A Threat Assessment and Security Analysis of the Three Sports Facilities of Indiana University-Purdue University, Indianapolis

NCAA Softball Fields, Carroll Stadium, and the IU Natatorium

O'Neill School of Public and Environmental Affairs

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Contributors

Carmen Diaz, Co-Student Managing Editor; Amanda Haines, Co-Student Managing Editor; Owen Richardson, Co-Student Managing Editor; Willie Brooks, Student Case Study Editor NCAA Softball Fields; Carmen Diaz, Student Case Study Editor Carroll Stadium; Kristol Ward, Student Case Study Editor, Natatorium; Kevin Albert, Student Researcher and Writer; Tania Amos, Student Researcher and Writer; A.J. Baker, Student Researcher and Writer; Alex Beck, Student Researcher and Writer; Zachary Clemens, Student Researcher and Writer; Scott Conway, Student Researcher and Writer; Emelyne Lane, Student Researcher and Writer; Sergio Lopez, Student Researcher and Writer; Douglas McDonald, Student Researcher and Writer; David Miller, Student Researcher and Writer; John Newcomer, Student Researcher and Writer; Alexandria Palmer, Student Researcher and Writer; Abbie Plunkett, Student Researcher and Writer; Ryan Purkiser, Student Researcher and Writer; Andrew Smith, Student Researcher and Writer; Troy Sutton, Student Researcher and Writer; and William Foley, Ph.D., Faculty Advisor and Editor

Executive Summary

This research report provides a security assessment of the Softball Fields, Carroll Stadium, and the Natatorium Complex at Indiana University-Purdue University Indianapolis (IUPUI). The purpose of this report is to prevent and mitigate harm to visitors and these facilities which resulting from human-made or natural disasters. Research is guided by the hypothesis that these facilities- due to their respective importance, locations, and attendance patterns are in harm's way; and that certain strategies of prevention, protection, and mitigation coupled with effective preparedness, response, and recovery can lessen risk, improve security and provide

added resilience. Further, “harm’s way” is considered to be either a natural disaster or a human-made disaster, accident, active provocation, or act of terrorism. Methods of analysis include applied research; predominantly utilizing qualitative data with some quantitative investigation.

Results of this assessment illustrate that these venues possess numerous vulnerabilities to both natural and human-made threats that if exposed, could result in serious consequences. The two most likely natural hazards identified include straight-line winds and tornadoes. Further, the most likely human threats to these facilities arise from a potential terrorist vehicle attack (TVA) and an active shooter. This project also identifies a specific need for additional planning to prevent an IED or VBIED attack on the Natatorium.

Common themes from the attached three case studies reveal that given theses vulnerabilities, the following safety and security adjustments are recommended:

- Surveillance equipment
- Metal detectors
- Security bollards or other temporary barriers
- Evacuation routes and shelter in place plans
- Special event security procedures
- Weather related technology and protocols
- Staff training for emergency situations

Introduction

The Natatorium, Michael A. Carroll Stadium, and the NCAA softball fields are three sports facilities on the edge of Indiana University-Purdue University, Indianapolis campus which comprise a significant area of responsibility. All three facilities host a variety of high-profile

sporting events for high school, collegiate, professional, amateur, and Olympic purposes and have the combined capacity for seat 19,383 guests.

These facilities face a wide range of safety and security threats, including unruly fans; alcohol consumption; drugs; unsupervised locker rooms; outdated technology; and staff that may be insufficiently prepared to respond to a significant emergency situation, due to the need for additional training and exercise. The facilities also face human-made and natural hazards that are less common than those listed above, but have substantially higher consequences should one of these situations arise. A security assessment of these three facilities was necessary in order to identify the most likely threats and vulnerabilities and to make recommendations for an improved security configuration that will improve resilience.

This research is guided by the hypothesis that these facilities, due to their respective importance, locations, and attendance patterns, are in harm's way. Certain strategies of prevention, protection, and mitigation coupled with effective preparedness, response, and recovery can lessen risk, improve security, and provide added resilience to each of the facilities. Furthermore, "harm's way" is considered to be either a natural hazard or a human made disaster, accident, provocation, or act of terrorism. The methodological approach involves applied research employing mostly qualitative research with some quantitative examination.

The remainder of this study addresses the vulnerabilities these facilities hold and the consequences of not adding additional protection. It also covers the most likely natural disasters, including straight-line winds and tornadoes, as well as the most likely terrorist events, including a terrorist vehicle attack (TVA), an active shooter, and an IED or VBIED attack. This is followed up with a discussion reviewing the common themes from the case study of each facility that can be applied to the area of responsibility as a whole. Finally, recommendations will be made for

tactics, techniques, and technology which could improve safety and security in the area of responsibility.

Vulnerabilities and Consequences

Prestigious Events

IUPUI is home to three sporting facilities that host events of significant importance. Hosting these events makes these three facilities potential targets for human-made disasters. Typically, terrorists target buildings or gatherings that produce the greatest payoff. Their goal is to target civilian populations to induce fear and foster distrust in current authorities to protect them. To accomplish this task, potential terrorists will often choose to attack open-access events and mass gatherings, such as marathons, sporting events, rallies, parades, and festivals ("First Responder's Toolbox", 2018).

The Natatorium is home to the NCAA Division One Swimming and Diving Championships, Olympic Diving Trials, Olympic Swimming Trials, IHSAA Swimming and Diving State Championships, and the US Swimming World Championship Trials. This facility can seat 4,700 people for one event. The Natatorium, as the venue for several Olympic trials and with its large seating capacity, is the most obvious potential target of a terrorist attack of the three facilities on IUPUI campus.

The NCAA softball fields were built in preparation for the 1987 Pan American games and hosts the NCAA Division One IUPUI Jaguars home softball games and annual Fall Tournament ("IUPUI Softball", 2019). The complex has also featured a variety of other prestigious events over the last 20 years ("IUPUI Softball", 2019). With a seating capacity of over 2,500 people, the softball fields have the ability to draw quite a crowd of spectators. As a

primarily outdoor facility, however, the gathered crowds are exposed to a large, wide open area with little cover or shelter that is readily available in the event of an emergency.

Carroll Stadium has by far the most seating capacity of the three sports facilities with a capability of hosting 12,183 visitors including the media box ("About", 2019). This stadium has a long history of hosting major national and international events, including Olympic Trials and Indy Eleven professional soccer; and it was built with the dream of making Indianapolis the "Amateur Sports Capital of the World" ("Michael A. Carroll Track", 2019). The combination of hosting the famed Olympic Trials and professional soccer games (a sport that is extremely popular all around the world) makes Carroll Stadium a prime target for human-made attacks.

Sporting events have a long history of being targets of violence (Lee, 2013) In the past, terrorists have often chosen to display their anger and violence to the world through attacking Olympic games and trials, World Cup games, and marathons (Lee, 2013). Altogether, these three sporting facilities, located next to each other in the same area of campus, host major national and international events, Olympic trial games, and local sporting events; and were built with the grand intentions of making the state of Indiana the amateur sports center of the world. This means that not only do these locations host events of consequence, but they are also symbolic because to the image of the entire state. This combination of fame, large crowds, location, and big dreams puts these facilities at a heightened risk to experience potential terrorist attacks in the future.

Location of Sporting Facilities

The IUPUI NCAA softball fields, Carroll Stadium, and the Natatorium are all three located on the southern side West New York Street. This location puts all three sports facilities

on the southern edge of campus on the border with the White River, meaning that all three facilities are somewhat isolated in regards to response efforts. All first response agencies and personnel must come from the north or from New York Street when they are responding to emergencies or situations. This leaves few viable options to respond to a disaster and establishes West New York Street as an extremely important factor in accessing these facilities.

Emergency evacuation from any of these buildings will have to begin on New York Street initially. The vast majority of available parking is located to the north of the facilities with a couple of additional options to the east of Carroll Stadium, meaning that all fleeing attendees will be heading north and east from the soccer stadium and softball fields. This makes evacuation from these two facilities especially dangerous because everyone is fleeing in the same directions. This situation produces several important high consequence vulnerabilities to visitors attending events at these facilities:

- Dense crowds without provocation present a danger due to possible trampling, building of aggression, surging, rushing, or crushing people between each other or objects (“Dangers of a Crowd”, 2017).
- The large groups that have gathered will be particularly susceptible to human-made threats, such as active shooter, VTA, and IED attacks.
- As people flee or leave an event, they are naturally funneled into the same direction. This makes an attack or a secondary attack easier for terrorists because they already know the direction in which all spectators and attendees will flee the sporting venues.

