

Chapter 1
**INTRODUCTION TO EVENT CROWD AND QUEUE
CONTROL**

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Chapter Outline

- Introduction
- What is Crowd and Queue Control?
- Understanding Crowd Dynamics
- Queue Management in Events

- Theories of Crowd Behaviour
- Principles of Effective Crowd and Queue Control
- Policy Guidelines and Practical Frameworks
- Conceptual Framework for Crowd and Queue Control
- Summary
- Key Questions

1. Introduction

Public gatherings such as religious pilgrimages, music festivals, sports tournaments, and political rallies are characterized by crowds and queues. As much as these phenomena tend to represent mass energy, identity and commonality, there is also the problem of order, security and effectiveness. Crowds that are poorly controlled have been the root causes of tragic events throughout history, such as stampedes, crushes, and conflicts, which is why systematic and professional methods to control crowds and queues are necessary (Still, 2014). In the same manner, dissatisfaction, frustration and even insecurity may arise at the cost of the experience of the participating individuals, and the success of the event due to the loss of control over queues (Maister, 2005).

The growth in magnitude and sophistication of contemporary events require more than a patch job. As the number of attendees can easily go into the tens or hundreds of thousands, organisers need to implement evidence-based approaches that will combine both the design, psychology, communication, and technology. The management of human behaviour in physical and social space is therefore not necessarily a matter of logistics but a matter of crowd and queue control. The work in question involves risk anticipation, the promotion of cooperation, and the integration of safety principles into the entire event life cycle, including planning and entry management, and dispersal and the post-event assessment.

In this chapter, the concepts, theories, and frameworks underlying effective crowd and queue management are explored in detail. It explores the dynamics of crowds, discusses important psychological theories of behaviour, and describes some practical methods of queue design and management. It also determines international policy guidelines and

suggests a conceptual system of the so-called Crowd and Queue Control Wheel, which combines ten mutually reinforcing principles. The comprehensive goal will be to identify the general structure of the research into how crowds and queues may be controlled in a manner that is both professional and ethical and how the events in question may be pleasant, inclusive and fun to its participants.

2. What is Crowd and Queue Control?

Crowd and queue control are key elements of contemporary event management and its emphasis is on the safe, effective and orderly movement of people in a limited space. Although both concepts are very similar, they have different meanings. Crowd control is the process or planning, supervision, and guidance of large masses of individuals in order to avoid accidents, minimize risks, and create good experiences. It entails measures that provide a balance between event operational objectives and the safety of the participants, including flow maintenance at the entrances, exits, or meeting points (Still, 2014). On the other hand, queue control is the more narrow concept, describing the organization of crowds before they can be served, admitted to a location or event, or become participants. The combination of the two dimensions creates an entire management system of human behaviour in a high-density environment.

Crowd and queue control is vital due to several tragedies throughout history. For example, stampedes at sporting events and religious pilgrimages have resulted in the death of hundreds of people and in most instances this is attributed to over-crowding, poor organization or simply as a result of lack of communication (Fruin, 2005). The consequences of these accidents show the final result of the lack of consideration of human dynamics in mass areas. Through proper organizing, there will be minimal occurrence of physical injuries; it may also make the event to be enjoyable and fair. In fact, it has been discovered that when people have a feeling that queues are fair and properly handled and that they are also moving efficiently, they tend to be satisfied with situations (Larson, 2023).

Crowd control involves preventive and reactive action. Some preventive steps involve venue design, simulation of crowds, zoning, and ticketing that restricts the capacity to a safe level. Also used in response to unexpected surges or clashes are stewards, emergency

response and emergency signs. Prevention is always the best option as it will reduce the necessity to use real-time crisis interventions, but both are needed to promote resiliency in changing environments (Chalip, 2017).

Meanwhile, Queue control lies at the interface of psychology and logistics. Physically, it needs layouts that include zig-zag barriers, holding areas and specific pathways that make the most of space and help to create order. Queues control psychologically the aspects of perception of waiting time. As Maister (2005) postulates in his masterpiece about the psychology of waiting, wait times are often perceived to be longer than the wait time itself unless distractors or assurances are identified. Therefore, organisers of events often implement digital ticketing, live event updates or entertainment in lines to keep the audience happy. Queues are controlled with physical and psychological methods, with the aim of minimising frustration, minimising the chance of queue-jumping or conflict and improving the overall experience.

Crowd and queue control have increasingly become computerized. CCTV tools, drone surveillance, wearable sensors and the crowd simulation software enable the organisers to anticipate bottlenecks and act before issues develop (Helbing and Johansson, 2013). Mobile application and scheduled entry can also contribute to a decrease in the number of arrivals in peak times, as well as real-time data dashboards that can assist managers in redistributing staff or adding lanes. It is a transitional state between the past model of dealing with the crowd through the use of the wall and a smart approach of dealing with the crowd through judgments being made in response to continuous surveillance and predictive analytics.

After all, it is all about freedom and control in crowds and queues. The organisers of an event should not restrict their participants too much, but they need to maintain a high level of control to prevent accidents. The difficulty is in predicting behaviours, creating environments that support natural flow and preparing responses that reduce risk when human unpredictability occurs. At the bigger level of event management, crowd and queues control is not only practical in the context of safety, but also in enhancing the inclusiveness, equity, and success of events in the peoples.

