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Study on the Impact and Prevention of Risk or Threat for Industrial Disaster Management

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Abstract - In the past, the land that is currently part of Jaipur City was referred to as 'Matsya Desh.' In the Mahabharata, it was the realm of King Virat. Rajasthan's lovely Pink City Jaipur, was the stronghold of a clan of monarchs whose three hill forts and series of palaces in the city are important attractions. Known as the Pink City because of the hue of the stone used solely in the walled city, Jaipur's bazaars offer embroidered leather shoes, blue ceramics, tie and dye shawls and other unusual products. Western Rajasthan itself forms a handy circuit, in the center of the Thar desert which has affected its history, lifestyles and architecture. The contemporary industrial economy and the creation of additional jobs have both benefited from the increased focus on industrialization as the world's population has grown. The official system has also been put into place. Jaipur's efforts to become an industrial hub are being supported by the Rajasthan Industrial and Investment development Policy 2010.

Keywords - Economy, Architecture, Investment, Development, Industrial

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1. INTRODUCTION

In the past, the land that is currently part of Jaipur City was referred to as 'Matsya Desh.' In the Mahabharata, it was the realm of King Virat. The Kacchawa Rajput clan is descended from Kusha, the son of Rama, and this ruler is a descendant of the Kacchawa Rajput line. Maharaja Sawai Jai Singh created 'Sawai Jaipur', the new capital city, in 1727 A.D. and renamed it after himself. A new capital city has emerged because of economic transformation. In both Dausa and Amber, farming is still the primary source of income. Micro-finance banking and the commerce in jewelers, food grains, cotton, and marble stone for construction materials were the primary industries of Jaipur City. Morphology focuses mostly on towns and cities' physical shape and pattern structure. Similarly to Lynch (1960, pp. 49) who classified landscape imagery into five categories: path, edge, node (the focal point), district (part of exhibiting a degree of homogeneity), and landmark (points that serve as a point of reference), Lynch (1960, pp. 49) has also classified landscape imagery into five categories. On the map of Jaipur, the same characteristics are readily visible as in any other city in the globe. In urban morphology, we study the main features of this city's architectural scheme and patterns of the street, road and housing patterns as well as the town's market position (Grewal, 1991). The link between the city's layout and social ties was identified as urban morphology (Mumford, 1938, pp. 101).

Disasters halt progress and devastate decades of hard work, setting countries back decades. Recovery from catastrophes has a disproportionately large toll on poor countries, which is why both pre- and post-disaster measures in terms of preparation, capacity development, and public awareness are critical in order to minimize loss of life and property.

Jaipur is at risk from a wide range of natural and man-made catastrophes. Due to its low average rainfall and the unpredictable behavior of the monsoons, Rajasthan is one of the most drought-prone states in the country. In recent years, the state has seen some major disasters, including the floods in Barmer (2006), the Ajmer Dargah bomb blasts (2007), Jaipur serial Bomb blast 2008, Stampede at Jodhpur Fort Temple (2008), IOC Depot Fire at Sitapura, Jaipur 2009, Chemical tanker Fire incident near Chandwaji (Jaipur) 2012, to name a few. Additional seismic zones III and IV exist in various sections of the state.

2. LITERATURE REVIEW

Bhandari, Dinanath (2010) Prepare for and recover from catastrophe by focusing on livelihoods, as explained in "Understanding Disaster Management in Practice with Reference to Nepal." It focuses on the connection between poverty and risk exposure. Due to a lack of financial and political power, the poorest members of a society are sometimes compelled to reside in high-risk locations. 30 percent of Nepal's 27 million people live below the poverty line in the country's most hazard-prone areas. In the event of an ecosystem's depletion, it becomes a danger unto itself. In order to minimize susceptibility,

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it is necessary to understand the link between natural resource management and disaster risk reduction (DRR). Livelihood strategies form the nucleus of each of these policy domains. Communities with high levels of resiliency often have a varied range of sources of income that can be easily adapted to changing circumstances. They can withstand local shocks brought on by catastrophe because they are ecologically sustainable and connected to outside resources, services, and markets. In order to be long-term, DRR initiatives must be grounded in the knowledge and experiences of the local community. As a result, it is critical that the residents of a certain area participate actively in the planning process. With this strategy, catastrophe victims are not the only ones who benefit from it; they are also the beneficiaries of this technique.

