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INTRODUCTION, REVIEW ANDCRITERIA OF BRIDGE UNDER THE DIFFERENTS TYPES OF LOADS AS PER CODE IRC: 6 – 2014

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Abstract: -*To development of any countries, states and cities, the most and prime requirement is the public transportation under the various ways. From that bridges play a vital role maybe it for railway over bridge or metro or any other kind of fly over and it became most essential structure since many decades. The design and analysis of any bridges depends lots of factors for the life span and its entire life of serviceability. The design and analysis of bridge may be deferring from one to one by the terrain, utility criteria, future development and economic justification. The loading imparts to design and analysis become prime important and from that Indian Road Congress gives such a criteria and guidance. Various literatures and case study has been studied for understanding the loading and deflection pattern. In this paper, shows the effect of different type of dead load and working load or live load in design and analysis consideration of bridge.*

Keywords: *bridge, analysis, review, dead load &water currents, live loads, components.*

I. INTRODUCTION

A bridgeis a "the elevated, enclosed plat form on a ship from which the captain &officers' direct operation. Multispan plate girder bridge deck on concrete piers. Beam bridge are simplest structural forms for bridge span supported by an abutment on pier at each end. No moment is transferred throughout the support; hence their structural type is known as simply supported. Prestress concrete is ideally suited for the construction of medium and long span bridges. Ever since the development of prestressed concrete by freyssient in early 1930. The material has found considerable application in the construction of long span bridges. Gradually restore steel which needs costly maintain due to the inherent disadvantage of corrosion under aggressive environment condition.

A. Components of bridge structure:

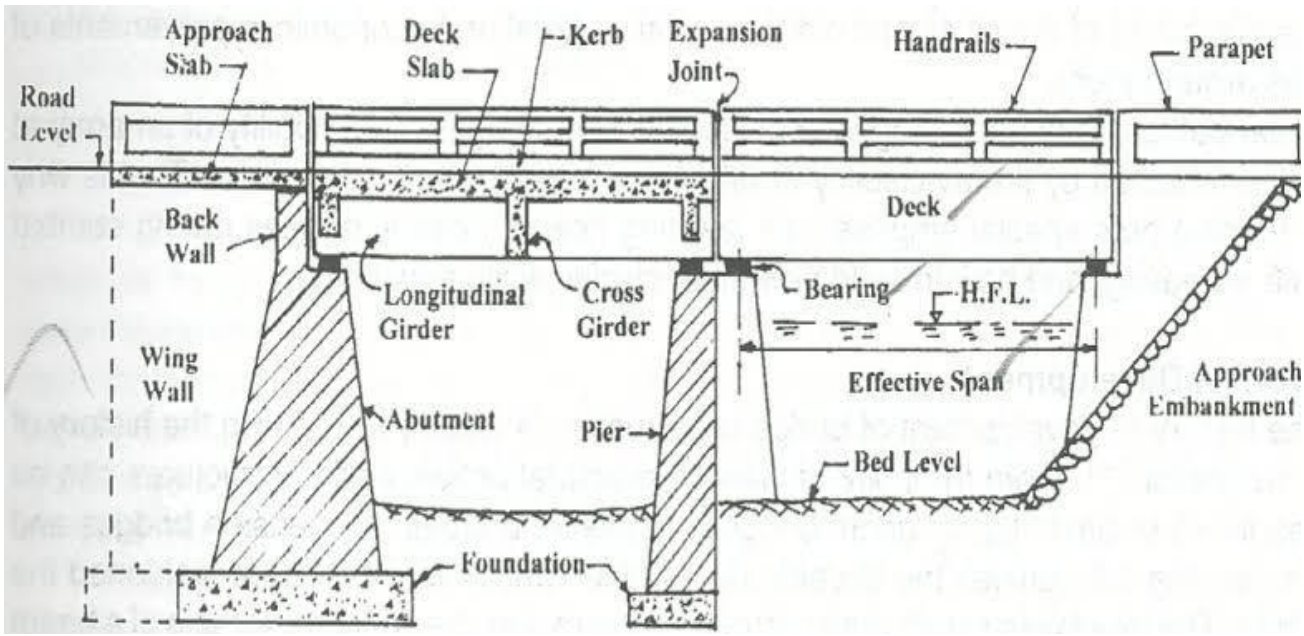
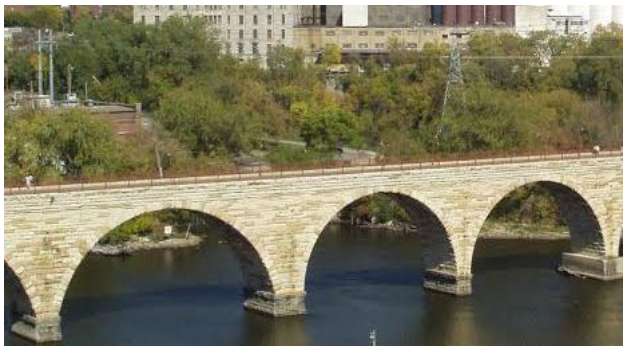
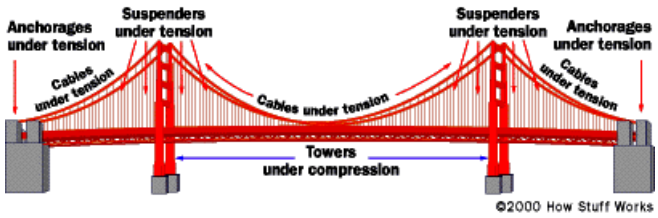
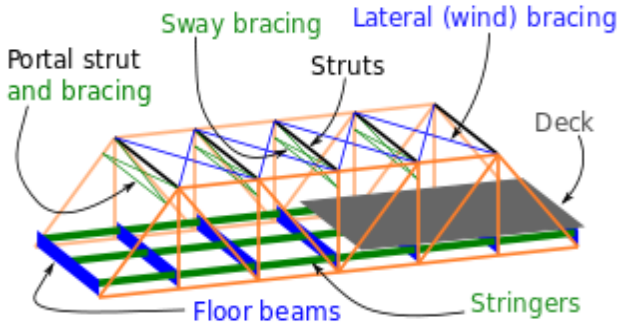


