



A-A剖面图

⑥

M O K A D e t a i l s D e s i g n M a n u a l

摩卡细部设计丛书



STAIR SPACE DESIGN MANUAL

楼梯空间设计手册

香港理工国际出版社 编

 天津大学出版社
TIANJIN UNIVERSITY PRESS

摩卡细部设计丛书

STAIR SPACE DESIGN MANUAL

楼梯空间设计手册

香港理工国际出版社 编

图书在版编目 (C I P) 数据

楼梯空间设计手册 / 香港理工国际出版社编.

—天津 : 天津大学出版社, 2013.6

(摩卡细部设计丛书)

ISBN 978-7-5618-4703-9

I. ①楼… II. ①香… III. ①住宅—楼梯—室内装饰设计—手册 IV. ①TU241-62

中国版本图书馆CIP数据核字(2013)第119639号

责任编辑 郝永丽

出版发行 天津大学出版社

出 版 人 杨欢

地 址 天津市卫津路92号天津大学内(邮编: 300072)

电 话 发行部 022-27403647

网 址 publish.tju.edu.cn

印 刷 深圳市铭彩纸品包装有限公司

经 销 全国各地新华书店

开 本 230 mm × 300 mm

印 张 20.75

字 数 274千

版 次 2013年7月第1版

印 次 2013年7月第1次

定 价 358.00元

凡购本书, 如有质量问题, 请向我社发行部门联系调换

CONTENTS

目录

016-095	Straight Stair	单跑楼梯	Wood / Concrete / Marble / Metal	木 / 混凝土 / 大理石 / 金属
096-209	Double-flight Stair	双跑楼梯	Wood / Concrete / Marble / Metal / Glass	木 / 混凝土 / 大理石 / 金属 / 玻璃
210-241	Trinal-flight Stair	三跑楼梯	Wood / Concrete / Marble / Metal	木 / 混凝土 / 大理石 / 金属
242-331	Spiral Stair	螺旋楼梯	Wood / Concrete / Marble / Metal / Glass	木 / 混凝土 / 大理石 / 金属 / 玻璃

摩卡细部设计丛书

STAIR SPACE DESIGN MANUAL

楼梯空间设计手册

香港理工国际出版社 编

 天津大学出版社
TIANJIN UNIVERSITY PRESS

图书在版编目 (C I P) 数据

楼梯空间设计手册 / 香港理工国际出版社编.

—天津 : 天津大学出版社, 2013.6

(摩卡细部设计丛书)

ISBN 978-7-5618-4703-9

I. ①楼… II. ①香… III. ①住宅—楼梯—室内装饰设计—手册 IV. ①TU241-62

中国版本图书馆CIP数据核字(2013)第119639号

责任编辑 郝永丽

出版发行 天津大学出版社

出 版 人 杨欢

地 址 天津市卫津路92号天津大学内(邮编: 300072)

电 话 发行部 022-27403647

网 址 publish.tju.edu.cn

印 刷 深圳市铭彩纸品包装有限公司

经 销 全国各地新华书店

开 本 230 mm × 300 mm

印 张 20.75

字 数 274千

版 次 2013年7月第1版

印 次 2013年7月第1次

定 价 358.00元

凡购本书, 如有质量问题, 请向我社发行部门联系调换



If the entire house is a unit, and each floor is a part, the stair is to connect all parts into one unit, and functions as the channel of air.

如果将整个住宅作为一个整体，每一层是一个局部，那么楼梯就是把所有局部联系成为整体的枢纽，是气的连接通道，是接气与送气的所在！



FOREWORD

前言

As a component of the vertical transportation between floors in a building, the stair can be used in transportation contacts between floors and in the case of great height difference. In multi-story buildings and high-rise buildings equipped with elevators and escalators as main vertical transportation means, the stair should still be kept for fire escape purposes.

The stair is composed of stair flight, resting platform and enclosure component, etc. There are not more than 18 steps and not less than 3 steps in each flight in view of walkers' continuity. According to its position, the resting platform can be divided into floor platform and middle platform. The railing is an enclosure component on the vacant side of the stair flight and the resting platform, which should have certain strength and stiffness, and on which handrails should be available to support people. Horizontal projection distance between the lowest and the highest level of the stair is called stair length, and the total height of steps is the stair rise.

