

ENGLISH ABSTRACTS

BILBAO EXHIBITION CENTRE

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The BEC is conceived on the one side as a functional challenge and on the other, as a landmark inside the urban space of the province expressing Bilbao's trading activity and presenting its enterprising aspect to the World, all these expressed through technology, sobriety, and a contemporary language.

Although always conceived as a single building, the functional difference between the exhibition areas of the pavilions and the representative areas of the offices and convention centre has been used to produce a strong counterpoint between the horizontal conception of the pavilions and the verticality of the offices and halls building, turning into a singular landmark in the landscape.

From the urban point of view, its situation in a strategic area such as a transportation node and the same time at the fringe of the urban nucleus allows the building to express itself through all four of its façades, thus hiding the usual circulation of freight trucks around it, which in this case would become awful for the city.

The main characters in the pavilions are the large 125 meter long trusses which arranged orthogonally cover the whole distance of the exhibition space with no intermediate pillars while all services run through them hiding from the view of the visitors and allowing for maintenance to be carried out without interfering with the use of the building. One of the larger halls will be the Biscayan Arena that will be able to host all sort of shows, sports and cultural events, as well as exhibitions.

The Convention centre stands out for its height and its conception as a "layering of functional strata" where each use piles vertically on top of the other, generating a rich interior spatial composition through the voids in some of the areas. The exterior also produces an interesting composition. The Convention centre is composed of concrete vertical communication cores that make up the main structure allowing for open and flexible floor plans for meetings. One of these cores extends vertically to constitute the support for the glassed office box, suspended from the superior trusses. The technical service area configures one more functional layer, vertically piled and transparent towards the exterior.

The exterior of the pavilions has been conceived to provide a homogeneous character to the whole, avoiding an excessive appearance of a trade fair pavilion. The metal skin wraps the pavilion and the services providing anchor points for these from the central production area to the pavilions. The skin is supported in the east and west elevation by V shaped porticos, which bare the service buildings of each pavilion and allow trucks to circulate beneath them. The metal skin's texture has been designed searching for a veiled transparency and a slight volumetric configuration allowing its appearance, texture, and reflexes to vary according to the light.

THE SCALES OF ARCHITECTURAL THOUGHT. A TRIP THROUGH THE DIFFERENT BUILDING SOLUTIONS OF THE B.E.C.

David Resano

What scale are construction details thought at?

Does it make any sense to solve problems 1/1 forgetting about the context?

In this essay we will discuss on different technical and building systems employed in the BEC related to its location, program, and architectural design. In order to do so we will briefly cover its basic building systems: foundations, structure, facades and interior finishings. In each one of them we will try to figure out its connection to the internal loggia of the project and how its solutions answers to the urban scale, issues related to the program, dimensional needs and the interior's character. In this sense, we will attempt to go in depth into the complex relations between the different scales of thought in every architectural decision, using the BEC as reference.

WIDE SPAN STRUCTURES

Rufino Goñi Lasheras

There are many kinds of wide span structural systems. All of them will require of a greater or smaller depth for the bearing systems regarding the span and the degree of vault effect desired by the architect.

Undoubtedly, the spaciousness of the BEC is found in the six multifunctional rooms (pavilions) that make up the main hall of the building. We will also comment on the perimeter structures of this main hall, of the tower, and the winding stair in the central corridor.

The six pavilions, of varying dimensions, are all solved in the same way. The main element of the roof's structure are four huge girders layed out as a tic-tac-toe board standing on 8 concrete pillars which function as access doors to the hall. This 8 meters tall girders are built in situ welding double T profiles. The length varies depending on the size of the room. This beams will provide space for services and maintenance, being clad on the exterior by a fretted plate. The nine cavities created by the tic-tac-toe disposition are covered with nine three dimensional meshes. This allows for open space, without columns and a perfect integration with the building.

The rest of the building, with the exception of the tower, is composed of the central and lateral corridors that link the six pavilions together and what has been called the 'backpack' in the roofed perimeter of the building allowing the entrance of delivery trucks. The 'backpack' also hosts the building's services.

This parts are all built with steel elements adopting different solutions to different parts of the building.

BEC's 92,5 meter tall tower is uno of the highest in the Vasque Country. The structure is made out of a concrete core and a steel super-structure. This core was poured into slip form. The steel structure was 'hanged' from the core once it was finished.

Special attention must be placed in the winding stair of the Atrium, similar to the one built by Javier Lahuerta in the Alcobenda's church of the dominicos by Miguel Fisac. This stair has the shape of half spiral, standing on its lower end, while the stair in the BEC is hold on to both ends shaping a complete spiral.