3. Understanding Crowd Dynamics

Crowds are a common and repetitive feature of human society, observed in both normal situations such as transport centres, shopping malls and festivals and in extraordinary ones such as political rallies, sports tournaments or religious pilgrimages. Although the concept of a crowd is mostly associated with positive traits of group excitement and experience, it is also marked with the possibility of chaos, danger, and tragedy. Crowd dynamics is thus a core study of what is referred to as effective event management. Learning how individuals act in crowds, how density impacts movement, and how moods are transferred in crowds can be used to create safer and more enjoyable events.

Defining Crowd Dynamics

Crowd dynamics is a term used to describe the patterns, behaviors and interactions that arise when people come together in large numbers and when they share physical space. It not only gical and social processes that affect the decision making within a group (Helbing and Johansson, 2013). The crowds, in general, unlike individuals, are subject to emergent behaviour that cannot be identified by studying individual members. This is observable when the individual might desire to go to the closest exit but he / she will find a lot of people on the route that he/she has always been used to and the route might be the busiest route.

Crowd dynamics is therefore a physical mechanics (density, flow rates, velocity, obstacles) and social psychology (emotions, group identity, risk perception) issue. Crowd management plan is an effective plan that integrates all these dimensions to foresee the risk and develop environments that support natural and safe movement.

Key Factors Influencing Crowd Behavior

1. Density

Density is the most significant factor that determines safety and is expressed in persons per square metre. There is free movement and low-density people. However, compression, suffocation and trampling all become exponentially threatening as the crowd becomes packed. Fruin (2005) comes up with four phases of the crowd density:

- o Low density (<2 persons/m²): comfortable movement, low risk.
- o Medium density (2–4 persons/m²): movement slows, body contact increases.
- o High density (4–6 persons/m²): restricted movement, risk of falls and surges.
- o Critical density (>6 persons/m²): crush conditions possible, danger of asphyxiation.

2. Flow and Directionality

Crowds are safer when the flows are unidirectional. Turbulence, bottlenecks and abrupt stoppages are formed by cross flows, counter flows and converging streams. Narrow passages and obstacles increase these risks, which is why the design of the venue is also a highly significant consideration when it comes to safety (Still, 2018).

3. Time Pressure

Time-induced situations like lack of seating, weather emergencies or sudden weather changes can turn cooperative crowds into competitive ones. When there is a sense of space or resource scarcity, pushing and surging tend to happen more.

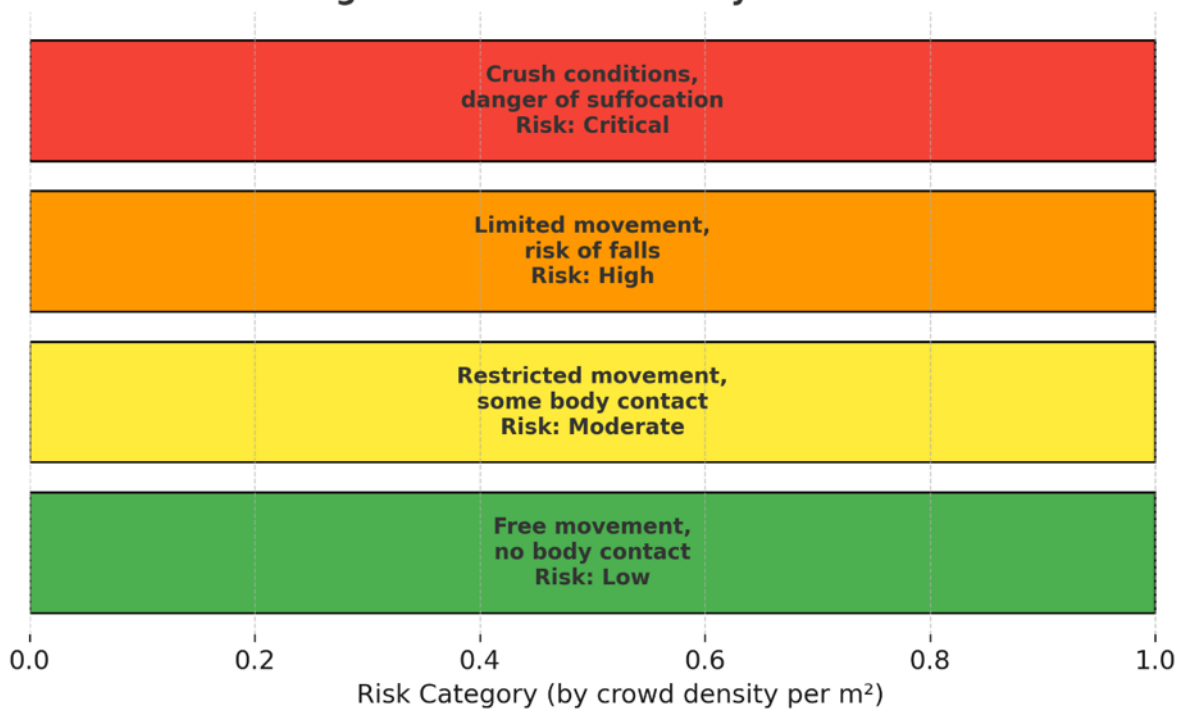
4. Emotional Climate

Passions are contagious and, in most cases, more influential than logic. Excitement in a concert can promote risky behaviors like jumping or pushing forward but panic will increase with anxiety in an emergency. According to Social Identity Theory, people in a crowd have a common identity, which intensifies emotional feelings in the crowd (Reicher, 2001).

