



# WAG

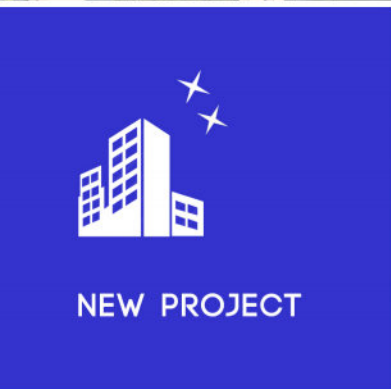
## e·news



UNDER  
CONSTRUCTION



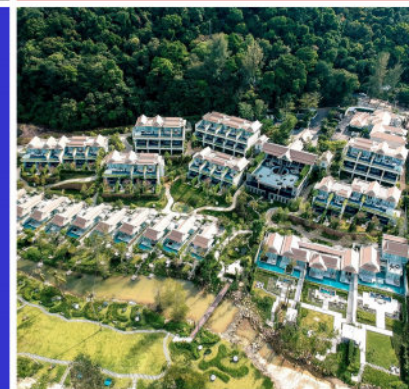
COMPLETED  
PROJECT



NEW PROJECT



ECT.  
ACTIVITIES & ARTICLE



COMPLETED PROJECT  
**BANYAN TREE KRABI**



# COMPLETED PROJECT BANYAN TREE KRABI

**Location :** @Krabi, Thailand

**Owner :** Andaman Resort Asset Co., Ltd.

**Project Summary :**

72 luxurious suites and villas with own private pool.  
Construction area is estimated at 70,000 sq.m.

**WAG Responsibilities :**

- Civil and Structural Design
- Site Drainage

**Project Information**

SIMPLICITY IS THE ULTIMATE SOPHISTICATION

Banyan Tree Hotels & Resorts has created yet another locally-infused sanctuary offering a place to rejuvenate the mind, body and soul in a truly awe-inspiring location. Banyan Tree Krabi is located approximately 30 minutes from Ao Nang heading up the coast on the partially-isolated, but gorgeous Tubkaek Beach. Th resort is located at the northern end of the beach and is in close proximity to the Hat Noppharat Thara - Mu Ko Phi Phi National Park.

**Architect :** Architrave Design & Planning Co., Ltd.

**Photo credit :** [www.banyantree.com/thailand/krabi](http://www.banyantree.com/thailand/krabi)



COMPLETED PROJECT  
**ASIA AVIATION ACADEMY**



# COMPLETED PROJECT ASIA AVIATION ACADEMY

**Location :** @Vibhavadi Rangsit Road, Bangkok, Thailand

**Owner :** Thai AirAsia Co., Ltd.

**Project Summary :**

Training center/exclusive office building, multipurpose, and bridge.  
Construction area is 22,225 sq.m.

**WAG Responsibilities :**

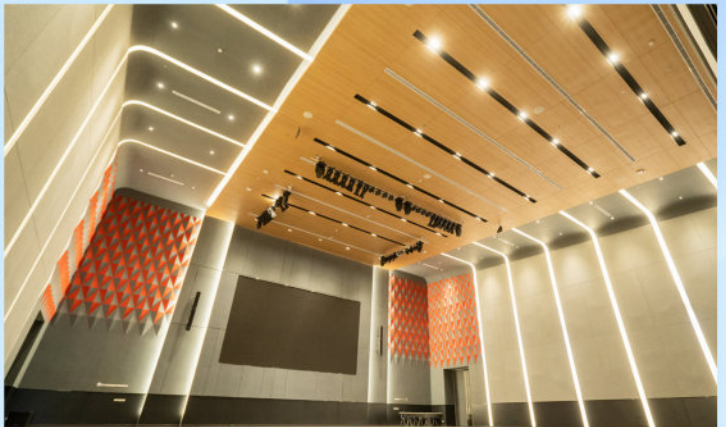
- Mechanical, Electrical and Plumbing System Design
- Civil and Structural Design

**Project Information**

Asia Aviation Academy is an accredited flight school founded under Asia Aviation and Technology with an aim to produce airline pilots, private pilots, and flight instructors of international standards and quality.

