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## Burj Dubai: Life Safety and Crisis Response Planning Enhancements

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Jon M. Evenson is a consultant for Rolf Jensen & Associates (RJA) specializing in crisis response planning. Mr. Evenson has 12 years of experience in developing unique solutions to challenges involving crisis management, occupational safety, security and life safety for a variety of occupancy types located throughout the United States and the Middle East. Since joining RJA in 2002, Mr. Evenson has been active in numerous projects ranging from security surveys for the United States Senate to crisis response for high-profile commercial real estate properties. He is currently involved in a megaproject located in Dubai, United Arab Emirates which includes developing a comprehensive site-wide crisis response plan for more than 60 high-rise buildings, the Burj Dubai (world's tallest building) and The Dubai Mall (world's retail facility). Mr. Evenson's unique background allows him to provide a wide range of integrated services in safety, health, security and fire protection to clients throughout the United States and abroad. Mr. Evenson is a member of the National Fire Protection Association (NFPA), a certified Fire Safety Director in the City of Chicago and the author of numerous published articles on crisis response planning. Based in the RJA/Chicago office, He can be reached at (312) 879-7200 or via e-mail at [jevenson@rjagroup.com](mailto:jevenson@rjagroup.com).

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Aaron F. Vanney is an Associate for Rolf Jensen & Associates (RJA) in the International office located in Chicago, IL. Mr. Vanney specializes in international projects including mixed use high-rise buildings, casinos, and convention centers. He has focused his project work in code consulting, developing building fire and life safety strategies and performance-based design.

Since joining RJA, Mr. Vanney has participated in the design of the world's tallest building, has lead teams in the commissioning of the newly developed casino's in Macau, and has managed a number of super-tall building projects throughout the Middle East. He is currently involved in the design of a super-tall building in Doha, Qatar as well as the design and integration of over 20 smoke control systems in a development in Dubai, United Arab Emirates.

Mr. Vanney's engineering and consulting background allows him to integrate unique fire protection solutions that achieve an adequate level of life safety without compromising the architectural design. Mr. Vanney is a member of the National Fire Protection Association (NFPA), a member of the Society of Fire Protection Engineers (SFPE). He is a graduate of Worcester Polytechnic Institute with a degree in Mechanical Engineering and Fire Protection Engineering. Based in the RJA/Chicago office, He can be reached at (312) 879-7200 or via e-mail at [avanney@rjagroup.com](mailto:avanney@rjagroup.com).

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## Abstract

Burj Dubai, the world's tallest building, faces challenges in how building management will respond to various types of crises that may affect the building. The Crisis Response Plan and Life Safety enhancements range from technology-driven (Elevator Assisted Evacuation) to building operational enhancements (Structured Crisis Response Plan). These enhancements are being developed to provide the Burj Dubai Management Team with the ability to effectively manage various types of crises and minimize the effects of a crisis on building occupants, visitors, staff and operations.

This paper will review the Crisis Response Plan and Life Safety enhancements that are currently being developed to assist the Burj Dubai Management Team in managing various crises. Readers will gain an understanding of the challenges facing the Burj Dubai when responding to crises, as well as proactive approaches that include both Life Safety Enhancements and Crisis Response Planning Enhancements. In addition to the discussion of the building and operational enhancements, this paper will discuss the integration of the Burj Dubai Crisis Response Plan with the Downtown Burj Dubai development response plans and Civil Defence operations.

**Keywords:** Burj Dubai, Super Tall, Life Safety, Crisis, Evacuation, Training, Enhancement

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## Introduction

The Burj Dubai is currently under construction in Dubai, United Arab Emirates. Upon completion, the Burj Dubai will hold all four (4) Council on Tall Buildings and Urban Habitat (CTBUH) height records.

The Burj Dubai (Figure 1) will be the focal point of a one (1) km<sup>2</sup> development known as Downtown Burj Dubai. When completed, this development will include over 50 high-rise buildings and the World's Largest Mall (The Dubai Mall).

