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Symbolism in contemporary architecture, with facades made of precast concrete elements

Paweł Mika

pawel.mika@pk.edu.pl | https://orcid.org/0000-0001-6132-7662

Faculty of Architecture,
Cracow University of Technology

Jing Yifan

jingyifan@tcu.edu.cn | https://orcid.org/0009-0008-2784-762X

School of Architecture,
Tianijn University, China

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Abstract

The article deals with the issue of symbolism in contemporary architecture with facades made of precast concrete elements. The aim of the study was to demonstrate that such facades, beyond their structural and aesthetic roles, can also serve as a medium of communication, referring to the history of a place, local traditions, or the architect's design intent. An analysis of more than 100 buildings was conducted on the basis of literature, project documentation, statements by architects and critics, as well as case studies. The findings identify four main methods of embedding symbolism: through the overall form of the building, the design of precast elements, the relief and tectonics of surfaces, and the structural system itself. The conclusions confirm that contemporary prefabrication is no longer limited to repetition and standardization but has become a tool of architectural narration, in which facades function as a system of signs, culturally and emotionally legible to the observer.

Keywords: precast concrete facade elements, symbolism, contemporary architecture

1. Introduction

The primary function of external walls was originally to protect the interior. They shielded against weather conditions, wild animals, and other people. Today, external walls usually consist of several layers, each fulfilling multiple roles. This outer, visible layer is called the elevation, and the front, most representative elevation is called the facade. It often contains information that is very important to the recipient. It conveys this information directly or through symbolism. (Cucuzzella, Rahimi, Soulikias, 2023).

Contemporary architecture is increasingly moving away from facades that clearly identify a building's function. Analyzing selected examples, one gets the impression that the main factors that allow one to guess the function are: scale, the grid of divisions with glazing, and the form of the building. In a few cases, designers have attempted to include details that make it easier to recognize the function, as was the case in historical architecture.

"The form of the facade, constructed using appropriate means of expression (scale, proportions, articulations, shape of the body), has an intense and suggestive effect on the observer's psyche, evoking emotional states with a specific charge" (Komar, Tymkiewicz, 2006). The architect's task is to select the means of expression to achieve the desired effect. Most often, the aim is to create compositions that promote a sense of satisfaction, relaxation, and pleasure. The means most often used by architects to achieve this goal include: regular rhythms and divisions, familiar local motifs, human scale, natural greenery around and on the building, soft forms, and natural materials. A regular rhythm was usually assigned to facades made using prefabrication technologies. This was due to the use of repetitive elements. The designer's task was to adopt a modular grid with appropriate proportions and to develop the form of individual types of components – their shape, texture, color, and possibly tectonics.

The article attempts to prove that precast concrete facade elements in contemporary architecture can be designed in a way that conveys specific symbolic meanings–referring to tradition, the history of a place, or the designer's ideas. They do not only serve an aesthetic and structural function and do not have to be limited to a regular, repetitive rhythm. Architects consciously use them as a symbolic medium, designing the forms and layout of precast elements so that they convey meanings rooted in the history of the place or design ideas.

1.1. Contemporary prefabrication

Concrete prefabrication originated in the 19th century with the search for technologies that would enable the industrialization of the construction process, particularly in rapidly urbanizing countries such as France and Great Britain. Its origins are considered to be the experiments of Joseph Monier and François Hennebique with reinforced concrete elements cast in molds, which could then be transported and assembled on the construction site (Konieczny, 2004; Lewicki 2010; Kind-Barakauskas, Kauhsen, Polonyi, Jörg, 2001). The original purpose of prefabrication was to standardize and repeat construction elements, which significantly reduced costs, accelerated the construction process, and made the quality of workmanship independent of variable conditions at the construction site (Giedion, 1994). In the early days, it was mainly used for the production of beams, floor slabs, and wall panels. Later, it became one of the key tools for rebuilding cities after the war and for mass housing construction, which resulted both from the need to ensure speed of implementation and from the idea of modernist technical rationalism (Banham, 1986).

