

When a Large Building is impacted by an Airplane, the making of a Burn Mass Casualty Incident (BMCI)



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Introduction

This paper focuses on the risks associated with the rapid development of aviation as well as the rapid growth of high-rise or large capacity buildings. The aim of the work is to further evaluate the incidence of building strikes involving aircraft. With this scenario, a burn injury is the most common for survivors. This paper will examine the nature and frequency of these events. Knowing the risks can aid the planning effort for all involved with a role in the response to a mass casualty incident.

Methods

The researchers reviewed historical records involving airplane crashes into large occupied buildings. This review included databases searched such as PubMed as well as commonly used search engines; Google and Bing. Inclusion criteria for buildings included those either considered mid-rise or high-rise (typically considered taller than 33 meters [108 feet]) or a large footprint (defined as 5000 square meters [54820 square feet]). Furthermore, the buildings had to be occupied.

The airplanes included civilian (commercial) and military aircraft. The literature reviewed included historical accounts and historical references from a variety of news archival services that were chronicled in articles published and indexed in the PubMed search engine or found in common historical databases. The search also included the National Transportation Safety Board (NTSB) reports.

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Several examples from the results includes:



Austin, Texas, February 18, 2010. Single engine aircraft impacts the IRS Building killing 2 (pilot and one occupant of the building).



Indianapolis IN, October 20, 1987. A-7D Corsair II impacts hotel attempting to make an emergency landing at the Indianapolis Airport. During flight from Pittsburgh to Nevada, the pilot reported engine failure. Pilot attempting to land but when he realized he would be short of the runway, steered to a highway area and ejected just before ground impact. Jet impacted the highway, skipped across the top of a nearby bank and struck the front of the Ramada Inn. Total killed 10; all guests or employees of the Ramada Inn.



The Netherlands, October 4, 1992. Boeing 747 Cargo Plane impacts apartment building on approach to airport to Amsterdam Airport. During takeoff, two engines detached (stress/maintenance issue) creating wing damage. Pilot attempting to return to land but crashed into an apartment building near the airport. Total killed 43; crew/passenger of 4 and ground deaths of 39.



Jakarta, Indonesia, June 13, 2015. S C130 Cargo aircraft impacts apartment building while attempting to return and make an emergency landing. Killed all 122 on board the plane and 17 in the apartment building.

References

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Results

Once the descriptive data were collected, the information was analyzed for similarities and trended where applicable. A total of 19 of the aircraft impacts were analyzed for this work. While death tolls were included in the results collected, the work aimed to identify the number of injured patients, and where possible, further identify those with burn injuries. All of the crashes also included the distance to the closest metro area (typically where a burn center was or should be located.) It should be noted that all of the buildings impacted were located within 50 kilometers (31 miles) of an airport with many of them occurring on or adjacent to airport property.

Conclusions

It is reasonable to presume that commercial or military aircraft that impact large occupied buildings such as a commercial complex, high-rise housing or an office building will produce disastrous consequences. This scenario includes significant casualties and loss of life. Findings from this research can offer insights from actual occurrences to disaster planners and emergency managers. History is not always a good predictor of the future given the changes in technology such as avoidance radar technologies and global positioning systems that for some aircraft, are programmed to recognize both altitude and location of these buildings. Nevertheless, some commonalities can be considered in the threat and hazard analysis process.

All hospitals are required to have an emergency management function that includes the performance of a Hazards and Vulnerability Analysis (HVA). The HVA process must include what types of services are offered at a given hospital when considering what types of patients may either be served there as a primary, secondary or tertiary center for a given patient population. It remains imperative for burn centers to be involved with the hospital disaster preparedness process, particularly for hazards that can lead to a BMCI.