The Trend in High-Rise Development & the Advent of Wind-Driven Rain Drainage System

The Need of High-Rise

With the rapid development of modern cities such as Singapore, Hong Kong and Sydney, high-rise buildings are both booming in quantity and expanding in height. The reasons for adopting high-rise buildings could be solutions for density problems and lack of available land for development. The continuously evolvement of structural system is also considered as another driver for the growth of high-rise development worldwide.

High-rise buildings are also getting greener and healthier as they strive to meet the highest sustainability and well developed building codes. Green or sustainable building is the practice of creating and using healthier and more resource-efficient models of construction, renovation, operation, maintenance and demolition. Green building industry is growing very fast nowadays as countries across the world are concerned about high carbon emission, especially in large, fast growing economies.

About Wind-Driven Rain

Many modern buildings are now designed with spaces which whilst effectively covered are subject to wind-driven rain (WDR). That is, there is no external façade or rainwater screening system preventing rainwater being driven into the space. Such spaces are typically Balconies, Lobbies, Mechanical Rooms, Corridors, Recreation areas, Sky bridges, Canopies, Multi-storey car parks, etc. For the purpose of this article these spaces are referred to as **'Wind-Driven Rain Spaces'.**

All Wind-Driven Rain Spaces are defined as being spaces which have at least one external façade wall which is unprotected from 'wind-driven rain' making them susceptible to an ingress of water into that space. Each and every individual space, that is a space which is compartmentalized by a separating or dividing walls (e.g. Apartment balconies) to form its own unique space must be provided with a rainwater outlet or grating designed to provide for the Rate of Run-Off of that individual space.

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Definition of Wind-Driven Rain (WDR) Spaces

'Spaces which have at least one external façade which is unprotected from wind-driven rain making them susceptible to an ingress of water into that space.'

Iconic projects such as Sky Habitat and South Beach Development in Singapore, Icon Residence Mount Kiara in Malaysia and Jewel Residences in Australia are just a few of developments that designed with repetitive balconies. As the numbers of floors in the building increases, the number of balconies sharing a single discharge pipe increases. This increases the amount of water discharged into the single pipe, risking water backflow in balconies especially in a high-rise building; and as a result increases the chance of flooding in the balconies.

Fast Flow Pressurised System which consists of the psVent™, psPipe™ System and design software is the solution to fulfill the requirements necessary for the design, supply, installation, testing and commissioning of a rainwater drainage system for the conveyance of rainwater from ***'Wind-Driven Rain Spaces'*** and eliminate fear of balcony flooding.

Fast Flow Pressurised System - an engineered solution

- The Pressurised System has been draining Wind-Driven Rain Spaces since 2007.
- The Pressurised System was the result of intensive Research and Development with final testing and **VALIDATION by TUV** in 2007.
- Technology Patent was applied for in 2007 and the first Patent was granted in 2009 in Singapore.
- It is the only **ENGINEERED** system in the world for **Wind-Driven Rain** spaces.

Fast Flow Siphonic System Brings Forth Flexible Pipe Work Configurations for Design Freedom

