing, purlins, internal walls, ceilings, cladding, and insulating panels for exterior walls.

Non-structural steel: steel is also found in many non-structural applications in buildings, such as heating and cooling equipment and interior ducting.

Internal fixtures and fittings such as rails, shelving and stairs are also made of steel.

For infrastructure

Transport networks: steel is required for bridges, tunnels, rail track and in constructing buildings such as fueling stations, train stations, ports and airports. About 60% of steel use in this application is as rebar and the rest is sections, plates and rail track.

Utilities (fuel, water, power): over 50% of the steel used for this application is in underground pipelines to distribute water to and from housing, and to distribute gas. The rest is mainly rebar for power stations and pumping houses.

References:

http://www.worldsteel.org/Steel-markets/Buildings-and-infrastructure.html

GBCA joins ground breaking project to build a carbon zero future

The Green Building Council of Australia (GBCA) has joined forces with the World Green Building Council (WorldGBC) to deliver on the ambitions of the Paris Agreement and tackle climate change.

The Advancing Net Zero project will see the WorldGBC and green building councils in countries with some of the fastest growth trajectories for construction launch national 'net zero' building certification and training programs.

The GBCA joins GBCs from Brazil, Canada, Germany, India, Netherlands, South Africa and Sweden, and other not-for-profit organisations, in committing to national net zero or carbon zero certification.

"The pledge to ensure global warming remains below the critical two degrees Celsius mark must be followed with real-world action," says the GBCA's Chief Executive Officer, RomillyMadew.

"Our built environment presents some of the cheapest and fastest opportunities to reduce our emissions – and we can do this with proven and readily-available technologies.

"The property and construction industry understands how to deliver low-carbon assets – all those Green Star ratings are positive proof. Our next challenge is to move beyond 'low carbon' to 'no carbon'.

"Last year, we committed to recognise buildings, fitouts, and communities that achieve 'net zero', or even deliver positive outcomes in terms of energy, carbon or water.

"Over the past six months, we have been working with NABERS and the Department of the Environment to adapt the Australian Government's Carbon Neutral Standard for buildings and precincts. This is the next step to bring our work and commitments to the international stage.

"Our participation in the Advancing Net Zero project reinforces Australia's international sustainability leadership, and strengthens international collaboration as we work towards a zero carbon future worldwide," MsMadew adds.

In addition to the recognition of net zero and carbon positive buildings, the GBCA is also developing a new curriculum to educate professionals on the design and delivery of net zero buildings.

The launch of Advancing Net Zero reconfirms the commitment of the WorldGBC, its 74 GBCs and 27,000 member companies, to reduce CO2 emissions from the buildings sector by 84 gigatonnes by 2050.

The WorldGBC's long-term targets include:

All new buildings and major renovations are net zero in 2030, and no buildings are built below net zero standards beyond 2030

100% of buildings are net zero by 2050

75,000 professionals are trained on net zero building by 2030, and 300,000 professionals by 2050

All GBCs which operate certification schemes have net zero rating tools in place by 2030.

Announcing the project at the Business and Climate Summit in London, Terri Wills, Chief Executive Officer of WorldGBC, said: "The success of our ambitions to keep global warming to within 1.5˚C to 2˚C will depend on our ability to advance net zero buildings – those which generate clean energy and produce no net emissions. Net zero buildings will be a defining contribution in our efforts to tackle climate change."

Burkill Hall and the Bandstand in Singapore Botanic Gardens

Burkill Hall, one of the historic buildings in the Singapore Botanic Gardens, will be repainted and returned to its original identity as an Anglo-Malayan Plantation Style House. AkzoNobel will refresh the look for Burkill Hall and the Bandstand, through the Garden City Fund, the National Parks Board's (NParks) registered charity. AkzoNobel will contribute to the restoration of these culturally important structures with a comprehensive portfolio of wall, wood and metal coatings.

Burkill Hall served as the residence of the Gardens' superintendents and Directors for more than a hundred years. Built in 1868, the building is believed to be the only surviving example of an Anglo-Malayan plantation-style residence in the region. The Bandstand, on the other hand, derived its name from the open parade ground built in 1861, which regularly hosted evening performances by military bands. In 1930, an octagonal gazebo-like building was constructed, where it remains today. Though less frequently, concerts are still occasionally held at the Bandstand as a nod to this early tradition. It is today a popular backdrop for wedding photos. Both landmarks are expected to be refurbished by 2017.

BCA AWARDS 2016

Recognising Excellence in the Built Environment

BCA GREEN MARK CHAMPION AWARD

Nanyang Technological University (Platinum^{STAR} Champion)
Genting Singapore PLC Champion
Ministry of Education, Singapore Champion
Ministry of Health, Singapore Champion
National Parks Board Champion

BCA GREEN MARK PEARL AWARD

7 & 9 Tampines Grande Pearl Prestige
11 Tampines Concourse Pearl
Central Mall (Office Tower) Pearl
Jem® (Office Tower) Pearl
Ocean Financial Centre Pearl