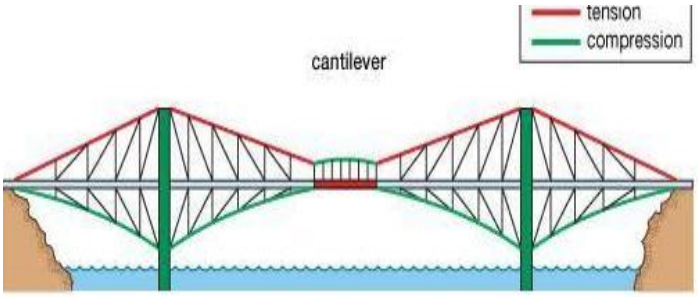
Figure 1. components of bridge

B. Types of bridge:

Bridge are made up different types of material. Materials historically used for bridge building include **rope** and other fibres, **wood, stone** and **masonry, iron, steel** and **concrete.** Fibre, **timber, stone** and **masonry** are still used occasionally, but **steel** and **concrete** are the material used for the **most Morden bridge building.**The overall topography of the site will probably determine the line of the road or railway. The bridge namely typed as:

1. Arch bridge
2. Box girder bridge
3. Suspension bridge
4. Truss bridge
5. Cable –stayed bridge
6. Rigid frame bridge
7. Cantilever bridge
8. Continuous bridge
9. Girder bridge
10. Movable bridge

Sr.no	Name of bridge	Description of bridge	Figure
1.	Arch bridge	This bridges have great natural strength. The more a arch bridgeis used, the stronger it gets. This is because the material compact closer & closer together, giving an even firmer foundation.	
2.	Box girder bridge	This is a bridge in which the main beams comprise girder in the shape of a hollow box. the box girder normally comprises either presteed concrete, structure steel or a composite of steel and reinforce concrete.	
3.	Suspension bridge	The suspension bridge is the type of bridge in which the deck is hung below suspension cables or vertical suspenders.	
4.	Truss bridge	A truss bridge is a bridge whose load bearing superstructure is composed of a truss, structure of connected elements forming triangular units. The connected elements may be stressed from tension, compression, or sometimes both in response to dynamic loads.	