Amstadter, Ananda L (2011) the state of health of a person shortly after a tragedy may be a good indicator of long-term illness and death. However, physical health effects, especially in poor nations, are understudied compared to the rising body of research on post-disaster mental health. Before and after Typhoon Xangsane slammed the Da Nang region of Vietnam in 2006, physical health data was collected and correlated with post-disaster health functioning, among other aspects, in the present inquiry Before and after the typhoon, researchers spoke with 795 people who were chosen at random. Participants with serious depressive and panic disorder symptoms, were those who were older, and those who had expressed high levels of distress during the actual typhoon were all shown to be at greater risk of having worse self-rated health after the catastrophe than those without these risk factors. For poor countries, this research adds to the body of knowledge on post-disaster physical health correlations since Vietnam is still considered a developing country. This database record is owned by 2020 APA and is in the public domain.)

Battersby, Sarah E (2011) Understanding the sources, impacts, and spatial patterns of local hazards ? is critical to helping people make informed choices about how to react to their risk. Because of this, it's not always easy to get reliable information about local risks. This study discusses the construction of an online South Carolina hazard atlas in this article. The purpose of this atlas is to help people better understand the causes and impacts of risks.. This atlas is mainly intended as a teaching aid for K-12 students, since we believe that educating the next generation about climate change is an important part of our mission. However, we've organised the atlas in a way that makes it useful to a broad audience. It is our goal in writing this article to examine the pedagogical, methodological, and technological elements of creating an online hazards atlas in order to better understand the advantages and disadvantages of such a product and how it might be used to better educate the public about potential risks. We provide a methodology that may be customized for usage in various geographic locations to handle these challenges.

Boon, Helen Joanna (2012) Australia's recent weather-related calamities (e.g., floods, fires) may grow in frequency and intensity due to expected climate variability. Researchers in Australia were motivated to look into the existence and extent of government policies and guidelines that support disaster management in schools because there was a paucity of research on how schools can best protect vulnerable students with disabilities (including those with intellectual disabilities) in case of disasters. Students with disabilities may be ignored during severe situations if there are no standard rules and procedures in place to protect them from ill-advised evacuations. The study's findings show that the disaster preparation planning and management for vulnerable students with impairments has been overlooked. According to the results, disaster preparation seems to be underfunded and potentially ignored. Many state education rules include vulnerable kids with impairments; however this has not been taken into account where disaster planning for Australian schools is concerned. Further complicating matters is the vagueness of phrases used to describe pupils, such as "special needs." The research also looked at how the phrases may affect school emergency management plans. Students with disabilities may benefit from emergency management planning systems that are currently in place in local schools. Schools, researchers, first responders, and professions should collaborate with education authorities throughout the globe to ensure that children with disabilities are not at danger during natural disasters.

Bowman, Sharon L (2011) As a result of natural disasters and catastrophes, the authors propose that counseling psychologists and counseling psychology programmers need to include trauma-related help into their preventative, training, and social justice repertoire. As a result of their training and ideals, counseling psychologists are uniquely qualified to help those affected by natural disasters. Using examples from two training programmers, the authors describe how students were prepared for disaster mental health work in the field and how the students were prepared for this job. Students and interventions for resolutions are discussed as well as how real-world crisis situations may readily be utilized as training resources for students. Students' adaptability, openness to cultural challenges, self-care, solid interpersonal skills, resilience, and compassion are among the characteristics that appeared across the catastrophe site instances discussed by the writers.

3. SOCIO ECONOMIC BACKGROUND OF THE STUDY

Jaipur has been laid according to the typical nine-grid layout that astrologers consider to be

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auspicious, and which has been suggested in the ancient Indian book on building. Each grid consists of a square, and they have been organized such that, in the Centre of the city lies the City Palace. Spread around it, in rows, are public buildings, the mansions of noblemen, the living and trade quarters of merchants and craftsmen. Straight, broad pathways run through the city, while a high, crenellated wall that constitutes its defense is punctured with seven gates that serve as access points. Today, these walls may be more difficult to see because the city has expanded much beyond its original layout, but they are still there, showing that despite Jaipur witnessed no big siege, it was more than sufficiently prepared for one.

