

# Pools on high

## Strata developments in Singapore and Malaysia

By Corrine Teng

Strata developments—be they condominiums, cluster houses, serviced apartments, mixed-use developments or resorts—are increasingly equipped with more and better features to enrich the offerings of the premises.

It is no wonder then, that aquatic facilities like swimming pools are not only a common sight in many strata developments in Singapore and Malaysia, but are sporting designs that make heads turn.

Now more than ever before, swimming pools do not merely serve as a place to swim, but have even evolved to become a symbol of sophisticated living where one would expect nothing less than an indulgent experience.

### Regulations and restrictions on swimming pools in strata developments

Aquatic facilities are presided over by regulatory bodies or authorities to ensure proper industry practices, consistent standards, and overall safety relating to design, construction and maintenance.

In Singapore, the Building and Construction Authority (BCA) regulates the structural safety of structures or buildings, including any swimming pools that may be built in them. This means that the structural design and calculations of a swimming pool have to be submitted for approval by a professional engineer to the BCA as part of the structural plan prior to the commencement of the building works.

In addition, the BCA and the National Water Safety Council (NWSC) have jointly initiated the Singapore Standard (SS) 556:2010 Code of Practice for the Maintenance and Design of Aquatic Facilities to ascertain national water safety standards, taking effect from May 27, 2010. The SS establishes general requirements for the design, construction and maintenance of aquatic facilities in Singapore, ranging from swimming pools, leisure, hydrotherapy and wave pools, and even diving facilities.

Another governing body is the National Environment Agency (NEA). According to a spokesperson, "the National Environment Agency (NEA) licenses all swimming pools in Singapore to which the public has access, including those located within strata-titled condominiums, hotels and private clubs. As at February 2015, there were 2230 licensed swimming pools in Singapore, with more than 90 per cent of them located in strata-titled condominiums. Swimming pools in private residences are not licensed as they are for private use."

Together, these guidelines serve as a benchmark for structural and operational activities to ensure that swimming pools in strata developments, in this context, adhere to high safety and health standards to minimise the risk of injury and other health-related dangers that could arise from the use of these facilities.

The Code of Practice on Environmental Health (COPEH), implemented by the NEA, is one such standard in Singapore that governs the swimming pool scene, amongst other facilities. It specifically addresses the design criteria for swimming pools from the consideration of public health, such that the water quality will always

The glass walled infinity pool on the environment deck at the Setia Walk Trigon Luxury Apartments





Cool relaxation at the Island Club Eco Sanctuary in Singapore

## Pool bridge in the sky

Sky Habitat is a residential project designed by Moshe Safdie currently under construction in the centre of Singapore's fringe city district of Bishan.

When completed, the iconic and architecturally distinctive development will feature an infinity sky pool on the 38th floor, connecting the two towers of the development while providing a rooftop oasis where residents can enjoy panoramic views of the city and the large parks and reserves around Bishan.

Sky Habitat is being billed as a garden development with generous outdoor spaces including individual garden retreats in the sky, and spacious balconies to allow residents to bring the outside in or extend their internal spaces.



The Sky Habitat Sky Pool bridge being installed on the 38th floor

PHOTOGRAPHY: CapitaLand Singapore Limited



Residents can swim while enjoying views across the city and nearby parklands

remain safe during its operation. Licensees are also required to maintain the cleanliness of the pool and ensure that the water quality meets the standards as stipulated in Environmental Public Health (Swimming Pools) Regulations. In addition, they must arrange for the swimming pool water to be sampled and analysed by accredited laboratories for chemical and bacteriological quality at least once a month and subsequently submit the water quality test results to the NEA. Any swimming pool licensee who fails to comply with these regulations may be fined up to \$2000.

Some of the design criteria include a six hour filtration turnover rate for the main pool, and not more than two

number of cluster houses allowed in various types of strata landed housing developments.

But with the new guidelines implemented as of 23 August 2014, a revised set of formulae will result in fewer strata landed housing units on the same plot of land to cater for enhanced communal facilities and greenery provision. This revision would mean that developers have to dedicate at least 45 per cent of the land area for communal open space, compared with just 30 per cent previously. Of which, up to 20 per cent can be used for facilities like swimming pools.