5. Communication and Information.

The key in moulding the crowd behaviour is good communication. Puzzlement or silence in a crisis breeds fear and rumor, but explicit instructions, whether in signs or loudspeakers or wardens, can direct mass action along orderly lines.

Figure 1.1: Crowd Density Risk Chart



The figure shows the relationship between the safety risk and the density of the crowd. With low densities, people have their own space and freedom of movement. When the number of people per square metre exceeds four, then personal autonomy will be affected, and the probability of accidental falls, pushing, and compression will improve. Beyond the six individuals per square metre, the situation is life-threatening, with or without apparent panic. The following model highlights the importance of the density of monitoring in event safety planning.

4. Queue Management in Events

One of the most obvious and unavoidable elements of the events is queues, whether it is buying tickets and going through a security check or going to eat or go to the bathroom. Queues can significantly affect the satisfaction of their participants, the performance of their operations and even their safety, though they are perceived as a mere nuisance. In other instances, uncontrolled waiting queues caused congestion, exasperation, and fights that threw a spanner into the gears of an event. As a result, queue management has become a distinct field of event management, based on operations management, psychology and technology principles.

The Nature of Queues in Events

A queue is an intermediate waiting mechanism in which the demand of a service surpasses current capacity. Queues also happen at entrances, exits, concession counters, ticket sales, or interactive attraction locations, in events. In contrast to a retail or transport venue, event queues typically have a highly emotional and heterogeneous audience, with both children and elderly attendees, or excited fans and nervous, security-minded members (Larson, 2019). The stakes are consequently greater: queues not only affect the perceptions of fairness/organisation but also may turn into safety hazards in the case of an imbalance between demand and supply.

According to Maister (2005), waiting lines were not only a question of time, but perception. His study of the psychology of waiting pointed out that the wait time of people is less important in determining satisfaction than the way people experience waiting time. As an example, waits without any explanations are perceived as being longer and idle time is rated worse than active time. By using these principles, event managers are able to come up with queue systems that will reduce the level of frustration despite the fact that we may be forced to wait.

Physical Design of Queues

Physical design is the most basic aspect to queue management. Queues that are well designed use the space available optimally, avoid bottlenecks and are fair. Common strategies include:

1. Zig zag or serpentine lines: These add more to the perceptual advancement since they allow the participants to mark movement, even slow. Neither are they encouraging line-jumpers (Fruin, 2005).
2. Barrier systems: Temporary barriers known as fencing, stanchions or railings direct individuals in the orderly direction.
3. Holding areas: Buffer space is created at the entrance points and the arrivals become more homogeneous.

4. Multi service points: With a single long queue, which is split in to a few shorter ones, it is seen as having less wait time and the throughput is also increased.

The geographical distribution of queues is particularly significant at the entrance points where security checkups and issuing tickets could create natural bottlenecks. Flow in this instance should be balanced in regard to speed, accuracy and safety.

Psychological Strategies for Queue Control

Besides the physical arrangements, psychological interventions also impact on the mindset that the visitors develop concerning queues. Strategies include:

- Waiting time: Waiting is seen to require less time when one is distracted by entertainment, music or live screens (Maister, 2005). In order to maintain positive attitudes in queues, most theme parks such as Disney have interactive games or narration aspects in the queue environment.
- Transparency: Providing participants with a feeling of what to anticipate in regard to wait time creates in spectators a feeling of fairness and removes anxiety (Taylor, 1994). Online waiting line indicators or projected wait time can make a lot of difference in terms of perceived organisation.
- Fairness: where people are assured that the system is fair, they are willing to take longer. Perceptions of equity are reinforced by systems like a first come first served or open priority queue to disadvantaged groups (the elderly, disabled, or parents with children) (Larson, 2019).
- Progress cues: When the participants can observe that they already have made some progress (e.g. reached a checkpoint, crossed a barrier) they get an impression of success even when there are no net differences in waiting time.

Technological Innovations in Queue Management

Digital technologies have dominated the last few years and transformed the traditional systems of queues into smart queue management. These innovations include:

- Electronic ticketing and booked entry slots: It disperses the flow of arrivals across the day, and avoids overcrowding of ports of entry during peak periods (Chalip, 2017).
- Mobile apps: Through apps, attendees would have real-time data regarding the queue lengths and make informed decisions in order to reduce crowding at bottlenecks.
- Virtual queues: There are events and other attractions where one is able to reserve the place in the line virtually and receive an alert as it is their turn. This sets the attendants at liberty to engage in other activities in the meantime (Zhang and Kulviwat, 2018).
- AI-based surveillance: Queue length and velocity are tracked by sensors and cameras, and organizers can open new lanes at any moment or move employees around.

These technologies are able to increase efficiency and satisfaction of attendees and collect valuable information about the crowd behaviour that could be used in future organisation of events.

Queue Management and Safety

The queues are not only interested in convenience but also in safety. The risk of surges, pushing and falls can be enhanced by crowds at the entry points, especially when the audiences are impatient or anxious. Even a minor setback like a technical malfunction with ticket scanners can easily turn into panic when not prevented in advance. The UK Green Guide to Safety at Sports Grounds (2018) advises against the use of queues to block emergency exits and to ensure that there is always room to move out in case of an evacuation. Besides, the employees should be trained on how to handle an incident that occurs in queues by training them on conflict resolution and first aid.

