

BOTIN CENTER









The Centro Botín Lift Systems



CENTRO BOTÍN, SANTANDER, 2010-17 AN ARCHITECTURAL STATEMENT BY THE RENZO PIANO BUILDING WORKSHOP

The **Centro Botín** is a major new visual arts centre in **Santander**, in northern Spain, which was commissioned and financed by the **Fundación Botín**, a philanthropic Spanish institution founded in 1964.

The building, and its urban setting which links the city to its bay, was designed by the well-known architect Renzo Piano. As well as offering the people of **Santander** and the wider region of Cantabria a wonderful gateway to the arts, the Centre will surely strengthen the city's social and cultural appeal and create a striking new attraction, in an exceptional waterside location, for everyone from around the world who pays the city a visit.

The **Centro Botín** is an art space that also hosts educational and cultural activities. Projecting out into the Bay of **Santander**, it sits in a highly strategic location. Once part of the busy docks, the site had ended up as a massive car park for the ferry terminal. Now, finally, it has been restored to life in the city.

The building not only overlooks the bay but is also right next to the historic city centre, and adjoins a wonderful public space, the historic Pereda Gardens. It reconnects the old town to the bay and to the sea beyond, while the road that once blocked the gardens off from the dockside now runs out of sight through a tunnel. This has allowed the Pereda Gardens to double in size, to about ten acres, and to extend all the way to the bay, to be enjoyed by visitors and passers-by alike.

Set on the bayside at the edge of the park and lined up on the central axis of a nearby local market, the Centro Botín is elevated above the park and above the bay itself, half over land and half over water. This means that people strolling in the gardens have a glorious and unimpeded view of the bay, with the Centro Botín seeming to hover weightlessly at treetop-height, offering tantalising glimpses of itself through the foliage. A series of stairs and walkways in fine steel and glass separate the two rounded-off volumes of the building and create new public spaces. High above ground level, to the north of the building, these squares are entirely public. Stairways and lifts then lead up to the two blocks which make up the Centre, and crowning the eastern block is a rooftop terrace with spectacular views of Santander and its surroundings. Barely earthbound, the building shoots out 20 metres over the bay.

The twin-volume form of the **Centro Botín** emerged from extensive modelling during the design process, which made it clear that separating it along the central axis and rounding off the corners would light up the ground level and maximise the view of the bay from the park and neighbourhood at large. On both blocks of the building, the façades are covered with 280,000 small and slightly-rounded ceramic tiles, vibrantly mother-of-pearl, that reflect the sunlight, the ripple of the sea and the watercolour luminosity of **Santander**.

The west block is entirely dedicated to showing art. The exhibition galleries are on two levels, offering stunning views of both bay and park. The exhibition space on the upper floor is lit from above and is protected with three layers of roof covering: an outer layer of small silkscreened glass slats that prevent light from entering the gallery space directly, an intermediate layer of double glazing that weatherproofs the gallery and an inner layer of small aluminium louvres, controlled by sensors, that can be used to adjust the light or black the interior out completely. Beneath the west block, a glazed-in public space contains the restaurant, shop and leisure areas.

The east block focuses on cultural and educational activities. On one side, an auditorium rises to double height and is cantilevered out over the bay - a versatile space for hosting concerts, readings, lectures, festivals and ceremonies, with a terrace that offers visitors the beautiful views so characteristic of the **Centro Botín**.

At its northern end, the education centre provides multipurpose spaces designed with maximum flexibility to house activities large and small: from classes and workshops to music, dance and cookery events, for children, teenagers, adults and families.

Outdoors, a new amphitheatre has been created, facing the **Centro Botín**'s west façade, where a large LED screen is the focal point for an open-air cinema, where events inside the building can also be screened.

The ground floor of the west block is fully glazed and houses a café-restaurant, a shop and an information centre. The ceiling here is the tiled underside of the block itself, while the floor is orange, in contrast to the blue-grey concrete paving used outside. The views of the bay and landscape beyond stretch out in the shade of the building overhead as it projects out over the water, an outdoor terrace for relaxing and socialising with friends and family. Land, sea and sky – they all flow through the **Centro Botín**.



02.1. THE CHALLENGE: DESIGNING LIFTS WHICH DO MORE THAN AMAZE

Renzo Piano, the Botín Foundation and the Project Manager made it crystal-clear, right from the start, exactly what they wanted.

