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# Living Concrete: Expressiveness, Technique and Meaning in Contemporary Architecture

Jorge Marum[1, a)], Miguel S. Fernandes[1]

[1] *Beira Interior University Pole of the Research Centre in Architecture, Urbanism and Design from University of Lisbon (CIAUD-UBI), Portugal*

[a)] Corresponding author: jmarum@ubi.pt

**Abstract.** This paper investigates concrete as an active architectural matter, exploring its simultaneously technical, aesthetic and symbolic dimensions. It departs from the hypothesis that concrete, often seen as brutal, cold or austere, can be understood as "living matter" – mutable, expressive and imperfect. Rather than a neutral substance, concrete reveals itself through its texture, flaws and uncertainty, embodying time and process. The paper draws upon the theoretical contributions of Kenneth Frampton, Peter Zumthor, Juhani Pallasmaa and Tadao Ando, and engages critically with the Goetheanum by Rudolf Steiner as a paradigmatic case. It examines the dual nature of concrete — as structure and form, as support and surface — proposing that its plasticity and ambiguity allow it to function not only as a means of construction but also as a medium of poetic expression. By articulating technique and atmosphere, material and meaning, this reflection asserts that concrete plays a central role in the contemporary architectural imagination, positioned between rational precision and artistic freedom.

**Keywords:** Concrete; architecture; materiality; poetics; Rudolf Steiner

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## INTRODUCTION[1]

In contemporary architecture, materiality has evolved from being a merely technical or constructive concern to a critical, cultural and conceptual issue. Concrete, emblematic of industrial modernity, emerges within this shift as a paradoxical material: dense and fluid, cold and expressive, impersonal and profoundly symbolic. More than a structural medium, concrete reveals itself as a language capable of condensing spatial, cultural and sensory values.

This paper does not aim to offer a historical survey of architectural movements, nor to contrast academic styles with modern vanguards. Rather, it seeks to focus on the virtues and expressive potential of concrete itself — considered not in its technical formulation, but in its aesthetic, plastic and structural manifestations. While leaving aside the composition of cements, sands and binders, the emphasis lies on how concrete can act as a living material, one marked by transformation, imperfection and temporality.

[1] *This article expands upon a reflection initially presented at the "2nd Civil Engineering & 5th Concrete Future" conference, Covilhã, 2013. This version deepens the theoretical framework and incorporates new authors, cases and critical references.*

We begin from the hypothesis that concrete may be understood as "living matter" — not only because of its plasticity or adaptability, but because it embodies a temporal and existential presence. Its roughness, unpredictability and unfinished nature challenge classical notions of beauty and open a path toward a new ethic of construction.

This inquiry draws on key architectural thinkers — Kenneth Frampton, Peter Zumthor, Juhani Pallasmaa and Tadao Ando — and centres around the Goetheanum by Rudolf Steiner as a paradigmatic case. This building, which blurs the lines between structure and sculpture, construction and metaphysics, is treated here as a material manifesto that anticipates many of today's concerns about the role of matter in architectural meaning.

Throughout the paper, we propose a trajectory from technique to poetics, from structure to atmosphere, from matter to metaphor — positioning concrete as a site of synthesis between constructive reason and aesthetic intuition.

## MATERIALITY AND TECTONIC THOUGHT: CONCRETE IN THE WORK OF FRAMPTON AND SOUTO DE MOURA

The notion of "tectonics" proposed by Kenneth Frampton stands as one of the most significant theoretical contributions to the understanding of materiality in modern and contemporary architecture [1]. In contrast to functionalist rationalism, Frampton values the act of building as a cultural and sensorial expression, where the choice of materials, the processes of assembly, and the visibility of construction techniques play a decisive role in the meaning of the architectural work. In this context, concrete emerges as a paradigmatic element: at once modern and primitive, abstract and tangible, capable of expressing both structural logic and poetic intention.

Frampton emphasizes that "tectonic culture" distances itself from the superficial representation of form and instead roots itself in the physical presence of the building and the authenticity of the constructive gesture. Concrete enables this expressive truth, insofar as it reveals its mass, weight, the texture of the formwork, its flaws, pores, and joints. Like wood or stone in vernacular traditions, concrete here becomes a material of grounding — a material of place.

This understanding finds strong resonance in the architectural practice of Eduardo Souto de Moura, whose work with concrete reflects a continuous pursuit of material truth. In projects such as the Braga Municipal Stadium or the Monastery of Santa Maria do Bouro, the Portuguese architect employs concrete in its raw state, revealing its plastic and structural potential without resorting to cladding or disguise [2]. There is a constant tension between calculation and freedom, between detail precision and the unpredictability of the final result.

