

意大利米兰

加里波第火车站的全新灯光

New lighting for Garibaldi train station - Milan, Italy

文字：光凯莱·罗里 (Michele Lori), 保罗·斯波蒂 (Paolo Spotti)

摄影：恩特斯塔·约翰保罗·费尼乔 (endstart gianpaolo finizio)

对于像火车站这样的建筑,设计照明工程需要进行长时间的调查研究及构思概念,而这个概念要为该工程的每个参与者所理解和接受。照明设计师从最初阶段便和工程的整个团队并肩作战,时刻监控工程的每个环节。这样,灯光才能真正变成整个建筑技术和表现力的重要元素。

完美的照明工程应该是与车站川流不息的景象完美融合,让整个建筑看起来更美、更雄伟,在旅客停留的地方创造新的感受,并达到更高的安全标准。

川流不息的旅客和城市景象

米兰加里波第火车站可以说是米兰最大的交通枢纽之一。北来的列车、地下铁皆停泊于此,汇集到这里的还有附近巴士站的旅客,加上地处主要公路旁,每年的客流量可以达到 2500 万人次。照明工程必须能够起疏导旅客的作用,并且把火车站变成加里波第地区的一个地标,因此灯光要发挥作为照明工具,突出地标,以

一个完美的新型城市广场的照明设计工程,要与城市景象完美融合。意大利米兰加里波第火车站的照明工程,更使它成为地区的地标之一

New lighting for Garibaldi train station - Milan, Italy

by Michele Lori and Paolo Spotti
photo by endstart gianpaolo finizio

A perfect lighting engineering design for a new city plaza shall integrate with the city outlook. Garibaldi Station's lighting project, made the train station as a Milan landmark.

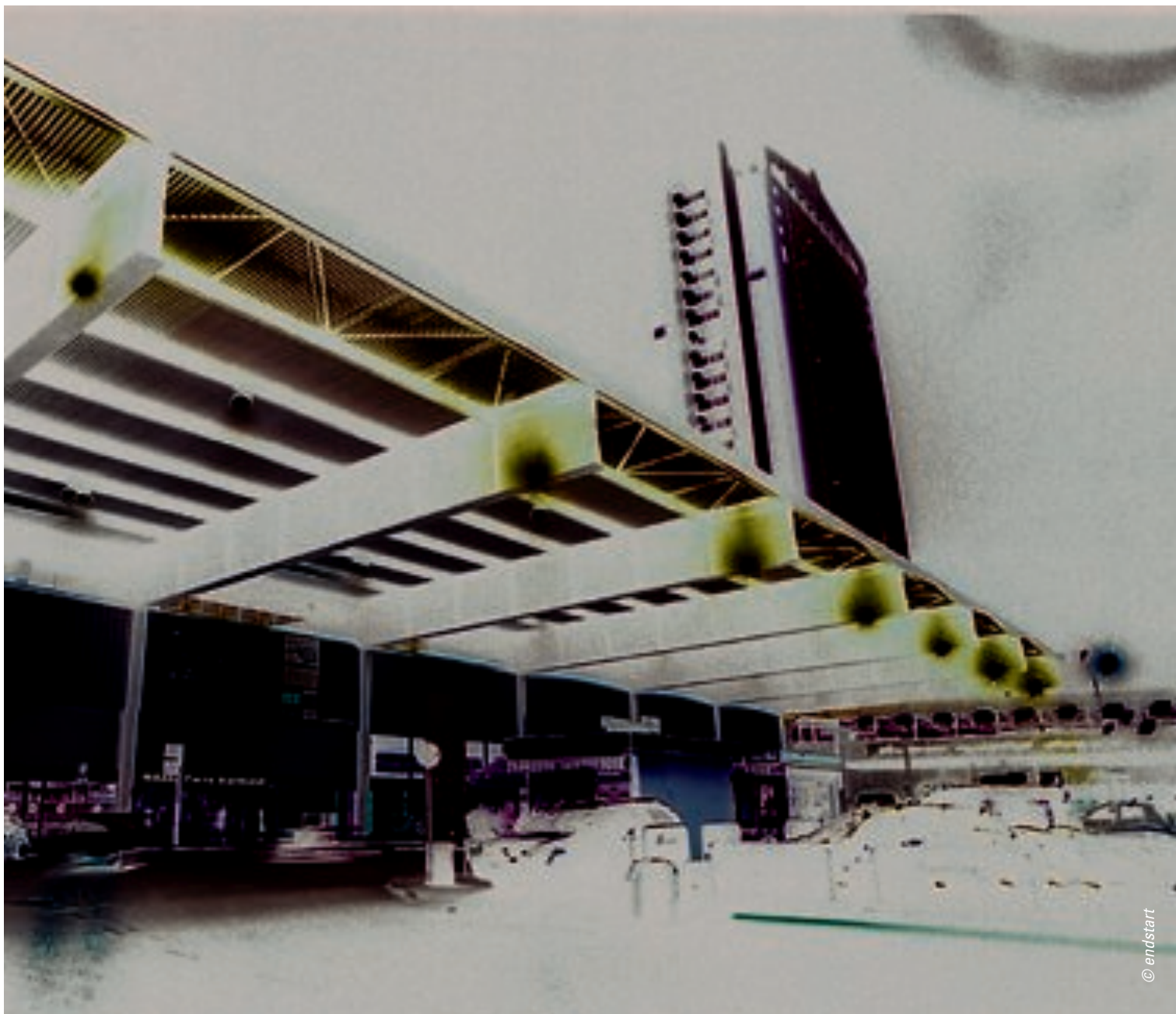
Lighting a complex piece of architecture like a city train station requires lengthy analyses and concept development. At the end of the day, the results must be shared, understood, and agreed to by all members of the development team. Here, the lighting engineering designer has worked alongside the design team ever since the planning phase of the project began. The designer was also involved in construction from start to finish. The result is a building that truly uses lighting as both a technical and as an expressive element.

