

“Dimension analysis and survey of E-rickshaws in Delhi region”

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ABSTRACT

This analysis paper aims to undertake a comprehensive study of the battery operated erickshaws inside the state of Delhi. As per the sampling analysis done with e-rickshaws on 7 diversified location in delhi consisting of rural & urban places, we can state that there are 8 different types of dimesnsion in erickshaws in the region. Though e-rickshaws are environment friendly but are hazardous to safety measures for human life and property due to its dimensional drawbacks. This analysis will present you information regarding various types of dimensions available in erickshaws which will be eventually helpful for the manufacturers to do R&D for the same.

1: INTRODUCTION

The word rickshaw’s origins consist the japanese language, and it virtually interprets to “a human supercharged vehicle”. The rickshaw is one among the oldest modes of transport, and was initial introduced within the late nineteenth century. it's used all across the planet, however additional common within the Asian countries, particularly in India and Asian nation. the varied kinds of rickshaws have conjointly evolved over time with the earliest ones being the pulled-rickshaws. different variations of the mode of

transport embody the cycle-rickshaw, the auto-rickshaw and also the comparatively newer iteration of the e-rickshaws. traditionally, India’s urban in addition as rural areas have trusted the varied rickshaw sorts for his or her travel needs. The state of Old Delhi has about to 100,000 Auto-rickshaws, Associate in Nursingd an calculable 700,000 cycle rickshaws, of that an outsized share is unauthorized[DIMTS 2011] the foremost recent modification referred to as the battery operated e-rickshaws (Referred as battery rickshaws afterwards within the study) was introduced within the town of latest Old Delhi throughout the Commonwealth Games 2010, with the commit to eventually terminate the physically onerous cycle-rickshaws within the town. although no government figures area unit offered, rough estimates place the quantity of rickshaws within the town about to the figure of 1,00,000. [Hindu 2014 a.] The e-rickshaws in Delhi are presently unregulated and are not registered with the government.

Electric rickshaws (also called TukTuk, e-rickshaw) are turning into a lot of well-liked in some cities since 2008 as an alternate to motorcar jinrikishas and force rickshaw due to their low fuel price, and fewer human effort compared to force rickshaws. they're being wide accepted as an alternate to Petrol/Diesel/CNG motorcar

rickshaws. they're wheels force by an electrical motor starting from 650-1400 Watts. they're principally factory-made in China, solely some alternative countries manufacture these vehicles. Battery-run rickshaws may well be a low-emitter complementary transport for the low-income individuals, who are suffering most from an absence of transport facility, if introduced in an exceedingly systematic manner in line with consultants. the electrical automobile didn't simply turn out to be a viable suggests that of transportation. analysis waned from 1920-1960 till environmental problems with pollution and decreasing natural resources reawakened the requirement of a a lot of environmentally friendly suggests that of transportation. Technologies that support a reliable battery and also the weight of the required range of batteries elevated the worth of constructing an electrical vehicle.[6] In 1837, Robert Davidson of European nation seems to possess been the builder of the primary automobile, however it wasn't till the Nineties that electrical cars were factory-made and oversubscribed in Europe and America. throughout the late Nineties, us roads were inhabited by a lot of electrical vehicles than those with combustion engines. There square measure several considerations relating to the mode of transport and its functioning within the state of metropolis. The battery rickshaws need to technically come back below the extent of the vehicles Act, 1988 but these vehicles do not appear to be registered or licensed, and there no special rules governing the actions of these battery rickshaws. Thus, they are not be prosecuted by the Traffic Police, or admonished for breaking any rules. The battery operated e-rickshaws at intervals the city have in addition