**Architect :** Contour Co., Ltd.

**Photo credit :** JWS Construction Co., Ltd.



UNDERCONSTRUCTION PROJECT

# GOVERNMENT SAVINGS BANK, NEW OFFICE



# UNDERCONSTRUCTION PROJECT GOVERNMENT SAVINGS BANK, NEW OFFICE

**Location :** @Phaholyothin Road, Bangkok, Thailand

**Owner :** Government Savings Bank (Thailand)

**Project Summary :**

A new 32-Storey corporate office building.  
Construction area is estimated at 78,000 sq.m.

**WAG Responsibilities :**

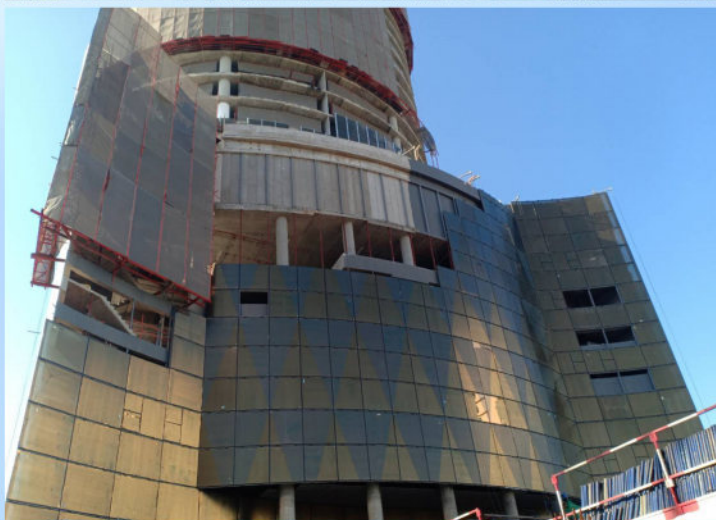
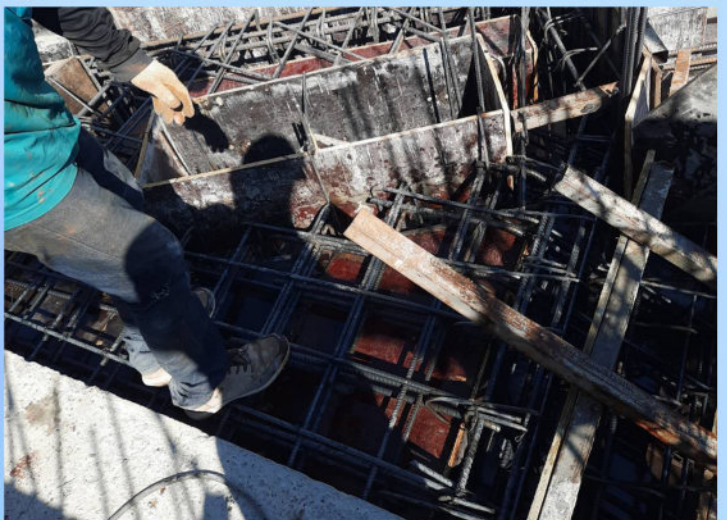
- Mechanical, Electrical and Plumbing System Design
- Civil and Structural Design

**Project Information**

Concept of design It is a modern contemporary To be timeless, look great a long time. The design details are simple, exquisite and classy. To move forward in the GSB way, to keep up the leader of saving encouragement organization for the happiness of the people and sustainable development for Thailand.

Architect: House of Architects Co., Ltd.

Photo credit: Southeast Asia Technology Co., Ltd.



# UNDERCONSTRUCTION PROJECT VANIT PLACE AREE





# UNDERCONSTRUCTION PROJECT

## VANIT PLACE AREA

**Location :** @Phaholyothin Road, Bangkok, Thailand

**Owner :** Laemthong Enterprise Co., Ltd.

**Project Summary :**

A new grade A 31-Storey office building with 598 car parking spaces. Construction area is estimated at 70,000 sq.m.

