

INDUSTRIAL BUILDING DESIGN

工业建筑设计

(德) 朱利安·韦尔 编 常文心 孙阳 译

辽宁科学技术出版社

INDUSTRIAL BUILDING DESIGN

工业建筑设计

(德) 朱利安·韦尔 编 常文心 孙阳 译

图书在版编目 (CIP) 数据

工业建筑设计 / (德) 朱利安·韦尔编 ; 常文心, 孙阳译. — 沈阳 : 辽宁科学技术出版社, 2017.6
ISBN 978-7-5591-0165-5

I. ①工… II. ①朱… ②常… ③孙… III. ①工业建筑—建筑设计 IV. ①TU27

中国版本图书馆 CIP 数据核字 (2017) 第 073334 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 25 号 邮编: 110003)
印刷者: 辽宁新华印务有限公司
经销者: 各地新华书店
幅面尺寸: 215mm×285mm
印 张: 16
字 数: 150 千字
出版时间: 2017 年 6 月第 1 版
印刷时间: 2017 年 6 月第 1 次印刷
责任编辑: 杜丙旭 王丽颖
封面设计: 关木子
版式设计: 关木子
责任校对: 周 文

书 号: ISBN 978-7-5591-0165-5
定 价: 218.00 元

联系电话: 024-23280367
邮购热线: 024-23284502
<http://www.lnkj.com.cn>

Industrial Building – Exciting Architecture

工业建筑——令人兴奋的建筑体

Industrial architecture, with all its importance to society, is often regarded as a predominantly engineered discipline, but there are other aspects to it which transcend the purely functional. Historically, the calculated rationality of early industrial constructions became one of the main inspirations for the modernist 'international' style of architecture eager to get rid of historicist references and ornamental décor. Today, the 'rational' has largely become an image which often obscures the underlying differences between industrial architecture tailored for a single process, and other more ad-hoc uses.

Industrial architecture in this way is still different from other programmes, but where it once was dominated by forms and typologies specific to each type of industry; it is today more a standardized system of components which can adapt to various uses in an almost one-size-fits all way – the big box.

However, industrial architecture, like any other type of construction, should be judged upon its performance, and not solely its appearance. The distinction between when a structure may be called architecture, and when it is mere building, is not a question of form: It is not about how good a design looks, but rather how it works, what it sets out to do, and in what way it gives quality to its users.

In our own architectural work, we firmly believe in 'inside-out' design – in the sense of buildings designed not as shiny exterior images, but rather devised as a response to the needs and requirements of people. In the industrial sector, it is even more apparent that designing from the inside and out is the only meaningful approach, focusing on both the various processes the buildings are meant to accommodate as well as the human users – an evident approach which, surprisingly, is not always seen. Often the big-box structures are little more than a backdrop to a huge sign, despite the occasional colour or 'architectural' gimmick.

These types of industrial buildings are also generally land consuming, energy demanding and depending on large-scale infrastructure, which makes them an all the more interesting subject for fresh thinking: Good design, energy savings and ecological rethinking can make a real difference in the industrial sector – and turn what might have been banal into exciting architecture.

Lately, new possibilities may be opening up: Industry, commerce and distribution, which historically evolved near waterways, urban centres or railroads, in recent times took over a new territory – the suburban roadside 'corridors'. This can be seen as a natural consequence of the nature of the industrial environmental

工业建筑因其对社会的重要性通常被视为占主导地位的工程门类，但是除了纯粹的功能性之外还涉及其他多个方面。历史上，早期工业建设经规划测算后得出的合理性成为急于摆脱历史以及观赏性装饰的现代主义“国际”风格建筑的主要灵感来源。“合理性”现在已经成为工业建筑的主要形象，但这经常使为个别加工过程量身打造的工业建筑与为其他更特别用途而建造的工业建筑之间潜在的差别变得模糊起来。

但是，一旦受形态和各产业类型的特性主导，工业建筑仍由此与其他工程项目不同。如今，工业建筑已经是一个标准化的组件系统，以通用的形式——大框架——应对各种使用需求。

然而，与其他任何一种建筑类型一样，对工业建筑的判断应建立在其性能而不只是外观上。建筑与建筑物之间的区别不在于它们的形态：这与设计看起来如何好无关，而是在于它如何发挥作用，将要做什么，以及以何种方式为其使用者提供优质服务。

我们在建筑创作过程中始终坚信“突出内在”的设计——认为建筑物的设计不在于光鲜亮丽的外表，而应该满足人们的需求和要求。在工业领域，这种从内在出发进行的设计更为明显，而外部的形象设计只是一种象征性的手段，我们关注的是建筑物将要容纳的各种工作程序以及身处其中的使用者，这是一种显而易见的设计方法，奇怪的是，这种方法并不常见。大框架结构往往代表着巨大，无论它采用了哪种不常见的色彩或者利用了某些“建筑上的”噱头。

此外，这类工业建筑通常要占用土地、消耗能源，依赖于大规模的基础建设，这使工业建筑成为新思维更感兴趣的设计题目：好设计、节约能源和对生态的反思可以为工业领域的设计带来切实的改变——将一个可能平庸的建筑转变成令人兴奋的建筑体。

最近可能会出现新的可能性：工业、商业和物流集散这些以前在水路、城市中心或者铁路旁落地发展的行业，近来占领了新的领地——郊外公路旁的“交通走廊”。我们可以将其视为工业发展对自然环境影响的正常结果，工业确

impacts, which indeed contributed plenty of problems such as extensive land use, pollution, noise, traffic etc. which are still issues to be dealt with today. But the changing nature of the industrial environmental performance may open up completely new perspectives where production and urbanity could again become neighbours.

