WHAT WE DO IS ESSENTIAL

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EXECUTIVE SUMMARY

On June 27, 2014, Hughes Associates, Inc. (Hughes) and Rolf Jensen & Associates (RJA) completed the historic merger of two highly respected firms in the fire protection industry. Our combined experience provides enhanced services and resources to our clients which include:

- Fire protection and life safety
- Research and testing
- Hazard analysis and risk management
- Performance-based design
- Code consulting
- Construction management and security

Celebrating more than 79 years of combined experience, Hughes and RJA is a global leader offering engineering and consulting services with over 58 offices globally. Our experts are committed to providing the most cost-effective, sustainable, and appropriate solutions that meet our client’s needs.

ENGINEERS. CONSULTANTS. SCIENTISTS.

Our staff consists of a renowned group of more than 180 engineers, scientists, and computer programmers, as well as investigators and other specialists, who are among the best in the field of fire protection engineering and code consulting services. Our engineers serve on numerous National Fire Protection Association (NFPA) committees (multiple with Chairman positions) including the Life Safety Code, Fire Alarm and Signaling Code.

SUPERIOR FIRE PROTECTION ENGINEERING

Our team is exceptional in meeting the life safety, fire protection, code consulting and security needs and objectives for our national retail clients. Hughes delivers timely and ground-breaking solutions that support the code-compliant expansion and fire protection systems reliability at retail facilities across the globe. Our fire protection engineers and life safety code consultants work collaboratively to ensure technical and cost-effective solutions.
THE GLOBAL CHALLENGE

As we move toward a true global economy, the need for increased levels of fire protection and security is a global concern. This concern creates a challenge for the international architect, developer, owner/investor and risk insurer:

“How do we achieve acceptable levels of life safety and security in environments with different levels of technological development, diverse risk management philosophies and less defined regulatory infrastructures.”

Despite high-profile projects designed by teams from around the world, there is still no universally adopted set of building standards recognized world-wide. The result is innumerable variations of fire safety codes, fire protection system design standards, and product testing standards.

Much of the current activity in the codes and standards making process is aimed at harmonizing fire safety standards. As countries join the global economy, they update their building regulations and standards to mirror the global built environment. A substantial element of this world-wide standardization effort includes the development of a regulatory framework for the use of performance-based approaches to fire safety design. This effort includes the development of methodologies for establishing design objectives, emergency scenarios, analytical tools and evaluation of results.

Global design and construction teams also play a key role in moving the globalization process forward. As we participate on global design teams – an architect from New York, a structural engineer from Paris, a construction manager from Seoul – we continue to harmonize our expertise in much the same way as the standards making bodies are adopting unified regulations.

In the future, with the further development of scientifically based fire simulation tools, the use of performance-based design approaches will eventually be the primary means of establishing equivalent fire safety compliance for any code. Variations in the prescriptive requirements of local codes will be of secondary consideration.

Successfully meeting these challenges often necessitates working closely with local Code and Fire Officials to develop effective solutions to unique challenges. The requirement becomes one of matching each unique situation with a responsive, flexible, effective and economical solution. Integrated fire alarm, suppression, smoke control and security systems must be designed, installed and maintained properly. Personnel must also be trained.
ADVANTAGES THAT SET US APART

Superior Technical Talent. We employ nearly 500 professionals who hold degrees in a multitude of engineering disciplines – fire protection, electrical, mechanical, chemical, structural, civil – as well as specialists in architecture, security, fire research and media technology. Our project teams incorporate a unique blend of veteran engineers and top graduates from the leading engineering schools. We invest heavily in their ongoing technical and project management education and support their involvement in the professional organizations that shape and regulate the state-of-the-art in fire protection and security.

Unmatched Service Scope. There are multiple dimensions to our scope of services. In terms of consulting services, we provide our clients with total solutions, from analysis and master planning, through design, specification and construction management, to final acceptance testing. We also offer a broader array of disciplines including fire protection, security, mass notification and emergency response. But of most importance to our clients, we have the ability to integrate these capabilities into a seamless solution for every project challenge and deliver that solution wherever the project is located.

Outstanding Project Performance. We have participated in more than 100,000 projects worldwide. These projects include: government facilities ranging from military installations and embassies to courthouses and the headquarters for the FBI; landmark high-rise buildings in the Americas, Asia, Europe and the Middle East; major gaming complexes from Las Vegas to Macau; biomedical, applied science and laboratory facilities on the campuses of leading colleges and universities; world renown hospitals; hotels owned and operated by the leading names in the hospitality industry; manufacturing plants; and large venue assembly and convention centers around the world. The common denominator in all these projects is that we’ve built trust among our clients that we will provide them with intelligent solutions to their fire protection and security challenges… on time and within budget.
ENGINEERING AND CONSULTING SERVICES

FIRE SAFETY SYSTEM DESIGN & COMPUTER MODELING
Fire detection, alarm and mass notification systems design; water-based and foam fire suppression system design; fire pump system design; fire water supply analysis/fire flow testing; smoke control system design, plans and specifications development; shop drawing review; systems inspection; cost estimation; construction administration services; acceptance testing; fire scenario development; egress analysis; and, fire/smoke movement analysis.

CODE COMPLIANCE CONSULTING
Applicable code determination; code compliance analysis; construction type determination; code documentation; Accessibility/ADA compliance; code equivalency development; code variance preparation; code strategy analysis; code conflict resolution; performance based analysis; and negotiation with Authorities Having Jurisdiction.

PLANS REVIEW SERVICES
Life safety/fire design criteria determination; egress analysis; fuel loading determination and inspections; special use permitting; review and analysis; third party installation plan reviews; fire separation requirements; and fire protection master planning.

FACILITY ASSESSMENTS
Site survey; life safety analysis; risk assessment and quantification; fire hazard identification (including chemical, biological, radiological and natural hazards); fire hazard scenario development; fuel load analysis; and, loss prevention consulting.

LIFE SAFETY PROGRAM CONSULTING
Occupant awareness training program development; fire safety procedures and manual development; evacuation planning and emergency preparedness planning; risk assessment; and loss prevention.

FIRE INCIDENT SUPPORT
Incident investigation; equipment failure analysis; systems analysis for code compliance; system false activation analysis; and, litigation support.

SECURITY CONSULTING
Security planning; security assessment; Crime Prevention Through Environmental Design (CPTED) review; security program management; security system engineering and design; and, security training.

ENVIRONMENTAL SERVICES CONSULTING
Regulatory forecasting and analysis; policy and standards development; sustainable design; plan and audit services; and, remediation.
LEADERS IN THE FIRE PROTECTION INDUSTRY

We have established a reputation for expertise, ethics, and competency in fire protection engineering and research. We have achieved this through years of active participation in regional, national, and international building and fire code committees and regulatory bodies. We continue to contribute to the development of such codes through our representation both on and before many of these committees.

Our engineers have detailed knowledge in the application and interpretation of the National Fire Protection Association (NFPA) Standards and local codes, ordinances, and regulations. Committee participation includes the following codes:

- NFPA 13: Automatic Sprinkler Systems
- NFPA 92: Smoke Control Systems
- NFPA 220: Types of Building Construction
- NFPA 750: Water Mist Fire Suppression Systems Committee
- NFPA 45: Laboratories Using Chemicals
- NFPA 921: Guide for Fire and Explosive Investigations
- NFPA 204: Task Group, Guide for Smoke and Heat Venting
- NFPA 11: Low Expansion Foam
- NFPA 409: Task Group on Protection Criteria for Class I Hangars
- NFPA 16: Installation of Foam-Water Sprinkler Systems
- NFPA 30: Flammable and Combustible Liquids
- NFPA 2001: Clean Agent Fire Extinguishing Systems
- NFPA 10: Portable Fire Extinguishers

- Authored chapters of the NFPA Fire Alarm Code Handbook
- Authored chapters of the NFPA Handbooks on subjects such as life safety and suppression Systems
  - Authored chapters of the SFPE Handbook of Fire Protection Engineering

Our familiarity and participation in the codes and standards – making processes enables its staff to develop code compliant approaches or equivalencies in a timely manner, effectively streamlining the design and construction process.

