

# Preparation of Future Action Plan for Kumbh Mela: Nashik 2015

Mr. Sachin Suresh Kare<sup>1</sup>

<sup>1</sup>PG Student, NDMVPS's KBT COE Nashik

**Abstract:** In India, the mass gathering occurs during the festivals and the religious Mela's which result in collection of numbers of people at a particular place is very high for very short time. The human stampede at this place is result in loss of life and the loss of property. There are two major cases of stampede is stampede of KumbhMela held in 1954 and 2003 at Allahabad and Nashik respectively. In this study the details of the route used by pilgrims are discussed and studied. The stampede event occurred in last KumbhMela is due to only a congested route and can be rectify by widening the routes of the pilgrims. The traffic coming from the Dhule, Mumbai, Aurangabad, Pune, Trimbakeshwar, Peth, Dindori, and Traffic from Nashik City itself is managed and moved in proper way to avoid the congestion and to avoid the any unwanted event during the KumbhMela. Also a detailed action plan for the stampede event management is discussed in the report. The project will helpful to the organizations that managing and involved in the preparation, operation and control the crowd in KumbhMela.

**Keywords:** KumbhMela, Nashik, Stampede, Action Plan, Event Management.

## I. INTRODUCTION

At Nashik, though, the population rose from zero to 10 million in just a few weeks. This leads to uncontrolled movement of peoples resulting human stampede end up with loss of lives. This Chapter explores the different definition and theory of disaster, management of disaster, KumbhMela, and stampede in KumbhMela and some cases studies of stampede in KumbhMela.

### A. Definition of Disaster:

An event occurs naturally or created by Human being, unexpected or progressive, which bangs with such harshness that the exaggerated society has to react by taking extraordinary measures, is called as a Disaster.

### B. The Disaster Management Cycle:

The following figure explains the disaster management cycle

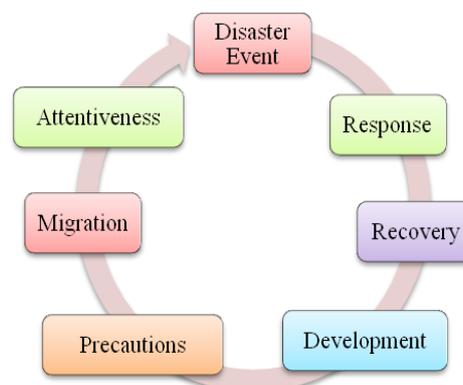


Fig 1: Disaster Management Cycle

### **C. Human Stampede:**

During religious pilgrimages, gathering during festival, professional sporting and music events lead to Human stampede as the functions and gathering involve the large numbers of the peoples. The Human stampede also occurs at a place where people panic as people try to escape from the event place. The main cause of the stampede is that people move forward towards the escape doors or gates because of panic and fear of confrontation without thinking that peoples in front row get crushed. This reflected in loss of the life. Human stampedes are subjective to the number of factors related to the biomedical, ecological and emotional field. People lost their lives in stampedes majorly because of suffocation under very high pressure on the chests applied by the push of the crowd.

### **D. KumbhMela: Overview:**

KumbhMela is a mass Hindu pilgrimage of faith in which Hindus gather to bathe in a sacred river. It is measured to be the biggest peaceful gathering in the world where around 100 million people were expected to visit in city where MahaKumbhMela is held. It is held every third year at one of the four places by rotation viz. Haridwar, Allahabad, Nashik and Ujjain. Such is the religious magnificence of KumbhMela that tourists from different parts of the world come to witness this grand festivity of India.

## **II. LITERATURE REVIEW**

An extensive literature evaluation has been carried out to set up a well define begin to follow the projected study. The focused of literature review is on investigation of stampede in various gathering like religious, musical and political, the current practice of the disaster management and present research in the field of crowd management. India is a melting pot of sundry civilization and faithful people and the subcontinent is known as the land of festivals. India is second largest country by population in the world with the largest number of religions; most population has religious events during which large number of people brings together in public or private places.<sup>[3]</sup> Governance is nothing but the power to implement laws and rules in the society which having well and formulated structure and who take collectively decisions. The adoption of governance perspective involves the putting attention to distribution of power politically both to internal of the state and international level. Authors note that in spite of the shift towards governing beyond the state where the role of international networks becomes of better significance. Author also states the Neoliberalism and the position of contributors in growth in feeble states<sup>[4]</sup> Two major events was held in China that are the Beijing Olympics in year 2008 and Shanghai Expo in the year 2010, this events rise the problems like the management of crowd, emergency services and response task forces in the emergency.<sup>[6]</sup> A complete fire safety administration policy has been presented to show how the best practices in fire safety management can be put into practice in complex developments. The future fire safety administration approach consists of fire management team plan, fire emergency procedures and maintenance plan.<sup>[5]</sup> Crowd investigation has been going on since at least the 1890s with studied the psychology of mob by scrutinizing how they shaped. Crowd performance is nonspecific and Isaac Newton comprehensive its dynamics when referring to the "madness of crowds" during the financial crisis of the South Sea Bubble in the early 18th century.<sup>[7]</sup> The stampede disaster in any region or country direct to the deaths and injuries of the peoples. Disasters like stampede occur due to the continuation of high concentration in a limited area.<sup>[8]</sup> A terrible event blows up at 7 pm when lakhs of devotees caused a melee when the railway authority announced the change in platform for running the two Mela special trains at last minute of arrival. The crowd moves towards changed platform vary rapidly causing a rush on FOB. It results in 36 people death and hundreds are injured.<sup>[9]</sup>

## **III. METHODOLOGY**

Methodology is a skeleton that sketch up the methods that are pursued for study and research work. This chapter, therefore, discuss the problem statement of the research work, Scope of research work, objectives of the work, methodology adopted for the work, flow chart of the methodology to easy understanding of the concept, and details about organization of the this project report

### **A. Problem Statement:**

As India is the nation of verity of culture and continues when the traditional festivals are allow to celebrate in free and healthy environment. In India, every part of the country having continues gathering for religious purpose and it increases the stress on the local administration and Law and order authority.