Today's lighter, more adaptable and in many cases more integral production processes could lead to a shift. There is plenty of potential in such a re-integration of industry and urbanity: transportation may be reduced, surplus heat from processes or cooling may be recovered and employed in residential buildings, or completely new hybrids may be created.

All in all, this can become a relevant contribution to a new industrial design ethic, where waste is treated as a resource, energy is recycled, and where mechanical processes and the human scale are reconciled, keeping in mind that these buildings are not primarily made for machines, but for humans: However much automatics and robotics prevail, industrial buildings are still workplaces for people, and there is no reason why these workplaces should be of lesser quality than any other working environment.

Julian Weyer
Partner, Architect maa.
C.F. Møller Architects

实导致大量问题出现，例如过度占用土地资源、污染、噪音、交通等，这些至今仍是亟待解决的问题。但是从本质上改变工业环境性能可以开启全新的发展前景，即生产与城市再次成为朋友。

如今的工业发展更轻型、更具适应性，在许多情况下，更多综合性的生产程序将产生变化。工业与城市的重新整合有许多潜在的可能性：可以减少交通运输，生产过程中产生的过剩热能或制冷能量可以在住宅建筑中得以再利用，或者产生出全新的混合体。

总而言之，这能为新的工业设计道德规范做出相应的贡献，即：视废弃物为资源，对能源进行再回收利用，使机械加工处理与人员规模形成和谐关系，始终牢记这些建筑物首先不是为机器而造，而是为人类：即使大量的自动机械与机器人技术盛行，工业建筑仍然是人类的工作场所，没有任何理由可以让这些工作场所比其他任何工作环境差。

朱利安·韦尔
合伙人，建筑师
C.F.默勒建筑事务所

Industrial Buildings Have Been Inserted into the City Everyday Discourse

让工业建筑插入城市日常生活

Industrial

Relating to or characterized by industry
Designed or suitable for use in industry

Architecture

The art or practice of designing and constructing buildings
The complex or carefully designed structure of something

Dédalo was a very famous Greek architect. Ícaro, was Dedalo's son, builder of Crete's labyrinth. He taught everything to him. Sculpture, Architecture and the freedom desire. 'Men have no wings, but we will build it and then we can fly' Icaro finds daring the plan of this genial architect, that was his father. Icarus fascinated because of the lightness of his body in the air, don't belong to his father anymore, he decided to fly.

Jean Prouvé, builder, steel worker, engineer and French designer, was who designed in 1957 one of the first systems of steel Light facades to be produced in a factory. He dedicated his life in order to integrate industry and architecture and was a visionary, like Henry Ford in the automotive world.

'Not normal that a house is built in two years and a car in two days. Never design anything you can not produce' Jean Prouvé.

Buckminster Fuller, contemporary with Prouvé, asked to a young Norman Foster, collaborator then in his office... How much does your building weigh, Mr. Foster? In this times of technology, we should escape from this constructive labyrinth, where we are in and bet for a lighter architecture. Approach buildings as industrial products. [industrial architecture]

Recover the spirit of a quality construction, started in the first part of the last Century, when the mirror to look at, was automotive, Aeronautic and the arms industry [study houses in California, Charles and Ray Eames, Mies Van Der Rohe, etc...]. We should try to export this idea of construction model much closer of the avant-garde industrial, to any kind of building and programs [housing, cultural, commercial, etc...]

A little bit by chance, like most of these things used to happen, a little bit looping for it, we get to develop a line of work in the limits of the industry. Building in Port and postindustrial areas, in the city-industry, city-sea and sea-industry border. There is where we feel comfortable, in the ZAL, near of the containers, of the train rails, of the cranes, pipes. Places that remember me landscape of my childhood, to architectures always reference, Vaquero Palacios, Castela... [industrial romanticism]

The heavy construction is a question of the past. Why not to think in a new

产业属性

建筑特点与工业种类有关或者由工业种类决定
建筑专门为工业使用而设计或者适用于工业领域

建筑属性

建筑设计和建造中的艺术效果或实践过程
复杂或细致的建筑结构

Dédalo是一位非常有名的希腊建筑师，Ícaro是Dédalo的儿子，也是克里特岛迷宫的建造者，他继承了父亲Dédalo的衣钵和精神——雕塑、建筑和对自由的渴望。“人没有翅膀，但是我们可以创造出翅膀，这样我们就可以自由翱翔了。” Ícaro从他父亲，这位天才建筑师身上继承了大胆的设计风格，同时他还因为身心自由而感到欣喜若狂，所以他决定要在设计的天空中自由翱翔。