PARTICIPANTS IN INTERNATIONAL ORGANIZATIONS

- INTERNATIONAL ASSOCIATION FOR FIRE SAFETY SCIENCE (IAFSS)
- INTERNATIONAL CODE COUNCIL (ICC)
- INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)
- AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
- INTERNATIONAL MARITIME ORGANIZATION (IMO)
- EUROPEAN COMMITTEE FOR STANDARDIZATION (CEN)
- UNITED NATIONS ENVIRONMENT PROGRAMME (INEP)
- WORLD BANK
CHINA PROJECT EXPERIENCE

Marriott Corporation - China
We have performed fire safety and or security consulting services for more than 150 Marriott hotels located throughout Southeast Asia. Work includes life safety reviews, plan and design reviews, construction management, system pre-testing, and system commissioning. Projects in China have included:

- Renaissance Shanghai Pudong
- Yantai Marriott Courtyard
- Xiamen Marriott
- Galaxy Guangzhou
- Zhengzhou Greenland Plaza
- Shanghai Zhong Shan Park
- Shanghai Puxi Courtyard Hotel
- Renaissance Hotel, Wuhan
- Beijing City Wall JW Marriott
- Guangzhou Grandview Zhengia Marriott
- Hangzhou Qiangiang (Hualian) Marriott
- Ritz-Carlton Beijing Financial Street
- Cheng Dahong MEA
- Shenyang Maoye
- Nanjing Ren
- Shijiazhuang Ren
- Shanghai Jin Quao
- Jhuhai Renaissance
- Shenzhen Xiangjiang
- Hangzhou Qian Jiang Courtyard
- Qingdao Zhongti

UICC - Taiwan, China
We conducted a site survey and defined a project plan, goals and approaches for Calamity System Design Development. Fire scenarios were developed that reflected specific facility concerns including: ignition source, fuel source, and fire growth rate. Modeling and engineering methods were used to evaluate the impact of fire scenarios identified including: rate of smoke production and extent of smoke spread.
Shanghai Tower – Shanghai, China
The Shanghai Tower is a super tall skyscraper located in the financial trade zone of Pudong district in Shanghai, China. The tower rises approximately 632 meters from the ground and will be the tallest building in China and in Asia so far. The tower consists of 121 floors above grade and 5 floors below grade. The above grade floors are divided into 9 zones, including luxury retail spaces, meeting rooms, ballrooms, offices, hotels and observation floors. Each zone features three atria interconnecting all floors of the zone, with the maximum height of the atrium to be 61.9 meters. Some atria are relatively skinny, similar as a double curtain wall.

The unique and super tall design of the building demands unique fire and life safety design strategy. As a fire protection consultant of this project, we provided both code consulting and performance based design services for the architects. The performance based design includes the separation method between the atrium space and the adjacent occupied space, atrium fire detection and suppression system design, atrium smoke control system design, atrium steel structure design and elevator assisted evacuation modeling using STEPS. Through the fire modeling and egress modeling, fire-rated glass walls or tempered glass walls protected with closely spaced sprinklers are proposed to separate the atrium space from the adjacent occupied space, depends on the atrium width. Elevator assisted evacuation is proposed for the whole building.

Shanghai World Financial Center – Shanghai, China
We were retained by Mori Building Co. Ltd. to provide fire protection consulting services for the Shanghai World Financial Center in Shanghai, China. The total project area is approximately 317,000 m² and includes an Office Tower with a Hotel above, retail stores at the base, a Gallery and an Observation Deck at the top.

The purpose of our services for this project was to assist in development of fire protection strategies for the large public assembly spaces and amusement ride located at the top of the building. We utilized CFD fire and smoke modeling as well as egress simulations to verify the design and to refine the smoke control approach for the space. We were able to develop cost effective solutions to the fire safety requirements of the project that are consistent with the applicable codes and which represent internationally recognized "best practice" approaches to fire safety engineering design. The project was governed by the building and fire codes applicable to the City of Shanghai, China.

Jin Mao Tower – Shanghai, China
The 421 meter high Jin Mao Tower is China’s second tallest building and among the tallest building in the world. The building contains mixed uses including office, hotel, retail, and assembly. The structure is a prominent landmark on Shanghai’s skyline. Our scope of work for this mixed-use high-rise tower included the development of a fire safety master plan to address the atrium fire protection strategies and fire compartment requirements for the facility. The effort included a performance based design approach utilizing fire modeling. The RJA Group, Inc. subsidiary, Sako & Associates, Inc. provided the security approach and design for the project.
Nanjing Greenland Financial Center – Nanjing, China
The Nanjing State-Owned Assets & Greenland Financial Center is a mixed-use development consisting of a 320 meters high 65-story office and hotel tower, a second 94 meters high 22-story office tower and a 7-story podium building interconnected by a 6-story high atrium and containing retail space, restaurants and cinemas.

The unique features of the building design could not be fully addressed by the China codes and required us to develop a performance-based approach. Our role on this project included fire and life safety code consulting, and performance-based fire protection analysis to address issues of building height, increased fire compartment size of the podium building, and high occupancy assembly area located on above the third floor of the building.

Pearl River Tower – Guangzhou, China
The Pearl River Tower is designed to be a 310 meter, 70-floor tower containing offices, a business club, restaurants and conference center functions. The building will have approximately 170,000 gross square meters (“gsm”) above ground and 40,000 gsm below ground for a total area of 210,000 gsm. The project contains approximately 8,000 gsm of site work area. The Pearl River Tower is one of the most environmentally friendly buildings in the world with turbines that turn wind into HVAC energy, a rainwater collection system and a solar collector for power generation. We were chosen to create the fire protection strategy for the building but also to contribute our LEED accredited expertise to the sustainable design elements of the life safety systems.

North Bund White Magnolia Plaza – Shanghai, China
The North Bund White Magnolia Plaza is a mixed-use development, consisting of a 66-story office tower, a 39-story west hotel tower, a 24-story east hotel tower and a 4-story retail podium building including three blocks. The retail podium building block A is connected to the two hotel towers on Level 2 to Level 4 by bridges. In addition to the retail podium building, underground retail spaces are also designed on lower level 1 and lower level 2. These two underground retail levels are interconnected by numerous sunken gardens.

By providing code consulting to the design team and working closely with the design team, we assisted the design team to develop a fire and life safety strategy that complies with code requirements or is accepted by the local fire authority, without eliminating the unique features of the architectural design. Unique issues addressed include the openness of the underground retail spaces, the fire compartmentation, the exit discharge of the office tower, the egress of the underground cinemas, and the fire fighting access through the hotel canopy.
Zhengzhou Greenland Plaza – Zhengzhou, China

The Zhengzhou Greenland Plaza Project is a mixed-use development consisting of a 55-story (250 m high) office/hotel tower and a 5-story (35 m high) podium building containing retail, restaurants, KTV, ballrooms, cinemas and conference rooms.

Our scope of work for this mixed-use high rise building includes fire and life safety code consulting and performance-based fire protection analysis to address the unique design features that cannot strictly comply with the China code requirements or are not fully addressed by the China codes. FDS modeling and dynamic egress simulation are conducted for the hotel atrium connecting all hotel floors to determine the smoke exhaust rate and make-up air strategy, for the typical office floor to address the oversized fire compartment size, for the observation floors on the top of the tower to address the high occupant area located above 3rd floor.

The Venetian - Macau SAR, China

The Venetian Hotel and Casino consists of more than 3,000 hotel suites and includes showrooms, convention center space, casino and gaming areas and a retail mall. This facility is 38 stories tall with an overall area of approximately 12,000,000 ft². The combination of the hotel, meeting space and the convention space with over 1.6 million ft² will make The Venetian the world’s largest hotel and convention complex under one roof.