Emaar Properties PJSC is the developer responsible for the development and construction of the Burj Dubai and Downtown Burj Dubai development. Emaar has identified the concerns related to crisis response planning by proactively addressing the crisis response planning through life safety system enhancements and well-defined Crisis Response Plan.

These enhancements are designed to assist the Burj Dubai Management Team's ability to effectively manage building operations, coordinate emergency response efforts and assist occupants affected by a crisis.

All super-tall buildings face the challenge of managing normal building operations, emergency response efforts and occupant movement before, during and after a crisis. The challenges facing the Burj Dubai are amplified due to its centralized location in the Downtown Burj Dubai, close proximity to The Dubai Mall and its status as the World's Tallest Building.



Figure 1: Burj Dubai Rendering

### Life Safety General Information

The Burj Dubai is being designed to meet building code requirements identified by the International Building Code (IBC) with additional British Standards being incorporated into the building's design. The Burj Dubai design team has designed life safety and fire protection systems that not only meet the requirements, but surpass them, thus providing the occupants of the building with a safer environment.

When evaluating the appropriate degree of fire protection for the building, the design team applied three fundamental life safety concepts:

1. Control the Fire and its Effects
2. Accommodate Occupant Relocation/Evacuation
3. Facilitate Fire-Fighting Operations

### Control the Fire and its Effects

Each of these life safety concepts have been addressed by integrating both passive and active systems with an overall goal of introducing increased reliability. While there are a number of threats to a building of such distinction and size, an uncontrolled fire can threaten occupants, property, and business continuity, making an uncontrolled fire a potentially devastating threat to the building. The first fundamental life safety concept is to use fire protection systems and best design practices to control potential fires and minimize the likelihood of this threat.

An automatic sprinkler system is being installed throughout the building to control the growth and spread of potential fires, while fire resistant construction protects

the building's structure and separates floor-to-floor fire zones, hazardous areas, and the means of egress. While a potential fire is a threat to occupants who may be in its immediate vicinity, the larger threat from a fire is the smoke and toxic gases that may spread to remote areas of the building.

The building is being equipped with various smoke control systems including pressurized exit stairs, smoke resistant construction separating each residential unit, and a corridor exhaust system for the hotel, apartment, and office floors. The active smoke control systems are designed to operate automatically upon receipt of alarm from the fire detection system. A smoke control panel will be provided for first responders, which will allow manual operation of the smoke control systems to assist in fire-fighting operations. (Table 1)

### Accommodate Occupant Relocation & Evacuation

Occupant safety is the primary goal of the fire protection design, however evacuating the building is a unique challenge due to the height of the building and the large population located above the ground floor. A number of features have been integrated into the building to contribute to the safe relocation and evacuation of occupants.

In the event of a fire, the building occupants and staff will be notified of the incident through the fire alarm voice communication system. The system is designed to allow for select messages to notify various building zones.

This feature allows the Crisis Response Team to modify the evacuation strategy if the threat level escalates.

Building Feature	Burj Dubai	Jin Mao Building	Petronas Towers	John Hancock Center	Sears Tower
Refuge Areas	Provided	Provided	Provided	Provided	None Provided
Fire Resistance	Columns: 3 hr Floors: 2 hr	Columns: 3 hr Floors: 2 hr	Columns: 3 hr Floors: 2 hr	Columns: 3 hr Floors: 1½ hr	Columns: 3 hr Floors: 3 hr
Fire Compartment Size	1 per floor	2,000 m <sup>2</sup> in office and parking areas	2,000 m <sup>2</sup> in office areas	1 per floor	1 per floor
Smoke Compartment Size	1 per floor	1 per floor	2,000 m <sup>2</sup> in office areas	1 per floor	1 per floor
Fire Pumps	Yes	Yes	Yes	Yes	Yes
Fireman's Elevator	2 to most levels 1 to every level	2 provided	2 provided	1 provided	1 provided
Smoke Protected Exit Stairs	Pressurized	Pressurized stairs and vestibules	Pressurized	Vestibule with naturally ventilated smoke shaft	Vestibule with naturally ventilated smoke shaft
Floor Smoke Control	Provided	Provided	Provided	Provided	Provided
Fire Command Center	Primary and Secondary Provided	Primary and Remote Provided	Provided	Provided	Provided
Emergency P.A. System	Provided	Provided	Provided	Provided	Provided

