

A Project Report  
On  
**Crowd Management Practices at Puri Jagannath Temple  
during Important Festivals**

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**Certificate**

This is to certify that the project report entitled “Crowd Management Solutions at Puri Jagannath Temple” submitted by Mr. Suman Sekhar Sahoo (ID No. 2021A7PS2605H) in partial fulfillment of the requirements of the course HSS F266, Study Project Course, embodies the work done by him under my supervision and guidance.

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## **ABSTRACT**

The Jagannath Temple in Puri, Odisha, is one of the most significant Hindu pilgrimage sites and also one of the Char Dhams, attracts millions of devotees annually, especially during major festivals like Rath Yatra, Sankranti, Karthika Purnima etc. However, the massive influx of pilgrims poses significant challenges in crowd management, often leading to stampede-like situations and compromising the safety of visitors. This study aims to conduct a comprehensive evaluation of the existing crowd management practices employed at the temple during important festivals. Subsequently, it explores modern crowd management techniques and best practices implemented by temples that have succeeded in managing their crowds, enabling the identification of suitable solutions that could be adapted to the Puri Jagannath Temple. Ultimately, the findings of this study contribute to the development of comprehensive guidelines and recommendations for enhancing crowd management practices at the Puri Jagannath Temple during important festivals.

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# Chapter 1: Introduction, Objectives, and Methodology

## 1. Introduction:

The Jagannath Temple in Puri, Odisha, is one of the most revered and significant Hindu pilgrimage sites in India. It is one of the Char Dhams that a Hindu must visit once in their lifetime. Dedicated to Lord Jagannath, an avatar of Lord Vishnu, the temple holds immense spiritual and cultural significance for millions of devotees across the country and around the world.

The annual car festival- Rath Yatra, which celebrates the journey of Lord Jagannath, his brother Balabhadra, and his sister Subhadra, is the most prominent event that attracts a staggering number of devotees.

During this festival, as well as other auspicious occasions celebrated throughout the year, the Jagannath Temple witnesses an overwhelming influx of pilgrims, often resulting in massive crowds congregating within its premises and surrounding areas. The numbers have significantly increased in recent times after COVID-19 restrictions were lifted. This surge in human traffic poses significant challenges in terms of crowd management, safety, and security.

Over the years, instances of stampedes and other crowd-related incidents have occurred, leading to unfortunate loss of lives and injuries.

Stampede-like incidents:

- [30 devotees hurt in near stampede-like situation at Jagannath Temple in Puri during darshan](#) (Nov 10, 2023)
- [Odisha: 14 injured, 82 faint during Rath Yatra in Puri](#) (Jun 21, 2023)
- [Two Devotees Injured In Stampede-Like Situation In Puri Jagannath Temple](#)(Jan 15, 2023)
- [6 School Girls Injured In Stampede-Like Situation At Jagannath Temple In Puri](#) (Dec 27, 2022)
- [4 killed, 30 hurt in Puri temple stampede](#) (Nov 6, 2006)

Tragedies involving deaths:

## TEMPLE TRAGEDY

➤ 6 pilgrims died in a stampede inside Jagannath Temple in Puri on the occasion of **Nagarjuna Besha ritual** on **November 26, 1993**

➤ 6 died in a stampede in front of chariots during **Rath Yatra** in Puri on **July 4, 2008**

➤ 4 devotees were crushed to death following a stampede inside **Jagannath Temple** on **November 4, 2006**

➤ 2 women died during a stampede during



Devotees queue up for entering Jagannath Temple in Puri on Sunday

**Nabakalebara Rath Yatra** (chariot pulling festival of newly carved idols) outside Jagannath Temple on **July 18, 2015**

These tragic events highlight the need for effective crowd management strategies and robust safety measures to ensure the well-being of devotees visiting this sacred site.

The absence of reliable data and forecasting methods to estimate the anticipated influx of devotees during major festivals and religious occasions at the Jagannath Temple poses a significant challenge in devising comprehensive crowd management plans and allocating appropriate resources effectively.