In most of the festival people lost their lives because of the stampede and controlling the stampede in such huge crowd is one of the main challenge. Before approaching to the formulation of rules and laws to the control the stampede events, it is necessary to understand the attitude of the peoples and necessary to study previous stampede in India. KumbhMela is the one of the major gathering in India which held in every 4 year at 4 places in India.

The purpose of this study is to realize mass gatherings and consequential human stampedes in KumbhMela. KumbhMela gatherings were identified from the Daily News Papers, online project reports and reviewed literature. The information thus pick was then used. Recognized stampede events were evaluated by focusing on the factors that influence the development of the cause of panic, crowd performance and their movement plan.

#### IV. DISASTER MANAGEMENT PLAN

Stampede disaster management plan is mainly divided in to five segments as like Preparedness Phase, Early warning Phase, Response Phase, Relief phase and Restoration phase.

- **Phase –I: Preparedness Phase:**

This is first phase of the stampede management plan for Nashik KumbhMela 2015. This includes the details of the institutional mechanism for the management, points to be consider during the KumbhMela to avoid the stampede event, how to reduce the impact of the stampede, preparation of ESF plan, list and location of the proposed response centers with information and decision flow chart.

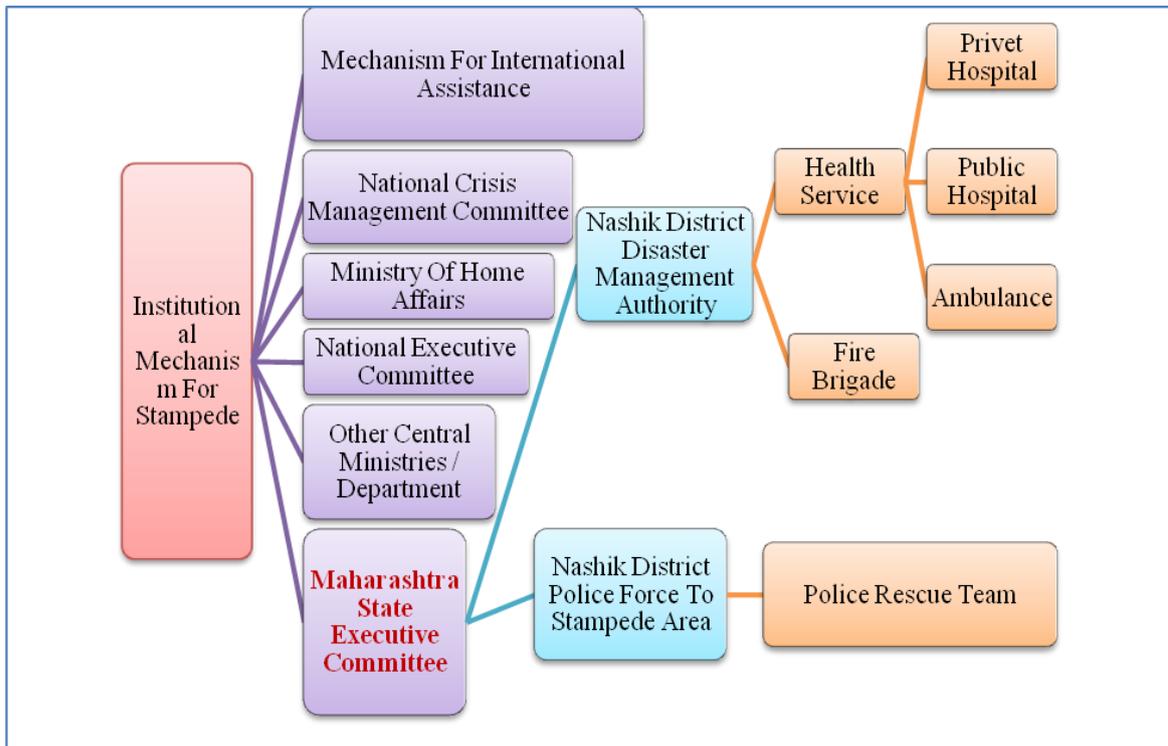


Fig 2: Institutional Mechanism for Stampede Management

- **Preparation of (Emergency Support Function) ESF plan:**

Emergency support function plan will be geared up at a Corporation top level clearly indicating the area of the household tasks of each of the agency concern that will make available mutual assistance in terms of the manpower, equipments and resources during the stampede. The following details should be included in to the plan and plan must be review and revised as per the requirement of situations.

1. Name,
2. Address
3. Telephone number of the officer

The ESF plan is headed by the Hon. Commissioner of the Nashik municipal corporation and NMC is the acting as lead agency in the support plan. The detailed emergency support function plan will be describe in detailed in phase 3 i.e. response phase.