让·普鲁威（建筑师、钢铁工人、工程师和法国设计师）在1957年设计了第一种可在工厂生产的轻型钢结构外墙系统。他一生都致力于将工业和建筑结合在一起，并且他像汽车界的亨利·福特一样是个有远见的人。

“花费两年时间建好一座房子和花费两天时间造出一辆汽车都是不可能的事情，所以不要设计出无法生产的东西”，让·普鲁威说。

巴克米斯特·福勒，与普鲁威是同一时代的人，他曾问那时在他的工作室工作的年轻的诺尔曼·福斯特：福斯特先生，您的建筑重量是多少？

在这个充满技术的时代，我们应该从这种结构迷宫中逃脱出来，尝试寻找更轻便的建筑结构并将建筑看成工业产品。【工业建筑】

从20世纪初期开始向历史的镜子中看去，会依次出现汽车、航空器和军火工业（加利福尼亚研究站、查尔斯和瑞·埃姆斯、密斯凡德罗等），我们应延续这些以往高品质建筑的精髓。我们应该设法将这种结构模型构思传播出去，使其贴近一线工业生产，同时也将这种想法传递到其他种类的建设和项目中（住宅、文化、商业等）。

从一个偶然的机会到一点点的循环发展，世间万物往往都是这样开始的，我们在工业行业的限制内开始了一系列的建设工程，从港口工业区和后工业化区域到城市工业区，从城市与海的边界到海与工业区的边界。在集装箱、火车

way of building, really sustainable, more over than 'this fashion word', a light construction, dry, fast, flexible, close to industrialization, that allows an easy deconstruction, recyclable, and with short times. The lightness of new materials and solutions, that allows big formats and an easy manipulation of them, linking the production process, design and work on site. [new architectures]

Projects born from industrialization, dynamics and built in shorter times, that can be moved, grow or decrease with the pass of the time and the needs of the place. Spaces close to industry and in progress, always linked to the city. This areas so good reflected in some movies from Wim Wenders, Kaurismäki, Kim Ki duk ... Places where the urbanism becomes imperfect, where imperfection becomes beauty, where the sea and heavy industry is breathed. We try to go deeper in this 'imperfection' of the landscape and of the industrial architecture, that hides a manufacturing constructive functionality. [aesthetic imperfection]

On the other hand, it is interesting that the industrial typology, not remain relegated to only certain areas on the outskirts of the city, industrial areas, etc ... We should be able to open, some of these facilities to the city and its relation to the citizens. New uses for industrial spaces uninhabited, but also do it with buildings of new construction, which may form part of the city as a cultural container, a sports promptly, to advocate for mixture of uses, times, flows, that not relegate industrial type to residual elements in the city limits.

Make the city aware of the industrial buildings that has and the great possibilities to use them, either permanent or temporary. Numerous examples that have been born with a vocation of industrial architecture, have managed somehow to be inserted into the city everyday discourse. Major Railway Stations of the early twentieth century, the great Piers of southern England or the most common spaces in U.S. industrial buildings and warehouses, recovered household and nowadays called Lofts...

Sergio Baragaño
Architect. Founder and Director
[Baragaño]

轨道、起重机和管道旁，我们感到舒适安逸，这样的区域使我想起儿时记忆中的那片故土，同时建筑架构也可参照这些元素进行设计建造，例如建筑师巴盖罗·巴拉西奥斯、卡斯特劳等的作品。【工业浪漫主义】

建筑结构繁重是存在于过去的问题，为什么不以一种全新的方式看待建筑呢？建筑要做到真正的可持续发展，这已经不再是字面上的流行用语了，如今的建筑结构轻便、干燥、快速、灵活、贴近工业生产，更便于拆卸、回收并且施工期短。新材料和设计方案的亮点在于建筑师采用了大型且易于操控的结构，设计贴近一线工业生产流程和工

作场地。【新型建筑】
建筑项目源自工业化建设，它们动态感十足并且施工期短，会随着时间和地域需求的变化而变换地点、扩大或者缩小场地面积。建设中的工业区附近的空间通常与城市相连接，维姆·文德斯、考里斯马基和金基德的电影都很好反映出这种区域化特征。某些地域的城市化进程并不完善，这种不完善产生了特有的美感，使得周围的海域可以和重工业产业一同呼吸。我们试着深入到景观和工业建筑的这种不完善中去，这里隐藏着一种制造建设的功能性。

【缺憾美】
另一方面有趣的是，工业类型不会因为城市郊区、工业区等所带来的地域性问题而改变。我们应该将一部分设施面向城市并与城市居民生活连接起来，无人居住的工业区的新用途也需要新的建筑来完善，这样一来该区域可能成为城市文化和运动元素的一部分，体现出了功能、时间和线路等方面的优势，因此城市的地域上限制元素不会改变工业类型。