- Strikingly original made-to-measure lifts with one-off dimensions and a very high load capacity, which would impress visitors and safely handle the transportation of notable works of art, both large and small.
- Fine, top-quality finishes for the lift cars, hand-picked by the architect's studio and approved by the client
- All lift components designed and made to measure.
- Exceptional safety features to guarantee the welfare of both passengers and works of art when travelling in the lift cars.
- Stringent temperature-control and air-conditioning specifications to optimise performance in all and any circumstances.

IMEM Lifts' dedicated team of engineers worked tirelessly to deliver lift systems which met the specific and highly detailed requirements of this emblematic building to the very highest possible standards.

02.2. THE MAIN LIFT SYSTEM



The main lift, whose **essential task is to transport both passengers and artworks**, is located along the central axis of the Centro Botín.

· It is a machine-roomless lift with a 6500kg/86-passenger load capacity and serves four floors with a travel distance of 20.3 metres at a speed of 1 metre/ second. Although we were more than aware that designing, manufacturing and installing a lift of this significance and speed without a machine room was going to be a considerable challenge, from the very first we were convinced that it would be by far the best solution. We wanted the lift to take up the minimum possible space and, by the same token, we were determined to avoid the lift's technical requirements restricting the architects' freedom to design in any way they saw fit. Doing without a machine room removed the necessity of building a structure to house it which would have disrupted the roof line and gone against the whole aesthetic of the building. If, on the other hand, we had sited the machine room at ground level, its proximity to the Bay of Santander would have required the undertaking of expensive works to protect it from possible water damage. Hence our final decision.

- The lift has a 4:1 roping ratio and a centrally-mounted support frame, a configuration that we chose because it delivers excellent passenger ride comfort.
- A major priority for us was to make sure that the weight of the lift system (slightly over 30 tons), its lift car speed of 1 metre/second and its traction drive speed of 4 metres/second did not lead to the generation of significant vibration in the support structure when the lift car was in motion, which would have seriously affected acoustic purity within the Centro Botín. We achieved this by insulating every possible source of vibration with the most advanced damping materials available.
- The lift is equipped with a state-of-the-art permanent-magnet drive unit. We opted for a gearless motor because it is 50% lighter than its geared equivalent, which makes its handling and installation on-site significantly easier. The compact size of a permanent-magnet motor reduces the space it takes up inside the shaft to a minimum and its gearless configuration reduces the lift's energy consumption. Currently dominant in the modern lift sector, the benefits of this technology include delivering the smoothest and quietest of rides, great reliability, a long working life and notably eco-friendly operation as it does not require lubricating oil.
- The glazed lift car is five metres high and offers its passengers glorious views of the Bay of Santander. The car and landing doors are built of stainless steel and are centre-opening, using four 3600 x 4000mm panels. Given their unusual size, both the cars and the doors were made to measure, and other door and door-entrance components such as the stainless-steel sills were also specially manufactured for the project.
- The lift car roof was designed and built to reflect the ceramic-tile cladding of the Centro Botín, and incorporates a fabric which was specifically created for the job. The lift car flooring is the same as the wooden floor finish used in most of the building, and is more than capable of handling the passenger and cargo traffic anticipated.
- The lift car is vented to the exterior so as to control and maintain the temperature difference between the shaft and the building interior as required. The landing doors are completely smoke-proof and, when closed, they prevent any exchange of air at all between the shaft and the building interior. The car is equipped with its own air-conditioning system which is programmed to repro-



duce precisely the temperature inside the art galleries. It is fitted with huge panels of thermal glass, measuring four by five metres, which prevent the condensation that would otherwise result from the temperature difference between the building interior and exterior.

- The shaft pit has one particularly unusual feature: it is located below sea level. In case of any water leakage, it is fitted with a water detection device which can activate pumps to remove the water while the lift car is held between floors.
- The lift is fitted with the very latest safety measures available, such as a special automatic re-levelling system in the lift car and a control system designed to keep the car floor level with the landing during loading. The doors have electronic safety barriers to their full height



to ensure the damage-free loading and unloading of particularly large works of art.

- The lift system is programmed with different function modes that are activated using RFID (Radio-Frequency Identification) cards: operation as a passenger lift or a goods/passenger lift, independent-service mode, outof-service mode, controlled access and various others related to the Centre's Building Management System (BMS).
 - The lift control system uses artificial-intelligence applications to manage alarms, breakdowns and traffic management.
 - The state of the lift is monitored twenty-four hours a day and it has been designed so that necessary maintenance work can be carried out in the safest possible conditions, bearing in mind the added difficulties presented by the heights involved, the unusual size of some of the component parts and so on.

