"Crowd Management and Public Safety in India-A New Policy Initiative"

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1.0 Introduction:

With a very old history, stampede is a recurrent phenomenon at places of mass gathering in India. Literature refers to deadly stampedes in 1840, 1906, 1954 and 1986 at Allahabad pilgrimage events. Population explosion, increasing number of people visiting religious locations as well as commercial establishments like malls, absence of management and mitigation plans for events / venues of mass gathering, cascaded with increasing frequency of stampedes (Allahabad-2013, Ratangar-2013, Malabar Hill -2014, Chitrakoot-2014, Patna-2014) in last few years, is a cause for serious concern.

Disasters are not new to mankind. They have been the constant, though inconvenient, companions of the human beings since time immemorial. With unimaginable growth and development in management technologies, 21st century offers huge opportunities to potentially benefit planners, responders and the people at risk with multihazard mitigation and response management techniques.

In India - experience of catastrophic disasters in recent times combined with opportunities offered by advancement in management techniques have led to changes in disaster policy and creation of new organizations. Policy changes include the enactment of Disaster Management Act, 2005[i] and development of the national guidelines for managing key hazards (both natural and manmade). Concerned at the recurring stampedes at places of mass gathering, including religious places, and typically ad-hoc responses to those, the National Disaster Management Authority (NDMA) has embarked on formulating an integrated and structured approach to crowd and disaster management at such places.

In this paper, the National guide on "crowd management at events / venues of mass gathering"[ii], developed by the National Disaster Management Authority (NDMA) is presented and discussed.

2.0 Crowd Related Disasters:

Crowding occurs as a result of an excessively large number of people gathering in a specified and relatively small area. Large numbers gather routinely in such places as temples, mosques, shopping malls, train stations, bus stations etc. However, they also gather, often in greater density, where particular attractions or events are taking place, such as at sporting events, concerts, theatres, cinemas, religious festivals and melas.

Safe crowd conditions can be usually assumed for densities up to 2-3 persons per square meter and maximum acceptable flow of 82 persons per meter and minute[iii]. Once the crowd density exceeds between 4 or 5 persons per square meter, congestion can build up quickly, which implies high risks for people to stumble or fall (particularly if the ground is uneven). At such events there may be greater risks of human stampede which could result into mass casualties.

People in a dense crowd cannot see what happens a few meters away from them, and they are not aware of the pressure in the front. The density, noise, and chaos in a dense crowd results in a natural desire to leave the crowd and people try to do that desperately which further worsens the situation.

A peaceful crowd can quickly turn into a senseless panicked heaving mass in which rational behavior by any single individual becomes nearly impossible. What is worse is that the stampede can be triggered while there is no actual danger. Under certain situations, a crowd that has grown to a big and tight enough size and density reaches a critical state at which the slightest twitch is sufficient to send it into a stampede.

Stampede can happen when people are fleeing something of perceived danger. They are running from something that scares them (panic situation). Another situation which may result into stampede is – when a majority of people in an event with mass gathering tries to move towards something of perceived value (craze) of central attraction.

Panicked crowds move fast and release an incredible amount of energy, usually compared to the energy generated by a running train: once a crowd gets moving it is very hard to stop, and the flow of people could literally sweep you off your feet. As per the studies made - force of only 6 or 7 people pushing in the same direction can generate up to 200 kgs. of force – enough to bend steel railings and topple brick walls. During a deadly stampede, people can even die standing up… people die when pressure is applied to their bodies in a front to back direction, causing them to suffocate to death. When pressure is applied to their sides, they often survive, probably because their rib cages are protecting their ability to breathe.

3.0 Crowd Disaster Process

In any mass gathering - when crowd density equals the plan area of the human body, individual control is lost as one becomes an involuntary part of the mass. At occupancies of about 7 persons per square meter a crowd becomes an almost fluid mass. Shock waves can be propagated through the mass sufficient to lift people off their feet and propel them distances of up to 3 meters or more[v]. Intense crowd pressures, exacerbated by anxiety, make it difficult to breathe. The heat and thermal insulation of surrounding bodies cause some to be weakened and faint.