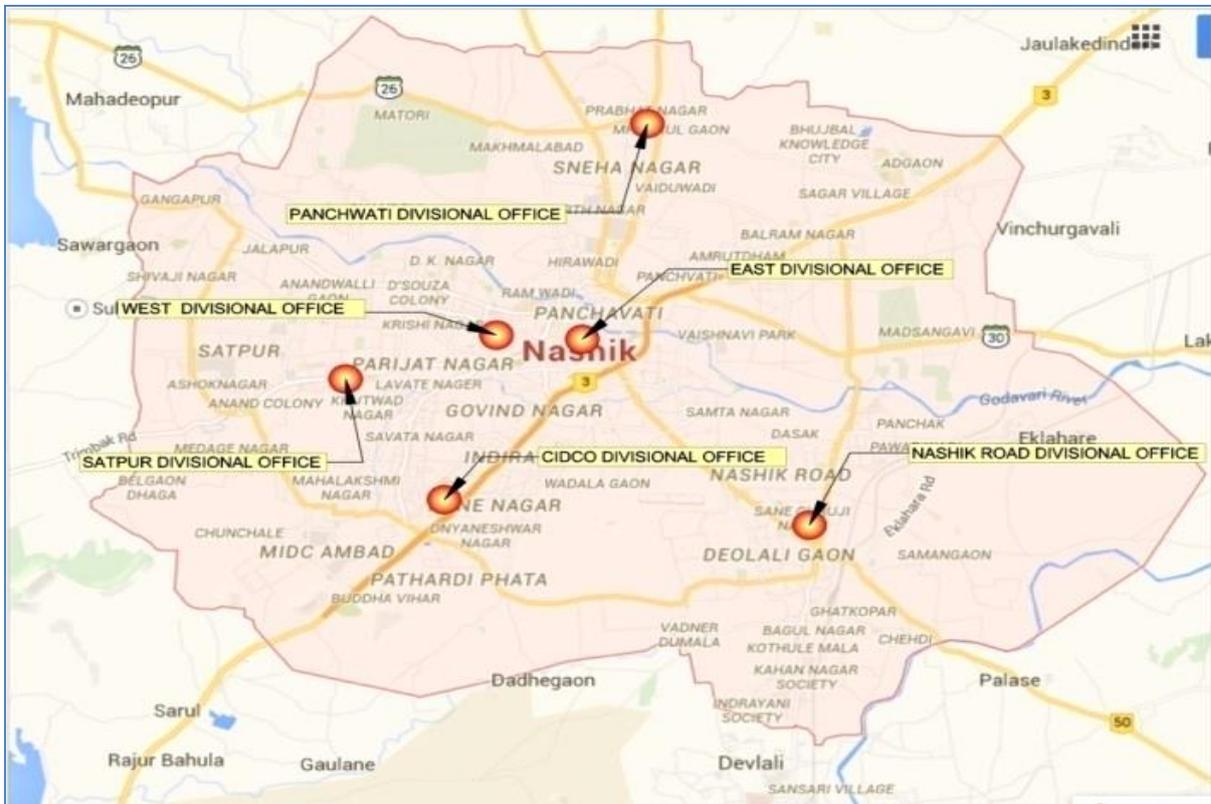
• **List of response centers:**

The response centers are to be set up at various locations in the Nashik city so to give exact and correct backup for the disaster management system when critical situation occurs.

Following are the response center established at the Nashik city

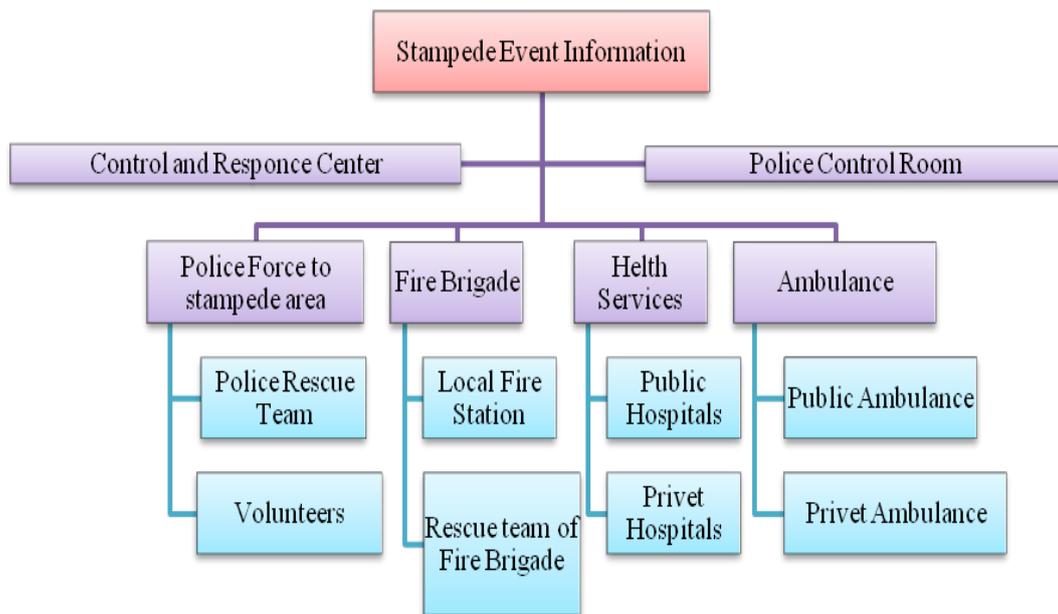
**TABLE I: Location of the response center**

