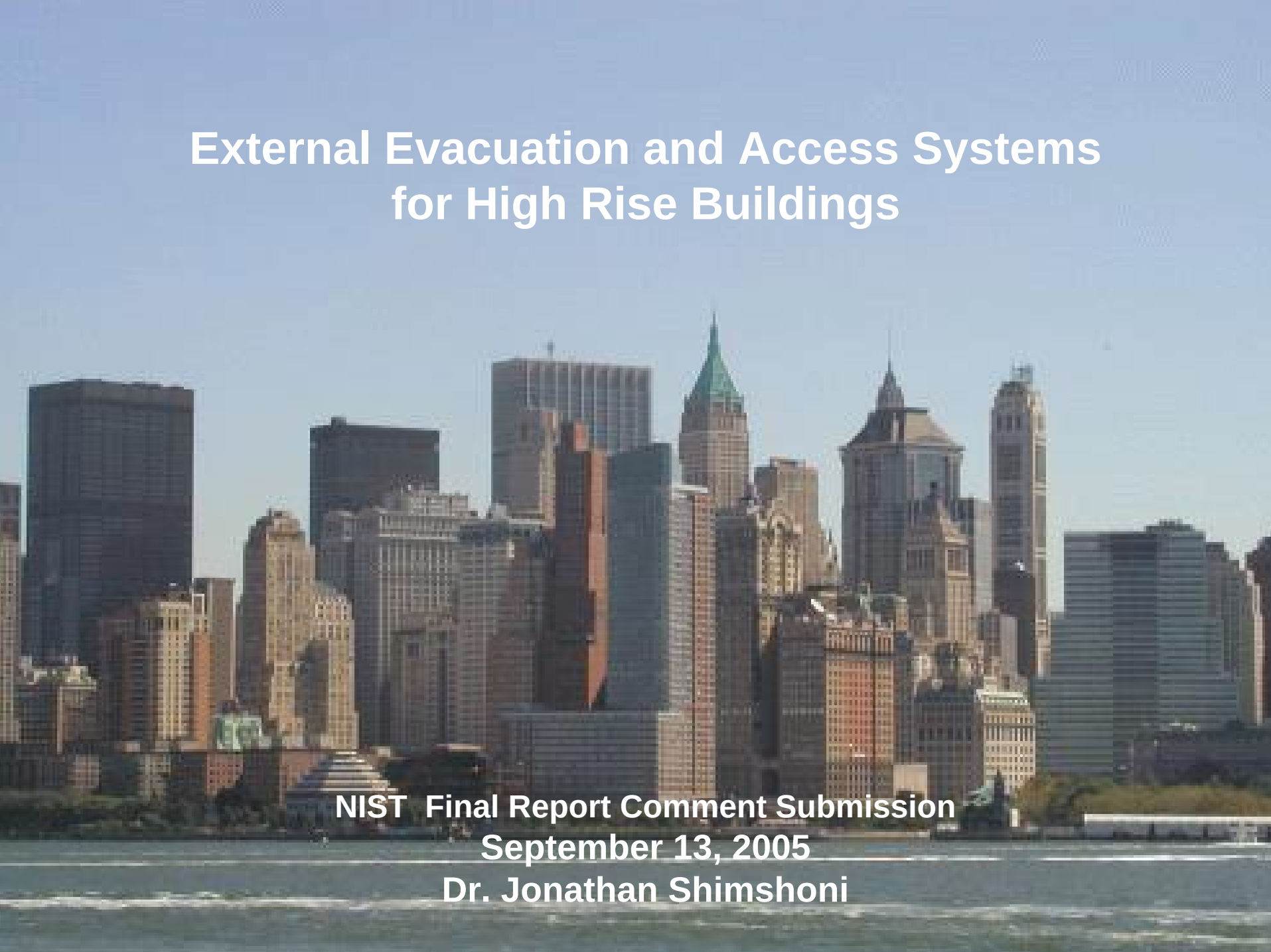
External Evacuation and Access Systems for High Rise Buildings



NIST Final Report Comment Submission
September 13, 2005
Dr. Jonathan Shimshoni

Chapter 9.2--NIST's Recommendations for Improving the Safety of Buildings, Occupants, and Emergency Responders

9.2.5 Group 5. Improved Building Evacuation

- Accommodation of timely full building evacuation (#17)
- Maximum remoteness and functional integrity of egress systems (#18)
- Evaluation of evacuation technologies for future use (#20)
  - an equal opportunity for evacuation for all occupants
  - to facilitate emergency response access

9.2.6 Group 6. Improved Emergency Response

- Installation of fire-protected and structural hardened elevators (#21)
  - to provide timely emergency response access
  - to allow evacuation of mobility-impaired occupant