Fruin (1993) has pointed out that virtually all crowd-related incident deaths are caused by compressive asphyxia, not as a result of being trampled on by a panicking crowd, as often reported by the media. Horizontal forces sufficient to cause compressive asphyxia would be more dynamic as people push off against each other to obtain breathing space.

Study conducted on a simulated "panic" showed that 5 persons were capable of developing a force of 3430 N (380 kgs)[v]. A British Home Office report (1973), for example, cited the death of

a male when subjected to an estimated load of 1400 lbs. (over 6Kn) in 15 seconds and of another when subjected to an estimated load of 260 lbs. (1.1Kn) for 4.5 minutes. Later experiments by Hopkins, Poutney Heyes and Sheppard (1993) concluded that males and females were able to withstand pressure loads in the region of 140-180 lbs (approximately 800 Newtons)**Error! Bookmark not defined.**. Current medical opinion is that in conditions where the human body is subjected to a higher static pressure load of approximately 300lbs (1.1Kn) on the chest cavity beyond 2.5-3 minutes, the brain begins to starve of oxygen and permanent injury may be caused. Beyond 3 minutes, death may occur at any time[iv] .

An intolerable pressure load can be caused in a number of ways at places of mass gathering. For example, high crowd density or a lateral or dynamic surge can convert to a static load. In these circumstances, it is common for those persons right in front of the gate / entrance / barrier to push backwards in order to gain space to breath. This can then subject persons further back from the barrier to a two-way horizontal load as persons at the back press forward. Alternatively, a crowd collapse can occur as a result of a dynamic or lateral surge, individuals fainting, ground conditions or cultural behaviour. If a crowd collapse occurs, an intolerable vertical load is imposed on the person(s) at the bottom of a pile of bodies very quickly. A crowd collapse can occur anywhere within a crowd mass.

Causes and Triggers:
Incidents of stampedes can occur in numerous socio-cultural situations. Some of the possible situations / events where stampedes can occur include - Entertainment events, Escalator and moving walkways, Food distribution, Processions, Natural disasters, Power failure, Religious events, Fire incidents during religious/other events, Riots, Sports events, Weather related. Detailed review of some of the recent crowd disasters in India suggests six (6) broad categories of causes which may trigger crowd related disasters. These are - Structural, Fire/Electricity, Crowd Control, Crowd Behaviour, Security, and Lack of coordination between various stakeholders.