Sr. No.	Name of the Zone	Location of the Response Center
1	Nashik East Zone	Nashik Municipal Corporation office Nashik (East) Email : do_nashikeast@nashikcorporation.in Phone : +91 253 25 97 982
2	Nashik west Zone	Nashik Municipal Corporation office Nashik (West) Email : do_nashikwest@nashikcorporation.in Phone : +91 253 25 82 348
3	Nashik Road zone	Nashik Municipal Corporation office Nashik Road, Nashik Email : do_nashikroad@nashikcorporation.in Phone : +91 253 24 60 234
4	Panchavati Zone	Nashik Municipal Corporation office Panchavati, Nashik Email : do_panchavati@nashikcorporation.in Phone : +91 253 25 13 490
5	CIDCO Zone	Nashik Municipal Corporation office CIDCO, Nashik Email : do_newnashik@nashikcorporation.in Phone : +91 253 23 90 768
6	Satpur zone	Nashik Municipal Corporation office Satpur Road, Satpur, Nashik Email : do_satpur@nashikcorporation.in Phone : +91 253 23 50 786



**Fig 3 : Location map of the response centers in KumbhMela 2015**

• **Information and decision flow chart for stampede event:**



**Fig. 4: Information and decision flow chart for stampede event**

• **Phase –II: Early Warning Phase:**

This is the second phase of the stampede management plan prepared for the KumbhMela 2015. This includes the stakeholder’s details, different nodal agencies,

• **Stake Holders:**

Stakeholders are the people or an organization that directly and indirectly contributes to the disaster management. This stakeholder required develop the emergency plan, to build capacity at all levels, to educate and train the society at the time of the risk and disaster, to required regular monitoring of situation and evaluation of the situations, to ensure the availability of the manpower and resources.

• **Control Room:**

1. Control room is the established at the state level and district level for functioning the relief and management of any disaster in the district.
2. The control room is under control of the district collector and placed in the district collector office for better functioning.
3. The Control Room of District Collector, Nashik will function round the clock and will be the courage centre to observe, organize, and execute the actions for Disaster Management.
4. TOLL FREE NO of Nashik District Disaster management. - 1077.

• **Standard operation plan for control room:**

The figure 5 shows the detailed operation plan for the control room in the situation of stampede event. The control room must be connected with all response centers stated above and round a clock information must be collected about the situation.

The following details are highlighted in the control room in bold letter.

1. Name of the police station
2. Phone No of police station
3. Nearest Fire station Phone
4. nearest Health Center

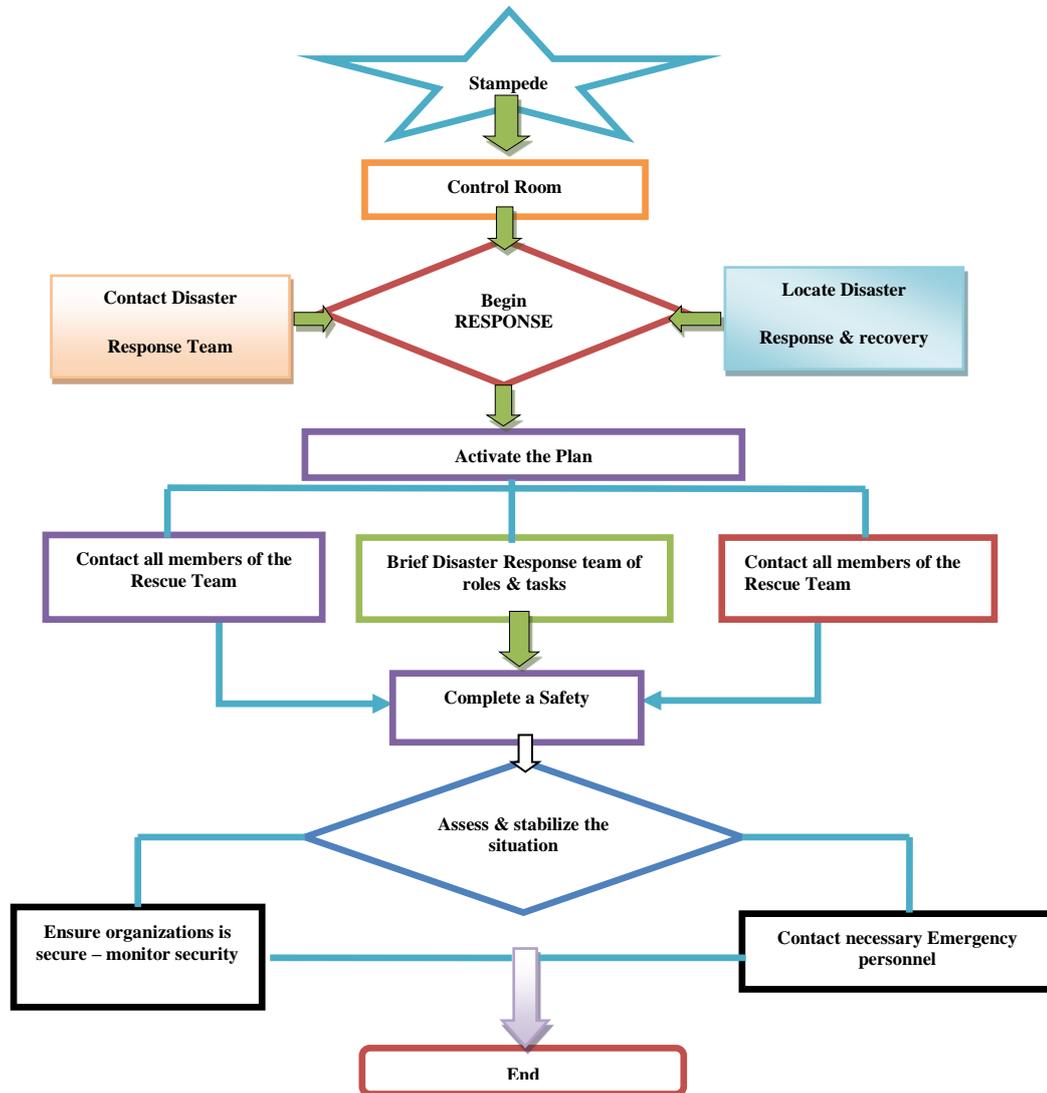


Fig. 5 Error! No text of specified style in document.: Standard operation plan for control room