应该确保城市意识到工业建筑的存在，并会在很大程度上使用它们，无论这种使用是永久的还是暂时的。许多例子都很好的说明了工业建筑在城市中的地位，它们已经在设法插入城市每天的日常生活中。20世纪初期的主要火车站，英格兰南部的码头或者美国工业厂房和仓库，这些最常见的空间都使用了矩阵式结构，今天我们称之为顶楼。

塞尔吉奥·巴让甘尼
董事、创始人、设计师
巴让干尼建筑事务所

CONTENTS

目录

Industrial Building—Exciting Architecture	002	工业建筑——令人兴奋的建筑体
---	-----	----------------

Industrial Buildings Have Been Inserted into the City Everyday Discourse	004	让工业建筑插入城市日常生活
--	-----	---------------

CHAPTER ONE	008	第一章
DESIGN GUIDELINE OF INDUSTRIAL BUILDINGS		工业建筑设计指南

Urban Planning of Industrial Buildings	010	工业建筑的城市规划
--	-----	-----------

Urban Configuration of Industrial Enterprises	010	工业企业在城市中的配置
---	-----	-------------

Factors that Influence the Urban Configuration of Industrial Enterprises	012	影响工业企业在城市中的配置的因素
--	-----	------------------

Arrangement of Transportation	013	交通运输的布置
-------------------------------	-----	---------

Architectural Design of Industrial Buildings	014	工业建筑的建筑设计
--	-----	-----------

Main Considerations about Architectural Design	014	建筑设计的主要方面
--	-----	-----------

Architectural Design of Multi-storeyed Industrial Buildings	022	多层厂房的建筑设计
---	-----	-----------

Architectural Design of Single-storeyed Industrial Buildings	038	单层厂房的建筑设计
--	-----	-----------

Safety Precautions of Industrial Buildings	050	工业建筑的安全设计
--	-----	-----------

Sound Insulation	050	对噪声的削减
------------------	-----	--------

Architectural Anti-vibration	052	建筑防震
------------------------------	-----	------

Electromagnetic Shielding	053	电磁屏蔽
---------------------------	-----	------

Purification	054	净化
--------------	-----	----

Explosion and Fire Protection	055	防爆、防火
-------------------------------	-----	-------

Energy Conservation Measures	057	工业建筑的节能要点
------------------------------	-----	-----------

Proper Orientation and the Arrangement of Windows	057	合适的朝向和窗口布置
---	-----	------------

Day-lighting Concepts	058	自然采光
-----------------------	-----	------

Natural Ventilation of Outdoor, Indoor and Attic Spaces	058	室内外空间及阁楼的自然通风
---	-----	---------------

Direct Solar or Photovoltaic Energy	059	直接太阳能或光伏能
-------------------------------------	-----	-----------

Other Energy Measures	060	其他节能措施
-----------------------	-----	--------

Landscaping of Industrial Buildings	061	工业建筑的绿化
-------------------------------------	-----	---------

Functions of Landscaping	061	绿化的作用
--------------------------	-----	-------

Landscaping of Industrial Buildings	062	工厂的绿化布置
-------------------------------------	-----	---------

Exterior Lighting for Industrial Buildings	068	工业建筑室外场地的照明
--	-----	-------------

Importance of Exterior Lighting	068	室外场地照明的意义
---------------------------------	-----	-----------

Fixture Design	069	照明设施的设计
Parking Lot Lighting	071	停车场的照明
Pedestrian Area Lighting	071	步行区域的照明
Site Security Lighting	072	室外场地的安全性照明
Requirement for Luminance	072	亮度要求

CHAPTER TWO CASE STUDIES 074 第二章 案例研究

Multi-storeyed Industrial Buildings	076	多层厂房
Unilever Indosa Plant, Riverhourse Valley Industrial Estate – Durban, South Africa	076	河屋谷工业区联合利华加工厂 ——南非德班
Preisinger Winery	084	普利辛格酿酒厂
Winery Château Faugères	090	福日尔城堡酿酒厂
Marmelo MILLOliveira da Serra Olive Oil Mill	096	马麦隆橄榄油制造厂
Tabacco Factory Kanfanar	104	坎法纳尔香烟厂
Addcomm Group	112	艾德科姆集团
Metal Foundation	120	安塞乐米塔尔钢铁生产基地
Saint Gobain Glass	128	圣戈班玻璃公司
New Factory Building – ELIN Motoren GmbH	136	伊林发动机新工厂建筑
Hilti P4plus	144	希尔蒂 P4 大楼
Pack Line Ltd	152	包装线公司
Huga Fab III and Headquarters Building	158	广镓光电中科三厂暨总部大楼
ARGOS – Building for an Electrical Generator at a Cement Factory	164	阿格斯水泥厂发电站
Single-storeyed Industrial Buildings	170	单层厂房
Château Cheval Blanc	170	法国白马酒庄
Byass Winery	178	比亚斯酿酒厂
Olisur Olive Oil Factory and Offices	186	奥利索橄榄油工厂和办公室
Cargill Cocoa Production Plant ‘De Eenhoorn’	194	嘉吉可可工厂“独角兽”
MASCHINENFABRIK Liezen	202	利岑 MFL 铸造机械工程公司
GH Genhelix Biopharmaceutical Facilities	208	GH 生物制药公司
Vestas Wind Turbines Randers	216	兰德斯维斯塔斯风力涡轮机厂
KHS Machinery Plant	224	KHS 机械厂
Sede Social GM Vending	230	塞代 GM 公司
Waste Treatment Facility from Vallès Occidental in Vacarisses	236	瓦莱斯西区废物处理设施
Afvalstoffendienst 's-Hertogen bosch	244	斯海尔托亨博斯废物处理站