5.	Cantilever bridge	This is only supported on one end for small footbridge, the cantilever may be simple beams. For large cantilever bridges, designed for road or rail traffic the cantilevers are trusses build from structure steel or box guider built from prestressed concrete.	
6.	Girder bridge	A girder bridge, in general, is a bridge that uses girders as the means of supporting the deck. A bridge consists of three parts the foundation, the super structure, and the deck.	

C. Loading on bridge

The different types of loads on (live load, dead load, imposed load, wind load etc.) forces and moments are considered in the analysis of the different component of bridge. The type and magnitude of loading has a highway loading by its nature is impossible to determine exactly, either in disposition or in magnitude. A highway bridge requires a deck on which the traffic can run and the deck must be strong enough to distribute the loading to the main girders. There are rules for multiple lane loadings,frequently assuming that not more than two lanes are fully loaded at any one time, again based on a probabilistic approach. Many authorities also specify checks for a single very heavy abnormal vehicle. In many codes, the effect of impact of highway lodes is implicitly taken in to account by the static load specification.

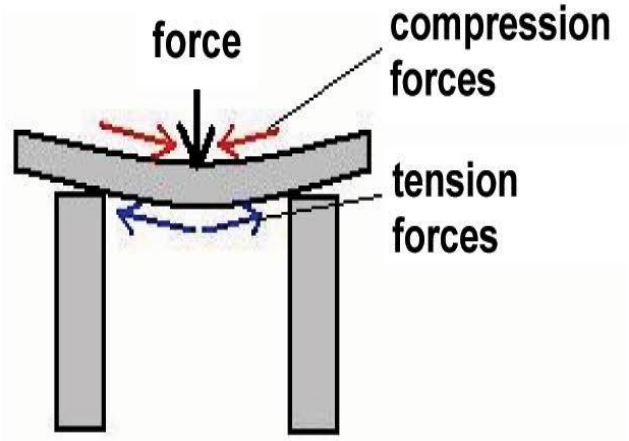


Figure 2.Shows Deadload, Live load and Reaction of point

D. Deck slab

The simplest form of bridges the single span beam or slab which is simply supported at it ends this form is widely used then the bridge crosses a minor road or small river. In such cases, the span is relatively small and multiple spans are infeasible and/or unnecessary. The simply supported bridge is relatively simple to analyse and to construct but is disadvantages by having and joints at both ends.tie cross section is often solid rectangular but can be of any of the

forms presented above. A bridge deck can be considered to behave as a beam when its length exceeds its width by such an amount that when loads cause it to bend and twist along its length, its cross section displace bodily and do not change shape. Many long pan bridges behave as a beam because the dominant load is concentric so that the direction of the cross section under eccentric loads has relatively little influence on the principle bending stresses.

II. DESIGN CRITERIA AND REVIEWS (AS PER CODES)

A. Horizontal forces due to water currents:

Any part of a road bridge which may be submerged in running water shall be designed to sustain safely the horizontal pressure due to the forces of the currents. As per the code below types of piers are constructed:

