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editor
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The Construction Engineering Institute and the 1949 International Housing Competition

V. Azorín López, A. Sorli Rojo

The 1949 International Competition to distinguish the optimal design for industrialising housing construction in Spain was organised by the Construction Engineering Institute, a body under the aegis of the Spanish National Research Council's Juan de la Cierva Trust. To be fully understood, the competition needs to be set against the backdrop of the institute itself and its socio-political context.

In 1939, with a view to enlarging its facilities and conducting systematic technical research on the industry, the Institute for Construction and Building (Spanish initials, ITCC), founded in 1934, adhered to the recently created National Research Council, successor of the Extended Studies Council (Spanish initials, JAE), the body founded to pool Spanish research. By adhering, the institute obtained premises and funding for interns, a few engineers and quite a number of engineering and architecture students, who were gradually drawn into the scientific and technological milieu created around the person of Eduardo Torroja. Prior to that date, for want of suitable facilities, the institute had engaged in more theoretical than practical scientific endeavours.

While conducting the research for which it was founded, the institute also provided technological support for the industry. Productivity was high in the early years, for during the post-war period the industry was in great need of scientific counsel, which was largely furnished by technological institutes grouped under the National Research Council (Spanish initials, CSIC). The result was intense knowledge transfer between the scientific community and the industrial and business world. Affiliation with the Juan de la Cierva Trust enabled the institute to implement a series of mechanisms for coordination and cooperation with public and private organisations and institutions. In pursuit of its objectives, it patterned its basic operating services after the modern theoretical studies and research centres in place in other countries. These services included "technical commissions" in which both external and in-house architects and engineers participated to perform specific tasks regarded as necessary for the institution's smooth operation.

The ITCC gradually came to be regarded as an advisory body to the Government and private enterprise on ways to perfect construction-related industrial production and manufacturing. It established working partnerships with the Rationalisation and Standardisation Institute (Spanish initials, IRANOR) and the Ministries of Housing, Public Works and Industry. This model of cooperation had a considerable impact on the country's economy, for it meant that scientific and technical expertise was incorporated into standards, codes and specifications sheets.
At the same time, avenues were paved for coordination with public and private, domestic and foreign organisations, and advisory bodies were created for construction-related decision-making. Knowledge transfer continued to be encouraged with the organisation of conferences, training courses, meetings, competitions and the like.

The first conference series under the auspices of the CSIC began in November 1940, spurred by Alfonso Peña Boeuf, the new regime's Minister of Public Works and President of the ITCC. Peña Boeuf himself delivered the opening conference entitled "Problemas técnicos que plantea la reconstrucción de España" (technical problems posed by Spain's reconstruction). His lecture covered both the technical and the political problems involved in rebuilding a country ravaged by war. He described the technical and scientific difficulties confronting the new regime due, among others, to the shortage of construction materials and the speculation aroused by their high cost, not to mention the problems posed by rising wages and worker under-performance. The supply of prime materials was yet another obstacle, along with the paucity of ancillaries (particularly in large-scale projects) and transport shortcomings (often hindered due to the poor condition of the roads, leaving rail as the sole alternative).

But according to Peña Boeuf, these were not the only problems facing architects and engineers attempting to rebuild the country. Another no less important problem was bureaucracy, which caused delays and consequently raised costs. Along these same lines, in this first conference series, Pedro Muguruza, Director General of Architecture and prominent member of the Falange (one of the political organisations that backed the new regime), delivered a speech on his national-socialist theories for a National Reconstruction Plan. Implementing such a plan would call for organising specific programmes for each branch of activity: A) materials, wages, transport, ancillaries and components; and B) design, worksite supervision and work organisation.

In his speech, Muguruza stressed the unemployment rate in Madrid, noting that while demand was high for some trades, unemployment reigned in others, affecting large numbers of people, mostly with rural backgrounds, generally unschooled and unskilled, and with no knowledge of any trade whatsoever. That part of the population would have to be trained if they were to be productive. Such training should take place at the workplace or through apprenticeship courses. Muguruza's plan likewise envisaged controlling manufacturers' output and establishing fees, as well as organising the shipment of prime materials to worksites to reduce costs, particularly fuel costs. Like Peña Boeuf, he advocated slimming and streamlining official bureaucracy, for the concomitant construction delays were very costly.

In this early stage of its affiliation with the CSIC, another of the ITCC's major responsibilities was the organisation of competitions. Several were organised and awards were granted to further activities geared to improving working systems, productivity or the understanding of materials.

