



ASSESSMENT OF FACTORS FOR IMPROVING EFFICIENT CIRCULATION AND SECURITY IN AIRPORT TERMINALS

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ABSTRACT

It is well known, that the movement passengers from one point to the other and safety of within the airport has become the talking point among users of air transportation. Especially considering the ease of movement of passengers with their luggage around the airport premises and their safety at this time when security of live and properties have become a serious issue around the world in recent years. The aviation industry has undergone significant changes since the inception of commercial air travel. In the last years, there has been a shift in focus from operational excellence to the provision of quality passenger experiences. This shift has been articulated in terminal buildings. Furthermore, the need evaluates and assess the factors that will enhance or improve efficient circulation and security. Therefore, this journal fit for consideration in academic studies because it highlights and emphasizes on the factors that are considerably adequate as it regards the save and ease circulation in air ports terminals, through the use of existing and related journals books, articles and web search.

Keywords: *Efficient Circulation, Security, Air Transportation.*

INTRODUCTION

Demerjian, (2008), in his view express that the travel experience from the airport entrance to the aircraft departure gate is one of the most stressful parts of the passenger's trip. Scheduled arrival and departure times during peak periods produce the most congestion on airport roadways—for example, drivers wishing to pick up passengers are often not aware of delays to arriving aircraft. Drivers who reach the curb prior to the arrival of the individuals being picked up are typically forced to move by police or traffic enforcement agents, which increases recirculation traffic on already congested roadways and causes secondary problems, including

- Increased parking along the shoulders of the access roadways as drivers wait before returning to the curbside,

- Potentially unsafe driving maneuvers resulting from drivers attempting to access impromptu parking areas or being uncertain about the return path to the terminal,
- Operational effects on traffic as drivers travel slower than the traffic flow to lengthen their travel time back to the curb, and
- Increased vehicle emissions. (Demerjian, 2008)

AIRPORT SECURITY GUIDELINES

A careful review of the prevalent threat to the environment and consideration of minimum applicable standards prior to finalization of plans will help to determine an airport's most appropriate security posture. Such a review may also help to reduce a later reliance on labour-intensive procedures and equipment. Inclusion of airport security expertise early in the planning process will result in a better-coordinated and more cost-effective approach to security (recommended security guidelines for airport planning, design and construction, 2006).

The only way to avoid the consequences of crime and the potential litigation nightmares that follow is to make every "reasonable" effort to prevent any "foreseeable" criminal attack (Robert A. Gardner, 2002).

Airport security is a necessary evil. It can be intrusive, even humiliating. But it's also the last chance we have to stop terrorist from smuggling weapons onto our airplanes. Modern air travel isn't exactly glamorous. It's bad enough that travelers have to wait in interminable lines before being herded into cramped airliners, where they are charged extra to check their bags, only to arrive at their destinations late. Security in airport is essential on all parts of the airport from the landside through the terminal to the airside. It seems like the most secured part of the airport is the airside. This is so to avoid passengers taking illegal items to the airplanes like weapons or bombs, or smuggling illegal items out of a country like drugs, etc. to another. This section will explore how the three parts of an airport will be made secured, though according to Nathan, it might not be so perfect but at least it will go a long way in reducing airport crime.

SOLUTIONS TO CIRCULATION AND FLOW CHALLENGES

Recent innovations to improve on-airport ground access vary between physical improvements and technology-based operational improvements. Airport operators are providing dedicated short-term parking lots, frequently referred to as cell phone lots, for drivers to wait for their parties to arrive. These lots are typically provided free of charge and, in some cases, have large flight information display screens that notify drivers when flights have arrived. Other innovations designed to move vehicles more efficiently through the airport roadway systems include

- Low-frequency advisory radio and variable message systems on overhead signage to notifying travellers of bottlenecks;
- Peak-hour pricing discounts that reduce or eliminate parking fees, encouraging drivers to park their vehicles rather than circle on airport roadways; and
- Automated vehicle identification (AVI), which can help track the number of commercial vehicle trips through the terminal core. (Avery, 2004).

