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A Review on Progressive Collapse of the Bridge

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Abstract - *A bridge is a structure that is often built on top a type of obstacle for a water area, valley, or road. Many the purpose of the bridge is to provide a passage over these bars. Bridge failure can also be natural or human an error that leads to further deterioration resulting in loss damage to health and property. Continuous wrapping is understandable such as when a key structural element fails, due to failure of the main feature the whole structure collapses. i.e. local ultimate failure of global structural failure. I continuous falls may be accidental, due to design error, substandard material, or natural disaster (e.g. earthquake, flood) or man-made disaster is a form of action Terrorism, War, or the wrong way to destroy it exists Much research has been done on building structures. But little reaction work done in relation to bridges as compared to buildings. This paper is designed to review I the concept of continuous degradation of a variety of bridges.*

Key Words: **Bridge, Progressive collapse, Seismic load.**

1. INTRODUCTION

India is a developing country. Travel facilities and the development of related infrastructure plays an important role contribute to the development of developing countries such as India. Bridges are one of the most important engineers transport infrastructure. Bridges are there usually built on a type of barrier of similar water sources seas, rivers, lakes and valley or road. Many the function of the bridge is to provide a course of resistance these obstacles. Number of various loads seized on the bridge as gravity loads, earthquake loads, wind load, temperature, brake load, moving loads. The first the purpose of the design engineer is to improve the design of a building plan for each member of the building to know keep the code calculated in relation to joint members. A few buildings, though, exist to meet the custom of the member as set out in the design plans, I cannot provide satisfactory levels of repetition to address the area losses, losses that can lead to further deterioration of the whole structure of the building.

The building continues to collapse when the first element of the structure fails, leading to the failure of the combined elements of a structure, which cause the structure failure. It also describes it as standard damage or wrapping that up inconsistent with the size of the start of the event. Ongoing wrap analysis is intended to reveal structural capacity or unusual load resistance.

1.2 CAUSES OF PROGRESSIVE COLLAPSE

In the history of bridges, dozens of bridges collapsed as a result for various reasons. In particular there are two main reasons which are natural and man-made features. Natural features floods, earthquakes, landslides, landslides, storms, and hurricanes, which exacerbate these natural disasters they are inevitable which can cause great damage to structure.

- **Natural Factors**

1. **Flood** - Heavy rain often leads floods, which can cause events like scour, erosion, the confluence of rivers, enough depth of embedding, over-protection functions fall or hydraulic jump, soft rock, sand mines, impact of debris or abrasions on a bridge foundation, etc. One or a combination of those causes may cause a significant decrease within strength and stability of key components of the bridge and may also cause bridge failure.

2. **Scour** - Scour can be something that happens over time the width of the river becomes less the result of water erosion, which leads to exposure to bridge foundations. On the rise depth of scour, lateral resistance of soil motivation is greatly reduced, thus increasing the lateral deviation of the inspired head. Moreover, when critical scour depths reach, bend bends inspiration can happen under the combined effect of the load of large bridge structures therefore traffic volume.

3. **Earthquakes** - Earthquakes cause reactions horizontal ground movement that will fail the bridge paragraphs. The direct movement of the earth causes Axial power rotation on the bridge columns or columns, which can attract the outside wrapping or crushing of columns or bars. In addition, direct earth movement may it causes a great increase in bending moment facing the center of the bridges, which may cause failure of the bridge to bend. Straight ground movement and horizontal ground moving waves provide bridge failure columns or columns. Also, both vertically and

vertically horizontal ground movement may result immersion of soil at the foundations of the bridge, which can greatly reduce load-bearing capacity bases even directly causing the bridge to collapse.

- **Human Factor**

1. **Imperfect design and construction –** For many cases, errors from incomplete design, the deliberate use of inferior materials, or the adoption of wrong construction method, false the structure of the structure leading to stress contact with members can cause a bridge falling within the construction phase. And it is wrong material and improper monitoring are affected the efficiency of a failing bridge the bridge.