## 2. Aim and Objectives:

The primary aim of this study is to conduct a comprehensive evaluation of the existing crowd management practices implemented at the Puri Jagannath Temple during major festivals and religious events. The study seeks to identify the strengths, weaknesses, and challenges associated with the current strategies and protocols in place to manage the large influx of devotees during these occasions. This would involve delving into the current protocols followed, infrastructure and resources deployed by the temple authorities and Puri local administration. Subsequently, the study will involve reviewing and analysing existing literature to understand more about crowd management. Furthermore, the study will draw comparisons with best practices employed at other prominent religious sites (for eg: Tirumala Tirupati Temple) and mass gathering events. This will enable the

identification of successful strategies and innovative solutions that could be adapted or implemented at the Puri Jagannath Temple.

Some of the key aspects the study tries to achieve:

1. Assess the current crowd management protocol employed at the temple during peak festival seasons.
2. Learning more about crowd management (disaster management study) from the available literature.
3. Draw comparisons with best practices employed at other prominent religious sites.
4. Develop a comprehensive set of recommendations and guidelines to improve crowd management practices.

### 3. Methodology:

The study will follow a mixed approach that will combine qualitative and quantitative method (wherever possible) in order to give a thorough investigation.

- Data collection methods:
  - The data presented in the study are collected from Secondary sources like Newspaper articles, scholarly works of other authors and interviews of family members.
  - Additionally, the study relies on personal observations that were made during multiple field visits.

### 4. Scope and limitations:

The study focuses specifically on crowd management strategies employed during peak festive seasons and special occasions like public holidays.

Festivals and special occasions that observes huge turnout:

- Rath Yatra (turnout: 10 lakhs<sup>i</sup>)
- Snana Yatra
- Chandan Yatra
- Karthika Purnima (Panchuka turnout: 3 lakhs<sup>ii</sup>)
- Navaratri
- Makara Sankranti



- Durga Puja
- Public holidays like New Year, Diwali etc. (New year turnout: 5 lakhs<sup>iii</sup>)

## Disclaimer

Due to lack of official data regarding number of visitors, peak visiting time of the day and many other aspects, the study would involve many assumptions (based on personal observations) and take into consideration the average of the values presented by secondary data sources (if any).

# Chapter 2: Current Management Techniques

## 1. Visitor count statistics

The temple currently follows a token less free entry system wherein devotees enter the temple premises free of cost and without the need for any token. Hence getting an exact figure of visitor count is quite not possible. However, the number of visitors can be approximately estimated. The Department of Tourism, Odisha publishes tourists visit in identified tourist centres of Odisha in its Statistical Bulletin every year.

Tourists Visit to Puri during 2019<sup>iv</sup>:

	<b>Domestic</b>	<b>International</b>	<b>Total</b>
Puri (Day visitors)	1,34,41,996	37,534	1,34,79,530
(Hotel occupancy)	48,53,954	37,534	48,91,188

NOTE: - This data also includes residents of Odisha visiting Puri  
- Although the latest Statistical bulletin for the year 2022 is available, the bulletin for the year 2019 would give us a better estimate as the later years had many COVID-19 restrictions and therefore reported lower visitor turnout.

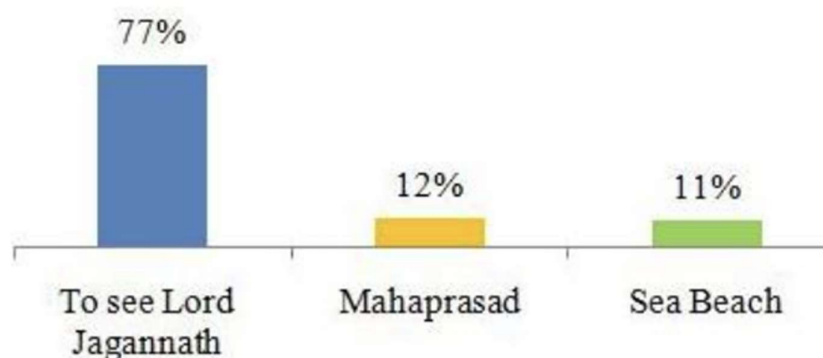
### Daily footfall of devotees:

Estimations of daily footfall are published in newspapers. The numbers vary across different newspapers. According to an article published in The Hindu (dated 25 December 2023), the daily footfall at Jagannath Temple is over 50,000 on normal days<sup>v</sup>. The number surges as high as 5 Lakhs<sup>vi</sup> during important festivals and holidays.

