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# "DESIGN AND ANALYSIS ON HIGHWAY GUARDRAIL FAILURE ANALYSIS"

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## ABSTRACT

***Computer simulation is the most versatile approach for investigating a wide range of possible impact scenarios (e.g., vehicle type, guardrail type, and impact conditions). Computer simulation can also be very useful for determining the precise effects of a crash with a barrier on a vehicle's performance. Experiments and finite element analysis (FEA) are two methods that were considered for use in this study. In an experiment, a static test is performed to validate the model of the W-beam rail section, and the FEA model is used to model different crash scenarios.. In this chapter, the methodology used to assess the performance of guardrail systems in this study is presented here C Channel, cut C section 200 cut C channel used for post and spacer for guardrail design so in this study C- section channel is best compared to exiting model.***

***Keyword***: *FRP, C Channel, Cut C section , 200 cut section*

## I. INTRODUCTION

Indians are among the most versatile individuals on the planet. Insights show that 74% of residents matured 40 years or more seasoned own an engine vehicle and voyaged a normal of 16,000 kilometers on India's streets during the year 2004, Transport India. The quantity of authorized drivers hopped from 17.1 million of every 1988 to over 22.5 million out of 2005, Transport India. This degree of versatility accompanies a cost. Truth be told, Statistics India shows that the quantity of mishaps, however diminished during the last decade, actually stays high as delineated in Table 1.1. The quantity of fatalities diminished from 4154 of every 1988 to 2767 out of 2007 while the quantity of genuine mishaps diminished from 28031 out of 1988 to 13723 out of 2007. The expense of the revealed mishaps in 2004 was around $63 billion Vodden et al., (2007). On account of the passings and wounds, car accidents keep on being the significant transportation security issue in India and stay one of the main supporters of long stretches of lost life among Indians, to a great extent because of passings among youngsters, Transport India. In the United States, Baker and Krueger (1992) revealed that in 1985 engine vehicle mishap wounds cost $49 billion dollars in clinic spending, treatment and circuitous expenses. The vehicles are exposed to various types of crash: full front, back sway, side effect, back rakish effect, rollover and so forth Mishaps can occur in the city, at low velocities, or on the expressways at higher rates. To further develop the vehicle execution and diminish the engine vehicle wounds and fatalities, government associations issue guidelines and wellbeing principles. The decrease of wounds can be accomplished either by upgrading the traffic guideline or by executing more dynamic security highlights or by further developing latent wellbeing execution of the vehicle. In India, the Ministry of Transportation is the authority substance that directs vehicle security. The Transportation Development Center (TDC) is Transport India's focal innovative work branch, under the Policy Group's Transportation Technology and Innovation directorate.

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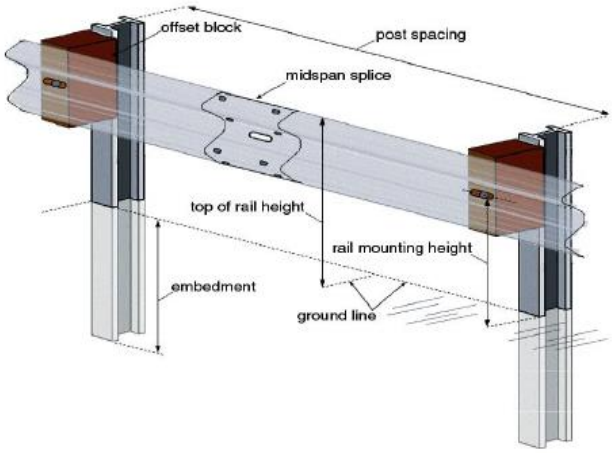


Figure 1 Use of midspan splices and offset blocks in a MGS (Ochoa, C & Ochoa, T, 2011)

## II. LITERATURE REVIEW

**Olegas Prentkovskis et al,[1]** in their work 'An investigation of the redirections of metal street guardrail components, 2009' has examines Statistical information on auto collisions in 2008 in Lithuania. Metal guardrails, comprising of Σ-shape metal posts and a defensive W-shape even shaft, are generally famous. The creators inspected the disfigurement cycles of the components of the previously mentioned guardrail. They have additionally assessed flexible distortions, just as the impact of soil on the covered post part of the guardrail. In view of the created numerical model of metal street guardrail, the diversions of its components brought about by the effect of a vehicle moving at different not set in stone. The got upsides of avoidances of guardrail components (a defensive W-shape level shaft and a Σ-shape post) introduced in paper don't surpass the permissible upsides (of bar diversions). The model created might be altered to utilize it for the examination of distortion cycles of shaft framework's designs in transport foundation (for example light posts, traffic-signals and street signs).

