

responders. In the time available, they were not able to get very far. For example, emergency responders wearing police uniforms, not wearing Self-contained Breathing Apparatus (SCBA), and not carrying extra equipment, were able to climb the stairs at a rate of approximately 1.4 min per floor while climbing to floors in the 40s inside of WTC 1. The climbing rate for firefighters wearing protective clothing and SCBA and carrying extra firefighting and rescue equipment was about 2 min per floor. The downward flow of evacuees, especially those who had physical disabilities or were obese, also slowed the responders' progress, especially in the 44 in. wide stairwells. The flow of the evacuees caused teams of emergency responders to become separated, further disrupting team operations.

Neither the number of responders who entered the towers nor the floors they reached are known, due to the incompleteness of the Command Boards and their eventual destruction. From radio communications and first-person interviews, it appears that there were responders as high as floors in the 50s in WTC 1 and the 78th floor in WTC 2.

7.2.5 Communications

There were multiple equipment systems for command-to-field communications, for responders to communicate among themselves, and for contact to and from building occupants:

- Landline telephone system (including access to the 9-1-1 system),
- Emergency announcement systems within WTC 1 and WTC 2,
- Cellular systems (including access to the 9-1-1 system),
- Warden phones (tower stair landings to Command Post),
- Firefighter phones, called standpipe phones, in the WTC towers, and
- FDNY handie-talkies, with booster support from a repeaters on WTC 5 and a Battalion car repeater located inside WTC 2.

Within WTC 1, the system used to make the emergency announcements was disabled by the first aircraft impact, communications to the elevators in the upper third of the buildings were lost, the Warden phones did not work, and attempts to use the landline phones to contact people upstairs were unsuccessful due to the failure of some phones in the building.

Little is known about the function of the internal communications inside WTC 2 after the aircraft struck the building. This is because all of the key emergency responders working inside WTC 2 died when the building collapsed. However, interviews with some occupants who evacuated from the building and interviews with emergency responders who communicated with counterparts inside WTC 2 indicated the following: some of the building's public address systems were working, some of the elevator phone systems were working, and some of the landline telephones were working. It is not known if the Warden Phone system was fully operational or if the standpipe phones were operational. Emergency responder communications inside WTC 2 primarily depended on radio and face-to-face communications.