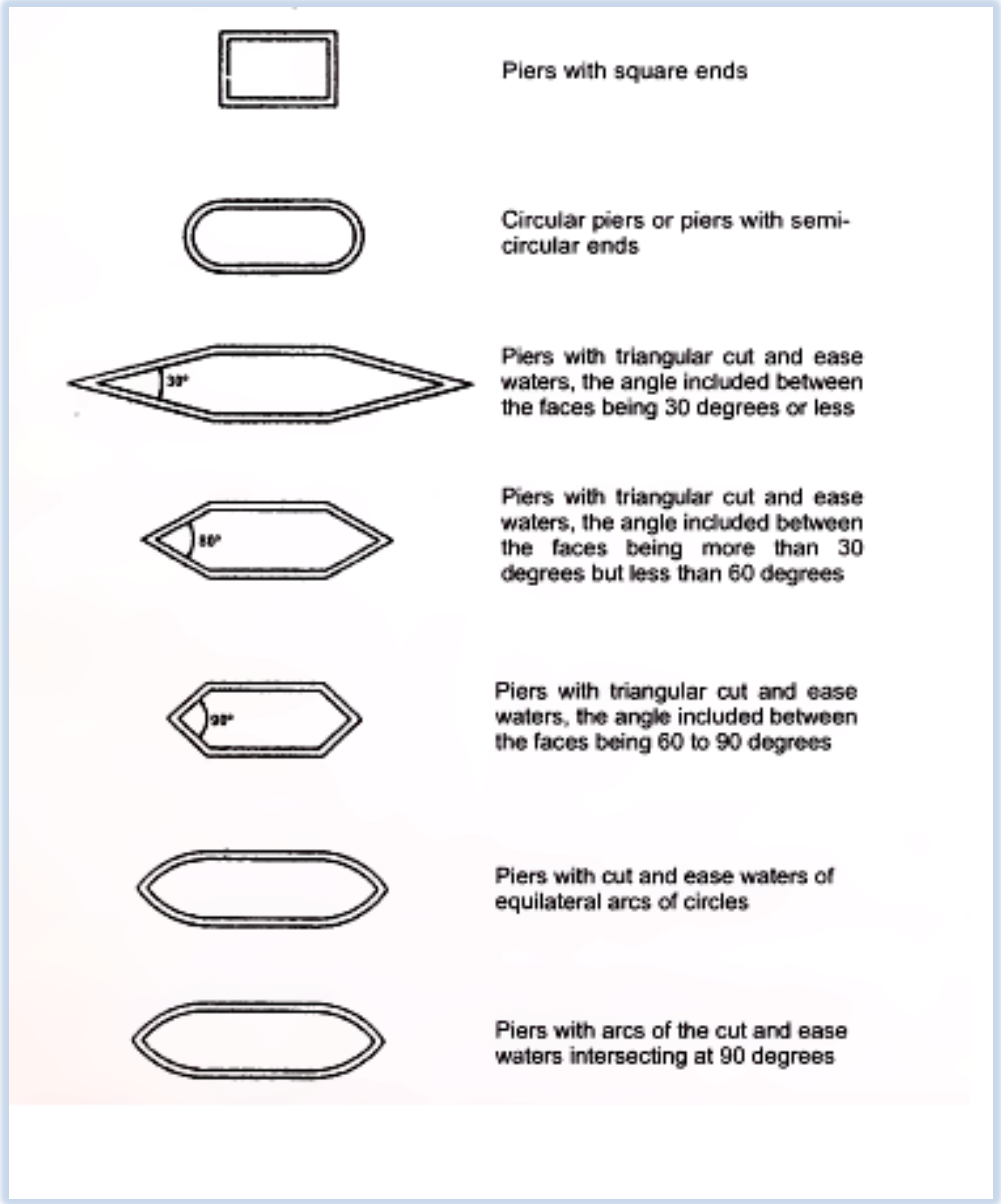


Figure 3. shapes of bridge piers

B. Dead loads:

The dead load carried by a girder or member shall consists of the portion of the weight of the superstructure (and the fixed loads carried thereon) which is supported wholly or in part by the girder or member including its own weight. The following unit weights of materials shall be used in determining loads, unless the weights have been determined by actual weighting of represented samples of the materials in question, in which case the actual weights as thus determined shall be used.