**WAG Responsibilities :**

- Mechanical, Electrical and Plumbing System Design

**Project Information**

Design for the future

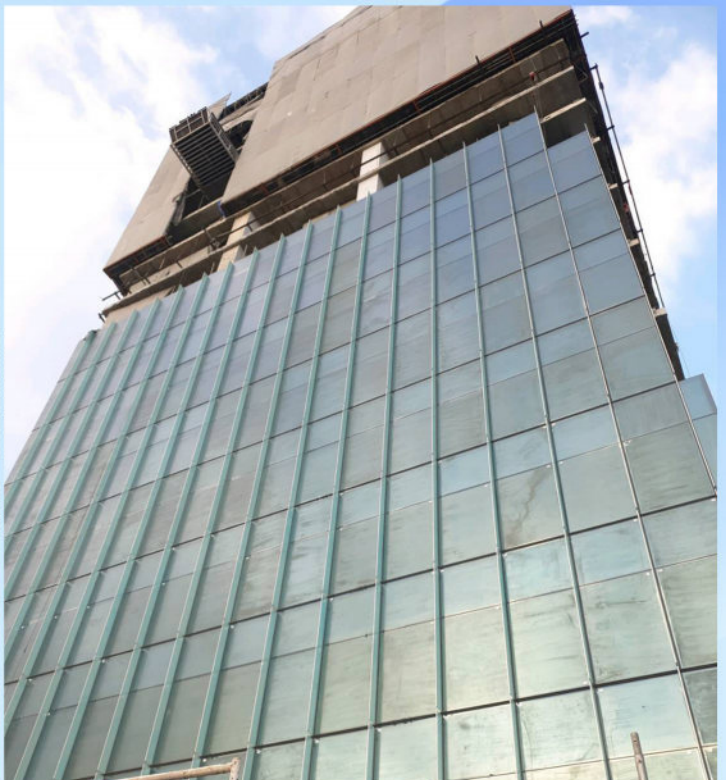
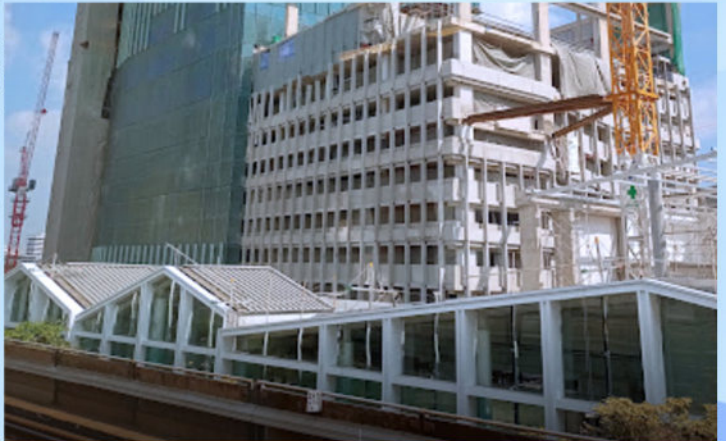
Vanit Place Area is designed in accordance with the LEED-Gold Level standard. The main equipment and systems selected are designed to optimize energy and water usage. The building is constructed with environmentally-friendly materials and methods. With our strong focus on well-being and hygiene, Vanit Place Area is equipped with touchless access and air conditioning system with advance filtering methods for PM2.5 particles. Our column-free office floor plan and knockout panels enable flexible office planning so you can create a productive and effective office layout. In addition, the sky garden and retail space will provide a relaxing area enhancing mental health and wellness.