Table 1: Super Tall Building Fire and Life Safety Comparison Chart

Upon notification to evacuate, exit signage and emergency lighting assist the trained building staff to direct occupants to the exit stairs. Building occupants are provided with multiple egress paths from each floor via pressurized fire rated exit stairs. The exit stair shafts are vertically isolated at various points to prevent an entire exit stair shaft from being compromised by fire or smoke. Trained staff and dynamic directional signage will assist occupants who may need to transfer to other exit stairs in the event the stair becomes compromised.

### Facilitate Fire-Fighting Operations

While the automatic sprinkler system is intended to control and suppress anticipated fires in the building, the Civil Defence Authorities fulfill a crucial role, whether fighting a fire that was not suppressed by the sprinkler system or ensuring the building is safe and secure after a crisis. The building features various systems intended to facilitate fire-fighting operations.

Upon arrival, the Civil Defence Authority will be briefed by the Crisis Response Team and will be provided access to the fire command center, where they will have the ability to monitor and control the necessary building systems that assist in their fire-fighting strategies.

Access to each floor of the building is provided by the fire rated service elevators which are protected by pressurized vestibules on each floor. Communication of Civil Defence personnel is assisted by a two-way telephone system providing lines of communication between the fire command center and various strategic locations throughout the building. Upon reaching the fire floor, the Civil Defence personnel are provided with standpipe hose connections allowing for manual control and suppression of the fire.

### Life Safety Enhancements

Traditionally, super-tall buildings utilize the “Defend in Place” crisis response strategy. In the “Defend in Place” strategy, building occupants are directed to remain in place until they are directed by building management to evacuate. The Burj Dubai is no exception, but life safety enhancements allow the Burj Dubai Management Team to modify the “Defend in Place” strategy depending on the type and severity of the crisis.

The Burj Dubai Life Safety System has been enhanced using the following methods:

1. Areas of Refuge Floors
2. Elevator-Assisted Evacuation
3. Life Safety Communication Systems

#### Enhancement 1: Areas of Refuge Floors

The Burj Dubai’s design incorporates Areas of Refuge located at strategic levels in the tower. These Areas of Refuge are designed as staging areas during an evacuation for occupants above the Areas of Refuge (Figure 2).

In the event that occupants are required to evacuate, the building staff will direct the building occupants to evacuate their area using fire rated exit stairs down to the nearest Areas of Refuge to await further directions by building staff.

These Areas of Refuge are separated from the remainder of the building by 2-hour fire resistance rated construction and are pressurized to minimize the migration of smoke into the compartment.

Additionally, the Areas of Refuge are being designed to connect various tower stairwells. This design allows occupants to evacuate their specific location and move to the Areas of Refuge and, if directed, proceed down the tower through multiple protected stairwells.

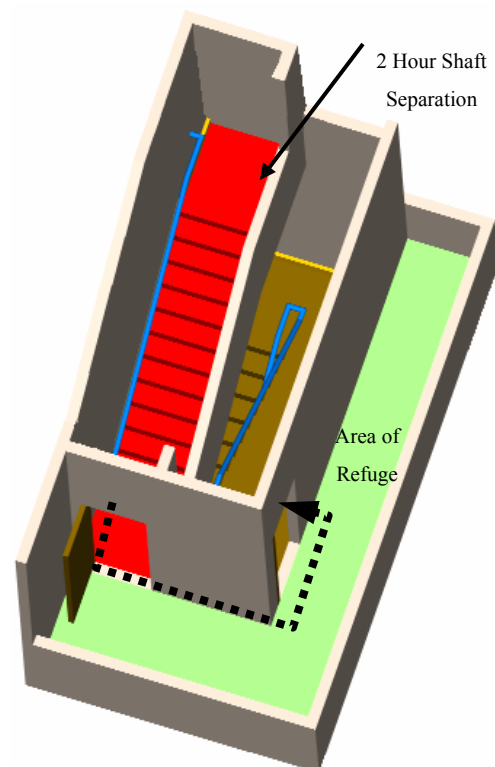


Figure 2: Typical Area of Refuge Configuration

The Areas of Refuge allow for a controlled evacuation of occupants to a pre-determined location that allows first responders to coordinate the evacuation strategy of occupants affected by the crisis.