Only over 1.6 lakh people called the city home in the year 1900. Census estimates put the total population of Jaipur Municipal Corporation at 30.46 million in 2011, up from 23.22 million in 2001. Of this total, 16.03 million were male and 14.43 million were female. Male literacy is 76.65% (12.46 Lakh) and female literacy is 89.38% in Jaipur, for an overall literacy rate of 83.33%. (9.69 lakh). According to the 2011 nationwide urban growth rate of around 2%, Jaipur's average yearly growth rate is 2.38 percent, making it one of the fastest growing cities in the country. From 1971–1981, the average annual growth rate of the population was 3.67–3.73 percent. The maximum annual rate of population increase was 37.30 in 1981; by 2001, it had dropped to 34.61%, and by 2011, it had dropped another 10.86%, to 23.75%.

Table 3.1: Rate of population growth in Jaipur City (1941 -2011)

Years	Total Population	Growth Rate (%)	Annual Average Growth Rate (%)
1941	175,800	---	---
1951	291,000	39.59	3.96
1961	403,400	27.86	2.79
1971	636,800	36.65	3.67
1981	1,015,567	37.30	3.73
1991	1,518,743	33.13	3.31
2001	2,322,575	34.61	3.46
2011	3,046,146	23.75	2.38

(Source: Census of India 1941, 1951, 1961, 1971, 1981, 1991, 2001 & 2011)

3.2.1. Population Growth Rate

Changes in the number of people living in a given area over time are measured by what demographers call "population growth." Positive change occurs when there is an increase in population over a specified time period. As of right now, population shifts in most regions of Jaipur city are virtually always favorable. Since 1971, the city of Jaipur's population has increased, although at varied rates. The population of the city increased by a factor of five between 1951 and 2011 according to the census.

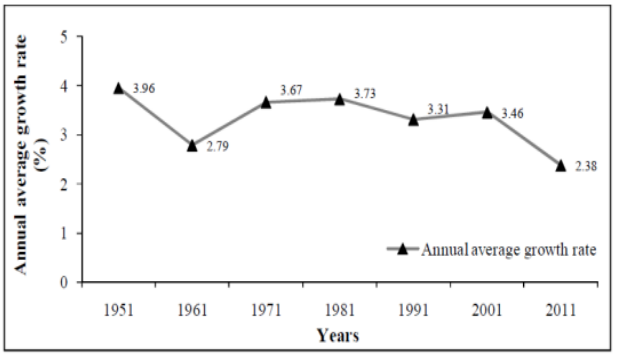

Figure 3.1: Temporal changes in annual average growth rate of population

3.2.2. Population Density

When examining population structure, population density is a crucial indicator to look at. In 2011, there were 6593 people per square kilometre living in Jaipur Municipal corporation, which is much greater than the population density in 1981, when it was just 2624 people per square kilometre. depicts the population density of the walled city region between 1981 and 2013. In 2013, the density was 42008 inhabitants per square kilometre, a reduction of 18118 persons per square kilometre (60126). The remainder of JMC, as can be seen, has a very low population density. When compared to 2001, however, it was much greater in 2011. The population density of JMC was 5027 people per square kilometre in 2001, but it has skyrocketed to 6593 by 2011. In 2001, the walled city was home to about four lakh inhabitants inside its 6.7 sq. km. (2.32 percent of the entire area of JMC). Population density in the "walled city" fell by 16045 people per square kilometre between 2001 and 2011, presumably as a result of people leaving in search of a better quality of life in the newly built residential colonies.