Modernist architecture, dominated by gigantic, detail-less forms, often ignored symbolism, especially on a human scale, which resulted in aesthetic and spatial discomfort (Mus, Nowak, 2013). In contemporary prefabrication, the primary goal is no longer maximum repeatability of elements and cost reduction. Its basic feature is to ensure a high-quality product and the possibility of quick

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assembly regardless of weather conditions. The wide range of possibilities in terms of texture, tectonics, color, and shape, among other things, has allowed designers to return to architectural detail as a carrier of information and symbolism.

1.2. The issue of symbolism in contemporary architecture

Architecture, like other forms of art, functions not only in material and utilitarian dimensions but also as a system of signs. According to the semiotic theory of Charles S. Peirce, a sign is something that represents an object and generates a specific interpretative effect in the mind of the recipient. The sign (representamen) operates within a triangular relationship between what it represents (object) and what it produces (interpretant) in the observer's mind (Baldy, 2007). In architecture, such signs may take the form of geometrical arrangements, materials, textures, or facade compositions, all of which carry specific cultural and aesthetic meanings.

The German philosopher Ernst Cassirer described the symbol both as an object and as a product of cognition, a way in which humans interpret and construct reality (Cassirer, 2018). As Ball-Nowak (1990) explains, "A symbol, being a particular kind of sign, does not passively reproduce reality, but gives it a specific meaning and shape". From this perspective, architectural symbolism need not be confined to simple imitation but may actively co-create cultural and social space.

Umberto Eco argued that architecture can in fact be understood as a language that generates messages. A building becomes a "text", which the observer interprets through visual, spatial, and cultural experience (Eco, 1980). Every element of a facade–its proportions, rhythms, materials, and textures––forms part of this message. Eco asserted that the basic function, or denotation, is always accompanied by additional cultural connotations. Symbolism in architecture is therefore variable, dependent on context and ideology, and its recognition requires knowledge of social codes (Eco, 1986).

Charles Jencks, a scholar of contemporary architecture, introduced the concept of "double coding", meaning that postmodern architecture communicates simultaneously through two parallel languages. On the one hand, it employs modern techniques and engineering solutions; on the other, it refers to traditional forms, symbols, or details that are recognizable to a broader public. As he wrote: "Double coding: the combination of modern techniques with something else (usually traditional building) in order for architecture to communicate with the public and a concerned minority, usually other architects" (Jencks, 1977). In this way, a building can engage both the general audience, who perceive familiar cultural references, and critics or experts, who recognize more complex interplays between tradition and modernity. In the context of concrete prefabrication, "double coding" may involve the use of precast elements as modern technology, while endowing their surfaces with reliefs or textures that evoke local architectural traditions.

The theories of Jencks and Eco build upon the model developed by C.K. Ogden and I.A. Richards, known as the "triangle of meaning", one of the classical frameworks explaining how the meaning of a sign is formed. "In the study of meaning, we shall use the words Symbol, Thought or Reference, and Referent to indicate the three factors in the triangle of meaning. There is no direct connection between symbol and referent; the relation is mediated by thought" (Ogden, Richards, 1923: 11). The model is based on three interrelated components: the Symbol–the material form of the sign (e.g., the shape of a building, relief, or texture); Thought or Reference (concept)–the content evoked in the mind of the observer (e.g., the association of concrete prefabrication with durability, weight, or modernity); and the Referent–the actual object, phenomenon, or function in the real world to which the symbol refers (e.g., another contemporary building with a facade made of concrete

prefabrication). In other words, what we see (symbol) provokes a thought (concept), which in turn relates to reality (referent).

Eco (1980) and Jencks (1980) adapted the Ogden–Richards model to architectural analysis, emphasizing that in a semiotic perspective it is essential to distinguish between the signifier (the physical form of the object), the signified (the idea or concept evoked in the observer's mind), and the referent (the actual function of the building).

2. Methodology

For this study, more than 100 completed contemporary buildings were analyzed. The selection of examples aimed to construct a representative spectrum of projects in which the final aesthetic expression is strongly determined by precast concrete elements. This does not mean that concrete was the only facade material, but it was always the dominant one. The oldest example is a single--family house designed by Frank Lloyd Wright in the 1920s, while the most recent is the Aranya Art Center, an art gallery in China completed in 2021. The majority of analyzed buildings were constructed within the last 25 years. The selection was not limited geographically, since different climatic conditions, combined with the creativity of architects in protecting buildings and the influence of local traditions, lead to continuous exploration of new design approaches. Temporary structures and small-scale architecture were excluded. Only utility buildings were included in the study.