The key points of the architectural and lighting

design at Garibaldi Station were the integration of the flow of travellers throughout the station, the aesthetic improvement of the building, the creation of new services in waiting areas and, of course, a high standard of safety.

The flow of travellers -- and the image of the city

The Garibaldi Station in Milan, Italy, is one of Milan's major travel nodes. The building is used contemporaneously by rail traffic coming from the north of Milan, by the underground line, and by travellers from the nearby bus station. It is next to



© endstart

a heavily travelled road and accommodates about 25 million visitors yearly.

One project requirement was that the lighting design support the architectural design in expediting and facilitating the flow of people through the station. Another clearly desirable objective was to make the station a Milan landmark.

Designers quickly concluded that lighting could help the building deliver a beautiful overall visual impact, while signs would help accomplish people-moving objectives (**See the opening, figures 1a, 1 b**).

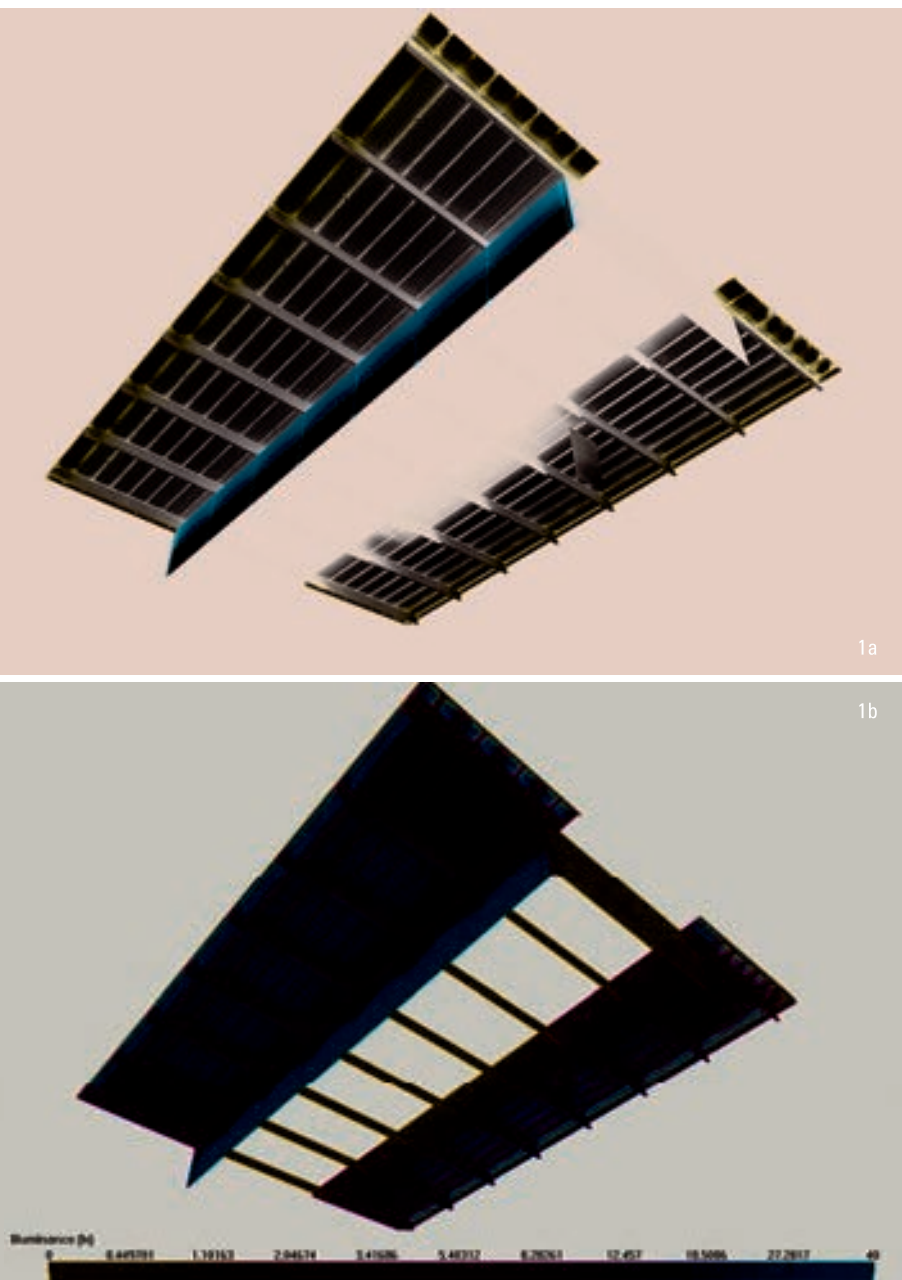
The lighting engineering project went so far as to include -- in collaboration with Sadi Spa in Italy -- the design of new aluminium panels for the false ceiling, with holes drilled in an irregular pattern and lined with a methacrylate panel (**figures 2, 3a-b**).

The pattern of the panels enables designers to install them in a customary sequence or rotated 180 degrees for different effects. Normally, such an approach may result in lighting that is not harmonious -- but in this case, the result is a random-effect lighting design which offers great visual appeal to all who see it.

Behind these panels were put watertight ceiling

意大利米兰—加里波第火车站,外观

Milan Italy, Garibaldi Station, exterior



及作为指示标志的两大功能（图 1a, 1b）。

在与塞迪公司 (la Sadi spa) 的共同努力下,整个照明工程的天花板使用一种新型铝板,这种铝板以穿孔凿洞的方式造成不规则图形,内衬扩散型甲基丙烯酸酯板（图 2, 3a-b）。

个别装饰的每个板材不但可以按照固定步骤安装,也可以旋转180度进行安装,而天花板的照明效果丝毫不会受到影响,也不会给人杂乱无章的感觉。

铝板后面安装着密封好的顶灯,这些顶灯都装有荧光灯管,用以显示图象及为整个大厅提供照明。在转站区、路轨、候车月台、通道所在的地下区域及刻意经营天花照明的地面区域,这样的铝皮途人可经常看到。（图 3a, 3b）