• **Detailed communication Plan during stampede event:**

Police Control room No: 0253 – 2305233

Collector Nashik District:

Name: – Mr. Vilas Patil

Phone No: - 0253 -2578500

Fire Brigade Office: -

Name: Chief Fire Officer

Phone No: 0253 - 2509766/2590871

Mobile No – 9423179101

Email ID - cfo@nashikcorporation.in

Medical & Health Department, Nashik Municipal Corporation

Name: Health Officer

Phone No. : 0253- 2222466/2572062

Mobile No: 9422259115

Email ID: - health@nashikcorporation.in

Name: Medical Superintendent

Phone No.: 0253- 2222534/2317292

Mobile - 9423777180

Email ID - med\_sup@nashikcorporation.in

- **Phase –III: Response Phase:**

- **First response team:**

In the stampede disaster where major early warning signals are not available the community members and the local police force are the first responder. The immediate support and assistance must be available from other important first responder like the police, state disaster response force, fire and medical services.

- **First Information report:**

The first response team must send the first information report to the district disaster management center, Control room and all authorized agencies immediately after attainment at event spot. FIR will give an account of harshness of the disaster. The FIR should contains following –

1. Intensity of the stampede disaster
2. Action taken by local authorities
3. Local available resources.
4. Best mode of delivering the relief
5. Forecast of future risk

- **Emergency Support Functions Plan (ESFP) for stampede:**

The emergency support functions will gives the command, control and coordination between the state disaster management authority and local authorities those handling the stampede disaster. Local authority shall activate the emergency support function and the concerned agencies of the emergency support functions shall identify requirement in consultation with their counterparts in affected area, mobilize and deploy the resources to the affected areas to assist the rescue teams working on field. Looking towards the KumbhMela 2015, the stampede is the major risk form the point of disaster management. This Emergency support function plan helps to react with the event like this in the emergency. The emergency support plan shall be responsible for the followings-

1. Emergency support functions shall coordinate directly with their functional counterparts in the area to provide disaster management team assistant required.
2. Request for the assistance shall be channelized through the response center to the control room of District Disaster management authority.
3. The requirement of assistance is fulfilled by the DDMA to the Functions or to the affected area directly.
4. The designated authorities for each of the emergency support function shall constitute quick response teams and assign the specific task to each of the members.
5. The designated authorities for each of the emergency support function plan shall identify and earmark the resources like manpower and material during the disaster.
6. The designated authorities shall delegate with adequate administration, legal and financial powers for undertaking the task assigned them.

- **Routes in KumbhMela 2015:**

For Nashik KumbhMela following are the routes that need major concentration

1. Aurangabad Route (From Aurangabad)
2. Mumbai Agra route (from Mumbai)
3. Mumbai Agra route (from Dhule)
4. Pune Nashik Route (From Pune)
5. Dindori Road (From Dindori)
6. Peth Road (From Peth)
7. Gangapur Road (from Nashik city and Gangapur)