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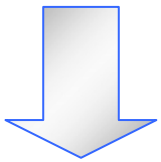
Egress and Access Improvement

Improving the interior-based approach – important but not enough

- **– applicable mostly for new buildings**
- **– not robust, vulnerable**
- **– vertical movement—problematic**
- **– cost-effectiveness—low**



The market has identified the potential of the external dimension—has developed a plethora of external evacuation and access technologies

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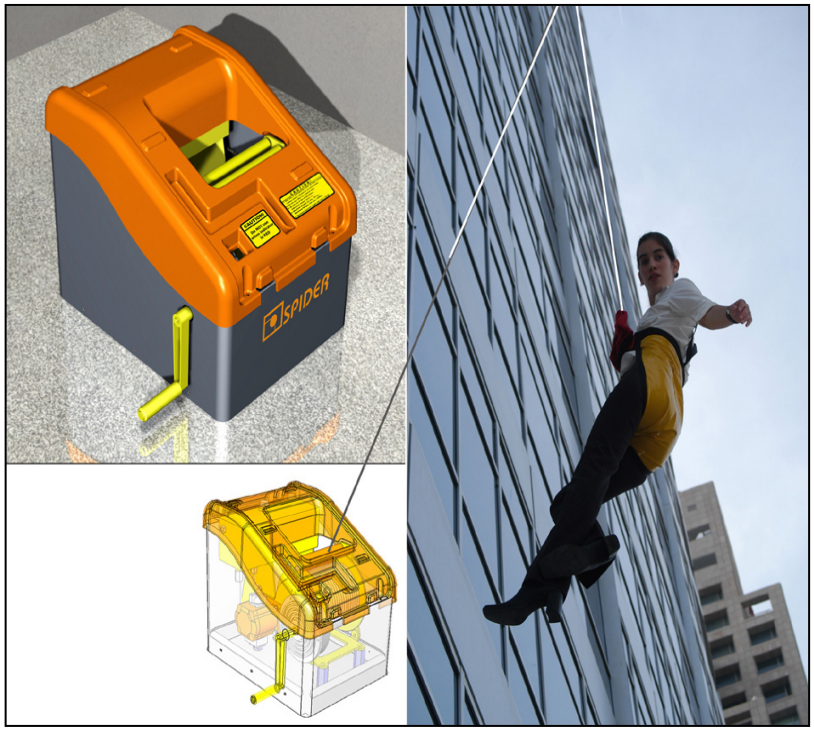
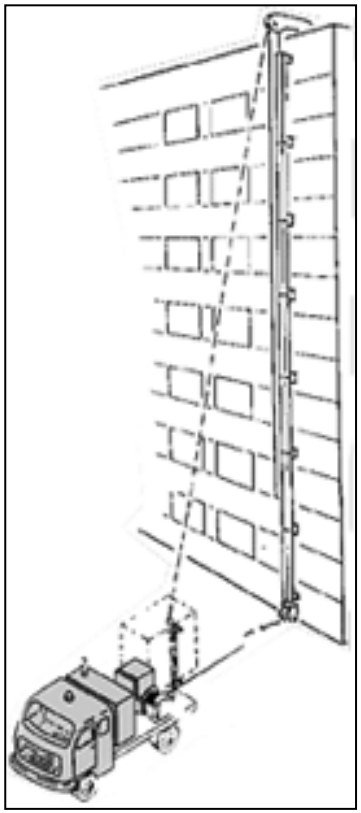
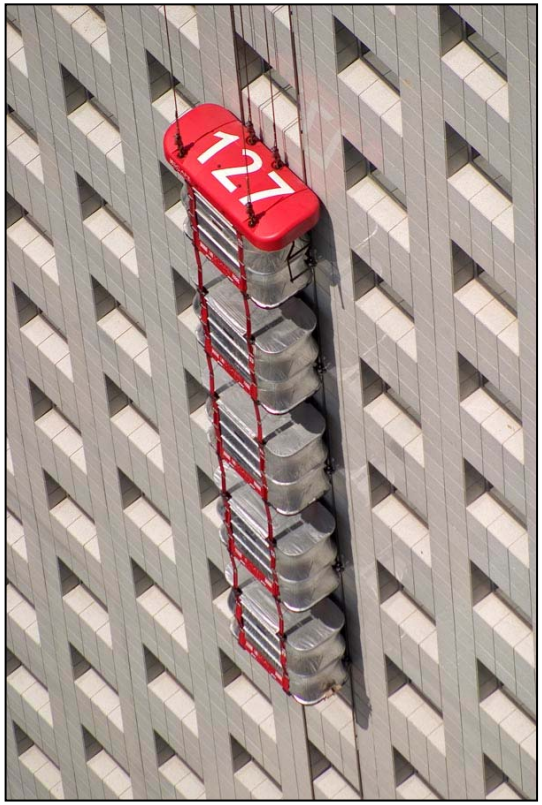
External Evacuation and Access Technologies