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3 COMPETITIONS: The institute organised the following competitions in 1949:

   - International competition 1949, worth 100,000 pesetas, for the best proposal for organising the housing industry to build 50,000 units yearly in Spain.
   - Competition for the best original article published in Spanish technical journals, worth 10,000 pesetas; a 5,000-peseta prize for the best article on cement research and manufacture, and two others, worth 10,000 and 5,000 pesetas, on improvement of its applications.
   - First national prize 1949, worth 20,000 pesetas, for the best paper on concrete durability.
   - Second national competition 1949, worth 20,000 pesetas, for the best paper on tendons for price breakdowns.
   - Worker competition 1949 for masonry squads, worth 8,000 pesetas. And lastly, an ongoing ideas competition with cash prizes for initiatives relating to construction practices with suggestions for changing the existing systems to lower the works cost or raise their quality.
Competitions were organised both on a national and international scale and addressed different construction issues. One of the most prominent, both for its media impact and the degree of participation attained, was the 1949 international housing competition.

The 1949 international competition

At its 2 February 1949 meeting, the Technical Construction Institute's Technical Administrative Council decided to call an international competition on industrial design for the production of the machinery, components and materials required to industrialise the production of 50,000 dwellings per year in Spain.

The 1949 International Housing Competition raised the institute's visibility, for up until then, its international repute was based primarily on the prestige of its director, Eduardo Torroja. This competition was publicised over the world via the main media existing at the time: specialised journals, newspapers with a national circulation and an eight-page brochure on the competition rules printed by the institute. This leaflet was supplemented by a fuller text in Spanish, French and English, designed to encourage participation and containing supplementary information on the Spanish population, climate, industry and labour market, as well as on standard household practices.

Fig. 1. Competition rules  
Fig. 2. Additional Competition Information

The competition had an enormous impact. The institute received 89 proposals from around the world, most of which were foreign. Only 18 Spanish contestants registered.

6 Informes de la Construcción. No. 8, February 1949.
7 ABC (Spanish daily newspaper). 10 April 1949, page 21.
8 Torroja Historic Archive /C/A/023/004.
9 Torroja Historic Archive /C/A/023/005.
The Technical Council created a jury to assess the designs submitted, whose membership included engineers in the employ of the Ministries of Housing and Industry, and two foreign judges, one from France (M. Marini) and the other from England (R. Fitzmaurice). The judges were:

President: Federico Turell, Chairman of the institute’s Board of Directors
Secretary: Jaime Nadal Aixalá, representing the Technical Construction Institute

Members:
- José Fonseca Llamado, appointed by the Director of the National Housing Institute
- Rafael Cereceda Delgado, appointed by the Director General of Industry
- Juan del Corro, Chief Standards Section Officer, chosen by the Director General of Architecture
- Alejandro Suárez, Director General of Industry
- Federico Mayo, Director of the National Housing Institute
- M. Marini, Director of the Scientific Building Centre, Paris
- R. Fitzmaurice, Deputy Chief Scientific Adviser, Ministry of Works, London

Motivation for the competition

One of the major problems in the mid-twentieth century the world over and in Europe in particular was the shortage of housing. The Technical Construction Institute, regarded at the time as an advisory body to the Government for construction-related questions, and closely involved in the activities conducted by the IRANOR and the Ministries of Housing, Public Works and Industry, was consequently requested by the Government to furnish opinions on the most advisable methods for building inexpensive housing in Spain.

Steady post-war population growth, in conjunction with the rural population’s tendency to migrate to cities, led to high growth rates in large urban centres. The logical consequence was a shortage of lodging. The theoretical solution to the problems this posed, namely a parallel rise in construction rates, did not materialise. Despite the efforts made, which in some areas alleviated the situation, the severity of the problem grew day by day.

The pace of construction was too slow to meet the country’s real needs. In addition, in the late nineteen forties, Spain was afflicted by economic imbalance prompted by the rising cost of construction in general, and of housing in particular, which made decent living quarters virtually unaffordable for most Spanish families. The economic and social problem posed was of such a magnitude that its solution was beyond normal construction volumes. Traditional methods were simply unable to contend with totally unprecedented growth in demand.

The inability of a given production process to rise to circumstances that vastly exceed its scope of application was not new in economic history. In the early twentieth century, similar problems had arisen in a number of industries. The solution entailed replacing traditional, inefficient working methods with new systems of organisation, new machinery and new procedures, such as mass production and rationalised working systems. The aim was to improve and economise production to meet growing needs.