BCA GREEN MARK AWARD FOR BUILDINGS

NON-RESIDENTIAL BUILDINGS

158 Cecil Street
21B Senoko Loop
71 Robinson Road
Acacia Home
Academic Block North
Administration Building
All Saints Home (Yishun)
AMK AutoPoint
Ang Mo Kio TechLink
Bedok Integrated Complex
Biopolis One
BNP PARIBAS Campus Asia Pacific
Bukit Timah Plaza
Campus Clubhouse
Capital Square
Carrier Singapore
Cassia @ Penjuru
Changi Prison Complex Main Entrance
Construction of Aircrac Hangar Complex and Workshop Building
Depot Heights Shopping Centre
Downtown Gallery
DSTA Annex
Fortune Centre (MCST 1001)
Fusionopolis One
Gain City Megastore @ Sungei Kadut
Gardens by the Bay (Bay South)
General Industrial Factory Building
Goodwood Park Hotel
Grand Copthorne Waterfront Hotel Singapore
Greenridge Shopping Centre
Hotel Boss
Hotel Royal Queens, Singapore
Jalan Terusan Recreation Centre
JCube
Jewel Changi Airport
JTC Food Hub @ Senoko
JTC Space @ Gul
JTC Space @ Tampines North
Jurong Point 1
Jurong Point 2
Kuehne + Nagel
LASALLE College of the Arts
Lee Kong Chian School of Medicine, NTU (Novena Campus)
Lian Soon Industrial Building
Lot One Shoppers' Mall
Mapletree Logistics Hub – Toh Guan
Marina Bay Financial Centre Tower 3
MOM Services Centre
MSC Building
Nanyang Academy of Fine Arts Campus 3
Nanyang House
Nanyang Technological University – N1
Nanyang Technological University – N1.1
Nanyang Technological University – N2
Nanyang Technological University – N2.1
Nanyang Technological University – N3
Nanyang Technological University – N4
National Design Centre
National University of Singapore – Engineering Block E4
National University of Singapore – Frontier
National University of Singapore – Yong Loo Lin School of Medicine Block MD3
National University of Singapore – Yong Loo Lin School of Medicine Block MD10
New Community Club @ Keat Hong
Ngee Ann Polytechnic Blks 34, 37, 46, 47 & 50
North Spine
Oasis @ Sakra
OCBC Centre
Ocean Financial Centre
Orchard Hotel Singapore
Orchard Towers
OUE Bayfront, OUE Link, OUE Tower
Our Tampines Hub
P+F GDC Building
Parkway Parade
Pasir Ris Sports Centre
Plaza Singapura
Prison Link Centre (Changi)
Project Hamptons
PSA Brani Terminal Building
PSA Maintenance Base
Resorts World Sentosa – Maritime Experiential Museum
Rigel Innovation Centre
Schlumberger
School of Bioengineering (BioE)
School of Biological Sciences
School of Chemical and Biomedical Engineering
School of Materials Science & Engineering (Block N4.1)
School of Mechanical & Aerospace Engineering (Blk N3.1)
School of Mechanical & Aerospace Engineering (Blk N3.2)
SEAMEO Regional Language Centre
Sembawang Shopping Centre
Sheraton Towers Hotel Singapore
Siglap Centre
Sin Ming Autocity
Singapore American School
Singapore Changi Airport Terminal 3
Singapore Telecommunications Ltd – Yio Chu Kang Exchange
StarHub Green
STT Defu
Student Services Centre
Sunshine Place
Suntec City Mall
Suntec Singapore Convention & Exhibition Centre
Supply Chain City
Tata Communications Exchange
Temasek Polytechnic East Wing
The Atrium@Orchard
The Star
Tiong Bahru Plaza & Central Plaza
Treetops Executive Residences
Tuas South Recreation Centre
United World College of South East Asia – Dover Campus
Universal Studios Singapore
University Hall, National University of Singapore
UOB Plaza 2
V Hotel Bencoolen
Valley Point
Woodlands North Plaza

BCA GREEN MARK AWARD FOR BUILDINGS

RESIDENTIAL BUILDINGS

Blk 161A-B, 162A-B, 163A-B, 162(MSCP), 160A-B, 165A-B, 166A-B, 166(MSCP) Punggol Central
Blk 167A-D, 168A-B, 170D(BCP), 168C-D, 169A-C, 170A-C, 169(MSCP)
Blk 171A-C, 171(MSCP), 172A-C,172 (MSCP) Edgedale Plains
Blk 201A-D, 201(MSCP), 202A-B, 203A-B, 204A-D, 204 (MSCP), 205A Punggol Field
Blk 293-299, 292(MSCP) Punggol Central
Blk 301A-C, 303A-C, 301(MSCP) Punggol Central
Blk 301D, 302A-D, 303D, 302(MSCP) Punggol Place
Botanique @ Bartley
Commonwealth Tower
HDB Greenprint Pilot Neighbourhood at Yuhua
J Gateway
Kampung Admiralty (Residential)
Nanyang Heights Faculty Housing
Nanyang Meadow Faculty Housing
Nanyang Technological University Graduate Hall 1
Nanyang Technological University Graduate Hall 2
Nanyang Technological University Hall of Residence 1
Nanyang Technological University Hall of Residence 2
Nanyang Technological University Hall of Residence 3
Nanyang Technological University Hall of Residence 6
Nanyang Technological University Hall of Residence 7
Nanyang Technological University Hall of Residence 8
Nanyang Technological University Hall of Residence 9
Nanyang Technological University Hall of Residence 10
Nanyang Technological University Hall of Residence 11
Nanyang Technological University Hall of Residence 12
Nanyang Technological University Hall of Residence 13
Nanyang Technological University Hall of Residence 14
Nanyang Technological University Hall of Residence 15
Nanyang Technological University Hall of Residence 16
Nanyang View Faculty Housing
Nassim Woods
North Park Residences
Principal Garden
Punggol Opal
St George's Towers
The Vales
The Verandah @ Matilda
Trivelis
Waterwoods

BCA GREEN MARK AWARD FOR BUILDINGS

SCHOOLS

Admiralty Secondary School
Beamy Secondary School
Peicai Secondary School

BCA GREEN MARK AWARD FOR BUILDINGS

LANDED HOUSES

21 Sunset Place
33 Olive Road

BCA GREEN MARK AWARD FOR BUILDINGS

HEALTHCARE FACILITIES

CGH Medical Centre
National Centre for Infectious Diseases and Centre for Healthcare Innovations
SingHealth Polyclinic at Marine Parade Central
West Point Hospital

BCA GREEN MARK AWARD

(OCCUPANT-CENTRIC SCHEMES)