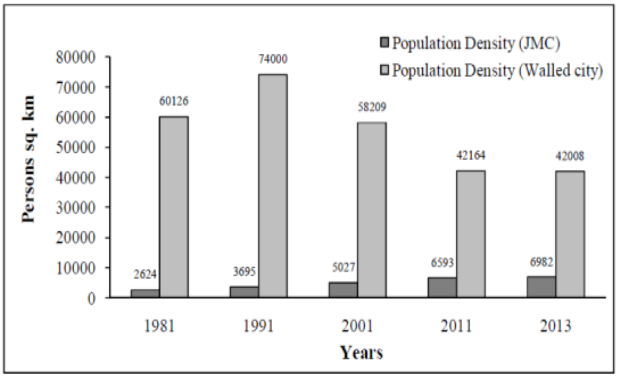

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Figure 3.2: Temporal change in population density of JMC area

3.2.3. Migration Pattern

Travelers and residents from all across Rajasthan flock to the city. Immigrants made up around 29 percent of the city's population in 1991, but by 2001 they made up just 27 percent. But the total number of people migrating to the city has been on the rise. From 1991 to 2001, the city had an influx of around 2 million people, bringing the total number of migrants there from 4 million to 6 million.

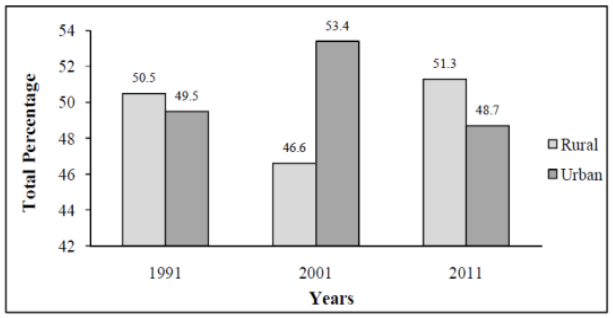

Figure 3.3: Comparison of rural-urban migrants in 1991, 2001 and 2011

3.3.1 Industrial Sector

In 1943, the Jaipur Metal and Electrical Industry, Limited was founded, marking the beginning of Jaipur's modern industrial era. The Ram Mandir neighbourhood, close to Jaipur Junction (the city's major Railway Station), was where the city's primary industries were first founded. Around the middle of the 20th century, the State Department of Industry built Bais Gowdown, another industrial district, close to the Jaipur South Railway Station. There are mostly minor factories in this industrial zone. Soon after, in the early 1960s, a second Iindustrial area was developed near the Dher ka Balaji Railway Station in Jhotwara, and then, in Jawahar Nagar, a small industrial estate was built between the Gandhi Nagar Railway Station and the Tonk Road.

To ensure the orderly and sustainable growth of industry in Rajasthan, the state government established the Rajasthan State Industries Development and Investment Corporation (RIICO) in 1979. Vishwakarma, located north-west of the city near the Jhotwara Industrial Area, Malviya Nagar, situated south-east of the city, and Sanganer Town, situated south of the city, are all examples of new industrial zones constructed under RIICO. RIICO's most recent development project is the Sitapura Industrial Area, located in the city's southeastern quadrant.

Manufacturing in the city also features prominently among the city's home and cottage industries. The following is a synopsis of each of these areas:

3.3.3.1 Large and Medium

The city is home to roughly 12,000 people who are employed by one of the city's 43 big and medium-sized companies. Machine tool and metal and associated product manufacturing are at the forefront of the labour market. When compared to other industries, ceramics and glass have a relatively low rate of labour absorption.

Table 3.2 Large and Medium Industries

Type of Industries	No. of Units	Employment
Machine Tools and Parts	1	3,688
Agro, Food and Allied Products	8	813
Electronics and Related Products	5	478
Electrical and Allied Products	2	1,479
Textiles	1	62
Cement and Cement Products	2	139
Chemical, Gases, Lubricants and Plastics	7	658
Metal and Allied Products	8	3,628
Automobile and Parts	2	760
Ceramics and Glassware	2	25
Drugs and Pharmaceuticals	2	215
Minerals, Stones, Lime and Lime Products	3	130
Total	43	12,075

Source: Jaipur City Investment Plan, 1998.

The state government has launched a number of programmes to stimulate manufacturing growth in the city. In 1994, the government officially adopted a "industrial strategy." RIICO, or the Rajasthan State Industrial Development and Investment Corporation Limited, is the primary organization in charge of industrial growth in the area. It is home to 21 different manufacturing hubs. The current development status is shown in table 3.3. Out of the total of 21 industrial hubs, 14 are fully developed, 3 are semi- developed, 3 are in the process undevelopment, and 1 remain underdeveloped.