Inclusivity in Queue Systems

Inclusivity should also be taken care of in modern queue management. The vulnerable groups that require alternative arrangements to enable them to enjoy equal access are persons with disabilities, older participants, and families with young children. The

provisions of the priority lanes, the seating within the waiting bays, and the readability of the signages are all inclusive and aligned to the overall social sustainability goals of event management (Raj and Musgrave, 2009). Being able to include people in queues is not only ethical but also enhances the reputation of the organisers and increases repeat attendance.

The Staff and Communication role.

Without qualified human management, technology and design will not be able to handle queues. The human face which is provided to them by the Stewards, Usher staff and security people makes them sure that they will be safe; they will bring equity and will help in the tensions reliever. Communication is imperative and admirable. It has been shown that the reaction of participants is more positive when staff justify delays, updates and show empathy (Reicher, 2001). Communication and cultural awareness/de-escalation staff training is a component of queue management.

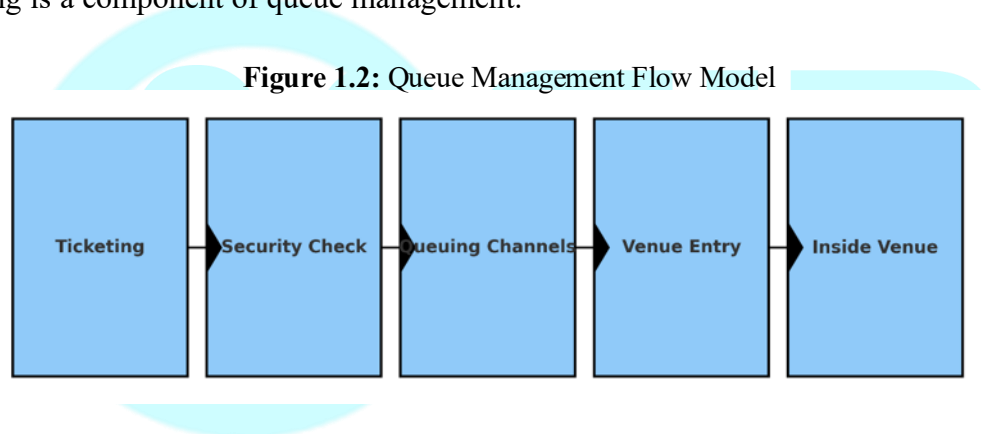


Figure 1.2 demonstrates the overall movement of the participants through the major steps of entry process of an event, and how the correct management of queues can lead to the safety, fairness, and efficiency. This model starts with the Ticketing where players either buy or redeem their tickets. This step is critical on access control since only those people with authorization continue. Security Check is the next step whereby bags, credentials and identities are checked. Security checks are usually bottlenecks, and the efficiency of such checks directly influences the length of the queue and satisfaction of participants.

After the level of security, they proceed to the Queuing Channels and are arranged into ordered queues with the help of barriers, signs or personnel directions. This will contribute to maintaining fairness, preventing congestion and successively distributing attendees to service points. The characteristics of the Stage of Venue Entry are the Performance of

Controlled Entry and Ticket Scan that are based on the speed and security. Finally, the participants reach Inside Venue, and they are divided into seats or standing area.

The sequential flow underscores the value of coming up with a smooth and coordinated flow. Each stage relies on the others and the slowness/inefficiency of one stage spreads to the rest of the system.

This allows event organizers to create a holistic view of their queues, starting at the ticketing stage and continuing into the final entry, ensuring that the participant experience is improved, safety risks are minimized, and guests are sure to have an outstanding first impression of the event.

5. Theories of Crowd Behavior

The behaviour of crowds has been a source of interest to sociologists and psychologists over the past 100 years, in large part due to the fact that people tend to behave in ways they would not act upon when alone. Such changes in behaviour and their cognition are paramount to organisers of such events as it provides a framework through which risks, interventions, and safety are predicted. A range of theoretical approaches has been suggested to describe the phenomenon of crowd behavior, and each of them provides various explanations of the way people think, feel, and behave in group situations.

1. Contagion Theory

Contagion Theory is one of the oldest theories and was created by Gustave Le Bon (1895). Due to his argument, he claimed that people in the crowd lose their individual responsibility and reason and get submerged in a collective mind. Here, anger, excitement, or fear (if not, my state), like a contagion, are spread quite quickly. A little pushing at a concert can lead to mass surging, an example of this is those who are not aware of what they are doing, and just copy it without realizing. Although this theory has been criticised as being too deterministic and ignoring the role of the individual in crowds, it documents the significance of emotional control in the crowd (Reicher, 2001). Organisers of the event use this understanding to train employees to de-escalate negative emotions within a short period and to create physical spaces that minimise the chances of a rapid escalation.

2. Convergence Theory

Convergence Theory, on the contrary, argues that crowd behaviour represents the desires of the people who convene, but does not make them irrational. The theory developed in the middle of the 20th century assumes that individuals that share the motivation are brought to the same location and that the collective behaviour is the result of the existing characteristics (Turner & Killian, 1987). To illustrate, a protest is not disruptive because people lose control of their own feelings, but because people are at the protest because they already have grievances or anger. Convergence theory reminds organisers in event management that they need to take into consideration the kind of audience an event draws. A football derby with a history of rivalry would be an example of this compared to a family based cultural festival.

