

PAPER • OPEN ACCESS

## Design of Bus Depot Terminal Element Consideration for Safe and Effective Infrastructure

To cite this article: V. Rajeshkumar *et al* 2021 *IOP Conf. Ser.: Mater. Sci. Eng.* **1145** 012079

View the [article online](#) for updates and enhancements.

You may also like

- [Time-dependent distribution of SN-38 from injectable polymeric depots in brain tumor model](#)  
Chawan Manaspon, Khuanjit Chaimongkolnukul, Kanchana Kengkoom et al.
- [Visualization of subcutaneous insulin injections by x-ray computed tomography](#)  
M Thomsen, M Poulsen, M Bech et al.
- [Analysis of robustness of urban bus network](#)  
Tao Ren, , Yi-Fan Wang et al.



**ECS**  
The  
Electrochemical  
Society  
Advancing solid state &  
electrochemical science & technology

**DISCOVER**  
how sustainability  
intersects with  
electrochemistry & solid  
state science research

## Retraction

### **Retraction: Design of Bus Depot Terminal Element Consideration for Safe and Effective Infrastructure (*IOP Conf. Ser.: Mater. Sci. Eng.* **1145** 012079)**

Published 23 February 2022

This article (and all articles in the proceedings volume relating to the same conference) has been retracted by IOP Publishing following an extensive investigation in line with the COPE guidelines. This investigation has uncovered evidence of systematic manipulation of the publication process and considerable citation manipulation.

IOP Publishing respectfully requests that readers consider all work within this volume potentially unreliable, as the volume has not been through a credible peer review process.

IOP Publishing regrets that our usual quality checks did not identify these issues before publication, and have since put additional measures in place to try to prevent these issues from reoccurring. IOP Publishing wishes to credit anonymous whistleblowers and the [Problematic Paper Screener](#) [1] for bringing some of the above issues to our attention, prompting us to investigate further.

[1] Cabanac G, Labbé C and Magazinov A 2021 arXiv:[2107.06751v1](#)

Retraction published: 23 February 2022



Content from this work may be used under the terms of the [Creative Commons Attribution 3.0 licence](#). Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

Published under licence by IOP Publishing Ltd

# Design of Bus Depot Terminal Element Consideration for Safe and Effective Infrastructure

V.Rajeshkumar<sup>1</sup>, S.Logeswaran<sup>1</sup>, R.Selvaraj<sup>2</sup>, Abishek<sup>1</sup>, DeviDharshini<sup>1</sup>, Aravind<sup>1</sup>, Dhivakar<sup>1</sup>

<sup>1</sup>Department of Civil engineering, KPR Institute of Engineering and Technology, Coimbatore

<sup>2</sup>Swamy Builders, Erode.

<sup>1</sup> rajeshkumar.v@kpriet.ac.in

**Abstract.** Bus transport in India is the main mode of transport in the 21st century for both intercity and interstate services. NUTP (National Urban Transport Policy) 2006 focussed the development of bus transport in Indian cities. They developed JNNURM policy for improving intercity bus services. Large part of bus transport is catered by private sector in 2020 than government sector in India. Without improving the level of service in depot areas, the bus accessibility and operational efficiency cannot be achieved. In order to improve the LOS certain strategy has to be followed in depot elements such as depot infrastructure improvement, planning guidelines for platform infrastructure, and design elements for achieving the increased LOS. This paper explains the standards for individual element in Bus depot to be followed for effective utilisation and functioning of facilities provided. The specific guidelines, standards and toolkits are the most effective format for capacity building in an organisation. It also facilitates low cost with rapid sharing of knowledge and experience. Additionally, no stake holder requirement is overlooked and ensures the minimum standards of development.

**Keywords:** Turnout, capacity, Depot elements

## 1. Introduction

A bus depot is a large area facilitates for parking the buses and mainly provided for maintenance and repair purpose. The demand of bus depot depends on the number of buses coming for halt and the capacity existence [1-5]. The poor infrastructure followed in the existing system of design makes the threat to effective area utilization. The best mode of infrastructure can be followed by demanding the common design concepts in design elements. There are various factors must be considered while deciding the new bus depot design [6-10]. The following are some of the components that must be considered while going for bus depot setup,

1. Entrance/Exit of the depot,
2. Parking (External such as private vehicles)
3. Parking (Internal for Buses)
4. Fuel station
5. Maintenance workshop



6. Cleaning and water service area
7. Administration facility for recording
8. Surveillance area
9. Storage facility
10. Future extension gap

## 2. Literature review

### Guidelines for bus depot

The nationwide development of public transport especially in road sector forces major changes in design of terminal areas. One such parameter of bus terminus design includes the design of bus depot. The certain issues may be present in the existing terminals (in common),

- Insufficient entry and exit width/Improper orientation adjacent to road access
- Improper parking configuration
- Proper utilization of parking space for buses available
- Insufficient number of bays
- Turning radius issues
- Improper public utility area
- Future land acquisition is not possible
- Terminal area and Environmental factors
- Distance between the bus terminus and existing bus depot
- Difficulty in access
- Economic losses

Certain changes in existing design of the terminal should be made to accommodate the future expansion and congestion simultaneously.