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Table 3.3 Industrial Areas of Jaipur

S.No.	Development Status	Number of Areas	Industrial Areas
1	Developed	14	Vishwakarma, Jhotwara, Malviya, Sanganer, Bais-Godam, Sudharshanpura, Mansarowar, Hirawala Ext, Bassi-I, Bassi-II, Bassi Ext., Dausa, Lalsot, Kolana (Bandikui)
2	Semi-developed	3	Mahuwa, Bapi, Kilkipura.
3	Un-Developed	3	Bagrana, Apparel Park
4	Under Development	1	Bagru- Chitroli
	Total	21	

Source: Jaipur City Investment Plan, 1998.

There are a total of 6 designated industrial zones, totaling 2346.6 acres, all of which may be used by businesses. More than 90% of this area has been built upon. In all, 2,185 plots have been allocated in the zones (Table 3.4). Vishwakarma is the biggest and most advanced industrial sector. Sanganer industrial area is unique in being the least built up (only 16% of the land there is used for buildings).

Table 3.4: Area Under Industrial Areas

S.No.	Industrial Area	Toal Area (Acre)	Plots Allotted (Number)
1	Vishwakarma	1364.4	1265
2	Jhotwara	460	208
3	Malviya Nagar	164.3	248
4	Sanganer	50.3	251
5	Bais-Godam	30	118
6	Sudharshanpura	17.6	95
7	Sitapura	63.1	700
	Total	2149.7	2885

4. CASE STUDY OF IOC FIRE INCIDENT 2009 AT SITAPURA JAIPUR

4.1 Sitapura Industrial Area

RIICO established the Sitapura industrial area in the Jaipur district in four stages between 1996 and 1998. This is in addition to the Special Economic Zone (SEZ) I, II, and III established in 2003, the institutional area established in 1998, and the Ramchandrapura Industrial Area established in 2009. Location along National Highway 12 Tonk Road means that the neighborhood has access to excellent transportation networks, water and power systems, and other essential infrastructure.

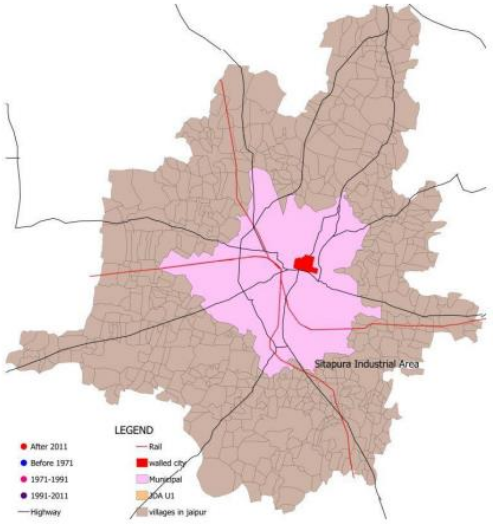

Figure 4.1: Location of Sitapura

Figure 4.2: Layout of Sitapura industrial area; Source: RIICO

In the commercial sector, you'll find companies like Infosys and Genpact, as well as IT service providers like SBL India Limited, Ratan Textiles, and Sambhav Gems Limited.

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Figure 4.3: Various types of industries in the industrial area.

Out of a total of 518.65 acres of land acquired and developed by RIICO (518.65 acres in the first and second phase, 425.31 acres in the third phase, 92.21 acres in the fourth phase, 360.83 acres in the EPIP, 21.5 acres in the SEZ-I, 89.39 acres in the SEZ-II, 138.32 acres in the institutional area, and 496.45 acres in the Ramchandrapura Industrial Area), 849 plot This industrial region has an abundance of skilled workers.

Figure 4.4: Phases of development for sitapura.

