Fortune
Shepler
Saling

Vertical Transportation Consultants

www.fs2ec.com

John Portman and Associates

Contents

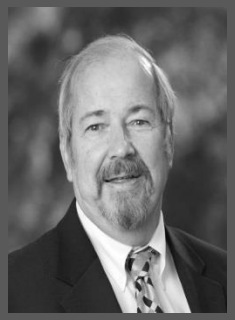
Introduction

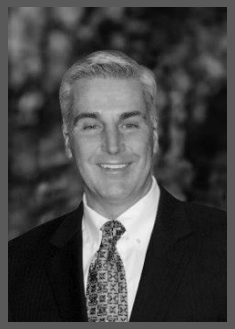
This brief demonstrates the vertical transportation design capabilities and experience of FS².

FS² has completed numerous projects in most every industry sector, on most every continent. With projects in the USA, Russia, Middle East, Europe, China and Southeast Asia, FS² continues to develop our practice of serving our clients wherever their projects arise.

FS² is a boutique firm born of consultants who adhere to the concept that quality work results in on-going client relationships. We execute commissions of all sizes, from supertalls to retail, sporting arenas to mixed-use.

Fortune Shepler Saling Inc.
Vertical Transportation






Firm

FS² originated as Fortune Consultants Ltd, started by Jim Fortune in 2005. Today, FS² includes four Principals:
Jim Fortune, Houston
Scott Shepler, Denver
John Saling, New York
Steve Mikkelsen, Seattle

Each Principal has significant experience in the vertical transportation industry; collectively the firm has unmatched design expertise.

Fortune Shepler Saling Inc.
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Firm

Jim Fortune is the world's foremost expert in designing supertall towers. His portfolio includes Kingdom Tower, Burj Khalifa, Taipei 101, International Commerce Center, Ping An International Finance Center, Wuhan Greenland Center, and Greenland Tower Chengdu, all classified by the CTBUH as *Supertalls*.

As FS² continues to expand, engagements have extended beyond the design of Supertalls. Within the last three years, FS² has been engaged for everything from retail stores, to sporting arena, to mid-rise buildings around the U.S.

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Vertical Transportation

Project Spotlight

Burj Khalifa

by James W. Fortune

Background

Unlike the last three "world's tallest" record holders, the 508-meter-tall Taipei 101 Tower in Taiwan, the 492-meter-tall Shanghai World Financial Center and the 452-meter-tall Petronas Towers in Malaysia (Figure 1), which were all 100% office occupancy towers, the just completed 162-story, 828-meter-tall Burj Khalifa Tower was designed from its inception for multi-use tenancies. The 3-million-square-foot tower is planned to house about 4,000 tenants and visitors, compared to about 15,000 office tenants that would be projected to occupy the space, had it been designed exclusively for office tenants.

The Burj Khalifa "Super Tower" contains the following major components in their ascending order: (Figure 2)

- An 11-level (plus two upper levels), 220-room, five-star Giorgio Armani hotel (levels 5-16, 38 and 39)
- A 19-story, 405-room serviced-apartment section, which can be rented out as overflow hotel rooms or as short-term stay apartments (levels 19-37)
- A 30-level, standard 343-room residential section (levels 43-72)
- A 33-level, 250-room luxury residential section (levels 76-108)
- Three sections of corporate suites (boutique offices), 37 floors total (levels 112-121, 125-140 and 144-154)
- Three levels of observatory, residential and hotel club floors (levels 122-124)
- Three levels of commercial communications and high-definition television (HDTV) broadcast equipment (levels 155-158)
- 50 spire unoccupied levels reserved for the tuned sloshing damper located in the lower floors.

The adjacent four-level, 1,950,000-square-foot podium floors contain parking, building services, the hotel pool, ballroom and meeting levels, restaurants and retail stacks.

The required passenger elevators designs, in any project, are based upon the number of projected building tenants and their anticipated arrival and departure patterns. It is the predominate hotel, residential and condominium nature of the Burj Khalifa and its low projected occupancies, that makes the tower core so efficient. Thus, the Burj Khalifa only required the installation of 32 main passenger elevators to meet the mainly residential tenancy, with world-class design standards. A similar size, 15,000-plus-person office tower would require the installation of about 75 single-deck or about 53 double-deck group passenger elevators to meet Class "A" office design standards.

Discussion: Why Build It?

The first question the general public may ask when contemplating the ever-continuing progress towards "the new world's tallest tower" may well be, why build it?

Continued

CTBUH Best Tall Building Award Finalist
Council on Tall Buildings and Urban Habitat
Pearl River Tower
Guangzhou
Asia & Australasia Region 2013

Council on Tall Buildings and Urban Habitat
FKI Tower, Seoul
Best Tall Building Award Finalist
Asia & Australasia Region 2014

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FS² articles have been published in Elevator World, and our projects continue to receive recognition by the Council of Tall Building.