With this international competition, the Government, duly advised by the Technical Construction Institute, made an earnest and rigorous attempt to study the possibility of adopting new methods. In particular it sought systems geared to the industrial production of machines, components and materials which would provide architects with the means to design homes affordable for lower income families and meet the housing needs stemming from inordinate population growth, especially in large cities, without impinging on their creative freedom.
As a result, rather than addressing functional, aesthetic or architectural problems, the designs submitted to the competition were to offer technical-industrial type solutions, given the enormous volume of construction, labour, components and ancillaries that would be required.

For the construction industry to evolve in keeping with the new parameters, the national economy would have to be totally reorganised to the extent that it would be affected by the new procedures. The use of new components and machinery, in turn, would entail the creation or reorganisation of the respective ancillary industries.

When the competition was called, neither the institute’s managers nor the senior officials in the Ministries of Industry and Housing had sufficient information on the effect that the adoption of new methods would have on construction costs and therefore on housing prices. A commitment was consequently established to obtain those preliminary data to be able to assess the possibilities of applying the new processes and report on their implications.

The Technical Construction Institute, whose legal purposes included the furtherance and publication of studies and research contributing to the advancement of construction techniques, deemed that the time had come to confront the problem in its entirety and attempt to find holistic solutions. On those grounds, it envisaged the deployment of both traditional construction methods and the possible innovations that would arise in the competition, geared primarily to the industrial production of housing components. The objective was to define an overall approach to low-cost housing construction by organising the industrial production of the necessary components on a large enough scale.

The essential features of the competition rules are summarised below.

- The housing units were to be designed to be feasibly built on the outskirts of Spanish cities, in places that would be designated by the competent authorities.
- The dwellings could be designed for any area of the country, in groups of no fewer than 500 units.
- The developments were to be connected by road to the closest railway station, which was to be no farther than 20 km away.
- The compounds were to be designed to variable densities to ensure that land costs would not be an obstacle to construction.
- Components and construction systems were to be designed so that their uniform characteristics would be generally usable in any of the country’s climates.
- Possible mechanical difficulties or damp induced by the terrain underlying the foundations were not to be taken into consideration, as they would be addressed individually, as appropriate, outside the competition.
- The shape, layout and size of the units would be incumbent upon the designer, the only limitation being that they were to be suited to the average needs of Spanish families.
- The construction design was to be submitted together with a general schedule of works organisation as well as a proposal for establishing new ancillary industries and adapting any existing plants to the new needs.
- All the components envisioned for housing construction were to be manufactured nationally, including, in addition to any existing on the contemporary market, the elements to be produced in the new plants referred to in the preceding rule.
- Any construction machinery required would also have to be manufactured nationally, as specified in the preceding rule. Nonetheless, if deemed absolutely indispensable, the national equipment could be supplemented with imports, which were to be kept to a minimum and in any event to 5% or under of the total value of the works.
- Submission of a proposal to the competition implied acceptance of all its rules.
The rules were supplemented by a series of final remarks, which included the following.

The deadline for submitting designs was 15 November 1949.

The jury was to publish the award by 31 March 1950.

A single and indivisible ONE HUNDRED THOUSAND-PESETA prize would be awarded to the winning proposal.

The jury would be able to propose secondary awards where merited, in consideration of the effort invested.

The prize could be declared void if the jury deemed that none of the submissions merited the award. Even in that case, however, the jury could grant secondary prizes at its discretion.

The jury's decision would be final. Submissions not distinguished with a prize could be collected by the authors at the institute's headquarters.

Acceptance of the award would imply authorisation to publish the winning design by the institute at its expense and in the manner deemed most suitable.

Publication of the other submissions would be subject to the authors' explicit permission. Inasmuch as the object of the competition was a selfless attempt to find an industrial solution to the housing problem, the institute reserved the right to obtain any licences or permits required to implement the winning design.

It also reserved the right to make copies of all the submissions and use the ideas and data they contained, for strictly scientific and research purposes. All other industrial and intellectual property rights envisaged in Spanish law or provided in the international agreements adhered to by Spain would be held by the authors. The contestants would be free to protect and patent their designs in keeping with international law, inasmuch as the institute declined any possible liability deriving from author or third use of the ideas contained therein.
Design selection process

The designs received by the institute were assigned an incoming number before they were forwarded to the members of the jury, which was divided into three parallel sections: Architecture, Housing Institute and Industry. These sections were in turn sub-divided into a total of 18 groups, which processed the information and drafted detailed reports, subsequently forwarded to the judges for discussion and consideration of the proposals.