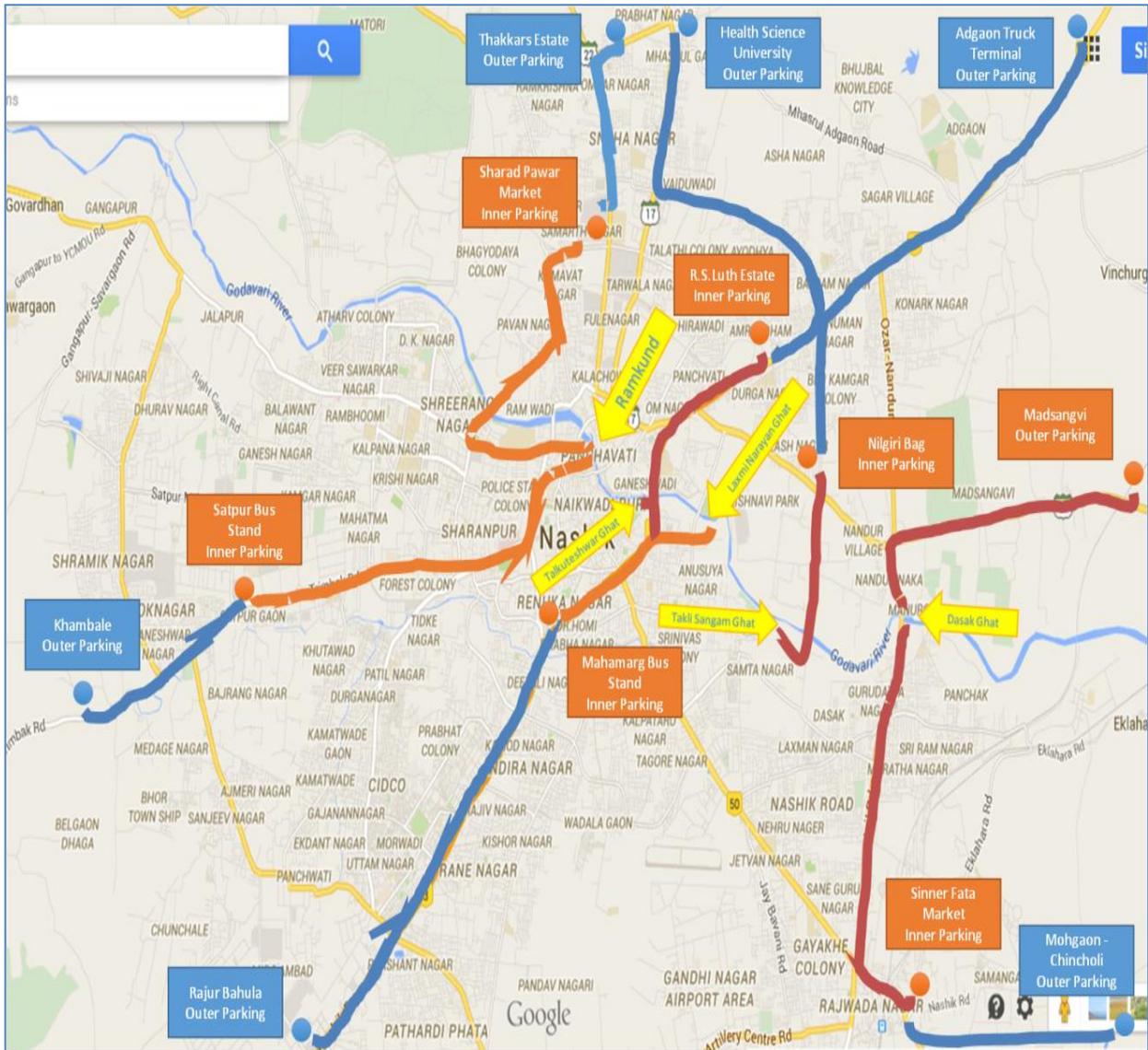


Fig 6: Routes in KumbhMela 2015

### 1. Aurangabad Route:

People coming from Aurangabad will take SH 30 to reach at Dasak Badge. People will enter from one side of the road and exit from other side of the road.

- Escape route for emergency services:

The SH 27 would be used as emergency route for ambulance and fire brigade. The route has certain hospitals like NMC Hospital, Mahajan hospital, Srinath and Samartha hospital, which will be used to handle emergency situations. Ambulance and fire brigade vehicles would be also stationed on this route

- Major Hospitals on Route :

1. NMC Hospital,
2. Mahajan Hospital,
3. Siram Hospital,
4. Samrath Hospital,
5. Sujata Birala Hospital.

## **2. Mumbai Agra route (From Mumbai):**

People coming from Mumbai via Mumbai Agra road would be taken by the path under Kannamwar Bridge to the new ghat. Pilgrims would enter from right side of the road and would leave from the left side of the road. This way crowd can mobilize effectively.

- Escape route for emergency services:

The emergency route is near by the ghat area and from this emergency route easily can be reached at the Dwarka circle. The emergency services are available at Dwarka and nearby Dwarka circle

- Major Hospitals on Route :

1. Wockhart Hospital,
2. Ganorkar Hospital,
3. Nashik Hospital,
4. Amrutvinayak Hospital

## **3. Mumbai Agra route (from Dhule):**

People coming from Dhule side through Mumbai Agra road would be taken by the path under Kannamwar Bridge to the new ghat which is opposite to the pilgrims from Mumbai. Pilgrims would be entered from right side of the road and would leave from left side of the road.

- Escape route for emergency services:

The Talukeshwar Bridge can be used to connect the emergency route near by the ghat area. From there it is directly connected to the Mumbai Agra road after reaching Dwarka Circle. Emergency services will be positioned near Talukeshwar Bridge itself

- Major Hospitals on Route :

1. Supertech Hospital
2. Ahirrao Hospital

## **4. Pune Nashik Route (From Pune):**

People coming from Pune via Nashik road will take a right turn from a famous theatre to Takli road for taking a dip at Laxminarayan ghat. People will enter from one side of the road and exit at other side of the Road.

- Escape route for emergency services:

There are roads that directly connect to the Mumbai Agra Highway, from highway emergency services can be easily accessible.

- Major Hospitals on Route :

1. Suvichar Hospital
2. Chetana Hospital
3. Amrutvinayak Hospital

### 5. Dindori Road (From Dindori):

In 2003 KumbhMela maximum number of pilgrim came from this road. Hence planning for proper incoming and outgoing routes with dedicated emergency path for this road become the foremost important. It will avoid any crisscrossing of pilgrim and hence would avoid the likely stampede.

Fortunately the incoming roads in this area are wide and can accommodate heavy crowd. The pilgrim coming from this side can be guided to Ramwadi Bridge to take their holy dip. As shown in figure the pilgrims coming from the dindori road will come from Gulmoharnagr and will go to the Ramwadi Bridge. They will have their holy dip there and will out from the same route.

- **Escape route for emergency services:**

There is a fire brigade station in the road connecting the pilgrim route and emergency route. Emergency services will be positioned there and movement can happen through the connecting routes.