In turn, FS² shares our expertise and project experiences via the AIA Continuing Education Program.

CONTINUING EDUCATION AIA

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Vertical Transportation

Vertical Transportation design contributes to the success of any project. Over designing results in wasted core space, ill contrived designs result in under performing buildings.

A proper design provides the expected levels of performance and provisions for both people and goods movement. The art of VT design combines the proper peak period performance criteria with an understanding of how people move during such peaks.

The goal is to develop a project specific solution that results in a high performing building within the project budget.

Expertise

In today's modern buildings, elevators can be integrated within the building systems. This integration has enabled significant information collection, which in turn, is used to for intelligent elevator dispatching and overall building traffic management.

FS² has expertise in leveraging the advanced dispatching features. In our designs we consider how to utilize the technology to overcome space planning challenges.

We also recognize the value in traditional dispatching systems and apply the appropriate solution to meet the client's expectations.

Select Project Experience

Kingdom Tower
Jeddah

Kingdom Tower will be the world's tallest tower featuring a luxury hotel, offices, serviced apartments, luxury condominiums and the world's highest observatory.

The vertical transportation strategy includes 59 single-deck lifts, 5 double-deck lifts and 12 escalators. The observatory will be served by high speed lifts traveling at 10.0mps.

FS² was commissioned to complete the vertical transportation analysis, develop the specifications and VT drawings, and assist during the tendering process.

Adrian Smith + Gordon Gill Architecture
Chicago

Select Project Experience

Wuhan Greenland Center
Wuhan

A 119 level mixed-use tower, including offices, luxury apartments, a five star hotel, and penthouse level club. The project includes a top/down hotel design where the registration lobby affords every guest views from the top of the tower.

In order to minimize the core space planning, the vertical transportation strategy includes two office sky lobbies at levels 25 and 49, a residential sky lobby at level 70, and hotel sky lobby at level 116.

FS^2 was commissioned to complete the vertical transportation analysis, develop specifications and drawings, and assist during the tendering process.

Adrian Smith + Gordon Gill Architecture
Chicago

Select Project Experience

Greenland Chengdu Center
Chengdu

China's fourth tallest tower, the design includes a 468 meter tall tower with two smaller towers and connecting podium. The iconic tower includes Class A office space in the lower zone, a luxury hotel in the middle zone, and CEO suites in the high zone. The two smaller towers accommodate high-end SOHO apartments. The podium includes retail, conference center, and exhibition center.

FS² was commissioned to complete the vertical transportation analysis, develop specifications and drawings, and assist during the tendering process.

Adrian Smith + Gordon Gill Architecture
Chicago

Select Project Experience

FKI Tower
Seoul

A 50 story, 248m tall tower built for the Federation of Korean Industries. The project includes 33 elevators with top speeds of 1200fpm.

The FKI tower was a 2014 Best Tall Building Award Finalist nominee by the Council of Tall Buildings and Urban Habitat.

Adrian Smith + Gordon Gill Architecture
Chicago

Council on Tall Buildings and Urban Habitat

FKI Tower, Seoul
Best Tall Building Award Finalist
Asia & Australasia Region 2014

Select Project Experience

EXPO 2017
Astana

The EXPO 2017 project includes an exhibition Sphere, cultural center, hotel, retail and residential components.

FS² was engaged to complete the Phase 1 conceptual designs of each project component, including establishing the vertical transportation strategy for the iconic Sphere building.

Adrian Smith + Gordon Gill Architecture
Chicago

Select Project Experience

Metropolis Phase 2
Los Angeles

Metropolis Phase 2 is a Greenland USA residential development including two towers of 40 and 56 floors, with a shared retail and parking podium. The towers include 480 and 770 residential units, respectively.

The vertical transportation strategy includes single zones of elevators serving all floors. Each residential group will include a swing service elevator with a discrete rear entrance for transport of resident's furniture during moves.

FS² was commissioned for the design development through construction oversight. Design development included a reconfiguration of the elevator design to meet the client's requirements.

Harley Ellis Devereaux
Los Angeles

Select Project Experience

Amazon – Corporate Campus
Seattle

FS^2's Steve Mikkelsen has provided vertical transportation design for 14 Amazon buildings in their ever-expanding corportate campus in Seattle.

Featured here is block 34 – two 12 story office towers with 7 levels below-grade parking. His current project is block 21 with 23 stories of office space and 4 levels of below grade parking.

FS2 was commissioned for concept design through construction oversight.

Graphite Design Group
Seattle

Select Project Experience

Jardim
New York City

Isay Weinfled's first New York City project is a luxury condominium just west of the High Line. The property includes an arched driveway, outdoor living spaces and lush gardens.