Modern airport terminal design is a vast departure from that of the past, but there are also many similarities. One of the most notable differences is the use of technology to make the buildings, processes more efficient, and customer friendly. A review of case studies and press releases regarding new terminal projects identified the following innovative designs/ future trends:

- As passenger processing speeds increase, the size of the facility and the staffing requirements can be reduced while customer satisfaction increases.
- Many airport operators and the surrounding communities are considering massive investments in public transportation, particularly rail systems. The main goal will be to provide easy access between the terminal and intermodal facilities while at the same time providing a service that is financially feasible.
- Passengers desire more choices for check-in so that they may avoid unnecessary queues or agent transactions. Because traditional ticketing/check-in layouts do not provide sufficient options, the focus has shifted to automated self-service operations in a variety of locations on and off the airport.

- To improve flexibility, the shell of the terminal building can be a separate structure from the core facilities inside. As it is difficult to predict the needs of passengers and airlines beyond 5 or 10 years, this separation would allow airport operators to minimize the cost of adapting to the changing needs of airport users.
- Relocating the terminal curb side roadways into the parking garage could minimize at-grade crossings. Other traditional terminal functions—check-in, baggage check and rental car pickup/drop off—is now being performed in the parking garage.
- Enhanced way finding through the use of natural light, straightforward circulation and large public spaces allows passengers to see more of the terminal and better orient themselves within the space.
- Hotels and business centres integrated into the terminal facilities or located adjacent to the terminal provide a greater variety of services at the airport and attract customers other than those related to airline travel.
- Renewed focus on the bag claim or arrivals hall as the passengers' first impression of the airport and surrounding area has led to more open spaces and better way finding in the terminal, close-in parking, and ground transportation.
- Terminal roadways are being segmented by mode of transportation rather than by departures and arrivals (e.g., ground transportation centres).
- Non-secure people-mover systems are being used not only to transport passengers between terminals, but also to connect them to regional transit, consolidated rental car centres, and remote parking. In some locations, passengers are able to check in for their flights and check their baggage at the remote locations.

Airport security

It refers to the methods and techniques used in an attempt to protect passengers, staff and planes which use the airports from accidental/malicious harm, crime and other threats. Aviation security is a combination of human and material resources to safeguard civil aviation against unlawful interference. Unlawful interference could be acts of terrorism, sabotage, threat to life and

property, communication of false threat, bombing, etc. Large numbers of people pass through airports every day. This presents potential targets for terrorism and other forms of crime because of the number of people located in one place. Similarly, the high concentration of people on large airliners increases the potentially high death rate with attacks on aircraft, and the ability to use a hijacked airplane as a lethal weapon may provide an alluring target for terrorism. Airport security attempts to prevent any threats or potentially dangerous situations from arising or entering the country. If airport security does succeed then the chances of any dangerous situation, illegal items or threats entering into an aircraft, country or airport are greatly reduced. As such, airport security serves several purposes: To protect the airport and country from any threatening events, to reassure the travelling public that they are safe and to protect the country and their people.

AIRPORT SECURITY CHALLENGES

The multifunctional considerations inherent in today's air travel pose considerable security challenges. Airports must meet incredibly demanding criteria with regard to security, safety and communications. Challenges include:

- Protecting passengers and employees
- Preventing terrorism
- Ensuring that staff and traveller traffic moves efficiently
- Integrating numerous subsystems
- Managing a wide variety of access authorizations

These challenges include knowing where the pilots, flight attendants, ground staff are located. They include monitoring perimeter areas, terminals, parking areas, aprons, baggage, cargo, shops and other passenger facilities.

AIRPORT SECURITY SOLUTIONS

The manner of safeguarding security will depend on the scope of the airport operation, individual destinations, airlines, kind of operation (scheduled, chartered or general aviation) and the airport size. In designing the airport protection, it is necessary to consider the following:

- Protection of the airport perimeter, aircraft on the ground whether in hangars or on movement areas of the airport, operational facilities, stores and terminals.
- Limitation of movement of persons and vehicles into security sensitive areas on the airside 4 security checks of passengers and employees.
- Control of movement of passengers and separation of arriving and departing passengers.