BCA GREEN MARK AWARD FOR OFFICE INTERIORS

AGC Asia Pacific Pte Ltd
Aldwych International Pte Ltd
Anglo American Marketing Limited Singapore Branch
Atos Information Technology (S) Pte Ltd
ATPI Singapore Pte Ltd
BCA Academy, Academic Tower (Level 9 and 10 offices)
Beca Carter Hollings & Ferner (S. E. Asia) Pte Ltd
BNP Paribas
BNP Paribas Wealth Management
British Council (Singapore) Limited
Bugis Junction MCST Office
CapitaHub in Capital Tower
CBRE Pte. Ltd.
DP Architects Pte Ltd
DSM Singapore Industrial Pte Ltd
DTZ Facilities & Engineering (S) Ltd
Estee Lauder Cosmetics Pte Ltd
F. H. Bertling Pte Ltd
Future Electronics Inc (DIST) Pte Ltd
GAC (Singapore) Pte Ltd
Gaffney Cline & Associates (Consultants) Pte Ltd
Gazprom Marketing & Trading Singapore
Grey Group Pte Ltd

Harley-Davidson Asia Pacific Pte Ltd
Hong Leong Properties Pte Ltd
Johnson Controls (S) Pte Ltd
Keppel Land & Keppel REIT
Kerry Ingredients (S) Pte Ltd
Lloyds Banking Group Singapore
Luchansa Cargo Aktiengesellschac
Luchansa Group
Ministry of National Development / Building and Construction Authority /
Agri-Food & Veterinary Authority of Singapore
NCR Asia Pacific Pte Ltd
Occulus Pte Ltd
Ocean Financial Centre Management Office
SGX Office at SGX Centre
Shaw Industries Asia Pte Ltd
SingEx Exhibitions Pte Ltd
South32 Marketing Pte Ltd
Swiss Reinsurance Company Ltd
Tan Tock Seng Hospital Annex 1 Office
Tan Tock Seng Hospital Annex 2 Office
Tenant Service Centre @ CapitaGreen
Tenant Service Centre @ Six Bamery Road
Transoceanic Development (Singapore) Pte Ltd
Twimer Asia Pacific Pte Ltd
UBS AG
Walton International Group (S) Pte Ltd

BCA GREEN MARK AWARD
(OCCUPANT-CENTRIC SCHEMES)

BCA GREEN MARK AWARD FOR SUPERMARKETS

Cold Storage Aperia
Cold Storage Guthrie House
Cold Storage Sime Darby
FairPrice Finest Supermarket at Amara
FairPrice Finest Supermarket at Bedok Mall
FairPrice Finest Supermarket at Clementi Mall
FairPrice Finest Supermarket at Junction 8
FairPrice Finest Supermarket at Katong V
FairPrice Finest Supermarket at The Seletar Mall
FairPrice Finest Supermarket at Woodgrove
FairPrice Supermarket at Bukit Batok Home Team
FairPrice Supermarket at Bukit Merah
FairPrice Supermarket at Chinatown Point
FairPrice Supermarket at City Square Mall
FairPrice Supermarket at Eastpoint Mall
FairPrice Supermarket at Jurong East
FairPrice Supermarket at Potong Pasir Community Centre
FairPrice Supermarket at PSA
FairPrice Supermarket at Sun Plaza
FairPrice Warehouse Club at FairPrice Hub
FairPrice Xtra at Changi Business Park
FairPrice Xtra Hypermarket at JEM

BCA GREEN MARK AWARD
(OCCUPANT-CENTRIC SCHEMES)

BCA GREEN MARK AWARD FOR RETAIL

DBS Aperia Branch
DBS ARC Branch
DBS MBS Branch
DBS NUS Branch
DBS Raffles Place Service Centre
DBS Sports Hub Branch
DBS Suntec City Branch
DBS Tai Seng Branch
DBS Treasures Parkway Parade Branch
DBS Westgate Branch
DEL-Care Edu Centre Pte Ltd
Fitness First (Gravity) CapitaGreen
POSB Canberra Branch
POSB ITE College Central Branch
POSB Jurong East Central Branch
POSB Kampong Ubi Branch
POSB Pasir Ris East Branch
POSB Potong Pasir Branch
POSB Seletar Mall Branch
POSB West Coast Branch
POSB White Sands Branch
POSB Zhenghua Branch

BCA GREEN MARK AWARD
(OCCUPANT-CENTRIC SCHEMES)

BCA-IDA GREEN MARK AWARD FOR DATA CENTRES

1-NET North Data Centre
AVA JEM Data Centre
BCA JEM Data Centre
Digital Realty – Loyang Way – SIN11
STT Defu
STT MediaHub

BCA GREEN MARK AWARD
(OCCUPANT-CENTRIC SCHEMES)

BCA–NPARKS GREEN MARK AWARD FOR PARKS

Coney Island Park
Kranji Marshes
One-North Parks (Parcel 3, 4, 6 & 7)
Senja Parc View & N6 Neighbourhood Park
Yishun Nature Park

BCA GREEN MARK AWARD FOR BUILDINGS
(OVERSEAS)

8 Park Avenue (Blocks 7 to 10), China
Anggerek Desa Technology Park, Brunei
Ascom Bonifacio Global City, Philippines
Ascom Jakarta, Indonesia
Aspen House, Malaysia
Atria Shopping Gallery, Malaysia
Bay Walk Mall @ Green Bay Pluit, Indonesia
CapitaMall Jinniu Phase 2, China
CapitaMall Xuefu, Harbin, China
Citadines Salcedo Makati, Philippines
Dolce Vita, Phase 1, China
East Coast Mall, Malaysia
Exchange Tower, Thailand
Ferringhi Residence, Malaysia
Hill Crest Villa (Phase 1-1), China
International School Brunei
Ken Rimba Jimbaran, Malaysia
Kigamboni Housing Estate, Tanzania
Serenity Cove Phase 3, China
Sunway Velocity Phase 1A, Malaysia
Waterfront Residence, Nantong, China

BCA GREEN MARK AWARD FOR OFFICE INTERIORS (OVERSEAS)

Sino-Singapore Tianjin Eco-City Investment and Development Co Ltd, China

Tianjin Binhai Library

MVRDV have, with the Tianjin Urban Planning and Design Institute (TUPDI), designed Tianjin Binhai Library as part of a larger plan to provide a cultural district for the city. The building acts not only as an education centre but as a connector from the park into the cultural district. An oval opening, punctured through the building is propped open by the Eye, a mirrored sphere with an auditorium, which takes the main stage within the atrium and enlarges the perceived space within. Terraced bookshelves which echo the form of the sphere create an interior, topographical, landscape whose contours reach out and wrap around the façade. In this way, the stepped bookshelves within are represented on the outside, with each level doubling up as a louvre.

