

# URBAN RAIL TRANSIT DESIGN MANUAL

(英) 路易斯·维达尔 / 编  
杨子玉 孙阳 / 译

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## 图书在版编目 (CIP) 数据

城市轨道交通设计手册/ (英) 维尔达 编; 杨子玉, 孙阳 译.

— 沈阳: 辽宁科学技术出版社, 2013. 10

ISBN 978-7-5381-8151-7

I. ①城… II. ①维… ②杨… ③孙… III. ①城市轨道交通—设计—手册 IV. ①U239.5-62

中国版本图书馆 CIP 数据核字 (2013) 第 152294 号

出版发行: 辽宁科学技术出版社

(地址: 沈阳市和平区十一纬路29号 邮编: 110003)

印刷者: 利丰雅高印刷 (深圳) 有限公司

经销者: 各地新华书店

幅面尺寸: 215mm×285mm

印 张: 17

插 页: 4

字 数: 80千字

印 数: 1~1200

出版时间: 2013年 10 月第 1 版

印刷时间: 2013年 10 月第 1 次印刷

责任编辑: 陈慈良 孙 阳

封面设计: 周 洁

版式设计: 周 洁

责任校对: 周 文

书 号: ISBN 978-7-5381-8151-7

定 价: 298.00元

联系电话: 024-23284360

邮购热线: 024-23284502

E-mail: lnkjc@126.com

<http://www.lnkj.com.cn>

本书网址: [www.lnkj.cn/uri.sh/8151](http://www.lnkj.cn/uri.sh/8151)

# FOREWORD

## 前言

### Designing stations for the 21st century: a major challenge

The mobility of people and goods is inextricably associated with the development of countries and social interaction. Cities could not exist or trade without efficient transport systems and a high and increasing mobility should be considered as one of the main defining elements of development of a society.

Historically the productive development of the 19th century is inseparable from the arrival of a new mode of transportation: the railroad. Therefore, stations emerged as a new typology of buildings addressed to organize the traffic of people and goods with a main objective underneath: effectiveness.

Hence, from its origins, stations appeared linked to the concept of process, development and evolution becoming a symbol of the new times. 19th century stations have been many times pictured by cinema and art and they are represented in the collective imaginary linked to the ideas of smoke, agglomeration and fuss. Meanwhile, the path that stations have taken to evolve is looking for more organization, cleanliness and creating hyper-coded spaces to fulfill new necessities while cities expand, population grows and means of transport multiply.

Velocity is per se the definition of this global era, the world is moving very fast due to technology and the way we travel today has changed consistently. So, thinking how to design the stations of the future has become a major challenge for architecture, whose aim is giving functional solutions to future needs.

Stations today should apply the concepts of tomorrow and the latest developments, from self-produced and sustainable energy supplies, revolutionary security concepts, e-ticketing and near-field communication to groundbreaking architectural designs which help improve passenger flows.

### Sustainability and greener stations: From the age of steam to the new era of renewable energies

Even though electric rail travel is considered to be a rather sustainable form of public transport, railway stations usually have soaring energy demands and high carbon footprints. To make the necessary step into a greener future, we need to bid farewell to the age of steam and welcome a strong commitment to develop renewable energy for self stations.

### Architecture at the service of the passenger

Apart from a social responsibility, Architecture can have the capacity to influence people's life and the ability to reduce the stress caused by time restrictions that a passenger could face when using a station. Some architectural decisions such as legibility of buildings, a clean articulation of flows or a good illumination, preferably with natural light, can help the passenger to have a satisfactory non-stressful experience.

### 21世纪的车站设计：一项重大的挑战

人和货物的流动性与国家和社会活动的发展有着千丝万缕的关系。没有高效的交通运输系统城市无法存在，贸易也无法进行，较高的和不断增加的流动性是社会发

展的一项主要构成元素之一。历史上，19世纪生产力的发展与一种新型的交通运输方式：铁路，密切相关。因此，车站作为一种新型建筑物出现在人们的视野中，它确定了人和货物的运输主要目标：效率。

因此，从车站的起源说起，车站的出现与新时代的变化过程有关，在这一过程中车站发展并逐步演变成新时代的象征。19世纪的车站已经多次在电影院和艺术作品中出现，它们的出现伴随着烟雾缭绕的场景。随着时代发展车站的铁轨线路也发生了变化，它们变得更加整齐且有秩序，同时车站也创建多层空间以满足城市扩张、人口增长和交通运输多样化所带来的新需求。

速度是这个全球化时代的新定义，技术发展使得我们的世界正在快速的运转，并已经彻底的改变了我们的移动方式。所以，思考如何设计未来车站已经成为建筑行业的一项主要挑战，其目的是为了给未来需求提供功能性的解决方案。