Buildings for which reliable information about symbolism, hidden meanings, signs, or narratives was not available were excluded (around 30%). The research was based exclusively on documented and published design concepts as well as architectural criticism.

Chosen methodology followed directly the aim and hypothesis of the study. The research problem required detailed analysis of both national and international scientific sources, including archival and recent publications related to architecture and construction–such as journal articles, monographs, and professional websites. Photographic documentation from research trips was also used, as well as photographs and drawings published in professional journals, online platforms, and on architectural firms' websites. Based on the collected material, objects were divided into suitable categories.

The research used also a case study approach. This enabled a detailed analysis of selected buildings in terms of the use of precast concrete and the ways in which the intended symbolism was expressed. In addition, available project documentation–plans, sections, sketches, and visualizations––was analyzed to provide a deeper understanding of the architects' concepts. The review of publications, including scientific works, monographs, and designers' statements, was complemented by interpretations from architectural critics. This combination of methods enabled a comprehensive perspective and classification of the analyzed objects. Only part of the examples was presented in the article, to illustrate the discussed issues, research problems, and findings while maintaining clarity of the argument.

3. Embedding of symbolism in buildings with precast concrete facades

In the analyzed cases, contemporary facades may serve several functions: they can inform about the purpose of the building, include symbols and references to the history of the place where the building is located, express the prestige and status of the owner or tenant, signal cultural affiliation, or indicate the period of construction. As B. Jürgenhake notes, the facade is often compared to the human face. Even the slightest expression of the face conveys meaning, sends

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a signal, and attempts to communicate. Metaphorically speaking, the facade functions like a face–it speaks to its audience (Jürgenhake, 2013).

This study focuses on symbolism–the meanings facades can convey and the methods of such communication. As a result of the research, three primary strategies of implementation were identified:

3.1. Symbolism embedded in the form of the building

An example of a building in which symbolism is primarily contained in the overall form is the V & A Dundee (design museum, arch. K. Kuma, Dundee, Scotland, 2018) (Fig. 1.01). In one interview, the architect stated: *"My inspiration always begins with the place where the project will be located..."* (Magali, 2018). Accordingly, the museum was inspired by the cliffs of the nearby coastline. The building was conceived as two inverted pyramids clad with precast concrete "planks" arranged in a horizontal layout. A single element on its own does not carry meaning–it is merely a concrete beam. However, the composition of these elements strongly refers to the local landscape of steep Scottish cliffs. The facade operates within the semiotic model (Eco, Jencks), where form refers directly to the idea of place.

Another building where precast concrete was used in a similar way is the National Museum of Qatar (museum, arch. J. Nouvel, Doha, Qatar, 2019) (Fig. 1.02). The architect aimed not only to reflect the ambitions of Qatar and its rapid recent development, but also to connect the project with the surrounding desert landscape and the sea, which have shaped life in the region for centuries. The resulting form references a natural mineral formation known as the desert rose, which occurs naturally in the sandy areas of the region (Griffiths, 2019).

The Church of God the Merciful Father, also known as the Jubilee Church (church, arch. R. Meier, Rome, Italy, 2003) (Fig. 1.03), is an example where symbolism and emotional meaning are embedded in the entire form. The architect designed the building to resemble a ship, with three large curved walls resembling sails and three vertical structures recalling a hull (Traverso, 2019). These freestanding curved walls, evoking sails in the wind, symbolize humanity's "entry" into the new millennium. They were built using white, self--cleaning concrete, intended to remain permanently pure–a quality that carries metaphorical meaning as well.

The City of Justice (office complex, arch. D. Chipperfield, Barcelona, Spain, 2009) (Fig. 1.04) represents another case. Composed of nearly 12,000 large precast elements of identical form, the complex could have created an overwhelming impression of monotony and scale. However, through subdued coloring, a legible urban layout, and clear divisions adapted to the human scale, the architecture generates positive responses. According to the architect, the clarity and simplicity of the facades were intended to symbolize transparency of law and to evoke a sense of justice and equality. At the same time, the massive, heavy concrete architecture conveys institutional gravity and commands respect for the rule of law (Moore, 2009).