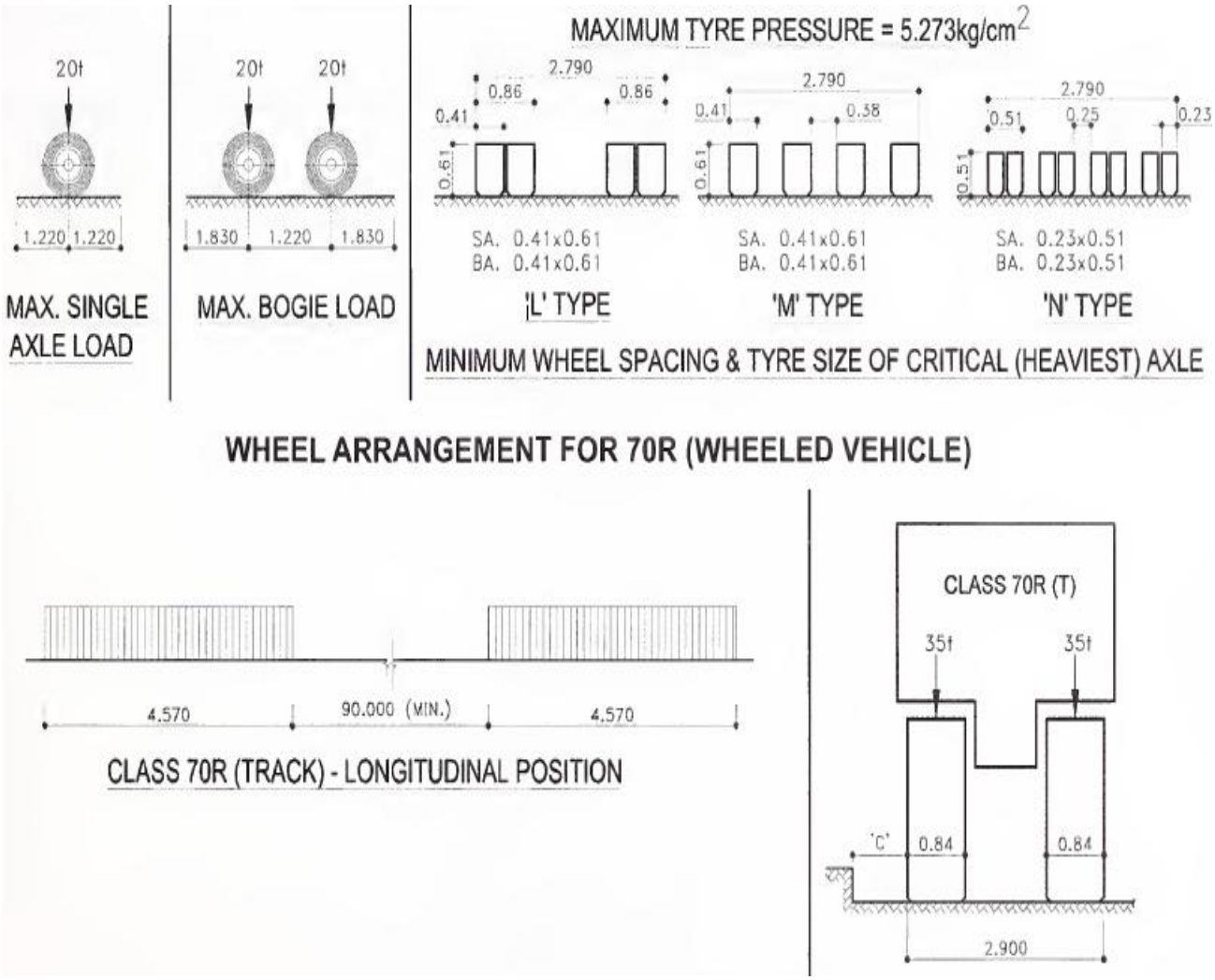


Figure no: 5 dead load acting on bridge

C. **Live loads:**

For the bridge classified under the design live load shell consist of standard wheeled or trucked vehicles or trains of vehicles as illustrated. The trailers attached to the driving unit are not be considered as detachable. Within the kerb to kerb width of the road way, the standard vehicle or train shall be assumed to travel to travel parallel travel to the length of the bridge & occupy ant position which will produce maximum stresses if the minimum clearance between a vehicle and the road way face of kerb & between two passing or crossing vehicles.