Nevertheless both of them, bear the geometric and building complexity becoming, however, an elegant solution for an everyday element.

THE ENERGETIC BACKPACKS IN BEC

César Martín Gómez

What should the equipment for multifunctional building used simultaneously by thousands of people be like? Let's start with the (architectural) logic:

- Such a space must allow for people's movement and carry out activity with total freedom, without the interference of the necessary and voluminous service shafts.

- Services must be easily accessible for maintenance.

Although these statements might be obvious, these design principles are not always correctly prioritized in the design process, adding problems to an already complex situation.

In the building we will focus on, however, we will see how logic has been employed since the beginning of the project. This way, the equipment design for the BEC becomes a reinterpretation of Kahn's theories for service and serviced spaces.

Each main hall, every exhibition pavilion, is suited with its own equipment space where the services are placed. An "energy backpack" sprouting out of the spatial conception of the architecture, since the architects had the service requirements for every pavilion since the starting point of the design. This solution helps, at the same time, to hide the complex perimeter circulation of the trucks.

On the other hand, I must insist—in the same way I try to transmit it to my architecture students—how the services and infrastructure, while they don't usually play the leading roles in buildings or urbanism, they are the elements that, like "technological x-rays", show the logic behind the design and construction of a certain architecture. Thus, inside the pavilions, the services might be enjoyed, used, and maintained, without being noticed by its users, and they do not appear on the fifth façade, the roof, since they are logically integrated in the architecture they belong to, a difficult thing to achieve in buildings of such characteristics and dimensions.

When the project for the BEC started, the energetic issues did not have the relevance they posses today. Nevertheless, beyond the possible installation of solar panels that would have given the idea of a relatively "sustainable" building, truth is that the construction rigor, its modulation, dry construction, and the common sense employed for the design of services and the maintenance ease during the life-span of the building, allow for a more coherent approach in the services design—and thus an energy saving on the long run—than the current verbal diarrhea usually employed when referring to a false integration of services in the building.

SPACE FOR A GASTRONOMIC SOCIETY

Carlos Pereda Iglesias / Oscar Pérez Silanes

The starting conditions of this project where defined by its small functional program, very few aspects of the surroundings and a scarce budget. The program defined a space that would host the leisure and cultural activities proper of a gastronomic society being flexible enough for different events, including an exterior terrace, storage room, rest room and pantry.

The lot was defined by the following characteristics: on the one side, its located at the end of a estate outside of the village's urban center, on top of a plateau, viewing the historical center in the distance; On the other side, both pedestrian and traffic access are located on only one of its sides; And finally, its irregular shape, slightly oblong in the east-west direction. The remaining conditions regarded the observance of the regulations, broadly defining heights and setbacks.

The proposal traces a clear interior organization, almost schematic; the main room is set longitudinally in the east-west orientation extended with the exterior terrace towards the views of the historical city. The remaining rooms appear as appendixes hanging from the main one describing their programmatic subordination. The organization of the spaces develops into clean and bold volumes providing special importance to the cladding materials as one of the most significant decisions of the project providing the building with its character from natural materials best suited for our proposal. On the one side, the tile as a cladding material provides the expression of the volume with its texture, color, and irregularities. Both the roof and façades are clad with the same material providing homogeneous volumes.

This decision configures the volume as an irregular shell, an origami exercise. In this scheme, the perpendicular sides closed with glass and iroco deck emphasize that idea balancing between the transparent and the opaque, camouflaging movable and fixed walls, providing with its geometric texture a natural counterpoint to the abstract composition of the volumes.

EVALUATION OF ELECTRONIC LOCKING DEVICES FROM A GLOBAL PERSPECTIVE

Frank Branderburg

Electronic locking systems are superior to mechanic systems since they favor the processes carried out in the buildings in a flexible way, both in public areas as in restricted access ones. A global perspective of the building's situation and its costs (Cost of Ownership), demonstrates that the cost-quality ratio is many time advantageous.

Another advantage derived from electronic locking systems is an increase in security, providing a higher standard than mechanical systems, since electronic devices might be locked quickly and flawlessly.

Costs might be foreseen through software, as a profit calculator, to decide when the electronic system could be profitable.

Through electronic systems is possible to manage the entrances, limit them occasionally, and conduct protocol functions. This way it is possible to supervise when and who has acted upon every lock. Locking whole areas is easier since rights can be variably awarded through computer software. Special solutions can also be provided for specific buildings.