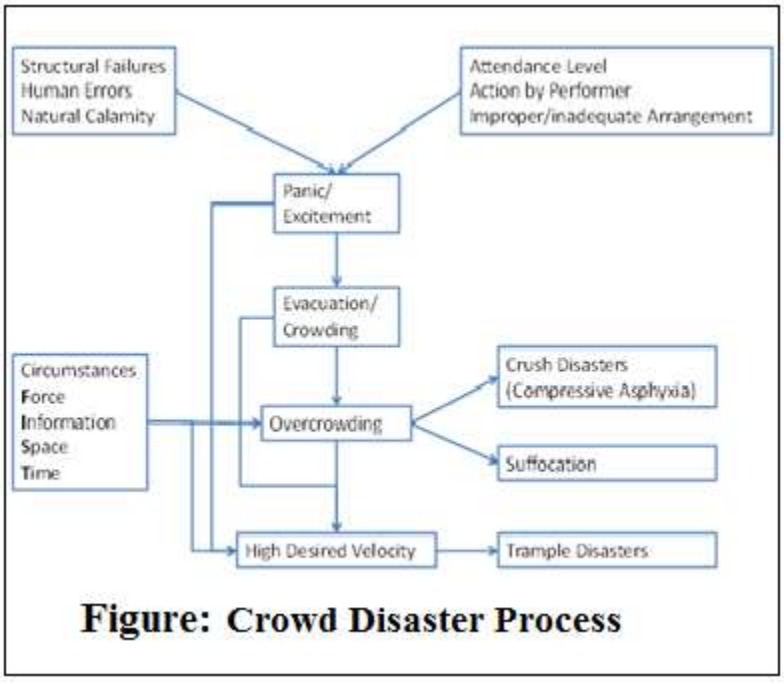

Figure: Crowd Disaster Process

In addition - High attendance levels beyond coping capacity of the venues / event, reaction to unaccepted announcement by event management or Performer or Improper/inadequate arrangements may work as potential trigger. As a result, there is either panic or an excitement in visitor's mind which further leads to evacuation or crowding respectively. When this happens, as explained by Fruin (1993)[v], the FIST[vi] circumstances namely crowd **F**orce, the **I**nformation (false or real) upon which the crowd acts, the physical **S**pace

(seating area, chairs, corridors, ramps, doors, lifts etc.) involved, and the **T**ime duration of the incident (rapid ingress/egress) play a very important role resulting in either overcrowding (high crowd density: a large number of people per unit area) or high desired velocity (accelerated movements). On occasions, this has led to deaths because of crushing, suffocation, and trampling. Historically, compressive asphyxia has been the most common reason for deaths in crowd disasters. (This crowd disaster process adapted from Fruin, 1993; Zhen et al, 2008 is as given in the figure above)

4.0 Example of Crowd Disasters in India:

From festivals to pilgrimages, public protests to political rallies – mass gatherings are a way of life in India – and some of them result in unfortunate, sometimes avoidable, incidents of stampedes. Parsing through a timeline of such disasters over the past decade paints a sad picture. A country of over a billion people needs to have better ways of dealing with crowds. We need to first understand the root causes behind stampedes and then attempt to address them. Here are a few illustrative examples:

S.No.	Month/Year	Event / Location	Deaths	Event
1	3rd Oct 2014	Dussehra celebration at Gandhi Maidan in Patna	33	Religious
2	**25th Aug 2014**	Temple in Chitrakoot area (Satna), Madhya Pradesh during parikrama.	10	Religious
3	18th Jan 2014	Malabar Hill, Mumbai - Dawoodi Bohra community gathered to pay last respects to the spiritual leader.	18	Funeral
4	**Oct 2013**	**Ratangarh, Datia, a stampede on a bridge where a section of railings broke in Madhya Pradesh**	121	Religious
5	**Feb 2013**	Allahabad Railway station, Uttar Pradesh	37	Religious
6	**Nov 2012**	Chhath Puja in Patna, Bihar	18	Religious
	Feb 2012	Junagarh Temple, Gujarat	6	Religious
	Nov 2011	Shrine in Haridwar, Uttarakhand	22	Religious
7	**Jan2011**	Makara Jyothi at Sabarimala, Kerala	104	Religious
8	**Mar 2010**	Ram-Janki temple, Pratapgarh, Uttar Pradesh (free food and cloths!)	70	Religious
9	**Aug 2008**	Naina Devi temple , Bilaspur, Himachal Pradesh	138	Religious

	Mar 2008	Karila Village, Madhy Pradesh	8	Religious
	Jul 2008	Jagannath Puri, Orissa	6	Religious
10	**Sep 2008**	Chamunda Devi temple, Jodhpur, Rajasthan	147	Religious
11	**Oct. 2007**	Train station in North India	14	
	Aug 2006	Naina devi, Himachal Pradesh	140	Religious
12	**Dec 2005**	Flood relief supplies were handed out to homeless refugee in south India	42	Food Distribution
13	**Jan 2005**	Mandhar Devi temple, Maharashtra	265	Religious
14	**Aug 2003**	Kumbh Mela, Nasik, Maharashtra	40	Religious
15	Sep 2002	Charbaug Railway Station Stairs, Lucknow, Uttar Pradesh,	19	
16	Jan 1999	Sabarimala Stampede, Kerala	52	Religious
17	Jun 1997	Uphaar Cinema, Delhi Movie goers trying to come out of a smoky cinema hall.	59	Entertainment
18	Jul 1996	Mahakaleshawar Temple in Ujjain, Madhya Pradesh	39	Religious
19	Feb 1997	Baripada, Odisha, Fire at a religious congregation	206	Religious
20	Dec 1995	Dabwali, Haryana, Fire at a school function held in a *shamiyana* (tent)	446	School

Incidents listed above show that– majority of stampedes had happened during religious events at places of worship. Old religious sites in India are infamous for not having proper emergency exits and railings, and having slippery staircases. In most of the cases of major stampeded Government commissioned Judicial commissions / Inquiry Commissions for finding out "causes" behind the incident and recommendations on preparatory measures so as such incidents do not recur.