- **Major Hospitals on Route :**

1. Indira Gandhi Hospital
2. Shri Sai Hospital
3. Ramalya Hospital.

### 6. Peth Road (From Peth):

The pilgrims coming via Peth road would also be guided to Ramwadi Bridge. They will coming though the Fulenagar and Kalachowki area and would move to the Ramwadi Bridge. There they will take their holy dip and will return from the dame route. There are many small outgoing ways from the place where they will take the holy dip which will be barricaded to maintain the smooth flow of the crowd.

- **Escape route for emergency services:**

There is a fire brigade station in the road connecting the pilgrim route and emergency route. Emergency services will be positioned there and movement can happen through the connecting routes.

- **Major Hospitals on Route :**

1. Indira Gandhi Hospital
2. Shri Sai Hospital
3. Ramalya Hospital.

### 7. Gangapur Road (from Nashik city and Gangapur):

The Pilgrims coming from Gangapur Road are the least according to 2003 KumbhMela. Those who would be coming can be moved to other side of the Ramwadi Bridge as that of the Dindori road and Peth road pilgrims. The pilgrims would be moved from dsouzas colony to yashwant colony to gole colony to Ramwadi Bridge. The outgoing path would be same as that of incoming as number of pilgrim are very less from this path.

- **Escape route for emergency services:**

There are road connecting to emergency services from this route.

- **Major Hospitals on Route :**

1. Kulkarni Hospital
2. Sri Saibaba heart Institute
3. Sushrut Hospital

- **Phase –IV: Relief Phase:**

Rescue & relief operations shall be based on ground assessment of damage and losses. Preliminary assessment shall be carried out immediately within 24 hours for planning the response

- Rapid damage assessment
- Immediate repair of infrastructure
- Disposal of Dead Bodies
- Information and Media Management
- *Phase –V: Restoration Phase:*
- Relief Camp
- Medical Response
- Food & Nutrition
- Sanitation and Hygiene

## V. RESULTS AND DISCUSSIONS

The aim of the project report is to find out the basic plan for the stampede management in the KumbhMela going to held in the July 2015.

Following are the results drawn from the report for minimizing the risk of the stampede event in the KumbhMela 2015.

1. The five stage plan for the stampede management is proposed for effective implementation of the plan. The first step of the plan is preparedness phase which includes the institutional mechanism for stampede management, national disaster management authority, state disaster management authority, preparation of (Emergency Support Function) ESF plan.
2. The proper institutional mechanism for stampede management is explained in the first unit. The national and state level disaster management authority and the function of the institution for state and national level also elaborated to cover a broad view of the function.
3. The response center for the Nashik city is proposed to proper communication among the working authority in the KumbhMela. The Nashik city is divided in to six different zones and each zone has the response center.
4. The second phase in emergency support function plan is Early Warning Phase which includes the stake holders like Police, Rescue Teams, Health Service, Public work department, Fire brigade etc. the function and responsibility of the each stake holder is finalized on the basis of important of the work and situations.
5. The control room is proposed in the district collector office as it is centralized location for the control of the event in all respect. The standard operation plan for control room is also proposed to proper operation of the control room and to simplify the procedure to improve the efficacy of the control room.
6. The detailed communication plan during stampede event also prepared to avoid major casualties during the stampede event. The nodal agencies for early warnings of stampede event also identified with traffic department who can respond very first just after the event occur.
7. The third phase is response phase for the stampede event. The first information report is proposed to prepare by the response center and must be forwarded to the control room in prescribed format given in the appendix at the end of the project report.
8. The routes in KumbhMela 2015 are proposed are Aurangabad route, Mumbai Agra route Mumbai Agra route, Pune Nashik route, Dindori road, Peth road and Gangapur road.
9. The routes in KumbhMela 2015 are proposed are Aurangabad route, Mumbai Agra route Mumbai Agra route, Pune Nashik route, Dindori road, Peth road and Gangapur road.
10. For the Aurangabad route, people those are coming from Aurangabad will take SH 30 to reach at Dasak badge. People will enter from one side of the road and exit from other side of the road for emergency the SH 27 would be used. The major hospitals on route are NMC hospital, Mahajan hospital, Siram hospital, Samrath hospital and Sujata Birala Hospital.

11. For the Mumbai Agra route, the people coming from Mumbai via Mumbai Agra road would be taken by the path under Kannamwar Bridge to the new ghat. Pilgrims would enter from right side of the road and would leave from the left side of the road. This way crowd can mobilize effectively. For emergency route is near by the ghat area and from this emergency route easily can be reached at the Dwarka circle. The major hospitals on route are Wockhart hospital, Ganorkar Hospital, Nashik Hospital, Amrutvinayak hospital.

12 For Mumbai Agra route, people coming from Dhule side through Mumbai Agra road would be taken by the path under Kannamwar bridge to the new ghat which is opposite to the pilgrims from Mumbai. Pilgrims would be entre from right side of the road and would leave from left side of the road. For for emergency services the talukeshwar bridge can be used to connect. The major hospitals on route are Supertech hospital and Ahirrao hospital

13. For the Pune Nashik route, the people coming from Pune via Nashik road will take a right turn from a fame theatre to Takli road for taking dip at Laxminarayan ghat. The people will enter from one side of the road and exit at other side of the road. For emergency there are road that directly connect to the Mumbai Agra highway, from highway emergency services can be easily accessible. The major hospitals on route are Suvichar hospital, Chetana hospital, Amrutvinayak hospital.