"The Eye is the centre of the library. It 'hollows out' the building and creates, out of bookshelves, an environment to sit, to read, to hang out, to climb and to access, to create an organic social space," explains MVRDV co-founder Winy Maas. "In its heart is the auditorium which mirrors the environment, giving a 360 degree panorama of the space inside; a truly reflective and pensive environment."

The futuristic library sits within a sheltered gallery, topped with cathedral-like vaulted arches, which winds its way throughout the scheme. MVRDV's project is surrounded by four other cultural buildings designed by an international team of architects including Bernard Tschumi Architects, Bing Thom Architects, HH Design and GMP.

The five levels of the building contain an extensive programme of educational facilities. The subterranean level has in it service spaces, book storage and a large archive, whilst above this on the ground floor are easy access reading areas for children and the elderly, the main entrance and access to the cultural complex, the auditorium and terraced access to the floors above. The first and second floors consist primarily of reading rooms, books and lounge areas whilst the top two floors also include meeting rooms, offices, computer rooms and audio rooms.

Tianjin Library is part of German architects GMP's 120,000m2 masterplan which aims to accentuate the characteristics of the surrounding districts. Through its design the complex will become a junction point for the CBD, old town, residential districts, commercial areas and the government quarter; hoping to compensate for any missing programme in each. The library's outer volume was given in the masterplan so the Eye and its surrounding semi-public area is an internal space, like an inverted icon, acting as a central point and folly in the building.

The project will be MVRDV's second completed design in Tianjin. TEDA Urban Fabric, completed in 2009, provided 280,000 m2 of mixed high and low-rise housing and retail.

Project Credit :

Location : Tianjin Binhai, China
Year : 2016
Programme & Size: 34.200m2 Library

Design Team:

Winy Maas, Jacob van Rijs, Nathalie de Vries with Wenchian Shi, María López Calleja, Chi Li, Ángel Sánchez Navarro, Daehee Suk, Guang Ruey Tan, Xichen Sun, Michael Zhang, Kyosuk Lee, Mariya Gyaurova, Jaime DominguezBálgoma, Antonio Luca Coco, Costanza Cuccato, Matteo Artico and Tomaso Maschietti.

Concept Design:

Winy Maas, Jacob van Rijs, Nathalie de Vries with Renske van der Stoep, Martine Vledder, Kyosuk Lee, Gerard Heerink, Chi Li, Francisco Pomares, Nicolas Lee, Claudia Bode, Sharon Sin, Jaap Baselmans, Herman Gaarman, Hui Hsin Liao, Antonio Luca Coco, Costanza Cuccato, Matteo Artico and Tomaso Maschietti.

Partners:

Co-Architect: Tianjin Urban Planning and Design Institute (TUPDI), Tianjin, China

Movie: Tianjin Urban Planning and Design Institute (TUPDI)

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BIM COMPETENCE CENTER

Better Accuracy and Speed in On-site Data Acquisition for Building Information Modeling

Building Information modelling (BIM), as a concept, first came about in the 1970s, but its methods have been refined considerably since then. Widely used by city planners, architects, and civil engineers today, BIM enables stakeholders to better make high-impact decisions by providing timely, relevant information.

According to the National BIM Standard-United States®1, BIM is a digital representation of physical and functional characteristics of a facility, shared as a knowledge resource to form a reliable basis for decisions during its life-cycle, which is defined as existing from earliest conception to demolition.

BIM facilitates the collaborative process of designing a building, putting varied types of information all on one coherent system of computer models, as opposed to separate sets of drawings. More than just geometry, BIM covers spatial relationships, light analysis, geographic information, and quantities or properties of building components. Today, a typical BIM file contains data that extends all the way to the 'seventh dimension'. This includes the basic, traditional two-dimensional technical design drawings of buildings; three-dimensional (width, height, and depth) spatial drawings; 'fourth dimension' of time (4D BIM); 'fifth dimension' of cost (5D BIM); 'sixth dimension' of sustainability (6D BIM); and 'seventh dimension' of facilities management (7D BIM).

Apart from its ability to collate discrete sets of information, BIM allows data to be updated in real-time, which means various stakeholders will have instant and common access to the latest information. Simply by being on the same page, companies have avoided costly mistakes of error and rework, and also enjoyed enormous benefits of time-savings and greater levels of accuracy in estimation.

Laser Scanning Technology in BIM

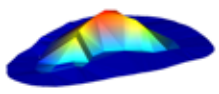
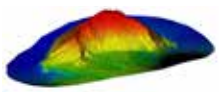
As the usage of BIM evolved over the last two decades, the user community has found laser scanning technology to be useful in numerous applications. The capabilities of a modern day laser scanner have contributed much richness and texture to the information included in BIM files for architects, contractors, facility managers, and owners.

Laser scanning solutions from 3D measurement device manufacturers such as FARO have shaped the way teams work together, making it easier for them to communicate, collaborate, and solve problems that may crop up in the course of a project. Overall, such BIM solutions have resulted in high-quality projects and enabled teams to complete them in a shorter time, and at a lower cost.