Architect : Arsom Silp Institute Of The Arts

Photo credit:

1. A E Asia Co., Ltd.

2. www.vanitplacearea.com



NEW PROJECT

# RAMATHIBODI SI AYUTTHAYA MEDICAL CENTER



## NEW PROJECT

# RAMATHIBODI SI AYUTTHAYA MEDICAL CENTER

**Location :** @Si Ayutthaya Road, Bangkok, Thailand

**Owner :** Faculty of Medicine Ramathibodi Hospital, Mahidol University

**Project Summary :**

27-Storey hospital and office tower.

Construction area is estimated at 30,000 sq.m.

**WAG Responsibilities :**

- Mechanical, Electrical and Plumbing System Design

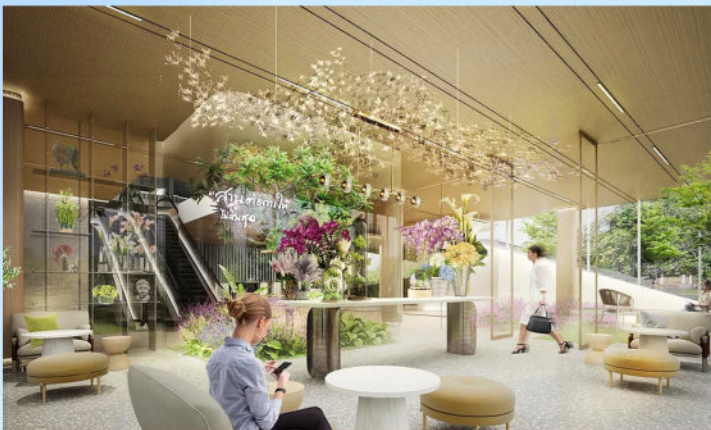
**Project Information**

Under the core concept idea of "GIVING NEVER ENDING" while aiming to be future hospital. The building behaves as a public space for the neighborhood area – creates the value of giving back to the community. In parallel with giving back to the world by giving the importance of being such a sustainable building for both during the construction and operation phases.

The ambition is to capture a building with such timeless architectural language. That speaks out from its functions and while being complements by the aesthetic.

Architect : Vessu Collaboration Co., Ltd.

Photo credit : Vessu Collaboration Co., Ltd.



NEW PROJECT

# STATE AUDIT OFFICE OF THE KINGDOM OF THAILAND



## NEW PROJECT

# STATE AUDIT OFFICE OF THE KINGDOM OF THAILAND

**Location :** @Kamphang Phet Road, Bangkok, Thailand

**Owner :** State Audit Office of the Kingdom of Thailand

**Project Summary :**

29-Storey office building with 1 underground basement.  
Construction area of 82,000 sq.m.

**WAG Responsibility :**

- Construction Management (JV with PKW)

**Project Information**

The new office building for The State Audit Office of Kingdom of Thailand is located on Chatuchak Road, Bangkok comprises the following:

- The office building with 29-Storey and 1 basement.
- Multipurpose building with 3 floors
- Car park building for 1,000 cars

Architect: Forum Architect Co., Ltd.

Photo credit: www.meinhardt.net



NEW PROJECT  
**SASARA HUA HIN**



## NEW PROJECT

# SASARA HUA HIN

**Location :** @Hua Hin, Prachuap Khiri Khan, Thailand

**Owner :** Charn Issara Development Public Co., Ltd.

**Project Summary :**

4-Storey Low-rise condominium with 110 units. Private luxury beachfront in the central of Hua Hin. Construction area is estimated at 10,000 sq.m.

**WAG Responsibilities:**

- Mechanical, Electrical and Plumbing System Design

**Project Information**

"THE ART OF ESCAPE"

The design concept of SASARA is inspired by the narrative of a stream gently flowing down from the upriver and natural pathways. The gentle stream eventually flows into the river forming a delta that delivers the streams to scenic journey at the sea.

The stream, as an entity, brushes and touches its passing surroundings - the trees, the beach, the breeze, and the among these elements, SASARA applies the 'true to material' architectural tenet to its key motif of 'earthy orange juxtaposing against the sky blue swimming pool and the warmth of wooden brown'.

Architect: Habita Architects Co., Ltd.