### Purpose of visit:

A research study undertaken by the RAJIMR (2023)<sup>vii</sup>, with a sample size of 100 participants revealed the following:

**Fig No. 1: Justification for choosing this location**



- Majority of respondents constituting around 77% of the total visit Puri primarily to take darshan of Lord Jagannath.
- Around 12% of the respondents stated they visit Puri to witness the Lord and relish Mahaprasad.
- The remaining 11% of respondents stated different reasons for their visit.

### Seasonal Patterns of Tourist Visits<sup>viii</sup>:

- Peak Season: January-March and October-December
- Lean Season: April- September

### Peak time intervals in a day:

- During Sahanamela (7AM to 8AM)<sup>ix</sup>, public are allowed to have a close and free darshan of deities in Garbhagriha near the Ratna Vedi. Hence, this time sees a huge crowd influx.
- Highest number of trains and busses arrive at Puri in the interval between 9AM to 12PM<sup>x</sup>. Consequently, the temple has a huge crowd influx.

Darshan is halted during the performance of certain rituals. The ritual timings are as follows:

Ritual	Timings
Dwaraphita and Mangal Alati	5 AM
Mailam	6 AM
Abakash	6-6:30 AM
Besa Mailam	6.45 AM
Rosa Homa	8:30 AM
Surya Puja	7:45 AM

Sakala Dhupa	9AM to 10AM
Bhoga Mandapa Puja	11:30 AM
Madhyana Dhupa	5 PM
Sandhya Alati	6 PM
Mailam, Chandanalagi	NA
Badasinghara Dhupa	10PM TO 11PM

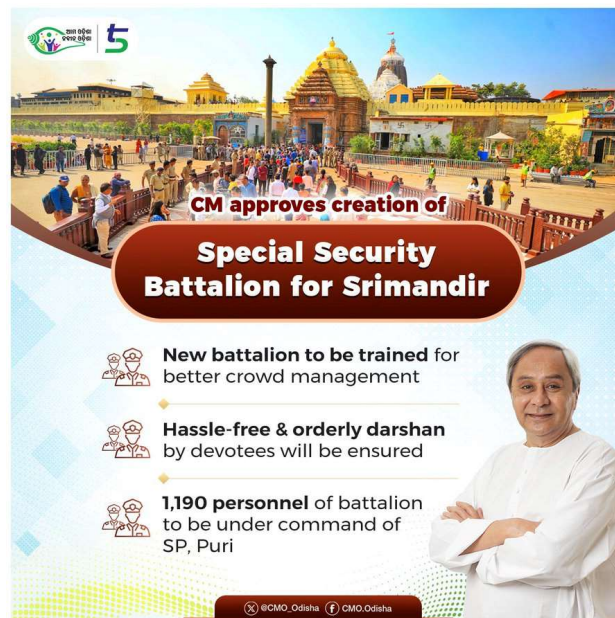
## 2. Crowd management practices during special occasions:

With Lakhs of devotees visiting the temple during festivals and other special occasions, the queue in Badadanda stretches as long as 1 Km. Waiting times extends to 7 hours on festive occasion or public holidays as admitted by SJTA officials<sup>xi</sup>. The following measures are taken by the administration:

- Street vendors near the Badadanda are asked to vacate the area in order to facilitate smooth pedestrian flow.
- Muti-row barricade tunnels equipped with AC, CCTV cameras, public announcement systems along with attached steel benches are installed in the Badadanda that stretches from SJTA office till Market street. The tunnels have a capacity to accommodate 3000 devotees<sup>xii</sup>.