In practice, FARO's laser scanning solutions are used by BIM specialists for site documentation purposes, right from a facility's structural design phase to its post-construction architectural phase. Laser scanning technology captures existing conditions in 3D within minutes, at the touch of a button. With the data, users can create 2D drawings, conduct inspections, create 3D building modelling, and even generate site plans that are registered to global positioning coordinates. Practitioners are preferring laser scanners over traditional tools such as total stations, because laser scanners provide them with much more detail and data points, which have proven useful when generating final deliverables of a project.

With laser scanning technology, architects can now work off real-time 3D data on their computers with much less effort – conjuring designs, manipulating drawings, or adding elevations – and all without compromising on measurement accuracies.

At a Glance: Conventional Surveying vs Laser Scanning

	 **Conventional Surveying Equipment**	 **FARO® Laser Scanner Focus3D X Series**
Type of Data Collected	Points and string data only	Anything that is within line of sight and visible to the human eye - position, points, and even photos.
Scanning Speed	50 - 150 points per hour	Up to 976,000 points per second
Scan Resolution	Average 1 point per square meter	> 2 million points per square meter
Type of Data Output	Usually a 2D or 3D CAD Plan	Detailed 2D/3D CAD, 3D model, point cloud data in DTM, DEM, DSM, or Contour formats, and more.
Sample Scan Result		

A quick comparison of the conventional surveying equipment and the laser scanning technology reveal that the modern laser scanner provides several advantages over traditional tools. Whether in terms of speed, scan detail, or flexibility of data output, the FARO® Laser Scanner as an example surpasses the conventional equipment choice of a total station. With laser scanning technology, BIM specialists complete surveying tasks much more quickly and obtain reports with more information (e.g. resolution, position, and color).

In fact, with FARO's complete laser scanning solution, practitioners can achieve better efficiency and effectiveness with an improved workflow for 3D documentation in three simple steps – Scan, Process, and Deliver.

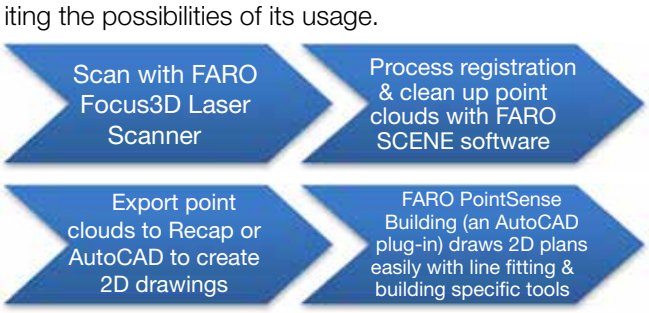
The following section highlights how users can benefit from using laser scanning technology in their projects.

This proven workflow has enabled users to digitize physical structures easily, save costs by eliminating rework, and keep projects on schedule.

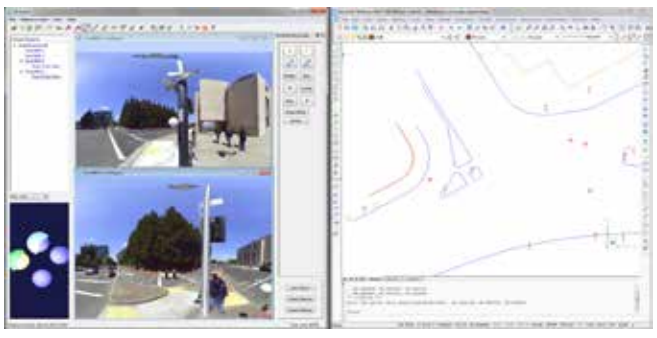
BIM Applications of Laser Scanning Technology

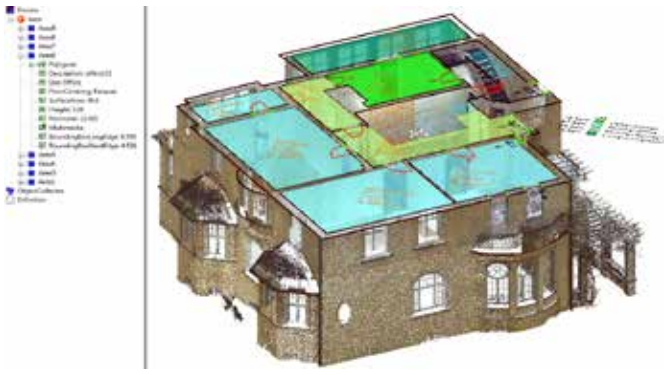
1. 2D Drawings

Many of today's building and infrastructure projects lack in as-built documentation of the existing facility, and 2D plans or existing drawings are rarely available for old buildings. The presence of this issue has made it challenging for planning and redesigning works to take place. In addition, the conventional total station is inadequate for capturing physical structures efficiently, since it can only capture a few points at a time. Not only is the method time- and labor-intensive, the data obtained would be incompatible with a point cloud processing software, limiting the possibilities of its usage.



3D documentation solutions like the FARO® Focus3D X Series and FARO® Scanner Freestyle3D would, however, be capable of addressing the need of digitization for BIM practitioners. Both devices quickly and reliably documents objects, structures, or entire rooms with high precision, and their portability makes it easy for scans to be conducted anytime, anywhere. Post-processing of the point cloud data obtained by the devices can then be performed with FARO's selection of software (e.g. VirtuSurv, PointSense, and SCENE), further simplifying and streamlining the process for users.



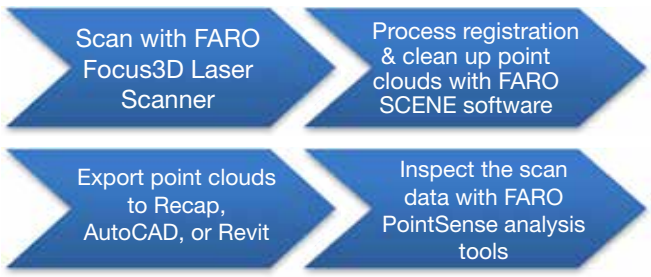


2D drawings can be created with line fitting and building specific tools in the PointSense Building software.

