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## Analysis of Bridge Bearings and Stability

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**ABSTRACT:** A course is a machine component which supports another moving machine element. It grants a relative movement between the contact surfaces of the individuals, while conveying the heap. Orientation can be part into two gatherings: Rolling course and Sliding heading. Rolling orientation endeavor to take out erosion and sliding between surfaces in an intersection by presenting interfaces, for example, balls or rollers which pivot or come in as opposed to sliding. Examples of this sort of direction are axial ball and roller bearings. Earthquakes can create serious damage to bridges. Structures already built are vulnerable to future earthquakes. Bridges outlined before were inadequate to withstand the impact of future seismic tremor. The super structure of the bridges was lacking to withstand the impact of future seismic tremors. Course is the most powerless part in opposing quakes. Bridge course are the segments of an extension which ordinarily gives a resting surface between connect wharfs and bridge deck. Reason for bearing is to permit controlled development and in this way lessen the pressure included. Different sorts of scaffold course are considered in this paper.

**KEYWORDS:** Elastomeric Bearings, Sliding Bearing, Mechanism Rotational Bearings

### I. INTRODUCTION

Bearing as "a structural device that transmits loads while encouraging interpretation as well as turn". In the past Caltrans has utilized an assortment of orientation with differing degrees of accomplishment. These incorporate rockers, rollers, pins, pots, steel brace holders, PTFE/elastomeric, and elastomeric cushions. Of the considerable number of heading specified, the strengthened elastomeric bearing has been the most broadly utilized the previous four decades. Arrangements must be made for expansive longitudinal removals because of temperature, pre push shortening, shrinkage, crawl and seismic exercises, and in addition pivots created by changes in camber, live load. also, misalignment of bearing seats because of development resilience. In avoid, Designers require a choice of bearing kinds to deal with changing requests.

Bearing harm has turned into an extraordinary concern as of late. The direction, which can be harmed by either the latency powers of superstructures under seismic excitations or the beating powers between the contiguous superstructures, give off an impression of being the weakest connection in basic protection from seismic burdens. . The possibility of whole bridge system collapse will be higher when the bearing is damaged. Thusly, to evaluate the seismic conduct of an extension framework in a more reasonable manner, a scaffold show considering the bearing harm and other affecting parts, for example, the beating impact ought to be created.

### II. LITERATURE REVIEW

**Huang Junjie, Su Qian, Zhang Licai, Li Yujie and Liu Bao , (Aug.- 2013)** represent in their paper that the bearing is the critical part that interfaces the superstructure and substructure of extension, in which infections happen influences the running wellbeing. In this paper, take the ailments of the shaking pivot orientation of railroad prestressed solid T-pillar connect as the support, the exceptional gear of sponsorship plate of the bearing base plate is delivered by one's own particular ace advancement. The specialized plan of correction and inspire of the bearing amid keeping up bay window of the working line is investigated. Fast treatment procedure of slanted bearing and track anomaly caused by

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settlement of the scaffold establishment is proposed. The exploration can be utilized for reference for comparable bearing illnesses direction ventures.

**Jie Wang, Jian Xin Liu** ,(Oct. – 2012) represent in their paper that plate compose elastomeric cushion bearing is the most ordinarily utilized as a part of expressway connect orientation. In the seismic outline of scaffolds, the level unbending nature of the bearing is an essential count parameters. The particular estimations of every parameter in the equation are not clear, and it can not give an unmistakable calculation measure, despite the fact that the recipe of level unbending nature is given in the determination. Against Series direction in plate compose elastomeric cushion bearing for Highway Bridge (JT/T4-2004), the People's Republic of China Communications Industry Standard, the basic parameters of the bearing are deliberately presented, including the shape factor, the bearing thickness, the thickness of the single-layer elastic and the aggregate thickness of elastic layer. The philosophy and point by point ventures of the bearing level unbending nature are then broke down and abridged by the equations above.