**D.A.F. Bayton et al [2]** in his work "Investigation of a security boundary association joint post-testing (Elsevier, 2007)" inspect the impact of a full effect vehicle crash test on the joint material and the mechanical latches that structure part of the wellbeing obstruction pillar to radiate association joint The outcomes show changes in the wellbeing hindrance bar material microstructure in the space of the opened openings where the mechanical clasp were exposed to shear stacks because of strain powers in the security obstruction shaft. Extra data is introduced to exhibit that adjustments of the material microstructure have not been brought about by cool work disfigurement supported in the assembling cycle. Further testing utilizing various materials, diverse space profiles and distinctive breadth bolts would decide their commitment to joint execution. They might even upgrade the hindrance execution as far as decreasing joint slip and obstruction avoidance or in fact they might have little impact on in general framework execution.

**M. Borovinsek et al [3]** in their work "Reenactment of crash tests for high regulation degrees of street wellbeing hindrances (Elsevier,2007)" presents the aftereffects of programmatic experiences of street security obstruction conduct under vehicle crash conditions for high control levels as commanded by the European standard EN 1317. An excellent understanding of reenactment and genuine accident tests results was noticed, which thus legitimizes the utilization of programmatic experiences during the time spent turn of events and affirmation of street wellbeing obstructions. In spite of the more prominent affectability of speed increases to not completely obliged test boundaries, the aftereffects of the reproduction and of the test contrast inside worthy ±10% edge. In any case, utilizing parametric programmatic experiences the best boundary plan for anticipated examination boundaries not really settled with sensible exactness.

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## III. PROBLEM FORMULATION

This failure could be due to many reasons, including poor design flaws, defective installation, and improper maintenance. The bearing plate, nuts, washers, and anchor bracket are rarely damaged.

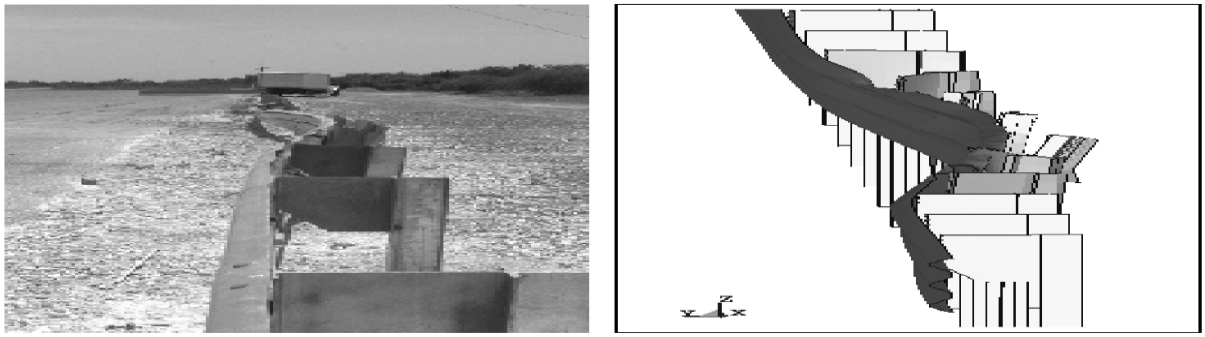


Figure.3.1 Highway guardrail (a)