been deemed unsafe owing to a deficiency of policy framework that governs the manufacturing of the vehicles, and no safety ratings exist for these vehicles. The Indian specific, quoting a report ready by TERI, finds that quite eightieth of passengers felt unsafe in associate degree e-rickshaw, and expect a stronger style once the rules are in situ. [Indian specific 2014] additionally to the security issues, there have additionally been debates over the functioning of the rickshaws on blood vessel roads that have resulted in traffic jams within the town that is witnessing a serious surplus of automobiles and is already below severe traffic stress. the govt. will utilize the info received with the assistance of regularization and registration of the battery rickshaws to conceive to relieve the traffic flow within the high-concentration areas. It may facilitate in fixing routes and fares thus on facilitate the operation of those rickshaws. From a socio-economic purpose of read, there aren't any finance choices out there for the e-rickshaw house owners because the e-rickshaws don't seem to be recognized by the state as a mode of transport. A Public Interest proceedings filed within the Old Delhi judicature in Jan 2014, additionally distinguished the absence of insurance choices for the rickshaws since they're not recognized as automobiles within the state. [The Economic Times 2014]This puts the passengers of e-rickshaws in danger as they can not claim any insurance just in case of a mishap. This study tries to advocate the foundations for the regularization of the rickshaws within the state of Old Delhi, by examining the socio-economic furthermore because the technical characteristics of those forms of vehicles. Regularisation would facilitate in up the security

of the vehicles, higher urban coming up with, and up the transport infrastructure in Old Delhi. The urban coming up with and therefore the transport infrastructure will be accomplished once the govt. obtains figures on the quantity of vehicles in line with the region once registering the vehicles. it'd additionally facilitate to bring the vehicles below the extent of the law, increase the govt. revenue and supply the essential amenities and backing for the jinrikisha drivers. the security would be enhanced with the assistance of a correct restrictive framework for producing the vehicles, and safety ratings beside the same example testing for the makers.

2. LITERATURE REVIEW

The Battery Operated electrical Rickshaws could be a new mode of transportation introduced within the state of Delhi in 2010. the amount of those kind of rickshaws has inflated from 40000 in 2010 to or so 1,00,000 in 2014. These e-rickshaws area unit a preferred mode of transport for short-distance commute at intervals town, and virtually 3,00,000 individuals within the country believe it for his or her keep.[Rana et al 2012 a.] showed the role of the battery operated rickshaws within the urban financial gain generation and also the employment creation in East Pakistan. It additionally shows the role of the mode of transport in depressurization of the migration to the capital state of Dacca. [Rana et al 2012 b.] checks the potency of the battery-operated rickshaws in East Pakistan, and recommends route fixation and also the supply of driving licenses to extend the potency in these areas. things in East Pakistan is analogous to the one discovered in Delhi, as a report calculable that

there have been quite fifty,000 unlicensed battery rickshaws within the cities of Dacca and urban center. The tribunal, in Gregorian calendar month 2014, rejected legal instrument petitions that wanted permission to permit the functioning of those vehicles within the cities, and illegal the rickshaws in Dacca and urban center. [Daily Star 2014] [Nandhi – I.F.M.R. 2011] studied the monetary behavior of the tricycle pullers in Delhi, and showed the employment of case study methodology to substantiate their findings. The results were utilized to assess the rickshaw pullers' strategies and decisions in savings furthermore on address the challenges moon-faced by them. The case methodology has been applied within the study to elucidate the importance of the mode of transport during a social context. The paper makes use of the analysis conducted to support the arguments in favor of regularization of the battery rickshaws in Delhi. The Socio-Economic study aims to visualize the role of the rickshaws within the employment and financial gain generation within the town, furthermore as its contribution to poorness alleviation of the drivers by doing a comparative analysis with their previous livelihoods. The technical study is aimed toward checking the protection and also the potency of the vehicles, so as to advocate the foremost effective policies for producing and functioning of those vehicles. The variables and parameters are elect consequently, to realize the objectives of the study. The battery-operated e-rickshaws were introduced in Delhi for the Commonwealth Games in 2010, and close to 4,000 rickshaws were supposed to be introduced and regulated by the end of the year. [Telegraph 2010]

The number of such battery rickshaws has increased exponentially in the period between October 2010 and July 2014 with the present number standing close to 1,00,000. In the 4-year period, there have been many attempts to initiate a policy regarding the functioning of these vehicles but there has been no concrete decision on the matter. [Hindu 2014 a.]

