

DESIGN MANUAL FOR

HKASP | 先锋空间 主编

PLANTS IN 屋顶花园 植物设计手册

ROOF GARDEN

中国林业出版社

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IMPORTANT ROLES THE ROOFTOP GARDEN PLAYS

屋顶花园的重要意义

Adjust Ecological Environment and Manage Pollution

At present, due to the excessive expansion of urbanization, many green lands and water surfaces are just covered by buildings and roads made from reinforced concrete. As the car occupancy largely goes up, traffic emission has aggravated the city's pollution with an obvious urban heat island effect. Unfortunately, many cities are suffering from haze troubles since days with PM 2.5 beyond the standard are increasing in a year. However, rooftop garden plays an important role in digesting PM 2.5 and purifying the air by means of adding much more green plants including rooftop greening and vertical greening to effectively absorb dust and particulate matters floating in the air and to reduce the pollutant concentration.

调节生态，治理污染

当前，由于城市化发展迅速，城市过度扩展，绿地、水面被钢筋水泥的建筑物、道路所覆盖。汽车占有率越来越高，汽车尾气排放污染严重，城市热岛效应明显。许多城市受雾霾困扰，一年中PM2.5超标的雾霾天气不断增多。

屋顶花园通过增加空中绿化，包括屋顶绿化和垂直绿化，而绿化可以有效。

吸纳空气中滞留的尘埃、颗粒物，降低污染物浓度，化解空气中的PM2.5，从而达到净化空气的效果。

Enlarge Space for Activity

Rooftop Garden has not only enlarged the city's green land area by making full use of the building space, but also expanded corresponding indoor space for activity. Besides, buildings are made more beautiful based on the perfect combination of rigid volume with green plants. Furthermore, rooftop garden serves as The Garden in the Air for high buildings as well as a green paradise free from noise and traffic emissions.

增加活动空间

屋顶花园扩大了城市绿地面积，由于充分利用建筑空间，不仅扩大了室内活动场地，还丰富了建筑美感，使生硬的建筑与更亲和的绿色植物完美结合。屋顶花园是高楼大厦中的空中花园，是绿色天堂，更是一处没有噪音、汽车尾气的世外桃源。

TYPES OF ROOFTOP GARDENS



屋顶花园的类型

* By its Detailed Functions 按使用功能分类

Recreational Rooftop Garden

Recreational Rooftop Garden is mainly for people's daily usage to increase their indoor space for activity. It is flexible to choose its design forms, but rooftop garden requires high-standard earthing and loading condition. In fact, rooftop garden shall be made available to plant larger trees and to build a swimming pool. This kind of rooftop garden is generally located at the city's business center which covers little green area of high land value. Best examples include Marina Bay Sands Rooftop Garden in Singapore and Washington Mutual Bank Center's Rooftop Garden.

Eco-type Rooftop Garden

Different from recreational rooftop garden, Eco-type Rooftop Garden, on the contrary, mainly plays its role in greening the space rather than entertaining people as a space for activity. Generally, recreational rooftop garden is transformed from old building with thinner soil layer and weak loading capacity. Thus, it cannot be used to plant large trees (short shrubs and turf are acceptable). Simple in design, it's basically suitable for carpet-type planting and nursery planting. Generally, Eco-type rooftop garden is located at the old city to quickly increase its greening space and reduce the building's energy consumption. Typical examples include Graz Rooftop Garden in New York and Sewage Treatment Plant in Shatin, Hong Kong.

Functional Rooftop Garden

Functional Rooftop Garden includes treatment-oriented Rooftop Garden, research-based rooftop garden, family rooftop garden and profitable rooftop garden. However, treatment-oriented rooftop garden is generally linked to hospital, rest home and children's activity center for the purpose of enlarging the outdoor greening and activity space because this kind of rooftop garden is helpful in creating a safe and relaxing environment for the old, children, pregnant women and patients. Yet, research-based rooftop garden can be applied to carry out teaching and research into the building's loading, ecological environment, air pollution and the plant's adaptability. Family fruit & vegetable garden is always located at the residential area, and it is suitable for planting some edible or medicinal plants. Actually, this kind of rooftop garden is free from the location limitations since such plant can grow both in the balcony and terrace. Typical functional rooftop gardens include Khoo Teck Puat Hospital in Singapore, Roppongi Hills Rooftop Rice Garden in Tokyo and Tallinn Kitchen Garden in Estonia.