2. **Collision -** Accidental collision between vehicles and large bridge and intermediate architecture and bridge brackets or columns in general unexpected. During a collision, it is very large third party power transfers to the affected bridge structures. This is a great force, to do in a small area of communication, can it has caused a very high local pressure and thus a local damage to parts of the bridge. Because the bridge consumes the dynamic, powerful forces of conflict idle power and vibration were improved. Collision power can cause great damage to the bridge parts or maybe the collapse of the bridge.

3. **Terrorist Attacks -** Recent years have seen a various terrorist attacks against transport systems around the world. Important infrastructure it is considered the main target of the attack their accessibility and potential impacts on the individual health and economic activities. Terrorists are always direct the key parts of the bridge in the same way as steel and decks due to the failure of these components causing the collapse of the bridge.

4. **Lack of Inspection and Care –** Bridges in the ministry they are always under attack by environment and living loads. As a result, bridges among the degrading. What exceeding a certain pressure, can cause harm problems. Degradation occurs as a result various features including physical structures as well mechanical and environmental. Although I the risk of bridge failure cannot be eliminated, a A decent program of inclusive and general remediation proper testing and renewal will prevent deterioration of the bridge and assistance system identify potential structural problems before them great disasters.

1.3 OBJECTIVE

1) To study the different causes of progressive collapse of bridge.

2) To study the structural phenomena of progressive collapse.

2. LITERATURE REVIEW

Hartanto Wibowo, S.M. CSCE; Silvena S. Reshotkina; and David T. Lau, F. CSCE 2009 [1] Continuous Failure it can be referred to as a global disaster or the fall behavior of a large part of the structure occurs as a result failure of a small or limited portion of the building area. Major crash of bridges determined by features of earthquakes such as magnitude, magnitude, and destiny. Reaction to the structure of seismic, continuous waves vibrations and tremors occur initial and repeated failures modification of cyclic pressure inelastic causative actions deterioration of strength, durability, and ductility of the bridge due to damage. He had analyzed the RC bridge using the ELS software developed in the Applied Element Method. He realized that cracks are formed first when communicating between the deck and pier and after upgrading cracks the deck fails due to the failure of the members. He said progress Demolition can occur due to earthquakes power not only due to gravity loads and explosion loads. Earthquake-resistant design should be considered continuous deterioration.

Uwe STAROSSEK 2006 [2] means a clear difference between durability and prevention of crashes. About progress collapse, fragile structures is a straightforward matter as well they require direct consideration. the need for that the consideration follows an examination of the current design methods based on the concept of honesty. Because of basic difficulty and thanks to the value as well the complexity of the influences that emerge after failure implementation, a design based on what is probably real buildings seem impossible. original design So a solution was proposed design processes based on common occurrence, as described within the codes, which are completed continuously testing and specific related design steps continuous deterioration during analysis it is controlled by cutting.

Power should be determined on the basis of strength of the elements introduced to continue and as a result power transmission should be checked down to inspiration. Compartmentalization achieved or consolidation or discount to continue at the room boundaries. In other words, room the boundaries must be ready to support the supreme power either mass migration. Properties, compartmentalization is that the proper way to stop the continuation decay an undeniable fact that has neglected within the civil engineering community. If this feature is ignored, one reason could be the goals are consistency, relevance, and

consistency they are measured in a logical way, a serious thought best for certain types of buildings.

Amir Seyedkhoei, Reza Akbari, Shahrokh Maalek 2019 [3] refers to the ongoing catastrophic process of prefabricated concrete bridge. Its generation of others details of the dispersion of the different category of a common, balanced, and unusual bridge properties. continuous pre-stressed disorder the bridge will appear as a kind of dominoes under the earthquake loads. Punching shear shows under the living areas of the box belt. Column usage starts the introduction failure part of the potential for the underlying structure to increase continuous deterioration but continuous prediction collapsing the normal bridge path is much easier than that another bridge. the height of the bridge pier also affects in the ongoing collapse of various bridges. Opportunities failure of the long hole is more than the short ones as well middle pillars. The ground slope also has a great influence on the fall machine. It also saw that scale power impact values on medium-height columns are lower tall pillars.