We developed the overall fire protection Third Party Quality Assurance program, as the designated third party reviewer for the Macau Fire Service Department, and performed reviews for the project’s fire protection report, fire and life safety drawings, smoke control and fire protection system designs, and negotiated numerous equivalencies that were integral to the overall project design. We performed shop drawing and equipment submittal reviews, and installation reviews to ensure the contractors were performing their work in compliance with the adopted codes and standards. We performed third party smoke control and fire protection system review inspections for the project, and prepared an inspection report for the Macau Fire Service department as the project’s Quality Assurance Agent. We attended design coordination meetings with the owner and their engineering firms to vet alternate means and methods for negotiation with the authorities having jurisdiction. We attended construction coordination meetings for Fire/Life Safety system coordination with contractors to assist in the planning and coordination of all final inspections and testing.
Shanghai World Expo 2010 Chinese Pavilion – Shanghai, China

The Shanghai World Expo 2010 Chinese Pavilion is located in the core area of the planning district of the Shanghai World Expo 2010, adjacent to the Huang Pu River. It consists of a 69.9 meters high National Pavilion, a 13 meters high Regional Pavilion, and a 3,000 square meters Pavilion providing exhibition spaces for Hong Kong, Macau and Taiwan. The National Pavilion has a building area of 27,000 square meters, with a dimension of 138 by 138 meters at the top platform, and a dimension of 70 by 70 meters between two column cores at the bottom. The unique architectural design replicates a traditional Chinese crown or an inverted pyramid with corbelled framing. An observation floor is located at the top of the Pavilion and an atrium with skylights is inside the Pavilion. At the bottom of the National Pavilion, there are 3 Elevators and 4 stairways located in each of the four column cores. The Regional Pavilion has a building area about 45,000 square meters and expands horizontally surrounding the National Pavilion.

As the fire and life safety consultant of this landmark building, we worked together with the joint design team and developed a unique fire protection strategy via performance-based analysis. For the Regional Pavilion, the fire protection strategy includes introducing a 12 meters wide fire isolation belt to separate fire compartments, using secondary 6 meters wide fire isolation belts between exhibition zones within each fire compartment, and optimizing the smoke control system plus installing closely spaced sprinklers in the aisle to address the extended travel distance issue. For the National Pavilion, fire and egress modeling are used to address the extended fire and smoke compartment sizes, extended travel distance and the effectiveness of the mechanical smoke control systems. A hand calculation is also used to analyze the required fire protection of the steel structural beams in the Regional Pavilion and in the National Pavilion.

City of Dreams Casino and Hotel – Macau, China

The City of Dream Casino and Hotel development consists of four high-rise hotel towers ranging from 130 m to 155 m in height, more than 2,200 guest rooms and hotel suites, approximately 420,000 ft² of casino space, 175,000 ft² of retail space, an interactive atrium “Bubble”. This project utilized a phased commissioning approach to complete our scope of services.

We developed the overall fire protection Third Party Quality Assurance program for this project as the designated third party reviewer for the Macau Fire Service Department, and performed reviews for the project’s overall fire and life safety report, fire and life safety drawings, smoke control and fire protection system designs, and negotiated numerous equivalencies that were integral to the overall project design. We performed shop drawing and equipment submittal reviews, and installation reviews to ensure the contractors were performing their work in compliance with the adopted codes and standards. We performed third-party smoke control and fire protection system review inspections for the project, and
prepared an inspection report for the Macau Fire Service department as the project’s Quality Assurance Agent. We attended design coordination meetings with the owner and their engineering firms to vet alternate means and methods for negotiation with the authorities having jurisdiction. We attended construction coordination meetings for Fire and Life Safety system coordination with contractors to assist in the planning and organization of all final inspections and testing.

China Expo Performing Art Center – Shanghai, China

The China Expo Performing Art Center is one of the four major permanent pavilions on the expo site of Shanghai Expo 2010. It is 41 meters high and its exterior resembles a flying saucer. It has a building area of approximately 126,000 square meters, including 74,000 square meters above ground and 52,000 square meters below grade. The above ground part consists of a main stadium surrounded by six other buildings. The main stadium has 18,000 seats consisting of 6 levels seating area and can be adjusted into small stadiums for different performing purposes. The underground part has two levels, including mechanical equipment and parking space, a 2-story high skating area and the retail space that connects to the retail space on the ground floor via a sunken plaza. The Performing Art Center will be the main stage for all kinds of performances and shows during the 2010 world expo in Shanghai.

The unique architectural design of the stadium brings challenges for the fire protection design of this project. As the fire and life safety consultant of this landmark building, we developed a unique fire protection strategy for this building via performance-based analysis. The analysis includes egress modeling of the main stadium with Exodus, fire and smoke modeling to evaluate the extended fire and smoke compartment sizes of the stadium and the effectiveness of the smoke control systems proposed via FDS, the selection of automatic fire suppression systems and fire/smoke detectors for the stage and the audience hall, and the separation approach between different functional areas. In addition, a brief crisis evacuation plan was also developed for the use of the design team to develop a comprehensive emergency response plan.

ADDITIONAL CHINA PROJECTS

Beijing
Beijing Mall
ChemSunny Plaza
China Film Museum
Microsoft China Headquarter Building
Shanghai Light Source
Shi ji Jing Yuan Mall

Macau SAR
Las Vegas Sands Macau
Wynn Resorts Macau
MGM Grand Macau
**Shanghai**
Shanghai National Science Museum
International Exposition Centre
Maxdo Plaza Diamond Building
CMB Credit card Center
Shanghai Haiyi Tower
Shanghai 21Century Tower
Shanghai Zhengda Entertainment Center
Disney ELL Training Centers
Hong Xin Mei Kai Long
NGS 118 Plaza
Shanghai Expo Africa Pavilion
Cheung Tai Lujiazui Parcel X3-2 Tower
Dowcorning Songjiang Factory
Shanghai Natural Museum
YueXing Universal Expo Center
Taipingqiao 126&127 Block
Norvatis Laboratory Campus
Shanghai Symphony Orchestra

**Suzhou**
Suzhou Lifu Plaza
Suzhou JinHope Hyatt Project
Suzhou Convention/Exhibition Center

...more
RTKL Chengdu Mixed Use - Chengdu
Nanjing Greenland Financial Center
Huizhou Huamao Building Complex
SigmaKalon Kunshan Bulk Resin
Hong Kong Convention & Exposition Centre - Hong Kong
Lanzhou IHG Hotel - Lanzhou
Lijiang International Hotel - Lijiang
Qindao Olympic Shopping Mall - Qingdao
Qindao Intercontinental Hotel - Qingdao
Lijiang International Hotel - Lijiang
China Resources Place Shopping - Shenzhen
Shenzhen Expo Center - Shenzhen
Zhixin Plaza - Wenzhou
IHG Hotel - Nationwide
INTERNATIONAL PROJECT EXPERIENCE

U.S. DEPARTMENT OF STATE

Under two successive contracts with the U.S. Department of State, we are providing fire protection engineering and code consulting services for facilities under the jurisdiction of DOS Overseas Building Operations. This work has included the following projects:

American Embassy - Quito, Ecuador
We designed a fire alarm system for the American Embassy in Quito, Ecuador. The embassy occupies a four-story, 40,505-square foot, government-owned structure. The system was designed to meet the minimum life safety requirements as defined by the UBC and mission continuity protection criteria as defined by the DOS.

American Consulate - Vancouver, Canada
We provided the design for a new fire alarm system for the renovation of the American Consulate in Vancouver. The chancery occupies 25,000-square feet on three floors of a 22-story building. Other existing fire alarm, fire sprinkler and standpipe systems in the 500,000-square foot building would remain in service.

Raphael Building - Paris, France
A review was conducted of fire alarm system manufacturer information for the installed systems at the Raphael Building in Paris, France. An on-site inspection was performed and we coordinated contractor modifications to allow communication between Siemens fire alarm system and French building fire alarm system. We witnessed functional testing of the fire alarm systems to verify that the systems are communicating properly.