Although according to the earliest version of the competition rules the submission deadline was 15 November 1949, it was subsequently pushed back to 15 March 1950 by a decision adopted by the institute’s Board of Directors in response to requests from several of the contestants. By the latter date, the secretariat had received 89 proposals, which are listed by nationality below.

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<td>Germany</td>
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<td>France</td>
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<td>Switzerland</td>
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<td>Italy</td>
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To streamline the review process, the Spanish members were asked to reject any submissions that initial screening showed to be of low quality or non-compliant with the competition rules. The foreign judges would receive only the designs whose characteristics were actually deemed to be of interest to Spanish industry and construction. The jury began to review the proposals in April 1950.

The jury met on 23 November 1951, presided by Federico Turell and attended by José Fonseca Llamado, Rafael Cereceda Delgado and Francisco Prieto Moreno.

The secretary, Jaime Nadal Aixala, provided background information and an updated report on the stage of review of the proposals submitted. The participants were informed that a considerable proportion of the submissions were found to conform to neither the 1st nor the 2nd rule. Therefore, although some of them contained promising ideas, those 55 submissions were disqualified in the first stage.

In the second, a further group of proposals was eliminated, for while addressing the core problem and conforming to the competition rules, they were based on premises not readily adaptable to the conditions prevailing in Spain.
Fig. 5. The Bremer Wirtschaft Wiederaufbau M.B.H. proposal took the 10,000-peseta 3rd prize in the International Industrialised Housing Competition organised by Eduardo Torroja in 1949.

In the third stage, 10 proposals that put forward what were deemed to be fairly original solutions to the problems posed and to reveal a thorough understanding of the subject at hand were nonetheless eliminated by the jury, which found them to be of a lesser quality than the rest. The remaining 17 proposals were selected for the final stage, which consisted of further review by the judges.

After that final review, the jury was re-convened on 3 December 1951, when it engaged in an extensive debate on the merits of the 17 proposals. Its unanimous decision was to:

1. reject the proposals submitted by:
   
   Eduard T. Bowser (France)
   Stent (Spain)
   Luis M Albin Sola Celetyp (Spain)
   Hermann Fiene (Germany)
   F. Steinbrink (Germany)
   A. Szokolocz Sisima Danielis (Austria)
   Estructuras ligeras (Spain)

2. to designate the remaining ten as finalists:

   J. Carrasco Muñoz (Spain)
   Société française de Construction (France)
   B. Llongueras-Mopin (Spain)
   Sémelas y Balsegas (Spain)
   R. Lucini Bayod (Spain)
Fig. 6. The Société française de Construction. France proposal took the 10 000-peseta 4rd prize in the International Industrialised Housing Competition organised by Eduardo Torroja in 1949.

Jules Cauvet (France)
Arbeitsgemeinschaft "Hebel" (Germany)
D. Willy Ott (Germany)
Bremer Wiederaufbaugesellschaft. Wirtschaft M.B.H.B. (Germany)
Franz Fischer (Germany).

The jury also decided to forward the aforementioned 10 proposals to the foreign judges, Professors Marini and Fitzmaurice, together with the summaries and opinions issued the Spanish sections of the jury.

After the foreign judges assessed the 10 finalist proposals, the jury was convened to a final meeting on 21/12/1952 to publicise its decision.
Jury’s decision

A translation of the jury’s decision follows.

Further to proposals presented verbally by all the judges present and in writing by Messrs Fitzmaurice and Marini, the jury has adopted the following decisions.

1. Inasmuch as none of the 10 pre-selected proposals provide a fully acceptable solution to the problem posed, pursuant to rule 13, none is deemed to be deserving of the prize.

2. Nonetheless, five of the proposals are outstanding, two of which, the designs submitted by Jules Cauvet and J. Carrasco Muñoz, are of particular merit.
   a. Jules Cauvet. France
   b. J. Carrasco Muñoz. Spain
   c. Arbeitsgemeinschaft “Hebel”. Germany
   d. Bremer Wiederaufbaugesellschaft. Wirtschaft M.B.H.B. Germany
   e. Société française de Construction. France

3. Messrs Carrasco Muñoz and Cauvet are therefore each awarded one 35 000-peseta prize.

4. One 10 000-peseta prize is awarded to each of the proposals submitted by Hebel, Bremel Wirtschaft and Société française de Construction.

5. The remaining five are awarded honourable mentions.

The solution proposed was approved by all the Spanish judges and Mr Fitzmaurice, but not by Mr Marini who, while agreeing that the single prize should in all fairness be declared void, felt that the monetary prizes should be granted to the first two proposals mentioned only.