这些设备除了能显出天花板的动态外,更重要的是能以柔和的光线照亮整个区域,感觉接近自然的光线。

光源色温的分布是区别外部和内部光源的重要指标。内部使用的全是荧光灯或金卤灯,色温在 3000 K 左右; 而外部则使用较冷的蓝色色调光源。

伸延至车站外部的两翼除了有照亮整个建筑基座的灯光外,还用叶片形照明设备发出蓝色的光照亮车站的顶部,清晰地勾勒出建筑的整体结构。这里没有加上可以降低叶片形设备功率的彩色滤光镜,取而代之的是 70W 的蓝色光源。

从街道和附近的行人区上看着这些排列有序的灯光,可以

图 1a, 图 1b - 叶片形光源(效果图): 通过蓝色的光线,我们可以清晰地看到火车站的外部轮廓。在众多的方案中选择这种叶片形设备,可以减少光点,减轻整个设备的负荷及维修费用。
(图片提供: 菲拉拉·帕拉蒂诺工作室 (Ferrara Palladino))

Figure 1a, Figure 1b - Blades of lights (Rendering). The profiles of the large outer coverings of the station are highlighted with a blue light. Of the various systems initially considered for this, the one chosen was blades of incident light that provide a highly soothing ambiance with the desired lighting levels, while being economical.
(courtesy: Ferrara Palladino)

luminaires with electronic powered fluorescent tubes that light the graphic signs and diffuse the light over the environment. These panels are constantly visible in the transit areas, and they are used in the lower floor (figures 3 a-b) where rail, underground, and walkways tracks connect. They are also used on the ground floor, particularly in specially designed ceiling luminaires. These luminaires — in addition to adding some visual movement to the ceilings — provide a soft and diffuse light, and create an appearance very similar to natural lighting.

The careful distribution of the colour

temperature of the light sources effectively delineated the interior and exterior spaces. All indoor lamps, whether fluorescent or metal halide, were around 3000 K while the outdoor lamps had colder lights, in a blue tone. On both the station's large exterior wings, luminaires light the areas beneath. Other luminaires — blue blades of light — create a luminous sign on the roofs, delimiting its structure. Instead of using coloured lighting filters which would have reduced the already-dim illumination of the blade systems, 70 W blue light discharge sources were chosen.

From both the street and the nearby pedestrian area, the ordered sequence of the lighting sources acts as a reference point by which travellers can locate Garibaldi Station easily, even within an area with an increasing number of highly lit nightspots. Some blue spotlights were added to the roof to light the skylight, establishing a line of continuity with the light effect on the exterior cladding.

Integration with the architectural design

The Centostazioni Company and RFI, both of Italy, the companies responsible for the

感觉到这个地方的夜色之美；建筑顶部也安装了蓝色的投光灯,勾勒出玻璃天井的轮廓,使整个建筑看起来更加宏伟。

百家车站股份公司 (Centostazioni S.p.a.) 及 RFI 公司(国家铁路集团属下的基础设施公司) 合共投资 2000万欧元建造一流的火车站,旨在为市民和旅客提供舒适的休憩环境和更多的选择。

火车站的意义有别于以往,不仅仅是旅客抵达目的地前的中转站,也同时是城市广场,是一个生机勃勃、让人们休憩并且提供更多更新服务的地方。因此照明工程要充分配合火车站新的商业用途,让人们更加舒适、更能体现广场的理念构思,所以地下区域的光照已经达到了 500 lx (图 3c, 3d)。

从建筑学的角度来看,值得注意的是建筑内部一个 14 × 28米用来照亮地下区域的「光井」。在这个光井和周围玻璃墙接缝的地方装有面向地下高亮度白色发光二极管,营造出满天星斗的效果。

利用大量玻璃天井引进日光照射建筑内部,是照明工程发展的重要指南。地面区域悬挂着许许多多的荧光灯(每个250 × 250厘米),制造出辽阔明亮的光面,跟光井连为一线,室内和室外的空间仿佛融为一体。