5.0 Causes of Stampedes:

A detailed review of reports prepared by various commissions appointed by Government and other independent agencies suggests six broad categories (Structural, Fire/Electricity, Crowd Control, Crowd Behaviour, Security, and Lack of coordination)of area which were "cause of concern". A detailed list, with elements under each identified cause / category, is given in the following para.

5.1 Structural

- Structure collapse of
  - Barricades/ bamboo railings/wire fence/ Metal barrier
  - Makeshift bridge.
  - Temporary structure.
  - Railings of the bridge caused by panic triggered by rumors.
- Barriers on the way
- Poor guard railings, poorly lit stairwells
- Difficult terrain (famous religious sites built on top of hills that are difficult to access)
- Slippery/muddy roads
- Narrow streets with illegal vendors on sides; sloped gradient; bad weather leading to crushing
- Windowless structure, narrow stairs
- Narrow and very few entry/exits
- Absence of emergency exits
- Unauthorized construction surrounded by high brick walls preventing evacuation

5.2 Fire/Electricity

- Fire in a makeshift facility or a shop
- Cooking in a makeshift facility
- Wooden structure/ quick burning acrylic catching fire
- Fire at illegal structure
- Non-availability of fire extinguisher/fire extinguishers not in working condition
- Unauthorized fireworks in enclosed places
- Inappropriate points of manufacturing and sale of fireworks
- Building and fire code violations
- Lack of adequate flood lighting of the assembly area and the path ways use by the crowd
- Electricity supply failure creating panic and triggering a sudden exodus
- Illegal electric connections
- Inappropriate fittings such as MCB, Aluminium wires instead of copper wires etc.
- Short circuit from electrical generator, (synthetic) tent catching fire.
- Elevators catching fire, people on higher floors panic, steep stair designs

5.3 Crowd Control

- More than anticipated crowd at store/mall/political rallies/ examinations/ religious gatherings/ public celebrations
- Underestimation of audience, staffing, services
- People allowed in excess of holding capacity due to overselling of tickets for an event
- Limited holding area before the entrance
- Lack of access control

- Closed/locked exit
- Sudden opening of entry door
- Reliance on one major exit route
- Uncontrolled parking and movement of vehicles
- Callous indifference in regulating traffic
- Lack of adequate and strong railings to marshal the queue.
- Lack of sectoral partitions to segregate assembled crowd
- Lack of proper public address system to control crowd

5.4 Crowd Behaviour

- A wild rush to force the way towards entrance/exits
- Crowds attempting to enter a venue after the start/closing time
- A collision between large inward flows and outward flows
- Rush during distribution of disaster relief supplies
- A large number of pilgrims trying to board a ferry for a sacred island site
- Free distribution of gifts/toys/food/Prasad/alms/blankets/cash/clothes triggering a surge and crush
- Tussle to catching a glimpse/autograph of a celebrity
- A large (much more than expected) anxious and competitive crowd gathering because of limited period promotional events at malls
- Rush to get covered/free/unnumbered seats at the venue
- Scramble to get event tickets
- Crowds trying to re-enter the venue (flows inward/outward flows mixed)
- Religious leaders taking a route (in wrong directions) in violation of orders in force
- Unruly and irresponsible crowd behaviour
- Angry crowd due to delay in the start of the event/late trains
- Last minute change in platform for train arrival/departure resulting in lots of movements within short time window
- Mad rush to leave a school
- Mad rush to exit/parking space
- Sudden flow of people in reverse direction
- Rush during distribution of disaster relief supplies
- Sudden mass evacuation because of a natural disaster
- Rumours of landslide caused by rains leading to rush down a narrow stairway

5.6 Security

- Under deployment of security personnel to regulate / control the crowd.
- Lack of adequate scientific planning in making police arrangements to deal with crowd with proper sectoral deployment under an officer with adequate manpower and then each sector reporting to the senior police personnel in charge of the police arrangement.

