



## Assessment of Visual Traits of Heavy Vehicle Drivers in India

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### ABSTRACT

*Inappropriate driving behaviour is considered to be one of the major causes of road crashes in India as compared to defective geometric design of pavement or mechanical defects in the vehicles. More than 65 % of road crashes on Indian roads are caused due to the fault of the road users apart from the other factors such as faulty road design, poor road maintenance and vehicle conditions account for the remaining share of road fatalities. Considering the increasing trend of road crash scenario in India occurring due to road users fault, as a starting point, it was felt prudent to assess the visual abilities of the heavy vehicle drivers.*

*Objective : The objective of this study was to assess the visual traits of the heavy vehicle drivers.*

*Methodology: In this study 535 heavy vehicle commercial drivers were selected across different age groups. During the study different psychophysical vision related tests were conducted e.g. (visual acuity, night vision test and glare recovery test).*

*Conclusions: The study highlights that all drivers performed drastically poor in all visual tests. Among the vision tests over fifty drivers performed "Below Average" in glare test. While over fourteen percent drivers performed "Below Average" and eleven percent drivers performed "Poor" in Visual Acuity Test which highlights that the drivers are drastically poor in Visual Capacity.*

*Recommendations : On the basis of this study recommends to carry out special screening and training of the goods vehicle drivers and special screening and training of the all commercial and Good vehicle drivers in India .*

### KEYWORDS :

#### 1. Introduction:

As per the reported literature, safety consciousness can be imparted amongst the drivers through the assessment of their abilities through an exhaustive driver screening programs, providing free visual aids and modifying present licensing procedures. In a recent study done at Guwahati, India (Chauhan S., 2009), an attempt was made to identify the shortcomings in physical attributes of the drivers that may pose road safety hazards such as visual acuity, peripheral vision, depth perception, glare recovery, colour vision, contrast sensitivity, phoria, etc. Based on the analysis of data collected, the following important findings were reported by them:

Three percent of the drivers failed in the phoria test, which checks for proper eye muscles and co-ordination of both eyes to correctly identify the placement of an object ahead. If a particular driver performs, unacceptable in this test, then it indicates that the driver may not be able to identify the position of an object such as, vehicle, pedestrian, etc. in front of him/her on the road correctly.

Similarly, based on a study conducted by Dandona et al (2006) in Hyderabad in India, the following deficiencies were observed:

- Seven per cent of the drivers failed in the glare recovery test, which is an important parameter for safe driving during night, especially on undivided roads, which are predominant in India, and where there is a substantial glare of headlight of the opposing vehicles.
- Five per cent of the drivers were found to have problem of tunnel vision while driving, which shows that such drivers may not be able to identify the side obstructions and correspondingly respond to the stimulus on time.
- Fifteen per cent of the drivers were found to have unacceptable

acuity vision in one of the eyes and 4% in both the eyes.

- Five per cent of the drivers had problem with night vision (vision in the presence of headlight).
- Performance of 5% of the drivers was found "unacceptable" in colour vision test.

In the study following malpractices were observed among Indian drivers:

- About 11% of motorized two wheeler drivers drive the vehicle without possessing driving license. This tendency was higher in the case of drivers aged between 16 and 25 years.
- Also, 0.5% was found to get a driver license before 15 years of age. Out of all license holders who were surveyed in the study, 21.4% had obtained the license without taking the mandatory driving test.
- Thirty per cent of the drivers were found to overtake other vehicles from any side depending on traffic conditions.
- Over 50% were found to drive the vehicle in the direction opposite to the flow of traffic.
- Out of all the drivers who were caught by the traffic police, 56% paid the fine while 26% paid bribe to escape.
- Regarding vehicle conditions, it was observed 49% of drivers had no rear view mirror in their vehicles.

A study done by Ashish Verma et al 2011 highlights that driver behaviour through better driver education, driver training and licensing

procedures along with good on-road enforcement can be improved. The gamut of these researches helped to create the background of the present study under different Indian conditions.

2. Objective of the Study

The objective of this study was to assess the visual traits of the heavy vehicle drivers.

3. Methodology:

In this study 535 heavy vehicle commercial drivers were selected across different age groups. During the study different psychophysical vision related tests were conducted e.g. (visual acuity, night vision test and glare recovery test).