灯光也是用来突出建筑本身的点睛之笔。在地下区域中有无数的波地奇诺大理石柱,那里装有大量叶片形设备,在柱子上投下明亮的灯光,同时在地上投影出无数奇特的图形。



infrastructure of the Italian State Railways, have invested 20 million Euro (€) with the intention of giving Milan an improved station offering travellers new opportunities. Under this new vision, Garibaldi Station is no longer a transit zone which people use only to reach the city or neighbouring areas. Rather, it functions also as a *city square*, a place full of life where people can stop and enjoy the new amenities. The lighting design symbolically reflects the Station's new commercial uses. In fact, average lighting levels were raised to reach some 500 lux in the underground areas

(figures 3c, 3d), which imparts a warmer, more inviting feel to them.

From an architectural point of view, one of the most interesting elements in Garibaldi Station is the “well of light” inside the building. It is a 14 x 28 metre opening that extends downward from the skylight to illuminate the lower floor. To make the most of the skylight end of the opening, high-powered white LEDs were installed to create the visual effect of a starry sky. Glass glazed surfaces enable the entry of daylight, carrying out a key lighting design objective. Large fluorescent tubes with extensive light surfaces (250 x 250 cm) are suspended off the ground floor, providing

图2 - 意大利米兰-加里波第火车站内部
Figure 2 - Milan, Garibaldi Station, an internal view



图3a, 图3b - 加里波地火车站。

地下, 全貌和局部图

Figure 3a, Figure 3b - Milan, Garibaldi Station.

Underground floor, general view and detail



图3c, 3d-地下部份既是中转区, 也是商店街。照明设备可以电子电源供应设定, 操作灵活。

(图片提供: 菲拉拉·帕拉蒂诺工作室 (Ferrara Palladino))

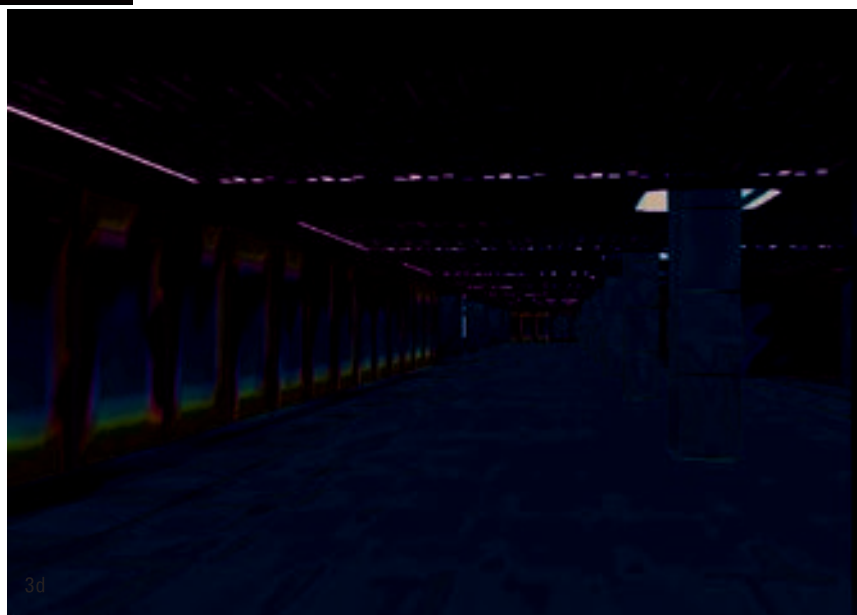
Figure 3c, Figure 3d - The underground floor is both a transit area and a commercial arcade, so the lighting system is designed to operate with a higher level of flexibility. For example, the source of lighting is regulated through electronic ballasts. (courtesy: Ferrara Palladino)