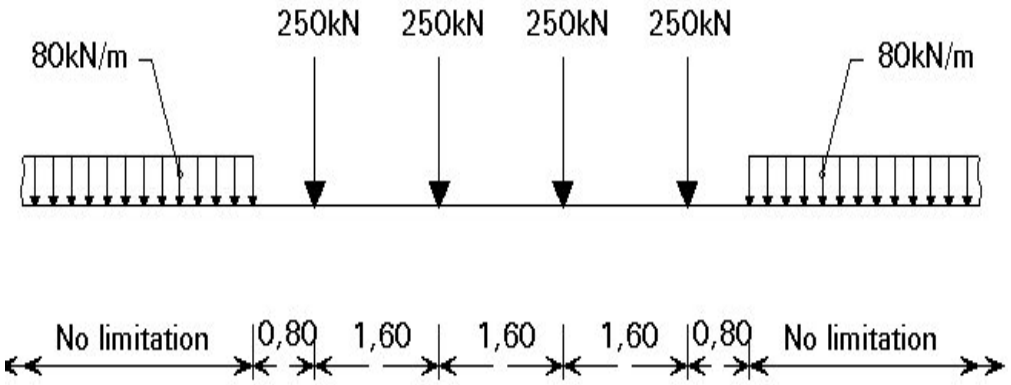


Figure6 Live load on bridge

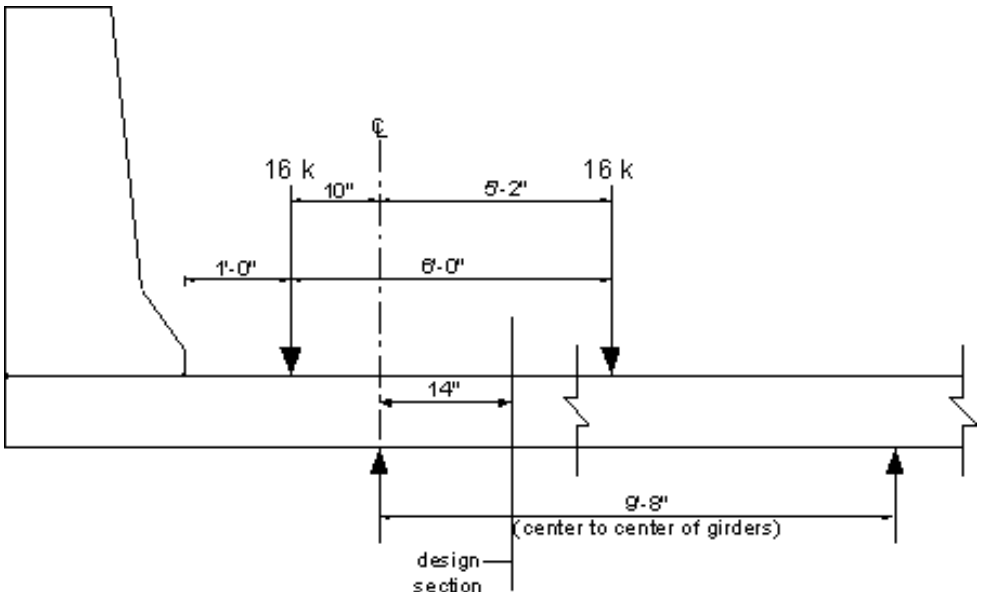


Figure 7-point load on deck slab (deck slabs)

D. **Impact load**

Another major loading on the bridge super structure is due to the vibration cause when the vehicle is moving over the bridge. This is considered through impact loading. IRC gives impact loads as a percentage of live load. As per IRC code, impact load varies with type of live loading, span length of bridge and whether it is a steel or a concrete bridge. The impact load, so evaluated, is directly added to the corresponding live load. The dynamic effect cause due to vertical oscillation and periodical shifting of the live load from one wheel to another when the locomotive is moving is known as impact load.

III. CONCLUSION

1. Live load and impact load on bridge is maximum affect then the dead load affect.
2. It is necessary to provide pre-stress girders in case of increase in length above 30m.
3. There are mainly two types of pre-stress girders which are used in practice like Pre-stress I girders and Box girder.
4. For longer span where piers are not more advice able at that time cable suspension bridge provide.
5. Cost of cable suspension bridge much more higher as compare to ordinary pre-stress bridge.
6. Wind load calculation is more important in considering when analysis of cable suspension bridge.

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