No-touch locking systems provide ease of use. Comfort is a key issue when confronted with other system and processes are often quicker.

All of them express the need to implement a continuous system with multiple integrating all kinds of locking systems. Nowadays modern locking techniques allow for a single system to control a whole building. These locking systems provide other advantages when combined with other functions such as payment management, time control, to offer unified solutions, the so-called multiple applications.

Specialized companies manage electronic locking systems according to the needs and specifications of the owner and the users, defining the design, costs, and the future use of the building.

Although the initial cost is higher, whenever the design for the locking systems is carried out simultaneously to the design of the building this provides substantial advantages.

50 SUSTAINABLE DWELLINGS IN SARRIGUREN

Rufino Hernández Minguiñón

Buildings housing projects has traditionally been the realm for research in efficiency through industrialization since this field makes up for 80% of the building industry's activity.

Industrialization in housing buildings has followed a "directional vectorial field" pattern where different technologies evolve over time with subtle direction alterations and a unit proportional to its global performance defined by the evolution of knowledge and social requirements. All the issues that determine the global efficiency of housing buildings is probably wider and more complex than others defining other areas of activity, allowing for technologies only partially efficient to remain over time; the lack of efficiency cannot, however, be balanced indefinitely sustained in other issues. The housing construction sector's inertia is, undoubtedly, a key issue in determining how slowly the applied Technologies are evolving; but it also contributes in allowing for these Technologies to evolve over time becoming more efficient and therefore, contributing to maintain and even increase building diversity.

The project for 50 dwellings is the outcome of a competition commissioning the construction of a group of housing plots in Sarriguren's ECO-CITY where aspects such as sustainability, functionality, material quality, paying method, and economic viability became very relevant.

Our proposal belongs to a socially oriented co-op whose aim is achieving the best posible housing with 'SOCIAL HOUSING COSTS', the lowest one in the wide housing market spectrum. The project we developed is not a test or a prototype but a real market example that can be applied to other housing promotions.

BURIED STRUCTURES AND ITS WATERPROOFING ACCORDING TO CTE

Carles Ibáñez Brugués

The Building Technical Code (CTE) is the framework regulating the basic quality requirements buildings must comply with. At the same time, the CTE provides the procedures to certify the observation of each of these requirements with enough technical credibility.

The CTE is structured in two grand areas; the first one containing the general conditions and dispositions for applying it and the basic requirements that building must comply with to fulfill the security and comfort regulations. The second one is made out of the Basic Documents (DB) which describe and quantify the basic requirements as long as the scientifically and technical development allows for. The DB also includes the procedures to certify the observance of the norms, defined by verification methods or practical solutions.

To justify the observance of the CTE the designer might either apply the technical solutions from the DB, the application of which is enough to certify the observance of the basic requirements, or adopt alternative solutions at the designer's risk, justifying its observance of the norm.

The products introduced in the construction techniques will have to be approved for their expected use. Products, systems and equipment which comply with a positive technical evaluation of their application will also be approved by the CTE.

Regarding reception control for products, the supplier will provide the required quality certificates for the products, assuring technical characteristics and evaluations that make new products suitable for the project. The on-site chief will verify if the provided documents are enough to accept the products. Nevertheless, in some given cases, tests on products must be conducted observing the current regulation, or according to the project in order to verify the observance of the basic requirements of the CTE.

CTE's Basic Document (DB) HS 1, regarding waterproofing includes the necessary conditions to waterproof the foundations and retaining elements of the building. The degree of waterproofing required for structural elements in direct contact with the soil is determined according to the existence of water and the geological permeability of the lot. The DB HS 1 itself describes a series of conditions to achieve the waterproofing requirements for walls and floors.

Finally, there are certain aspects of all these groups of conditions that are questionable. Such as the extrados of retaining walls, interior waterproofing of walls or excessive drainage that might reduce the water table without proper analysis of its surroundings.

ON THE INCIDENCE OF THE USE AND MANAGEMENT OF BUILDINGS IN THE FINAL CONSUMPTION OF ENERGY

Fabián López Plazas

Among the many phases of the life cycle of a building, it is usual to assume that the exploitation of it is the one with a greater energetic consumption associated to it. The issues that condition and influence this consumption are very diverse: the shape of the building, its outer skin, and the systems it possesses or the use it houses. But, are the use and management of the building and the energy consuming systems considered a determining factor? Or is it its incidence associated to one of the aforementioned issues?