高质量的设备

为了营造这样的整体气氛,这里一共安装了大概 1400 个照明设备: 从 70W 到 400W 的金卤灯, 线性和高密度荧光灯, 还有最新的发光二极管。

广场外部入口区域等保安重地使用了投光灯和大功率吊灯,为这些地方提供强力照明。

为了更能适应火车站的特别需求,很多设备都经过改良,使其更能融入建筑的设计;还有一些设备是专门为这个火车站设计制作的,让车站照明更能相互融合(图4)。■



照明设备

内部

地下

| 安装种类 | 生产企业 | 灯种 | 编号 | 功率 |
|--------|-------------------------|-------|-----|--------|
| 特殊嵌入 | Louis Poulsen + Sadi | 荧光灯管 | 304 | 32x58W |
| 吸顶安装 | Sill (改装) | 金卤灯 | 88 | 70W |
| 嵌入地下安装 | Louis Poulsen | 发光二极管 | 45 | 3W |
| 墙壁 | Prolicht | 荧光圈 | 10 | 40+22W |
| 嵌入 | Prolicht | 金卤灯 | 5 | 2x35W |
| 嵌入 | Prolicht | 线性荧光灯 | 19 | 2x21W |

一 楼

| 安装种类 | 生产企业 | 灯种 | 编号 | 功率 |
|------|-------------------------|-------|-----|--------|
| 嵌入 | iGuzzini | 金卤灯 | 20 | 70W |
| 悬挂 | iGuzzini | 金卤灯 | 11 | 70W |
| 嵌入 | iGuzzini | 金卤灯 | 56 | 70W |
| 特殊悬挂 | Eleber | 线性荧光灯 | 36 | 2x58W |
| 特殊嵌入 | Louis Poulsen + Sadi | 线性荧光灯 | 16 | 18x58W |
| 悬挂 | Louis Poulsen | 混合光源 | 268 | 100W |

二 楼

| 安装种类 | 生产企业 | 灯种 | 编号 | 功率 |
|------|----------|-----|----|-------|
| 嵌入 | iGuzzini | 金卤灯 | 36 | 70W |
| 嵌入 | Prolicht | 金卤灯 | 5 | 2x35W |
| 悬挂 | iGuzzini | 金卤灯 | 2 | 70W |

天窗

| 安装种类 | 生产企业 | 灯种 | 编号 | 功率 |
|--------|------|-------|----|----|
| 顶部特殊安装 | Sill | 发光二极管 | 32 | 1W |

外部

玻璃幕

| 安装种类 | 生产企业 | 灯种 | 编号 | 功率 |
|------|------|----------|----|------|
| 投光灯 | Sill | 金卤灯 (蓝色) | 8 | 150W |

外部其它区域

| 安装种类 | 生产企业 | 灯种 | 编号 | 功率 |
|------|----------|----------|----|-------|
| 投光灯 | Sill | 金卤灯 | 28 | 400W |
| 投光灯 | iGuzzini | 金卤灯 | 3 | 250W |
| 投光灯 | Sill | 金卤灯 (蓝色) | 44 | 70W |
| 投光灯 | Sill | 金卤灯 | 7 | 250W |
| 整体功率 | | | | 118kW |

Installation Details

Interiors

Underground Floor

| Type of installation | Manufacturer | Lamp | Number | Strength |
|-----------------------|-------------------------|--------------------------|--------|----------|
| Special embedded | Louis Poulsen + Sadi | Tubular fluorescents | 304 | 2x58W |
| Ceiling | Sill (modified) | Metal halides | 88 | 70W |
| Built into the ground | Louis Poulsen | LED | 45 | 3W |
| Wall mounted | Prolicht | Circular fluorescents | 10 | 40+22W |
| Embedded | Prolicht | Metal halides | 5 | 2x35W |
| Embedded | Prolicht | Linear fluorescents | 19 | 2x21W |

Ground Floor

| Type of installation | Manufacturer | Lamp | Number | Strength |
|----------------------|-------------------------|------------------------|--------|----------|
| Embedded | iGuzzini | Metal halides | 20 | 70W |
| Hanging | iGuzzini | Metal halides | 11 | 70W |
| Embedded | iGuzzini | Metal halides | 56 | 70W |
| Special hanging | Eleber | Linear fluorescents | 36 | 2x58W |
| Special embedded | Louis Poulsen + Sadi | Linear fluorescents | 16 | 18x58W |
| Hanging | Louis Poulsen | With mixed light | 268 | 100W |