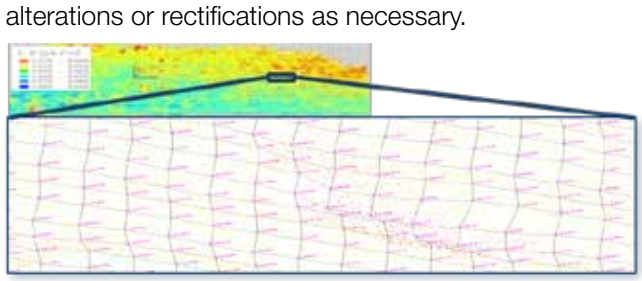
2. Structural Inspection

Structural damage to buildings can cause substantial economic losses to property owners, and can also reduce a property's current and future value. Structural inspections enable owners to take preventative measures or to make necessary rectifications.

With traditional surveying tools, data capture for structural inspection is slow and inflexible. Moreover, the extent of damage cannot be monitored with certainty, and the evidence is documented only in 2D images. On the other hand, FARO Focus3D can provide the information required for an effective assessment. For instance, an analysis of concrete floors for slab flatness will indicate if any area needs to be adjusted, after which the BIM specialist can determine the volume of material needed for that job –resulting in less wastage and a better cost management process overall.



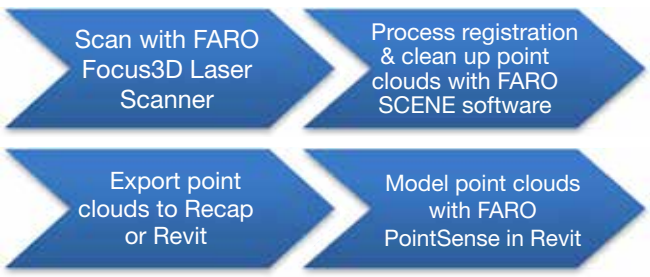
In addition, laser scanning technology can also be used to verify that components of a building have been installed according to its original design, which is helpful for cost management, insurance claims, or legal disputes. The FARO Focus3D can perform as-built documentation with millimeter-accuracy (±2mm), capturing details such as pipes, HVAC systems, structural steel, floors, and even rebar in concrete slabs throughout a building. If any discrepancies are observed when compared against a design, property owners can either make alterations or rectifications as necessary.



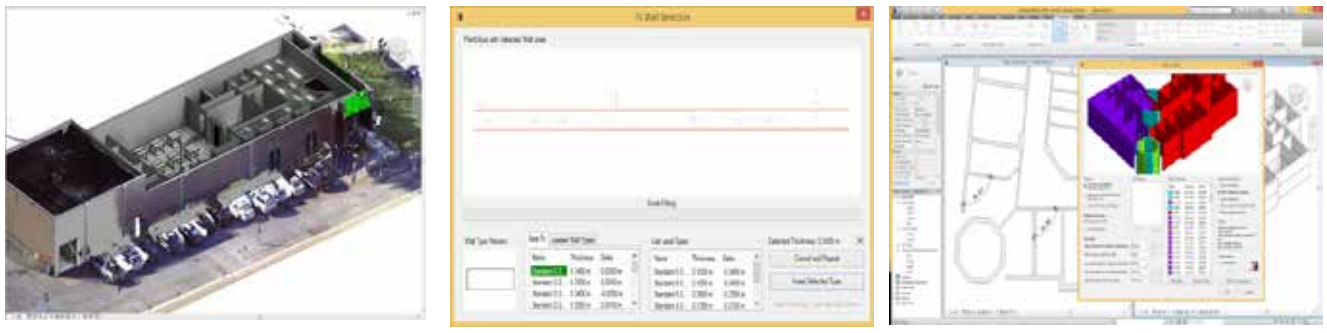
Sample of a flatness analysis performed with PointSense Software on a section of concrete flooring.

3. 3D Building Information Modelling

Contractors of building and infrastructure projects often do not keep a record of current construction or maintenance documents of the existing facility. Yet, to acquire digital survey data of a large space by utilizing conventional methods would be too time-consuming and laborious. In any case, the incompatibility of the data acquired would have made it difficult for the team to import the information into any of the popular CAD programs available in the market.



In a similar fashion to which 2D drawings can be generated from the scans obtained by FARO Focus3D, producing 3D building information modelling is also a breeze with FARO 3D documentation solutions. The FARO VirtuSurv software acts as a flexible interface to allow users to import and export scan data for use on various platforms. The FARO PointSense Building software, an AutoCAD plug-in, then efficiently processes the 3D scan data with a range of available tools, which allows a user to manipulate the information for specific project deliverables.



Laser scanning technology enables a reduction in design man hours with automated tools (e.g. wall alignment and wall fitting tool) when creating building models.

An example of a 3D building model created with PointSense Revit through post-processing of the point cloud data.

Success Stories of FARO Customers

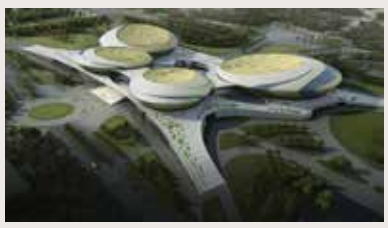
1. On-site 3D Building Model Creation Made Easy

Third Building Construction Company of China Construction Eighth Engineering Division (CSCEC83) is one of the biggest building contractors in China. The company has been involved in building projects for a variety of uses, including aviation and aerospace, sports venues, super high-rise buildings, municipal mass transit, environmental protection and water resources, urban complexes, commercial and office buildings, industrial factories, as well as medical and health facilities.