### Methods of analysis of newly proposed data

Game theory can be the way to identify the maximum utilization of depot area. This can enhance the performance analysis of present and future traffic handling capacity.

## 3. Particularization and Dimensions

- The Number of bays provided as per requirements of buses is 160
- Men's toilet
  - Washbasin- 2 x 2 inch
  - Toilet- 3 x 4 inch
  - Urinals- 1.5 x 2 inch
  - Men's toilet- 24 x 22 inch
- Women's Toilet
  - Washbasin- 2 x 2 inch
  - Toilet- 3 x 4 inch
  - Women's Toilet- 27x 22 inch
- A Building with size 190 x 260 inch has 4000 racks of automated car parking area with a capacity of 5200 cars.
- A building with size 275 x 275 inch has 730 racks of automatic bike parking area with a capacity of 800 bikes.

## 4. Design strategy

- Two general options can be proposed for redeveloping the improved the sectorial bus terminal area. It is based on the static and dynamic bay arrangement which differs in numbers, loading arrangements or maintenance bays with ideal bays. Spatial re-organization and infrastructure

improvements are proposed with the goal to enable enhanced, efficient bus and passenger circulation.

- Overall improvement at the terminal can be done through resolving conflicts and other issues related to circulation.
- Internal bus circulation will be planned with static and dynamic bay allocation. In order to improve the efficiency and conflict points it is planned for streamlined buses and passenger circulation. Offloading bays are not taken in the present infrastructure.
- Apart from this, the depot's entrance gate is proposed to be shifted to the opposite edge (adjoining the external road) in order to allow access from the main road instead of ISBT parking area.

#### Bay type:

- Idle and Unloading operations and common bays Loading are taking place in a same bay
- Idle and Unloading operations and segregated bays Loading takes place at different bays

#### Depot Size:

- Peak bus flow (Small) < 60/hr
- Bus Flow (Medium type) > 60/hr < 300/hr
- Peak Bus Flow (Large type) > 300/hr

### 5. Conclusion

The bus terminal elements suffers due to irregular pattern of flow of buses but in case of depot due to change in alignment of location of bus maintenance and its actual duration it leads to queue formation. In order to avoid the concept of mis-alignment the factor sectorial bus pattern has to be followed. The regional sector helps the drivers to flow a mean free space path.

### References

- [1] Azhar Al-Mudhaffar, Albania Nissan, Karl-Lennart Bang *Bus stop and bus terminal capacity Transportation Research Procedia* **14** ( 2016 ) 1762 – 1771.
- [2] BRT Planning guide (ITDP) *Isambad Kingdom Brunel A set of guidelines to approach station design based on station sizing.*
- [3] Bhargav Adhvaryu *Design of Bus station: A case study of Brighton in Traffic Engineering and control*, May 2006. [www.researchgate.net/publication/266020731](http://www.researchgate.net/publication/266020731).
- [4] Bhubaneswar Development Authority (BDA) *Architectural and Urban Design for Developing Inter State Bus Terminal (ISBT) at Baramunda, Bhubaneswar Detailed Project Report Volume I: Main Report*, December 2017.
- [5] Jiangfeng Xi, Quan Wang, Tongqiang Ding, Lili Zheng, Shengli Wang, and Wei Li *Research on the Coordinated Design of Bus and Taxi Station* Hindawi, **2015**, Article ID 372496, 5 pages.
- [6] A. Haldorai and A. Ramu, Security and channel noise management in cognitive radio networks, *Computers & Electrical Engineering*, vol. **87**, p. 106784, Oct. 2020. doi:10.1016/j.compeleceng.2020.106784
- [7] A. Haldorai and A. Ramu, Canonical Correlation Analysis Based Hyper Basis Feedforward Neural Network Classification for Urban Sustainability, *Neural Processing Letters*, Aug. 2020. doi:10.1007/s11063-020-10327-3.
- [8] SRA &SKF (2004). *Road Design*. Swedish Road Administration SRA (Vägverket) and Svenska kommunförbundet SKF.
- [9] Sumeet Kumar Jaiswal *Busway Platform Bus Capacity Analysis A thesis submitted for the degree of Doctor of Philosophy*, Queensland University of Technology December 2010.

- [10] Viswanathan Rajeshkumar *Archives of Civil Engineering Performance evaluation on selection of formwork systems in high rise buildings using regression analysis and their impacts on project success* **LXV**(2) 2019.

Retracted