Feng Miao, Michel Ghosen 2017 [4] Current agreements for continuous structural failure does not apply to it the continued failure of the bridge. Differences between topology, load transfer method, and structure the configuration of buildings is different from bridges perpetual and transient uploads. In that case, there are major problems that occur in the test of loads used and the ability of the lowering system flexible fall. Probabilistic expression expression continuous crash of the bridge as follows P (C) = P (C / D) P (D / H) P. The word P (C / D) most commonly used check firmness. They have analyzed the metal metal box bridge and steel truss bridge. They concluded that it was a box the steel bridge contributed to the fatigue crack in the middle of a the box belt and the metal strap lose weight the ability of the first strut. These scenarios are selected because of these bridges are often designed as unnecessary, critical fracture formation is expected falling under its own weight when one member fails.

Lu Deng, Wei Wang, Yang Yu 2015 [5] They have done it much work in understanding behavior and as a means demolition method of different types of bridges though challenging stories always continue. Because it is combined the effects of many different factors make the bridge fail a completely convoluted structure that comes with a lot of complexity see the best conditions for accelerating failure. That's right it is difficult to conduct a court investigation for security reasons and number. Two things are natural and man the factors that cause the bridge disaster. Many types of bridge collapse are a weak type support reference, decking decay, and shear loss causes birth defects, loss of shear pier, and continuous deterioration due to abnormal ability to be the result at a loss of support.

Uwe Starossek 2007 [6] states that dynamic deterioration can delivered by another tool. Next the different types of variations depend on the strength flexible reaction, energy efficiency, physical properties, over quality, and spoilage. Six types violations are registered, for example, the type of Pancake as well Zip type, and domino type. Category type,

Type of instability, and integrated type. Very high level the thought can be shaped by the flapjack type and the domino a type of separation tool known as a result phase or phase of redistribution. Classification of zipper type for much of it is caused by earthquakes. Hypothetical as well different conditions may vary for different types of divisions programs. In the event of a flapjack break it could be On closer inspection, the type of zipper may be viewed as a possible dependency. It offers more than that indications of partial fracture.

Audumber Wani1, Dr. R. S. Talikoti 2 [7] A hypothetical cable-stayed bridge with a concrete box deck has become modeled and analyzed gravity and ground forces in various cases of cable loss in SAP2000 software V17. They compared the cable loss models with the outside cable losses based on parameters such as deviation and forcing penetration strings. After losing the rope the healthy bridge goes down

a major deviation at one time. It also affects inequality power supply to the cable leading to further transmission crumble. They conclude as in progressive typology continuous wrap of the zipper type occurs on to build hinges.

Abolhassan Astaneh-Asla 2018 [8] Represent summary of how the ongoing collapse of the steel floor bridge I 35W, situation bridge before the fall. Read the inspection report of Minnesota Department of Transport, owner and the caretaker of the bridge. He also read the picture taken in the past. Fatigue and cracking developed on the first member of the bridge or a the main truss interaction caused the continuation wrap due to lack of second loading method. He learned the plans for the bridge and the same bridge model and updated in the same context in SAP 2000 software. He concluded that the gusset plate of the main truss was under the design. This happened because of incorrect design and lack of bridge maintenance.

3. CONCLUSIONS

Earthquakes are one of the most important events in your life the ongoing collapse of the bridge does not end there gravity and explosion loads. It seems to exist guidelines for the continuous collapse of a building are not available suitable for bridges due to different load transmission method, topology, and its structure to stop. A lot of work has been done locally continuous collapse of structures but response the bridge infrastructure is relatively quiet so there is a requirement for different continuous wrapping guidelines for bridges. This assists architectural engineers a

comprehensive approach to earthquake formation. While designing a bridge one should avoid one's mistake with to assess the structure and conditions of bridge requirements design and proper testing and maintenance of a bridge is needed to avoid further consequences.

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