- Secondary attacks that purposefully target first responders are a heightened risk factor because an initial attack will send everyone in the same, predictable direction. After attacking the facility initially, setting up a secondary one for fleeing attendees will take no skill and little intensive planning.

Parking at the Natatorium presents less of an issue because the building has a parking lot or garage on three sides and an additional lot available to the immediate northwest. It is ideal to have people leaving the facility in different directions to prevent harm.

The problem for all facilities, however, is that all traffic must either utilize or cross New York Street. If this road is closed down or the threat comes from New York Street, there is nowhere for visitors in vehicles to evacuate or leave safely. Attendees may be trapped with the White River at their backs and to the west, with the only available option in that direction being the New York Street bridge crossing over the river. Any damage to, or threat on, this bridge cuts off another entire escape route for visitors and response routes for emergency personnel. While there are multiple side streets that run north and south, they all connect to the same three streets, including: New York Street, Vermont Street, and Michigan Street. This gives fleeing attendees few options and traffic will back up horribly, creating a whole new hazard.

Lack of Accessible Indoor Shelter

The NCAA softball fields and Carroll Stadium are both primarily outdoor facilities. They are both surrounded by each other, open fields, and open parking lots. The nearest indoor shelter for these two facilities **is** the Natatorium and if this is not available for whatever reason, then the next options are the National Institute for Fitness and Sport and the School of Social Work. Both of these buildings are some distance away.

They also may be locked in times of distress. Any event that would require attendees to shelter in place or seek indoor shelter would cause a serious problem for these two facilities in particular. Warnings and decisions would need to be made quickly in order to give people enough time to make it to these buildings or seek other shelter. Hesitation or the inability to make a decision would devastating because people would be caught out in the elements.

The Natatorium, on the other hand, can shelter a large number of people inside the facility. If the people inside needed to flee to another building, the Natatorium connects to the School of Social Work with a Skywalk tunnel. The School of Social Work is also directly north of the Natatorium so people can also flee outside instead of taking the tunnel. Nearby are also the Herron School of Art and the National Institute for Fitness and Sport so visitors attending an event at the Natatorium have more options to shelter indoors than those attending events at the softball complex or Carroll Stadium. Parking garages could also be used.

Most Likely Natural Hazards

Thunderstorms, Straight-Line Winds, and Tornadoes

Straight-line wind is defined as any wind produced by a thunderstorm that is not associated with rotation and is classified as damaging once wind speeds reach 50-60 MPH (“Severe Weather 101”, n.d.). Wind damage from severe thunderstorms is the most common type of weather-related damage in the lower 48 states, accounting for half of all weather-related damage reports (“Severe Weather 101”, n.d.). This makes damage caused by straight-line winds more common than damage resulting from tornadoes (“Severe Weather 101”, n.d.).

Carroll Stadium and the Natatorium are both known to host events year round while the NCAA softball fields hold the vast majority of their events in the spring. For the year 2019, the

Natatorium has already experienced the most dense months of scheduled sporting events between January and March, but it continues to hold a variety of competitions, leagues, invitationals, and sectionals throughout the rest of the year ("2019 IU Natatorium Events", 2018). The busiest times of the year for Carroll Stadium are the spring and fall, when most of the featured games showcase Indy Eleven professional soccer games, however the stadium also plays host to many other shows, festivals, and other events ("Michael A. Carroll Stadium", 2019). In the summertime, Carroll Stadium tends to host several marathons every year ("Michael A. Carroll Stadium", 2019). The 2019 softball season is scheduled between February 8 and May 4th, making the main season for the NCAA softball fields the spring ("2018-2019 Softball Schedule", 2019).

According to these schedules, the vast majority of events, games, marathons, and festivals occur in the spring. According to Climate Central (2015), spring is the peak of the severe weather season every year. This is because the atmosphere is warming from the cold of wintertime and the rise in temperature creates the perfect environment for thunderstorms that produce damaging winds, hail, lightning, and tornadoes (Climate Central, 2015). Since this is also the busy season for all three sports facilities on campus, the natural hazard threat to each facility is substantially heightened. Carroll Stadium and the NCAA softball fields are at the most risk in the case of weather-related difficulties because both facilities are primarily outdoors. The Natatorium is still at risk to experiencing weather damage and other related issues, however it is an indoor facility.

In the event of a damaging storm with high winds, the softball fields and soccer/track complex are more likely to experience injury to people or loss of life if proper precautions are overlooked due to the outdoor nature of the two facilities. Secondary to the threat to human

welfare is the damage the facilities themselves will suffer in the event of inclement weather. The Natatorium, being an indoors facility, is more likely to experience property damage during a thunderstorm with damaging winds or hail than injury or loss of life. All three facilities, however, are at heightened risk to experience loss of life, injury, and property damage in the event of a tornado. Urban tornadoes are rare, but Nashville, TN had one in both 1998 and 2006.

Most Likely Terrorist Threats

Terrorist Vehicular Attack (TVA)

G4S Corporate Risk Services recommends that authorities consider vehicle ramming as a legitimate threat when planning for a special event ("Vehicular Terrorism", 2017). Terrorists are relying more on low tech, low sophistication methods to attack crowds because they are more difficult for police to detect or intervene ("Vehicles as Weapons of Terror", 2019). A vehicular attack is one of the easiest types of attacks because it requires little to no planning, no particular skill, and is versatile enough to fit almost any situation ("Vehicular Terrorism", 2017). New York Street runs through the length of the south side of campus past all three sports facilities. Having these facilities in the same location and on the same street makes them particularly vulnerable to terrorists targeting civilians and intending to inflict mass casualties with a vehicle.

Internet sources that are designed to give terrorists motivation and ideas specifically encourage attacking sports venues, entertainment events, and shopping centers ("Vehicular Terrorism", 2017). These same readily accessible sources also encourage terrorists to utilize vehicles in their attacks because they can inflict casualties even without access to explosives, firearms, or other weapons ("Vehicular Terrorism", 2017). They can also be used to target crowds, buildings, and other vehicles ("Vehicular Terrorism", 2017). Due to the versatility and

ease of use of a vehicle as a weapon, and the convenient location of three major event venues in the same place on campus, a TVA against the sports facilities has a high likelihood and should be included in the plans and preparations of security for all three facilities.

Active Shooter

The threat of an active shooter on a university campus is not new. This became a central issue to university security in 2007, when a student opened fire on Virginia Tech campus, killing 32 people and, ultimately, himself (Roman, 2018). The active shooter threat has become heightened since that time, with 250 such attacks occurring between the years 2000-2017 (Roman, 2018). Of these attacks, 15 took place on college campuses (Roman, 2018).

The type of the venues evaluated in this study causes them to be at risk to an active shooter by their very nature. Each complex draws large crowds and can seat thousands of spectators. They are historically associated with Olympic Games and trials, professional and amateur sports, marathons, and other spotlight events. Active shooter attacks require crowds in order to be a successful ("Vehicular Terrorism", 2017). The size and prestige of the events held at all three sports facilities on campus, combined with the fact that they are all in the same place, makes them an exceptionally prime target for an active shooter.

A terrorist could find a list of featured events online and determine if two or more are held at the same time and plan their attack around that information. By simply looking at the scheduling, a motivated terrorist could pick the perfect time to plan out an attack to inflict mass casualties. Due to these unique circumstances, the NCAA softball fields, Carroll Stadium, and the Natatorium all have an elevated risk of experiencing an active shooter situation.

Most Vulnerable Facility of Consequence

The Natatorium

The Indiana University Natatorium is the most significant sports complex at IUPUI. Being an Olympic style venue hosting large scale events including the NCAA Division 1 Swimming and Diving Championships, Olympic Diving and Swimming Trials, USA Swimming World Championships, and a multitude of other large-scale sporting events, this venue is considered to be of the most consequence from a safety and security standpoint; with 4,700 seating capacity. Additional specifics for this venue can be found in its respective case study attached to the end of this document. With the Natatorium being the home for national events that attract global attention, acts of terrorism become a critical component of the planning and prevention process being discussed. More specifically, an Improvised Explosive Device (IED) or a Vehicle Borne Improvised Explosive Device (VBIED) present the largest threat to life and property when specifically referring to this venue.