In 2014, CSCEC83 embarked on a new project to construct the Jiangsu Grand Theatre and to complete the handover by June 2016. Given the large scope of the project (a total net land area of 196,633 m2, and total construction area of 271,386 m2), to say that the team was hard pressed for time was an understatement. The unique design of the theatre further added to the complexity of the project in terms of quality control.

Previously, the team was using the Electronic Total Station (ETS) to test the accuracy of abnormally shaped structures by comparing structural key points. Due to the limited numbers of data points collected, the test results were inherently incomplete and unreliable. Coupled with the complex double curved surfaces on the water droplet structures, it was practically impossible for the team to achieve proper, accurate results using the ETS.

To overcome this immense challenge, the team decided to use the FARO Focus3D X 330. FARO Focus3D X 330 could effortlessly scan the entire curved surface and provide the team with the necessary data, thus resolving the quality control issue.



An artist's impression of the Jiangsu Grand Theatre

In conducting the structural testing of curved surfaces of the water droplets, the Focus3D X 330 was first used to collect the point cloud data. Next, the FARO SCENE software was used to integrate the scan data, followed by a comparison with the architectural design model on the Geomagic® software to check that the various design requirements were met.

This entire process was not only fast, it was also highly accurate. A job that used to take an entire week or more was instead accomplished in just two days with the Focus3D X 330, which brought vast improvement to CSCEC83's productivity.

2. Simplifying Structural Deformation Monitoring

Beijing Urban Construction Exploration & Surveying Design Research Institute (Beijing Urban) undertakes projects involving railway construction and detection (or monitoring) of tunnel deformation, providing independent appraisals that contribute to the safety of civil engineering projects.

There were several limitations with Beijing Urban's

Laser scanning technology as applied in railway construction and monitoring of tunnel deformation

older methods of data acquisition. For one, performing measurements was dreadfully timeconsuming, requiring up to 8 hours for just data collection (excluding processing and analysis). In addition, data collected with total stations was inaccurate as they were only able to register a limited number of points. The team had to rely on software to extrapolate extensively and to connect the dots so as to form any shape. For this reason, crucial data points that would indicate instability or deformation often went undetected.

With the Focus3D, Beijing Urban managed to improve on both its productivity and accuracy. The team is now also able to generate better reports for its customers, including tunnel cross-sections, histograms, and 3D model outputs. For a job that used to take 8 man hours, Beijing Urban now requires just 3 to 4 hours to complete.

Additionally, Beijing Urban also benefited from the portability offered by the Focus3D. With a size of only 24 x 20 x 10 cm and weighing just 5.0 kg, the Focus3D was an enabler of convenience that the team welcomed. As a standalone solution, the device did not require external devices to operate, eliminating the need to transport any extra equipment to the scanning location.

Evidently, the investment increased the company's productivity by leaps and bounds, and added much more detail and richness to the data acquisition process.

3. Acquiring Accurate Measurements of Harsh Mechanical Rooms Safely & Quickly

Air conditioning equipment (including boiler, chiller, air handling unit, and heat exchanger) for a building is usually located in a dedicated space known as the mechanical room. The interior of a mechanical room can get rather hot and noisy while the equipment is in operation. In such a harsh environment, a person can only work at full concentration levels for about an hour. Consequently, workers who are deployed to the mechanical room – to take measurements of dimensions and existing equipment required for construction drawings – need frequent breaks in order to work effectively.

Point cloud data of a mechanical room. While it resembles a photograph, each point in this image is a three-dimensional (3D) coordinate. With the SCENE software, the user can obtain the exact dimensions of relevant parts.

Hibiya Engineering Ltd is a company that provides engineering services – including air conditioning, water supply, drainage and sanitation, electricity, as well as information and communication technology services – to building owners. At the end of 2011, Hibiya Engineering invested in a FARO Laser Scanner Focus3D to facilitate the measurement of existing facilities. Using this new device, it takes the team only an hour to measure existing facilities that are due for renovation, with a measurement process that is significantly simpler.

For Hibiya Engineering, the critical factor in choosing the FARO Focus3D was its economical price point. Apart from that, the accompanying point cloud data processing software, FARO SCENE, and the device's portability stood out to the team. The FARO Focus3D's small form and weight made it extremely suitable for taking multiple measurements in a narrow space, requiring minimal manpower.

Since introducing the FARO Focus3D, Hibiya Engineering has enjoyed several improvements to the renovation process of air conditioning facilities. Using the new device, the company requires only a handful of workers to obtain high-quality measurements safely and within a short time period. Working at heights has also become a thing of the past, because Hibiya Engineering no longer has to rely on manual methods to take measurements, which would have required scaffolding for workers to access hard-to-reach areas. The FARO Focus3D eliminated such needs almost completely, making working conditions much safer for the engineers.

Moreover, the device also reduced the need for any rework, saving Hibiya Engineering precious time on projects. In the past, when the team relied on hand tools and paper records, it was common for engineers to revisit a site to repeat measurements because figures did not match up at times. However, with the FARO Focus3D, engineers can 'revisit' the point cloud data on the computer as often as required, without having to physically return to the equipment room.

As Hibiya Engineering adopted FARO Focus3D into its workflow, Building Information Modeling (BIM) replaced traditional drawings, enabling the team to virtually design and build a 3D model of any given facility on the computer.

Using point cloud data collected by the FARO Focus3D, the engineers create a BIM model of the current setup of the mechanical room with CADWe'll Tfas by Daitec. Based on the 3D model, the team prepared the plan and design for the renovation accordingly.

With the walkthrough feature, the team can view the space as though renovation had been completed, even before the work begins. In fact, the BIM model allows all parties involved in the renovation (e.g. client, subcontractors) to better understand the work plan, facilitating the entire process from start to finish.