3. Emergent Norm Theory

The gap between the contagion and convergence approaches is filled with the Emergent Norm Theory proposed by Turner and Killian (1987). It believes that fresh norms and rules of behaviour emerge in the crowd as things progress. At first, crowds are not sure how to behave, but with time, some people persuade others, and their behaviours become traditional patterns. Taking the case of a small group of people at a festival sitting on the floor to relax, others might also be encouraged to do the same, creating a new rule of behaviour which is not permanent. On the other hand, when a handful of persons begin to jump over fences, others will take this as a normal behavior and imitate them. This theory emphasizes the role played by leadership, obvious role models and effective communication in influencing crowd behaviour. The organisers can affect emergent norms by making sure that the stewards model composed, organised behaviour in both normal and emergency conditions.

Social Identity Theory

Social Identity Theory (SIT) is popular in modern scholarship, especially in the form formulated by Reicher (2001) in his collective action book. According to SIT, people do not lose their identity when they are in a crowd, they acquire a collective social identity depending on what group they think they belong to. Group norms then control behaviour instead of personal irrationality. As an example, the audience at a football game can also

behave in support of the supporters of their sport, at the expense of opponents. Notably, SIT acknowledges that not all crowds are irrational and dangerous-high rates of cooperation and order can be observed in most crowds, including religious pilgrims or political protesters, that are led by a common positive identity (Drury and Reicher, 2000).

SIT provides a better lens to event organisers. It implies that the management strategies need to collaborate with the identities of the attendees, but not work against them. Usually, people who come to music festivals may enjoy inclusivity and partying, so messages that appeal to these qualities will be more helpful than commanding instructions.

Similarly, in emergencies, collective responsibility (help other people to get out safely) rather than individualistic messages when framing messages about evacuation can prove more effective.

Principles of Effective Crowd and Queue Control

Managing these masses of people is not only about responding to the events as they come. Crowd and queue control involves evidence based planning and constant observation to ensure that people move safely, efficiently and comfortably across event areas. These are the values on which modern-day event management is built because it maintains a safety balance against the desire to depict a positive experience to the audience members.

1. Pre-Event Planning

The control of crowds, queues is founded on the planning before the event. This encompasses risk assessment, simulation of potential crowd movement, identification of the high density areas such as entrances, exits and concession points (Fruin, 2005). The pre-event planning also includes estimation of the attendance, the weak population and the weather and time of the day. Simulator computer programmes of crowds can assist the organisers in forecasting where the bottlenecks will be, as well as trying the contingency plans (Still, 2018).

2. Venue Design and Layout

An essential determinant of behaviour in crowds is the physical environment. According to flow principles, the space should be designed in such a manner that enables them to

establish natural flows, eliminate dead ends, crossflows, and other components that cause turbulence (Helbing and Johansson, 2013). The doors to the building should be large to accommodate the projected volumes and signs and the barriers must not be employed to restrict movement but they should guide it. Queues are serpentine in design and the lanes are decreasing in a proper direction even out the situation and minimise line-cutting. Accessibility, waiting areas and seating is also included in inclusivity and safety.

3. Real-Time Monitoring and Control

Without constant monitoring of good plans, they will fail. Currently, the use of CCTV, drone, and AI-informed crowd analytics technologies can offer real-time data on the density, flow rates, and hotspots to organisers (Zhou et al., 2019). Flexible control is enabled by surveillance, and it gives the personnel the option to add more gates, switch lanes, or interfere when there is an overcrowding. The feedback loops generate a dynamic environment enabling the detection of the issues and their solution before they receive an opportunity to evolve.

4. Communication

Crowd management is grounded in communication. It has been found that confusion and lack of information in case of an emergency aggravate panic (Drury and Reicher, 2000). The organisers ought to communicate transparent, congruent yet realistic messages using diverse medium such as signage, loudspeakers, computer screens and apps on mobile platforms. Not only do you need to communicate in order to give the instructions but also to console the attendants to minimize the stress levels among the long queues or the crowded areas. Inclusion can also be increased with the help of multilingual signs and culture sensitive messages.

5. Steward and Staff Training

The intervention of human nature remains required. Frontiers of crowd handling, movement, enforcement of rules, and maintaining the weak are the stewards, ushers and security personnel. Such problems as de-escalation plan, cell conflict management and first aid knowledge, evacuation routes and emergency plans knowledge must be listed among the issues that have to be addressed during the education process (Chalip, 2017). It is worth

noting that non-aggressive, respectful behaviour should be imitated by the employees because visitors tend to follow the behaviour of those in authority in the period of hesitation (Turner and Killian, 1987).

6. Emergency Preparedness

Emergency planning is necessary because crowds are very sensitive to sudden changes. The emergency exits need to be clear of obstructions and make certain that the assembly areas are situated in secure areas. Other possible triggers that contingency plans should take into account include severe weather, technical breakdowns, or medical emergencies. Daily exercises and training guarantee the personnel to be able to use the protocols as fast and securely as possible (Sports Grounds Safety Authority, 2018). Preparedness helps to mitigate the minor incidences to full-scale crises by eliminating the element of uncertainty.

Safety is just one part of modern crowd and queue control that includes inclusivity. Patients at high risk (people with disabilities, older adults, those having children, etc.) require special accommodations (like priority lanes and time to read or rest) that other patients do not require. Inclusive queues are more supportive of perceptions of justice and are consistent with other social responsibilities in event management (Raj & Musgrave, 2009). Inclusivity is both an ethical requirement and enhances general satisfaction and repeat attendance.