New Zealand Embassy - Washington, DC
We provided comprehensive electronic and physical security countermeasure design.

U.S. Embassy - Conakry, Guinea
We conducted a progress inspection of fire and life safety systems.

U.S. Embassy - Rangoon, Burma
A progress inspection of DOS construction was performed in Burma.

U.S. Embassy - Accra, Ghana
A progress inspection of DOS construction was performed in Ghana.

U.S. Embassy - Panama
We witnessed pump string testing for the Patterson Pump.

U.S. Embassy - Nigeria
Construction Inspection Services
A progress inspection of DOS construction was performed in Nigeria.

U.S. Embassy - Freetown, Sierra Leone
A progress inspection of DOS construction was performed in Freetown.
U.S. Embassy - Merida, Mexico
A progress inspection of DOS construction was performed in Merida.

U.S. Consulate - Peshawar, Pakistan
Design services were provided for the replacement of the fire alarm in buildings under renovation.

U.S. Consulate - Mumbia & Chennai, India
We provided evaluation and acceptance testing services for fire alarm and fire sprinkler systems at the U.S. Consulates in Mumbai and Chennai.

U.S. Consulate - Surabaya, Indonesia
We provided fire safety consulting expertise to resolve a fire and life safety issue for a portion of the U.S. Consulate in Surabaya.

ASIA

Marriott Corporation
We performed fire safety and or security consulting services for more than 150 Marriott hotels located throughout Southeast Asia. Work includes life safety reviews, plan and design reviews, construction management, system pre-testing, and system commissioning. Projects have included:

**HONG KONG**
- Sky City Marriott
- Renaissance Kowloon
- Sanya Agile JW Marriott

**KOREA**
- Marriott MEA Seoul

**MALDIVES**
- Renaissance Gaakoshibee

**INDONESIA**
- JW Marriott, Jakarta
- Ritz Carlton Bali Resort

**VIETNAM**
- Vietnam Bien Hoa Marriott
- Ham Tan Courtyard
- Nha Trang Marriott
Marriott Corporation (continued)

**INDIA**
- JW Marriott Jasola New Delhi
- JW Marriott New Delhi Airport
- Courtyard Pune City
- Courtyard Bhopal
- JW Marriott Mumbai
- Mumbia Kula Marriott
- Kochi Fenix Courtyard Marriott
- Hyderabad Courtyard Marriott
- Mumbai Andheri Courtyard
- Courtyard Kochi Lulu

**FIJI Islands**
- Fiji Marriott

**SINGAPORE**
- Singapore Ritz Carlton Residences

**MALAYSIA**
- Johor Bahru Renaissance

**THAILAND**
- Mercure Hotel Pataya
- Mercure Samui Buri Resort
- Khao Lak Resort & Spa
- Bangkok Edition Hotel
- Bangkok Edition Ritz Carlton
- Marriott Resort Hotel, Rayong

**CAMBODIA**
- Siem Reap Courtyard Marriott

**J.W. Marriott Hotel National Convention Center - Hanoi, Viet Nam**
Security consulting services were provided for the design of a comprehensive security system for this five-star hotel and convention center.

**Road Tunnel Fire Suppression - Taiwan**
We conducted a literature review to compile full-scale data on vehicle fire tests to establish a range of design fires for the vehicles using the tunnel. Four proposed suppression systems were evaluated: movable monitor, water mist, water curtain, and hi-expansion foam.
U.S. Navy Support Facility - Diego Garcia
We provided on-site services for fire and life safety projects on Diego Garcia. Work included design of fire alarm and sprinkler systems, hydraulic calculations, system design review, and testing and commissioning for base renovation projects. Facilities included aircraft hangars, radar facilities, warehouses, boat maintenance facilities, detention buildings, residential quarters, and offices.

MIDDLE EAST

Mina Zayed Waterfront Development - Abu Dhabi, UAE
Fire safety consulting is being provided for the design of this 69-acre mixed-use waterfront development, slated to become an international tourist destination, with business, entertainment, hotel, and residential facilities.

New York University (NYU) - Abu Dhabi, UAE
We served as code consultant for the design and construction of NYU’s campus in Abu Dhabi. Fire safety planning was coordinated with the UAE Civil Defense Department.

Palm Tower & Village Center - Dubai, UAE
Code consulting services were provided for the design of this 120-story mixed-use facility.

Al Raha Beach Development - Abu Dhabi, UAE
Fire safety consulting services were provided for a 5-star, 110-room luxury resort.

Limitless Dubai - Abu Dhabi, UAE
Fire safety consulting was provided for the design of the Downtown Jebel Ali Zone 1 Central Plaza project.

Al Ghurair Center - Dubai, UAE
A fire safety design analysis was conducted for this multi-use facility consisting of three high-rise structures, two residential use towers and an office tower, each located over a two-story covered mall containing retail spaces and a large cinema. Fire safety features as well as smoke control system requirements were analyzed based on NFPA 101 (Life Safety Code), NFPA 92 (Recommended Practice for Smoke-Control Systems), and NFPA 92B (Smoke Management Systems in Malls, Atria and Large Areas). Architectural drawings and applicable codes and standards were reviewed to develop design fire scenarios.
INTERNATIONAL CAPABILITIES AND EXPERIENCE
PEOPLE’S REPUBLIC OF CHINA

Arab Museum of Modern Art - Qatar
Fire safety consulting was provided for the design of the Arab Museum of Modern Art, including 33,000 square meters of enclosed space, outdoor terraces, sculpture gardens, and car parks.

Mecca - Saudi Arabia
We provided consulting to analyze pedestrian movement around Mecca with respect to proposed developments.

King Abdulaziz International Airport Expansion - Jeddah, Saudi Arabia
Security Consulting - A Concept of Design Report was provided for all security-related areas associated with the overall airport and a new passenger terminal.

Fire Safety Consulting - Support was provided for the renovation of the South and North terminals as part of the airport’s $250 million expansion and modernization effort. The expansion is planned to ultimately enable the airport to serve 80 million passengers a year. It will include new terminal buildings and a high-speed rail link.

Jet Propulsion Center - Jeddah, Saudi Arabia
We used the Computational Fluid Dynamics (CFD) model Fire Dynamics Simulator (FDS) to evaluate fire protection strategies for the three-story atrium space over the reception lobby entrance to this new building.

New Doha International Airport - Qatar
Fire safety consulting was provided for an aircraft maintenance hangar.

EUROPE

Athens International Airport - Athens, Greece
Conceptual designs of fire suppression system options were developed for an aircraft maintenance hangar at Athens International Airport.
**Champalimaud Centre - Lisbon, Portugal**
An analysis was conducted of smoke control requirements for the three-story atrium at this laboratory/healthcare facility. A report was developed that outlined an atrium smoke control system design for the building that met the intent of the local codes and standards. The results of the report were presented to the client substantiating the design.

**National Library of Scotland - Edinburgh, Scotland**
An investigation was conducted of sprinklers installed at George IV Bridge. Sprinkler heads were evaluated for corrosion, sampling, and testing. A report was prepared with recommendations for mitigation of problems.

**Fabrication Facility - Dublin, Ireland**
We performed an engineering evaluation analysis for purposes of life safety to assess how long the unprotected long-span steel trusses of a fabrication facility will stay in place given a wet bench fire.

**Safety Hi-Tech - Roma, Italy**
We performed a detailed technical analysis and provided recommendations on appropriate factors for system design of a total flooding gaseous fire extinguishing system. Identified system variables, analyzed and quantified appropriate design factors, and provided documentation including recommendations for both ISO and NFPA standards.

**Aviano Air Base - Aviano, Italy**
We prepared a fire suppression system design for a fuel cell maintenance hangar that met USAF criteria. The design included a high expansion foam system for the fuel cell maintenance bay. Work included specification development, review of shop drawings, and preparation of record drawings.

