Martin Towers

Safety Audit - 2016

1 Introduction

The state-wide power blackout in September 2016 identified a number of issues relevant to resident safety. This event has acted as a catalyst to conduct a safety audit on the Martin Towers building.

1.1 Purpose

The purpose of a safety audit is to systematically examine the workplace safety program, and is conducted for the purposes of fire, health and safety hazard identification.

The purpose of the document is to record the hazard identification, document the associated risk analysis, and to present recommendations germane to resident and worker safety.

1.2 Scope

The scope of the safety audit is constrained to any common area accessible to a Martin Towers resident or to a worker who is engaged in maintaining the Martin Towers building.

2 Hazard Identification

The following subsections identify the hazards that present potential harm to the safety of equipment, residents and visitors (including work persons) to Martin Towers, and the ability of the building to support its function as an apartment complex.

2.1 Structural Collapse of Building

The building could suffer structural collapse due to aircraft strike, earth quake, normal weathering, nuclear blast etc. The consequences of such an event would prohibit the building from carrying out its primary role and is likely to result in the death of individuals currently located in the building.

2.2 Individual Trapped in Stairwell

An individual could become inconvenienced in a stairwell if they enter without carrying their FOB – they would need to return to the ground level to exit from the stairwell. However, if an individual enters the South Eastern stairwell at the Plaza level without a South Tower utility key and the 'cage gate' has been disabled, they can become trapped in this area.

2.3 Failure of Hotel Services

Hotel services (i.e., gas, electrical power, rubbish collection, sewage, telecom and water) could fail to be provided or could be diverted to an unwanted area of the building (e.g., sewage leaks into the commercial car park basement area). The consequences of such an event are a hazard to public safety and specifically, the failure of:

- Gas supply would impact on the provision of hot water and the ability of residents to cook food.
- Electrical Power supply would impact on the provision of common area lighting, pumping of water (including clean water for apartment use, rain run-off and swage), running of the lifts and subsequently on the security system (i.e., building access controls and video surveillance) in the case of a protracted electrical power outage. There would be an impact on the apartment residents with their loss of electrical power too.
- Rubbish Collection could result in health issues during a protracted failure to collect rubbish from the building.
- Sewage blockage would impact on building cleaning with the ability to dispose of cleaning water but the inconvenience to residents would be greater for a protracted blockage.
- Telecom outage would impact on the ability of our security service to remote monitor the building. There would be some impact on residents who do not have a backup to support their telecom needs.
- Water outage would impact building cleaning, and the long-term management of the pool and spa. There would be considerable impact to residents who would be unable to bath, carry out normal apartment cleaning and most likely would be inconvenienced in their ability to cook food.

2.4 Gym Equipment Fails

Failure of gym equipment would not impact on the building's primary function. However, it would impact on a secondary function of providing fitness support to residents. It is also possible that the actual event of failure could damage the resident currently using the gym equipment.

2.5 Pool & Spa Facility Failure

Extended failure of the chemical treating equipment or water filtration equipment could result in a health risk to residents. The event would prohibit the building's ability to support a secondary function of providing fitness support and relaxation to residents.

2.6 Drowning

Falling into the swimming pool or spa could result in drowning.

2.7 Potential Physical Attack

Residents and visitors could suffer physical harm and/or the building could be damaged by a wild animal(s) or deranged person(s) being trapped in common areas such as the car park, stairwell or lifts. The event could result in harm to the individual and/or damage to the building.

2.8 Access to Apartment Not Granted

Failure of the common doors to open or lift failures would result in inconvenience to the resident and visitor. Failure of the intercom system would result in inconvenience to the resident and to the visitor. Resident and visitors could be blocked from using their normal entry into the building or forced to use an alternative means of entering the building (e.g. using the stairwells).

During the recent blackout it was apparent that a number of people (confirmed for a number of North Tower residents) were not aware how to get back into the building without the use of the lifts. This should be considered a failure on the building's primary function to allow residents into the building when the lifts are not operational.