#### Enhancement 2: Elevator-Assisted Evacuation

In super-tall high rise buildings, one of the primary concerns is how to effectively and quickly move thousands of occupants from the building during a full-building evacuation. The Burj Dubai has implemented a pro-active approach to enhance the evacuation process.

The Burj Dubai Elevator-Assisted Evacuation Strategy is an evacuation method that utilizes specific lifts in the building to move occupants from pre-determined levels throughout the tower. The

Elevator-Assisted Evacuation Strategy will rely on lifts that have been enhanced beyond standard code requirements including:

1. Shaft Visual Inspection Capabilities
2. Raised Lift Door Thresholds
3. Water-Resistant Equipment
4. Emergency Power Back-Up

While most crises will not initially require a full-building evacuation, the Burj Dubai is being designed with a lift system that can assist with the evacuation of occupants and response efforts during a crisis. The “Elevator-Assisted Evacuation” Strategy is designed around designated lifts being controlled during a crisis by the Dubai Civil Defence and will allow first responders, trained building staff and occupants to be safely moved throughout the building during a crisis.

Rolf Jensen & Associates, Inc. conducted a full building evacuation analysis to determine the percent reduction in evacuation time using various elevator-assisted evacuation scenarios. The study provided the design team a quantifiable metric to identify how many elevators will be enhanced. The Burj Dubai will utilize ten enhanced elevators to assist the Crisis Response Team in a full building evacuation.

Evacuation Scenario	Percent Reduction in Base Condition Evacuation Time
0 Elevators	-
4 Elevators	22 %
10 Elevators	47 %

The Burj Dubai Elevator-Assisted Evacuation lifts, with the enhanced design features, will quickly and safely evacuate occupants, as well as move first responders to the location of the crisis quicker than standard methods.

### Enhancement 3: Life Safety Communication

Another concern during a crisis is information flow and management. The standard communication strategy for Burj Dubai is to automatically notify occupants in the fire compartment of alarm and adjacent compartments, through the emergency voice/alarm communication system.

The Burj Dubai is also equipped with an enhanced building communication system that includes both building Public Address Systems as well as Liquid Crystal Displays (LCD) installed in all residential units, hotel rooms and Areas of Refuge Floors.

These LCD’s will allow the Dubai Civil Defence and Burj Dubai Management Team to quickly and effectively disseminate information related to the crisis to occupants both affected and not directly affected by the crisis. These LCD’s can provide information including current crisis information, evacuation procedures and unsafe conditions related to the crisis.

With the enhanced life safety communications systems designed and installed, the Burj Dubai

Management Team and Dubai Civil Defence will be capable of developing, implanting and controlling crisis-related information and increase the speed and effectiveness of the crisis response management.

### Crisis Response Planning General Information

When the World Trade Center was bombed by terrorists in 1993 and again on September 11, 2001, crisis response planning became a focus for owners, end-users and government agencies. Crisis Response Plans that were developed by the various companies inside the World Trade Center reduced the overall devastation and saved lives. Lives were saved due to Crisis Response Plans implementing a sound response strategy to evacuate their staff from the towers in an orderly manner to the exterior of the building.

The National Fire Protection Association (NFPA) identified the need to create guidelines to assist in the creation of Crisis Response Plans that can be implemented during a crisis. NFPA 1620 Recommended Practices for Pre-Incident Planning provides organizations with the basic guidelines for the development of crisis response plans. These guidelines focus on all aspects of the Crisis Response Plan from assessment of potential risks to training guidelines to ensure that the Crisis Response Plan can be implemented successfully by the building management staff during a crisis situation.

Emaar Properties PJSC, a global property developer, determined that the Burj Dubai should have a Crisis Response Plan developed that provides the Burj Dubai Building Management Team and occupants with the key strategies to respond to various crises.