This manual focuses on the main points of the staircase design from the forms and materials of stair, and is a rare staircase design reference book in the current market.

作为建筑物中楼层间垂直交通的一部分，楼梯用于楼层之间和高差较大时的交通联系。在设有电梯、自动扶梯作为主要垂直交通手段的多层和高层建筑中，仍然要保留楼梯，供火灾时逃生之用。

楼梯由梯段（又称梯跑）、平台（休息平台）和围护构件等组成。每个梯段上的踏步数目不得超过18级，考虑到人们在梯段上行走时的连续性，每个梯段上的踏步数目不得少于3级。休息平台按其所处位置分为楼层平台和中间平台。栏杆是设置在楼梯段和平台临空侧的围护构件，应有一定的强度和刚度，并应在上部设置供人们扶持用的扶手。楼梯的最低和最高一级踏步间的水平投影距离为梯长，梯级的总高为梯高。

本手册从楼梯形式和材质等方面，对楼梯设计的要点进行了阐述，是当前市场上不可多得的楼梯设计参考手册。

INFORMATION OF STAIR

Forms of Stair

According to different stair flights, the stair can be divided into straight stair, double-flight stair, trinal-flight stair, multi-flight stair, spiral stair, etc. The flat shapes of the stair flight include three types: straight line, fold line and curve line.

The straight stair is the simplest, and suitable for the building of lower story height. The double-flight stair is the most common, and has straight, folded, parallel and other types, which is suitable for civil and industrial buildings. The trinal-flight stair is usually three-bend, T-shaped, split-merging, and suitable for public buildings. The scissor stair is composed of opposite double-flight parallel stair, or a pair of overlapping straight stairs without communicating with each other, which can save more space for more people. The spiral stair is composed of fan-shaped steps surrounding a support pillar. Though it's not comfortable for walk, it can save space, and is suitable for less busy places. Circular stair, semi-circular stair and curved stair are supported by curved beams or curved plates, and the steps are slightly fan-shaped, rich in decorative properties, diverse and lively, and suitable for public buildings.

The spiral stair is lightweight and beautiful, frequently seen in general public buildings; it not only can meet the requirements of the architectural functions, but also has special spatial artistic effects. There are various forms of the spiral stair, among which the center-pillar spiral stair is the most common, which has the above features, and has other features such as small coverage, flexible layout, simple structure, and convenient construction. The spiral stair can be closed or open. The closed stair is supported by the enclosing wall. Architects can take advantage of the cambered exterior wall formed by the spiral stair to enrich and shape the form of the building's space. The load-bearing ways of the open layout are center-pillar, curved plate, curved beam and hanging modes, which can fully display the curve stairs' senses of flow and rhythm, and especially the flowing lines formed by the spiral stair handrail are more dynamic. It's possible for architects to take advantage of the graceful rhythm and the gentle dynamic sense of the spiral stair to create a special spatial atmosphere for all types of buildings.

Materials of Stair

The stair can be divided into the ordinary stair and special stair. The ordinary stair includes reinforced concrete stair, steel stair, wooden stair, marble stair, etc. The reinforced concrete stair is the most common, and has many advantages, including structural rigidity, fire-resistance, cost-saving, easy construction and modeling, and others. The special stair mainly includes safety stair, fire stair and escalator.

Reinforced Concrete Stair

The construction methods of the reinforced concrete stair are all on-site casting, all prefabricated, and part on-site casting and part prefabricated. The all on-site casting is rigid, and applied to the building with special requirements and higher shockproof requirements, but the cost is very high, and the construction lasts a long time. The prefabricated stair component has three types: large, medium-sized and small-sized. Large prefabricated stair makes the entire flight and platform as a component. Medium-sized stairs are to prefabricate the flight and platform separately. Small-sized stairs are to prefabricate the oblique beam, steps, platform beam and plate separately, and then connect them into a whole by the ways of welding, anchor, bolt, and pin. There is another way to construct the small-sized stair to inset the prefabricated L-shaped step components into the side wall, and make a cantilevered staircase. Its construction is adaptable, easy to install and transport, and with lower cost. As for the part on-site casting

and part prefabricated stair, the usual practice is to make molds to cast the stair beams, then install the prefabricated tread and platform board, and finally cast them into one unit. Compared with the all on-site casting, this method can save more molds and more time, and can keep the precise characteristic and adjust the size and the form.

