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Study and Importance of Fencing Guardrail for High Ways

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Abstract— *Guardrail, fixed to lessen the sternness of run-off-road clash, is the most frequent traffic security system found on California State Highways. Guardrail may forward a sinful vehicle and disperse force from the collision in some, but not for all cases depending on the series of events throughout the conflict. Even though guardrail is itself a permanent object, it may lessen conflict sternness in situations where it is firm that remarkable the guardrail is less severe than striking fixed objects or slopes behind the guardrail. The road traffic safety (RTS) management system is focal point on serious injury and death due to road mishap and always tries to reduce. Many methodology and technology is developing to reduce accidental effect on human body as well as vehicle. The aim of paper is to study the importance and functions of the Guardrail.*

Keywords—Fencing guardrail, highway, accident, safety, collisions.

I. INTRODUCTION

In traffic engineering, highway guardrail may avoid a delinquent vehicle from impacting roadside obstacles which may be either man-made (sign structures, culvert inlets, utility poles) or natural (trees, rock croppings), running off the road and going behind a steep embankment, or veering off the roadway into approaching traffic. Roadside obstacles are usually referred to as predetermined objects. A secondary objective is keeping the vehicle upright while deflected along the guardrail. The most regular type of guardrail in use today is the Blocked-Out W-beam (Strong Post). Strong-post W-beam guardrail consists of wood posts and wood blockouts or steel posts with wood or plastic blockouts or composite material posts. The wood or plastic blockouts lessen or decrease a vehicle snagging on the posts upon collision. In addition, a blockout may be used to enhance the offset of guardrail with an obstacle such as a curb. The posts' main function is to uphold the height of the guardrail during the initial stages of post deflection.

II. IMPORTANCE OF GUARDRAIL

Transportation engineers limit the quantity of guardrail placed as much as feasible, as guardrails should only be positioned when the roadside conditions create a greater threat than the guardrail itself. In addition to new investigate into end treatments, public awareness among both drivers and engineers has been gradually reducing injuries and fatalities due to guardrails.

Maintaining guardrail height also reduces the potential for a vehicle to vault over the guardrail upon initial impact. The posts also play a role in the amount of conflict and deflection a guardrail may incident during collision. Confrontation in a strong post system results from a combination of tensile and flexural stiffness of the rail and the bending and shearing resistance of the posts. One of the most important concerns with strong-post W-beam guardrail has been the capability of the system to control and redirect modern vehicles that have a higher center of gravity along with the increased weight of those vehicles.

FUNCTIONS AND ADVANTAGES OF GUARDRAIL

In most cases guardrail would not be able to withstand the shock of a vehicle just by the force of the individual posts in the area hit by the vehicle. Guardrail functions as a system with the guardrail, posts, link of rail to the posts and to each other, and the end anchors (or terminals) all playing an integral role in how the guardrail will purpose upon impact. Soil conditions, height of rail, existence of curb or dike, heaviness of impacting vehicle, space from back of post to hinge point and depth of post within soil can all determine how well the system will function upon impact. Guardrail is efficiently one strong band that transfers the energy of the vehicle to the rail elements, posts, and end terminals or anchors A run of guardrail must be anchored at each terminating end either by transitioning the rail into a fixed anchor such as a bridge rail or with an end terminal or end anchor placed in the ground or within an embankment. Newer concrete barriers, while usually tough enough to withstand direct hits by cars, still work on a similar standard in deflecting heavier vehicles such as trucks.

Guardrail is projected to deflect. The quantity of deflection is dependent on a number of factors some of which consist of type and weight of impacting vehicle, height the guardrail is placed, type of soil the posts may be embedded within, length of embedment of the posts, and distance of the hinge point to the face of guardrail are just a few. A guardrail that deflects considerably can causes pocketing

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which has the potential to snag a vehicle which may cause it to flip or roll, or cause the rail to fail allowing a vehicle to go through the guardrail.