Photo credit: [www.charnissara.com/sasarahuahin](http://www.charnissara.com/sasarahuahin)





## DISRUPTING THE FLOW

An extensive research project measures the impact of common storage facility obstructions on ESFR sprinklers, data that could inform changes to NFPA 13

There's a joke in the sprinkler and storage industries that you don't design an early suppression fast response (ESFR) sprinkler system around a building—you design the building around the ESFR sprinkler system.

The joke illustrates the importance of ESFR systems in protecting an array of high-challenge storage settings, as well as the numerous considerations involved with installing these systems in a storage facility - especially when the installation encounters potential sprinkler obstructions. ESFR systems utilize fast-acting, high-volume sprinklers designed to protect the most challenging stored goods, including items containing large amounts of highly combustible plastics. The current edition of NFPA 13, Standard for the Installation of Sprinkler Systems, includes a number of restrictions that apply to ESFR installations, including the proximity of the sprinklers to nearby obstructions that can include structural elements, duct work, and lighting. Those restrictions have generated concerns among stakeholders over the years, many of them focused on a central question: Exactly how much do nearby obstructions impact the performance of ESFR sprinkler systems?

A new report by the Fire Protection Research Foundation (FPRF) offers answers. The 160-page "Obstructions and Early Suppression Fast Response Sprinklers," published in August, summarizes six years of research conducted by Wiss, Janney, Elstner Associates, Inc., the global engineering/architectural firm that partnered with the FPRF on this project. The research

evaluated the potential impact of obstructions on the performance of ESFR sprinklers during fires. The project also resulted in an analytical tool that can simplify the decision-making process for the placement of ESFR sprinklers in relation to various obstruction configurations and sizes.

The findings could have important ramifications for NFPA 13 and for the stakeholders who rely on it. Data collected from the ESFR obstruction research is being reviewed by the NFPA 13 Technical Committee as part of its discussions for possible changes to the 2022 edition of the standard. The committee has discussed modifying existing requirements and adding new provisions in Chapter 14 to address isolated and continuous obstructions below ESFR sprinklers.

## CREATING THE TESTS

ESFR sprinklers are the heavy hitters of the sprinkler world in three important ways: they are designed to activate quickly in order to achieve full suppression of a fire; they create large water droplets that resist evaporation on their way to the seat of a fire; and they release an immense amount of water to aid in suppression. Imagine driving through a rain shower that your wipers can handle easily: that's the output of a typical sprinkler. Then imagine driving in the kind of deluge where you can hardly see beyond your windshield, one so intense that you have to pull over and wait for it to pass: that's an ESFR sprinkler. Depending on the storage scenario, ESFR sprinklers can eliminate the need for in-rack sprinklers.





In Redlands, California—a reminder of the potential hazard posed by very large storage facilities packed with densely stored commodities. (AP/WIDE WORLD)

Despite that power, NFPA 13 contains a number of strict provisions for installing ESFR sprinkler systems, in part because of the hazardous nature of the materials those systems are designed to protect, and because the systems can be designed to achieve full extinguishment of a fire. An array of building components, from structural elements including beams and columns to features such as ductwork, smoke vents, lighting, and skylights, can all impact the position and spacing of ESFR sprinklers. According to NFPA 13, the options for installing ESFR sprinklers near obstructions are limited to adding another sprinkler below the obstruction or removing the obstruction altogether - thus the joke that it's easier to construct the building around the sprinkler system. As the authors write in the new FPRF report, the requirements in the current edition of NFPA 13 “are considered conservative and have created difficulties in practical application.”

To address concerns over the perceived limitations imposed by NFPA 13, the FPRF proposed an ambitious research project to study the impact of various obstructions on the effectiveness of ESFR sprinklers. The project, which began in 2014, contained multiple phases, including a literature review, a research planning and development phase, and an extensive testing phase that included nine full-scale tests conducted at

Underwriters Laboratories' large-scale fire test facility in Northbrook, Illinois.