REFERENCES AND INDEX 252 参考资料及索引

INDUSTRIAL BUILDING DESIGN

工业建筑设计

(德) 朱利安·韦尔 编 常文心 孙阳 译

Industrial Building – Exciting Architecture

工业建筑——令人兴奋的建筑体

Industrial architecture, with all its importance to society, is often regarded as a predominantly engineered discipline, but there are other aspects to it which transcend the purely functional. Historically, the calculated rationality of early industrial constructions became one of the main inspirations for the modernist ‘international’ style of architecture eager to get rid of historicist references and ornamental décor. Today, the ‘rational’ has largely become an image which often obscures the underlying differences between industrial architecture tailored for a single process, and other more ad-hoc uses.

Industrial architecture in this way is still different from other programmes, but where it once was dominated by forms and typologies specific to each type of industry; it is today more a standardized system of components which can adapt to various uses in an almost one-size-fits all way – the big box.

However, industrial architecture, like any other type of construction, should be judged upon its performance, and not solely its appearance. The distinction between when a structure may be called architecture, and when it is mere building, is not a question of form: It is not about how good a design looks, but rather how it works, what it sets out to do, and in what way it gives quality to its users.

In our own architectural work, we firmly believe in ‘inside-out’ design – in the sense of buildings designed not as shiny exterior images, but rather devised as a response to the needs and requirements of people. In the industrial sector, it is even more apparent that designing from the inside and out is the only meaningful approach, focusing on both the various processes the buildings are meant to accommodate as well as the human users – an evident approach which, surprisingly, is not always seen. Often the big-box structures are little more than a backdrop to a huge sign, despite the occasional colour or ‘architectural’ gimmick.

These types of industrial buildings are also generally land consuming, energy demanding and depending on large-scale infrastructure, which makes them an all the more interesting subject for fresh thinking: Good design, energy savings and ecological rethinking can make a real difference in the industrial sector – and turn what might have been banal into exciting architecture.

Lately, new possibilities may be opening up: Industry, commerce and distribution, which historically evolved near waterways, urban centres or railroads, in recent times took over a new territory – the suburban roadside ‘corridors’. This can be seen as a natural consequence of the nature of the industrial environmental

工业建筑因其对社会的重要性通常被视为占主导地位的工程门类，但是除了纯粹的功能性之外还涉及其他多个方面。历史上，早期工业建设经规划测算后得出的合理性成为急于摆脱历史以及观赏性装饰的现代主义“国际”风格建筑的主要灵感来源。“合理性”现在已经成为工业建筑的主要形象，但这经常使为个别加工过程量身打造的工业建筑与为其他更特别用途而建造的工业建筑之间潜在的差别变得模糊起来。

但是，一旦受形态和各产业类型的特性主导，工业建筑仍由此与其他工程项目不同。如今，工业建筑已经是一个标准化的组件系统，以通用的形式——大框架——应对各种使用需求。

然而，与其他任何一种建筑类型一样，对工业建筑的判断应建立在其性能而不只是外观上。建筑与建筑物之间的区别不在于它们的形态：这与设计看起来如何好无关，而是在于它如何发挥作用，将要做什么，以及以何种方式为其使用者提供优质服务。

我们在建筑创作过程中始终坚信“突出内在”的设计——认为建筑物的设计不在于光鲜亮丽的外表，而应该满足人们的需求和要求。在工业领域，这种从内在出发进行的设计更为明显，而外部的形象设计只是一种象征性的手段，我们关注的是建筑物将要容纳的各种工作程序以及身处其中的使用者，这是一种显而易见的设计方法，奇怪的是，这种方法并不常见。大框架结构往往代表着巨大，无论它采用了哪种不常见的色彩或者利用了某些“建筑上的”噱头。

此外，这类工业建筑通常要占用土地、消耗能源，依赖于大规模的基础建设，这使工业建筑成为新思维更感兴趣的设计题目：好设计、节约能源和对生态的反思可以为工业领域的设计带来切实的改变——将一个可能平庸的建筑转变成令人兴奋的建筑体。

最近可能会出现新的可能性：工业、商业和物流集散这些以前在水路、城市中心或者铁路旁落地发展的行业，近来占领了新的领地——郊外公路旁的“交通走廊”。我们可以将其视为工业发展对自然环境影响的正常结果，工业确

impacts, which indeed contributed plenty of problems such as extensive land use, pollution, noise, traffic etc. which are still issues to be dealt with today. But the changing nature of the industrial environmental performance may open up completely new perspectives where production and urbanity could again become neighbours.