- For the queue, there are 8 designated rows, with the first row reserved for disabled individuals and the second row allocated for senior citizens<sup>xiii</sup>.
- In addition, other facilities like drinking water, and resting areas for elderly and disabled devotees are set up near the queues.
- A special security battalion consisting of 1190 personnel has been approved by the Chief Minister. The new battalion would have the primary responsibility of providing full-proof security to Shri Jagannath Temple, Puri, crowd management and devotee facilitation.<sup>xiv</sup>



- Devotees are allowed to move from one stretch to another in 4-5 phases with stops at: (i) AC tunnel, (ii) SJTA office (where there is Mobile and Footwear stand), (iii) In front of Simha Dwara, (iv) at Baisi Pahacha, and final stop (v) near the entrance of Natamandira.
- During festive season, the crowd is allowed to enter through Simha Dwara (East gate) and Vyaghra Dwara (West Gate) while allowing exit through other two gates.<sup>xv</sup>
- The authorities gear up all resources to ensure timely observance of rituals.

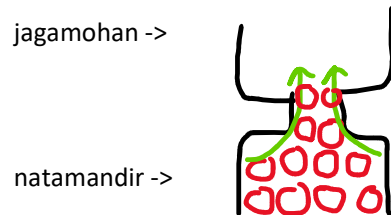
### 3. Problems faced by devotees despite the measures:

- Devotees spend long hours waiting in queues without being provided water or food to get a glimpse of the Lord.
- When the barricades are lifted, all devotees rush inside, pushing each other. The elderly devotees having limited speed are worst affected.
- The queuing area at Baisi Pahacha lacks proper barricades or sheltered waiting spaces. Devotees are forced to stand in close proximity, leading to overcrowding and sometimes even theft incidents occurring.<sup>xvi</sup>
- Because of the chaos and overcrowding, children and older people often get lost and separated from their companions in large crowds.
- Inside the main temple, around 1000 people are allowed in at a time. The place lacks any barricades and hence constitutes for a chaotic movement. Hundis being placed at a certain side forces people to cross the crowd along perpendicular to the crowd flow resulting in push and pull, ultimately reducing movement speed.
- Short height people and children are unable to get a glance at the deities. Therefore, they sometimes return to take another darshan. Which adds to the crowd.
- The servitors of the temple often misbehave with devotees (Dakshina) over donations. There are also instances of servitors resorting to violence if devotees refuse to pay dakshina<sup>xvii</sup>.
- Sometimes, people faint due to suffocation and are stamped upon.

#### Weaknesses of the crowd management system:

- Most importantly, the temple lacks essential technologies that helps to count and monitor crowd like usage of crowd surveillance systems, people counting systems, or crowd analytics tools, which may lead to inefficient monitoring and management of crowds.
- The temple lacks clear signage and guidance, for instance, even if there is a special queue line and also a special entry through North gate<sup>xviii</sup>, for elderly and disabled people, often they are unaware of such facilities and end up being affected the worst due to their inability to walk at pace and bear push and pull.

- The temple has inadequate emergency planning, trained personnel and a communication system to handle a situation like stampede. In such cases, if all necessary conditions prevail, a stampede is inevitable.
- The Pandas and other sevayats constantly look to extract money out of devotees' pockets and many times end up with quarrels. They also fight among themselves for various reasons. One such incident turned out violent, with blood stains found in the Garbha Gruha<sup>xix</sup>, thereby shutting down of the temple for sanitizing and conduction of special purification ritual (Bada Mahasana). All these are the results of lack of regulations and coordination between the servitors and temple authorities.
- Although the queue around the temple has been revamped, the crowd inside the temple has remained chaotic. There is no queue, and hence devotees pack themselves horizontally as tightly as possible, and when there is a bottleneck like an entrance to Jagamohan from Natamandira, devotees in the extreme ends squeeze those in middle to enter the gate.



- The temple authorities have been conservative in adopting modern crowd management techniques, such as online booking which would encourage devotees to come in specific time slots, thereby spreading the crowd load over the day.