First Floor

| Type of installation | Manufacturer | Lamp | Number | Strength |
|----------------------|--------------|---------------|--------|----------|
| Embedded | iGuzzini | Metal halides | 36 | 70W |
| Embedded | Prolicht | Metal halides | 5 | 2x35W |
| Hanging | iGuzzini | Metal halides | 2 | 70W |

Skylight

| Type of installation | Manufacturer | Lamp | Number | Strength |
|----------------------|--------------|------|--------|----------|
| Special ceiling | Sill | LED | 32 | 1W |

Exteriors

Skylight Exterior

| Type of installation | Manufacturer | Lamp | Number | Strength |
|----------------------|--------------|-------------------------|--------|----------|
| Projection | Sill | Metal halides (blue) | 8 | 150W |

OTHER OUTSIDE AREAS

| Type of installation | Manufacturer | Lamp | Number | Strength |
|-----------------------|--------------|-------------------------|--------|----------|
| Projection | Sill | Metal halides | 28 | 400W |
| Projection | iGuzzini | Metal halides | 3 | 250W |
| Projection | Sill | Metal halides (blue) | 44 | 70W |
| Projection | Sill | Metal halides | 7 | 250W |
| Total Power Installed | | | | 118kW |

工程信息

意大利米兰—加里波第火车站

企划：

百家车站股份公司 (Centostazioni S.p.a.)

建筑师：马里娅·泰莱莎·哲璐妮 (Maria Teresa Genoni)

建筑师：乔治·派奈斯特里 (Giorgio Pennestri)

照明工程：

菲拉拉·帕拉蒂诺 (Ferrara Palladino)

时间：

开始时间：2004年3月

结束时间：2006年3月（比预计时间提前了6个月）

施工单位：

建筑单位：GDM 建筑股份公司 (GDM S.p.A.)

照明：嘉里股份公司 (Galli S.p.A.)、芝安尼·本芬努托有限公司 (Gianni Benvenuto s.r.l.)

工程负责人：

乌贝托·瓦欣托尼 (Umberto Vasintoni)

Work Sheet

Garibaldi Station, Milan, Italy

Design:

Centostazioni S.p.a.

Maria Teresa Genoni, architect

Giorgio Pennestri, architect

Lighting engineering design:

Ferrara Palladino

Construction periods:

Start of work : March 2004

End of work : March 2006 (six months ahead of schedule)

Contractors:

ATI - GDM Costruzioni S.p.a,

Elettromeccanica Galli S.p.A

Gianni Benvenuto s.r.l.

Project Director:

Umberto Vasintoni



图4 - 在地下部分的建设过程中,制造了一个模型,用来检验嵌入灯光的设计效果。(图片提供: 菲拉拉·帕拉蒂诺工作室 (Ferrara Palladino))

Figure 4 - Pattern. While constructing the underground floor, mock-up lighting was constructed to check the effective value of the lighting produced by the designed embedded lights (courtesy: Ferrara Palladino)

a point of continuity with the glazed openings that “communicate” with exterior light sources.

The lighting design also highlights and complements the building’s architecture. In lower areas, where there are numerous marble columns, *luminaires with blades of light* were installed that provide grazing lighting on the columns, creating a uniquely original lighting pattern on the floor below.

Quality luminaires

Almost 1,400 luminaires were installed to complete the system. Metal halide lamps were used with power ranging from 70 to 400W, as were

fluorescent lamps, linear and compact, and the latest generation, the LED lamps.

In the outdoor square, at the entrance and above the rail tracks, projectors and swinging lamps with high rendering optics were introduced to allow high levels of lighting in areas that, from a security point of view, were usually considered at risk.

To blend perfectly with the specialised needs of the station, some *special luminaires* were created that involved modifying catalogue products to make them better suited to the conditions imposed by the design. Other lights were

designed *ad hoc* to provide a unified look to the station’s overall lighting scheme (figure 4). ■