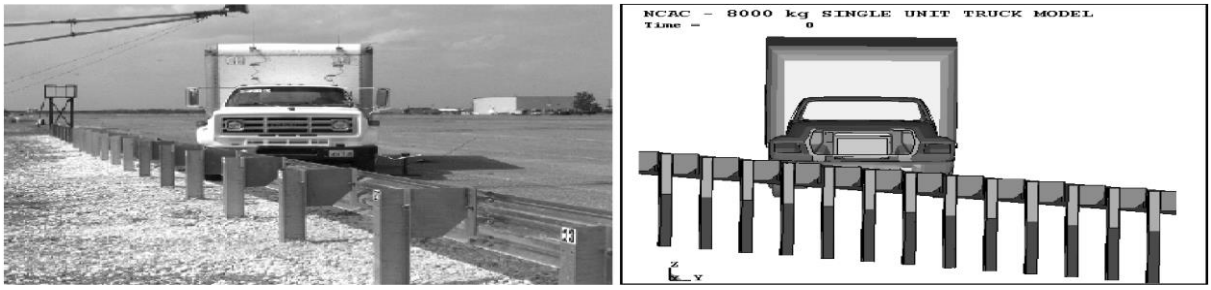
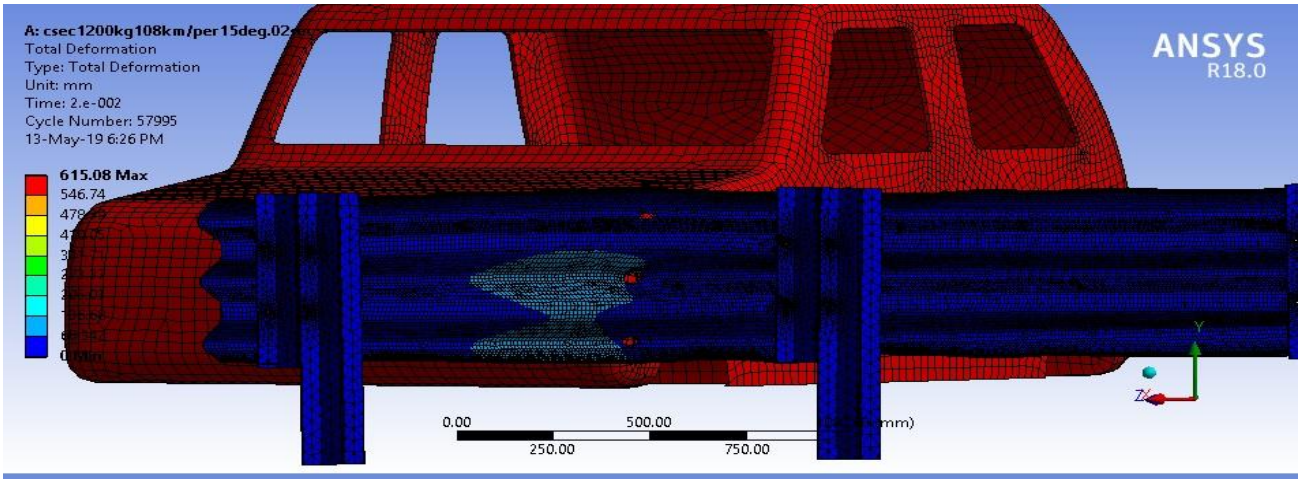



Figure.3.2 Highway guardrail (b

## IV. NEED

Across the country, there are numerous dangerous roads that don't have the guardrails installed to prevent serious accidents from occurring. These roads may have a high risk for a head-on collision, rollover accidents, sliding off of steep roads with little shoulder, or careening off the road and into trees. When city, county, or state departments try and cut costs, they may fail to install guardrails on roads that desperately need them. When this occurs, they may be held accountable for any serious accidents that occurred on that road.

