Road system of developing nation has an outstanding part to play for nation’s economy and development. Transportation through road systems fulfills the essential needs of users. Many lives are lost and tremendous measure of property harm happens due to mishaps. This paper is an endeavour to break down the activity wellbeing circumstance H B Town SQUARE to Jersey Milk Processing Plant on Bhandara road in Nagpur of National Highway 53 and Asian Highway 46, India recognition of countermeasures is done for extends in which the aggregate damage brought about by accidents can be significantly and promptly diminished. After conducting Road Safety Audit, it was found that trucks are halted on freeway which diminishes the successful width of carriageway and making movement dangers to quick moving activity. Unapproved median openings were discovered which ought to be quickly closed. Missing road and middle markings to be done and speed signs should organize with speed. Service streets are inadequate which requires quick change. The Vulnerable Road User (VRU) i.e. people on foot and cyclists offices close home are missing and should be encouraged on need. The required recommendation was given for improvements in quality consider coordinates of entire study area to be implemented in future.

Keywords: Road Safety Audit, Safety Analysis, Traffic safety, Road accidents, Safety Program

I. INTRODUCTION

Roads are fundamental piece of the vehicle framework and Roads are key for driving in day by day life. A nation's street system ought to be effective so as to boost financial and social advantages. They assume a huge part in accomplishing improvement and adding to the general execution and social working of the group. Presently a day, because of quick life vehicles and steady street width are expanding quickly, they changing condition situation, the mishance are expanding quickly step by step. Street wellbeing is a fundamental worry to lessen street mishance. A Road wellbeing measure keeps the mishaps to a base. Street wellbeing can be expanded by giving security measures, for example, activity quieting gadgets; movement signs, signs, and markings; road lighting; spans, ducts, over extensions and underpasses; discard along the roadway; legitimate geometric outlines of an area; stopping directions; evacuating sight checks in the roadways; and so on. Giving a protected driving condition is without a doubt a duty, as well as the most noteworthy need for all street ventures.

A Road Traffic Accident (RTA) can be characterized as, 'An occasion that happens on a way or road open to open movement; bringing about at least one people being harmed or executed, where no less than one moving vehicle is included. In this way RTA is an impact between vehicles; amongst vehicles and people on foot; amongst vehicles and creatures; or amongst vehicles and topographical or structural hindrances.' Road car crashes are a human catastrophe. They include high human enduring and financial expenses as far as unexpected losses, wounds, loss of profitability, et cetera.

In India, 15 individuals bite the dust and 60 are genuinely harmed or incapacitated each hour in street mishaps. Consistently more than 1.17 million individuals kick the bucket in street mishaps around the globe. The predominant part of these passings, around 70 percent happen in creating nations. Sixty-five percent of passings include people on foot and 35 percent of walker passings are kids. More than 10 million are disabled or harmed every year. It has been assessed that no less than 6 million more beyond words 60 million will be harmed amid the following 10 years in creating nations unless pressing move is made.

The street mischances passings and wounds are worldwide marvels yet more disjoin circumstance in blended activity condition as overarching on Indian multilane roadways. Idea of value administration and practical wellbeing has made strides in the previous twenty years and might have been among the variables that drove policymakers and venture supervisors to understand the requirement for absolutely security arranged instruments. One of the best instruments for development of street security is Road Safety Audit (RSA) which specialists endeavour to recognize possibly risky components on the parkway condition and propose healing measures. Road Safety Audit can be characterized as a precise approach for assessment of existing or new streets by an autonomous review group at the phases of arranging, plan, development, operation and upkeep to accomplish mishance free streets and to upgrade general wellbeing execution.

Road Safety Audit (RSA) was started in Great Britain (1980) is directly spread in a few countries around the world. The RSA system set up in UK spread to USA, New Zealand, Australia, Denmark, Canada, Malaysia, China, Japan and Singapore and now it is used as a model in various countries for the meaning of principles and orchestrating of their main streets. It is at various periods of execution in developing nations like India, Africa, Thailand, Egypt, South Pakistan and Bangladesh.
II. LITERATURE REVIEW

Dr. S. S. Jain et al. examined street wellbeing for four lane national highways. The stretch out from Km 75.00 to Km 130.00 of National Highway 58 had been decided for examination. The survey focus on evaluating the benefits of the proposed exercises that have emanated from inadequacies perceived through the audit methodology. Ensuing to coordinating RSA, it is found that trucks are halted on roadway which reduces the reasonable width of carriageway and making action threats to quick moving traffic. Unapproved medians openings were found which should be rapidly closed. The most Vulnerable Road User (VRU) i.e. walkers and cyclists workplaces close home is missing and ought to be energized on need.

Mehara and Agarwal concentrated A Systematic Approach for Formulation of a Road Safety Improvement Program in India. The audit presents basic thoughts to develop an incident record structure for Positioning of Safety unsafe zones, for recognizing verification of prosperity change measures, to choose needs of prosperity measures. It is typical that this audit will give a productive approach to manage progression of road security change program in India and thusly make prepared for upgrading prosperity on Indian avenues.