Absorption is when the energy of impact is directly transferred between the vehicle and guardrail, which may cause the end to puncture the vehicle. This is most common where a "whale tail" or blunt end treatment exists. To mitigate this a number of guiderail end treatments exist such as "Extruder end treatments", "eccentric loaders" and "Driveway wrap treatments" which result in blunt ends rarely being left exposed in modern installations.

COMPOSITE MATERIAL

The composite material prepared from composed of at least two or more than two element. Which mixed together to create new material have unusual property approach through element improving the composite material property. Most composites mingle of fiber reinforcement material with matrix material add to increase the strength as well as stiffness. The reinforcement is basically fiber and matrix is liquid. Combine together made solid structure

TYPES OF GUARDRAILS

The approved types of guardrail are metal beam, concrete and cable.

Metal Beam Guardrail is typical for embankment and fixed object shielding. It is made up of "W" shaped metal beam rail elements mounted on wood or plastic blocks fastened to a wood or galvanized steel posts.

All metal/composite material wood posts and blocks for guardrail are force treated to resist decay. Line posts shall not be installed in structural pavements that would restrict movement of the posts during impact. Only one type of post, either wood or steel, should be used in a run of guardrail. Vegetation control should be considered for use around guardrail. Details for vegetation control beneath guardrail are in the Standard Plans.

Concrete Barrier is generally harm resistant and can be used in place of metal beam guardrail to decrease maintenance worker exposure..

GUARDRAIL INSTALLATION CRITERIA

When making an allowance for setting up of guardrail at an embankment or a fixed object the following criteria, although not an all inclusive list, may be used as a guide:

1. *Collision History*: Based upon the run-off-road collision record, statistical experience or analysis can be used to forecast if guardrail is a potential solution to reducing the sternness of a impact at a particular roadway segment.
2. *Roadway Alignment*: Remote curves on relatively straight roadway alignment may enlarge the risk of running off road. Also, on roads with curving alignment, curves that are Sharper than expected may increase the probability for run-off-road collisions.
3. Operating Conditions: The location's traffic characteristics can also affect the potential for a vehicle to depart the traveled way:
   a. Volume: The higher the volume of traffic, the better the potential for run-off-road collisions.
   b. Speed of Traffic: Higher operating speed can amplify the potential for run-off-road impact, and will influence the distance that a vehicle will cross before the driver can regain control or bring the vehicle to a stop.
   c. Merge and Weave Areas: The potential for run-off-road or lane departure collisions may increase in the locality of ramp merge and diverge areas, especially those without auxiliary lanes where stopped or slowing traffic can cause abrupt lane changing and collision avoidance maneuvers.
4. Climate Conditions: Frequent dense fog, rain, or snow and ice conditions increase the risk of run-off-road collisions.
5. *Roadside* Recovery Area: The risk of a run- off-road vehicle colliding with an embankment or a fixed object is greater as the recovery area decreases.

The highway facility type, whether a freeway, expressway, or a conventional highway, has an impact on the analysis for installing guardrail due to the differing characteristics of these facilities.

GUARDRAIL AT EMBANKMENT SLOPES

Installing guardrail to shield embankment slopes is largely a result of analyzing the above criteria on a case by case basis and determining whether a vehicle hitting guardrail is more severe than going over an embankment slope. The line in Figure 7-1 represents collisions at combinations of embankment height and slope that resulted in severities generally equal to the severity of an average guardrail collision to install or not to install guardrail and the type of end treatment at an embankment slope, and the consent must be documented in the project files.

