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A STUDY ON ELEMENTAL INFRASTRUCTURE FOR THE NEW CAPITAL CITY AMRAVATHI.

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Abstract

The study of the ongoing research at Department of management studies,Vignan University entitled, "Smart strategies for transportation development for the Greenfield capital city-Amaravathi" embraces the need to have flexible transportation infrastructure and how their strategies can help in developing Amaravathi as a smart city. This paper attempts to study the literature on flexible infrastructure systems develop strategies for a resilient transportation for new capital city of Andhra Pradesh state. There are many hurdles in developing Amaravathi into a world class city. This newest capital is going to be between Vijayawada and Guntur in about 217 square kilometers of which large amount falls under flood risk zone. As we are going to make or cities smart, there is need to study the strategies and innovations to apply and adopt to develop an extensive" Water-Networked city". There by the historical region of Amaravathi is going to be the Riverfront capital city for the state of Andhra Pradesh.

Introduction:-

The more we develop, the greater is the impact of each disaster on our cities and its infrastructure disrupting the functionality of our cities by resulting our infrastructure unusable. Disaster and their effects continue to affect millions of people annually creating a pressing need to develop our infrastructure under time and budget constraints. Therefore we need diverse groups of agencies and organizations to coordinate under stress.

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The most important expertise of the infrastructure has been based totally on the restrained view of our infrastructure as a mixture of discrete sectors which comprise bodily assets and facilities. Over the huge decade the infrastructure of our towns has evolved into a device which includes networks of belongings know how and institutions. However still in exercise there are pre disaster vulnerabilities which can be regularly did not be addressed inside the production of infrastructure. There's an boom in want for our cities to manage and adopt to the effects of a want that we pass our cognizance from a reactive on focusing on effective catastrophe response to a proactive one, via which weekend expand an information of what, whilst and where in infrastructure desires to be installed vicinity and the way to address the city infrastructure to prevent or reduce the impact of natural event.

Like the existing city of Vijayawada, the capital city Amaravathi is also going to have heat waves, flash floods and high climate variability as they both reside on either sides of the river and share common threats. The new city lies southern side of the river Krishna and falls under flood prone zone in an extent of 217 sq.kms and is going to be between the existing cities if Vijayawada and Guntur

To take a look at may be categorized as these three important phases. The first phase offers with the literature on resilient infrastructure and identifies the center properties of resilient infrastructure. The second phase deals with context of Amaravathi and profiles its catastrophe nature with the case of its neighboring town Vijayawada. The third phase studies the literature of resilient transport infrastructure inside the context of Amaravathi and promises a method for the improvement of the same.

Scope of the paper

The main scope of this paper is to identify the principle features of resilient infrastructure as a first step; then it focuses on applying these principles to generate recommendations for resilient infrastructure for any one sector. This study is the ongoing project work at Vignan University under the center of excellence in transportation systems department. The title of the paper is "Smart strategies for transportation development for the Greenfield capital city-Amaravathi".

For the purpose of paper, resilience refers to the events of climate change and its subsequent effects lie urban flooding and variable temperatures but in fact the term resilience is a vast concept. To explain the resilience strategies the study focuses on road transportation infrastructure while excluding air, rail and maritime transportation.

Resilience

In all its definitions resilience is connected to the concepts of recovery after physical stress. Also, according to petit et al. (2013) resilience is the ability to:

- Absorb acceptable shock of deformation in a time of crisis;
- Recover the functionality of the system after a disaster or a sudden shock; and
- Operate appropriately even if some parts of the

A few studies suggest that resilience is a sensible mindset that looks at ways to strengthen the capability of a gadget, to surely adjust dangers (Hollnagel, 2004).

Resilience is regularly used to suggest both flexibility and electricity concepts. In different studies, resilience is likewise cognizance more often than not on survival. The definition of resilience that is currently the most famous turned into proposed by way of Timmerman (1981): "In synthesis resilience is the ability of human communities to resist external shocks or perturbations to their infrastructure and to get over such perturbations". Resilience is also understood as "how speedy the variables go back towards their equilibrium following a perturbation".

Two general aspects can be observed from these definitions and all the concepts discussed. First is the resistance to an unusual external shock and second is the ability to recover quickly. Later more complexes and comprehensive understanding of the term. Bruneau.et.al provided 11 aspects of resilience, under 4 properties, 4 dimensions and 3 results. They include: technical, organizational, social, and economic, more reliability, more recovery, lower consequences, resourcefulness, redundancy, rapidity and robustness.

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Principles of Resilient Infrastructure

The growing need for infrastructure systems that can cope with unexpected events and their impacts is the main objective behind developing resilient infrastructure. Resilience can be estimated as long-term and short-term resilience. Where to cope with extreme weather events as storms short-term resilience is considered where as to cope with long-term changes like changes in environmental conditions such as gradual climate change or soil deterioration at low costs long-term resilience is considered.