Emaar Properties PJSC decided that the Crisis Response Planning development process should begin as the design of the building and life safety systems were being finalized. This proactive approach allowed Emaar and the Dubai Civil Defence to create a relationship that is vital to overall success of the Crisis Response Plan by allowing the Civil Defence to review and comment on the Crisis Response Plan and elements of the building’s fire and life safety strategies.

The Burj Dubai Crisis Response Plan is being developed to provide procedural responses to the various crises that could occur. The types of crises have been divided into categories including:

1. Building System-Related Crises
2. Human-Related Crises
3. Weather-Related Crises

The goal of the Crisis Response Plan is to develop crisis response procedures that can be activated until the arrival of the Dubai Civil Defence or Dubai Police Department.

The Burj Dubai Crisis Response Plan has been enhanced in the following methods:

1. Response Team Organization
2. Crisis Response Management Strategies

3. Response Procedure Documents
4. Mutual Aid Support
5. Continual Crisis Response Training
6. Integration with Downtown Burj Dubai

As the Crisis Response Plan is being developed, the Dubai Civil Defence and Dubai Police Department are actively involved to identify challenges or issues they have with the response procedures, team organization or other aspects that need to be addressed prior to the building opening.

Upon completion, the Burj Dubai Crisis Response Plan will be developed into electronic and hard copy formats and located both on-site in pre-determined locations and with the Dubai Civil Defence. Multiple locations ensure that in the event that a large scale crisis occurs, the documentation needed to manage the crisis will be available.

### **Enhancement 1: Response Team Organization**

The Burj Dubai will manage crisis response through a two (2) tier response team organization. The primary crisis response management team (Crisis Command Team) will oversee all response efforts, while the secondary response teams (Zone Response Teams) will be responsible for the management of response efforts in their assigned zones.

To coordinate the initial crisis response efforts at the Burj Dubai, a Crisis Command Team is being developed to include key management team members from the Burj Dubai Management Team. The Crisis Command Team is designed to provide a link between building staff and the Dubai Civil Defence and/or Dubai Police Department before, during and after a crisis.

In addition to the key team members, additional Burj Dubai Management Team members are identified to assist in large scale crises including managing mutual aid support, crisis response documentation and the management of crisis media information.

Each of the Crisis Command Team positions will be activated when their services are required until the arrival of the Dubai Civil Defence or Dubai Police Department. Upon arrival of the local authorities, the Crisis Command Team is designed to become a subset support group to the local authorities.

The Crisis Command Team shall coordinate the response efforts prior to the arrival of the Dubai Civil Defence and/or Dubai Police Department, while the Zone Response Teams will provide a localized response in their assigned zones during the crisis.

The Zone Response Teams will be provided crisis information and directions from a single member of the Crisis Command Team. This approach will reduce miscommunications and information management mistakes that may occur during a crisis by limiting the source of crisis information to a single source. In addition, the Zone Response Teams will report crisis information to the same Crisis Command Team position to ensure accurate information is reported from the

area(s) affected by the crisis to the Crisis Command Team and local authorities.

The goal of the Zone Response Teams is to provide quick response resources by building staff that are familiar with the zone operations and occupants. This approach reduces the time needed to deploy staff to the area affected by the crisis and speed up the response efforts to minimize the severity of the crisis.

The Zone Response Teams will only be activated during crises that directly affect their assigned areas of operations. This approach will limit the amount of building staff and building occupants that are adversely affected by the crisis and reduce the amount of occupants that require assistance during a crisis.

The Zone Response Teams are comprised of building staff that have intimate knowledge of building operations in their assigned building zones. This approach ensures that those responding to a crisis in a building will understand the layout and operations of the zone and will be familiar with the occupants present.

The Burj Dubai Crisis Response Strategies hinge on the Burj Dubai Crisis Response Organization's ability to comprehend and implement their designated duties and responsibilities during various crises.

### **Enhancement 2: Response Management Structure**

The Burj Dubai will encounter crises on a daily basis and has developed Crisis Response Management Structures to effectively manage small (Crisis Level 1) to large scale crises (Crisis Level 4).