- Lack of proper wireless deployment with clutter-free call arrangement between sector in-charge and officer in-charge of the police arrangement
- Inadequate briefing of security personnel on crowd control before deployment
- Lack of adequate dress rehearsals before actual deployment
- Lack of adequate observation towers with PA system and back up force with proper wireless communication with the tower to monitor and regulate crowd
- Lack of adequate CCTV surveillance of the crowd with PA system to control monitor and guide as and when required
- Lack of adequate briefing of the personnel manning the observation towers, CCTV and PA system on dealing with problems in effective manner as and when they see and observe the crowd
- Absence of walkie-talkies for the police on duty
- Absence of public announcement systems or effective wireless system with the police
- Lack of adequate anti-sabotage check of the entire area and sanitizing the same against terrorist, extremist and separatist attack
- Lack of adequate road opening parties to secure the routes of pilgrimage
- Lack of adequate door frame metal detectors and frisking of pilgrims entering the pilgrimage area or persons entering the gathering area
- Fights within groups of the crowd and with police, other officials etc
- Weapon(s) brandished in the crowd
- Ineptitude of the police in effectively managing the crowd and enforcing prohibitory orders
- Security agency firing/teargas/using force leading to panic and stampede
- Crowd forced against sharp metal fencing

5.7 Lack of Coordination between Stakeholders

- Coordination gap between agencies (e.g. Commissioner /Superintendent of Police and District Magistrate; PWD, Fire Service, Forest officials, Revenue officials, Medical officers and Shrine management etc.)
- Poor infrastructure (Plans on paper but no implementation due to lack of funds, resources, or will)
- Inadequate water, medical assistance, public transport/parking facilities
- Lack of understanding of the range of duties entrusted
- Communication delays
- Vacant/late/delayed posting of key personnel
- Local decision to remove barricades on administrative route to allow a small group of pilgrims

5.8 Emerging Concern:

5.8.1 Growth in Population and Tourism:
India's population is currently growing at a rate of 1.4% per year, far surpassing China's rate of 0.7%. During the past few decades, rapid population growth has been accompanied by an unparalleled decline in mortality rates and by an increase in income per capita, both globally and in India. Rising incomes, increasing affordability, growing aspirations, increasing globalization, and a growing airline industry along with improvement in travel-related infrastructure are major contributor to the exponential growth in tourism. The country's rich history, cultural heritage, beauty, diversity of religion and medicine fascinate both budget and luxury travelers. People prefer places of worships as their choice as it would serve two purposes – i.e. vacations and pilgrimage. Increasing population and affordability would further increase inflow of visitors at places of worships and the size of gathering is expected to increase significantly in coming years.

Events / venues of mass gathering would undergo a perpetual increase in number of people gathering at such places with increase in affordability and population growth. Thus, it is very important that adequate development of infrastructure takes place in sync with the population growth, keeping principles of disaster risk reduction (DRR) as the foundation.

5.8.2 High Tolerance to Crowd:
Different cultures have varying degree of forbearance for crowd, but a very high tolerance for crowds and crowded spaces in India means major events in the country are vulnerable to stampedes, according to an international expert on crowd management. "The higher tolerance for crowded spaces in India allows for people to get closer, because they don't feel uncomfortable until it is very packed. At that point the crowd is dangerously large leaving no scope for "controlling" it. **Pro-active planning, Preparation and Action** would be necessary to contain the crowd before it reaches to a level of "no control".

6.0 Crowd Management at Events of Mass gathering – A National Framework:
Crowd management is not particularly established as a discipline in India. Professionalization of managing crowds is a relatively new concept worldwide and has developed as a response to disasters at events around the world.