Find out more about 3D laser scanning technology as applied to BIM in this FARO webinar: *www.faro.com/home/bimwebinar.*

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Externally Supported Roofs (ESR)

ESR with mixer

CST's ESR is built to accommodate higher static and dynamic loads, applications with higher pressures and vacuum conditions, and where a smooth inner roof surface is beneficial. These roofs are specifically designed for applications where a center mixer is requires to be carried by the roof. With a newly designed center ring installation and service of center supported loads is easily accomplished.

Design and cost optimization has made CST's new ESR a high quality, highly competitive cover solution for the digester and other market's needs. When CST redesigned its ESR, higher performance was not the only result. The new ESR has approximately 30% fewer parts, which makes it even easier to assemble.

CST's ESR is designed with a smooth, unobstructed inner surface. This smooth surface is ideal for applications where corrosion of internal structural members is a concern, maintenance of internal structural members is cost prohibitive and ease of cleaning is desirable.

Knuckle-Roof

Since its origin as a dry silo cover, the knuckle roof's application has greatly expanded to a variety of liquid and dry storage needs. For small diameter tanks in an areas of higher environmental loads but minimal dynamic loads, a knuckle roof is the most economical cover. Easy installation adds to the cost benefits of this type cover.

Having been integrated onto silos and tanks for over 60 years, there is a tremendous amount of field data validating the knuckle roof designs. Knuckle roofs have a proven life expectancy even in extremely demanding applications such as leachate tanks and digesters.

Knuckle roofs are limited to 31 ft (9.5m) in diameter which makes them ideal for silo covers. Most sizes are predesigned and have reduced manufacturing times. Unlike flat steel roofs knuckle roofs have a high slope. This makes knuckle roofs an ideal solution silos and small diameter

tanks in high snow load areas. Its steep slope also minimizes the need for internal structural support but may also be a hindrance to regular access or access with loads.

CST's knuckle roofs are predominantly manufactured in Vitrium glass-fused-to-steel. They can also be manufactured in stainless steel and other materials. CST's engineers can match the customer's needs with the material and design to meet the application requirements.

Trough Deck

CST's trough deck covers are primarily designed for areas with low environmental loads where cover cost out drives total containment and durability requirements. Minimal construction costs, locally available components and no special construction tools make this the ideal solution for moderate diameter, less stringent applications.

When the diameter is small and the loads are minimal, beams can be used to span the tank and, thus eliminate the need for any internal, vertical support columns. For higher load applications and when tank diameters are larger, internal beams can be supported by vertical columns. These columns do add to the complexity of cleaning and maintenance needs.

http://www.cstindustries.com

Sloped Steel Decks or Roofs

CST's supported and unsupported flat steel decks, or roofs, provide an economical solution to many liquid and dry containment needs where safe, regular access to accessories on the deck is desired. Based on years of experience and field-proven assembly this type of cover is an excellent option for numerous applications.

Flat steel decks were one of the CST's earliest designs for tanks covers and is still used often today. At CST we have optimized the design through finite elements analysis, proprietary design programs, new materials and almost 100 years of field experience. CST's flat deck roofs can be usually constructed up to 32 feet (9.8 m) and up to 100 feet (33.8 m) supported, but spans in access of 120 feet have been constructed. Supported decks can be center column supported or contain multiple columns depending on the size and loading.

CST's flat decks can be deigned to accommodate a variety of accessories from valves to hatches. Safe and easy access to these accessories for regular maintenance and use is often important, so CST's near-flat design and standard safety railing designs are significant benefits.

Enquiry No. 001/06

Architectural paint color options in Kynar 500

Wasco offers a variety of architectural paint color options in Kynar 500, baked enamel, as well as various anodized coatings.

Kynar 500 -

70% PVDF (Kynar 500®) resin-based coatings offer the ultimate protection in building performance. These finishes exhibit outstanding resistance to humidity, color change, chalk, gloss loss and chemicals. These sustainable coatings will ensure a long-lasting, durable finish. No other coating system can withstand the rigors of nature and time like those based on the Kynar 500 resin. 70% PVDF resin-based coatings include standard color two-coat systems, consisting of a primer and color coat.

Baked Enamel - Baked enamel coatings are harder than PVDF coatings and are often used for interior application where color retention, chalk, fade and weatherability is not required. Baked enamels are generally a one-coat system as no primer is required. In this process the color coat is applied directly to the aluminum.

Anodized

Anodizing is the process of electrochemically controlling, accelerating and enhancing oxidation of an aluminum substrate. The anodizing process, because it is an integral part of the substrate, produces an oxide film that is uniform, hard and protects the rest of the aluminum substrate from deterioration - providing excellent wear and abrasion resistance with minimal maintenance in most environments.

The coating produced is extremely durable, and the hardness of the surface is comparable to a sapphire—the second hardest substance on earth. This characteristic makes anodize an excellent choice for use in high-traffic areas where resistance properties are important. Anodized aluminum resists the ravages of time, temperature, corrosion, humidity and warping, adding to it's long life cycle. Anodized aluminum is an inert material that is not combustible, 100% recyclable and poses no health risks.

http://www.wascoskylights.com/

Enquiry No. 002/06

Toroids

Toroids are appearing in structural applications due to their aesthetic & structural benefits. Examples include the Dubai & Osaka airport terminals, and London Museum. However the structural efficiencies of this shape are also being applied by Triodetic in long-span ORE STOCKPILE ENCLOSURES for mining companies. Toroid shapes are simply described as a double curved surface that resembles part of a tyre or inner-tube.

The toroid shape has curvature in two planes & therefore can be designed as a shell. Space Frame designs This results in less structure mass than linear designs and by controlling the angle of the structure wall at its base, footing reactions can be minimized. Overall structure curvature & member sizes must be designed to resist buckling & to restrain surface discontinuities, however these structures can be very economical & fast to construct.

www.triodetic.com/products/toroids

Enquiry No. 003/06

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www.archidex.com.my

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www.bex-asia.com

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www.thebig5constructindia.com

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http://10times.com/jiangsu-international-green-building-fair

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