Each type of crisis that can occur at the Burj Dubai has been identified with four specific Crisis Levels (1-4) to allow for escalation and de-escalation of response efforts and resources. Crisis Level 1 is a small scale crisis that could affect a small number of occupants or area of the building. Crisis Level 4 is a large scale crisis that could affect a significant number of occupants or a large portion of the building.

Each type of crisis has trigger points that escalate the crisis from Crisis Level 1 to Crisis Level 4. Within each Crisis Level, there is information on how the crisis will be managed and what resources will be utilized to assist in the response efforts.

This approach allows the Burj Dubai Management Team to coordinate response efforts and resources without affecting building operations not affected by the crisis. In addition, this type of scalable approach allows the Burj Dubai Building Management to increase or decrease response resources and personnel as dictated by the crisis' severity.

During small scale crises, the Crisis Command Team will determine the management structure and Zone Response Teams that should be activated due to the location and severity of the crisis. The Crisis Command Team will work with the Front of House (FOH) and Back of House (BOH) management to ensure that response efforts are being implemented and building operations are continuing in the building zones not directly affected by the crisis.

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In the event the crisis situation escalates, the Crisis Command Team shall provide initial response efforts until the arrival of the Dubai Civil Defence and/or Dubai Police Department. These types of events will adversely affect multiple zones and will require the activation of the entire Crisis Command Team to manage the initial response efforts.

The development of the Crisis Levels and various management structures, allows the Burj Dubai Management Team to effectively respond to a variety of crises on a consistent basis.

### **Enhancement 3: Response Procedure Documents**

The Burj Dubai Crisis Response Plan has developed Crisis Response Procedures for over 50 different crises to assist the Burj Dubai Crisis Command Team and Zone Response Teams in responding to a variety of crises that could occur in the building. Each of the Response Procedures is designed to provide a documented response procedure that can be utilized to train staff in how their position is responsible for responding to a crisis.

The Response Procedures are being developed in a standard format to allow building staff assigned to the Crisis Command Team and Zone Response Teams the ability to understand and learn their roles and responsibilities for each type of crisis in a standard formatted document.

The Response Procedures include the following sections to address the response efforts required for each category of crisis:

1. General Response Information
2. Crisis Response Flowcharts
3. Crisis Command Team Tasks
4. Zone Response Team Tasks
5. Appendix Information

In the General Response Information section of the Response Procedures, general crisis response information related to 1) Activation, 2) Deactivation, 3) Notifications and 4) Civil Defence Interaction. This is general information that identifies how the appropriate procedure will be activated and how information is communicated to both building occupants and Civil Defence.

In the Response section, response steps are identified in both written and graphical methods. The responses were developed in a graphical format to be used later by Burj Dubai Building Management during the Crisis Command Team and Zone Response Team training sessions.

In the Crisis Command and Zone Response Team Tasks sections, response tasks are being identified for each role for each Crisis Level. These checklists will provide documentation of tasks that staff member will be responsible for during a crisis. Additionally, the checklists will be developed into a training document to be used by Burj Dubai Building Management during the Crisis Command Team and Zone Response Teams training

sessions.

The Response Procedures provide the basic documentation of the Burj Dubai Crisis Response Plan, and also provide information to be used during training of the building's staff responsible for assisting in crisis response efforts.

In addition to procedural steps for the Crisis Command Team and Zone Response Teams, the Crisis Procedural Responses also identify when additional outside support may be requested and activated. During large scale crises, Mutual Aid Support is a critical element in the response efforts.

### **Enhancement 4: Mutual Aid Support**

During large scale crises, the Burj Dubai Management Team may need additional support to assist with the response efforts during and after the crisis. Mutual Aid Support can outsource response resources and allow the Burj Dubai Management Team concentrate on assisting those building occupants that are directly affected by the crisis.

To be effective during a crisis, Mutual Aid Support needs to be pre-approved with signed agreements in place so that if support is needed, the needed Mutual Aid Support can immediately be implemented without delays due to missing documentation and agreements.