The small foot-print project includes three highly custom MRL elevators.

FS2 was commissioned for design through construction oversight.

Isay Weinfeld San Paulo, Brazil	SBLM New York

Select Project Experience

Wilshire Grand
Los Angeles

The new Wilshire Grand is a mixed-use, 74 story tower, in downtown Los Angeles. The development designed by AC Martin for Hanjin International and Martin Project Management, includes 300,000GSF of office space, a 900 room hotel and podium meeting and amenity spaces. The design includes a hotel Sky Lobby registration on Level 70.

The vertical transportation strategy economized the core space by using double deck elevators for the office zone and to transfer hotel guests to the Sky Lobby level. The hotel zone will be served by two groups of top/down hotel locals. Destination dispatching will be provided on the office, hotel express, hotel local and hotel back-of-house service elevators.

FS^2 was commission for the design development through construction oversight.

AC Martin
Los Angeles

Select Project Experience

11 Times Square
New York, NY

SJP Properties 1.1 million square foor office tower, 11 Times Square has 18 high-speed gearless elevators featuring a Destination Dispatch system intergrated with lobby turnstiles.

FS^2 was commissioned to perform ongoing elevator simulation studies to model the impact of tenant and leasing requests on the vertical transportation service levels. The property features an anchor tenant with highly customized mid-buillding ammenity floors.

SJP Properties
New York | New Jersey

Select Project Experience

Block 48
Seattle

Block 48 in Seattle, Washington is a Vulcan Development project overlooking Seattle's Lake Union. The development includes a 40 story residential tower and 20 story office tower.

The residential tower provides for 472 residential units ranging from studios to three bedrooms. The vertical transportation strategy includes four high high speed passenger lifts traveling at 1000fpm. One of the lifts is oversized for a swing service function.

FS² was commissioned for design through construction oversight.

ZGF Architects
Seattle

Select Project Experience

255 South King
Seattle

A mixed use development near the Seahawks home stadium. The project includes a 23 story and 19 story hotel/office development.

FS² was commissioned for design through construction oversight.

255 South King LP
Seattle

Select Project Experience

Seattle Civic Square
Seattle

601 4th Avenue is a mixed-use development in downtown Seattle. The 40 story, 525’ tall, tower includes 600,000 square feet of office space on the first 23 floors with 150 residential units above. Ground level includes a public plaza with retail and entertainment spaces with parking below grade. Below the site is a new Metro Light Rail transit station with escalator access to the site. The vertical transportation strategy includes low/high groups serving the office zone, and dedicated elevators serving the residential zone and below grade parking.

FS² was commissioned for design through construction oversight.

GGLO, LLC
Seattle

Select Project Experience

Crown Sydney
Sydney

The Crown Sydney project is a 70 story tower with a six star hotel and casino, high end luxury residential units, and amenities for both hotel guests and residents.

The residential portion of the tower includes 80 living units spaced over 40 floors. The vertical transportation strategy for the residential zone includes three high speed passenger lifts traveling at 7.0mps. Separate back of house lifts are provided for goods transport and residential service support.

FS² was commissioned to complete the vertical transportation analysis, develop the space planning for the lifts and specifications. Construction oversight was passed to a local consultant.

Wilkinson Eyre Architects
London

Select Project Experience

Union Tower West
Denver

Union Tower West will be a mixed-use development including 100,000 GSF of office space, a 180 room hotel, and 200 spaces of above grade parking in the LODO District of Denver.

The vertical transportation strategy includes separate office, hotel and parking groups.

FS² was commissioned for design through construction oversight.

John Portman and Associates
Atlanta

Select Project Experience

Charlotte Office Building
Charlotte

A 370,000 GSF, 18 story office building development by Portman Holdings adjacent the Westin Charlotte.

The vertical transportation strategy includes a low/high arrangement with destination dispatching controls and a dedicated service elevator.

FS² was commissioned for design through construction oversight.

John Portman and Associates
Atlanta

Select Project Experience

Lane Field North
San Diego

A 17 story, 400 room, dual branded hotel located in the North Embarcadero area of San Diego. The development is a joint venture comprised of Portman Holdings, Phelps Development, and Lankford & Associates.

The vertical transportation strategy includes a low/high arrangement with destination dispatching controls and a dedicated service elevator.

FS² was commissioned for design through shop drawing review.

John Portman and Associates
Atlanta

Select Project Experience

Jinan International Financial Center
Jinan

This mixed use development includes an iconic 65 story office tower, two 40 story office towers and two 18 story residential buildings. Each designed above a shared retail and below grade parking podium.

FS² was commissioned for conceptual designs through initial specifications prior to engagement of the Local Design Institute.