The relaxing of this guideline means greater flexibility for architects when designing these swimming pools

*"Singapore developers have to dedicate at least 45 per cent of the strata land area for communal open space, of which up to 20 per cent can be used for swimming pools."*

hours for a stand-alone wading pool, as well as the need for at least one standby pump unit and motor to supplement the duty pump provided in the filtration system.

It also specifies the acceptable chlorine and pH levels of swimming pools. These regulations must be observed under the Environmental Public Health Act. In Singapore, all aquatic works must comply with the stipulated code of practice. Such standards provide the basis for aquatic facility owners, namely the developers, as well as operators, when addressing matters relating to aquatic facilities in strata developments.

In land-scarce Singapore, increasing effort has been placed on accommodating more greenery and communal facilities in strata housing developments so that the living environment will not be crowded with too many units.

Pertaining to the size of swimming pools in such instances, Singapore's Urban Redevelopment Authority (URA) had previously set a guide for the maximum

to transform the landscape and provide residents with a better living environment.

In Malaysia, swimming pool designs are regulated under the Uniform Building By-Laws (UBBL) 1984. In addition, the Local Government Act enacts further by-laws or jurisdictions for the design and construction of swimming pools. Where there are no specific by-laws or guidelines pertaining to swimming pool designs, the design and construction of swimming pools have to be aligned to proper practices that have been adopted locally or overseas, and with the approval of the local authority.

## Design innovations and trends

Communal facilities like swimming pools are a big draw in strata housing like condominiums or cluster houses. With growing affluence, homebuyers are becoming more discerning when deciding on the next property to purchase. With this knowledge,





Amazing resort style living in the Coco Palms Singapore

developers are sparing no effort to reinvent the strata living experience.

"Residents of high-end developments can expect a more pampered experience, as swimming pools are often tailored to stand out as a selling feature when the development is being marketed," says Chew Soo Ngee, president of the Malaysian Swimming Pool Association (MSPA).

He says that with residential developments, the scale and quality of swimming pools depend very much on the profile and target buyers of the development.

Paul Soh from SP Setia Berhad, a property, infrastructure, and business company headquartered in Malaysia, also notes that iconic lifestyle swimming pool designs are the main attraction for homebuyers.

"Purchasers in Singapore are increasingly looking for swimming pools with universal design-friendly features such as a playground, aqua gym, and semi-sunken dining incorporated into the pool," he says.

"For large developments with bigger pools, some architects have designed pools to be beach-like, where users will enter the pool through a slope – equivalent to a beach – instead of the usual ladder."

In such instances, the use of a slope over a ladder would also be in line with Singapore's BCA Code on Accessibility in the Built Environment 2013 to ensure that physically-challenged users can easily utilise the pool in an effort to create premises that are more inclusive.

"In Malaysia, swimming pool designs have also gone beyond just being lap pools for swimming. Recent trends in pool designs in strata developments show a move toward making it a more integral part of the building and landscape concept of the development."

For example, Trefoil SoFo (Small Office Flexible Office), a Malaysian commercial strata development located in Setia Alam, Shah Alam, Selangor features a 50-metre lap pool, a pebble stream and a wading pool,

alongside an integrated floating gymnasium.

This trend is similarly mirrored in Singapore, with more developers going to great lengths to craft elaborate swimming pool designs that blend with other features. In Eco Sanctuary, for example, an island club is integrated with the swimming pool. Such designs demonstrate innovation and willingness on the part of developers to sculpt first-class facilities to offer users a heightened experience.

Soh cites some other recent examples of innovative designs that transform the swimming pool into a focal waterscape. These include freeform pools that blend with lush landscapes to conjure a resort ambience; pools that are an integral part of the landscape and create an interesting foreground for the above units during the day; special lighting features to transform the pool during the evening; cascading waterfalls to lend melodic white noise to calm the users' senses; attached wading pools with features such as water jets and sculptural play equipment to create a fun place for kids to explore and learn; and glass-edge swimming pools with an "infinite" outlook.