The Burj Dubai Crisis Response Plan has identified Mutual Aid Support that may be required during a large scale crisis. Mutual Aid Support includes providing manpower to assist in response efforts, transportation to move occupants off-site, perishable materials including food and water for occupants evacuated from the building, etc.

Due to the number of occupants and the nature of the building, Mutual Aid Support is critical to supplying additional support and materials from food and water to emergency generator fuel. To be effective each party must be in agreement before the building is operational and a crisis is occurred.

### **Enhancement 5: Crisis Response Training**

The Burj Dubai Crisis Response Training Program is being developed to be an interactive program that includes Classroom Training Sessions, Table-Top Training Sessions and Crisis Response Drills.

Traditional Classroom Training sessions are being designed to provide training information to the building staff and management that will be responsible for the management and implementation of the Crisis Response Plan. This style of training will be conducted with all employees on a semi-annual basis.

The second stage of the Crisis Response Training Program is conducting Table-Top Training Sessions. These sessions provide the Crisis Command Team and Zone Response Team members with "real-life" scenarios where they are responsible for working through their response efforts. Table-Top Training Sessions are valuable to the Crisis Command Team and Zone Response Teams because they allow responders to review



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their response procedures in a controlled environment.

The last stage of the Crisis Response Training Program is to conduct live drills with building staff and selected occupants. Due to the nature of the building, full-scale drills will be difficult to implement, but live drills will be conducted with building staff on selected levels to further enhance their comprehension of their responsibilities during a crisis.

Throughout the Crisis Response Training Program, the Dubai Civil Defence, Dubai Police Departments and the Downtown Burj Dubai Crisis Management Team will be invited to participate in the training. Their involvement in the training sessions will provide an additional level of understanding of the Burj Dubai Crisis Response Plan procedures.

#### **Enhancement 6: Integration with Downtown Burj Dubai Site-Wide Crisis Management Plan**

The Downtown Burj Dubai development will require the integration of the Burj Dubai Crisis Response Plan with the Site-Wide Crisis Management Plan that is currently being developed to provide a global response strategy for the entire development. The goal of the integration is to ensure that in the event of a crisis affecting the Burj Dubai or other parcels in the Downtown Burj Dubai, a coordinated response effort is implemented.

The Downtown Burj Dubai is currently developing a Site-Wide Crisis Management Plan that will identify site-wide management policies to manage crises that affect the entire development. In addition, standardized Crisis Response Plans are being developed for each of the parcels identified in the development. The standardized response plans will be designed in accordance with the Burj Dubai Crisis Response Plan and corporate standards.

The benefits of coordinating the Crisis Response Plan for the Burj Dubai and Downtown Burj Dubai development will allow for sharing of technologies, staffing and resources during and after a crisis has occurred. Additionally, the coordination will help minimize the effects a crisis may have on the building occupants, visitors and staff at the Burj Dubai and Downtown Burj Dubai parcels.

#### **Conclusions**

The Burj Dubai is going to face challenges in responding to crises that occur and affect occupants and operations. To address Crisis Response Planning, Emaar Properties PJSC has taken a proactive approach to solidify response strategies that can be implemented from day one of operations and effectively manage various types of crises that may affect the Burj Dubai.

With the iconic nature of the Burj Dubai, Emaar Properties acknowledges that crises that may occur will be considered world news and the manner in which the Burj Dubai Management Team responds and manages the initial crisis response efforts will be thoroughly examined. To address this concern, the Burj Dubai Management Team is working on implementing proactive approaches

to effectively manage crises, while continuing operations.

A combination of the building's life safety features and operational management will assist the Burj Dubai Management Team in their efforts to provide a safe building for occupants, visitors and staff that will visit, live and work in the World's Tallest Building.

#### **References**

- EVENSON, J., VANNEY A. (2007). *Case Study: Burj Dubai: Innovations in Crisis Response Planning, Design and Operations*. Proceedings of National Fire Protection Association 2007 World Safety Conference and Exposition. June 4, 2007, Boston, MA
- ICC, International Code Council, Inc., *2003 International Building Code*.
- NFPA, National Fire Protection Association, *NFPA 1620 Recommended Practice for Pre-Incident Planning*.