7. Technology and Innovation

Crowd and queue management technology has altered practice. Such instruments may include a time-based entry slot, mobile applications that can help cope with congestion, the use of real-time feedback and virtual queue systems, etc. (Zhang and Kulviwat, 2018). Wearable devices and sensors can be used to monitor the crowd density that is beneficial during post-event analysis as well. Privacy needs to be implemented along with these technologies but their role in predictive and adaptive management cannot be ignored.

8. Continuous Evaluation

Finally, crowd and queue management is a learning process. The data monitoring analysis, debriefings and post-event surveys combined with reviewing can help the organisers to learn their weak areas and consequently improve their plans during future events (Downing

and Ballantyne, 2007). Evaluation makes sure that it is dynamic and hence changes with the emerging needs of the audience, technical changes and regulation.

6. Policy Guidelines and Practical Frameworks

Crowd and queue control is not solely a matter of best practice or managerial discretion; it is shaped by policy guidelines and regulatory frameworks developed by governments, professional associations, and international bodies. These frameworks provide standardized approaches to safety, ensuring that organizers adopt evidence-based strategies that reduce risks, protect participants, and enhance accountability. Just as sustainability in events has been institutionalized through international standards (Raj & Musgrave, 2009). Crowd and queue management has gradually been codified through safety legislation, industry codes, and operational manuals.

International and National Guidelines

The Green Guide to Safety at Sports Grounds is one of the most impactful documents currently issued in the sixth edition in the United Kingdom (Sports Grounds Safety Authority, 2018). The Green Guide also offers specific advice on the size of crowds, how to design barriers, stewarding, evacuation routes and queue arrangements. Though mainly used in sports facilities, its concepts have been broadly used in concerts, festivals, and other mass events across the globe.

The National Fire Protection Association (NFPA, 2018) develops the standards of building design, emergency exit, fire, and crowd evacuation procedures offered in the United States in the NFPA 101: Life Safety Code. This framework highlights why it is essential to plan for the worst-case scenario and has been incorporated into fire and building codes in states.

At the international level, the ISO 22320: Emergency Management Guidelines establish the parameters of the successful response to the occurrence according to the communication, the structure of the decision-making and the organization of interaction with emergency service (ISO, 2018). Although it is broader in scope than crowd control, its focus on structured response mechanisms is much more applicable to event organisers. Likewise, ISO 20121, which was initially intended to support sustainable event

management, includes the elements of safety and inclusivity that intersect with crowd and queue management activities.

Principles from Policy Frameworks

In these various sources there are a number of shared principles:

1. **Capacity Management:** It has always been emphasized that safe crowd capacities of the venues should be defined and admission controls should be set so as to avoid overcrowding. This includes calculations of density, flow rates and exit capacities (Fruin, 2005).
2. **Evacuation Planning:** It should be evident that the emergency preparedness exists: It should be apparent that there are evacuation routes, that the signage and the assembly points are in sight. It is highly encouraged that drills and rehearsals are undertaken (Sports Grounds Safety Authority, 2018).
3. **Communication and Signage:** It is also associated with the multilingual messages, the good announces, the technology that is presented to people to learn about the waiting time or any other process change to achieve it (ISO, 2018).
4. **Stewarding and Staff Training:** The anthropological part of the safety management is also to be elevated i.e. the corresponding training of the staffs on the psychology of crowds, the conflict management of the staffs and the First aid training of the staffs is also to be conferred upon them (Chalip, 2017).
5. **Monitoring and Evaluation:** A significant quantity of frameworks make crowds to be trailed through the whole period with the assistance of CCTV cameras, sensors, or even post-event human observation and assessment to create learning and development (NFPA, 2018; Koffel, 2019).

Event-Specific Frameworks

In addition to the general safety codes, industry specific frameworks are available. The present case UK sport crowds in the mega sporting events has given the norms of operation which in this case; our norms of operation will be crowds control by various ways such as diversity awareness and inclusion of persons with disability (UK Sport, 2005). On the

same note, the music festivals have equally developed the concept of strategy such as the Sustainable Music Festival Guide (2007) that has provided the control on the crowd that consider the parameter of the sustainable environment because the book contains the information with the waste management systems, transport planning and queuing.

Special management systems have been designed due to religious events e.g. Hajj in Saudi Arabia. To put the millions of pilgrims in check, the governments have installed time slot booking machines, re-routed the routes and monitored more (Rowland, 2019). These methods demonstrate how structures are inculcated into definite cultural and logistical facts.

Practical Applications

The policy guidelines should not exist as a theory, but should be used as a guideline to the daily operations. One of them is that the Green Guide states that queue management should not obstruct the emergency exits compared with ISO 22320 that states that there should be unhindered chain of command in case of emergencies. The two prevalent compliance frameworks include certification and audit whereby the venues and organisers are assessed according to the established standards. This helps to offer accountability and crowd safety is no longer incidental.

Remarkably, a framework can be used to promote the local emergency response with the police, fire brigades, medical staff that participate in the planning and real-time operations to carry out the planning process. Such integration will reduce time taken to respond to crisis and ensure that roles are shared appropriately.

Benefits and Challenges

There are several benefits of adhering to policy guidelines:

- Minimisation of risks: Minimisation of accidents and liability.
- Consistency: setting a similar standard in events.
- Professionalization: strengthening the reputation of event management as a profession.