## Strengths of the crowd management system:

Over the years, although the visitor count has only increased, the number of stampede and stampede-like incidents has reduced. In the recent years, there has been no death incidents linked to stampede. This shows that the crowd management techniques has improved over the years. Alongside the infrastructural development, the authorities have enforced several new reforms:

- Sale of Mahaprasad is being streamlined<sup>xx</sup>. No one is allowed to sell Mahaprasad anywhere in the temple premises other than the Ananda Bazaar. Only

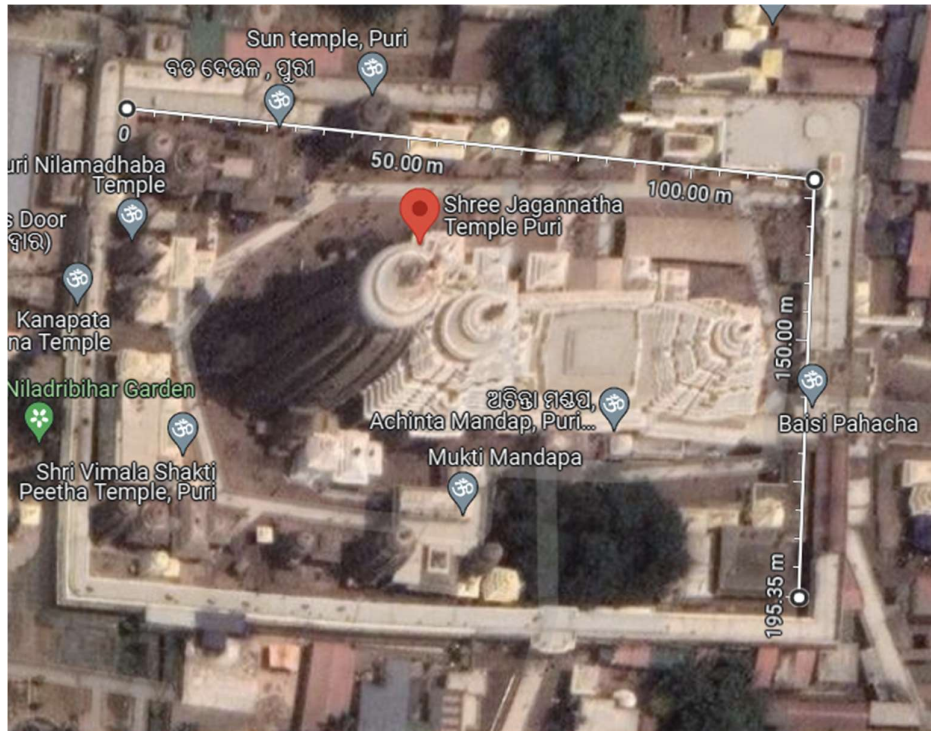
authorised servitors of the Shree Jagannath temple will be allowed to sell Mahaprasad. The rate of food items will be standardized.

- Temple has banned the consumption of gutkha and pan inside the temple premises ensuring the place is clean to be accessible by everyone<sup>xxi</sup>.
- To prevent overcrowding near the donation Hundi, the authorities have set up multiple Information centers and Donation cells in the Badadanda.



# Appendix 1: Crowd capacity analysis

## 1. Temple's infrastructure overview:



- The outer walls, Meghanada Pacheri, enclose an area of 665' x 644'<sup>xxii</sup>.
- The main temple, and also most other temples are located in the inner enclosure (called the Bhitara Bedha) measuring 420' x 315'
- Area =  $w \times l = 315 \times 420 = 132300 \text{ feet}^2 = 12,291 \text{ meters}^2$  (This includes the

Assuming around 25% of the Bhitara Bedha area is accessible by devotees (other 75% includes temple's walls + trees + and other restricted areas like inside Garbagruha, Bhogamandapa, Mukti Mandapa, inner sanctum sanctorum of other temples, offices):