There are existing Acts and Regulations in India for management of assemblies and crowds under provisions of the Police Act 1861. Few States have formulated specific regulations / rules for managing situations involving mass gathering – for example - Madras police act 1888 makes licensing compulsory for resorts, shops etc. The act also confers power to State police for regulating assemblies; UP meal Act. 1938 confers various powers to magistrates for authorizing sites to open and operate temporary market, bathing place, recreation and entertainment etc.; Delhi Cinematographs Rules 1953 stipulates number of spectators that can be accommodated in the building and associated arrangement.

Currently, permissions / licenses are granted for holding specific events under existing rules framed under Police Act 1861 and other specific regulations / act in the state. However - Recurrences of crowd related disasters (with increasing frequency in recent past) points toward "inadequacy of existing mechanism" and suggest for evolving a pro-active mechanism to support

preparation, mitigation, response and recovery aspects connected with events and venues of mass gathering, keeping environmental dynamics and new legislations / regulation (including National DM Act 2005) into consideration.

In India, the National Disaster Management Authority (NDMA), as the apex body for disaster management, is headed by the Prime Minister and has the responsibility for laying down policies, plans and guidelines for DM (and coordinating their enforcement and implementation for ensuring timely and effective response to disasters), based on which Central Ministries, Departments and States are to formulate their respective DM plans. In addition to formulating DM guidelines National Disaster Management Policy (3.2.1) – mandates that NDMA will take such other measures as it may consider necessary, for the prevention of disasters, or mitigation, or preparedness and capacity building, for dealing with a threatening disaster situation or disaster.

Accordingly, the NDMA embarked on formulating an integrated and structured planning for crowd management at events and venues of mass gathering. Under the proposed comprehensive framework for managing crowds at places of mass gathering, "organizers, administrators, and other stakeholders" would need to prepare guidelines / plans for events management. State Government may like to prepare necessary guidelines to be followed by organisers / administrators, who in turn will work with local and district authorities for planning, preparation and implementation of required plans, engaging all stakeholders in thinking through the life cycle of a potential crisis, determining required capabilities and establishing a framework for roles and responsibilities, taking end objectives into consideration.

NDMA has drafted the National Framework for managing mass gathering at events / venues. Suggested structure for the plan ensures a consistency between other Disaster Management (DM) plans prepared at various levels in the State. The paradigm shift in DM from a relief-centric approach to a regime that anticipates the importance of preparedness, prevention and mitigation has been kept into consideration while designing the proposed framework of the plan. The National framework suggests an outline, as summarised below, of major components to be included while preparing plan for managing events / venues of mass gathering.

6.1 Event / Venue, Visitors and Stakeholders:

Derive detailed understanding on event / venue, visitors and stakeholders as the first requirement in the planning process. Activities under this component would include - estimation on type of event (religious, youth festival, school/university event, cricket/sports event, music concerts, political gathering); season in which it is conducted; and the type and location of the venue (temporary/permanent, open/confined spaces, bus stand, rail/metro station, plain/hilly terrain). Based on this basic information and from prior knowledge and experience, Organiser / administrator would determine the type of crowd expected (age, gender, region, locals/visitors, people with special needs etc.) and their estimated numbers.

Composition of stakeholders may vary with type of event but should include all possible actors. For example, while planning a religious event - shrine management and security personnel desire high degree of orderliness but local shop owners, priests, and their economic interests cannot be

ignored. Certain routes habitually used by locals must be kept in mind. An arrangement has to be made for the media personnel. Community stakeholders (PRIs, CBOs, NGOs, business associations, schools/colleges, and neighbor-hood societies/ associations/*mohalla* committees) should be encouraged to take ownership in such events.

6.2 Hazard Risk &Vulnerability Analysis:

Risk is the predicted impact that hazard would have on the people, services and specific facilities in the community. This is necessary for event management to undertake a risk assessment of those hazards which could cause harm to staff and/or members of the public attending the event. A risk assessment is a systematic approach to the control of hazards and should be done in relation to the physical characteristics of the venue, likely audience behaviour, technical installations, nature of performance etc. It involves the identification of foreseeable hazards, evaluating the risks associated with them and considering what needs to be done to reduce the risks to an acceptable level. The process should be comprehensively documented and recorded. Relevant actors should write down all the activities and attractions, which make up the event and identify ways in which people (employees, the public and any contractors) could be harmed.