**Noble Energy - Lysaker, Norway**
A Process Hazard Analysis (PHA) was conducted for a monoethylene glycol reclamation unit.

**USAF Air Combat Command, Lajes Field - Azores, Portugal**
We conducted a site survey and provided cost estimates for the renovation of Hangar T-820. Recommendations were made for a new fire protection system to include high expansion foam system and necessary upgrades to the water supply for the building.
CENTRAL & SOUTH AMERICA

Australian Embassy - Buenos Aires, Argentina
Code and fire protection consulting was provided for the design of the Chancery and Head of Mission residence at the Australian Embassy.

Sherwin-Williams Company - Buenos Aires, Argentina
We assisted the management of the facility in specifying, procuring, and supervising the installation of a fire pump installation for a Sherwin-Williams location. Hughes provided construction phase services, including on-site inspections, to assure a code compliant fire pump installation meeting U.S. standards.

Willich - Chile S.A.
We assisted the client in developing a guidance manual for the application of passive fire proofing (PFP) for refineries. The work is to be done for ENAP, the Chilean oil company. The project also includes reviewing specifications and documents for PFP for an ongoing ENAP project and conducting an audit of the PFP at an existing refinery.

U.S. Embassy Chancery - Brasilia, Brazil
An on-site Life Safety and Fire Protection Engineering survey of the Chancery at the U.S. Embassy of Brazil in Brasilia prior to the design of Phase II renovations. Phase II renovations included Building B, the south connector to Building A (renovated in Phase I), and civil work. The building area to be renovated was approximately 4,600-square meters.

The survey was an evaluation of all life safety and fire protection systems to gather all information necessary for the preparation of a Life Safety Report. The evaluation included the identification of deficiencies and the development of conceptual solutions to be presented by the client to Post representatives for concurrence. Items were added to a Site Survey Matrix and the Project Analysis Package (PAP). Assistance was provided for the drafting of a Site Survey Report, including completion of necessary text, graphics, photos, drawings and analyses to describe findings and recommendations.

ArcelorMittal Tubarao - Serra, Brazil
The conceptual design for a nitrogen foam fire protection system was provided for the Tubarao steel convertor control building.

LANDTEC, Alphaville - Baueri, SP Brazil
A hazardous materials code analysis was provided for new gas manifold room for a new manufacturing facility in Brazil. Review will be based on the International Building Code and International Fire Code. LANDTEC produces landfill gas, and green house gas monitoring equipment.

Phoenix Park Gas Processors Ltd. - Port of Spain, Trinidad & Tobago
Fire safety training services were provided for the client’s manager incident command system.
Sherwin-Williams Company - Cautlapan, Mexico
We provided risk consulting services to assist local management in the evaluation of fire protection and risk reduction recommendations. We developed a statement of work and engineering specifications to correct noted fire protection and loss control deficiencies.

Forward Operating Locations - Aruba & Curacao
We provided fire protection engineering services for the design of USAF hangars and associated buildings for FOL operations. Fire protection systems consisted of low-level AFFF systems, sprinkler systems, and building and base-wide fire alarm systems.

IBM Headquarters - Bogota, Colombia, South America
We provided fire protection engineering sprinkler design services for the IBM de Colombia, S.A. headquarters building renovation in Bogota, Colombia. The building is approximately 156,200-square feet and consists of five stories above grade with a basement and underground parking garage. The facility is to be used for offices and related support spaces.

CANADA

Ontario Police College - New London, Ontario, Canada
We conducted a Security Needs Assessment of a 400+ acre police training facility to serve as foundation for Homeland Security Master Plan. Comprehensive report identified existing and potential threats and vulnerabilities and provided prioritized recommendations with associated costs where applicable.

Pipeline Analysis, Edmonton - Alberta, Canada
We developed radiant heat exposure distances from the full surface storage tank fires to prevent damage to tanks.

Ontario Police College - New London, Ontario, Canada
A complete security system design document was prepared for new indoor and outdoor firing ranges.
WORLDWIDE

Estee Lauder Co., Inc. - Worldwide Locations
We conducted site visits for a comprehensive analysis of fire protection and life safety features of Estee Lauder Co. facilities located worldwide. Fire alarm, detection, and sprinkler systems were designed as needed to improve facility safety in U.S. and European facilities. We assisted in the development of a master specification for new building fire protection and loss prevention projects. Services provided also included: training in testing and inspecting fire protection equipment; exit/egress studies; flammable liquid storage analysis; dust exposure evaluation; dust explosion analysis in powder manufacturing facilities; and, analyses of fire and life safety in retail and distribution facilities. Locations included those in the U.S., Spain, Belgium, and Canada.

Seagate Hard Drive Facilities - Worldwide
We updated and consolidated Seagate’s existing fire and life safety Standard Operating Procedures (SOP) to incorporate a risk based management systems approach. As part of the project, Seagate facilities around the world were visited in order to gain an understanding of their operations and the fire safety issues currently facing their plants. Audits were conducted reviewing fire safety systems design, life safety procedures, and identifying hazards. Facility locations included those in the U.S., Malaysia, Thailand and Ireland.
INTERNATIONAL CAPABILITIES AND EXPERIENCE
PEOPLE’S REPUBLIC OF CHINA

CHINA OFFICES AND STAFFING

SHANGHAI OFFICE
Jin Mao Tower
24th Floor, 2406B
88 Shi Ji Avenue
Pudong, Shanghai  200120, PRC
Tel: 86-21-5049-7008

Total staff in this office = 13

- Fang Li – Exec. VP, China Ops.
- Cuili Cao
- Caixia Hong
- Yimin Huang
- Huahui Li
- Zhuangzhi Liu
- Zhuo Qi
- Xiaolan Wang
- Yong Wang
- Fei Xu
- Jing Zhang
- Lei Zhang
- Xingfei Zhu

MACAU OFFICE
Av. Dos Jardins do Oceano, n.388
8th Floor, Unit 8B-C, Ocean Tower
Taipa, Macau
Tel: 853-2882-7779

Total staff in this office = 8

- Robert Keough - Sr. VP, Pacific Rim Ops.
- Man Chi Ho
- Tak Hoi Lam
- Man Kit Lei
- Jacinta Leong
- Jie Loh
- James Taylor
- Joseph Vaughn

SHANGHAI OFFICE
Xuanrun International Building
100 Wuzhong Road, Suite 819
Shanghai, China 201103
Tel: 86-21-3470-1796-7
Fax: 86-(0) 21-3470-1798

Total staff in this office = 4

- Scott Chong – VP, APAC Region
- KyuBack Choi
- Kim Gwang Kim
- Star Zhou

HONG KONG OFFICE
Suite 1110, Exchange Tower
33 Wang Chiu Road
Kowloon Bay, Hong Kong
Tel: 852-6395-5184

Total staff in this office = 6

- Richard Wong - VP, Building Services APAC
- Sam Liang
- Thomas Luk
- Tan Teck Seng
- Patrick Wang
- Wynne Chan
C. Scott Chong, SET, CFPS has 18 years of experience providing fire protection and life safety services for US Government and Commercial facilities throughout the world. He has spent extensive time developing inspection, testing, and maintenance (ITM) protocols for fire alarm and fire protection services for the Department of Defense with the US Army and Air Force based on the Unified Facilities Criteria (UFC) and National Fire Protection Association (NFPA) standards. Apart from the UFC standards, Mr. Chong has been involved with JCAHO compliance for the 121st General Hospital and 18th Medical Command facilities throughout the United States Forces Korea (USFK) installations. In addition to maintaining US Government contracts, he provides fire protection and life safety consulting services to Marriott International in Asia, Europe, Middle East, and Africa. Mr. Chong is a current member of SFPE and NFPA.

**Project Experience:**

**Marriott International, Asia Pacific:** Project Manager responsible for fire protection and life safety consulting services for Marriott International hotels in Asia Pacific. Countries include: Korea, Japan, China, Taiwan, Indonesia, Malaysia, Vietnam, Cambodia, Philippines, Singapore, and India. Services include egress, exit sign, emergency lighting, fire alarm, and sprinkler plan review along with field and system inspections.