Clearly, swimming pools in today's strata developments are designed to engage the senses in more than one way. Swimming pools should no longer be thought of as just an added facility that provide for recreational swimming. Their evolution is increasingly observed, as more sophisticated and elaborate swimming pools front new developments.

Terry Chang, chief executive officer of Aqua Works, a specialist contractor for aquatic facilities in Singapore, echoes these sentiments.

"There is an increasing trend of incorporating multiple uses for swimming pools these days to include Jacuzzis, hot tubs, water playground elements, aqua gym equipment, and custom water features to enhance the aesthetics of the pool," he says.

"They are no longer merely rectangular; they can come in various shapes and sizes to complement the surrounding landscape. The image of a seemingly endless infinity pool blending into a dramatic landscape invokes the idea of a luxurious vacation, and as such, the beautiful elegance of a rooftop infinity pool has also become highly desirable."

In Singapore, for example, architects take design inspiration from some of the best lifestyle offerings in the world. Coco Palms, a 944-unit luxurious resort-themed condominium development by City Developments Limited (CDL), boasts a grand lagoon and four accompanying pools. The resort-living experience is heightened with other aquatic features like a salt water pool and an *onsen*-style hot bath.

One of the most notable of these lifestyle-oriented trends over the past decade is the commissioning of suspended swimming pools in strata developments. Such pools are gaining traction among developers, especially for developments in small cities or prime districts. As Chew highlights, suspended swimming pools allow developers to leverage on the vertical vantage of tall strata developments, and are a clever way of optimising limited land space within the development to house more amenities.

This trend can be noted at Setia Sky Residences – a high-end condominium located at the heart of Kuala Lumpur – where a sky deck at level 34 offers a 50-metre



This lap pool at TrefoilSoHo even comes with a "floating" gymnasium

lap pool; and also at Singapore's Sky Habitat (see p52).

Increasingly, swimming pools on high floors are sought-after, as more residents are taking to the idea of an unobstructed view of the city while they swim or sunbathe.

#### Safer swimming pools

Better aesthetics and improved features are clearly a trend in the design of swimming pools in the South East Asia, as in other parts of the world.

But that is not all in terms of latest innovations

in the strata development swimming pool scene. As people are becoming more informed about the potential hazards of unhealthy lifestyles, they are turning to swimming pools to provide added therapeutic benefits.

"With rising purchasing power and consumer health consciousness of Singaporeans, we have noticed an increasing number of savvy users looking for healthier alternatives to chlorine. There have also been many new products in the market which help to reduce the usage of chlorine in pools," Chang says.

Edmund Oh, project manager at Modern Pools Pte Ltd, agrees, adding that most strata developments now specify salt chlorination systems, for example, as they consider they will provide a better experience for the residents, solve issues with chemical storage and also be more cost-effective than chlorine dosing.

In the past decade, the move towards constructing sustainable and more energy-efficient buildings has also become more pronounced. This means that swimming pool designs are also becoming more energy-efficient and eco-friendly in the effort to reduce their carbon footprint.

"Besides the importance of designing the pool system for water and energy efficiency, there are also new products which help achieve better water quality through more competent methods of water filtration," says Chang.

"Innovative products developed from recycled materials may also help reduce the carbon footprint. Additional requirements have also been imposed for ancillary features. For instance, LED underwater lights are preferred to halogen ones for their energy-saving benefits."

He adds that end-users in Singapore could choose to adopt products and services endorsed by the Singapore Green Label Scheme to help reduce carbon footprint.

### Technical considerations

There is also an emphasis on using materials that require less maintenance in the long haul. Apart from considering the space to be allocated for a swimming pool within a development, SP Setia Berhad also looks into its construction cost, ease of use, and cost efficiency for future maintenance.

Attention is also paid to details like the waterproofing system to ensure there is no leakage, the precise location of the pool within the development to minimise noise for residents, the types of pumps and filters to be used, and the amount of the water body exposed to sunlight to ensure the temperature is not too cold for pool users.