## V. RESULT



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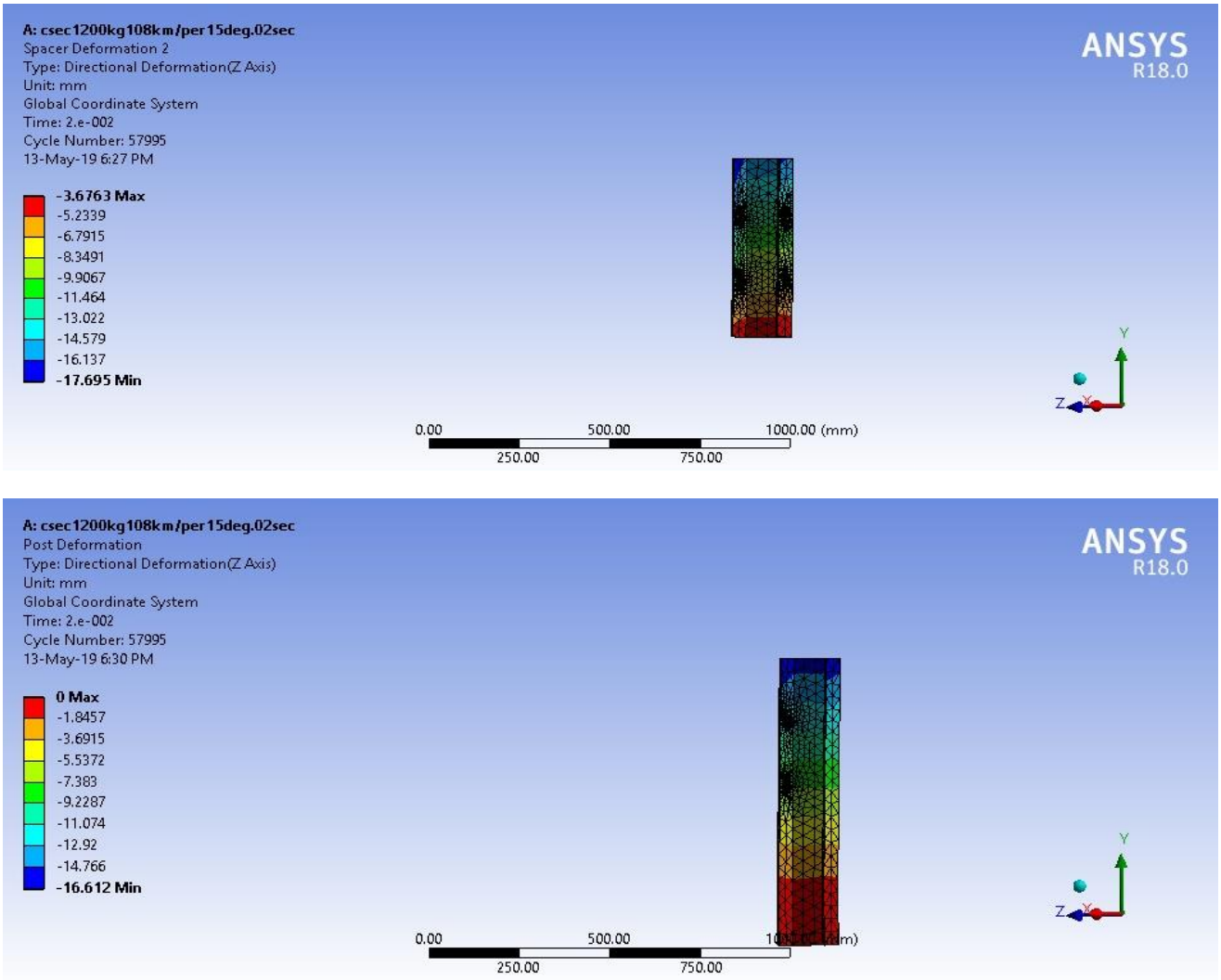