**IKEA Japan:** Fire Protection Consultant providing fire alarm, sprinkler, and smoke control plan reviews and inspections for new build stores.

**United States Army 18th Medical Command, Korea:** Fire Protection Consultant performing inspection, testing, and maintenance for 18th Medical Command facilities located throughout U.S. Army installations in the Republic of Korea.

**United States Army Contracting Command, Korea:** Fire Protection Consultant providing inspection, testing, and maintenance of fire protection systems for Kunsan and Osan Air Base.

**United States Army 18th Medical Command, Korea:** Fire Protection Consultant providing fire protection maintenance services for 45 facilities. These services include fire alarm, sprinkler and chemical suppression systems maintenance under NFPA and Joint Committee on Accreditation of Healthcare Organizations (JCAHO) standards.

**Education**

B.S., Environmental Science, University of San Francisco 1995

**Certifications**

Certified Fire Protection Specialist (CFPS)

National Institute of Certification in Engineering Technologies (NICET)

Level IV Fire Protection Engineering Technology – Fire Alarm Systems

**Associations**

Member, National Fire Protection Association (NFPA)

Member, Society of Fire Protection Engineers (SFPE)
Fang Li | Executive Vice President-China Operations | Shanghai Office

**Professional Experience**

Fang Li is Executive Vice President of China Operations in China. She has been responsible for the RJA Shanghai Office since 2004. Fang Li was authorized by SFPE to operate the SFPE China Chapter and was elected as the founding Chairman.

Upon graduation from WPI in December 2000, she joined Rolf Jensen & Associates (RJA) as a fire engineering consultant. Her work included application of modeling protocols for fire dynamic analysis, smoke control analysis and egress analysis. Ms. Li was promoted to the position of Vice President for China Operations at RJA.

**Relevant Project Experience**

- **Nanjing Suning Plaza River West**, Nanjing, China
- **Shanghai Suning MGM Square**, Shanghai, China
- **Dowcorning Songjiang Factory**, Shanghai, China
- **Suzhou JinHope Hyatt Project**, Shanghai, China
- **Shanghai Natural Museum**, Shanghai, China
- **Suzhou Convention Center**, Suzhou, China
- **Guangzhou Pearl Tower**, Guangzhou, China

**Professional Affiliations**

- Society of Fire Protection Engineers (SFPE)
- National Fire Protection Association (NFPA)
- China Fire Protection Association
- Salamander Fire Protection Honor Society

**Education**

- **Worcester Polytechnic Institute, Worcester, MA**
  - M.S., Fire Protection Engineering, 2000
- **Xi’an Jiao Tong University**
  - Xi’an, China
  - B.S., Chemical Engineering, 1987-1991
Lei Zhang is an Associate in the China office of Rolf Jensen & Associates, Inc. (RJA). Lei Zhang has experience in a safety science research institute. His main responsibility is the safety evaluation, fire risk assessment and application of fire engineering.

Lei Zhang’s experience also includes hazard analysis and assessment, fire resistance analysis, building evacuation analysis and smoke movement, occupants evacuation modeling. He holds a master degree of Fire Protection Engineering with strong fire dynamic modeling operation skills and knowledge. Also, Lei Zhang has worked very actively to support the office performance based design work with the fire dynamic modeling component as well as providing supports for various project task needs.

### Relevant Project Experience

- **Dieshiqiao Home Textile Market**, Nantong, China
- **Huai’an Wanda Plaza**, Huai’an, China
- **Zhenjiang Wanda Plaza**, Zhenjiang, China
- **Hohhot Wanda Plaza**, Hohhot, China
- **Baotou Wanda Plaza**, Baotou, China
- **Zhen Ru Fu Center**, Shanghai, China
- **Wuhan IKEA**, Wuhan, China
- **Yifang Call Center Industry Park, Huaqiao, Kunshan**, Suzhou, China
- **Wuxi Grand Theatre**, Wuxi, China
- **Xuzhou Concert Hall**, Xuzhou, China
- **Huai’an Airport Terminal**, Huai’an, China
- **Gillette Shanghai Factory**, Shanghai, China
- **Langfang Wanda Yilin Hotel**, Langfang, China
- **Wuxi Hilton Double Tree Hotel**, Wuxi, China

### Education

- **China University of Mining Technology**, Xuzhou, China
  - B.S., Fire Safety Engineering, 2004-2008
- **China University of Mining Technology**, Xuzhou, China
  - M.S., Safety Engineering, 2008-2011
Cuili Cao Associate

**Professional Experience**

Cuili Cao is an Associate in the China office of Rolf Jensen & Associates, Inc. (RJA). He joined the RJA Shanghai Office in 2008. During his study in China University of Mining Technology, Cuili Cao had been working in State Industrial Safety and Engineering Technology Research Institute as an assistant researcher for one year. His main responsibility was the application of fire research, including fire dynamic analysis, smoke control analysis, heat transfer analysis, and full size fire testing and egress analysis.

**Relevant Project Experience**

- **Pudong HXMKL Shopping Mall**, Shanghai, China
- **Hangzhou Yintai Shopping Mall**, Hangzhou, China
- **Expo Chinese Pavillion**, Shanghai China
- **Suzhou Huaqiao International Exhibition Center**, Suzhou China
- **Expo Africa Pavilion**, Shanghai China
- **Hefei International Exhibition Center**, Anhui, China
- **Qingdao Linghai International Exhibition Center**, Shandong, China
- **Taizhou Exhibition Center**, Jiangsu, China
- **Shanghai Zhengda Theatre**, Shanghai, China
- **Shanghai Symphony Orchestra**, Shanghai, China
- **Shanghai Expo Stadium**, Shanghai, China

**Education**

- **China University of Mining Technology**, Xuzhou, China
  B.S., Safety Engineering, 2004-2008
Xiaolan Wang is an Associate for the Shanghai office of Rolf Jensen & Associates in China.

Xiaolan Wang obtained her master's degree of Safety Engineering at China University of Mining Technology in 2011. She has been working in State Industrial Safety and Engineering Technology Research Institute as an assistant researcher for two years. Her main responsibility was the application of fire protection research, including Performance-based fire safety design, fire safety assessment, egress analysis, and smoke control analysis.

**Relevant Project Experience**

- Dieshiqiao Home Textile Market, Nantong, China
- Wuhan IKEA Shopping Mall, Wuhan, China
- Hangzhou Yintai Shopping Mall, Hangzhou, China
- Huai’an Wanda Plaza, Huai’an, China
- Zhenjiang Wanda Plaza, Zhenjiang, China
- Hohhot Wanda Plaza, Hohhot, China
- Baotou Wanda Plaza, Baotou, China
- Taizhou Wanda Plaza, Taizhou, China
- Zhen Ru Fu Center, Shanghai, China
- Shanghai Financial District, Shanghai, China
- Wuhan Greenland Center, Wuhan, China
- Yifang Call Center Industry Park, Huaqiao, Kunshan, Suzhou, China
- Taiyuan Museum, Taiyuan, China
- Taiyuan Gallery, Taiyuan, China
- Wuxi Grand Theatre, Wuxi, China
- Xuzhou Concert Hall, Xuzhou, China
- Huai’an Airport Terminal, Huai’an, China

**Education**

- China University of Mining Technology, Xuzhou, China
  B.S., Fire Control and Prevention Engineering, 2009

- China University of Mining Technology, Xuzhou, China
  M.S., Safety Engineering, 2011
### Yong Wang

**Associate**

**Shanghai Office**

#### Professional Experience

Yong Wang is an Associate for the Shanghai office of Rolf Jensen & Associates in China. Mr. Wang completed his Bachelor degree in Fire Engineering in China University of Mining Technology. His experience includes fire protection design & engineering for industry, third party fire consultant service for international brand hotels.