### 可持续发展的绿色车站：从蒸汽时代到可再生能源时代

即使是被称作可持续化公共交通工具的电气化列车，其车站也经常具有飞涨的能源需求和较高的碳消耗量。为了创建绿色未来，我们需要告别蒸汽时代，致力于发展可再生能源车站。

### 建筑服务于乘客

除了一定的社会责任之外，建筑有能力影响人们的生活，并且能够减少乘客在使用车站时必须面临时间限制压力。一些建筑方面的决定如功能区的可识别性、规划合理的线路或者采用自然光线的绝佳光照条件，可以使得乘客拥有一种满意轻松的乘坐体验。

### 智能化的城市公共交通网络：智能车站

技术发展上的快速前进和人流量的大幅度提高需要人们在即时信息或售票系统之间寻找更高速高效的新的解决方案。

可使用手机或电子设备的智能车站还远不是我们理想世

## **Towards an intelligent network of urban public transport: smart stations**

The unstoppable advance of technology and the large increase in the number of passengers has caused the need to find new solutions that allow greater speed and efficiency, between other in systems of instant information or ticketing systems.

Smart stations with services at the reach of our cell phones or electronic devices is far from utopic but we still have a vast land to explore. For example, after more than 150 years of paper tickets, purchasing management train tickets appears to be entering a new era.

## **Future security**

In the post-9/11 world, security is an absolute top priority, especially at major transport hubs. Given that rail and subway networks carry as many passengers as major stations but use only a fraction of the security measures, operators globally are working on new measures to beef-up security methods like access control, metal detection and even biometrics.

Although terrorism countermeasures will be the subject of ongoing research and investment for rail operators and governments, major effort is also being dedicated to protecting passengers and stations from more menial crimes like theft, assault and vandalism.

## **Designs to impress: the influence of stations**

Stations should face the challenge of functionality by being equipped with a logical, functional and strategic profile, including bioclimatic aspects, workplace design without forgetting the importance of integration in its territory.

In this line, impressive and futuristic shapes resembling modern stations combined with sustainable materials and enhanced passenger and transportation flow concepts make many of the new constructions revolutionary architectural and public transport models.

Concluding, this book compiles the main characteristics that define contemporary stations, the different typologies that have arisen (from a subway station or the high-speed railway stations to the urban commuter hubs) helping us articulate the main traces of these contemporary buildings through practical examples coming from all around the world and showing that stations today are starting to be thought in the language of the future.

界中的乌托邦，我们仍需要去探寻这片广袤的土地。例如，在使用了超过150年的纸票之后，售票系统也可进入一个全新的时代。

## **未来安全因素**

安全因素在“911事件”后的世界中绝对是重中之重，特别是那些主要的交通枢纽。鉴于交通运输网络的大承载量，主要换乘站的乘客仅需要使用小部分的安检措施，全球的运营商正在研发新的安检措施例，如安检通道、金属探测，甚至生物识别技术。

虽然铁路运营商和政府正在着手如何应对恐怖主义，但是同时他们更着重于打击更多的小型犯罪，如盗窃、袭击和破坏。

## **令人印象深刻的设计：车站设计成果**

车站面临着来自空间布局的逻辑性、功能性和外观设计方面的挑战，包括生物气候和体现设计一体化重要性的工作场所设计。

拥有创新型未来建筑造型的现代车站与可持续性材料相结合，同时加强了客运和交通路线概念，从而产生了革命性的新建筑结构和公共交通模式。

综上所述，这本书囊括了现代车站的主要特点和目前已有的车站种类（从地铁站或高速铁路站到城市客运枢纽），通过世界各地的实际案例帮助我们描绘出当代建筑地图，同时还说明今天的这些车站设计正在开始向未来发展需求方向转变。

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The unstoppable advance of technology and the large increase in the number of passengers has caused the need to find new solutions that allow greater speed and efficiency, between other in systems of instant information or ticketing systems.

Smart stations with services at the reach of our cell phones or electronic devices is far from utopic but we still have a vast land to explore. For example, after more than 150 years of paper tickets, purchasing management train tickets appears to be entering a new era.

## **Future security**

In the post-9/11 world, security is an absolute top priority, especially at major transport hubs. Given that rail and subway networks carry as many passengers as major stations but use only a fraction of the security measures, operators globally are working on new measures to beef-up security methods like access control, metal detection and even biometrics.

Although terrorism countermeasures will be the subject of ongoing research and investment for rail operators and governments, major effort is also being dedicated to protecting passengers and stations from more menial crimes like theft, assault and vandalism.