Figure 5.1 Simulation Results

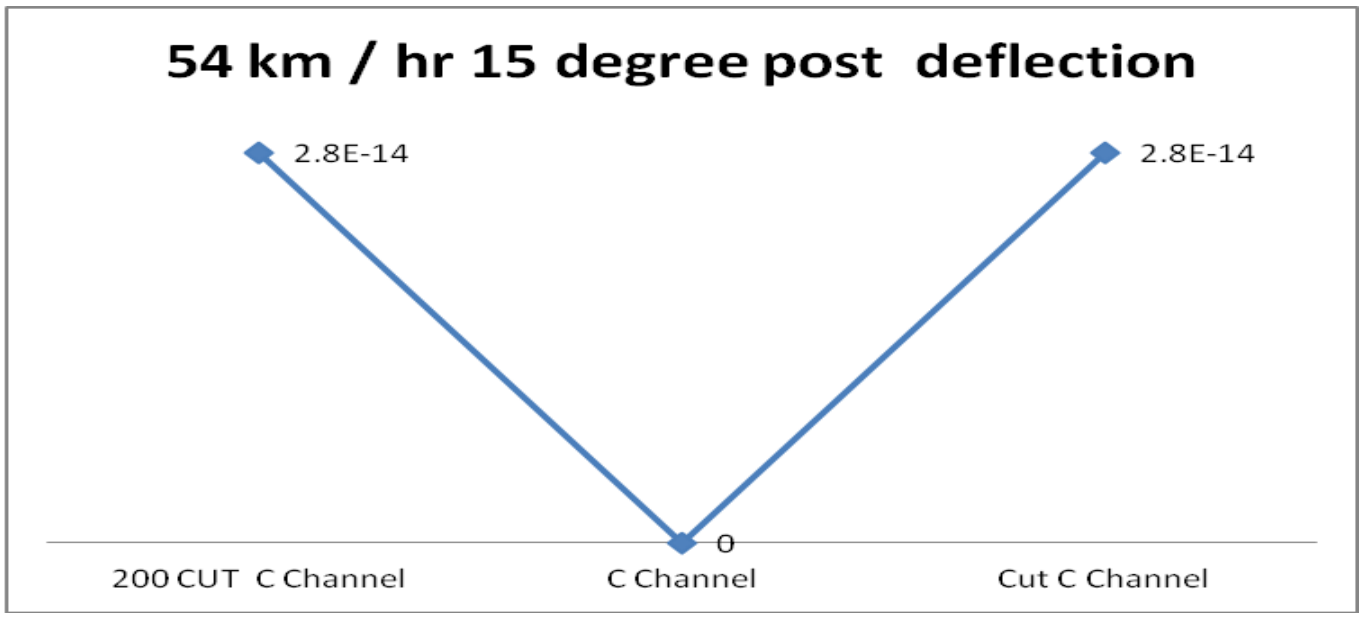


Figure 5.2 54 km/hr 15 degree post deflection graph

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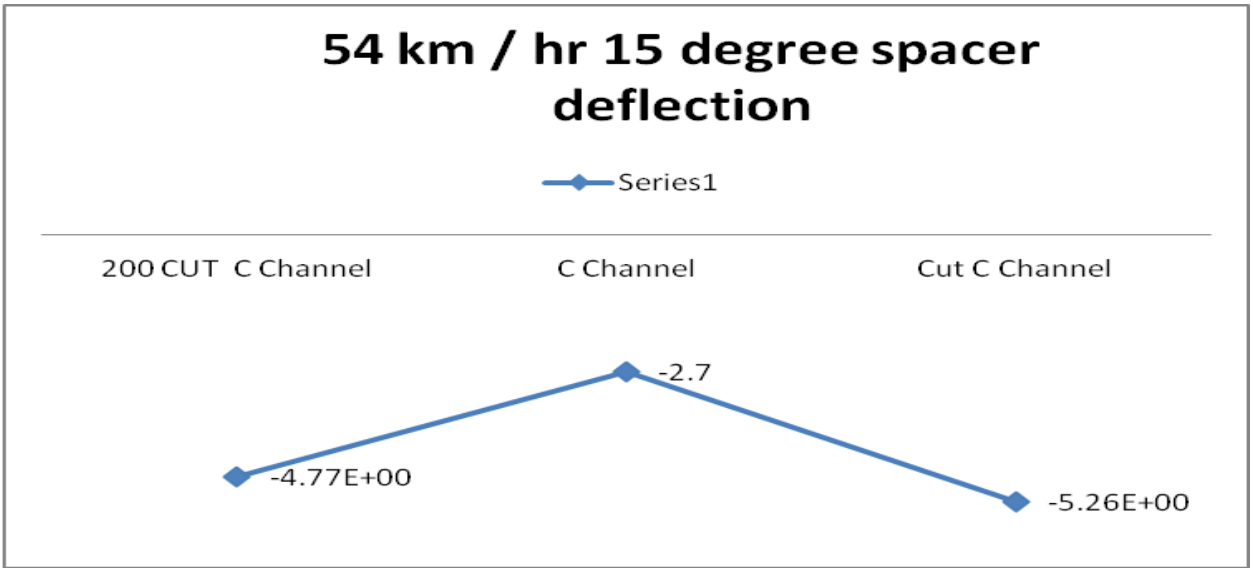