休闲式屋顶花园

休闲式屋顶花园的主要特点是可供人使用，增加室内活动空间，设计形式灵活多样，对覆土及建筑荷载要求较大，可以种植较大乔木与游泳池等活动场地。

这种类型的屋顶花园一般位于城市商业中心，绿地面积少，土地价值高。例如新加坡的滨海湾金沙屋顶花园、华盛顿互惠银行中心屋顶花园等。

生态型屋顶花园

生态型屋顶花园与休闲式屋顶花园基本相反，其主要特点是不供人使用，不提供活动空间，作为绿化屋顶，增加绿化的主要途径。通常是旧建筑改造，土层较少，荷载低，不能种植较大型乔木，以低矮灌木和地被为主，设计形式较简单，一般采用地毯式、苗圃式种植。多分布在老城市区，能较快增加绿化面积、降低建筑能耗，如美国纽约格拉茨屋顶花园、香港沙田污水处理厂等。

功能型屋顶花园

功能型屋顶花园包括疗养式屋顶花园、科研型屋顶花园、家庭式果蔬园、盈利性屋顶花园。疗养型屋顶花园一般位于医院、养老院、儿童活动中心等，其目的是为增加室外绿化及活动空间，这类型庭院能为老人、小孩、孕妇和病人等提供没有汽车危害的安全、放松的环境。科研型屋顶花园包括建筑物荷载、环境生态、大气污染、植物适应性等的教学及研究。家庭果蔬园常位于住宅区。

种植可食用或药用植物，此类型花园位置不受限制，也可在露台、阳台小面积种植。功能型屋顶花园案例包括新加坡邱德拔医院、东京六本木新城的屋顶水稻花园、爱莎尼亚塔林厨房花园。

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Golden Point View, Silver Edges and Lawn in the Middle

In terms of Chinese plant design, "Golden Point View, Silver Edges and Lawn in the Middle" can best speak for the principle applied in plant collocation. However, Plant design for rooftop garden can apply the same principle. At the main entrance and some major points, we can decorate them with major plants to form "Golden Point View", and generally, selected plants should be graceful in their shape, or blossoming with pleasing scent or rich in their colors. Silver Edges means that the greening plant belt or edge can be created along main roads, lawns and the building. Clipped green fence, shrub cluster and under-shrub are frequently used as Silver Edges. Lawn in the middle means that, we can plant some grass in the middle of the rooftop garden in conformity with the light loading condition in the center of the building's beam column. In fact, Guangdong International Financial Center's Rooftop Center can best reflect this design principle.

Appropriate Extensiveness and Intensiveness

To put it in a simple way, appropriate extensiveness and intensiveness mean that the plant's density must be made appropriate in design. The same density value shall not be applied to all plants. On the contrary, we shall make a distinction to bring out the sense of layer. Among the major cluster, arbors, shrubs and turfs shall be elaborately arranged. This principle is always applied to design various edges or corners against the greening part background. As a matter of fact, this principle is similar to Lawn in the Middle.

金角、银边、草包肚

中国的植物设计中常用“金角、银边、草包肚”，“疏可走马，密不透风”，来形容植物搭配的原理。屋顶花园植物设计中同样可以使用这个原理。在重要的出入口、主要景点处点缀植物设计中的主角，即为“金角”，所选的植物一般造型优美，或开花或芳香或色彩艳丽，也称点景。银边即沿道路两边或草地边沿，建筑周边等位置的植物带或边，常用修剪的绿篱、成片的灌木、列植的小灌木，是比金低一等级的“银”。“草包肚”即花园中间种植草坪，屋顶花园中选择“草包肚”符合建筑梁柱中心位置荷载少的特点，可重点使用。本书广东国际金融中心天台花园即体现这一设计原理。

疏可走马，密不透风

“疏可走马，密不透风”，简单的说指植物设计该疏的疏，该密的密，不可过于均等，主次分明，层次有致。在重要的组团中乔木、灌木、地被搭配精致，常设计于边角，或作为绿色植物背景中，“疏可走马”与“草包肚”同样的道理。

CHINESE EXPERIENCE IN DESIGNING ROOFTOP GARDEN PLANTS

屋顶花园植物设计的中式经验