The lift's commissioning date was the 23th of June 2017. During its first few months on the job, this lift has made an average of 1000 starts with 11 hours of travel a day. There are peaks in passenger traffic to the art galleries during the day when it is in constant operation.

Aside from passengers, **the lift has also transported works** of art – some of them huge – by renowned artists such as Francisco de Goya, Carsten Höller, Jannis Kounellis, Miroslaw Balka, Tacita Dean, Mona Hatoum, among others..

02.3. SECONDARY LIFT SYSTEMS

The Centro Botín has another lift system, a machine-roomless SilensPro Mega[®], that is built to carry loads of up to 2000kg at a speed of 1 metre/second and equipped with a lift car which, like the 6500kg lift, was designed to match the design aesthetic of the building. Given that they lead directly to the building exterior, the doors of this second lift are fully weather-proofed.

Finally, to round things off, **there are two dumbwaiters** that serve **EI Muelle, the Centre's** ground-level café-restaurant run by the two-Michelin-starred chef **Jesús Sánchez**. These lifts were built with special overhead-clearance characteristics to ensure that they reflected the overall visual look of the building.

02.4. THE MAIN LIFT: TECHNICAL DATA

Lift type · A special machine-roomless lift, designed and manufactured to fulfil client needs and specifications.

Roping ratio \cdot 4:1

Load capacity · 86 passengers, 6500kg

Travel distance · 20.33 metres

Number of stops $\cdot 4$

Speed · 1 metre/second, frequency-controlled

Lift car

- Made to measure in accordance with architect's instructions.
- Single entrance.
- The car's end wall is panoramic and the side walls are of stainless steel. The internal height is 5 metres.
- Car dimensions: 3850mm (width) x 5000mm (height) x 2800mm (depth).
- The glazing is self-heating to avoid condensation on its inner surface due to the difference in temperature between the building's interior and exterior.
- The car has the same wood flooring finish as most of the building.
- The car roof reflects the aesthetic of the Centro Botín's ceramic tiling, in harmony with the design of the gallery block.
- The car is equipped with two 4-metre Dewhurst M-10 REB Braille operating panels.
- The car door is stainless steel with an entry clearance of 4 metres (height) and 3.6 metres (width).
- The car door opening is fitted with a photocell barrier along its full height that protects passengers, artworks and the doors themselves from coming to any harm.

Lift car frame

- The car frame is built of high-resistance steel, resulting in easier installation, reducing the system's static load and making it extremely robust and sturdy.
- This type of support frame is particularly effective with a 4:1 roping ratio and, in line with European standards, is equipped with progressive safety gear.
- The frame is finished in RAL 2009 as specified by the client.

Technical characteristics:

- (P + Q) max. = 15500kg.
- Max. speed = 1 metre/second.
- Max. passenger load = 86.
- Max. cargo + passenger load = 6500kg.

Lift car guide rails

Cold-drawn T14O-3/B-model rails, fully compliant with ISO 7465.

Counterweight frame

With the 4:1 roping ratio so suited to machine-roomless lifts and the lift's large load capacity. Painted in RAL 2009.

Counterweight guide rails

Cold-drawn T90/B-model rails, fully compliant with ISO 7465.

Landing doors

- Automatic Wittur doors, Taurus model, centre-opening with 4 panels and finished in Scotch-Brite stainless steel.
- The doors are insulated against heat loss.
- Horizontal entry clearance of 3.6 metres and vertical clearance of 4 metres.
- The airtight seal between the fast door panels, and between the panels and the door frame, ensures that the doors are smoke-proof when closed.
- T100 flush sill and track in stainless steel (AISI 316).

Lift car doors

- Automatic Wittur doors, Taurus model, centre-opening with 4 panels and finished in Scotch-Brite stainless steel.
- Horizontal entry clearance of 3.6 metres and vertical clearance of 4 metres. Opening blocked when between floors.
- Variable-frequency asynchronous motor.
- An optoelectronic light curtain that, along with its associated wiring, is integrated into the door panels, interrupts door closure as soon as it is breached.

Landing operating panels

The landing operating panels are 4 metres high and are equipped with Dewhurst M-10 REB Braille push-buttons.

Lift ropes

Drako 250T IWRC 1570 U sZ, with a diameter of 13mm.

Compensating chain

Drako CB 600 comfortBalance.

Pawl device

NS 70/100-model safety device which stops the cabin dropping during loading and unloading operations.