Such considerations commonly apply to both swimming pools in residential and commercial strata developments. However, there is more to consider relating to total pool weight, potential leaks and noise for a high-rise swimming pool above and beyond that required for a conventional in-ground pool.

Pertaining to the issue of weight, Chew says that as suspended pools are usually part of the superstructure of the main building, the structural engineer will consider the additional weight put onto the structure amassed from the weight of the pool structure and water.

One of the challenges is for the architect and the consultants to find a suitable location for the pump room, which is usually one level below the pool. However, due to space constraints, the pump room can at times be located far from the pool. This can lead to higher costs to the whole filtration system.

Since the chief concern of building a suspended pool is usually the weight and stresses on the structure, Chang adds that pre-fabricated stainless steel pools are sometimes preferred over concrete pools as they are lighter, but they have to be hoisted up to site during construction. For concrete pools, a double slab construction method is preferred, but that usually adds additional weight.

In addressing the issues of leaks of suspended pools, he notes that additional attention is paid to ensure water tightness, as it would be difficult to resolve any leakage problems in future. For pools directly above someone's million-dollar-view condominium unit for instance,

water tightness would be a critical factor.

With the filtration equipment usually located near the swimming pool, Chang points out that it could result in noise or vibration disturbances to those staying near the high-rise pool. This is in contrast with in-ground pools, where the equipment is usually located at the carparks or basement areas, and noise or vibration would not pose a disturbance to others. In such a situation, acoustic treatments would then be necessary for high-rise pools.

But for both suspended swimming pools and in-ground pools, maintenance costs can generally be minimised with a well-designed pool circulation system, where pool water is well distributed during the pool turnover period.

There are also new products that can improve efficiency with filtration and save money in the long run.

"New-age equipment such as the Waterco Multi Cyclone unit would reduce the frequency of backwashing of the filters, which would in turn save money on water and chemicals used in maintaining the pool water chemistry," Chew says.

Relating the day-to-day operation and maintenance of swimming pools, state-of-the-art systems are sometimes preferred as they support automation and remote monitoring of the pool. While these systems tend to be more costly to put into place, their use can be justified by reduced labour maintenance hours required, as well as lower life cycle costs.

Unlike in Singapore, Chang says that strata developments in Malaysia may not face the same space constraints, and are thus more capable of catering for a higher capacity in the backend filtration system.

The work of constructing and maintaining a swimming pool can be very laborious, where one can expect many procedures and calculations, and naturally much expertise. However, these are necessary steps to ensure that a swimming pool serves both its function and has a desirable form.

Moving forward in the swimming pool scene, more can be expected to raise the standards of swimming pools in Singapore and Malaysia to match and possibly even exceed international standards in terms of raising health, safety and eco awareness.

In Malaysia, for instance, the National Institute of Occupational Safety and Health (NIOSH) and Life Saving Society of Malaysia (LSSM) are already proposing the establishment of a National Water Safety Council (NWSC) to promote water safety awareness and initiate national water safety standards. ■

## Contacts:

**Aqua Works** [www.aquaworks.com.sg](http://www.aquaworks.com.sg)

**Life Saving Society of Malaysia (LSSM):**  
[www.lifesavingmalaysia.org.my](http://www.lifesavingmalaysia.org.my)

**Malaysian Swimming Pool Association (MSPA):**  
[www.mspa.org.my](http://www.mspa.org.my) (They will also be at Piscine SPLASH! Asia on May 20-21 at Marina Bay Sands, Singapore)

**Modern Pools:** [www.modernpools.com.sg](http://www.modernpools.com.sg)

**National Environment Agency (NEA) Singapore:**  
[www.nea.gov.sg](http://www.nea.gov.sg)

**National Institute of Occupational Safety and Health (NIOSH) Malaysia:** [www.niosh.com.my](http://www.niosh.com.my)

**National Water Safety Council (NWSC):** [www.watersafety.sg](http://www.watersafety.sg)  
**Singapore Building and Construction Authority (BCA):**  
[www.bca.gov.sg](http://www.bca.gov.sg)

**Sky Habitat:** [www.skyhabitat.com.sg](http://www.skyhabitat.com.sg)

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