For Souto de Moura, concrete is both a constructive choice and an ethical position: do not hide, do not embellish, do not falsify. This approach aligns with Frampton's concept of a critical architecture — one that resists global homogenization and remains rooted in the specificity of context [1] [2].

Thus, in both theory and practice, concrete assumes a central role in shaping an architectural language that aspires to be grounded, dense, tactile, and meaningful.

## CONCRETE AS SENSORY AND EXPRESSIVE MATTER

Concrete, in its basic composition, is a composite mixture of aggregates (gravel, pebbles, sand), water, and cement — a formulation that, once hydrated and hardened, behaves similarly to stone [3]. This transformation from fluid to solid reflects not only physical processes but also conceptual ones. As a material, concrete embodies the act of becoming; it shifts from formlessness to form, from raw substance to architectural body. The act of shaping it presupposes an understanding of matter not merely as support, but as medium of expression.

Peter Zumthor speaks of architecture in bodily terms: mass, skin, membrane. For him, concrete is not just construction — it is corporeality. It has temperature, weight, texture. It surrounds us [4]. Juhani Pallasmaa reinforces this idea in *The Eyes of the Skin*, where he critiques the ocularcentrism of Western architecture and argues for a multisensory understanding of space. Concrete, with its roughness, porosity, and capacity to register time, becomes a material of memory and perception. Its imperfections — stains, pores, traces of formwork — are not flaws but signatures of the process and the place.

Tadao Ando takes this to an ascetic extreme. In his architecture, smooth exposed concrete becomes a surface of silence and contemplation. Light and shadow animate the monolithic forms, and the minimalism is not empty, but charged — with intention, spirituality, and restraint [5]. The concrete is no longer inert matter; it is presence, tension, atmosphere.

Beyond poetics, concrete also speaks a language of resistance and honesty. Unlike glass, metal or synthetic surfaces, concrete is unpretentious. It carries its own history, ages with dignity, and acquires patina. In Swiss architecture, particularly in the work of architects like Valerio Olgiati, concrete is treated with rigorous precision and

formal simplicity, exposing its raw qualities without ornamentation [6]. It is simultaneously structure and surface, container and content.

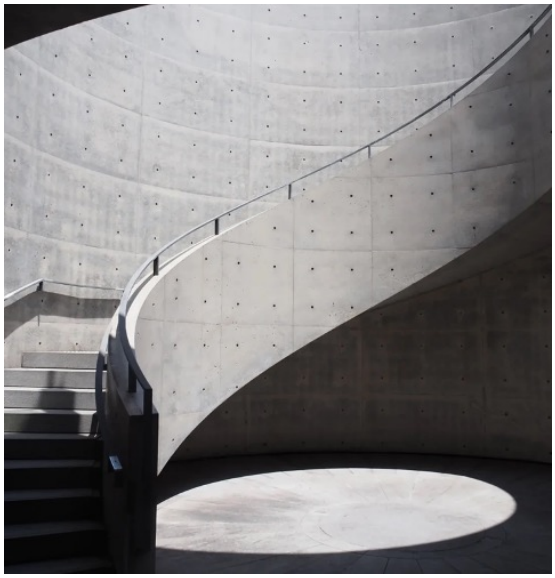

**FIGURE 1.** Hyogo Prefectural Museum of Art by Tadao Ando, 2002, Kobe

**FIGURE 2.** School by Valerio Olgiati, 1998, Paspels, Switzerland

As Cyrille Simonnet argues, material in architecture is not merely a technical vehicle; it becomes a mediator between utility and art [7]. Concrete exemplifies this dual role. It is both structural and aesthetic, rational and expressive. Initially formless, it only achieves its architectural identity when shaped and placed in relation to space, light, and body.

Ultimately, concrete is not simply a building material. It is a generator of atmosphere, a tactile memory, a living skin. It enables architecture to engage with time, imperfection and presence — turning construction into emotion, and matter into meaning.

## FROM TECHNICAL WORK TO MATERIAL MANIFESTO: THE CASE OF THE GOETHEANUM

The Goetheanum, designed by Rudolf Steiner in Dornach, Switzerland, stands as a singular work in the history of modern architecture. Initially built in wood and later reimagined in reinforced concrete, the project represents not only a technical shift but a conceptual transmutation [8]. More than a building, it is a "total work of art" — unifying architecture, sculpture, and painting into a single creative act. At a time when concrete was still an emerging material, Steiner's decision to work with it reveals a vanguardist and symbolic intent: a fluid, continuous substance without visible seams, ideally suited to embody spiritual and organic form.