As of July 2014, the battery rickshaws are not registered by the Transport Department of Government of N.C.T. of Delhi, and are unregulated in the city. According to the Motor Vehicles Act, 1988 and the Motor Vehicles Rules, 1993, vehicles with a motor power less than 250W and speed less than 25 kmph are not considered as motorized vehicles and were exempted from the rules. The rules of the Central Motor Vehicles Rules of 1989 that are of importance for this study are Chapter 1 – Preliminary 2 (u), Rule 126 and 126A. [CMVR 1989] The Chapter 1- Preliminary 2(u) rule was inserted on 16 September 2005. Central Motor Vehicles Rules, 1989

“[Rule 126] Prototype of every motor vehicle to be subject to test.—On and from the date of commencement of Central Motor Vehicles (Amendment) Rules, 1993, every 71[manufacturer or importer] of motor vehicles other than trailers and semi-trailers shall submit the prototype of the vehicle 72[to be manufactured or imported by him] for test by the Vehicle Research and Development Establishment of the Ministry of Defence of the Government of India or Automotive Research Association of India, Pune, or the Central Machinery Testing and Training Institute, Budni (MP), or the Indian Institute of Petroleum,

Dehradun, and such other agencies as may be specified by the Central Government for granting a certificate by that agency as to the compliance of provisions of the Act and these rules.

3: METHODOLOGY

To conduct the dimensional analysis, 7 locations in different areas of Delhi were taken as data samples, with a total of 37 battery rickshaws being sampled. A common measurement table was used in all the areas to assess the major part dimensions of the mode of transport. The areas for the survey were chosen after considering the demographics, and the location within the state. To avoid a sampling selection bias, 7 areas with diverse characteristics were considered. Both rural and urban locations within the state were studied to conduct the study. The locations in Delhi where the sampling was done.

- 1 JAMIA NAGAR
- 2.CANNAUGHT PLACE,
- 3.JAMA MASJID, OLD DELHI
- 4.SAKET
- 5.NEW DELHI RAILWAY STATION
- 6.LAXMI NAGAR
- 7.HAUZ KHAS

Also, 5 dealers and suppliers of E-RICKSHAW were helped us for this project.

So the measured data is based on two aspects :

1:Currently active on roads-Measurements were carried out for all relevant dimensions with ergonomics point of view with the use of measurement tools.

2:Placed in showrooms-

Most of the dimensions were taken from the available data at the showroom and few dimensions were taken additionally with the tools carried by our team.

4-RESULTS:

OVERALL DIMENSIONS OF DIFFERENT TYPE OF E-RICKSHAWS RUNNING IN DELHI STATE: 8 DIFFERENT TYPE OF DIMENSIONS OF E-RICKSHAW

TYPE 1 (SEATING CAPACITY : 4+1)	
OVERALL E-RICKSHAW DIMENSIONS	
Description	Dimension (mm)
MAXIMUM LENGTH	2790
MAXIMUM WIDHT	950
MAXIMUM HEIGHT	1790
HEIGHT FROM FLOOR TO ROOF	1300
LENGTH OF PASSENGER PORTION	1290
LENGTH (GAP) BETWEEN TWO PASSENGER SEATS	210
LENGTH (GAP) BETWEEN DRIVER SEAT AND HEAD CASE	160
SEATS DIMENSIONS	
DRIVER SEAT DIMENSION	
LENGTH	350
WIDTH	810
THICKNESS	60
PASSENGER SEAT 1(REAR FACING) /BACK SEAT	
LENGTH	310
WIDTH	910
THICKNESS	60
PASSENGER SEAT 2(FRONT FACING)/BACK SEAT	
LENGTH	400
WIDTH	910
THICKNESS	60