With the Natatorium being open to the public and centrally located at IUPUI, the threat of an IED (Improvised Explosive Device) becomes even more prominent. This venue should be considered a soft target in its current state due to the open accessibility in relation to the number of spectators concentrated in a confined area during the peak times of an event. The current ideologies of various, mainstream terrorist organizations can lead us to assume that an attack carried out by an IED would occur in the main seating area or entrance hall of the venue, as during an event with full capacity, but all spectators would likely be concentrated in either area which increases the likelihood of an attack being one of mass casualty. To prevent an IED from being used against a full Natatorium, the issue lies in preventing the bomb from compromising security measures and making it to the main spectator areas.

Improved security measures can be implemented at the Natatorium that would serve to harden the target against foreign or domestic terrorist organizations thus mitigating the threat of an IED attack. In an article written by Mark Lang, restricting access points to a large, soft target such as the Natatorium is cited as one of the most effective solutions for hardening a large venue (Lang, 2017). The main entrance points in the Natatorium are located at the east and west end of the building. Individuals can enter through these entrances and then access the main spectator area through other unmonitored access points within the venue. Restricting hallway and locker room doors in addition to side entrances forces all individuals to access the venue through two main points of entry, streamlining security efforts. Partnering with private contracted security companies as well as using the Indiana University Police Department to guard these access points can improve security. Through the use of armed or unarmed personnel, ensuring unauthorized individuals do not have access to the spectator area, is an important consideration. Creating a choke point for spectators through the east and west doors allows for better monitoring of people entering is a must. As seen in the Boston Marathon Bombing, an attacker with an IED will likely have it in a pack or bag they are carrying. Implementing the use of walk-through metal detectors at these two points would require each individual entering the venue to be screened cleared of any Improvised Explosive Device, while not compromising the demand for efficient ingress or line management. The entrance points must also include an armed security presence by the Indiana University Police Department or other neighboring agencies, such as the Indiana State Police or Indianapolis Metropolitan Police Department. This presence will act as a deterrent for any malicious actors attempting to enter the venue.

Another common approach taken by terrorist organizations is ensuring the IED is in place before the start of the event, allowing a malicious actor to bypass security measures implemented

at the start of the event. This threat is complex in nature, as the Natatorium is not monitored with 24/7 security personnel, and thus will be hard to mitigate. Addressing this threat is best done through a partnership with either the Indiana University Police Department or Indianapolis Metropolitan Police Department. Both of these agencies possess canine programs that have the capability of detecting an Improvised Explosive Device. With an event at the Natatorium that is expected to attract significant crowds of national recognition, a bomb certified canine could be taken throughout the venue to detect the presence of an IED set in place before the influx of spectators. Both approaches to this problem harden the target and could prevent a mass casualty incident from occurring at the IU Natatorium. The partnership between IUPD or IMPD and their canine programs segues into prevention efforts.

As also highlighted in its respective case study later, the IU Natatorium is located on the southeast corner of New York Street and University Boulevard. It could be assumed that an attack via a VBIED would likely occur directly west of the venue on University Boulevard, the Sports Parking Garage that is attached to the venue on the east, or on Blake Street, which is located on the south end of the Natatorium. All three locations directly border the venue, making them ideal locations for a vehicle attack. As we saw in the Oklahoma City Bombing, a truck or car containing a VBIED needs to be in close proximity to the target to have the largest effect, making these points the main areas of interest. While these attacks are preventable, they pose a more complex concern from a safety and security standpoint due to the public's ability to freely access these roads.

Activating a partnership between a canine program and the security personnel at the venue would allow for the early detection of a VBIED. This approach would produce the best results if, during a national or global event, access was restricted from New York Street onto

both University Boulevard and Blake Street. Restricting these access points allows the security staff to more effectively monitor vehicles coming onto these streets. As they monitor the vehicles, any large trucks or vans (as determined by a Standard Operating Procedure) would be searched using a bomb detecting canine before access is granted near the Natatorium. In order to ensure unauthorized vehicles do not compromise security efforts, solid barricades should be erected at New York/University and New York/Blake, thus forcing any traffic coming off of New York Street to be monitored for a potential VBIED. Solid barriers are inexpensive to obtain and would not likely require future budgetary attention. Having roads that can be accessed by the public surrounding the venue increases the level of prevention complexity; however, restricting access to authorized personnel only and closely monitoring the contents of larger vehicles that have the capability to carry a large VIED, is one option. Others are in the case study.

Common Themes

Attention should be paid to the three attached case studies which look at the specifics of mitigation for each venue. All three venues present three common themes which can be applied to the main area of responsibility (AOR). These are; open accessibility in constrained space, major disaster evacuation planning needs, and improved technology and surveillance. The case studies provide specific recommendations.

The first theme is relatively open accessibility in constricted space. All three sites are located in close proximity one to another on the south side of New York Street, thus establishing them as a "wall of security considerations," and in close as well to the other significant campus buildings. Those include University Hall, the Campus Center and Lecture Hall. This open

accessibility presents a multitude of challenges from a security standpoint, as it presents a row of inherent “soft-targets” until modified. Two of these facilities present fencing, though chiefly for crowd control. This fencing should be improved with portable barriers to lessen access from terrorists during heavy usage events. As all three venues are accessible at some point along New York Street, and the major barrier technology which is recommended are bollards. Preferably in the form of retracting bollards, implementing this acts as a restriction from road access points that can be erected at any given place during an event, addressing concerns of a TVA or VBIEDs.

Second an overall evacuation plan for the entire area of responsibility is recommended. As highlighted in the case studies, although each venue has an evacuation plan, each venue lacks an overall evacuation plan for the entire area ---should a major disaster or crisis impact all three venues at once. Individual venue evacuation plans should be developed to include provisions for simultaneous multiple venue evacuation. Case studies address particular tactics, techniques, and technology which could be implemented. This would ultimately conclude, creating an evacuation plan which guides spectators out to main points of egress, safely and speedily.

Finally, improved surveillance equipment should be provided for all three venues and improvements to inclement weather technology should be made. Too many vehicles and too many people, some with back packs, regularly get in with reasonable ease. Natural disasters pose a notably significant threat to the entire area. Because the same types of natural threats pose a threat to all the venues, one technology can improve the security of the entire area here. By using specialized weather instruments discussed in the case studies, weather monitoring for the entire area can be improved.

The three common themes complied from each case study should allow IUPUI to draft preparedness plans which can be implemented for the "whole community" and tailored to the specific venue. As mentioned, each venue's respective case study includes specific information regarding this.

Conclusion

The particular importance, locations, and attendance patterns of the Natatorium, Carroll Stadium, and the Softball Fields require strategies of prevention, protection, and mitigation coupled with effective preparedness, response, and recovery. The expected result is risk reduction, improvement of security, and added resilience. The application of these recommendations has the potential to improve the overall safety and security of this area of responsibility and the IUPUI campus as a whole; by reducing the potential for events that cause injury, death, and extensive structural damage.

References

2018-2019 Softball Schedule. (2019). Retrieved May 2, 2019 from https://iupuijags.com/schedule.aspx?path=softball

2019 IU Natatorium Events. (2018). Retrieved May 2, 2019 from https://iunat.iupui.edu/pages/calendar.asp#/

About Carroll Stadium. (2019). Retrieved April 11, 2019, from https://www.teamusa.org/US-Paralympics/Events/2012/June/29/US-Paralympics-Trials-Track-and-Field/About-Carroll-Stadium

Climate Central. (2015). Severe Weather Season. Retrieved May 2, 2019 from https://www.climatecentral.org/gallery/maps/severe-weather-season

"Dangers of a Crowd". (2017). *Professional Security Magazine Online*. Retrieved from, https://www.professionalsecurity.co.uk/news/interviews/dangers-of-a-crowd/

"First Responder's Toolbox" (2018). Planning and Prepareness can Promote Effective Response to a Terrorist Attack at Open-Access Events. Retrieved from https://www.dni.gov/files/NCTC/documents/jcat/firstresponderstoolbox/First-Responders-Toolbox---Planning-Promotes-Effective-Response-to-Open-Access-Events.pdf

IUPUI Softball Complex. (2019). Retrieved on April 14, 2019 from https://iupuijags.com/sports/2007/12/20/softball_complex.aspx?id=1

Lang, M. (2017). Protecting public venues from terrorists attacks. Retrieved from https://www.tacflow.com/wp-content/uploads/2017/07/Facility_Manager_Magazine-IAVM_PROTECTING_PUBLIC_VENUES_FROM_TERRORISTS_ATTACKS-by-Mark-Lang.pdf