2.9 Free Access to Apartment Granted

Failure of a common door to lock could result in undesirable entering the building. This would compromise a primary function of the building i.e., that of resident security.

2.10 Access to Roof Not Granted

Failure of a door to open to the roof area would create inconvenience to work persons attempting to clean windows, conduct roof repairs, attend to antenna maintenance and repair air conditioner heat exchangers. In the case of the North Tower, there are two doors leading to the roof – offering dual redundancy. In the case of the South Tower roof access is via the Lift Number 3 motor room and a large work area is available to rest tools and to safely move around to force the door open in an emergency and repair the locking mechanism where urgency is not an issue.

2.11 Free Access to Roof Granted

The roof area affords the opportunity to fall to the ground as there are places that do not present a physical barrier to the roof edge. Falling from the roof would almost certainly result in the death of the individual who fell.

2.12 Access to/from Car Park Not Granted

Access to the car park could be denied due to failure of a boom gate, failure of the sliding gate, failure of the traffic control light, a car broken down or wedged in such a way as to restrict entry or due to flooding of the car park.

2.13 Free Access to/from Car Park Granted

Free access to the car park would require the entry boom gate to fail up and the sliding gate to fail open. This could result in undesirable entering the car park and potentially causing damage to resident's property.

2.14 Vehicular Accident in Car Park

The is opportunity for several types of accidents in the car park i.e., car running into sliding gate as it is closing, car running into another car (e.g., reversing out from parking bay, misjudging space required for manoeuvring) and hitting a pedestrian. The latter being the most serious.

2.15 Air Quality in Car Park Compromised

Air quality in the car park could be compromised by flooding events, failure of the ventilation system or a fire in the car park. Such an occurrence could result in harm to residents and the inability to provide primary functionality of the building (i.e., the storage of resident cars).

2.16 Falling into Rubbish Chute

A small (i.e., young) individual could potentially open, climb up onto and fall into one of the rubbish chutes. Such an occurrence would most likely result in the death or at best considerable damage to the individual.

3 Risk Assessment

A risk has associated with it a consequence and a likelihood of the hazard occurring. A risk is also typically characterised by a hazard event that has not yet happened. However, for the purpose of this risk assessment, realised hazards will also be addressed in this report.

The Royal Australian Navy "Navy Hazard Risk Calculator" (ABR 6303) has been assumed in calculating the acceptability of each hazard. Table 1 provides a definition of the hazard consequence enumerations.

Table 1 - Hazard Realisation Consequences

Consequence	*Resident Safety*	*Building Serviceability*	*Environment*
Catastrophic	Death or permanent total disability	Prevent the building from meeting the	Significant long term damage to the environment and would

Martin Towers

Safety Audit - 2016

Table 1 - Hazard Realisation Consequences

Consequence	Resident Safety	Building Serviceability	Environment
		primary operational requirements	be extremely difficult to rectify
Critical	Permanent partial disability or temporary total disability in excess of 30 days	Significantly degrade the building's ability to meet primary operational requirements	Significant short term damage to the environment that would be difficult to rectify
Major	Temporary partial disability less than 30 days, hospitalisation, emergency medical treatment, injury or illness eligible for compensation	Temporary loss of one or more significant capability within the building	Short term damage to the environment that could be readily rectified
Minor	First aid or minor supportive medical treatment	Temporary degradation or loss of one or more capabilities within the building	Short term damage to the environment requiring no rectification activities

Table 2 provides a definition of the hazard likelihood enumerations.