- Public trust: Providing the attendees with the assurance that safety is of the utmost priority.

However, challenges remain. Smaller organisers may face a financial or logistical burden of compliance, particularly where compliance requires expensive monitoring tools or employee training over an extended period. Furthermore, the non-contextual obedience can either be weak or decrease the flexibility. To demonstrate the argument, a facility that is constructed around mega stadiums may not be practical in case of small communities.

7. Conceptual Framework for Crowd and Queue Control

Formulation of a conceptual framework of a crowd and queue management is important to incorporate the theories and principles as well as practical actions in a single system. This type of structure provides safety as not an improvisation but a fundamental element of managing events. A holistic model recognizes that the best control is a matter not only of physical infrastructure but also of human behaviour, communication, inclusivity, and technological innovation. The framework below is based on the experiences of international guidelines, theories, and industry best practices, and consists of ten interrelated aspects of crowd and queue management.

1. Organisation and Structure

The starting point of crowd and queue control is clear organisational structures. During regular operations and emergencies, roles and responsibilities must be defined and lines of authority to make decisions established (ISO, 2018). Consistency and accountability are based on the policies, procedures and employee training.

2. Design for Flow

Space used in events should be such that it allows natural movement. The venue structures should consider the entrance and exit capacities, points where barriers are placed and signs to guide individuals (Helbing and Johansson, 2013). When it comes to queues, serpentine layouts and waiting rooms reduce the perceived waiting time and maximise equity.

3. Avoidance

The best prevention of crowd disasters is to prevent any crowding. Checks on the number of attendees by ticketing, time slot admissions and pre-registration measures help to maintain a safe level of density (Fruin, 2005). Anticipation of environmental hazards, e.g. weather or terrain and prevention are also considered as avoidance.

4. Engagement

Participants do not sit back and watch the event, their cooperation is essential. Such engagement methods incorporate, pre-event provision of information, involvement and the formation of safety cognisance and awareness among the to be engaged (Reicher, 2001). Trust and compliance are encouraged through favorable interaction.

5. No Trace

The crowd and queues control should also be sustainable. Preservation of the environment is connected to safety management by means of policies that decrease the waste, use of temporary barriers as well as encouraging and implementing dispersal measures, which are more environmental-friendly (Raj and Musgrave, 2009). No trace is concerned with making the event have left behind safe, clean and undamaged spaces.

6. Legacy, Longevity, and Transparency.

The events have to be targeted not just at the safety here and now but also they should be designed to build long-term trust. This permanent development is attained through openness in reporting the crowd incidents, performance evaluation and deciphering of the learning. These are practices that improve professional practices overtime in the industry (Downing and Ballantyne, 2007).

7. Incentivize

When individuals can feel the gains, there is a higher probability of them to act according to the rules of crowds and queues. Discounted transport, early entry tickets, or the so-called fast-track systems stimulate orderly behaviour and limit the number of queuing (Zhang and Kulviwat, 2018). Rewarding employees by giving them rewards or prizes also encourages them to ensure that the policies are enforced continuously.

8. Strategic Management

Crowd and queue control involves strategic thinking that involves planning, monitoring, and evaluation. They can use critical path analysis and value chain modelling as instruments to determine when and where their intervention is most effective (Still, 2018). Strategic management will instill safety in all the phases of event life cycle.

9. Education

Training staff is not the only role of education, but also the creation of awareness among the people. Participants should be told and shown safety precautions, evacuation routes and line formations in advance and on the day. Collective learning and professionalism is also based on the sharing of best practices within the industry (Chalip, 2017).