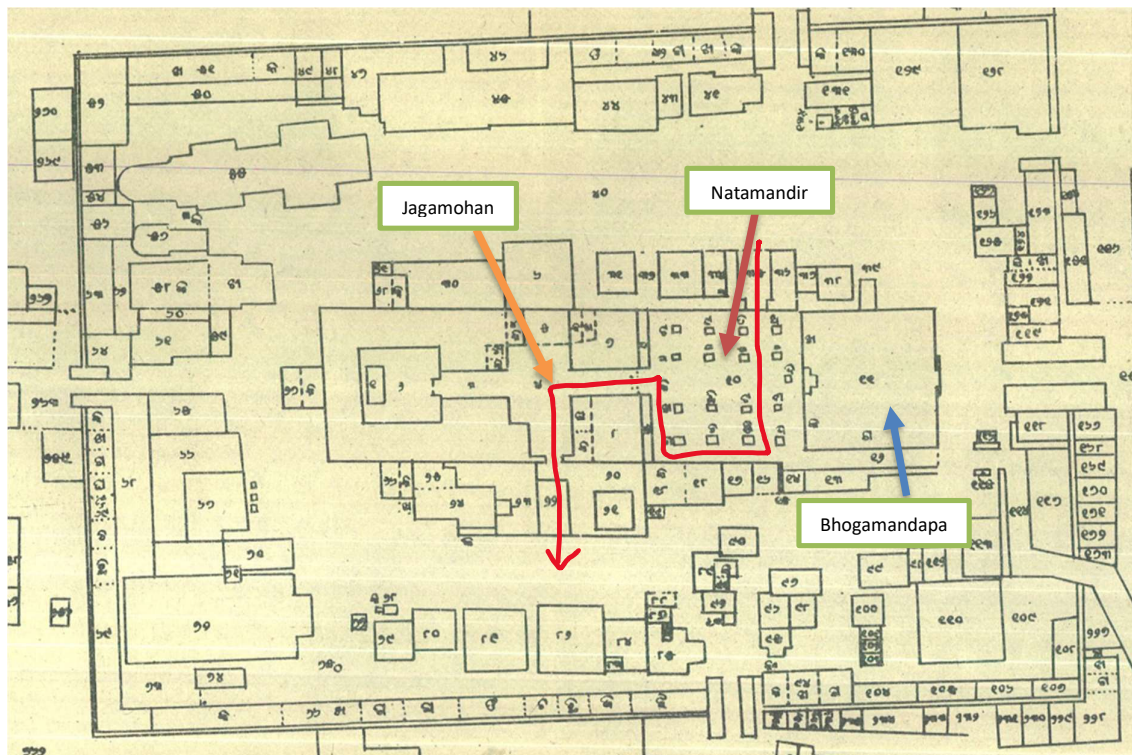
Total area accessible =  $25/100 \times 12291 = 3000 \text{ m}^2$  (Approx)

### Crowd capacity and Crowd density:

- Capacity is related to maximum number of people which can be allowed in an event without any risk. In other terms it can be stated as maximum number of people attendance limit to an area/event.
- When the space for one person is less than  $0.1858 \text{ m}^2$ , people will jostle one another, and the risk of stampede will be higher -According to The Federal Emergency Management Agency (FEMA)

This translates to  $1 \div 0.1858 = 5.38$  persons/m<sup>2</sup>

- Crowd capacity is reached when density is about **3 persons/m<sup>2</sup>**<sup>xxiii</sup>. Hence the temple has a capacity of around 9,000 people (3000\*3). However, this is the maximum number of people that can be accommodated inside the premises if the crowd occupies every tile of area evenly. Which is not the case. Generally the Parikrama area has less crowd whereas inside the main temple and other nearby temple there is higher crowd density.



