

Thumb based horn system on steering wheel

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Abstract—With the rise in total fatalities on the road and with increase in number of vehicles every day, the need for communication between vehicles before collision has never been this important. The time before collision is often not utilized to communicate promptly. Thumb based horn system on steering wheel utilizes this crucial time during critical emergency situations. Horn is the most easily understood method of communication on Indian Roads. The travel of hand to apply horn on airbag is reduced by providing horn on the steering wheel thumb contour. This saves crucial time during emergency situations and helps in prompt communication. This not only provides safety but also a convenience feature to driver especially in city traffic situation. A steering Wheel with both Honking arrangements was manufactured and time required to honk was calculated. The time required to honk with thumb based horn system was less than time required for honk with airbag. This is a significant time and can help drivers to take appropriate decision during emergency situations. With this provision of thumb based horn becoming common on passenger cars it will help in reducing fatalities, accidents on Indian roads.

Index Terms—Steering Wheel, Horn, Thumb Based Horn, Road related Deaths, Road Accidents, Airbag based Horn

1 INTRODUCTION

Over 1.2 million people die each year on the world's roads, and between 20 and 50 million suffer non-fatal injuries.

In most regions of the world this epidemic of road traffic injuries is still increasing. The Road accident will be leading cause of death in Year 2030. In most cases, studies have shown the cause of accidents is the fault of Driver (77%). Thumb based horn reduces the time required to honk during critical situation. By providing Horn close to the thumb, it helps in reducing the distance and thereby time, The study conducted shows how the Thumb based steering helps by giving more time to both vehicles to react and reduces the time required to move hand from steering wheel to airbag to honk. This is not only a safety feature but also a ergonomic feature. With the increase in number of vehicles and traffic condition the need to honk in India will increase, thumb based horn can help to reduce the fatigue of the Driver.[7][8][9]

2 PROBLEM STATEMENT

All Passenger Cars Horns are based on Airbags. To apply Horn, one has to left hand from the steering wheel and put on airbag resulting Delay in Horn application (ms), More Horn Pad effort, Fatigue in case of city traffic, Also, above situation can be fatal in emergency. "Thumb Based Horn system on steering Wheel" solves above problems

3 OBJECTIVE

1. To establish the distance and time required to apply horn between Airbag Horn and Horn on Steering Wheel
2. To establish the Pad Effort required on Airbag Horn and Horn on Steering Wheel

3. To establish this as a comfort and convenience feature

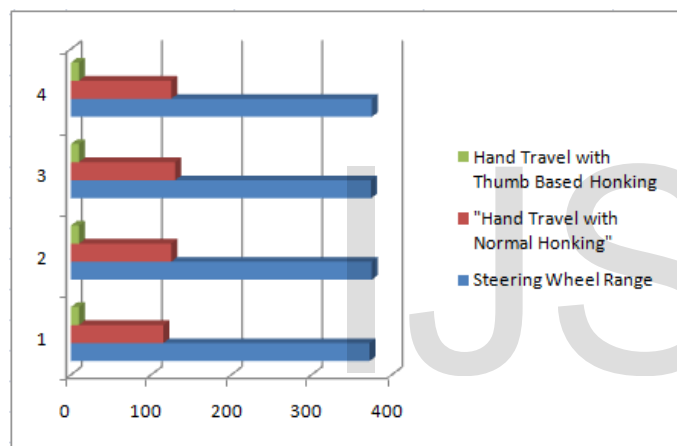
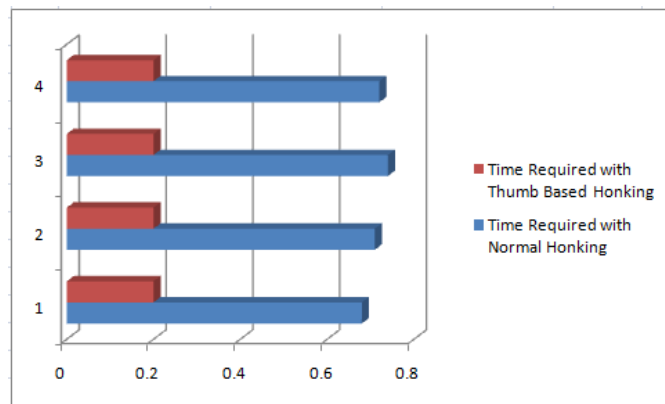
4 PROCEDURE