Quantifying risk enables management to focus on those hazards that poses higher threat to life, property and environment. Completed risk assessment should be written down and the necessary control or mitigation measures should be included in the safety section of the overall event plan (it may be necessary to obtain professional advice in conducting a thorough risk assessment). During and after the event, continuous evaluation of risk assessment is necessary to determine the effectiveness of the measures and procedures that are put in place.

6.3 Safety & Security:

Risk assessment forms the basis for designing the safety / security plan. Major components of an event safety plan would include (but not be limited to) – Safety Policy; Event Risk assessment; Signage (information service provided), installing PA system etc; Critical control points Location, type, and purpose of barricading (based on the risk assessment); Crowd management (number of home guards/volunteers/police/others, responsibilities, location etc.); Plans to involve home guards, civil defence, and community stake holders (how, when,) ; Security agencies deployed (license details, in case of private agencies) ; Entry and exit arrangements (routine and designation of emergency routes and assembly areas); Fire precautions (means of escape, safe holding capacity calculations, fire safety equipment) ; Structures (schedule of completion, certifying engineer); Electrical installations (lighting, auxiliary power provision); Environmental issues (noise, sanitation, catering, garbage / waste, drinking water, etc.); Vehicular access and exit (transport plan for site traffic and car parking arrangements); Medical/First Aid Provision (numbers required, location, ambulance, equipment); On site traffic management (where deliveries will be made, any parking etc.); Emergency power and lighting arrangements; Firework permit, if applicable; List and Locations of Food vendors using gas cylinders; Fire and electrical safety assessment plans, mock drills, and action taken reports; Communication plan (internal/external, before the event and in case of emergency); Command and control hierarchy.

6.4 Preparedness & Capacity Building

Planning is one of the key elements in the Preparedness cycle. Preparedness cycle illustrates the way the plans are continuously evaluated and improved through a cycle of planning, organizing, training, equipping, exercising, evaluating and taking corrective action.

6.4.1 Generic preparedness components:

This section would address preparedness aspects of -Emergency Operation Center (Control room), Public Information, Awareness – (local as well as wide area), Services and Utilities, First aid and basic health services, Visitors flow management, Access for emergency resources including ambulances, Hazard in the area and mitigation measures, Services for people with special needs / disabled, Transportation and Traffic Management, Safety and Security Plan, Lost and found, Contractors and supplier management plan, Chain of command, Incident monitoring & reporting system, Training and exercising.

6.4.2Community Based Capacity Building:

Connectivity between community and Crowd makes "Community based capacity building" more significant in the planning process. Civil defence, NGOs/ CBOs, Volunteers educational institutions should be seamlessly integrated into the community based capacity building process.

6.4.3 Health, Hygiene and Medical Services:

Events of mass gathering need to consider worst possible crisis situation for planning their resources. Major components to be addressed into this section would include -List of approved food vendors, Drinking water availability (location, sources,), Toilets (location, numbers for males and females, cleaning schedule, and Responsibility etc.), Waste Management (garbage bin arrangements, waste collection schedule, recycling plans), Plans to include local community members, Medical problems reported historically (impact of weather, terrain, etc.), Medical facilities (number of beds, equipment available etc.), staff (number of doctors, surgeons, paramedics, nurses etc. and their expertise), number of ambulances available (with/without life support systems) and their locations, Contact details, facilities and capacity of local hospitals, primary health centres, mobile hospitals, standby staff etc., Plan for first-aid training to volunteers, security personnel etc.