Tripodia et al. examined A Decision Support System for Analysis of Vulnerable Road Users Safety Issues: Results of the SAFERBRAIN Project. A Decision Support System (GIS-based application) is delivered to pick prosperity measures to diminish threat of setbacks of Vulnerable Road Users, recognize medicinal and preventive examinations and road security audits. The "remedial module" depends with examinations of VRUs incident data, recognizing confirmation of purposes behind setbacks, possible countermeasures basing on Cost-Benefit and Cost-Effectiveness Analyses and checking of results. The DSS arrangements to offer help to experts and pioneers to do incident examination or road prosperity surveys/examinations.

Weekley et al. Built up a road prosperity review gadget to perceive arrange standard and security deficiencies on high danger road portions. The ESReT broaden has developed an instrument to support the review of road portions that have been recognized as 'high danger' as showed by framework screening shapes and having two segment. The underlying fragment is an examination of road properties against layout measures and the second part is a connection of road qualities against 'security rules'. The device gives a system to experts to the amassing and examination of road characteristic data using ease, non-specialist adapt. The gadget gives a connection of road properties against diagram gages and against 'security precepts' to recognize insufficiencies and information on potential meds.

Oza Dakshesh kumar B.and Damodariya reviewed Road Safety for Kapurai - Dabhoi Section of State Highway-11. This paper is an endeavour to examine the development success condition Kapurai - Dabhoi Section of SH-11, Gujarat, India. The review plans to see countermeasures for connects in which the aggregate mischief brought on by mishaps can be widely and quickly lessened. In this survey the maker recognized the road setbacks, its causes, assortment with respect to yearly, month to month, hourly, customer sort vehicle, age, and consistent. Moreover dim spots in the survey area were perceived and proposals were given to upgrade prosperity of road customers.

Jurewicz and Excel contemplated Application of a crash-perceptive risk examination model to arrange road prosperity enthusiasm for Australia. This paper displayed the key parts of ANRAM and had demonstrates how it can be used to drive road security establishment program headway. It showed ANRAM's understanding as a mechanical assembly for conspicuous verification and arranging of road regions with high threat of outrageous mischances. The paper showed how creamer peril examination and crash desire framework are associated with gage individual and total genuine crash possibility.

III. METHODOLOGY

A. Road Safety Audit Group

The Road Safety Audit was completed by an autonomous group of street wellbeing engineers with suitable experience and capabilities for the specific venture. They had significant skill in street plan and development, movement administration and human elements.

B. Field Inspection and Agendas

The Road Safety Audit group directed the RSA with the objective to distinguish possibly hazardous roadway or activity elements of the interstate working condition, and additionally conceivably deceptive or missing data by the utilization of wellbeing standards of positive direction and self-clarifying streets while perceiving the potential impact of human variables, for example, street clients' constraints in abilities or newness. The RSA review endured around one month. The RSA group created agendas for the particular venture, as was asked for by the administrator. They depended on a survey of the important material and were custom fitted to the particular road. The road was examined in sunlight and at evening time in wet and dry conditions and incorporated all developments at each trade. The assessment was attempted from the perspective of all street clients. Motorcyclists represented a significant share of accidents, as was obvious from the information gave to the RSA group, while more established drivers showed troubles at specific areas The RSA group checked issues with respect to recognisability, early cautioning and direction, especially at areas where drivers settle on complex choices as well as perform complex moves. The street was looked into on the premise of the sufficiency of time accessible to drivers so as to choose and perform moves, the congruity of street format to driver hopes (any progressions/basic move focuses in street and activity qualities being shown unmistakably and in great time), checking potential infringement of anticipations identified with roadway plan. Investigations
were booked amid run of the mill or delegate movement conditions, permitting the RSA group to see how normal activity conditions and street client conduct may influence security amid the daytime and around evening time. The course seemed to have complexities at specific areas where drivers needed to pick bearings as well as move in short succession or inside passages, taking after rather confused signs at generally high speeds and in significant activity. The RSA discoveries were recorded in the RSA report together with proposals for usage.

C. Road Safety Audit Procedure

A road stretch of HB Town square to Jersey Milk Processing Plant of 18 km of National Highway 53 and Asian Highway is taken. After saving image, finalization of the parameters of road safety i.e. Inventories, Geometry, Rules and regulation are done. Data collection is started from 1 km stretch per day including all the data. Then data collected is tabulated. After the completion of data collection work, entire stretch of the road section is analyze in terms of safety concerns based on safety of each parameter that is being taken from IRC and MoRTH Post Construction stage checklist is readied, run the Checklist and then score the checklist. Further identify problem zone recognized in view of overall scoring of issue area or can be assessed in view of aggregate score of audit.