John Portman and Associates
Atlanta

Select Project Experience

Shanghai Expo
Shanghai

The redevelopment of the Shanghai Expo site includes four destinctly different hotels above a common convention center space.

FS² was commissioned for conceptual designs through initial specifications prior to engagement of the Local Design Institute.

John Portman and Associates
Atlanta

Select Project Experience

Las Vegas Arena
Las Vegas

An AEG and MGM Resorts International joint venture, the Las Vegas Arena will be a multi-purpose, 19,000 seat, venue capable of accommodating sporting events and concerts. The project will be located along the Las Vegas strip.

The vertical transportation strategy relies primarily on escalators to handle the arrival and exiting crowd surges, and elevators serving the exclusive suites patrons.

FS² was engaged for design through construction oversight.

Populous
Kansas City

Select Project Experience

Lime Street
London

Nicknamed the “Scalpel” the 190m, 38 story tower, will be the future home of W.R. Berkley in the heart of the London’s financial center, next to the Willis Building and Lloyd’s of London. The design includes street level retail, basement restaurant, a two-story main lobby, and offices above.

FS² was commissioned for the conceptual design studies through Stage D (design development). Studies included the evaluation of a three zone double deck, versus the ThyssenKrupp TWIN solution, which ultimately was the selected strategy.

Kohn Pedersen Fox Associates
New York

Select Project Experience

Tradewinds Centre
Kuala Lumpur

The Tradewinds project includes four towers above a shared retail & parking podium. The towers included a 65 story office building, 54 story hotel and serviced apartment building, 25 story office and 15 story medical office building.

FS^2 was commissioned for the initial conceptual design studies to establish the vertical transportation strategy for each component.

Kohn Pedersen Fox Associates
New York

Select Project Experience

Lotte World Tower
Seoul

A 123 story, 555m supertall tower, that includes a mixed-use program of retail, office, hotel and observation deck at the peak. T

FS^2 was commissioned for the initial conceptual design studies to establish the vertical transportation strategy for each component.

Kohn Pedersen Fox Associates
New York

Select Project Experience

Marina Bay Finanical Center
Singapore

MBFC includes three towers located on Singapore's waterfront. Tower 1 includes approximately 620,000 square feet, Tower 2 includes approximately one million square feet, and Tower 3 has nearly 1.3 million square feet of office space.

FS² was commissioned for the initial analysis and final field reviews.

Kohn Pedersen Fox Associates
New York

Select Project Experience

Lahkta Center
Saint Petersburg

The Lahkta Center project will be an 85 story, 360m tall office tower constructed as the headquarters for Gazprom in Russia.

FS² was commissioned to complete peer reviews of the vertical transportation design following the reassignment of the architectural responsibilities. Peer reviews included the evaluation of double deck, single deck and ThyssenKrupp TWIN strategies.

SMDP
Chicago

Select Project Experience

DUO
Singapore

DUO, a twin tower mixed use and residential project, is a joint venture development between the governments of Malaysia and Singapore. The commercial tower includes a retail podium, office space on floors 4-23 and a 350 room business persons hotel on floors 25-37, with restaurant and outdoor amenities on the top two floors.

The residential tower is a 650 unit condominium project with low/high zones. The low zone is served by three lifts traveling at 2.5mps, the high zone is served by four lifts traveling at 5.0mps. Residential service support is provided by a swing lift in each group.

FS^2 was commission for the initial design through construction oversight.

Buro Ole Scheeren Ltd
Beijing

Select Project Experience

OKO Towers
Moscow

OKO Towers includes an 85 story mixed use hotel and residential tower, a 50 story office tower and 10 story, 1500 vehicle parking garage.

The residential portion of the 85 story tower is served by three low rise lifts traveling at 6.0mps, and three high rise lifts traveling at 7.0mps. Back of house service is provide by two dedicated service lifts.

Destination dispatching was specified to provide exclusive service to residents purchasing the top floor penthouse units. Through the VIP separation feature residents with high security requirements are provided with a dedicated lift to and from their home.

FS² was commission for conceptual planning through design development.

Skidmore Owings Merrill LLP
Chicago

Select Project Experience

Pearl River Tower
Guangzhou

Pearl River Tower was a 2013 Best Tall Building Award Finalist nominee by the Council of Tall Buildings and Urban Habitat. Designed by Adrian Smith and Gordon Gill while at Skidmore Owings and Merrill, the project is a 71 story, 309m tall tower with approximately 166,000 sm of GFA.

The vertical transportation strategy includes 29 high speed elevators with the fastest traveling at 1800fpm.

Skidmore Owings Merrill LLP
Chicago

Council on Tall Buildings and Urban Habitat

Pearl River Tower, Guangzhou
Best Tall Building Award Finalist
Asia & Australasia Region 2013








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