The project defined a testing scope that researchers determined would be the most useful for the broadest range of warehouse storage occupancies. According to the report, survey results of NFPA 13 users worldwide indicated that open web steel joists are the most commonly used structural roof system, and that bridging members, which provide lateral support for maintaining stability under vertical loads, are the most problematic obstruction for ESFR sprinklers. The survey also found that the depths of the steel joists most commonly used range from 22 inches to 36 inches. The top chord of an open web steel truss is typically located above the sprinkler pattern discharge and does not present as much of a concern as the bottom chord, which resembles an unattached flat horizontal obstruction that is 4.5–5.5 inches wide.

Pendent-style ESFR sprinklers were selected for the tests, since they are more popular than upright ESFR sprinklers. K-17 sprinklers were selected—the k-factor refers to the size of the sprinkler orifice, which determines how much water can be emitted—for the tests, and the rationale was that the results of the K-17 tests could be applied to the larger K-22 and K-25

sprinklers, which are also used in ESFR sprinkler systems. Tests were also conducted using the slightly smaller K-14 sprinkler.

A testing method known as actual delivered density, or ADD—a tool commonly used for sprinkler listings and approvals—was used to evaluate specific aspects of ESFR sprinklers and how they are affected by obstructions. Using the ADD testing apparatus, a fire source simulated a rack storage fire, and collection pans were used to collect water into cylinders below the apparatus. Sprinklers could be positioned directly over, centered between, or offset from the centerline of the fire source. The vertical position of the sprinkler relative to the top of the ADD apparatus replicated the distance from the top of the storage array to the ceiling sprinkler location. Once the fire reached a steady-state burning condition, the pump controlling waterflow to the open sprinkler was activated to produce the desired sprinkler discharge pressure. Data was collected and recorded for each collection pan, and averages were calculated based on areas of interest and the associated obstruction. Sixty-five ADD tests were conducted as part of this research.

While ADD testing does not account for every variable, the methodology identified trends such as how various k-factors, as well as horizontal and vertical offsets of the ESFR sprinklers, impact the amount of water that can reach the fire. These factors were then used to select nine full-scale test scenarios for K-17 sprinklers, which analyzed joist obstructions with various depths and distances to the sprinkler deflector, as well as bridging members and flat obstructions.

The full-scale tests yielded four key takeaways cited in the report: 1) The obstruction created by an open web steel truss 22–36 inches deep, located a minimum of 6 inches horizontally from an ESFR sprinkler (K-14 or K-17), will not significantly decrease sprinkler performance; 2) The obstruction created by a bridging member or other obstruction 1.5 inches square or less, located a minimum of 12 inches directly below an ESFR sprinkler (K-14 or K-17), will not significantly decrease sprinkler performance. This also applies to a bridging member attached to open web steel truss; 3) The obstruction created by a flat or round obstruction less than or equal to 12 inches wide, located a minimum of 6 inches horizontally from an ESFR sprinkler (K-14 or K-17), will not significantly decrease sprinkler performance; and 4) The obstruction created by a flat or round obstruction less than or equal to 24 inches wide, located a minimum of 12 inches horizontally from an ESFR

sprinkler (K-14 or K-17), will not significantly decrease sprinkler performance.

These findings could influence the provisions of NFPA 13 related to ESFR sprinkler installations, which in turn could have a game-changing impact on stakeholders throughout the industry.

While the NFPA 13 Technical Committee hasn't officially completed the revision cycle for the 2022 edition of the standard, if these findings are applied to NFPA 13 they would improve some of the installation restrictions and allow ESFR sprinklers to be located closer to obstructions. Such changes would reduce the challenges designers currently face by maintaining appropriate sprinkler spacing while offering new approaches to common obstructions. One of the authors of the FPRF report recently gave a virtual presentation on the findings to the NFPA 13 Technical Committee, and committee members indicated that they agreed with the research.

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#### *References:*

*NFPA magazine, SPRING 2021*

*DISRUPTING THE FLOW, BY JACQUELINE R. WILMOT*

## CONTACT US

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