Today's lighter, more adaptable and in many cases more integral production processes could lead to a shift. There is plenty of potential in such a re-integration of industry and urbanity: transportation may be reduced, surplus heat from processes or cooling may be recovered and employed in residential buildings, or completely new hybrids may be created.

All in all, this can become a relevant contribution to a new industrial design ethic, where waste is treated as a resource, energy is recycled, and where mechanical processes and the human scale are reconciled, keeping in mind that these buildings are not primarily made for machines, but for humans: However much automatics and robotics prevail, industrial buildings are still workplaces for people, and there is no reason why these workplaces should be of lesser quality than any other working environment.

Julian Weyer
Partner, Architect maa.
C.F. Møller Architects

实导致大量问题出现，例如过度占用土地资源、污染、噪音、交通等，这些至今仍是亟待解决的问题。但是从本质上改变工业环境性能可以开启全新的发展前景，即生产与城市再次成为朋友。

如今的工业发展更轻型、更具适应性，在许多情况下，更多综合性的生产程序将产生变化。工业与城市的重新整合有许多潜在的可能性：可以减少交通运输，生产过程中产生的过剩热能或制冷能量可以在住宅建筑中得以再利用，或者产生出全新的混合体。

总而言之，这能为新的工业设计道德规范做出相应的贡献，即：视废弃物为资源，对能源进行再回收利用，使机械加工处理与人员规模形成和谐关系，始终牢记这些建筑物首先不是为机器而造，而是为人类：即使大量的自动机械与机器人技术盛行，工业建筑仍然是人类的工作场所，没有任何理由可以让这些工作场所比其他任何工作环境差。

朱利安·韦尔
合伙人，建筑师
C.F.默勒建筑事务所

Industrial Buildings Have Been Inserted into the City Everyday Discourse

让工业建筑插入城市日常生活

Industrial

Relating to or characterized by industry

Designed or suitable for use in industry

Architecture

The art or practice of designing and constructing buildings

The complex or carefully designed structure of something

Dédalo was a very famous Greek architect. Ícaro, was Dedalo's son, builder of Crete's labyrinth. He taught everything to him. Sculpture, Architecture and the freedom desire. 'Men have no wings, but we will build it and then we can fly' Icaro finds daring the plan of this genial architect, that was his father. Icarus fascinated because of the lightness of his body in the air, don't belong to his father anymore, he decided to fly.

Jean Prouvé, builder, steel worker, engineer and French designer, was who designed in 1957 one of the first systems of steel Light facades to be produced in a factory. He dedicated his life in order to integrate industry and architecture and was a visionary, like Henry Ford in the automotive world.

'Not normal that a house is built in two years and a car in two days. Never design anything you can not produce' Jean Prouvé.

Buckminster Fuller, contemporary with Prouvé, asked to a young Norman Foster, collaborator then in his office... How much does your building weigh, Mr. Foster? In this times of technology, we should escape from this constructive labyrinth, where we are in and bet for a lighter architecture. Approach buildings as industrial products. [industrial architecture]

Recover the spirit of a quality construction, started in the first part of the last Century, when the mirror to look at, was automotive, Aeronautic and the arms industry [study houses in California, Charles and Ray Eames, Mies Van Der Rohe, etc...]. We should try to export this idea of construction model much closer of the avant-garde industrial, to any kind of building and programs [housing, cultural, commercial, etc...]

A little bit by chance, like most of these things used to happen, a little bit looping for it, we get to develop a line of work in the limits of the industry. Building in Port and postindustrial areas, in the city-industry, city-sea and sea-industry border. There is where we feel comfortable, in the ZAL, near of the containers, of the train rails, of the cranes, pipes. Places that remember me landscape of my childhood, to architectures always reference, Vaquero Palacios, Castela... [industrial romanticism]

The heavy construction is a question of the past. Why not to think in a new

产业属性

建筑特点与工业种类有关或者由工业种类决定

建筑专门为工业使用而设计或者适用于工业领域

建筑属性

建筑设计和建造中的艺术效果或实践过程

复杂或细致的建筑结构

Dédalo是一位非常有名的希腊建筑师，Ícaro是Dédalo的儿子，也是克里特岛迷宫的建造者，他继承了父亲Dédalo的衣钵和精神——雕塑、建筑和对自由的渴望。“人没有翅膀，但是我们可以创造出翅膀，这样我们就可以自由翱翔了。” Ícaro从他父亲，这位天才建筑师身上继承了大胆的设计风格，同时他还因为身心自由而感到欣喜若狂，所以他决定要在设计的天空中自由翱翔。

让·普鲁威（建筑师、钢铁工人、工程师和法国设计师）在1957年设计了第一种可在工厂生产的轻型钢结构外墙系统。他一生都致力于将工业和建筑结合在一起，并且他像汽车界的亨利·福特一样是个有远见的人。