Table 2 - Hazard Likelihood

Likelihood	Individual	Equipment
Frequent	Likely to occur regularly	Continuously experience in the equipment
Probable	Will occur several time in the life of the item	Will occur regularly in the equipment
Occasional	Unlikely but can be reasonably expected to occur in the life of the item	Will occur several times in the equipment
Remote	Unlikely but possible to occur in the life of the item	Unlikely but can be reasonably expected to occur in the equipment
Improbable	So unlikely it may not be experienced	Unlikely to occur but possible

Martin Towers

Safety Audit - 2016

Table 3 presents a matrix of hazard realisation consequences vs hazard likelihood, that allows the risk assessment to be attributed. A risk assessment it attributed as follows:

- **1 – 5** Intolerable
- **6 – 9** Tolerable with continuous review
- **10 – 17** Tolerable with periodic review
- **18 – 20** Acceptable with periodic review

Table 3 - Risk Assessment Matrix

	Frequent	Probable	Occasional	Remote	Improbable
Catastrophic	**1**	**2**	**4**	**8**	**12**
Critical	**3**	**5**	**6**	**10**	**15**
Major	**7**	**9**	**11**	**14**	**17**
Minor	**13**	**16**	**18**	**19**	**20**

Table 4 identifies the relevant hazards and presents the risk analysis associated with these hazards.

Table 4 - Martin Towers Risk Analysis

Id	*Title*	*Consequence*	*Likelihood*	*Acceptability*
1	Structural Collapse of Building	Catastrophic	Improbable	**12**
2	Individual Trapped in Stairwell	Minor	Occasional	**18**
3	Failure of Hotel Services	Major	Occasional	**11**
4	Gym Equipment Fails	Minor	Occasional	**18**
5	Pool & Spa Facility Fails	Minor	Probable	**16**
6	Potential Physical Attack	Major	Remote	**14**
7	Drowning	Catastrophic	Remote	**8**
8	Access to Apartment Not Granted	Minor	Remote	**19**
9	Free Access to Apartment Granted	Minor	Remote	**19**
10	Access to Roof Not Granted	Minor	Improbable	**20**
11	Free Access to Roof Granted	Catastrophic	Remote	**8**
12	Access to/from Car Park Not Granted	Major	Remote	**14**
13	Free Access to/from Car Park Granted	Minor	Occasional	**18**
14	Vehicular Accident	Catastrophic	Occasional	**4**
15	Air Quality in Car Park Compromised	Major	Remote	**14**
16	Falling into Rubbish Chute	Catastrophic	Improbable	**12**

4 Risk Analysis

There is one Intolerable hazard and seven hazards identified that, although are tolerable, still require review. In particular, the following require action or at least further investigation. These hazards are discussed further in the following sub-sections.

4.1 Vehicular Accident

Due to the nature of the car park, excessive speed is not likely but inattentive driving with the potential to hit a child or infirmed person entering the car park from either of the two lift areas requires consideration. As the effectiveness of pedestrian controls would be questionable, particularly in the case of small children running out into the car park, or result in issues regarding free movement of residents moving cumbersome items, it would appear that driver controls would be more effective.

4.2 Drowning

Access to the pool area is protected by FOB controlled doors. Both the spa and swimming pool are clearly visible from the Plaza area with floor to ceiling affording visibility to anyone in the Plaza who could offer assistance in the case of an emergency. Unless the person was unconscious or substantially motion impaired in the case of the spa, lifting their head above the water would require simply standing up. The swimming pool, however, is deeper and would require the individual to be at least one TBD metres tall to be able to stand up and raise their head above the water.

It would be expected that any individual mobility impaired or shorter than a minimum height would be accompanied by a responsible guardian. However, signage of the pools depth is required and resuscitation instructions should also be provided in clear sight. Hence the considered opinion is that, save closing the pool area, that no further action to make the pool area safer is practicable.

4.3 Free Access to Roof Granted

There are three locations in the building that afford access to the roof i.e.:

- level 7A North Tower resident corridor
- top of the North Tower's North Western stairwell
- top of the South Tower's South Western stairwell

All three doors to the roof area are locked, requiring a master key to open them and are also very heavy doors which require considerable mechanical force to open them (once they have been unlocked). The doors are weighted to result in them closing under their own weight.

The door in the level 7A North Tower corridor is also located at a raised height requiring a concerted effort to step up onto the roof once the door has been opened. This area is substantially protected

by fences that corral an individual in a safe area. A concerted effort would be required to circumvent these fences.