Lee, Jane J. (2013). *National Geographic News*. Retrieved from, https://news.nationalgeographic.com/news/2013/03/130415-sports-marathon-olympics-bombers-culture/

Michael A. Carroll Stadium (IUPUI). (2019). Retrieved May 2, 2019 from https://do317.com/venues/michael-a-carroll-stadium-iupui/past_events?page=2

Roman, J. (2018). The new normal. *NFPA Journal*. Retrieved from https://www.nfpa.org/News-and-Research/Publications-and-media/NFPA-Journal/2018/September-October-2018/Features/Campus-Active-Shooter

Severe Weather 101- Damaging Winds Basics. (n.d.). Retrieved May 2, 2019 from https://www.nssl.noaa.gov/education/svrwx101/wind/

Vehicles as Weapons of Terror. (2019). Retrieved from https://www.counterextremism.com/vehicles-as-weapons-of-terror

Vehicular Terrorism the Threat Behind the Wheel. (2017). Retrieved from https://www.g4s.com/en-us/-/media/g4s/usa/files/whitepapers/vehicular_terrorism_the_threat_behind_the_wheel.ashx

Case Study One: NCAA Softball Fields

Abstract

The Indiana University-Purdue University, Indianapolis (IUPUI) NCAA Softball Fields were built in preparation for the 1987 Pan American games, feature every IUPUI home softball game, and have hosted a wide variety of other prominent events over the last twenty years ("IUPUI Softball", 2019). Combining permanent and temporary seating and standing room, the NCAA softball fields at IUPUI have the capacity to accommodate over 2,500 people for a single event ("IUPUI Softball", 2019). A large sports facility that houses many large events every year has many potential risks and vulnerabilities. Techniques, technology, and other equipment can be utilized to enhance the facility's security during events. Hall (2006) emphasizes the necessary steps university sports programs must take to secure their stadiums and campuses against potential threats. The planning process for securing a major sporting facility involves compliance and coordination from staff along with various local, state, and private agencies.

The goal of this case study is to develop effective mitigation and response strategies aimed at reducing the risk of potential natural hazards and man-made threats. First, an outline of the situation will be presented. Then, there will be a detailed review of the challenges and issues. This will be followed by a list of current actions and finally, the recommended changes and conclusion.

Keywords: security, technology, preparedness, planning process, mitigation, all hazards, response, terrorist vehicular attack, terrorist, natural hazards, active shooter, tornados, straight-line winds

Situation

The NCAA softball fields, located in downtown Indianapolis, Indiana (Marion County), are home to division one softball competitions for the IUPUI Jaguars. The complex itself is located close to the corner of West New York Street and Barnhill Drive. The White River runs along the south side of the complex. Located to the east is the Carroll Stadium soccer fields and track. There are practice softball fields on the west side of the complex and to the north resides the Vermont Street and Caldwell Street parking lots.

The high visibility of events associated with the softball fields combined with the high attendance produces the need for enhanced security protocols. This security review will encompass potential natural hazards and man-made threats, making it an all-hazards approach to securing the softball fields at IUPUI. The natural disasters discussed include tornadoes, straight-line winds, and thunderstorms. The man-made threats discussed in this article include terrorist vehicular attack (TVA) and active shooter.

Having a detailed plan in place for each of these possibilities allows first responders to react to any situation, save lives, and ensure efficient communications and agency interoperability. Implementing an all-hazards approach and preparing for the worst-case scenario allows for a tailored and scalable response to any unexpected incident. A good plan defines the roles and responsibilities of all relevant stakeholders in the safety and security of the NCAA softball complex on IUPUI campus.

Challenges and Issues

The softball complex has several vulnerabilities that need to be considered and remedied. In the State of Indiana, there is the potential for a multitude of natural hazards. The current 2019

Softball Season begins on February 8th and ends on May 4th ("IUPUI Softball", 2019). This means that the facility is subject to all of the spring season natural weather events that are common to the region. To be prepared, the Softball Complex needs to implement an all-hazards methodology to its preparedness and response efforts.

Natural Hazards

Tornadoes: According to data from the National Weather Service, Marion County alone experienced four tornadoes between 2012 and 2016 ("Marion County", n.d.). This data demonstrates that IUPUI can expect one tornado per year on average. Two of the four tornadoes experienced within this time frame struck during the springtime; therefore, there is a moderate risk of one occurring during softball season ("Marion County", n.d.). A tornado would be most devastating if it were to touch down in flatlands such as the practice softball fields, where there is no shelter. In this case, evacuation would be risky and dangerous because it would further place attendees and athletes in harm's way while they flee the ensuing weather across a wide, open expanse of land. Having a detailed response plan in effect for an event such as this could save lives and protect the university from potential litigation.

Straight-line Winds: Straight-line winds can produce intensely damaging winds that travel in the direction of the storm front. These winds can be commonly associated with either the front or down burst caused by a thunderstorm ("Severe Weather Awareness", n.d.). At their most damaging, straight-line winds can reach gust speeds of up to 130 mph, have sustained winds up to 58 mph, and can last for well over 10 minutes ("Severe Weather Awareness", n.d.). In the U.S., these weather events are most common during the spring when weather instability is typically the highest. This makes straight-line winds an increased threat to the IUPUI Softball Complex since its main sporting season is the spring. Preparedness planning for strong winds

such as a tornado or windstorm needs to be taken seriously because these are the most likely natural hazards to impact the softball complex and because simply asking the attendees to leave would only increase the risk to their lives.

Rain and Thunderstorms: During the spring and summer months in Indiana, thunderstorms can be dangerous and appear suddenly with little to no warning. Thunderstorms can produce heavy rain, lightning, strong winds, tornadoes, and potentially hail ("Thunderstorms", 2019). These particular weather events pose a significant threat to the NCAA Softball Fields due to its seasonal existence. Some thunderstorms have the strength to cause power outages, electrical damage, and severe damage to infrastructure. The middle stage of a thunderstorm is typically the most dangerous; therefore it is crucial to act immediately upon initial warnings signs ("Thunderstorms", 2019). The Indiana Department of Homeland Security recommends the following tips to ensure one's safety during a thunderstorm ("Thunderstorms", 2019):

- Avoid large open areas.
- Avoid taking shelter near water. (This is particularly important because the White River runs along the southern edge of the softball fields.)
- Be familiar with the area and alternate evacuation routes.
- Avoid metal objects and electrical wires.
- Avoid underpasses.
- If evacuation is necessary, seek the nearest indoor shelter.
- If a thunderstorm is expected, the safest precautions are cancelling or postponing the event.

Man-Made Threats

Active Shooter, Terrorist Vehicular Attack (TVA), and Improvised Explosive Device (IED): White River Trail runs along the southern border of the NCAA Softball Complex. Between the White River Trail and the softball fields is a chain link fence with multiple gates that are only secured by a padlock. These gates lead directly to the softball complex. There are no apparent security measures beyond the padlocks on the gates at these locations. This makes them vulnerable to terrorist threats or an active shooter event. One gate opens up south of the easternmost field and a second gate is located by the practice field that is behind home plate on the main field. The potential attacker(s) would have access to an area overlooking a majority of the lower seating. The field also sits below ground level on the south side, which could be dangerous in the event of an active shooter or other types of non-vehicular terrorist attacks, such as the placement of an improvised explosive device (IED).

On the north side of the softball fields, adjacent to New York Street, the main gate seems to be the most vulnerable for several types of attacks. The entrance is wide enough for vehicles to drive through and has no barrier to prevent one from entering the facility. There is also a gate just north of the left field foul pole that is only secured by a padlock. Overall, this is not an ideal place for someone to enter the facility because they are exposed to higher traffic, but it is still a vulnerable location for an attack to occur. The east side of the NCAA Softball Complex shares an entrance with Carroll Stadium and there is no permanent barrier separating the softball fields from the soccer stadium. The gate on the north side of the main softball field is also less likely to be vulnerable to covert terror attacks such as the placement of an IED, but may be more vulnerable to an active shooter, TVA, or suicide bomber due to the heavy pedestrian traffic near the gate and on West New York Street.