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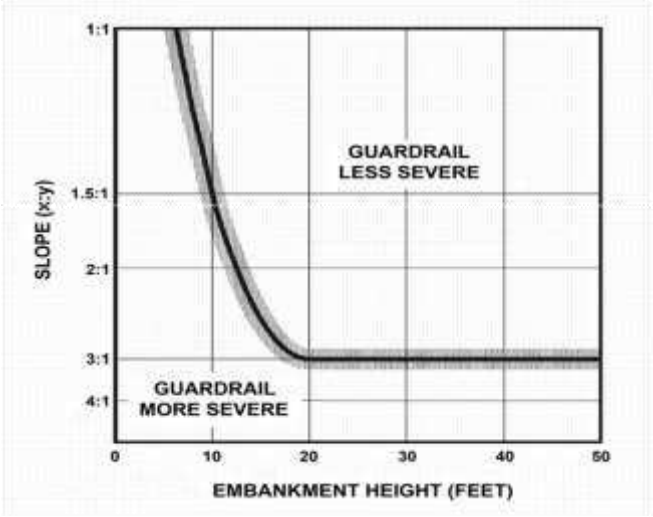

Fig.1: Equal Severity Curve

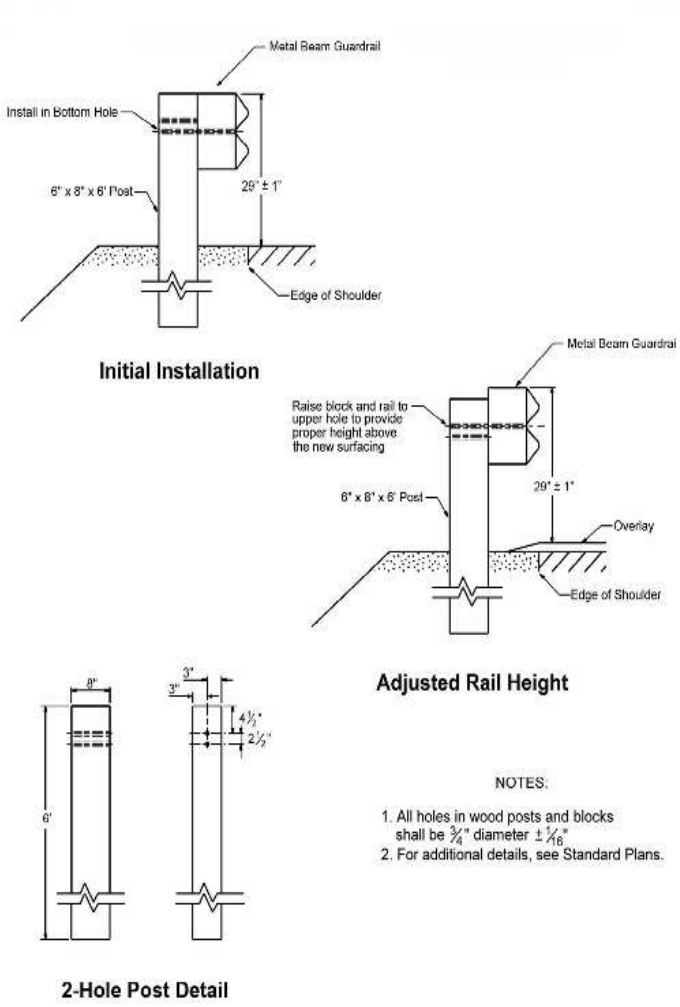

Fig.2: W-Beam Semi-Rigid Barriers

Fig.3: Flexible cable barriers

III. CONCLUSIONS

Every day several human are death or injuries in road accident cases. Most of the accident, vehicle are hit the road divider and damage the vehicle as well as itself. When the human is fall on road divider possible maximum injuries, in this condition it is provided the composite guard rail it's have good inflexibility and stiffness properties. The composite road guardrail is absorbing the shock and slowly relies; this is the attractive properties to selection for road divider. The composite road divider is design three types with rubber pad, without rubber pad, with composite guardrail. This composite guardrail is compare with concrete guard rail and found that the composite guard rail reduces maximum impact force. In that cases if we use the composite guardrail the injuries chances will be reduce.

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