The North Tower stairwell door is located at a landing at the top of close-set metal steps, which differ from the concrete steps of the stairwell and potentially act as a deterrent to their use by a resident. Should access to the roof be gained there are roof gutters, protected by raised lips that would offer some protect from an individual being inadvertently blown off the roof.

The South Tower stairwell door is located inside the lift number 3 motor room and hence is protected by a second locked door prior to access to the roof door. Access to the lift number 3 motor room is via close-set metal steps, which differ from the concrete steps of the stairwell and potentially act as a deterrent to their use by a resident.

It is the considered opinion that further safety measures are not applicable to individual safety.

4.4 Failure of Hotel Service

The failure of gas, rubbish collection, sewage, telecom and water although an inconvenience, are not life threatening to residents and visitors. The buildings function will be compromised with the loss of these hotel services but their recovery or at least a temporary work-around would be practicable within a short period of time (i.e., two work days maximum).

However, the loss of electrical power for greater than one hour will have safety concerns for individuals e.g., being stuck in a lift. It has also been noted that the stairwells (including those stairwells on the commercial car park levels) were devoid of any illumination one hour after a blackout.

4.5 Structural Collapse of Building

The structural collapse of the building is effectively guarded against by regular building inspections conducted by the Primary Corporation. It is the considered opinion that protection against a catastrophic incident (e.g., aircraft flying into the building) is outside the scope of this report.

4.6 Falling into Rubbish Chute

The effort required to climb into a rubbish chute unaided would be quite high. It is the considered opinion that protection against this hazard is outside the scope of this report.

4.7 Potential Physical Attack

The cost in additional security to protect against physical attack on an individual would be substantial. The best that can be achieved is to have video surveillance record the event. However, the extensive common areas make total coverage non-cost-effective and would have privacy implications. A survey of common areas is required to identify the location(s) of additional cameras.

4.8 Access to/from Car Park Not Granted

The failure to gain access to the building although an inconvenience, is not life threatening to residents and visitors. The buildings' function will be compromised but the recovery to building access would expect to be a temporary situation at worst and that full access would be expected in a short period of time.

The failure to release an individual from the building is considered to be of greater concern, particularly in the case of life-threatening situations. The building stairwells are checked each Monday. All stairwells offer unrestricted exit on the ground level. A button is available to override the sliding gate control to cause it to open. Each lift can be commanded to ground level without the need for a FOB. The North Tower foyer area can be exited without the need for a FOB.

In the case where an individual is incapacitated, extensive directions have been provided to ambulance crew to enable them to rapidly find the individual in the building.

4.9 Air Quality in Car Park Compromised

The car park air volume is quite large and some considerable amount of time would be required to fowl it, offering an individual considerable time to exit the area. The area is also protected by fire sprinklers that would act to dampen any flames.

4.10 Pool & Spa Facility Fails

The chemical computers are verified weekly by the Caretaking staff by manually testing water quality. It would be expected that any issues would be first checked against the conditions reported by the automatic system and subsequently verified at a later date.

5 Recommendations

The following recommendations have been made:

- Paint yellow and black stripes on the car park floor at the two locations were egress from the lifts occurs and install raises on the car park floor that result in a minor bump to a car traveling into the area where pedestrians would be expected to exit the lift areas.
- Move the Level 1 North Tower internal door to the other side of the fire stairs. This would allow persons on the Plaza to use the North-West stairwell.
- Signage of the pool's depth is required at both ends of the swimming pool and resuscitation instructions should also be provided in clear sight of the two platforms at either ends of the swimming pool.
- Obtain a quotation for battery storage of power generated by the solar panels and provide electrical power (supplemented by the battery) to the stairwell lighting, water/sewage pumps and to the lifts.
- Conduct a survey of the current video surveillance and make recommendation for improvements to the system.
- As a mitigation against residents not knowing how to renter the building in the case of the lifts failing to operate, the Welcome Introduction letter should be updated with this information and distributed to all apartments yearly.