## **Designs to impress: the influence of stations**

Stations should face the challenge of functionality by being equipped with a logical, functional and strategic profile, including bioclimatic aspects, workplace design without forgetting the importance of integration in its territory.

In this line, impressive and futuristic shapes resembling modern stations combined with sustainable materials and enhanced passenger and transportation flow concepts make many of the new constructions revolutionary architectural and public transport models.

Concluding, this book compiles the main characteristics that define contemporary stations, the different typologies that have arisen (from a subway station or the high-speed railway stations to the urban commuter hubs) helping us articulate the main traces of these contemporary buildings through practical examples coming from all around the world and showing that stations today are starting to be thought in the language of the future.

界中的乌托邦，我们仍需要去探寻这片广袤的土地。例如，在使用了超过150年的纸票之后，售票系统也可进入一个全新的时代。

## **未来安全因素**

安全因素在“911事件”后的世界中绝对是重中之重，特别是那些主要的交通枢纽。鉴于交通运输网络的大承载量，主要换乘站的乘客仅需要使用小部分的安检措施，全球的运营商正在研发新的安检措施例，如安检通道、金属探测，甚至生物识别技术。

虽然铁路运营商和政府正在着手如何应对恐怖主义，但是同时他们更着重于打击更多的小型犯罪，如盗窃、袭击和破坏。

## **令人印象深刻的设计：车站设计成果**

车站面临着来自空间布局的逻辑性、功能性和外观设计方面的挑战，包括生物气候和体现设计一体化重要性的工作场所设计。

拥有创新型未来建筑造型的现代车站与可持续性材料相结合，同时加强了客运和交通路线概念，从而产生了革命性的新建筑结构 and 公共交通模式。

综上所述，这本书囊括了现代车站的主要特点和目前已有的车站种类（从地铁站或高速铁路站到城市客运枢纽），通过世界各地的实际案例帮助我们描绘出当代建筑地图，同时还说明今天的这些车站设计正在开始向未来发展需求方向转变。

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# CHAPTER ONE OVERVIEW OF URBAN RAIL TRANSIT STATION DESIGN

## 1. Station Design Parameters

Transit station planning and design is comprised of six principles delineating the parameters of a successful station. The methods include, integration into the contextual fabric, accessibility via multiple modes, functional simplicity, security, comprehensive systems sustainability, articulation of form and identity and finally the incorporation of arts in transit. The features of these parameters are discussed in greater detail.

### 1.1 Integration into the Contextual Fabric

One of the basic components of station design factors is where a station responds to its surroundings through architectural elements. These surrounding factors include appropriate design measures to provide protection from environmental and climatic elements such as wind, rain, heat, etc. In addition, transit station design should also be sensitive to its context and associated cultural factors. A well-integrated station works symbiotically with its context to provide facilities and amenities to the passengers as well as surrounding residents and business owners.

Incorporation of transit-compatible uses, such as day care centres, dry cleaners, shoe/watch repair shops, coffee shops and small restaurants, provide increased incentives for the public to use transit and also create revenue mechanisms for the transit system (i.e. through space lease agreements, etc). Transit stations also offer unique opportunities for cultural integration through the designation of open spaces and plazas that can serve as dynamic gathering nodes within the urban fabric. Finally, stations often become iconic landmarks for the community and whether it is through the use of vernacular architecture or local building materials and methods, the transit station should relate to the user and the user's environment. Station architecture and

## 第一章 城市轨道交通设计概述

### 1. 城市轨道交通设计的基本参数

中转站的规划和设计由六条原则构成，这些原则划定了一个成功车站的参数，内容包括与周围设施相融合，可通过多种模式进入，功能简单、安全，可持续发展的综合系统，形式和特性的衔接，并最终将艺术纳入其中。这些参数的特性应被更详细地讨论。

#### 1.1 与城市设施的整合性

与周围的建筑元素相呼应，是车站设计要素的基本组成部分之一。这些环境因素包括适当的设计措施，以保护环境和气候因素，如：风、雨、热等，此外，车站的设计也应该反映其周围相关的文化因素。整合良好的综合车站通过为乘客以及周围居民和商业雇主提供设施和设备，与其周边环境共生。

可纳入与交通兼容的用途，如日间护理中心，干洗店，鞋/手表修理店，咖啡馆和小餐馆以鼓励大众使用交通运输设施，同时为系统创造更多收入（例如通过空间租赁协议等）。车站还通过指定开放空间和广场作为聚会的城市设施，提供独特的文化整合的机会。最后，车站往往成为一个区域内的地标性建筑。无论是否使用当地的建筑或当地的建筑材料和方法，车站都应与用户和用户的环境相关联。建筑架构和细节应为使用者创造一个温馨、安全、舒适的环境，以鼓励更多人更频繁的使用交通设施。