Chemical, Radiological, or Biological Threats: New York Street also has multiple side roads connecting to it in the vicinity of the softball fields. In the event of an attack or accident that causes harmful materials exposure on New York Street or a side street, the softball field is at risk of its occupants being exposed to the harmful material. The same is true of the White River Trail running behind the softball fields; a harmful material could be released behind the fields, exposing those inside the softball complex to a hazardous or harmful substance. The main entrance of the softball fields remains a weak point where an individual could drive a vehicle into the facility and then attempt to expose the occupants to whatever materials they choose to release.

Current Actions

The IUPUI Softball Complex is located on campus south of West New York Street. The complex includes three adjacent fields, highlighted by Field 2 at the main entrance of the compound ("IUPUI Softball", 2019). Field 2 is known for hosting IUPUI's Fall Softball Tournament during five of the past six years. The interior of Field 2 consists of a grass playing surface and a temporary boundary inside the main fence ("IUPUI Softball", 2019). The facility's unique layout includes concrete dugouts along both baselines that are built below the playing surface ("IUPUI Softball", 2019). Recently, a wireless nine-inning scoreboard was installed outside of the centerfield fence ("IUPUI Softball", 2019). There are construction plans in place to build a press box behind the home plate within the next few years ("IUPUI Softball", 2019).

Recommended Results and Changes

Mitigation. The planning process of reducing potential hazards and threats includes a collective effort from the university's sports program, IUPUI police department, and local and

state agencies. The following measures can be taken to improve security before holding a sporting event at the IUPUI NCAA softball complex:

- Annual emergency response drills should be held and should include all necessary first response agencies. These drills will ensure interoperability and delineate all roles, responsibilities, operating procedures, and expectations of each agency in an emergency. This also helps combat staff complacency by training them in the importance of their tasks.
- Install indoor and outdoor surveillance equipment.
    - A brief standard for this equipment includes: weatherproof and vandal proof, indoor/outdoor capability, 4k resolution, playback capability, 24-7 recording, zoom, infrared, and motion sensors.
- Adding security bollards to West New York Street and more temporary water or sand fillable plastic barriers to Beauty Avenue and Barnhill Drive.
- Create a detailed evacuation plan. We recommend West New York Street onto Lansing, West New York Street onto Limestone Street, West New York Street onto Barnhill Drive, and West New York Street heading over the White River.
- A plan to relocate attendees in the event of an emergency and indoor shelter is necessary.
- The incident commander should have communication and information networks in place to gain the best knowledge in order to make timely, well-informed decisions.
- Event staff need to have access to current live Doppler radar to assess weather patterns and lightning strikes.
- Incorporate the IUPUI text, phone call, and email warning system to warn about severe weather warnings, watches, and event cancellation.

- Either an emergency response vehicle or a temporary water or sand fillable barrier needs to be placed in front of the main gate to the softball facilities to prevent a potential TVA.
- Ensure lightning rods are placed in relevant locations around the softball fields to mitigate the effects of a thunderstorm.
- Place cameras and/or alarms around the gates on the southern border of the softball complex. This will alert event security if someone crosses over the fence, tampers with a padlock, or tampers with the fence.
- A drone with video camera capability can be used before and during events to monitor the large area that is the main softball field, practice fields, audience seating area, and all entrances, exits, and fences.
- Ensure all camera footage feeds back to a single, central location with constant monitoring before and during large events. Camera footage should also be recorded via DVR.

Response Strategies. In the event of a natural disaster or terrorist event, the actions taken in the initial minutes are crucial. It is absolutely critical that all responding agencies and personnel know their roles, responsibilities, and standard protocols for every possibility. The following response strategies can be made to improve security during events held at the IUPUI NCAA softball fields:

- Security inspections of the facilities, perimeter, and parking facilities need to be conducted before any event. We also suggest periodic sweeps during the game, especially before the event ends and people begin to leave the premises. K9 units are especially crucial to these sweeps.

- Periodic security checkpoints throughout the area to check bags. We also recommend a limit to the number of bags allowed per person and suggest advertising encouraging the use of clear or transparent bags for faster processing.
- Shut down nearby streets to serve as a buffer zone to the event as well as to allow emergency vehicles and first responders expedient access to the softball fields.
- Add plainclothes police officers to the crowd for quick emergency response and additional surveillance.
- Improve communications systems and interoperability between all responding agencies, including IUPD, IMPD, IEMS, IFD, MCSO and MECA. Utilizing a unique event channel via dispatch is also advisable to have each agency on the same frequency.

Conclusion

Overall, the IUPUI NCAA Softball Complex presents a unique challenge to sporting event security because it entails a wide, open expanse of land that is exposed to the elements and particularly vulnerable to man-made threats due to its somewhat isolated location. It is imperative that IUPUI is quick and willing when deciding to cancel sporting events held at the softball fields in the incidence of inclement weather or threats against the event, school, or surrounding area. It is critical that event staff remain up to date on the latest weather predictions and patterns to prevent potential tragedies, such as the 2011 Indiana State Fair stage collapse. Cancellations should be broadcast and advertised liberally to ensure the news spreads to fans, spectators, and athletes.

References

Hall, S. (2006). Effective security management of university sport venues. *The Sport Journal*. *20.* Retrieved from https://thesportjournal.org/article/effective-security-management-of-university-sport-venues/

IUPUI Softball Complex. (2019). Retrieved on April 14, 2019 from https://iupuijags.com/sports/2007/12/20/softball_complex.aspx?id=18

Marion County Tornadoes. (n.d.). Retrieved April 30, 2019, from https://www.weather.gov/ind/marion_torn

Severe Weather Awareness- Straight Line Winds. (n.d.). Retrieved April 17, 2019, from https://www.weather.gov/mkx/taw-straight_line_winds

Thunderstorms. (2019). Retrieved from https://www.in.gov/dhs/2790.htm

Case Study Two: Carroll Stadium

Situation & Current Actions

The Michael A. Carroll Track and Soccer Stadium was built in 1982 and is located on the southwest corner of the IUPUI campus at 1001 West New York Street, Indianapolis, Indiana. The stadium currently accommodates seating for 12,111 guests and includes a press box capable of seating up to 72 media representatives ("About", 2019). The stadium was developed in hopes of making Indianapolis the "Amateur Sports Capital of the World" ("Michael A. Carroll Track", 2019). Carroll Stadium has a long history of hosting major, prestigious national and international events including Olympic Team Trials. In addition to the numerous special events hosted at Carroll Stadium, it is the full-time home to IUPUI men's and women's soccer and track programs. Carroll Stadium was also the home of the Indy Eleven professional soccer team until 2018 ("Michael", n.d.).

Challenges and Issues

Terrorist Threats

Terrorist threats are perpetrated by both foreign and domestic organizations and individuals in the modern post 9/11 United States. Terrorist threats tend to indicate that an attack is imminent, and indications vary from site surveillance detected by local security to chatter on social media sites (CITE). There are also terrorist attacks that have occurred without any indicators, which forces first responders to catch up in establishing situational awareness and relevant tasking. Two specific types of terrorist attacks that can cause serious physical and psychological damage are vehicular attack and active shooter. Vehicular attacks have proven to be devastating and extremely difficult to detect and respond to. The Counter Extremism Project

is an international nonprofit organization that tracks extremist attacks worldwide, and they have documented 40 vehicular attacks since 2006 (“Counter Extremism”, n.d.). These attacks have been committed by individuals that are called upon by large networks such as ISIS, Al-Qaeda, and Hamas. A recent example of this was the attack in New York City by Sayfullo Habibullaevic Saipov. Saipov utilized a rented Home Depot truck to strike runners and cyclists on the West Side Highway (Prokupecz, Levenson, & Gingras, 2017). This attack resulted in New York City creating an additional 1500 barriers to protect pedestrians from vehicular attacks (Allen, 2018).

Active shooter situations are another type of threat that is hard to combat. There are several examples of active shooters on college campuses, the most notable example being the 2007 Virginia Tech shooting which claimed 32 lives (Rock, 2019). There have also been active shooter situations at religious establishments, concerts, and more parallel to this research, a congressional softball game. James Hodgkinson open fired during the Republican Caucus softball practice seriously wounding Representative Steve Scalise (Shear, Goldman, & Cochrane, 2017). Capital Police and Alexandria Police were on site at the time, and they were able to immediately thwart the attack and neutralize the assailant before more damage was done. These two types of attacks are arguably the hardest to counter without proper physical deterrents such as barriers and armed security on site during events. Proper response also requires the establishment and practice of Standard Operating Procedures (SOPs) that cover topics such as initial reaction, communication, chain of command, egress routes, rally points, and the roles and responsibilities of all stakeholders.