“花费两年时间建好一座房子和花费两天时间造出一辆汽车都是不可能的事情，所以不要设计出无法生产的東西”，让·普鲁威说。

巴克米斯特·福勒，与普鲁威是同一时代的人，他曾问那时在他的工作室工作的年轻的诺尔曼·福斯特：福斯特先生，您的建筑重量是多少？

在这个充满技术的时代，我们应该从这种结构迷宫中逃脱出来，尝试寻找更轻便的建筑结构并将建筑看成工业产品。【工业建筑】

从20世纪初期开始向历史的镜子中看去，会依次出现汽车、航空器和军火工业（加利福尼亚研究站、查尔斯和瑞·埃姆斯、密斯凡德罗等），我们应延续这些以往高品质建筑的精髓。我们应该设法将这种结构模型构思传播出去，使其贴近一线工业生产，同时也将这种想法传递到其他种类的建筑和项目（住宅、文化、商业等）。

从一个偶然的机遇到一点点的循环发展，世间万物往往都是这样开始的，我们在工业行业的限制内开始了一系列的建设工程，从港口工业区和后工业化区域到城市工业区，从城市与海的边界到海与工业区的边界。在集装箱、火车

way of building, really sustainable, more over than 'this fashion word', a light construction, dry, fast, flexible, close to industrialization, that allows an easy deconstruction, recyclable, and with short times. The lightness of new materials and solutions, that allows big formats and an easy manipulation of them, linking the production process, design and work on site. [new architectures]

Projects born from industrialization, dynamics and built in shorter times, that can be moved, grow or decrease with the pass of the time and the needs of the place. Spaces close to industry and in progress, always linked to the city. This areas so good reflected in some movies from Wim Wenders, Kaurismäki, Kim Ki duk ... Places where the urbanism becomes imperfect, where imperfection becomes beauty, where the sea and heavy industry is breathed. We try to go deeper in this 'imperfection' of the landscape and of the industrial architecture, that hides a manufacturing constructive functionality. [aesthetic imperfection]

On the other hand, it is interesting that the industrial typology, not remain relegated to only certain areas on the outskirts of the city, industrial areas, etc ... We should be able to open, some of these facilities to the city and its relation to the citizens. New uses for industrial spaces uninhabited, but also do it with buildings of new construction, which may form part of the city as a cultural container, a sports promptly, to advocate for mixture of uses, times, flows, that not relegate industrial type to residual elements in the city limits.

Make the city aware of the industrial buildings that has and the great possibilities to use them, either permanent or temporary. Numerous examples that have been born with a vocation of industrial architecture, have managed somehow to be inserted into the city everyday discourse. Major Railway Stations of the early twentieth century, the great Piers of southern England or the most common spaces in U.S. industrial buildings and warehouses, recovered household and nowadays called Lofts...

Sergio Baragaño
Architect. Founder and Director
[baragaño]

轨道、起重机和管道旁，我们感到舒适安逸，这样的区域使我想起儿时记忆中的那片故土，同时建筑架构也可参照这些元素进行设计建造，例如建筑师巴盖罗·巴拉西奥斯、卡斯特劳等的作品。【工业浪漫主义】

建筑结构繁重是存在于过去的问题，为什么不以一种全新的方式看待建筑呢？建筑要做到真正的可持续化设计，这已经不再是字面上的流行用语了，如今的建筑结构轻便、干燥、快速、灵活、贴近工业生产，更便于拆卸、回收并且施工期短。新材料和设计方案的亮点在于建筑师采用了大型且易于操控的结构，设计贴近一线工业生产流程和工作场地。【新型建筑】

建筑项目源自工业化建设，它们动态感十足并且施工期短，会随着时间和地域需求的变化而变换地点、扩大或者缩小场地面积。建设中的工业区附近的区域通常与城市相连接，维姆·文德斯、考里斯马基和金基德的电影都很好的反映出这种区域化特征。某些地域的城市化进程并不完善，这种不完善产生了特有的美感，使得周围的海域可以和重工业产业一同呼吸。我们试着深入到景观和工业建筑的这种不完善中去，这里隐藏着一种制造建设的功能性。

【缺憾美】

另一方面有趣的是，工业类型不会因为城市郊区、工业区等所带来的地域性问题而改变。我们应该将一部分设施面向城市并与城市居民生活连接起来，无人居住的工业区的新用途也需要新的建筑来完善，这样一来该区域可能成为城市文化和运动元素的一部分，体现出了功能、时间和线路等方面的优势，因此城市的地域上限制元素不会改变工业类型。

应该确保城市意识到工业建筑的存在，并会在很大程度上使用它们，无论这种使用是永久的还是暂时的。许多例子都很好的说明了工业建筑在城市中的地位，它们已经在设法插入城市每天的日常生活中。20世纪初期的主要火车站，英格兰南部的码头或者美国工业厂房和仓库，这些最常见的空间都使用了矩阵式结构，今天我们称之为顶楼。

塞尔吉奥·巴让甘尼
董事、创始人、设计师
巴让干尼建筑事务所

CONTENTS

目录

Industrial Building—Exciting Architecture	002	工业建筑——令人兴奋的建筑体
---	-----	----------------

Industrial Buildings Have Been Inserted into the City Everyday Discourse	004	让工业建筑插入城市日常生活
--	-----	---------------