Finally a few cases of the diverse sort of course are given. Some reference are Provided for the estimation of the solidness as often as possible of plate write elastomeric cushion bearing which are oftentimes utilized for parkway spans.

### III. FUNCTION OF BRIDGE BEARINGS

Bearing determination is impacted by numerous components, for example, loads, geometry, support, accessible leeway, dislodging, revolution, diversion, accessibility, approach, fashioner inclination, development resiliencies and cost. . Until the middle of this 20th century, the bridge bearings used consist of following types only:

- Pin
- Roller & Rocker
- Metal sliding bearings

Bearings are components exchanging vertical burdens from Superstructure to Substructure, however permitting over the top revolution & displacement of superstructure thus avoiding large superstructure, forces to be transferred to substructure & foundation. Bearings are critical elements within overall bridge systems.

### IV. TYPES OF MODERN BRIDGE BEARINGS

**Elastomeric Bearings-** Plain Elastomeric Pads, Laminated Elastomeric Bearings.

**Sliding Bearing Mechanism-** PTFE Sliding Material, Alternative Sliding Materials (ULTRA HIGHMOLECULARWEIGHT POLY ETHYLENE) .... Patented materials like MSM, ROBO Slide.

**High Load Multi** □ Rotational Bearings- Pot Bearings, Disc Bearings, Spherical Bearings

**Fabricated Steel Mechanical Bearings-** Rocker Bearings, Rocker cum Roller Bearings

1. The mostly used structural bearings are reinforced elastomeric bearings and pot bearings (90%).
2. Spherical bearings are the best solution for large rotations.
3. Elastomeric, pot and spherical bearings can be fixed, guided or free depending on design requirements.

### V. REINFORCED ELASTOMERIC BEARING PADS

Reinforced elastomeric bearing pads, designed in accordance with Bridge Design Specifications, Should be considered the preferred type of bearing for all structures. The typical hinge or abutment configuration using many small elastomeric bearing pads has proved highly reliable and redundant. In addition, these bearings are extremely forgiving of loads and translations exceeding those considered in design.

### VI. SLIDING CONTACT BEARINGS

Bearings are machine elements which are used to support a rotating member viz., a shaft. They transmit the heap from a turning part to a stationary part known as edge or lodging. They allow relative movement of two individuals in maybe a couple bearings with least erosion, and furthermore keep the movement toward the connected load.

The direction are grouped extensively into two classes in light of the sort of contact they have between the turning and the stationary part

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- a. Sliding contact
- b. Moving contact

The sliding contact heading having surface contact and are going under lower kinematic match.

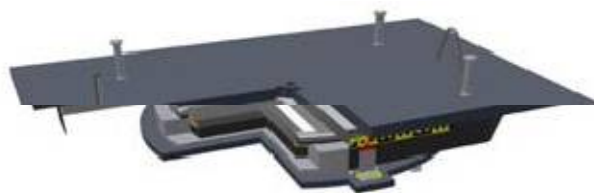
## VII. FIGURES



**Fig. Elastomeric Bearings**



**Fig. Steel Roller Bearings**



**Fig. (PTFE Sliding) Pot**

## VIII. CONCLUSION

This paper focus on importance of bearing and details about the types of bearing. We have studied mainly four types of bearing as they are having unique characteristics and applications in mechanical field. Thrust bearing is not in common use, but it is very useful mainly in heavy duty applications. The settled and portable heading set in an average multi traverse essentially upheld extension may get harmed because of over the top seismic powers transmitted from the superstructures amid seismic excitations. The seismic reactions of the scaffold are researched to inspect the impacts of the conceivable bearing harm, and the followings conclusions are drawn.

The examination device created in this investigation is observed to be suitable to assess the seismic reactions of a multi-traverse basically upheld connect with thought of bearing harm and different marvels engaged with sensible seismic practices. These directions are more effective in decreasing the powers and minutes on the bridge. They are also effective in reducing the deck displacement.

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