Other than Bruneau et al (2003), 4 dimensions of resilience infrastructure, it should also possess these properties; robustness, rapidity, redundancy and resourcefulness. The principle features of resilient infrastructure by various other studies are:

- Robustness: ability to tolerate the stress.
- Redundancy: flexibility to make choices etc.,
- Resourcefulness: readiness to face trouble or disturbance.
- Rapidity: ability to complete goals timely.
- Capacity: ability to withstand "known" disturbances.
- Flexibility: changes in one part would not disturb other part.
- Tolerance: stability at instance and gradual degradation.
- Cohesiveness: collaboration of different sub-systems.

Examples of transportation infrastructure failure

Transportation is the timeline of our socities. Minor disturbances to transportation infrastructure can cause catastrophic impact on the capacity of network, enterprise and financial system to recover from a disaster. The want for resilient delivery infrastructure have been a field active study during the beyond decade.

While the typhoon Katrina had a divesting impact on transportation community. "it changed into take-heed call for the sector, making clear that climate change is real and that transportation infrastructure isn't geared up to deal with severe weather situations. "Littman concluded after analyzing the hurricanes Katrina and Rita within the U.S that evacuation plans labored properly for motorist however didn't serve folks that have been dependent on public delivery.

The roads tarnished while the Seoul, the capital town of republic of Korea, obtained an huge large quantity of rain, 259.5mm. The in large part flooded urban roads have limited the emergency services and highlighted the smart towns inability to deal with serve situations. The unintended state of affairs changed into due to inefficient rain water detention wallet and concrete flood management techniques.

Case study-Hurricane sandy

Kaufman and et al submitted to Rodin center of transportation in 2012. Hurricane sandy strengthened the importance of numerous modes of transportation: subways, buses, bridges and tunnels in and around New York City. Some crucial investment areas for transport infrastructure are:

- Giving priority on mass transit by multiple modes of transportation.
- The streets in flood zone can be used with porous pavement.
- Walking and cycling need to be increased.
- Multiple ways of communications.

Hurricane sandy helped to understand the importance of alternate modes of transportation in events of crisis. While other cities slowdowns transportation New York used alternative services by which people suffering to find gas for their cars resulted in using bikes by adopting the recent bicycle infrastructure.

Amaravathi - Greenfield capital city

The whole capital region comprises approximately 7,420sq.km. of which the capital city exclusively has covered over 212sq.km. on the banks of river Krishna like the existing city Vijayawada hence sharing common treats with it. The main objective is to make it a world class city as it is competing in the 100 smart cities mission by the government of India. There exists extensive pressure on development if its infrastructure as Amaravathi is the Greenfield capital city of the Andhra Pradesh state.

Disaster profile:-

The new capital city Amaravathi is in risk zone for storms, floods, climatic changes, hot summers and mild winters due to river flowing through it. Like Vijayawada it is very much dependent on geography for the implementation of climate risk management project under the frame work of urban Disaster Risk Reduction project of GOI-UNDP, Vijayawada is one of the six cities in India. New capital city also is in danger of earth quake hazard zone III.

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Key issues

Expected city features	Existing city features
1. Prone to flash since proposed on banks of Krishna.	1. City has already seen flash floods in low lying areas.
1. Heat waves increased due to high water bodies and also results in reduction green land.	2. Many died due to heat waves and heart strokes.
2. As the world class city population is being expected to be 4.49 million by 2050 proper post disaster services need to be planned.	3. Due to increased population and heavy traffic population the past disasters services are being restricted.
4. There exist double threats to city from overflowing river and rainfalls.	4. Due to infrastructure cripples the city has blocked roads, for even small rainfalls.
5. The city is expected to experience minor tremors of earth quakes as it is in danger zone III as per IS 1893:2002.	5. The city has felt around 159 earth quakes till April, 2015 in and around 150km area.
6. In upcoming years the city is expected to face more heat waves.	6. Due to extreme weather conditions the city's pavement has reduced.

Approach for Amaravathi city's resilient transport infrastructure:-

This approach is very useful tool for both large scale and small scale transportation infrastructure. The approach helps in decision making process as a part of development of capital city region.

General context: In order to plan for transportation infrastructure the main thing that is to be considered is scale of infrastructure and climate effects of the Amaravathi region. Disaster profile of the region would help more.

Identification of transport assets: while identifying the transport assets in the second phase from the infrastructure we need to keep in mind the characters hat endangered infrastructure like: location, traffic volume, type of infrastructure etc.,

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Assessment of vulnerability

This phase is the interrelation between the above two steps and crucially analyses the assets and their vulnerabilities through planning, construction, operation and maintenances.