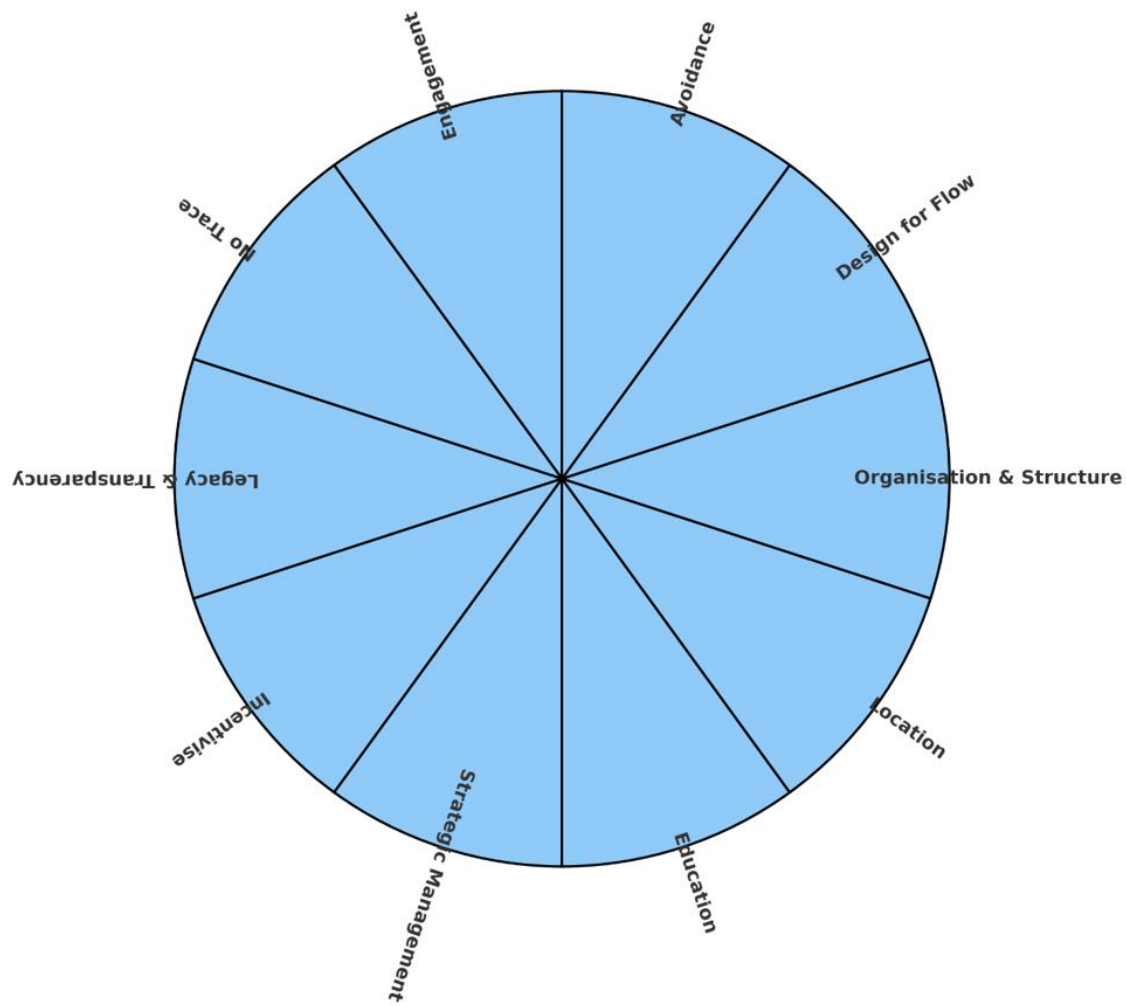
10. Location

The choice to use a venue has far reaching implications on crowd and queue management. Proximity to sites that are well transported, space, and flexible layout reduce risk. Conversely, however, inappropriate location selection may be one of the causes of the traffic jam and would nullify the safety measures. The location ought then to be in line with the principles of the accessibility, convenience and compliance to safety standards. Integrating the Framework

These ten elements are interconnected forming a kind of a wheel, which shows that crowd and queue management is a cyclical process that is in progress. With one part of a wheel missing, it becomes unstable just as not taking into account any part of the system becomes unstable. As an example, complex venue design (design-to-flow) will never be possible without training staff (organisation and structure), and engagement and communication will never be possible without inclusivity and fairness (education and transparency).

Under such a framework, event organisers would be in a position to go beyond the reactive models and into proactive frameworks in which safety becomes part of the design, culture, and operations. The framework also balances both the short term goals such as the aversion of bottlenecks and long term objectives such as the building of trust, professionalism and resiliency in the events industry.

Figure 1.3: Crowd and Queue Control Wheel



8. Summary

The chapter has presented the concepts, theories, and theoretical framework of event crowd and queue control. Human crowds are a characteristic element of human assemblies, and they symbolize both solidarity and danger. In the absence of proper management, any events including the feeling of dissatisfaction to disastrous event occurrences can damage the success and safety of the events due to the people gathered in the crowds. The chapter emphasizes that managing crowds and queue processes is the core of event management not only as logistical needs but also as tactical activities based on psychology, design, and policy.

Crowd control was described as the methodical management of a large crowd by preventive and responsive means and queue control as the methodical control of waiting lines to alleviate frustration, increase fairness, and streamline flow. They are incorporated

in a complementary strategy of effective and safe participation. Crowd dynamics emerged as a central theme to the concept of the significance of density, flow, emotional climate and communication as the most significant qualities of behaviour. The graph created on figure 1.1 showed that there was a direct relationship between the level of density and the safety risks and also provides a reminder to the organisers that they were supposed to monitor and control thresholds.

Since then theories of crowd behaviour have been formulated including the contagion theory of Le Bon and social identity theory to gain a deeper insight into the behaviour of people in crowds. These models pivot heavily on the fact that crowds are not necessarily irrational but are rather structured in terms of group identities, and emergent norms and signal states. Queue management was characterized as an art that is founded on both logistics and psychology and that integrates both the physical layout, equity, entertainment, and such technological innovations as mobile applications and virtual queuing.

An example of a control flow model of the ticketing to venue entry showed in Figure 1.2.

The importance of planning ahead of the event, live monitoring, communication, staff training, inclusivity, and emergency preparedness are the principles of effective crowd and queue management. Standardised guidelines include rules that bring unity and accountability to the environment, with example rules being the UK Green Guide, NFPA 101, and ISO 22320. The real-life use of such frameworks has shown that adherence to them increases safety and trust in the participants.

Lastly, the chapter presented a conceptual framework, which was visualised in Figure 1.3 in the form of the “Crowd and Queue Control Wheel. This model has ten interdependent components including organisation and structure, engagement, education and location. It highlights that crowd and queue management is cyclical and must involve continuous assessment, adjustment and an open system.

Key Questions

1. What is the risk of lack of attention to crowd and queue control during event management?

2. What are some of the ways theories of crowd behaviour can assist organisers of events to predict possible crises?
3. How can technology be used to improve the monitoring and management of queues in real time?
4. Based on the conceptual framework, what would you do to create a crowd control plan at a stadium concert?

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