CHAPTER ONE	008	第一章
DESIGN GUIDELINE OF INDUSTRIAL BUILDINGS		工业建筑设计指南

Urban Planning of Industrial Buildings	010	工业建筑的城市规划
--	-----	-----------

Urban Configuration of Industrial Enterprises	010	工业企业在城市中的配置
---	-----	-------------

Factors that Influence the Urban Configuration of Industrial Enterprises	012	影响工业企业在城市中配置的因素
--	-----	-----------------

Arrangement of Transportation	013	交通运输的布置
-------------------------------	-----	---------

Architectural Design of Industrial Buildings	014	工业建筑的建筑设计
--	-----	-----------

Main Considerations about Architectural Design	014	建筑设计的主要方面
--	-----	-----------

Architectural Design of Multi-storeyed Industrial Buildings	022	多层厂房的建筑设计
---	-----	-----------

Architectural Design of Single-storeyed Industrial Buildings	038	单层厂房的建筑设计
--	-----	-----------

Safety Precautions of Industrial Buildings	050	工业建筑的安全设计
--	-----	-----------

Sound Insulation	050	对噪声的削减
------------------	-----	--------

Architectural Anti-vibration	052	建筑防震
------------------------------	-----	------

Electromagnetic Shielding	053	电磁屏蔽
---------------------------	-----	------

Purification	054	净化
--------------	-----	----

Explosion and Fire Protection	055	防爆、防火
-------------------------------	-----	-------

Energy Conservation Measures	057	工业建筑的节能要点
------------------------------	-----	-----------

Proper Orientation and the Arrangement of Windows	057	合适的朝向和窗口布置
---	-----	------------

Day-lighting Concepts	058	自然采光
-----------------------	-----	------

Natural Ventilation of Outdoor, Indoor and Attic Spaces	058	室内外空间及阁楼的自然通风
---	-----	---------------

Direct Solar or Photovoltaic Energy	059	直接太阳能或光伏能
-------------------------------------	-----	-----------

Other Energy Measures	060	其他节能措施
-----------------------	-----	--------

Landscaping of Industrial Buildings	061	工业建筑的绿化
-------------------------------------	-----	---------

Functions of Landscaping	061	绿化的作用
--------------------------	-----	-------

Landscaping of Industrial Buildings	062	工厂的绿化布置
-------------------------------------	-----	---------

Exterior Lighting for Industrial Buildings	068	工业建筑室外场地的照明
--	-----	-------------

Importance of Exterior Lighting	068	室外场地照明的意义
---------------------------------	-----	-----------

Fixture Design	069	照明设施的设计
Parking Lot Lighting	071	停车场的照明
Pedestrian Area Lighting	071	步行区域的照明
Site Security Lighting	072	室外场地的安全性照明
Requirement for Luminance	072	亮度要求

CHAPTER TWO CASE STUDIES 074 第二章 案例研究

Multi-storeyed Industrial Buildings 076 多层厂房

Unilever Indosa Plant, Riverhourse Valley Industrial Estate – Durban, South Africa	076	河屋谷工业区联合利华加工厂——南非德班
Preisinger Winery	084	普利辛格酿酒厂
Winery Château Faugères	090	福日尔城堡酿酒厂
Marmelo MILLOliveira da Serra Olive Oil Mill	096	马麦隆橄榄油制造厂
Tabacco Factory Kanfanar	104	坎法纳尔香烟厂
Addcomm Group	112	艾德科姆集团
Metal Foundation	120	安塞乐米塔尔钢铁生产基地
Saint Gobain Glass	128	圣戈班玻璃公司
New Factory Building – ELIN Motoren GmbH	136	伊林发动机新工厂建筑
Hilti P4plus	144	希尔蒂 P4 大楼
Pack Line Ltd	152	包装线公司
Huga Fab III and Headquarters Building	158	广镓光电中科三厂暨总部大楼
ARGOS – Building for an Electrical Generator at a Cement Factory	164	阿格斯水泥厂发电站

Single-storeyed Industrial Buildings 170 单层厂房

Château Cheval Blanc	170	法国白马酒庄
Byass Winery	178	比亚斯酿酒厂
Olisur Olive Oil Factory and Offices	186	奥利索橄榄油工厂和办公室
Cargill Cocoa Production Plant ‘De Eenhoorn’	194	嘉吉可可工厂“独角兽”
MASCHINENFABRIK Liezen	202	利岑 MFL 铸造机械工程公司
GH Genhelix Biopharmaceutical Facilities	208	GH 生物制药公司
Vestas Wind Turbines Randers	216	兰德斯维斯塔斯风力涡轮机厂
KHS Machinery Plant	224	KHS 机械厂
Sede Social GM Vending	230	塞代 GM 公司
Waste Treatment Facility from Vallès Occidental in Vacarisses	236	瓦莱斯西区废物处理设施
Afvalstoffendienst ’s-Hertogen bosch	244	斯海尔托亨博斯废物处理站

REFERENCES AND INDEX 252 参考资料及索引