- Devotees are allowed to enter through the Natamandira and exit via Jagamohana.
- The Natamandapa's interior interior measures 69' x 67'. Here the crowd moves along the aisles in the peripherals of the Natamadapa as I've drawn in the map. The aisles are 10'6" wide<sup>xxiv</sup>. Area =  $(69 \times 67) - (69 - 2 \times 11) \times (67 - 2 \times 11) = 4500 - 2100 = 2400 \text{ ft}^2 = 210 \text{ m}^2$ . Excluding the 4th side of the aisle and half of the 3<sup>rd</sup> side, it has approximately 130 m<sup>2</sup> of accessible area.
- The area accessible in jagamohan is around 150-160m<sup>2</sup>. Hence Total capacity inside temple =  $280 \times 3 = 840$  people. This is the maximum number of devotees that can be allowed without having any risk of stampede. Whereas, in my recent visit around 1000 people entered into the main temple (above the safe limit).
- Assuming around 1/4 of the crowd inside the temple complex is inside the main temple, Total allowed crowd inside temple should be capped at 3500 to avoid

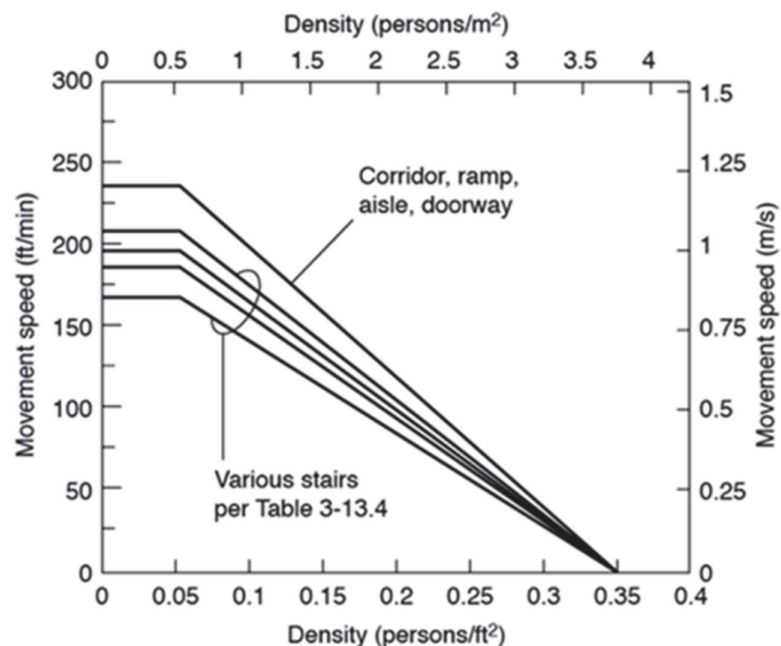
overcrowding at high density areas like inside main temple, Mahalakshmi temple, Bimala Temple etc.

NOTE: In these calculations, numerous assumptions were made due to the lack of data. Therefore, tracking and monitoring crowd movements and concentration is highly needed. This can be accomplished by installing CCTV cameras and running Image Processing software that detects crowd density and other parameters. This would also assist in tracking children and elders who become lost in the crowd.

- Ensuring crowd density is within capacity not only results in risk free crowd movement but also faster crowd movement. Movement speed is shown to be inversely proportional to crowd density.<sup>xxv</sup>

The walking velocity will approach 0 m/s when crowd density is 3.77 persons/m<sup>2</sup>

- Therefore it is a tradeoff between having higher crowd density (to clear off large chunk of elongating queue) v/s having lower crowd density (facilitating faster darshan)



## Conclusion:

So far the study has explored the statistics and current measures taken up by the temple authorities to manage crowd during festivals and other special occasions. With the easing of COVID 19 restrictions the temple is witnessing unprecedented influx of devotees. The infrastructural development and various other reforms have definitely improved the quality of darshan for devotees. However, the temple continues to see stampede-like incidents. A few of the shortcomings in their management are- lack of crowd monitoring system, lack of coordination with temple servitors, lack of clear signage and guidance and lack of emergency planning. The temple is also conservative in adopting modern technologies to their crowd management system.

The subsequent part of the study would focus on drawing comparisons with crowd management practices followed by temples that are successful in crowd management. The study will also try to develop solutions that would serve unique requirements of Puri temple. Finally, it would look at the feasibility of implementing the solutions.

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