The steps of the reinforced concrete stair should be easy to walk on, wear-resistant, anti-skidding, and easy to clean. The surface of the steps is usually finished with cement mortar and decorated with terrazzo, or quarry tile, marble veneer, or linoleum, plastic layer and carpet. In order to be anti-skidding, the edge of each step is set with footgrips made of cement emery, mosaic, plastic, rubber, or slotted ceramic or metal materials which can also give protective action.

Steel Stair

The steel stair is usually used in factories and warehouses, etc. In public buildings, it's more used as fire evacuation stair. The load-bearing elements of the steel staircase can be made of section steel, and the nodes of each element are anchored or welded with bolts. The surface of elements is painted to be rust-proof. The steps and platform boards are suitable to use embossed or grid sheet steel to be anti-skidding. In order to reduce noise and improve veneer effect, it's necessary to pave the elastics, concrete, or stone materials. It's also suitable to pave reinforced concrete or stone steps on the steel beams directly. This stair is called combined-type stair.

Wooden Stair

The use of wooden stair has some limitations because it is not fire-proof. There are two types: dark step and clear step. The steps are inset into sloped beam (also called bridgeboard), which is the dark step. If the steps are nailed into the triangle wood of the sloped beam, this method is called clear step. The surface of wooden stair is painted with coating to be corrosion-resistant.

Marble Stair

Originally, the marble is the white limestone with a black pattern in Dali, the surface of which can form various kinds of patterns naturally, such as landscape painting. The artificial marble is usually mixed, ground and polished by the broken stone of natural marble and granite, which is adhered by cement, gypsum, and unsaturated polyester resin. Therefore, the artificial marble has some features of the natural marble since it can be changed by people, it has many colors and patterns with better pliability; its convergence processing is not obvious; the overall sense is very strong, and it has ceramic gloss, high hardness of appearance; it's not easy to damage, and with corrosion resistance and high temperature resistance; it is very easy to clean. In the stair decoration of many hotels' lobbies, restaurants, family duplex buildings, to achieve the overall unified effect with the floor, the marble stair becomes the first choice. However, poor-quality artificial marble can bring great damage to the human body. Therefore, when selecting the artificial marble, we need to consider several points: good-quality artificial marble has pure surface, and has no small airy holes. It touches smooth like silk. If you use your fingernail to scratch the surface, there will be no visible scratches. Also you can compare two marbles with the same lines, and knock them; if they are easy to break, they are poor-quality marble.

Others like glass and wrought iron stairs are also applied in the modern decoration, whose decorative effects are not as good as above stairs, so they are not popular.

楼梯知识点

楼梯的形式

楼梯按梯段可分为单跑楼梯、双跑楼梯、三跑楼梯、多跑楼梯和螺旋楼梯。梯段的平面形状有直线形、折线形和曲线形

单跑楼梯最为简单，适合层高较低的建筑；双跑楼梯最为常见，有双跑直上、双跑曲折、双跑对折（平行）等形式，适用于一般民用建筑和工业建筑；三跑楼梯有三折式、丁字式、分合式等，多用于公共建筑；剪刀楼梯则由一对方向相反的双跑平行梯组成，或由一对互相重叠而又不连通的单跑直梯构成，能同时通过较多的人流并节省空间；螺旋梯的扇形踏步是支撑在中立柱上的，虽行走起来欠舒适，但节省空间，适用于人流较少，使用不频繁的场所；圆形、半圆形、弧形的楼梯，由曲梁或曲板支撑，踏步略呈扇形，花式多样，造型活泼，富于装饰性，适用于公共建筑。

螺旋楼梯结构轻巧，造型美观，常见于一般公共建筑中，它不仅能满足建筑功能的要求，而且有特殊的空间艺术效果。螺旋楼梯的形式较多，最常见的是中立柱螺旋楼梯，既有上述特点，又有占用面积小、布置灵活、构造简单、施工方便等优点。螺旋楼梯有封闭式和开放式两种。封闭式布局通过外围的墙来承重。建筑师可以利用螺旋楼梯形成的弧形外墙来丰富和塑造建筑的空间形态。开放式布局的承重方式有中柱式、曲板式、曲梁式和垂吊式等。它可以充分展示曲线楼梯所具有的流动感和节奏感，尤其是螺旋楼梯扶手所形成的流动飘逸的线条更具有动态美。建筑师可以利用螺旋楼梯优美的旋律、柔和的动态感去营造各类建筑所需要的特殊空间气氛。