- Step 1:- To establish distance between Airbag Horn and Horn on Steering Wheel
Step2:- To establish the time required on Airbag Horn and Horn on Steering Wheel
Step 3:- To establish the Pad Effort required on Airbag Horn and Horn on Steering Wheel
Step 4:- To calculate number of times Horn is used on different road condition [1][3][4]

A. TO ESTABLISH DISTANCE BETWEEN AIRBAG HORN AND HORN ON STEERING WHEEL

Distance between Steering Wheel Horn Position and Distance was calculated

Sr. No	Model Name	Steering Wheel Diameter (± 3 mm)	Distance between Hand Position and Honking Position (± 5 mm)	Distance between Hand and Thumb Based Honking Position (± 5 mm)
1	Maruti Suzuki Swift	372	115	10
2	VW Polo	375	125	10
3	Hyundai Verna	374	130	10
4	Honda City	375	125	10

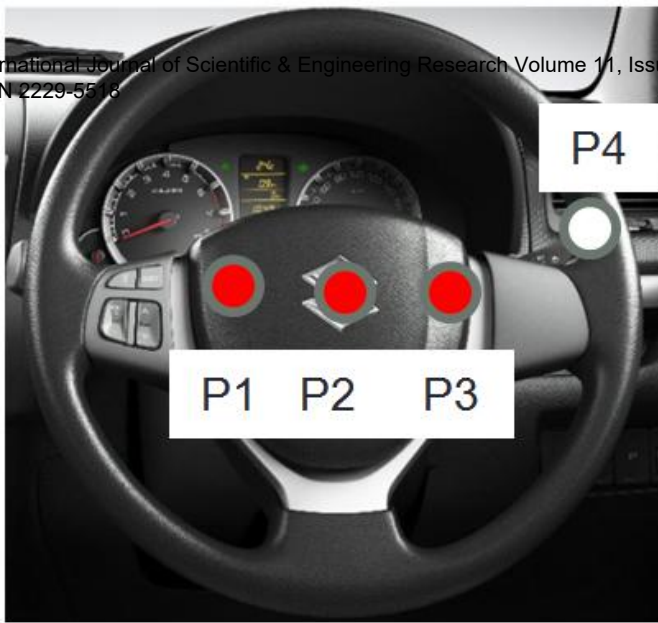


B. TO ESTABLISH TIME BETWEEN AIRBAG HORN AND HORN ON STEERING WHEEL

Sr. No	Model Name	Time between Hand Position and Honking Position (± 0.05 s)	Time between Hand and Thumb Based Honking Position (± 0.05 s)
1	Maruti Suzuki Swift	0.68	0.2
2	VW Polo	0.71	0.2
3	Hyundai Verna	0.74	0.2
4	Honda City	0.72	0.2

C. TO ESTABLISH PAD EFFORT REQUIRED ON AIRBAG HORN AND THUMB BASED HORN SYSTEM

Sr. No	Model Name	Horn Effort Required on Airbag Horn (N)			Horn Effort Required on Thumb Based Horn (N) P4
		P1	P2	P3	
1	Maruti Suzuki Swift	36.7	45.7	37.9	7.8
2	VW Polo	28.3	49.9	33.2	8.1
3	Hyundai Verna	28	37.5	33	7.2
4	Honda City	36.4	33.7	31.9	7.7



Based on the above factual study, it can be concluded that Thumb Based Horn is not only ergonomic feature but also can be life saving during critical driving conditions

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D. TO CALCULATE NUMBER OF TIMES HORN IS USED ON DIFFERENT ROAD CONDITIONS

To calculate number of times Horn is used on following road condition

Severe City Traffic
On Highways
On Rough Roads
Railway Crossings

Sr. No	Road Type	Distance	Frequency of Horn used on while driving	Road Used
1	Severe City Traffic	9.5 KM	22	Hinjewadi Phase 3 to Wakad Bridge
2	On Highways	14.3 KM	4	Mumbai Pune Old Highway Talegaon to Kamshet
3	On Rough Roads / Ghats	8 KM	7	KatrajGhat
4	Railway Crossings	0.3 KM	9	Mudhwa Railway Crossing

CONCLUSION

1. Thumb Based Horn is fast than airbag based horn system
2. Thumb Based Horn requires less effort to honk
3. Thumb based Horn can be convenient feature in more difficult driving condition