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Jeffrey Heller

On September 11th, one of the world's great icons was destroyed in an act of vicious barbarity, and we, as design professionals, are compelled to look not only at the human costs of the event, but at the technical aspects as well. By looking at the lessons of this profound tragedy, we might further improve the life-safety aspects of high-rise buildings and provide a greater margin of safety for the people who inhabit them. In doing so, we honor those who were lost on September 11th with a lasting legacy to their sacrifice.

This proposal for an enhanced emergency core was inspired by the images of the courageous firefighters climbing the stairs of the World Trade Center against the torrent of occupants pouring down the stairs. The

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stories of individuals interrupting their exiting to stand aside while badly injured workers were brought to ground-level further motivates us to develop designs to enhance exiting options in the future.

Existing Layout

Most contemporary high-rises have fire stairs at opposite ends of their core, with elevators, bathrooms, and various utility and air handling shafts located between those stairs. During an emergency, tenant elevators are usually recalled to the ground floor and building occupants head for the fire stairs to exit to the relative safety of the street.

High-rise buildings, particularly those over 30 stories, typically have dedicated freight elevators adjacent to the tenant hi-rise elevator bank. These freight elevators typically have dedicated service lobbies. Because the freight elevator services every floor of the building, it is usually the one unit set up for operation during an emergency, controlled by the fire department from the fire control room in the lobby. Sometimes, firefighters have more than one elevator at their disposal, but normally, the freight unit provides emergency elevator access.

Proposed Layout

In light of the World Trade Center experience, we are proposing an enhanced emergency exiting concept. This proposal combines the fire stairs and freight lobby into a unified evacuation core that can be pressurized and strengthened. In the case of an emergency, able-bodied people would go to the staircase, as usual. People who were injured or disabled, however, would have the option of going into the pressurized service lobby, now transformed into an area of refuge. Once in the refuge area, the disabled and injured could either be assisted down the staircase by able-bodied building occupants, or, if conditions permit, wait safely in the pressurized evacuation core until rescued by emergency personnel.

With this proposed layout, the service elevator would become the major access route for firefighters and other emergency workers. The evacuation core could provide an opportunity for advanced

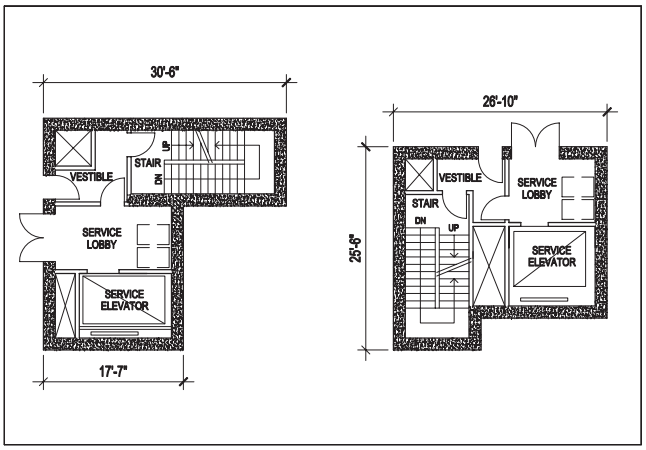

Figure 1. Fire access core

communications so that people in the refuge area could advise the fire control room of the status on that particular floor. Smoke and fire sensors as well as camera units within the refuge core could help firefighters determine whether it was safe to stop the elevator at the floor in question. If firefighters felt the floor (or floors) with the emergency zone was too dangerous to stop at, they could, as is their normal practice, get off at a lower floor and ascend one or two floors to the scene of the emergency.