His work in RJA Shanghai includes fire consultant service for International brand hotels and industrial projects.

#### Relevant Project Experience

- **P&G Gillette Plant**, Shanghai, China
- **Inner Mongolia Rongtai Optical Technology**, Inner Mongolia, China
- **Beijing Beikong Science Park**, Beijing, China
- **Kunshan Maodi Solar Battery Production**, Kunshan, China

#### Education

- **China University of Mining Technology**, Xuzhou, China
  - B.S., Fire Control and Prevention Engineering, 2009
Robert Keough  
**Senior Vice President – Pacific Rim Operations**  
Macau Office

### Professional Experience

Mr. Keough is the Senior Vice President for Pacific Rim Operations, which is located in the Macau office of Rolf Jensen & Associates, Inc. (RJA). Prior to joining RJA, he worked for the United States Department of State, serving as the Fire Protection Division's Deputy Director.

Mr. Keough has more than 25 years experience as a fire engineer. As a registered PE, he has extensive experience in the development of comprehensive fire and life safety approaches for all types of facilities. Mr. Keough has conducted fire protection and life safety evaluations of high-rise buildings, hotels, mixed-use facilities, sports arenas, casinos, chemical storage and processing facilities, atrium structures, residential, and office buildings. He has also performed fire protection analysis including evaluation of hazardous material use and storage, review of automatic sprinkler and fire alarm systems, atrium smoke control analysis, and has extensive experience applying US based code requirements to overseas fire protection concepts.

Mr. Keough’s experience also includes performance based code design approaches, third-party review, code compliance alternatives and equivalencies. He has extensive experience in system installation and commissioning programs through the implementation of project management processes that provided measurable cost controls and minimized schedule slippage.

### Relevant Project Experience

- **Venetian Macao Casino and Resort**, Macau SAR
- **Sands Casino and Hotel**, Macau SAR
- **Wynn Casino and Hotel**, Macau SAR
- **MGM Casino and Hotel**, Macau SAR
- **City of Dreams Casino and Hotel**, Macau SAR
- **Smithsonian Museum of American History**, Washington, DC
- **U.S. Capitol**, Washington, DC
- **30+ US Embassy and Consulate Projects**, Multiple Locations Overseas

### Registrations

- PE, State of Maryland
- Certified Fire Protection Specialist
- National Institute of Certifications for Engineering Technologies:  
  - Senior Engineering Technician, Fire Alarms (Level IV)
  - Associate Engineering Technician, Sprinklers (Level II)

### Professional Affiliations

- National Fire Protection Association
- Society of Fire Protection Engineers (Member)
Joseph Vaughn, PE  
Associate Manager – Pacific Rim  
Macau Office

**Professional Experience**

Mr. Vaughn is the Associate Manager for the Pacific Rim, managing projects in Macau, Guam, and Japan. He has worked with a wide range of design teams, building owners, and contractors for compliance with local and international fire safety codes and standards, and performance based engineering approaches. His experience includes development of fire protection design strategies using both code and performance based approaches as well as other special studies related to specific code compliance issues.

Mr. Vaughn joined the Macau SAR office and has conducted drawing review, site surveys, inspection, commissioning, and acceptance testing of fire protection and life safety systems for a large variety of assembly buildings. His experience includes including means of egress and compartmentation, automatic wet and dry sprinkler, standpipe, fire pump, fire detection and alarm, mass notification, gaseous suppression, wet chemical suppression, smoke control, HVAC, and fuel-oil piping and storage. Mr. Vaughn is responsible for DOD projects in the Pacific Rim region, and is experienced in the design, use and application of the Unified Facilities Criteria, International Codes, and NFPA Codes and Standards.

**Relevant Project Experience**

- **City of Dreams Casino Resort**, Macau SAR, China
- **Venetian Macau Casino Resort**, Macau SAR, China
- **Macau Airport Business Jet Hanger**, Macau SAR, China
- **Macau Helicopter Hanger**, Macau SAR, China
- **Macau International Airport Hangar**, Macau SAR, China
- **Macau Studio City**, Macau SAR, China
- **MGM (MGM Macau, MGM Cotai)**, Macau SAR, China

**Registrations**

Professional Engineer in Fire Protection  
California, License No. 1703 / Guam, License No. 1542

**Professional Affiliations**

- Hong Kong Institute of Engineers (HKIE)
- National Fire Protection Association (NFPA)
- Society of Fire Protection Engineers (SFPE), Professional Member

**Education**

- **Worcester Polytechnic Institute, Worcester, MA**  
  Master of Science in Fire Protection Engineering, 2008
  Bachelor of Science in Electrical Engineering, 2005
  Minor in Law and Technology
James Taylor Associate

Macau Office

Professional Experience

Mr. Taylor is an Associate with the Macau office of Rolf Jensen and Associates, Inc. (RJA). Mr. Taylor holds a Bachelor of Science degree in Civil Engineering from the Georgia Institute of Technology and a Master of Science degree in Fire Protection Engineering from Worcester Polytechnic Institute. Mr. Taylor recently moved to the Macau office from the Chicago, IL office of RJA.

Prior to joining RJA as a full time associate, Mr. Taylor was an engineering intern for RJA. Mr. Taylor’s responsibilities include preparing and reviewing engineering drawings and specifications for conformance with local, state and national codes; preparing and reviewing specifications for fire alarm and suppression systems; designing fire alarm and suppression systems and attending meetings with local and state officials.

Mr. Taylor is also involved in the onsite work performed by the RJA Chicago Office. Mr. Taylor’s responsibilities with regard to site work include surveys of facilities for compliance with fire alarm and suppression system installation, final acceptance testing of fire alarm and suppression systems, and accreditation surveys of healthcare facilities.

Relevant Project Experience

Venetian Macao Casino and Resort, Macau SAR
Sands Casino and Hotel, Macau SAR
Wynn Casino and Hotel, Macau SAR
MGM Casino and Hotel, Macau SAR
Jung Hotel, New Orleans, LA
India C-17 Beddown, Hindan AFB, India
Willis Tower, Chicago, IL

Professional Affiliations

Society of Fire Protection Engineers (SFPE) - Executive Committee Member
National Fire Protection Association (NFPA)

Education

Worcester Polytechnic Institute
Master of Science in Fire Protection Engineering, 2012

Georgia Institute of Technology
Bachelor of Science in Civil Engineering, 2009
**International Capabilities and Experience**

**People’s Republic of China**

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**Man Kit Lei**

**Associate Engineer**

**Macau Office**

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### Professional Experience

Mr. Lei is an Associate Engineer in the Macau office of Rolf Jensen & Associates, Inc. (RJA). His primary responsibilities are to do some inspection and drawing review of fire service systems for different Macau Project.

Prior to joining RJA, Mr. Lei was employed by Tyco Fire & Security Company as a Project Engineer. His primary responsibilities was to design and edit the fire service layout for Pier 16 Hotel (Macau China) according to the fire rules of Macau and he was responsible for the routine safety matters of workers of Tyco in Pier 16 Hotel (Macau China). Mr. Lei has experience working with the three major model building codes, as well as NFPA standards, LPC Standards and local codes of Macau.

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### Relevant Project Experience

- **Pier 16 Hotel**, Macau China
- **Venetian Cotai Strip Casino Resort**, Macau China
- **Venetian Cotai Strip Four Season Hotel**, Macau China
- **Venetian Cotai Strip Paiza Mansion**, Macau China
- **Venetian Cotai Strip Services Apartment**, Macau China
- **Venetian Cotai Strip Parcel 5&6**, Macau China
- **City of Dreams, Theatre**, Macau China
- **City of Dreams, Hard Rock Hotel**, Macau China
- **City of Dreams, Crown Hotel**, Macau China
- **City of Dreams, Hyatt Hotel**, Macau China
- **Wynn Encore Hotel**, Macau, China
- **MGM Grand**, Macau, China

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### Professional Affiliations

- Macau Institute of Engineers

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### Education

**University of Macau**

Bachelor of Science, Mechanical Engineering, 2004
Jie Loh  Consultant

Macau Office

Professional Experience
Mr. Loh is a Consultant in the Macau office of Rolf Jensen & Associates, Inc. (RJA). Prior to joining RJA, Mr. Loh was employed by Western States Fire Protection as a Project Engineer. His responsibilities including design building fire sprinkler systems, perform sprinkler hydraulic calculations, field survey, order materials for field installation, coordinate field drawings, manage projects, and review drawings for city approval.