6.5 Emergency Response Plan

Response plan guides the development of the more operationally oriented annexures. Its primary audience consists of the event/venue management/ authorities, local emergency management officials, and the community (as appropriate). The elements listed in this section should meet the needs of this audience while providing a solid foundation for the development of supporting annexes. Major components of response plan will include - Incident Response System, Emergency Operations Centres, Response flow chart(s), Hazard/Incident specific responsibility charts for emergency functions, Alert mechanisms, early warnings etc., Procedure for the activation of plans, resource mobilization, seeking external help, coordination with different agencies, Media management and information dissemination.

6.6 Event Approval Mechanism:

As a change from the existing procedure, a detailed plan (event management plan as explained above) prepared by Organiser / administrator would be an addendum annexure to the application

filed with the competent authority for obtaining permission / license for holding any event. The approving authority / organisation will cross-check adequacy of all information provided by the event management with safety checklist and satisfy themselves before issuing such permission. Hazard and risk assessment at venue is the responsibility of venue owner / event organisers / administrator.

The approving authority / agency will also consult city / Town and district disaster management planning authorities / agencies and circulate a copy of draft plan to all stakeholders. District Disaster Management Authority (DDMA) would annex approved plans prepared by events / venues falling under their jurisdiction. DDMA would also coordinate joint drills and exercises involving all stakeholders from time to time for review and revision of such plans.

Conclusion:

Majority of the crowd disasters in India and developing countries have occurred at religious places while stadia, venues of music concerts, night clubs, and shopping malls have been the typical places of disasters in the developed countries.

No crowded event is immune from tragedies like stampedes but with "higher tolerance to crowding" probability of occurrence increases in India. With population explosion and rapid urbanisation, Indian cities are likely to be more susceptible to crowd disasters in addition to places of frequent mass gathering like – religious places across the country. Pro-active planning and preparation would be essential for managing large gathering. Organisers must know the size & type of the crowd expected to estimate capacities required for effective management. National framework provides basic guidance to organisers / administrator of the event / venue to Plan and implement necessary measures to provide a safe event. Though venues and events may differ, the application of certain common principles and standards of good practice can reduce the uncertainty associated with planning and organising for a safe and successful event.

Organizers/trusts managing events / venues should rethink crowd management and have their event / venue disaster management plan in place to ensure safety of visitors / pilgrims as per the State guidelines.

This calls for urgent attention by all states (State Disaster Management Authority (ies)) to prepare guidelines on crowd management plan (mitigation, capacity building, response and recovery) for places of mass gathering, keeping suggestions / recommendations given in national guide into consideration. Such guidelines should address roles and responsibilities of all stakeholders including event organisers / administrators, local government and agencies responsible for granting licenses / permissions for holding events.

Agencies responsible for issuing permission/ licenses for events/venues of mass gathering would also need to review their existing process / procedures of granting such permission, keeping requirements of "crowd management" and various guide / guidelines issued in this regards into consideration. The National guide provides advice on issues that are not covered by formal legislation for management of crowd at events / venues of mass gathering under the police act[vii] and other similar regulations enacted by various states.

There is a similarity between "Dam" and "event of mass gathering". When both are filled beyond their capacity it would lead to disaster. For centuries - dams are protected by effective "dam management plan" with the help of technology tools for water level monitoring, gate management, alert and warning. Likewise, for managing crowds, effective plan would be necessary for regulating flow of people across the event / venue commensurate with its retaining capacity. Modern technology would play a key role in management of mass gathering at events / venues. Surveillance (monitoring of congestion, breakdown etc), resource tracking (GIS/GPS), Public Information system, Emergency Operation centers (EoC) etc. would be major areas with technology dominance.

The crowd disasters, in general, are man-made disasters which can be completely prevented with proactive planning and flawless execution by dedicated groups of well-trained personnel. Good that - Uttarakhand State did work on a planned approach for managing "Chardham yatra (June/July 2014)". Take-away from their first experience, combined with the National guidelines would help the state to review and revise their plan for next session.

Governments are expected to prepare specific guidelines for managing mass gathering based the proposed national framework. State Disaster Management Plan (SDMP) and District Disaster Management Plan (DDMP) should identify "Crowd" as one of the "hazard" and address mitigation measures.

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