Natural Hazards

The establishment and practice of protocols for the natural hazards that regularly impact Indiana such as tornadoes, straight line winds, and floods should also be considered a high

priority. The open-air layout of Carroll Stadium puts occupants at risk of being exposed to these threats. Many challenges are faced when it comes to natural hazards and this venue. These challenges include: lack of severe weather communication, minimal shelter, no clear evacuation plan, and little time to evacuate a large amount of people after the official tornado warning.

Severe weather notifications used today are broadcast over radio or television using the NOAA Weather Radio, broadcast over sirens, and through the utilization of the Live Doppler Radar which assists in tracking the movement of severe and inclement weather ("Tornadoes", 2011). There's a general requirement for patrons to be within earshot of sirens, near a television or radio, have the mechanism set up on a cellular device, or to be actively monitoring Doppler radar for any of these notification methods to be effective. There's a method of communication currently being utilized on IUPUI's campus during security driven events such as armed robberies, assaults, and rapes which sends out texts and calls to students' phones to alert them of the situation. However, this technology is not being applied during severe weather situations that would impact events at the stadium. Thus, challenges faced with communication are a lack of widespread, easily heard, and well-known sources of information during a natural disaster or severe weather. If students, attendees, faculty, and staff are not aware of where warning information should be coming from or cannot be readily reached with available technology, the health and safety of anyone attending an event at an open setting like Carroll Stadium are at risk.

Evacuation is an additional challenge for Carroll Stadium. The current average lead time for tornado warnings is 13 minutes according to the NOAA ("Tornadoes", 2011). This is a limited amount of time to evacuate a large crowd. While Carroll Stadium does have locker rooms, they are not sizeable enough to hold all occupants with the stadium at maximum capacity in addition to any surrounding pedestrians. Evacuation routes to the Natatorium, the safer of the

two structures nearby, are not explicitly communicated. Additionally, well-known and easily accessible shelters are not indicated on campus. These are significant impediments to efficient evacuation and overall safety when severe weather strikes.

Recommended Results and Changes

Surveillance Equipment

A multitude of physical security equipment is needed throughout the venue in order for Carroll Stadium staff to protect against all potential threats. Both interior and exterior surveillance equipment is recommended. Given the stadium's foundation of concrete and metal, we recommend installation of hard-wired cameras instead of the less reliable wireless systems. A better picture will be obtained with hard wired cameras, they are less likely to be hacked, and it is easier to record any video that is obtained. The NVR 900 8 Channel 2K Resolution Security System is specifically recommended. This indoor surveillance system features eight different security domes which can operate in regular or night vision mode ("NVR 8", 2019). Each camera can see up to 125 feet in 2K clarity which is twice the resolution of 1080p HD. This indoor system easily connects with Lorex Systems Nocturnal 4K Ultra HD IP NVR System and with 16-Channel NVR and 8 Outdoor 4K (8MP) Metal Cameras. This comprehensive outdoor surveillance system features 16 cameras which are weatherproof, have 4X optical zoom, and have a 250-foot infrared night vision maximum range. These cameras also include microphones which allow for audio recording of events. Both of these surveillance systems are made by Lorex Technology ensuring flawless connectivity ("Lorex", 2019). Both systems allow the user to record any video on a 3TB hard drive which can then be transferred to e-mail or the Cloud for easy sharing with police.

Metal Detectors

Physical security detectors and a variety of additional detection devices are recommended for the inside of the stadium. A combination of metal detectors and explosive sniffing K9s is the best solution. Pedestrian traffic should be directed to the main entrances where metal detectors should be positioned. The Protocol MT 5500 is a detector that would simplify the flow of traffic and allow for changing of detection sensitivity ("Protocol", 2019). This metal detector will indicate a general alarm location on the person making a follow up inspection easier. Simultaneously, a K9 and handlers' presence will cover metal detector shortfalls. K9s will be able to sense traces of explosives missed by the detectors, stopping an incident before it happens. The K9 unit will also offer mobility in monitoring high traffic or suspicious areas.

The last line of surveillance that we recommend is a drone. The Aeryon SkyRanger R60 would provide a superior level of surveillance ("SkyRanger", 2019). An aerial view can give the surveillance team an opportunity to monitor large groups or to follow a suspect without leaving their post. This drone can fly for up to 50 minutes in 40mph sustained winds and up to 55mph of gusting winds which is common in downtown Indianapolis. The R60 offers multiple cameras which feature long-range or infrared camera additions. The tracking system onboard automatically tracks a maximum of 10 targets up to 3 miles away while also calculating the target speed and heading ("SkyRanger", 2019). All of this information is streamed and recorded in real time under a secure encrypted network. This drone is currently used in multiple armies across the world and by countless search and rescue teams.

Mini-Marathon Suggestions

When preparing for the Mini Marathon there needs to be public safety personnel from each department involved in the planning. During the event there need to be specialized units from each department on standby. The IUPUI committee should also look into utilizing temporary/mobile video surveillance equipment so that the command center has an overview of what is happening on that area of the course. Anyone that is working the event needs to have a badge from the event signifying that they can help the public with any issues that arise.

The area should be swept for bombs days in advance and the day of the marathon. K9 teams are the best resource for finding bomb materials. The K9 is able to search a larger area in an adequate amount of time when compared with multiple people searching with detection devices. There should be specific checkpoint areas for ingress and egress with metal/CBRN detectors for any foot traffic from the general public. To help with blocking the roads and traffic, IUPUI could use either a concrete security barrier or a public safety vehicle across the travel lanes so outside vehicles are unable to drive through the course.

Barriers

The pedestrian areas we identified as vulnerable to vehicular attacks were the gate entrances at New York St./Barnhill Dr. and New York St./Patterson St. Neither of these locations have any barrier to stop a vehicle attack. The best type of barrier for the school to purchase would be removable bollards since they are both economical and removable (“Truckstopper”, n.d.). The school can remove the bollards after events so that it is easier for maintenance personnel to drive vehicles into the stadium should the need arise. They can also be removed for emergency situations where personnel need to bring a vehicle into the stadium.

Another vulnerable location is pedestrian traffic at the corner of New York St./University Blvd. and New York St./Limestone St. One type of barrier that could be used at both of these locations would be a concrete planter ("Security", n.d.). These are cost-effective, keep the aesthetics of the campus design, and promote safety for pedestrians. Another type of barrier that the school may want to employ are portable barriers that can be easily moved around the campus as needed. Examples of these include a resin molded hollow barrier that can be filled with water or sand ("Portable", n.d.). Filling these would give extra strength to the barrier. This type of barrier is cost effective and easily moved.

Weather Related Technology and Protocols

In the event of severe weather, students, faculty, and spectators alike should be aware of current technologies and protocols to ensure their safety in Carroll Stadium. Entities like the State Fair and IUPUI should have well documented procedures and guidelines for dealing with severe weather threats in order to prevent tragedies such as the State Fair stage collapse in 2011. Roles and responsibilities in cases of severe weather threats should be well known by all staff ahead of time. Security staff at all levels should be well trained for situations requiring evacuation or sheltering due to severe weather emergencies. Decision makers would also benefit from more accurate and location specific weather services. More localized information on the straight-line winds that caused the State Fair stage collapse may have led to an evacuation that would have prevented death and injury.

There are currently multiple technologies to keep people as informed as possible about inclement weather. We recommend encouraging visitors to download free weather apps that will notify them of dangerous situations. For example, Accuweather is a free app that pushes weather alerts to one's cell phone automatically. We also recommend that IUPUI utilize a service such as

Strategic Response Partners (SRP) which provides property specific, severe weather alerts, including those for smaller storms that can be missed ("Severe Weather", n.d.). SRP collects raw data from all NWS radar stations as well as thousands of other weather monitors around the United States. SRP also employs former military meteorologists who have extensive experience in operational forecasting where extreme accuracy is necessary. The location specific information and alerts provided by this service could be useful in monitoring weather threats and responding appropriately. In the case of a weather threat at the stadium, we further recommend utilizing the PA system to inform visitors of the situation and including explicit directions to maintain safety.

Evacuation Routes

Michael Carroll stadium potentially has four major evacuation routes. Two are found on New York Street as the main entrance and exits on the Northeast and Northwest ends of the stadium. On the East end of the stadium, there is another exit as well as a tunnel to the Natatorium. Citizens can also evacuate South of Carroll Stadium by taking the White River Trail to the East or West. Each direct exit is located on a busy street. Sending evacuees in a single outlined direction may not be a realistic option but we do recommend that evacuation directs people away from New York Street to allow first responder access.