楼梯的材质

楼梯分普通楼梯和特种楼梯两大类。普通楼梯包括钢筋混凝土楼梯、钢楼梯、木楼梯和大理石楼梯等，其中钢筋混凝土楼梯在结构刚度、耐火、造价、施工、造型等方面具有较多的优点，应用最为普遍。特种楼梯主要有安全梯、消防梯和自动梯。

钢筋混凝土楼梯

钢筋混凝土楼梯的施工方法有整体现场浇注、预制装配、部分现场浇注和部分预制装配三种。整体现场浇注的楼梯，刚性较好，适用于有特殊要求和防震要求较高的建筑，但成本很高，施工期较长。预制装配的楼梯构件有大型、中型和小型三种。大型的预制楼梯是把整个梯段和平台预制成一个整体；中型的是把梯段和平台各预制成一个构件；小型的是将楼梯的斜梁、踏步、平台梁和板预制成各个小构件，用焊、锚、栓、销等方法连接成整体。对于小型的，还有一种方式是把预制的L形踏步构件，按楼梯坡度砌在侧墙内，做成悬挑式楼梯。小型预制构件装配的施工方法适应性强，运输安装简便，造价较低。部分现场浇注和部分预制装配的，通常先制模浇注楼梯梁，再安装预制踏步板和平台板，最后将三者浇注成一个整体。这种方法较整体现场浇注节省模板和节约时间，但仍保持预制构件加工精确的特点，而且可以调整尺寸和形式。

钢筋混凝土楼梯踏步要求表面便于行走、耐磨、防滑、易清洁。面层一般采用水泥砂浆抹面，可做水磨石面层或采用缸砖、大理石贴面，或者铺油地毡、塑料铺材和地毯。踏步近踏口处，可饰以水泥金刚砂、马赛克、塑料、橡皮等材质的防滑条，以便防滑，或用有槽的陶瓷或金属材料包住踏口，兼起保护作用。

钢楼梯

钢楼梯通常用于厂房和仓库等。在公共建筑中，多用做消防疏散楼梯。钢楼梯的承重构件可用型钢制作，构件节点一般用螺栓连接或焊接。构件表面涂防锈漆。踏步和平台板宜用压花或网格钢板防滑。为减少噪声和提升饰面效果，可在钢踏板上铺设弹性物或混凝土、石料等面层；也可直接在钢梁上铺设钢筋混凝土或石料踏步，这种楼梯称为组合式楼梯。

木楼梯

因不能防火，木楼梯的应用范围受到限制。木楼梯有暗步式和明步式两种。踏步镶嵌于楼梯斜梁（又称楼梯帮）凹槽内的为暗步式；钉于斜梁三角木上的为明步式。木楼梯表面覆以涂层实现防腐。

大理石楼梯

大理石原本是指大理的带有黑色花纹的白色石灰岩，它的表面可以天然形成各种图案，比如山水画等；人造大理石通常是以天然大理石或花岗岩的碎石为填充料，用水泥、石膏和不饱和聚酯树脂等为黏结剂，经搅拌成型、研磨和抛光后制成，所以人造大理石有许多天然大理石的特性。人造大理石由于可人工调节，所以颜色款式多、柔韧度较好、衔接处理不明显、整体感非常强，而且绚丽多彩，具有陶瓷的光泽，外表硬度高，不易损伤、耐腐蚀、耐高温，而且非常容易清洁。在很多酒店大堂、餐厅、家庭复式楼房的楼梯装修上，为了取得和地面统一的效果，大理石楼梯成为楼梯装修的首选。劣质的人造大理石对人体的伤害比较大，因此在挑选人造大理石时，要注意以下几个事项：一般质量好的人造大理石，其表面颜色比较清纯，板材背面不会出现细小的气孔；优质的人造大理石表面摸起来很光滑；优质的人造大理石，用指甲划，不会有明显的划痕；也可以选择线条相同的两块大理石，进行相互敲击，如果很容易就碎了，那么就是劣质的。

其他如玻璃、铁艺等材质的楼梯也被运用在现代装饰中，但其装饰效果不如以上所提的几种楼梯，因此未得到广泛应用。