Below are some practical design measures to be taken in the pursuit of security in an air travel facility.

- Fast changing security threats require different design and construction of terminal buildings and other areas of the airport. The earlier terminals seldom comply with today's requirements. Old terminal buildings mostly do not allow separation of departing and arriving passengers, so that temporary solutions have to be adopted in order to separate the flows of passengers. **It is therefore necessary to design the terminal buildings with the maximum flexibility.**
- Measures to combat unlawful acts required intervention into the check-in process and into the design of the airport terminal. If the inspection of the passengers takes place at the gates, there would often be a delay to flights. However, **a centralized system of security inspections tends to be the most functional in the design of new terminal buildings.** The centralized system has several advantages:
 - Passengers' inspection is carried out before the entrance into the airside circulation area, so the passengers do not have to wait until their flights have been announced.
 - The flow of passengers through the security inspection is substantially more stable with smaller peaks than at individual gates.
 - There is higher utilization of technical equipment and personnel
- In the event of a bomb attack, large glass areas, providing natural light, can be very dangerous. Glass shards are a source of extensive injuries. **All glass in these areas should be toughened and secured firmly to a robust structure.**

- **Balconies, terraces and entresols**, which divide the internal area of the building in a suitable way, could be convenient observation points for the terrorists, **therefore they should be minimized.**
 - A blast which would do only superficial damage to a modern framed construction would cause moderate damage to load-bearing masonry.
 - In the design of airport premises, **the parking places should principally be located with no direct contact to the terminal building**, whether they have been designed as parking lots in the open or in multi-storey garages.
 - The floors of the garages directly adjacent to the areas for the passengers must be closed to the users and modified so as to limit the spread of the detonation wave.
1. **Bypass taxiways:** They provide flexibility in runway use by permitting ground manoeuvring of steady streams of departing airplanes. An analysis of existing and projected traffic indicates if a bypass taxiway will enhance traffic flow. Bypass taxiway locations are normally at or near the runway end.
 2. **Holding bays:** This provide a standing space for airplanes awaiting final air traffic control (ATC) clearance and to permit those airplanes already cleared to move to their runway take-off position. Although the most advantageous position for a holding bay is adjacent to the taxiway serving the runway end, it may be satisfactory in other locations.
 3. **Turnarounds:** This can serve as a combination holding bay and bypass taxiway, when it is not economically feasible to provide a parallel taxiway.
 4. **Dual parallel taxiways:** To accommodate high-density traffic, airport planners should consider multiple accesses to runways. A dual parallel taxiway need not extend the full length of runway. Crossover taxiways between dual parallel taxiways increase flexibility.
 5. **Exit taxiways:** Design and locate exit taxiways to meet the operational requirements of the airport. Exit taxiways should permit free flow to the parallel taxiway or at least to a point where air traffic control considers the airplane clear of the runway. A decision to provide a right-angled exit

taxiway or a standard acute-angled exit taxiway rests upon an analysis of the existing and contemplated traffic. A separation distance of at least 600 feet (180 m) is necessary for an efficient acute-angled exit taxiway, which includes a reverse curve for “double-back” operations.

6. **End-Around Taxiways:** In an effort to increase operational capacity, airports have added dual and sometimes triple parallel runways, which can cause delays when outboard runway traffic has to cross active inboard runways to make its way to the terminal. To improve efficiency and provide a safe means of movement around the departure end of a runway, it might be feasible to construct a taxiway that allows aircraft to transition around the ends of the runway. This type of taxiway is called an End-Around Taxiway (EAT). End-around taxiways must remain outside of the standard runway safety area (RSA), which extends 1,000 feet along the centerline, extended of the departure end of the runway (DER).

CONCLUSION AND RECOMMENDATION

Conclusively, the safety of boarder in an airport terminal is of paramount importance therefore all necessary parameters and guidelines highlighted in this journal should followed duly to mitigate the circulation stampede that will occur if not adhered to.

It is recommended therefore that this study should be adopted for further review and critique for further studies in this subject matter.

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