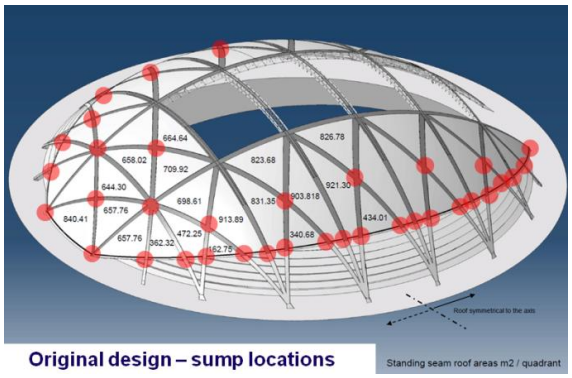
Developer:
Sports Hub Pte Ltd

Architect / Designer
ARUP and DP Architect

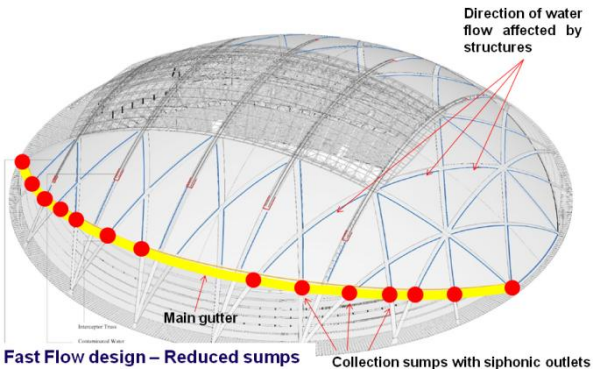
Main Contractor / Builder
Dragages Singapore

Year of Completion
2014

Fast Flow proudly presents Singapore Sports Hub as one of its huge project achievements in 2011. Fast Flow Singapore undertook the full construction of the project from design, supply and installation for this world's largest dome structure of 312 m diameter. The Stadium is designed with the latest technology: a retractable roof of 19,500 sqm. It covers 95% of the seats, takes about 20 minutes to open or close, and is made of cutting-edge weather-resistant material that blocks out the sun's heat as well as the rain. And that's not all; the roof also serves as a giant projector screen.



Original design – sump locations



Fast Flow design – Reduced sumps

Collection sumps with siphonic outlets

A lot of roof analysis was involved in the design proposal to integrate system within structural and aesthetic constraints. The locations of the pipes and outlet sumps had been taken into account to meet the water distribution analysis.

Fast Flow was able to understand the complexity of the roof profile and resolve the challenges the design presented. By utilizing Fast Flow's siphonic solution, the stadium only required 20 siphonic stacks to drain a total of 5,250 l/s of rainwater, concealed UPVC pipes in between trusses, penetrate through the thrust block and 2 meters deep ring beam, and long UPVC horizontal discharge pipes (maximum of 160m long) running without slope at basement car park high level; saves valuable headroom above car park spaces.

Fast Flow Technology: Delivering Rainwater Management System for Singapore's First Enterprise District

Fast Flow Singapore gains the biggest commercial & mixed-use development contract to date with a total catchment area of 50,000 sqm for Punggol Digital District (PDD) which is considered as Singapore's first enterprise district.

The company is celebrating its latest success in the commercial & mixed-use development sector, having secured a contract to deliver rainwater management system for Punggol Digital District. Fast Flow will provide essential service to help improve efficiency and safety in transporting the rainwater from the roof top to the rainwater tank and discharge area.

Fast Flow will supply Siphonic System and Pressurised System equipped with the industry's most modern and advanced products, capable of providing significant improvement in rainwater management efficiency by reducing carbon footprint and optimizing the space by utilizing flexible pipe work configurations for design freedom and improved buildability of unique architecture.

Construction of Punggol Digital District is due for completion in 2023, and reflects the urgent need for an inclusive and smart precinct where technology and social innovation will transform the way we live, work, play and learn. It is an exciting venture and Fast Flow look forward to contributing its expertise to make it a success.

Fast Flow Group
Newly Secured Projects
Q1/2020

Singapore
- SIT Plot 2
- 15 Holland Hill
- Logos E-Commerce Hub
- Solaris at Tai Seng
- Thomson CC (A&A)
- 2 & 4 Woodlands Loop
- 14 Bishopgate
- 35 Faber Green
- 8 Storey Hi Tech Industrial at Ubi Road 4

Malaysia
- Pasar Awam Batu Lancang
- KVMRT 2 Package S202
- SAC Plot 30
- KISWEL Factory