Figure 5.3 54 km/hr 15 degree spacer deflection graph

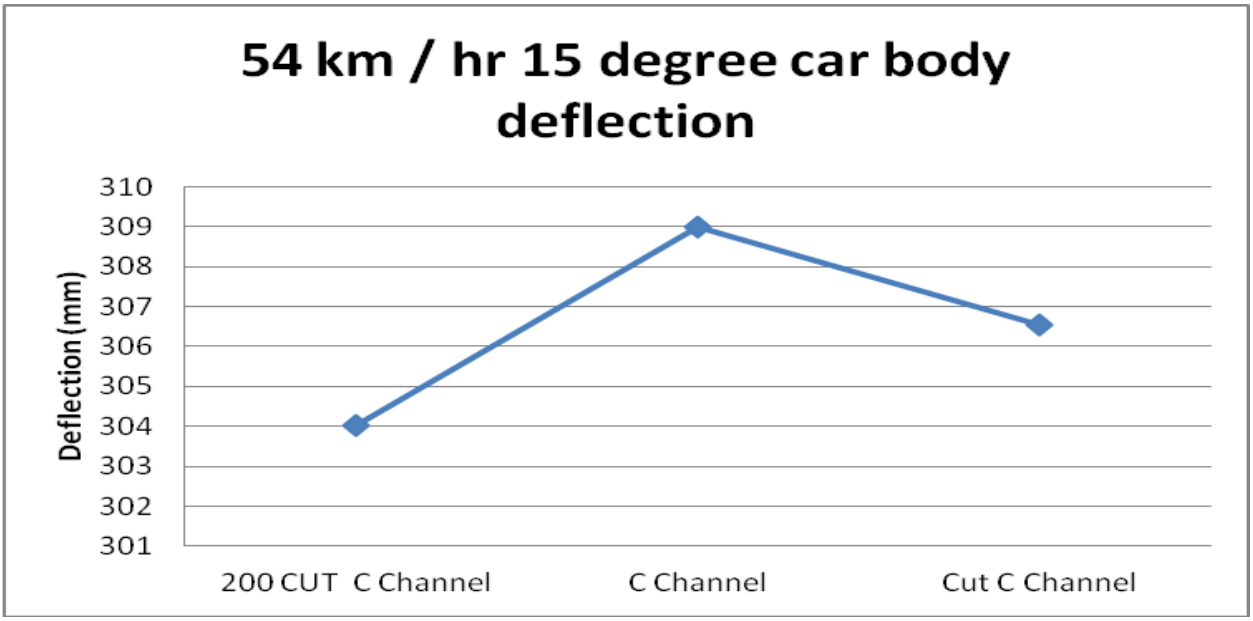


Figure 5.4 54 km/hr 15 degree car body deflection graph

## VI. CONCLUSION

This chapter discusses the methods of analysis that are used in this study, including modelling the G4(2W) guardrail system, performing the dynamic tests and validating the FEM model. Computer simulation is the most versatile approach for investigating a wide range of possible impact scenarios (e.g., vehicle type, guardrail type, and impact conditions). Computer simulation can also be very useful for determining the precise effects of a crash with a barrier on a vehicle's performance. Experiments and finite element analysis (FEA) are two methods that were considered for use in this study. In an experiment, a static test is performed to validate the model of the W-beam rail section, and the FEA model is used to model different crash scenarios. FEA has been used in several studies involving the impacts of vehicles with roadside safety hardware and has proven to be very effective. In this chapter, the methodology used to assess the performance of guardrail systems in this study is presented here C Channel, cut C section 200 cut C channel used for post and spacer for guardrail design so in this study c-section channel is best compared to exiting model.

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