IV. Site Selection for Study Area

The extend from H B Town SQUARE to Jersey Milk Processing Plant on Bhandara road in Nagpur of National Highway 53 and Asian Highway 46 had been chosen for applicant examination. The area delineate guide and course guide are appeared in Figure 1 and Figure 2. The National Highway is being kept up and worked by National Highway Authority of India (NHAI) from the Ministry of Road Transport and Highways (MoRTH).

![Study Area’s Terrain Map](Source: Google Earth)

![Study Area’s Route Map](Source: Google Earth)

V. Discussion and Conclusion

A. Hazard markers, Sign posts and Road Studs:

Speed limit sign (Fig.3) and informative sign(Fig.4) sheets must be presented at consolidating and isolating ways of organization streets, genuine crossing points, petrol pumps and specialist's offices. Delineators may be given on the edge of longitudinal curve. It is appealing to give road studs must be given on the centre and edge line of each and every even curve. Danger markers may be suited divisional and channelizing islands at all genuine crossing points, centre openings, before parapet bridge
structures, before crash obstacle, before vertical posts of overhead gantry sign sheets laying on shoulders. All signs are reflectorised sort with high power retro-canny sheeting of typified sort has been given.

![Fig. 3: Speed restriction Sign](image1)
![Fig. 4: Informatory Sign](image2)

### B. Lighting blueprint:
Adequate lighting game-plan is ahead of time on flyovers and on at level roads close-by cut-off focuses. High post lighting must be given at a couple of regions. Lighting strategy is in like manner required underneath area in vehicular underpasses. All major and minor convergences of the roadway should be empowered with high post lighting strategy for safe advancement of vehicular movement and people by walking.

### C. Black-top Marking:
Lane marking (Fig.5) was done in lion's share of road sections. Individual by walking cross stamping at school, recuperating focus, town/town limits, and transport inlets areas should must be completed for safe development of walkers.

![Fig. 5: Lane Marking](image3)

### D. Pedestrian facilities locations:
Unraised pathway (Fig. 6 and 7) is found and raised pathway should be given around the local area and town territory for wellbeing of pedestrian. Raised pathway is up in advance at transport narrows areas. Pedestrian guardrail might be given at the spots where pedestrian movement is high and on raised pathway in favour of carriageway at transport stops and transport coves for satisfactory length yet at least 20 m on either side for pedestrian wellbeing.
Fig. 6: Unraised pathways

Fig. 7: Unraised pathways

E. Median openings:
Most of the Median openings (Fig. 8 and 9) have been given stockpiling path for 'U-turn' vehicles. "STOP" line and 'U-turn' marking must be taken-up to manage the drivers legitimately. No vegetations must be planted in median (up to 100.0m) to keep up clear sight separate at median opening areas. Median opening sign sheets have been introduced in the majority of the areas. Arrow marking is still to be done away paths. It is watched that at a few areas of the venture extend, the nearby individuals were harming the middle kerbs and utilizing as unapproved middle openings. These might be confined and every single such opening might be shut.

VI. ROAD SAFETY AUDIT FINDINGS
The fundamental wellbeing issues can be gathered in particular point ranges and they are:

A. Markings
The street markings were blurred at specific areas (Fig.10), while old markings controlling impermanent activity had not been expelled viably (Fig.11). Change of street markings was suggested since ineffectual markings could bring about course deviation and driver conduct issues particularly in a rapid domain accordingly of deficient cautioning and direction. The utilization of an
excellent retro intelligent material compelling in rain and haziness with sufficient slip resistance qualities was prescribed. Need of usage was suggested for flat bends and move focuses.

![Fig. 10: Blurred marking](image1)
![Fig. 11: Old marking](image2)

**B. Roadside Dangers**

The RSA group recognized areas where the roadside barrier (Fig.12) was hindered for a short separation. This would bring about an errant vehicle entering the unprotected zone to be "caught", with no plausibility to hold control and collide with roadside impediments behind the obstructions. The establishment of a solid boundary of suitable stature and length and exceptional treatment of move ranges between the diverse sorts of restriction frameworks was suggested.

![Fig. 12: Unauthorized median openings](image3)

**VII. Recommendations**

Based on the present investigation of road safety audit for selected national highway, the accompanying Conclusions have been drawn:

It is found that Road Markings, Condition of Shoulder, Median Opening and Carriageway condition were fundamental parameters for bringing on mishances. It was additionally observed that moderate moving traffics were making activity perils for quick moving movement as it generally occupied the innermost path of highway.

In light of above conclusions following are the recommendations for the selected stretch are given:

1) All unapproved median openings ought to shut and satisfactory arrangement like zebra crossing required for crossing street for walkers or for crossing neighborhood individuals be made on priority.
2) All undeveloped major and minor crossing points must be developed with satisfactory lighting arrangements as fast as could be possible.
3) Pedestrian guardrail ought to be given up all along the footpath of Service Street and at bus stops.
4) There is important to give Bus Bays to traveller wellbeing and facility.
5) Various sign boards should be reinstalled and some others need correction only.
6) Few sign board are missing and is to be installed to avoid congestion or to avoid any incident.
REFERENCES


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