Symbolic associations with security are often provided by massive facades with a limited number of openings, built of durable and resistant materials such as stone or concrete. Such strategies are particularly used in buildings associated with defense, data storage, or financial security–for example, the Götzis Bank (bank, arch. Frei & Ehrensperger, Götzis, Austria, 1998) (Fig. 1.05), or the Experian Data Center (data center, arch. S. Robson, Nottingham, UK, 2003) (Fig. 1.06).

Finally, the Iceberg residential complex (housing, arch. CEBRA and JDS Architects, SeARCH, Louis Paillard, Aarhus, Denmark, 2015) (Fig. 1.07) evokes the image of an iceberg drifting in the ocean when seen from a distance. According to the architects, this was not the original design intention. Instead, the sloping roofs, sharp angles, and transitions between roof and walls were primarily driven by the desire to optimize sunlight, ventilation, and views for

all residents. Nevertheless, the symbolic association was reinforced through the use of smooth, white precast concrete elements that recall the crystalline surfaces of ice (Rasmussen, 2024).

3.2. Symbolism embedded in details

3.2.1. Form and shape of the precast concrete element

Arches Boulogne (residential building, arch. Antonin Darmon, Boulogne, France, 2016) (Fig. 1.08) is part of a broader redevelopment of an area formerly occupied by Renault car factories. Its name derives from the colonnades that surround all facades, giving the building a distinctly classical appearance. These arches reference the design of the former Renault factory buildings once located on the site. The project represents a modern reinterpretation of that industrial heritage, executed in white concrete.

In this case, the architect adopted a slightly different approach: the symbolism is not embedded in the overall form of the building or its massing, but rather in each individual arch, in every precast element, in the detail itself (Mairs, 2016). Here, the form of the prefabricated unit functions as a carrier of deeper meaning, directly linked to the cultural and historical context of the site.

3.2.2. Tectonics and surface relief of the precast concrete element

Fouquet's Barrière (hotel, arch. E. François, Paris, France, 2006) represents an example of reinterpreting local tradition through contemporary means. The architect recreated the facade of a townhouse on the Champs-Élysées by flattening its relief and executing it in precast concrete elements with a lead--gray tone. From a distance, the building blends into the Haussmannian fabric of the city, while up close it reveals its contemporary character. The facade does not imitate the original, but instead creates a simplified, abstract record of it. Precast concrete thus enabled a synthesis of Parisian tradition with modern interpretation, avoiding banal imitation (Anselmi, 2007).

A similar method was applied in the Perot Museum of Nature and Science (museum, Morphosis, Dallas, USA, 2012) (Fig. 1.10). Its facade was designed to resemble geological formations. The profiles of ridges and fissures create irregular surfaces, producing the effect of an organic facade. The tectonic pattern is denser in the lower part of the volume, creating an impression of compression of the bottom layers by the ones above. In this case, the symbolism is embedded in the unique panels rather than in the overall cubic form of the building. To fully understand the intended message, the entire facade must be observed, not just individual cladding elements (Stephens, 2013; Pagliari, 2013).

The massing of the Aranya Art Center (gallery, Neri & Hu Design and Research Office, Chengde, China, 2021) (Fig. 1.11) was deliberately simplified to fit the site's geometry. Its facades, however, were made of precast concrete panels with deep tectonic reliefs, producing dynamic light and shadow effects that change with the time of day. The designers drew inspiration from the nearby ocean waters—azure and calm in summer, yet taking expressive geometric, ice--like forms in winter–attempting to capture the fluid and transformative essence of water in architecture (Neri & Hu).

3.2.3. Graphics and surface pattern of the precast concrete element

The Hämeenlinna Provincial Archive (archive, arch. Heikkinen-Komonen, Hämeenlinna, Finland, 2010) (Fig. 1.12) was designed specifically for storing historical documents. The concrete used on the facade serves a dual role: as a graphically attractive surface reflecting the function of the building, and as a massive enclosure protecting its contents. The choice of material and facade solutions was intended to signal to passersby, at least to some degree,

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the building's purpose. This information was conveyed through the possibilities offered by graphic concrete. All the symbols, seals, and fragments of text were collected from the documents preserved in the archive, digitally processed, and embedded on the facade (Orell, 2010). Similar to the previous example, the references are contained in the visible surface of the prefabricated panels rather than in the simple, cuboidal form of the building.