TYPE 2 (SEATING CAPACITY : 4+1)	
OVERALL E-RICKSHAW DIMENSIONS	
Description	Dimension (mm)
MAXIMUM LENGTH	2790
MAXIMUM WIDHT	1000
MAXIMUM HEIGHT	1790
HEIGHT FROM FLOOR TO ROOF	1300
LENGTH OF PASSENGER PORTION	1290
LENGTH (GAP) BETWEEN TWO PASSENGER SEATS	210
LENGTH (GAP) BETWEEN DRIVER SEAT AND HEAD CASE	160
SEATS DIMENSIONS	
DRIVER SEAT DIMENSION	
LENGTH	350
WIDTH	840
THICKNESS	60
PASSENGER SEAT 1(REAR FACING) /BACK SEAT	
LENGTH	310
WIDTH	940
THICKNESS	60
PASSENGER SEAT 2(FRONT FACING)/BACK SEAT	
LENGTH	400
WIDTH	940
THICKNESS	60

TYPE 3 (SEATING CAPACITY : 4+1)	
OVERALL E-RICKSHAW DIMENSIONS	
Description	Dimension (mm)
MAXIMUM LENGTH	2790
MAXIMUM WIDHT	995
MAXIMUM HEIGHT	1790
HEIGHT FROM FLOOR TO ROOF	1300
LENGTH OF PASSENGER PORTION	129
LENGTH (GAP) BETWEEN TWO PASSENGER SEATS	210
LENGTH (GAP) BETWEEN DRIVER SEAT AND HEAD CASE	160
SEATS DIMENSIONS	
DRIVER SEAT DIMENSION	
LENGTH	350
WIDTH	855
THICKNESS	60
PASSENGER SEAT 1(REAR FACING) /BACK SEAT	
LENGTH	310
WIDTH	955
THICKNESS	60
PASSENGER SEAT 2(FRONT FACING)/BACK SEAT	
LENGTH	410
WIDTH	815
THICKNESS	60

TYPE 4 (SEATING CAPACITY : 4+1)	
OVERALL E-RICKSHAW DIMENSIONS	
Description	Dimension (mm)
MAXIMUM LENGTH	2790
MAXIMUM WIDHT	960
MAXIMUM HEIGHT	1770
HEIGHT FROM FLOOR OF TO ROOF	1300
LENGTH OF PASSENGER PORTION	1270
LENGTH (GAP) BETWEEN TWO PASSENGER SEATS	215
LENGTH (GAP) BETWEEN DRIVER SEAT AND HEAD CASE	165
SEATS DIMENSIONS	
DRIVER SEAT DIMENSION	
LENGTH	360
WIDTH	820
THICKNESS	65
PASSENGER SEAT 1(REAR FACING) /BACK SEAT	
LENGTH	320
WIDTH	920
THICKNESS	65
PASSENGER SEAT 2(FRONT FACING)/BACK SEAT	
LENGTH	410
WIDTH	920
THICKNESS	65

TYPE 5 (SEATING CAPACITY : 4+1)	
OVERALL E-RICKSHAW DIMENSIONS	
Description	Dimension (mm)
MAXIMUM LENGTH	2620
MAXIMUM WIDHT	850
MAXIMUM HEIGHT	1760
HEIGHT FROM FLOOR TO ROOF	1300
LENGTH OF PASSENGER PORTION	1210
LENGTH (GAP) BETWEEN TWO PASSENGER SEATS	205
LENGTH (GAP) BETWEEN DRIVER SEAT AND HEAD CASE	155
SEATS DIMENSIONS	
DRIVER SEAT DIMENSION	
LENGTH	340
WIDTH	710
THICKNESS	70
PASSENGER SEAT 1(REAR FACING) /BACK SEAT	
LENGTH	300
WIDTH	810
THICKNESS	70
PASSENGER SEAT 2(FRONT FACING)/BACK SEAT	
LENGTH	400
WIDTH	810
THICKNESS	70