Risk analysis

After studying the general context, transport assets, vulnerabilities and risks the final stage is to combine those disaster related and form policies and key tools to build resilient transport infrastructure.

Tackling urban floods

As new capital city Amaravathi is a flood prone zone the most important way to handle urban floods is to expand permeable layers and different spaces for the rainwater detention with the help of Integrated Flood Management system (IFM). Incorporating usage to detain water in highly urbanized areas in the city of Amaravathi is easy as it is desired to make Amaravathi as water centric city. Open street pavements can be used to store rainwater.

Tackling heat waves

To handle heat waves in both Vijayawada and Amaravathi cities we can approach two ways. One way is to plan for non-motorized modes and public areas through planting, shading etc., Second way is to reduce heat by effective promotion of efficient fuels and low carbon mobility. Tree planting requires space, water and maintenance and exact selection of the trees too. Both public and private should cooperate for the success of two ways to tackle waves.

Planning and design recommendations

To develop a multi model transport infrastructure Amaravathi should value diversity, flexibility and redundancy in its plans. A grid network would disperse the traffic with providing multiple links to each destination.

The implementation of potential solution strategies can be used in most cost effective way at each point of time and additional strategies to perform at need. Recognizing all the possible disasters and stress on transportation system, transportation facilities need

to be design such that they withstand even extreme conditions of heat waves and urban flooding. Emergency lanes and routes and emergency response as part of all transportation planning should be implemented. Transportation services need to be developed particularly for choices and services that help basic access. Taking into consideration the special needs of physical disabilities, low incomes, inability to speak the local language, etc., We need to adopt timework, delivery services etc., To provide access under unusual conditions we should maintain operative ways for information and communication.

Maintaining periodic transportation systems to evaluate early detection of possible problems and inefficiencies and making travelers know their transportation options and warns of problems, the disasters of transportation can be reduced or controlled.

Conclusion and discussion

The study started with literature historical background and then came up with constructing Amaravathi with resilient infrastructure as it is a danger zone area of floods, heat waves etc., Then some strategies were proposed to have a resilient infrastructure. And finally said that periodic updating in the systems adopted is needed to meet the changing climatic events.

The approach of transport infrastructure can be used for other assets infrastructure with slight modifications. The capital city of Amaravathi needs equitable transportation modes to overcome congesting of roads during emergency evacuations. Considering all the disasters, climate changes we need to create proactive infrastructure systems to avoid damage and disruption. A resilient or flexible infrastructure helps in developing safety concerned Amaravathi city.

References

Bocchini, P., Frangopol, D. M., Ummenhofer, T. & Zinke, T., 2014. Resilience and sustainability of Civil Infrastructure: Towards a Unified Approach. Journal of Infrastructure Systems, 20(2).

Bruneau, M. & et al., 2003. A framework to Quantitatively assess and enhance the seismic resilience of communities. Earthq. Spectra, 19(4), pp. 733-752.

CDPH, 2013. Preparing California for Extreme Heat: Guidance and Recommendations, California: California Department of Public Health.

EPTRI, 2011. State Action Plan on Climate Change for Andhra Pradesh, New Delhi: Government of India.

Garcia, P. & Papi, J. F., 2015. Towards Climate - Resilient Transportation Infrastructure, Louisiana: Smart Transportation Alliance.

Guha-Sapir, D., Vos, F., Below, R. & Ponserre, S., 2012. Annual Disaster Statistical Review. s.l.:Centre for Research and Epidemiology of Disasters.

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Reference should be complete in all respect and arranged in alphabetical order.

BOOK

Samson paul, A. (2009). ''Principles of Research Methods in Social Science". Sage Publications, New Delhi.

TWO OR MORE AUTHORS

Alan, J. and Lawrence,C. (2000). Cross Cultural Management, New Age International Journal, Article paginated by issue, New Delhi.

Saravan. S. (2006). ''study on the employees job satisfaction in BPO Industry", Indian Journal of commerce", 5(3) 12-18.

Journal Article paginated by volume

Sainaghi, R. (2008). Strategic position and performance of winter destinations, Tourism Review, 14, 40-57.

Newspaper

Menon (2011 , July . 12). Exports Roll Out New Fabrics to Beat Slump, The Economic Times, p 9.

Working paper

Ahamed, E. and N. Stern (1983). ''Effective taxes and tax reform in India", Discussion Paper 30, Calicut University, Calicut.

Unpublished work

Johnson (2003). '' Impact of Information Technology and Rural Marketing", Unpublished Doctoral Dissertations, University of Mumbai, Mumbai.

Websites

Daniel (2002). Behavior Pattern of consumer towards FMGG in Bangalore City. Journal of International Marketing Review, 2, 7-10. Retrieved June 23, 2002,from http://jsr. ac. In.

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