There is a post office in Sitapaura, and the Mahatma Gandhi Medical University & hospital (a hospital and dispensary) can be found in the city's Institutional Area. There are a total of eight different banks in the region, including the State Bank of India, the Central Bank of India, the Bank of India, the SBBJ, the Bank of Baroda, the Punjab National Bank, the Indian Overseas Bank, and the UCO Bank. The EPIP Institutional Area in Sitapura is home to 12 ATMs. Sanganer Sadala Thana, a police station, can be found on Tonk Road off of National Highway 12 to serve the neighborhood. There are fifteen highly regarded educational facilities in the region, including schools, engineering colleges, medical colleges, management colleges, and law schools. The Industrial Area is conveniently close to many transportation hubs, including the Sanganer Airport in Jaipur (only 6 kilometers away), the Jaipur Bus Terminal (12 kilometers), and the Jaipur Railway Station (12 kilometers). The distance between here and the relevant administrative headquarters is 22 kilometers. Jaipur, the closest major city, is located about 18 kilometers away.

Jaipur's RIICO Industrial Area is one of the biggest of its kind in the world. Measures were done to give institutional land in the industrial sector to encourage higher education in the state. The industrial zone also includes the Jaipur conference cum exposition center, which has room for a hotel.

Figure 4.5: Jaipur Convention Centre, Sitappura

A physical study of the industrial region was conducted to better comprehend the requirements of the industries and the expectations of the industrialist. The highlighted issues included **empty storefronts and encroachment from the informal sector into public walkways and green spaces.** The plan has set aside substantial swaths of land for the construction of future commercial districts. However, the se commercial installations have not been taken up since occupancy is low in the industrial sector. Small tea shops have sprung up in the neighborhood in the lack of commercial facilities, on the corner, on unoccupied public space, in the shade of trees, etc.

Figure 4.6: Map showing locations of informal sector in the sitapura area.

Green areas that have not been built upon or used. The pattern calls for plenty of open green space, but thus yet it has not been developed or even well maintained. The parks' open areas have become garbage dumps or parking lots for people's own automobiles.

Residential areas taken up by the HIG, and EWS squatting on the roads.

Inconsistent uses of land, such as residential and industrial, are mutually beneficial since both companies and residents need a labor force to function. Fifteen percent of the developed land is dedicated to residential construction in order to

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provide homes for employees in the surrounding industrial regions. The plots have been inhabited by the HIG and MIG individuals, while the employees of the industrial area reside in neighboring kachhi basties or squat along the road sides since there is NO strategy for assignment of these plots. No plans have been established for garbage disposal in the Sitapura industrial sector. The government has designated RIICO as the agency in charge of industrial zone development. After construction is complete, the land must be turned over to the local government agency responsible for trash collection. However, the land has not been transferred and there is no waste management system in place since it is not entirely inhabited and part of the plots remain with RIICO. Throughout the commercial zone, trash is being picked up at different points.

5. CONCLUSION

The contemporary industrial economy and the creation of additional jobs have both benefited from the increased focus on industrialization as the world's population has grown. The official system has also been put into place. Jaipur's efforts to become an industrial hub are being supported by the Rajasthan Industrial and Investment development Policy 2010. Developed urban townships, tourism, strong infrastructure, and updated amenities have all contributed to Jaipur's rise to the status of India's fastest-growing metropolis. Many domestic and foreign corporations have established significant presences in Jaipur. In Jaipur, there are "19 well developed industrial areas housing 19544 small scale and 50 medium and large-scale units," as stated in records collected from the RIICO office. Export Promotion Industrial Park (EPIP) and two Information Technology (IT) Parks that are among the best in the world. Jaipur is a hub for traditional export industries including the gem and jewelry, clothing and textile, carpet, and handicraft sectors. The city of Jaipur, India, is home to a wide variety of businesses, but none more so than those found in the Vishwakarma Industrial Area. Vishwakarma Industrial Area has acquired a total of 1399.34 acres of land. Built by RIICO, it is home to 1,645 different companies. All sorts of businesses may be found there. Industries such as Mangla is pat, Rajasthan transformer, Ultra tech, Bharat pottery, Universal foundry, K.G. Petrochem, Clay Craft, Auto light, Agarwal Marbles, Bajrang wire, Bairathi rubber, Poddar rubber, Gem electro, Rajasthan cylinder, Roachess watches, Tijaria pipes, Annapoorna Cold, Techno hind pipes, Om industries, S R Marbles, etc. can be found in the area's industrial zone.

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