External Evacuation and Access Technologies (2)



External Evacuation and Access Technologies (3)





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Around the World

Japan Regulation—supplemental escape venue
Over 250,000 Japanese units sold worldwide

Asia Certification—Korea Fire Equipment Inspection Co
Several producers, sales and installations

France Regulation—supplemental escape venue, specific groups of buildings
CD installations in hotels, hospitals, ministries and more

Germany, Spain, Austria, Finland, Australia
Several producers, thousands of installations, TUV certification

Canada Over 130,000 Canadian units installed worldwide

Israel Regulation—development of standards by Standards Institution of Israel (SII), Fire Commissioner and IDF
Certification by SII and TUV
Several producers and installations

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Regulatory Process

The acceleration in development of solutions after the WTC disaster energized the regulatory process:

NFPA Technical Committee on Means of Egress developing language defining and recognizing escape devices and systems as supplemental evacuation equipment

ASTM Subcommittee E06.77 on High-Rise Building External Evacuation Devices is in the process of developing standards for three families of devices:

- **Platform Rescue Systems (PRS)**
- **Controlled Descent Devices (CDD)**
- **Chutes Devices (CD)**

Standards Institution of Israel (SII) and ASTM are cooperating to develop, in parallel, US and Israeli standards

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External Evacuation and Access--Advantages

- **Breaks through the geometry boundaries of tall building:**
  - **Suitable for both new and existing buildings**
  - **Relatively easy and cost-effective to implement**

- **Increases the capacity of a building's means of evacuation—can be used to accommodate timely full evacuation of occupants (#17)**

- **Enhances the remoteness of egress components (#18)**

- **Suitable for evacuees of all ages and all abilities—allows all occupants an equal opportunity for evacuation (#20)**

- **Provides timely emergency access to responders, allows evacuation of mobility-impaired occupants (#21)**

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Comment Number 1

Page 211, Recommendation 17

Suggestion for revision:

"NIST recommends that tall buildings should be designed, *or in case of existing structures be reviewed for retrofitting,* to accommodate timely full building evacuation of occupants due to building-specific or large-scale emergencies such as widespread power outages, major earthquakes, tornadoes, hurricanes without sufficient advanced warning, fires, accidental explosions, and terrorist attack. Building size, population, function, and iconic status should be taken into account in designing the egress system.
The capacity of stairwells and exits, *together with other means of evacuation and access,* should be adequate to accommodate counterflow due to emergency access by responders."

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Comment Number 2

Page 211, Recommendation 17, paragraph c, first sentence

Suggestion for revision:

"If protected/hardened elevators are provided for emergency responders but become unusable during emergency, due to a malfunction or a conventional treat whose magnitude exceeds the magnitude considered in design, sufficient (*stairwell)* *means of evacuation and access* capacity should be provided to ensure timely emergency responders access to buildings that are undergoing full evacuation. Such capacity could be provided either via dedicated stairways for fire services use or by building sufficient stairway capacity (i.e., number and width of stairways and/or use of scissor stairs credited as a single stair) *or by external evacuation and access technologies* to accommodate the evacuation of building occupants while allowing access to emergency responders with minimal hindrance from occupant counterflow."

ESCAPE Rescue Systems

Comment Number 3

Page 212, Recommendation 18

Suggestion for revision:

"NIST recommends that egress systems should be designed: (1) to maximize remoteness of egress components (i.e., stairs, elevators, *evacuation and access systems*, exits) without negatively impacting the average travel distance;…"

ESCAPE Rescue Systems

Comment Number 4

Page 214, Recommendation 20

Suggestion for revision:

"NIST recommends that the full range of current and next generation evacuation technologies should be evaluated for future use, including protected/hardened elevators, (~~*exterior escape*~~) *external evacuation and access* devices, and stairwell navigation devices, which may allow all occupants an equal opportunity for evacuation, *additional evacuation capacity* and facilitate emergency response access."

ESCAPE Rescue Systems

Comment Number 5

Page 214, Recommendation 21, first paragraph:

Suggestion for revision:

"NIST recommends the installation of *evacuation and access systems (i.e.* fire-protected and structurally hardened elevators *or external evacuation and access systems)* to (~~*improve emergency response activities in tall Buildings by providing*~~) *provide* timely emergency access to responders and allowing evacuation of mobility-impaired building occupants. Such (~~*elevators*~~) *systems* should be (~~*installed for exclusive use*~~) *operated* by emergency responders during emergencies. In tall buildings, consideration also should be given to installing such (~~*elevators*~~) *systems* for use by all occupants."

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