3.1. Tools

**3.1.1. Porto Clinic:** This is a portable apparatus for testing the visual acuity of the drivers; colour blindness, depth perception, horizontal field test and phoria (refer Figure 1). In this test, the subjects have to read the Snellen chart letters or similar numbers followed by the conduct of Ishihara colour blindness test wherein the subject has to identify the numbers inside the chart without any time limits in place. Based on the understanding capability of the above chart, the comfort levels of the drivers were assessed.

**3.1.2.Porto Glare:** This apparatus was used for testing the tolerance level exhibited by the drivers towards the oncoming glare from the vehicle headlights which is basically referred as glare test. This test measures the vision capacity of the drivers during nighttimes.



Figure 1: Instrumentation Deployed for Porto Clinic and Porto Glare Test

3.2. Visual Acuity Test

The drivers from the sample population were randomly selected for the vision related tests. Visual acuity refers to spatial resolution or the measure of one's vision with respect to clarity, sharpness, or sight ability. In the present study the 57.14% drivers of below 30 age groups were having 6/6 i.e. very good visual acuity, vs. 27.85% drivers of above 30 years age group; from below 30 years only 14.28% required retesting for visual acuity while 27.8% required of above 30 years required "Retesting" and 5.70 % of above 30 years age group failed in the test.

Table-1: Test of Visual Acuity

Age	No. of Drivers	6/6	%	6/9	%	Re Test	%	Fail	%
Below 30	21	12	57.14	6	28.57	3	14.28571	0	0.00
Above 30	79	22	27.85	26	32.91	22	27.8481	9	11.39
Overall	100	34	42.50	32	30.74	25	21.07	9	5.70

Thus this study revealed that the compulsory vision screening is required for all the drivers whenever they go for license renewal or for any new licence applicant who are especially above 30 years of age.

3.3. Test for the Night Vision

Night vision is the ability to see in low light conditions. In the present study, the drivers were randomly selected for the Night Vision test. The analysis of data highlighted that 'Long Distance Route' drivers of above 30 years age group were more affected due to low illumination as 34.21% of them performed "Below Average" as against 2.44% of 'Short Distance Route' drivers of the same group. The study further revealed that only 30.26% of Long Distance Route drivers performed "Good" in the test as against 66% of the drivers of Short Routes. Thus

this study emphasizes the urgent requirement of special screening and training facilities for the Long Distance Route drivers (Refer Photo 2).



Figure 2: Night Vision Test Being Administered On the Subjects

3.4. Test for the Glare Recovery

Glare can be defined as the contrast lowering effect of stray light in a visual scene. Glare forms a veil of luminance which reduces the contrast and thus the visibility of a target is decreased. High beam of head-light of an on-coming vehicle has blinding effect and decreases the visibility drastically (Table 2).

Table 2: Classification of Subjects based on the Score Obtained during the Glare Test

Score Obtained (In Secs.)	Long Distance Route Drivers				Short Distance City Drivers				Remarks
	Age (in Years)								
	> 30	%	< 30	%	> 30	%	< 30	%	
> 1.0									Outstanding
1.1 to 1.5							1.00	2.44	Excellent
1.6 to 2.0					1.00	11.11	1.00	2.44	Very Good
2.1 to 2.5					2.00	22.22	10.00	24.39	Good
2.6 to 3.0	3.00	25.00			1.00	11.11	8.00	19.51	Reasonably Good
3.1 to 3.5			4.00	10.53	2.00	22.22	13.00	31.71	Satisfactory
3.6 to 4.0			5.00	13.16	2.00	22.22	2.00	4.88	Above Average
4.1 to 4.5	3.00	25.00	7.00	18.42		0.00	2.00	4.88	Average
4.6 to 8.8	6.00	50.00	18.00	47.37	1.00	11.11	4.00	9.76	Below Average
< 8.0			4.00	10.53					Poor

The data revealed that the 'Long Distance Route' drivers of above 30 years age group were more affected due to low illumination as 10% of them secured a ranking of "Poor" as against none of the subjects (of the same age group) falling under 'Short Distance Route' were affected. The study further highlighted that only 'Short Distance Route' subjects from the present sample size performed better than the 'Long Route' drivers .

4. Conclusion

Based on the findings of this limited study, it is emphasized that it is worthwhile to carry out special screening and training of the drivers. The study further analysed the performance differences i.e. "Short distance" commuting drivers performed better than "Long distance" commuting drivers. This may be due to fatigue and mental work-loads etc.

5. Recommendations :

This study strongly recommends to carry out special screening and training facilities for the heavy vehicle drivers in India.

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