The parameterization and evaluation of the use and management of the buildings as a matter of great incidence in the final energy consumption of these is the starting point for the investigation developed in the doctoral thesis written by the author, whose goal is to demonstrate how can we quantify, analyze, and assess said incidence. The report is developed starting from the analysis of the characteristics and tracing the energetic consumption and management in some educational buildings of Catalonia's Polytechnic University (UPC), with differences and similarities regarding the issues considered as determinate for energy consumption.

According to the results of the investigation, the main conclusion is that the energy consumption of a building is basically determined by its function and its management. The need to define an energetic strategy in the architectural project becomes apparent from the data collected. This strategy must begin with the definition of a use and managing profile, this being the key issue in all the factors influencing the consumption of energy resources.

CONSIDERATIONS ON THE ARCHITECT'S IMPARTIALITY WHEN WRITING EXPERT REPORTS

Domingo Pellicer Daviña

From a legal point of view, the expert architect holds a knowledge of his field of expertise which endows him to provide data for a lawsuit which will allow a judge or court to pronounce a judgement. The reality of expert practice becomes more complicated, since the legal frame is vague and uncertain, specially when referring to the responsibilities and obligations of the agents involved in the building process.

This essay breaks down the responsibilities and obligations of every agent, Developer, designer, builder, construction manager, quality control institutions, product providers, owners and users, as well as other agents involved in different ways, –Official Associations and Government–, some examples in which responsibilities are shared or when one same person acts as many agents.

Building laws and technical regulations are the legal frame regulating the actions of each agent, but borderlines between obligations and responsibilities of some of the agents regarding others sometimes become wide stripes, as well as the fact that it does not exist the same number of obliged and liable agents. When responsibility realms are shared a new source of conflicts appear.

The expert must try to rake through all the complex tangle of possibilities to conclude his report in the most objective possible way. However this is not what he is usually asked for: On top of the objectively stating the facts, he is asked to rule, in other words, to reveal the cause of the facts, but this causes are more complicated when they overpass the scientific realm and go beyond the realm of human actions.

The expert architect can consider his activity as one of the multiple and rich sides of Architecture focused on providing a public service to society. This will simplify the matter since his work will benefit all Architecture and its users which will usually require from this Fine Art at least two of the three Vitruvian classical conditions: firmness and usefulness.

The aim of the expert architect will be to contribute to the replacement of those conditions that might fail, helping the judge with the practical aspects of how to do that. That aim will make it easier to develop his tasks with impartiality.

HEATING AND COOLING URBAN NETWORK FOR EXPO ZARAGOZA 2008

Nieves Rodríguez Largacha

Urban networks can optimize the heating and cooling systems by managing jointly the production means for both heat and conditioning a central heating system is more efficient, reliable, profitable, and sustainable than thousands of individual boilers spread around the city. There is a double urban network circulating below the pavement transporting hot and cold water to the serviced buildings. Cold and hot water is transported at 90° and 5° C respectively. In the return network, temperature varies to 30° and 14° C. The network is made out of steel pipes with great insulation: There is very little temperature variation between the production plant and the consumption nodes.

Every building plugged to the network is equipped with a substation much smaller than classical boilers. These substations provide heating, warm water and, eventually, cooling to the secondary circuits of the building, which distribute it to each user (stores, offices dwelling...). The substations connect to the servers that control the functioning of the network, connection by connection.

The buildings connected might be of very different nature: city hall, schools, hospitals, swimming pools, dwellings, office buildings... This

diversity provides an extra advantage: the offices and schools are heated during the day, while dwellings are heated mainly at night. Some users need the conditioning system professionally: restaurants, hospitals...

Urban networks adapt quickly to external demands, choosing a certain fuel according to sustainability or economical issues. The share of renewable sources in the energetic mix is ever increasing and allows communities to fulfill the goals of CO₂ emissions reduction defined by Kyoto.

An urban network saves thousands of individual boilers and exhaust pipes in a city. Reduces smog, odors, noises, and all the nuances associated with the functioning of boilers in the buildings. The centralized production allows, among other things, for a better control of effluents and an optimum maintenance of the system.

Networks function 24 hours a day, 365 days a year, without interruptions. If a boiler stops, there will be another one taking over without the user noticing. The heating and cooling distribution is also more reliable: the absence of boilers and fuel stored or circulating through the building reduces the risk of accidents.

The flexibility of the energetic mix maintains a competitive global cost and results much less dependent on the rise of fuel prices. On an individual level, shared production centers make it more profitable for clients in many aspects: maintenance, equipment substitution...

The net provides a very valuable space inside the buildings: there are no heating systems in the basements any longer, or conditioning machines on the roofs.