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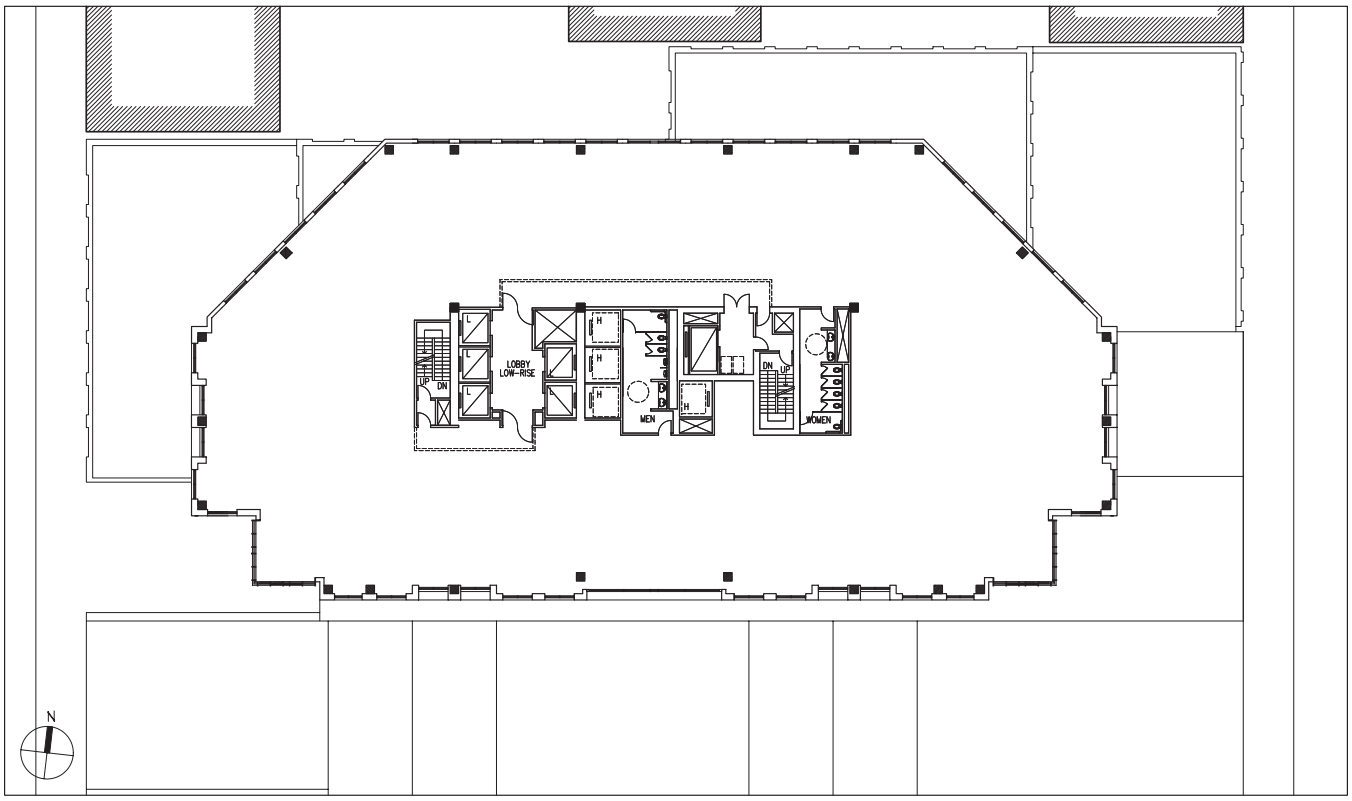

Figure 2. Fire access core

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Benefits of Layout

This concept for an enhanced emergency core has parallels with Britain's requirement for a dedicated fireman's lift at each stair, but it differs in two significant ways. Rather than building separate freight and firefighter lifts, this enhanced evacuation core concept has the service elevator doing double duty … with little additional cost or additional area required. Furthermore, incorporating the fire stair with the freight elevator and its service lobby creates a viable area of refuge for disabled and injured occupants at every level of the building.

Because the elevator service lobby and stair would be a single hardened and pressurized unit, there would be a substantial level of security within that area. Even if the service elevator was inoperable and/or