If the weather is severe enough to elicit an evacuation, pedestrian and vehicular traffic are major concerns. We recommend evacuation through the tunnel underneath University Blvd leading into the Natatorium. Using the tunnel instead of crossing New York Street allows first responders to have optimal access to the area. If the crowd of people going into the tunnel takes too long or causes a blockage of the tunnel, citizens should cross University Blvd and enter the

Natatorium through the main entrance. The Natatorium is the closest structure that can provide shelter from the storm.

References

About Carroll Stadium. (2019). Retrieved April 11, 2019, from https://www.teamusa.org/US-Paralympics/Events/2012/June/29/US-Paralympics-Trials-Track-and-Field/About-Carroll-Stadium

Allen, J. (2018). New York to install 1,500 more sidewalk barriers after vehicle attacks. *Reuters.* Retrieved April 17, 2019, from https://www.reuters.com/article/us-new-york-security/new-york-to-install-1500-more-sidewalk-barriers-after-vehicle-attacks-idUSKBN1ER1KU

Counter Extremism Project. (n.d.). Retrieved from https://www.counterextremism.com

Lorex Nocturnal Security System. (2019). Retrieved April 18, 2019, from https://www.lorextechnology.com/detail/detail/detail/4k-ip-camera-system/4k-ultra-hd-ip-nvr-security-camera-system-with-8-ip-cameras/4KHDIP1644NV-1-p?sorting=rating#reviewSection

Michael A. Carroll Stadium. (n.d.). Retrieved from https://iupuijags.com/facilities/?id=7

Michael A. Carroll Track and Soccer Stadium: Division of Finance & Administration. (2019). Retrieved April 11, 2019, from https://www.track-soccer.iupui.edu/

NVR 8 Channel Security System. (2019). Retrieved April 18, 2019, from https://www.lorextechnology.com/detail/hd-ip-security-camera-system/2k-resolution-

security-system-8-color-night-vision-ip-cameras/HDIP88BW-1-p?sorting=rating#reviewSection

Portable Barrier System. (n.d.). Retrieved April 18, 2019, from http://www.speedbumpsandhumps.com/barrier-system?st-t=sbhgoogshop&gclid=EAIaIQobChMIn_SdvK7a4QIV2rrACh0CuAlfEAQYASABEgKhDfD_BwE#specifications

Prokupecz, S., Levenson, E., & Gingras, B. (2017). Source: ISIS note found near truck used in Manhattan terror attack. *CNN*. Retrieved April 17, 2019, from https://www.cnn.com/2017/10/31/us/new-york-shots-fired/index.html

Protocol MT 5500. (2019). Retrieved April 17, 2019, from https://www.sds.l3t.com/metaldetectors/MT_5500.htm

Rock, A. (2019). College campus shooting statistics you should know. Retrieved from https://www.campussafetymagazine.com/university/college-campus-shooting-statistics/

Tornadoes 101. (2011). Retrieved from https://www.noaa.gov/stories/tornadoes-101

Truckstopper 7-40 Removable or Fixed Bollard. (n.d.). Retrieved April 18, 2019, from https://www.tymetal.com/crash/crash-bollards/truckstopper-7-shallow-single-mount/

Security. (n.d.). Retrieved April 18, 2019, from http://www.belson.com/Physical-Security-Products

Severe Weather Alerts. (n.d.). Retrieved from https://srp24.com/severe-weather-alerts/

Shear, M.D., Goldman, A., & Cochrane, E. (2017). Congressman Steve Scalise gravely wounded in Alexandria baseball field ambush. *The New York Times.* Retrieved April 17, 2019,

from https://www.nytimes.com/2017/06/14/us/steve-scalise-congress-shot-alexandria-virginia.htmlhtt

SkyRanger Aeryon. (2019). Retrieved April 16, 2019, from https://www.aeryon.com/skyranger/r60

Case Study Three: Natatorium

Introduction and Current Actions

The Indiana University Natatorium is a significant sports complex located on the southern edge of Indiana University Purdue University Indianapolis (IUPUI) campus. The construction of the Natatorium was completed in the summer of 1982. The IU Natatorium is the host of several iconic sporting events, including the NCAA Division 1 Swimming and Diving Championships, Olympic Diving Trials, Olympic Swimming Trials, IHSAA Swimming and Diving State Championships, and the USA Swimming World Championship Trials. These events draw thousands of people per year to the complex, creating a need for effective and extensive security measures. The IU Natatorium seats approximately 4,700 people, with the majority of pedestrian traffic entering through two doors, one at the east end of the building and one located at the west end. The entry points for pedestrian traffic create two choke points during the influx of spectators due to ticket personnel being unable to operate faster than the ingress of spectators.

The Natatorium is located on the southeast corner of New York Street and University Boulevard and is in close proximity to a majority of the vehicular traffic that travels through campus. Parking at the Natatorium is simple because most of the traffic will enter off Blake Street to the east of the building and park in the Sports Garage or the Riverwalk Garage, and then spectators will enter through the east doors. The Natatorium presents many security concerns that must be addressed to ensure the safety of visitors and athletes.

Situation

Natural Disasters

Tornadoes and Straight-line Wind: Accuweather describes a tornado as a high-speed swirling column of air that travels across the ground and damages a fraction of the area that a thunderstorm affects (Sosnowski, 2019). Straight-line winds are a microburst defined as "a strong downdraft in a thunderstorm that accelerates as it nears the ground" (Sosnowski, 2019). Straight-line winds have a broader range of damage than tornadoes but are usually less severe in terms of wind speed. Microbursts occur before the thunderstorm system hits an area. The most dangerous microbursts can reach up to 100 mph (Sosnowski, 2019). Micros bursts may not be as familiar to the public as tornadoes, but they can be very dangerous to structures not equipped to handle a sudden gust of air.

The Natatorium can be considered a large shelter for severe weather events. Recent renovations added reinforced concrete to the exterior walls (Attwood, 2016). The Natatorium's pool, weight room, and locker rooms are built into the ground and provide shelter from tornadoes and straight-line winds. Areas above ground, such as the Jungle, and classrooms can accommodate hundreds more people in the event of a weather-related emergency. These rooms are window free and are located right inside the east and west entrances.

Finally, the Natatorium is located near every sports venue on campus. Spectators, students, and athletes can quickly access the Natatorium from New York Street and University Blvd. It takes no more than 3-5 minutes of walking to get to the Natatorium from the Student Center, softball fields, and Carroll Stadium. This serves as a useful facility in regard to severe weather as it can shelter many people, including those attending nearby events at Carroll Stadium or NCAA Softball fields.

Man-Made Disasters

Terrorist Vehicular Attack (TVA): Recent terrorist culture, propaganda, and leadership has begun to advocate using vehicles as weapons to attack civilian populations around the world ("Terrorist Attacks by Vehicle Fast Facts", 2018). The call is being answered. In recent history, vehicles have been used as deadly weapons all around the world, including the United States, Canada, France, Germany, Sweden, Spain, and the United Kingdom ("Terrorist Attacks by Vehicle Fast Facts", 2018). The close proximity of vehicles and pedestrians in cities and college campuses make vehicle ramming a particularly appealing tactic to inflict mass casualties. Due to the rising popularity of vehicular attacks and the tendency of terrorists to target sporting events and entertainment venues, the Natatorium is at elevated risk of experiencing a TVA situation.

Active Shooter: Statistically in the past, guns have been the weapon of choice in the United States to inflict mass casualties (i.e. four or more people injured or killed); however, starting in 2013, the definition of 'mass killing' changed to mean three or more people killed in a single event regardless of the weapon of choice (Ingraham, 2015, p. 2-3). According to Klarevas (2016), "over 25 percent of all gun massacres in the past five decades have occurred since 2009". Reducing the risk of this type of violence is best accomplished by employing preemptive measures.

A combination of poorly designed physical environments, high-energy events, and poorly trained or inexperienced staff can increase the likelihood of spectator violence. It is important to recognize the characteristics of each venue, event, and available staff that may play a role in increasing fan aggression. No single characteristic of these elements guarantees that violence will or will not occur. This must all be taken into account to create a plan for an attack on the facility with the perpetrator utilizing a gun as his/her weapon of choice.