Mr. Loh has experience in using 3D coordination software (Naviswork & HydraCAD) to coordinate sprinkler system with other contractors before field installation. In addition, Mr. Loh has experience working with National Fire Protection Association (NFPA) codes, International Building Code (IBC) code, SFPE and FPE Handbooks. Since Mr. Loh joined the Macau SAR office, Mr. Loh has conducted drawing review, site inspection, commissioning and acceptance testing of fire protection and life safety systems for multiple large scale casino projects, which including inspection for fire sprinkler systems, standpipe, fire alarm, smoke control, HVAC and building egress.

Relevant Project Experience
- Venetian Macao Casino and Resort, Macau SAR
- Sands Casino and Hotel, Macau SAR
- Wynn Casino and Hotel, Macau SAR
- MGM Casino and Hotel, Macau SAR
- City of Dreams Casino and Hotel, Macau SAR
- UT Texas Union, University of Texas, TX
- Ft Hood Volar Barracks, El Paso, TX
- Ft Bliss Aircraft Hangar, El Paso, TX

Registrations
NICET Level 3 #125230

Professional Affiliations
- Tau Beta Pi Engineering Society
- Golden Key International Honor Society
- Pi Tau Sigma Mechanical Engineering Society
- Society of Fire Protection Engineering (SFPE)

Education
- University of Maryland, College Park, MD
  Master of Engineering, Fire Protection Engineering, 2011
- Oklahoma State University, Stillwater, OK
  Bachelor of Science, Mechanical Engineering
SECTORS WE SERVE

COMMERCIAL
Hughes experts help ensure that commercial infrastructure designs meet all building and fire safety code requirements while providing a safe environment for occupants. Hughes has experience with a wide range of commercial projects, including: offices, mixed-use, retail, restaurants, warehouses, and wineries.

GOVERNMENT
We meet the specialized needs of governmental and military agencies and departments. Hughes has performed under contracts to a wide range of federal government, military, and international government organizations, including: Architect of the Capitol, Department of Defense, Environmental Protection Agency, United Nations, and the United States embassies.

HEALTHCARE
The Hughes Healthcare team members draw on their experience with key healthcare agencies including the Joint Commission, Centers for Medicare and Medicaid Services (CMS) and the Department of Health to deliver consulting services and system designs that are practical and in compliance with code requirements.

We conduct facility evaluations that document deficiencies, outline plans for improvement, and design efficient, cost-effective systems. We evaluate both existing facilities and construction projects from pre-design planning through post-construction.

HISTORIC BUILDINGS AND MUSEUMS
Fire protection issues are complex in cultural institutions where fire safety engineers face challenges of protecting priceless property and ensuring life safety for thousands of patrons. We understand the need for designing non-intrusive systems that meet these challenges without impacting the historic fabric of the building. Hughes’ experience ranges from protecting rare zoological samples stored in flammable fluids to preserving the architectural integrity of historic and cultural buildings.

HOSPITALITY AND ENTERTAINMENT
Hughes specializes in the design of hotels, resorts, entertainment and amusement parks, and conference and convention centers. We are experts in hospitality fire protection and life safety systems design and accessibility compliance. Our in-depth knowledge of operational practices provides measurable value to our clients. We collaborate with our clients and other stakeholders to find creative and cost-effective solutions to their challenges.
INDUSTRIAL AND MANUFACTURING
Hughes delivers comprehensive services to manufacturing and industrial facilities. Our experts conduct detailed assessments of a wide range of facility requirements, including fire protection and process safety, risk vulnerabilities, and code compliance. We deliver an unbiased analysis of client needs, develop recommendations for improvement, and provide assistance in implementing solutions. Hughes is certified by the American Institute of Chemical Engineers (AIChE) for conducting security vulnerability analyses in accordance with the CCPS methodology and criteria. We are also a member of the Security and Hazards Mitigation Alliance, and can provide state-of-the-art solutions to any security issue from bioterrorism to industrial theft.

POWER AND ENERGY
Hughes' experts have diversified fire protection experience in support of existing and advanced nuclear power plants, independent spent fuel storage installations, uranium enrichment facilities, fuel fabrication facilities, geologic repositories, nuclear waste processing facilities, an assortment of defense nuclear facilities, and petrochemical facilities.

SCIENCE AND TECHNOLOGY
Our team of designers collaborates to create a specialized fire protection design that meets the specific needs of the client and type of facility. Our experience includes: university research and learning centers, life sciences research, R&D, pharmaceutical and biotech facilities technology research parks, and laboratories.

TELECOM AND DATA CENTERS
We specialize in the design of fire protection, life safety, and security systems in support of data centers, network operations centers, and telecommunications centers, as well as other highly technical facilities. Hughes has been extensively involved with the renovation and upgrade of existing data centers as well as the design of new facilities. In each case, Hughes was instrumental in integrating innovative fire and life safety engineering solutions including: fire detection systems, pre-action sprinkler systems, FM200 and other dry-type suppression systems, CCTV and IP camera systems.

TRANSPORTATION
Hughes assists airports, rail and road vehicle facilities, and marine facilities and ships, to ensure fire and life safety systems are designed properly to reduce the threat to life, property and the environment.
OUR GLOBAL REACH

PROJECTS COMPLETED WORLDWIDE

North America
USA
Canada

South America / Central America
Mexico
Ecuador
Trinidad & Tobago
Panama
Bermuda
Brazil
Uruguay
Argentina
Chile
Colombia
Bolivia

Australia
Australia
New Zealand

Antarctica

Europe
France
England
Portugal
Scotland
Ireland
Italy
Norway
Germany
Finland

Asia
People’s Republic of China
Turkey
Myanmar
Pakistan
Iraq
Saudi Arabia
Abu Dhabi
Dubai
Qatar
India
Maldives
Indonesia
Taiwan
Vietnam
South Korea
Singapore
Malaysia
Thailand
Cambodia
Fiji Islands
OFFICE LOCATIONS

NATIONAL OFFICE LOCATIONS

Arizona: Phoenix
California: Los Angeles, San Diego, San Francisco
Colorado: Colorado Springs, Denver
Florida: Miami, Orlando
Georgia: Atlanta
Illinois: Chicago
Indiana: Fort Wayne
Maine: Bingham
Maryland: Baltimore
Massachusetts: Boston
Nebraska: Lincoln
New Mexico: Albuquerque
New York: Armonk, Manhattan
Nevada: Las Vegas
North Carolina: Charlotte, Raleigh
Ohio: Cincinnati
Pennsylvania: Philadelphia
Rhode Island: Providence
Tennessee: Chattanooga
Texas: Austin, Dallas, Houston
Virginia: Fairfax, Virginia Beach
Washington: Seattle, Vancouver

INTERNATIONAL OFFICE LOCATIONS

China: Hong Kong, Shanghai
Guam: Hagatna
Italy: Milan
Korea: Seoul
Macau: Taipa
Malaysia: Kuala Lumpur
UAE: Abu Dhabi, Dubai
United Kingdom: London

CONTACTS

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Scott Chong, SET
Vice President, APAC Region
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schong@haifire.com

Robert Keough
Senior Vice President, Pacific Rim Operations
+853.2882.7779
rkeough@rjagroup.com

Fang Li
Executive Vice President, China Operations
+86.21.5049.7008
fli@rjagroup.com

Joseph Vaughn, PE
Associate Manager, Pacific Rim
+853.2882.7779
jvaughn@rjagroup.com