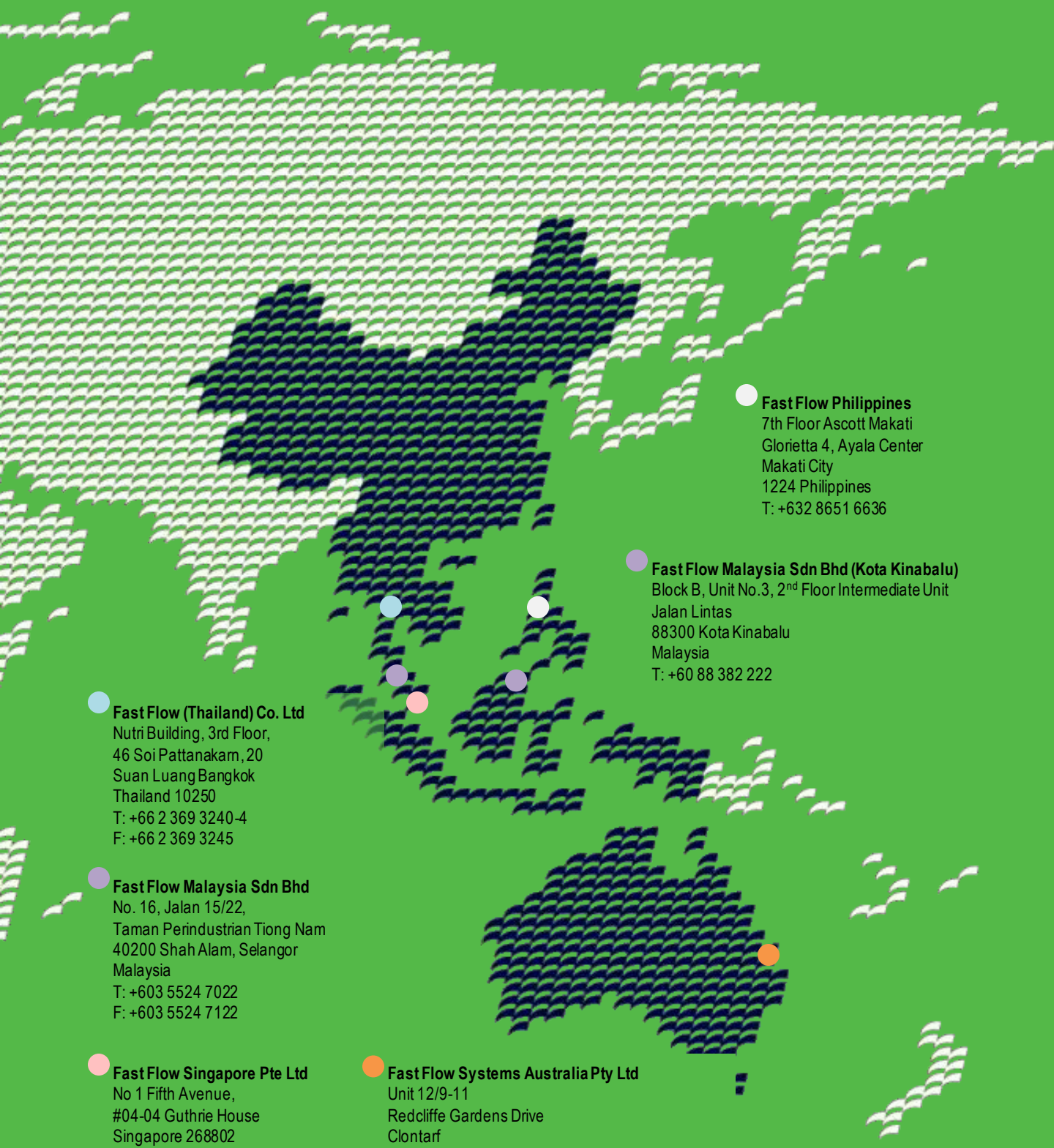
Thailand
- Mega Food Walk (extension)
- Topbest Motor
- Expansion BMW
- Atmoz Chaemgwattana

Australia
- Lennox Head Community Centre
- Tennis Centre Cairns
- 288 Edward Street
- 275 George Street

Project name: Logos E-Commerce Hub
Country: Singapore
Catchment area: 27,000 sqm

Project name: Solaris at Tai Seng
Country: Singapore
Catchment area: 20,000 sqm

Project name: Mega Food Walk
Country: Thailand
Catchment area: 4,302 sqm



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