Challenges and Issues

The Natatorium presents a unique set of safety and security challenges due to its location in downtown Indianapolis and placement on a university campus. Safety and security are of the utmost importance due to the quantity of people that enter and exit the facility daily. One of the security challenges that currently exists for the facility is its openness to the public. The Natatorium has a skywalk that connects to the rest of IUPUI campus via the School of Education and Social Work building.

The skywalk offers convenience to those on campus, but also creates opportunities for those with malicious intent. Being open to the public allows for people to come and go as they please and creates more opportunity for an attack such as a suspicious package, Improvised Explosive Device (IED), or chemical/biological material dispersal. To improve safety and security of the skywalk, the doors that give immediate access to campus should remained locked and only accessible with a student ID and PIN. Access using a student ID and PIN will also allow for better tracking of those entering and exiting the facility. This technology would prove beneficial in deterring offenders from committing crimes because they would know they are being tracked. The use of identification and badges would also serve to prevent anyone who is not supposed to be in the facility from gaining access.

The location of the Natatorium also presents a challenge because there are several parking garages nearby, the skywalk connects the building to the rest of the campus, the library and Military Park are nearby, and downtown Indianapolis hotels are within walking distance. If someone wanted to plant an IED or chemical, radiological, or biological dispersal device they could then blend in with the rest of campus and escape into the city. This means security cameras should be strategically placed along the perimeter of the building to allow for a clear view of identified hot spots on campus. Hot spots can include entrances, exits, parking garages, and areas

that gather large crowds. The cameras should pan and allow the operator to zoom in on an individual and still retain a clear picture.

Another challenge that the Natatorium experiences is the age of the building. The renovations in 2016 offered many improvements to the building, including lighting upgrades, but much more can still be done. The main renovations conducted were to enhance the interior design of the Natatorium, along with other improvements to ensure that the facility remains a nationally renowned world-class destination for aquatics ("IUPUI", 2018). Other improvements that would benefit the facility include additional surveillance equipment throughout the interior and exterior of the building, increased lighting along the perimeter of the building, and security improvements for the skywalk.

Recommended Results and Changes

A diverse selection of improvements could be implemented to the Natatorium, ranging from technology and safety techniques to equipment and tactics to enhance the overall security for events. The initial changes would begin outdoors before entrance into the building. Vehicles have often been used by terrorists to target large crowds, cause damage, take lives, and inflict terror. To assist in the deterrence of these offenses, permanent security bollards should be installed near the main doors of the Natatorium on University Blvd. A study conducted at Penn State revealed that an individual security bollard can stop and destroy an attacking vehicle weighing 10,000 pounds that is moving at a rate of 65 mph or a 20,000-pound vehicle that is moving at a rate of 46 mph (Hamm, 2017). Removable concrete barriers are another option for short-term road closures, but security bollards provide the best deterrent results.

Combining the presence of law enforcement officers, modern technology, and third-party security would make checkpoints in the entryway can become much more effective. Metal detectors, cameras, and magnetic wands handled by security staff will increase the effectiveness of monitoring devices. All civilians will be required to walk through the scanners and have their bag inspected by security. If they refuse to cooperate, then they will be denied access to the event. Bags should be inspected to prevent possible hidden detonation devices or weapons.

There must be communication between multiple jurisdictions for future success. The Natatorium has a variety of entrances throughout the building, including underground tunnels, glass walkways, parking garages, basement level doors, the main entrance, and a few entrances on the side loading area of the building. Using joint communication and combined manpower all doors should be monitored throughout every event and only the main entrance should allow visitors access to the Natatorium. Security personnel also need to conduct routine patrols around the interior and exterior of the building. Implementing a mixture of tactics, modern technology, and security techniques will best prevent a possible attack.

Venue security can be enhanced by creating a secure perimeter and maintaining a secure environment for the duration of the event. In developing these strategies it is critical to anticipate the worst-case scenarios in order to formulate a security and risk management strategy. Utilizing this process will assist in creating appropriate modifications to security, training, organization, personnel screening, and surveillance during the event.

All event security stakeholder should train for emergencies as one team under the Incident Command Structure (ICS), which should be utilized during the event. All law enforcement, fire, emergency medical services, and private security organizations should be coordinated under a single unified command to enhance communication and the ability for all

agencies to act as one cohesive entity. Officials within the unified command structure should take note of past mistakes relating to discoordination with too many delegations of authority and responsibility that generate a lack of fluent communication and undermine the command structure (Haddow, Bullock, & Coppola, 2017). This can be completed in a After Action Review (AAR) which gathers all entities to discuss the successes and failures of response during an event.

Training should be conducted to minimize the risk of complacency within the security apparatus. Complacency creates a false sense of security. To reduce complacency, tactile exercises and real-life scenarios should be implemented during planning to establish the practicality of a plan and highlight any shortcomings (Hall, 2006).

Visitor screening at the event perimeter and security checkpoints can be enhanced through the use of modern screening technology, including metal detectors, bomb detection, and drones. In order for this technology to be effective, the Natatorium's multiple entrances must be secured and the points of entry reduced to include only those with security checkpoints. Each checkpoint will require any individual entering the venue to pass through a walk-through metal detector to check for firearms, knives, and any other metallic object that is capable of being used as a weapon.

Explosive detection K-9 teams can be employed at security checkpoints to screen individuals and bags entering the facility. These teams can also be used within the venue to check for any explosive devices hidden within the facility prior to security establishing a perimeter. Finally, these teams would sweep any type of freight or other deliveries brought in by outside vendors prior to and during the event.

Drones can be used to supplement manpower both inside and outside of the venue. A single drone can circle above the site and provide incident command with a birds-eye view of the perimeter and enhance the ability to monitor crowds and rapidly gather intelligence on any emerging threats. Inside the building, smaller drones can be used to provide roaming surveillance.

Conclusion

The IU Natatorium is more prepared for natural disasters than it is for potential terrorist attacks. Without the ability to delve into more IUPUI plans and policies, it is difficult to fully assess how the facility can respond during these events. This security analysis provides an overview of potential problems and solutions with the Natatorium and provides a detailed account of the vulnerability of this facility during large events. The building is reinforced in the event of a severe weather threat, but there could be many improvements made when planning for a potential human-made threat.

References

Attwood, E. (2016, September). Air, Water Quality Key Drivers of IU Natatorium Renovation. Retrieved from https://www.athleticbusiness.com/aquatic/air-water-quality-key-drivers- of-iu-natatorium-renovation.html

Haddow, G., Bullock, J., & Coppola, D. (2017). Introduction to emergency management (6th ed.). Cambridge, MA: Butterworth-Heinemann.

Hall, S. (2006). Effective management of university sport venues. The Sport Journal, 20. Retrieved from http://thesportjournal.org/article/effective-security-management-of-university-sport-venues/

Hamm, G. (2017, June 22). Preventing Vehicle Terror Attacks on Campus with Bollards. Retrieved from https://www.campussafetymagazine.com/public/preventing_vehicle_terror_attacks_on_school_college_campus_bollards/

Ingraham, C. (2015, December 3). What makes a 'mass shooting' in America? The Washington Post. Retrieved from https://www.washingtonpost.com/news/wonk/wp/2015/12/03/what-makes-a-mass-shooting-in-america/?utm_term=.a70f884b1b14

IUPUI. (2018). IU Natatorium. Retrieved from https://iunat.iupui.edu/#/

Jenkins, B., M., & Butterworth, B., R. (2018). An analysis of vehicle ramming as a terrorist tactic. Mineta Transportation Institute. Retrieved from https://transweb.sjsu.edu/sites/default/files/SP0518%20Vehicle%20Ramming%20Terrorism.pdf

Klarevas, L. (2016). Rampage nation: Securing America from mass shootings. Prometheus Books: Amherst, NY

NFL. (2019, January). The Official Website of the Indianapolis Colts. Retrieved from https://www.colts.com/tickets/group-tickets/faq

Sosnowski, A. (2019, April 13). What's the difference between straight-line winds and tornadoes? Retrieved from AccuWeather.com: https://www.accuweather.com/en/weather-news/whats-the-difference-between-straight-line-winds-and-tornadoes/70005249

"Terrorist Attacks by Vehicle Fast Facts". (August 20, 2018). CNN. Retrieved May 3, 2019. https://www.cnn.com/2017/05/03/world/terrorist-attacks-by-vehicle-fast-facts/index.html