3.3. Symbolism embedded in structure

Headquarters of rapidly growing companies with a progressive profile almost always reflect the ambitions of their owners. Thanks to such investors, the construction market develops, and architects can experiment with unconventional technologies.

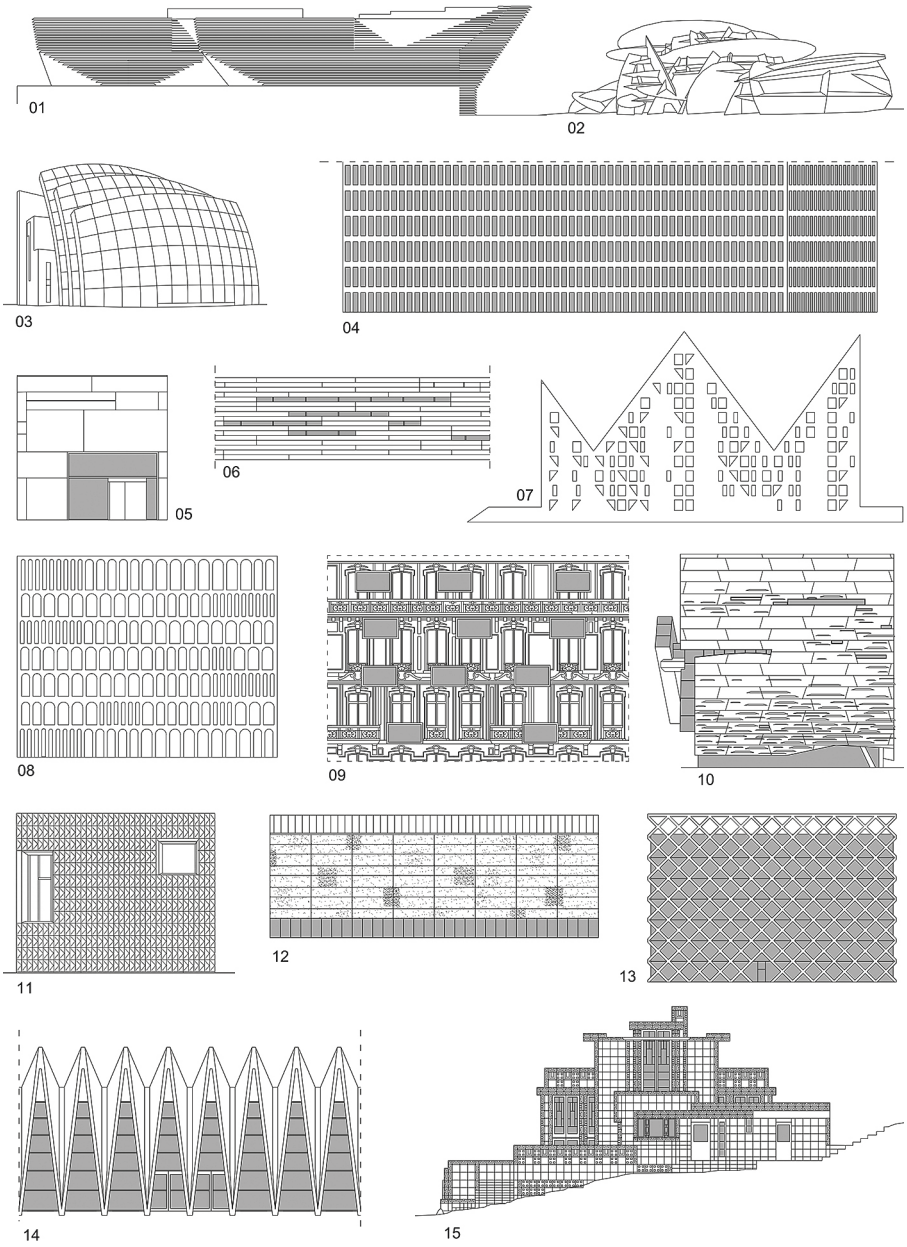

Fig. 1.01–1.15. Discussed buildings with facades made of precast concrete elements (by authors)

An example of a building using a rarely applied structural system is the Atlas Building (university research center, arch. Rafael Vinoly, location: Wageningen, Netherlands, 2006) (Fig. 1.13). Its facade takes the form of a perforated external load-bearing skeleton made of large-scale precast elements. They were produced from self-compacting concrete with the addition of titanium dioxide, giving the surface an extremely smooth and self-cleaning quality (Bizley, 2007). This unconventional system, combined with an advanced laboratory-developed material, fits the research profile of the university and, for the external observer, symbolizes development and progress. In this case, it is not the cubic volume or the detail itself, but the carefully designed external structure that conveys meaning and acts as a medium of communication.