TYPE 6 (SEATING CAPACITY : 4+1)	
OVERALL E-RICKSHAW DIMENSIONS	
Description	Dimension (mm)
MAXIMUM LENGTH	2780
MAXIMUM WIDHT OF	995
MAXIMUM HEIGHT OF	1750
HEIGHT FROM FLOOR OF TO ROOF	1300
LENGTH OF PASSENGER PORTION	1370
LENGTH (GAP) BETWEEN TWO PASSENGER SEATS	220
LENGTH (GAP) BETWEEN DRIVER SEAT AND HEAD CASE	170
SEATS DIMENSIONS	
DRIVER SEAT DIMENSION	
LENGTH	340
WIDTH	855
THICKNESS	50
PASSENGER SEAT 1(REAR FACING) /BACK SEAT	
LENGTH	300
WIDTH	955
THICKNESS	50
PASSENGER SEAT 2(FRONT FACING)/BACK SEAT	
LENGTH	400
WIDTH	955
THICKNESS	50

TYPE 7 (SEATING CAPACITY : 4+1)	
OVERALL E-RICKSHAW DIMENSIONS	
Description	Dimension (mm)
MAXIMUM LENGTH	2800
MAXIMUM WIDHT	1000
MAXIMUM HEIGHT	1800
HEIGHT FROM FLOOR TO ROOF	1300
LENGTH OF PASSENGER PORTION	1380
LENGTH (GAP) BETWEEN TWO PASSENGER SEATS	220
LENGTH (GAP) BETWEEN DRIVER SEAT AND HEAD CASE	170
SEATS DIMENSIONS	
DRIVER SEAT DIMENSION	
LENGTH	370
WIDTH	860
THICKNESS	70
PASSENGER SEAT 1(REAR FACING) /BACK SEAT	
LENGTH	320
WIDTH	960
THICKNESS	70
PASSENGER SEAT 2(FRONT FACING)/BACK SEAT	
LENGTH	420
WIDTH	960
THICKNESS	70

TYPE 8 (SEATING CAPACITY : 4+1)	
OVERALL E-RICKSHAW DIMENSIONS	
Description	Dimension (mm)
MAXIMUM LENGTH	2760
MAXIMUM WIDHT	990
MAXIMUM HEIGHT	1770
HEIGHT FROM FLOOR TO ROOF	1300
LENGTH OF PASSENGER PORTION	1350
LENGTH (GAP) BETWEEN TWO PASSENGER SEATS	210
LENGTH (GAP) BETWEEN DRIVER SEAT AND HEAD CASE	165
SEATS DIMENSIONS	
DRIVER SEAT DIMENSION	
LENGTH	370
WIDTH	850
THICKNESS	65
PASSENGER SEAT 1(REAR FACING) /BACK SEAT	
LENGTH	340
WIDTH	950
THICKNESS	65
PASSENGER SEAT 2(FRONT FACING)/BACK SEAT	
LENGTH	420
WIDTH	950
THICKNESS	65

Some Images of Erickshaw



5: CONCLUSIONS

With this study we found that there are Eight different category of E-Rikshaw that are running in Delhi Region having different dimensions, although they seem to be structurally same.

With the Ergonomic and structural point of view, we found that most of the designs were significantly poor in comfort and hazardous if safety is considered. Only few were structurally better, but again, ergonomics is compromised.

One of the benefits of our study is that the manufacturers around Delhi can use the dimensions taken by us to modify and improve the present design. A little R&D in this area by Researchers like shock absorbing system, casing strength, Seat comfort ability, Safety issues could be focused and could be beneficial to daily commuters.

It is recommended to use the anthropometric measurements of all categories and to develop a single design that is economical, ergonomically fit, structurally stable and equipped with all safety standards and it is an appeal to the Government to establish regulatory framework and manufacturing policies and set a committee of Research and Development in this area to avoid accidents and to safeguard the lives of the common man.

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