14. For Dindori road the pilgrim coming from this side can be guided to Ramwadi bridge to take their holy dip. Pilgrims coming from the Dindori road will come from Gulmoharnagr and will go to the Ramwadi bridge. They will have their holy dip there and will out from the same route. In emergency there is a fire brigade station in the road connecting the pilgrim route. The major hospitals on route are Indira Gandhi hospital, Shri Sai Hospital and Ramalya Hospital.

15. Form Peth road, the pilgrims coming via Peth road would also be guided to Ramwadi bridge. They will coming though the Fulenagar and Kalachowki area and would move to the Ramwadi bridge. For emergency services there is a fire brigade station in the road connecting the pilgrim route and emergency route. The major hospitals on route are Indira Gandhi hospital, Shri Sai hospital and Ramalya hospital.

16. For Gangapur road, the pilgrims coming from Gangapur road are the least according to 2003 KumbhMela. Those who would be coming can be moved to other side of the Ramwadi Bridge as that of the Dindori road and Peth road pilgrims. For Emergency services there are road connecting to emergency services from this route the major hospitals on route are Kulkarni hospital, Sri Saibaba Heart Institute and Sushrut hospital.

17. The relief and restoration phase also discussed to recover from the stampede event.

## VI. CONCLUSION

The mass gathering at a congested place having very high risk. This risks which could lead to death of the peoples with injuries to many peoples. The effective management of the religious gathering and function is a challenging task now a day. The psychology of the peoples is changing very rapidly. KumbhMela is planned on 2015, main events scheduled in the month of august and September. The major concern during KumbhMela is to maintain law and order situation along with the security of the pilgrims. This project is mainly focused to the stampede disaster management during the KumbhMela. The numbers of the pilgrims pouring during in to the city during the event will expose the inadequacy of the infrastructure to handle the crowd. The stampede disaster management plan is divided in to the five sections as Preparedness, Early Warning Phase, Response Phase, Relief Phase and Restoration Phase. The each phase having significance in the plan. The major part of the part is the Emergency support function plan and the routes for the crowd movement. Institutional mechanism is explained for the stampede management. The response centers and the center control room are located to manage the support and reaction activity to the stampede disaster. The location of the response center is maintained with proper map. The phone numbers and the address of the response centers are mentioned in tabular form. The Standard operation plan for the control room is mentioned to fine operation of the control room in the extreme emergency of disaster. Eventually, it is important to note that, disaster even through planned properly cannot be avoided, but with proper planning we can make sure that loss of life and property is at minimum possible level. The success of project is now depends on how well this plan will get educated. The stakeholders, their response and plan of action after stampede disaster play the key role in the success of the event. As KumbhMela is scheduled just next to the four months so there is less time to prepare, almost all the agencies are properly ready for the KumbhMela

## REFERENCES

- [1] W. Nick Carter, Disaster Management: A Disaster Manager's Handbook, Asian Development Bank (2008) [pp :32-196]
- [2] Kailash Gupta, 2005, Disaster Management and India: Responding Internally and Simultaneously in Neighboring Countries, Representative for India of the International Association of Emergency Managers, [pp: 3-14].
- [3] Faisel T. Illiyas, Shibu K. Mani, A. P. Pradeepkumar, Keshav Mohan, 2013, Human stampedes during religious festivals : A comparative review of mass gathering emergencies in India, International Journal of Disaster Risk Reduction Vol:5 [pp:10-18].
- [4] Samantha Jones, Katie J Oven, Bernard Manyena, Komal Aryal, 2014, Governance struggles and policy processes in disaster risk reduction: A case study from Nepal, International Journal - Geoforum Vol: 57 [pp:78-90].
- [5] Kelvin Hon-leung Wonga, Da-yong Xieb, 2014, Fire Safety Management Strategy of Complex Developments, Procedia Engineering Vol: 71 [pp: 410 – 420].
- [6] Wang Shangjun, Zhang Xinjian, 2012, Problems of Mega-events Engineering Risk Management in China, Systems Engineering Procedia Vol: 4 [pp: 431 – 437].
- [7] Anders Johansson, Michael Batty, Konrad Hayashi, Osama Al Bar, David Marcozzi, Ziad A Memish, 2012, Crowd and environmental management during mass gatherings, Lancet Infect Dis 2012; Vol: 12 [pp: 150-156].
- [8] Teo Yu Hui Angela, Vaisagh Viswanathan, Michael Lees, and Wentong Cai, 2014, Analysing the Effectiveness of Wearable Wireless Sensors in Controlling Crowd, (ICCS 2014) 14th International Conference on Computational Science, [pp: 1590-1599].
- [9] Dr. Mridul Deka, Abhishek Paul, 2013, Kumbh Mela Report, 2013, Allahabad, Uttar Pradesh, Doctors For You, [pp: 7-19].
- [10] Isabella von Sivers, Anne Templeton, Gerta Koster, John Drury, Andrew Philippides, 2014, Humans do not always act selfishly: social identity and helping in emergency evacuation simulation, The Conference on Pedestrian and Evacuation Dynamics 2014, [pp: 585 – 593].
- [11] JE'ANNA LANZA ABBOTT and MORGAN W. GEDDIE, 2001, Event and Venue Management: Minimizing Liability through Effective Crowd Management Techniques, Event Management, Vol. 6, [pp. 259-270].
- [12] P Gregg Greenough, 2013, The Kumbh Mela stampede: disaster preparedness must bridge jurisdictions, BMJ 2013; Published 20 May 2013.
- [13] The Mela Act, 1938.
- [14] The Disaster Management Act, 2005.