The Mülimatt Building (sports center, arch. Studio Vacchini, location: Windisch, Switzerland, 2010) (Fig. 1.14) is another example of architecture where structure serves simultaneously as form and message. The building is based on a series of precast concrete elements forming a distinctive undulating roof, resembling folded origami. This solution gives the object lightness, despite being built of massive concrete. Thin columns and glazed walls create a bright, open interior, well illuminated by daylight. The architectural expression symbolically refers to movement and the dynamics of sport – the changing lines of the structure and the play of light and shadow enhance the impression of activity. Thus, Mülimatt is not only a functional sports hall but also an example of how structure itself can communicate meanings and emotions (Roos, 2017).

3.4. Combination of methods

The Storer House (single-family house, arch. F.L. Wright, location: Hollywood, USA, 1923) (Fig. 1.15) was inspired by Mayan architecture and refers to it both in overall form and in details. Symbolism and references to local tradition are very strong in this project. The building was constructed using a technology developed by the architect – the so-called textile block system. This system consisted of concrete cubes produced directly on the construction site. There are four houses of this type, each with a different block design.

All the details of the Ennis House refer to traditional Mayan architecture, which was deeply imbued with symbolism. The shape of the concrete precast units resembling stone blocks, their color, size, and the carvings appearing on their surfaces all reflect this inspiration. The overall form of the building is also strongly linked to the tradition, through stepped facades, trapezoidal shapes, and rectangular openings (Pfeiffer, 2010; Ford, 2003; Bigaj, 2012).

4. Conclusion

The importance of precast concrete elements in contemporary construction is steadily increasing. This process results both from significant energy savings and from the growing potential for creating complex structures of high quality, which play a crucial role in shaping the aesthetics of facades.

The analyzed projects that employed precast concrete facade solutions demonstrate that these technologies can meet all the requirements of modern building envelopes. This is due both to the material's inherent properties and to the almost complete freedom in shaping the form and aesthetics of components. The wide spectrum of structural, dimensional, and textural possibilities enables architects to freely pursue desired aesthetic effects while simultaneously fulfilling other technical requirements of external partitions.

In the case of facades made of precast concrete, symbolism may be embedded in the overall massing of the building – its form and shape. The object must be appropriately situated to allow observation from a distance, enabling

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the viewer to perceive the symbolic message. In such cases, individual panels may appear neutral, even standard, mass-produced elements such as concrete blocks.

Symbolism may also be embedded within individual precast elements. The material itself, as well as its shape, color, texture, or surface relief, can carry meanings, references, or symbols important to the observer. Color, in particular, plays a key role across scales and functions. It allows the building either to blend harmoniously with its context or to stand apart. Color itself may also act symbolically or amplify symbolic content. Precast concrete is well suited for this purpose, as it can be colored in the mass or through the selection of aggregates and cement.

These strategies can–and should–be combined to create facades that operate on multiple levels, both at the scale of the detail and the whole building, since "symbols and signs, to be readable, must be adapted to human perspective" (Mus, Nowak, 2013).

The objects analyzed in this study demonstrate that precast concrete facades can be designed to communicate symbolic meanings–referring, for example, to history, local culture, or the traditions of a place. They are not limited to aesthetic or structural roles, nor to regular, repetitive rhythms. Contemporary architects have moved away from strict standardization and deliberately employ precast elements as symbolic and narrative media. Such facades function as a linguistic layer, where rhythm, texture, and detail together create a system of culturally and emotionally legible signs. In this way, precast concrete facades contribute to the broader discourse on the communicative role of architecture, bridging the gap between technical rationality and the cultural dimension of form.

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