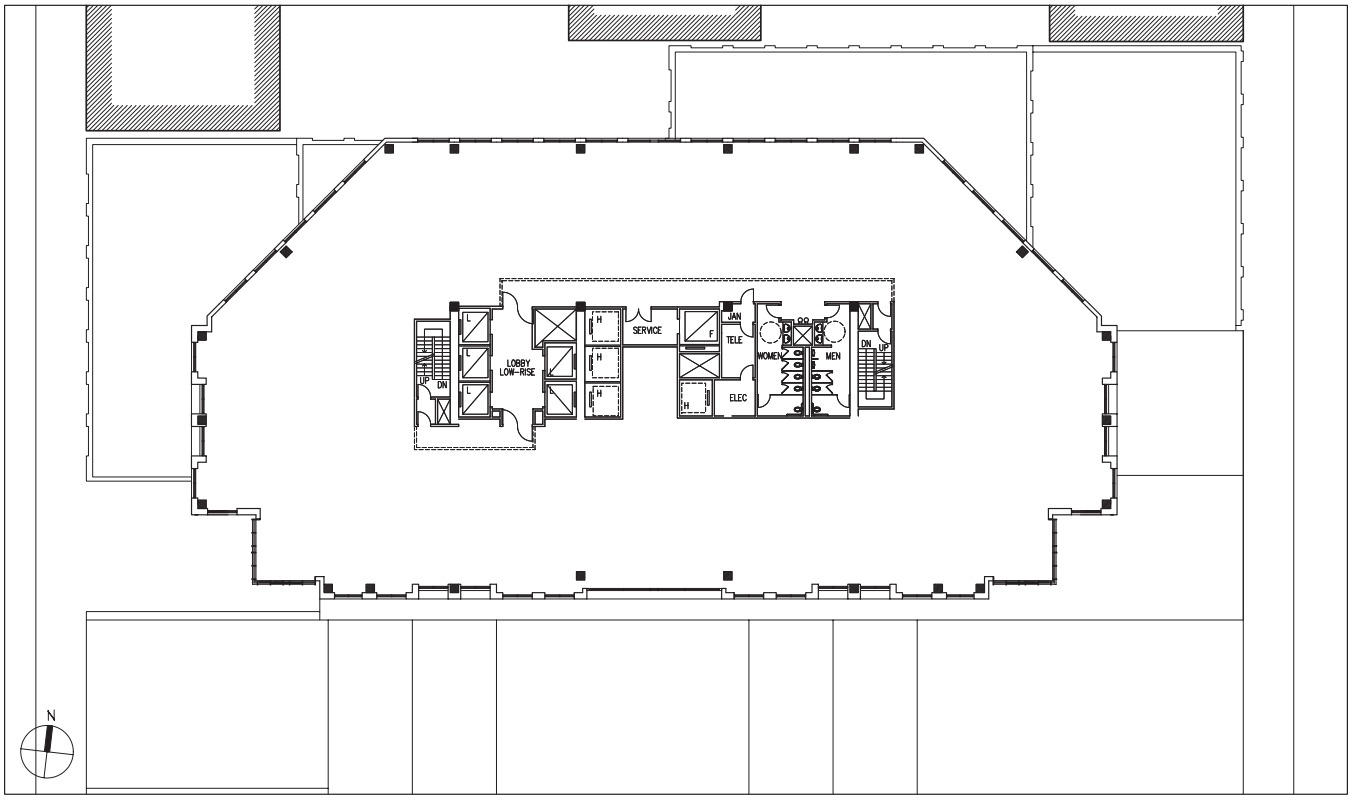

Figure 3. Typical core

the emergency was so urgent it was infeasible for occupants to wait for firefighters to come by elevator, the interconnecting door to the fire stair would allow an alternative means of evacuation.

Having an area of refuge at each level of the building is more disabled-friendly than an alternate scenario that calls for occupants and emergency personnel to move vertically to intermittent refuge floors. In the case of badly injured occupants, the opportunity to have an area of refuge at their level would clearly provide a far more viable option.

While the human costs of September 11th were profound, this disaster has caused all design professionals to reconsider the technical aspects of high-rise safety. By incorporating new concepts such as the enhanced emergency core and other proposals by the Tall Building Council, we may be able to reduce the loss of life during high-rise emergencies in the future.

About the Author

Jeffrey Heller is President of Heller Manus Architects, a multi-disciplined San Francisco firm founded in 1984. Mr. Heller's professional achievements include Fellow of the American Institute of Architects, Vice President of the California Architects Board, Member of the Bay Bridge East Span Design Advisory Panel, Chair of the Urban Land Institute's Development Regulation Council, and Director and Advisory Board Member of SPUR. Mr. Heller has both Bachelor's and Master's degrees in Architecture and Urban Design from the Massachusetts Institute of Technology.