Drive system

WTYF380 S20-3500-2: synchronous permanent-magnet gearless motor.

- Sheave diameter: 530mm
- Rated torque: 3010Nm
- Maximum power: 45.4kW
- Current: 103A
- Rated speed: 1 m/s (ratio 4:1)
- Brake voltage: 220V/100V

The motor is painted in a RAL colour in accordance with client choice.

Overspeed governor

SLC LF 30 CA model with tension pulley.

Safety gear

KB 55 SS / EB 75 GS model.

Pit damper mechanism

OB16 model.

Voltage

380/400V AC 50Hz

Shaft lighting voltage

220V AC.

Control system

Altamira II model, with distributed modular electronics and state-of-the-art CAN bus networking.

Basic characteristics of control system

- Single-lift control system, up and down collective.
- Four stops.
- Direct approach system with variable-frequency control.
- Includes phase failure relay and temperature control.
- Control of motor temperature.
- Intelligent control of lift car speed curve.
- On-line monitoring 24 hours/day.
- RS485 computer communication port.
- Special control system for loading and unloading artworks.
- Special lift-car control system using contactless smart cards for:
 - Independent service.
 - Out of service placement.
 - Cancellation of stops.

Applicable standards

EN81.1

EN81.70

Building Owner

MARCELINO BOTÍN FOUNDATION

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Architects

RENZO PIANO BUILDING WORKSHOP (in collaboration with LUIS VIDAL + ARCHITECTS -Madrid-)

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Developer

OHL/ASCAN

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Lift transportation systems contractor

IMEM LIFTS Adarzo 167-B 39011 Peñacastillo (Spain) Phone: (+34) 942 33 33 09 Contact Person: Antonio Pérez Luzuriaga (Marketing Director)

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Main contractor

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Project oversight – construction & landscaping

LUIS VIDAL + ARQUITECTS

Project manager - construction and health & safety

BOVIS PROJECT MANAGEMENT

Landscaping

FERNANDO CARUNCHO

.....

Building & tunnel engineering

DÝNAMIS

Electrical, public health, lighting, structural & fire engineering

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Environmental & urban planning PRADO Y SOMOSIERRA

RADO I SOMOSIERRA

Acoustics

MÜLLER-BBM

Lighting

ARTEC3

Leadership in Energy & Environmental Design BOVIS PROJECT MANAGEMENT

Cost consultant

GLEEDS

Graphic design

2x4

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Renzo Piano - architect of the Centro Botín

Renzo Piano was born in 1937 in Genoa, and lives in Paris. He studied in Florence and in Milan, where he worked in the office of Franco Albini. In 1971, he set up the Piano & Rogers office in London with Richard Rogers, and together they designed the Pompidou Centre in Paris. From the early 1970s to the 1990s, he worked with the engineer Peter Rice and, in 1981, he set up the Renzo Piano Building Workshop (RPBW).

RPBW currently has a staff of 150, with offices in Paris, Genoa and New York, and it has designed buildings all over the world: the Menil Collection in Houston, the Kansai International Airport terminal in Osaka, the Fondation Beyeler museum near Basel, the Jean-Marie Tjibaou Cultural Centre in New Caledonia, Potsdamer Platz in Berlin, the revitalisation of the Old Port of Genoa, the Parco della Musica Auditorium in Rome, the Nasher Sculpture Center in Dallas, the extensions to the High Museum of Art in Atlanta and the Morgan Library in New York, the Maison Hermès in Tokyo, the New York Times headquarters, the renovation and extension of the California Academy of Sciences in San Francisco, the Modern wing of the Art Institute of Chicago, the monastery at Ronchamp, the transformation of the Los Angeles County Museum of Art and the new wing of the Isabella Stewart Gardner Museum in Boston.

Recognition of his achievements includes awards such as the RIBA Royal Gold Medal for Architecture in 1989, the Praemium Imperiale in Tokyo in 1995, the Pritzker Architecture Prize in 1998 and the AIA Gold Medal of the American Institute of Architects in 2008. Some of his most important current projects include the redevelopment and enlargement of the Fogg Museum in Cambridge (Massachusetts), the new Whitney Museum of American Art and the neuroscience research facility at Columbia University in Manhattan, the Kimbell Art Museum extension in Fort Worth, the Shard in London, the Intesa Sanpaolo tower in Turin, the Stavros Niarchos Foundation Cultural Centre in Athens and – last, but by no means least – the new Centro Botín in Santander, Spain.

























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