The second Goetheanum (1924–1928), built in concrete, marked a radical departure from the orthogonal rigidity of rationalist modernism. Steiner envisioned curved planes, carved volumes, and organically modelled interiors — architectural forms shaped like sculpture, from the inside out. Rather than relying on conventional geometry or formal symmetry, his approach treats concrete as mass to be subtracted and hollowed, resulting in dramatic and theatrical spatial experiences.

Historically, concrete and iron introduced a new architectural language in the 20th century — one that challenged previous notions of ornament, composition, and support [9] [10]. In this new paradigm, structure began to shape space and acquire aesthetic presence. The Goetheanum, along with the Einstein Tower by Erich Mendelsohn, represents an early and powerful example of this shift. Concrete was no longer a neutral support; it had become a protagonist in the articulation of meaning, space, and atmosphere.

The expressive potential of concrete — its uncertainty, its visible flaws, its capacity for rawness — has been elevated by many modern architects, notably Le Corbusier, who famously spoke of a "beauty by contrast" born from imperfection. In this view, concrete is not polished or masked, but accepted in its roughness, its temporal nature, its brutal expressiveness. As Joaquim Cardozo noted, the continuity of concrete allows for both structural legibility and formal unity, linking static function to aesthetic form.

Lyotard (1988) reads Steiner's architectural language as expressive, almost mystical [11]. The Goetheanum does not seek functional transparency or economic optimisation; rather, it aims to provoke a spiritual and sensory encounter. Here, concrete is not inert — it is eloquent, alive, marked by metaphysical intent. It is both structure and metaphor.

In this way, the Goetheanum anticipates many later developments in architectural use of concrete: the sculptural fluidity of Ando and Zumthor, the raw material honesty of Souto de Moura. Steiner's work becomes a material manifesto, where tectonic innovation, symbolic resonance, and esoteric vision converge to define a unique architectural identity [12] [8].

Concrete, in this context, is not simply a constructive element — it is an expressive body. It is both medium and message, surface and soul. And in the Goetheanum, it becomes the very language through which architecture seeks to transcend its technical origins and become a living, meaningful space.

**FIGURE 3.** Einstein Tower by Erich Mendelsohn, 1921, Potsdam, Germany

The articulation between matter, form, and meaning is one of the most pressing concerns in contemporary architecture. Concrete, in particular, embodies this complexity: a material capable of simultaneously fulfilling structural demands and conveying poetic expression. Its ambiguity — between precision and accident, between

support and surface — makes it an ideal medium for exploring the relationship between construction and concept, presence and intention.

The Goetheanum, designed by Rudolf Steiner, exemplifies this synthesis. Originally conceived in wood and later reinterpreted in reinforced concrete, the building reflects Steiner's anthroposophical worldview — a fusion of scientific inquiry, spiritual perception, and artistic unity [8]. His approach to architecture was not mediated by drawings but by sculptural models, shaped from the inside out. In the first Goetheanum, light, color, and form blended to create an immersive, symbolic environment. The interior spaces emerged from a choreography of curves, chromatic rhythms, and material dialogues between wood and ornament [12].

**FIGURE 4.** Concrete by Le Corbusier, 1953, Chandigarh, India

Following the destruction of the original structure by fire in 1922, Steiner reconceived the second Goetheanum in concrete, inaugurating a radically new architectural language. The expressive domes gave way to carved, multifaceted planes, and the methodology shifted: form was now modelled from the outside in. Concrete was used not only for its structural capabilities but for its capacity to embody metamorphosis — to register gesture, tension, and spatial drama [8].

Le Corbusier famously described concrete as enabling a "beauty by contrast," where imperfections are not masked but elevated [13]. Steiner's approach resonates with this ethos: concrete here is not neutral but animated, not polished but deeply intentional. The staircases, auditorium, and façades of the second Goetheanum are sculpted volumes that speak both of tectonic intelligence and symbolic resonance. Matter is worked with an intensity that borders on the metaphysical.

The construction process itself — involving hundreds of workers, sculptors, and apprentices — became part of the work's significance. Like medieval cathedrals, the Goetheanum was not just designed; it was crafted on site, through a dynamic interplay of theory and praxis. Models were tools of invention. Formwork became drawing. Concrete became language [12], [14].

This process, which transforms raw matter into spatial narrative, reinforces the central thesis of this paper: that concrete is not merely a building material, but a medium of thought, perception, and meaning. As Juhani Pallasmaa reminds us, architecture is a terrain of the senses [15]. The Goetheanum, in its density, imperfection, and ambition, is the material embodiment of that terrain — a work where construction and spirituality, tectonics and expression, merge into a singular architectural gesture.

Thus, concrete becomes not just support but subject. It carries memory, registers intention, and enables metamorphosis. The Goetheanum stands not only as a masterpiece of early modern architecture, but as a living manifesto of what it means to build with significance.

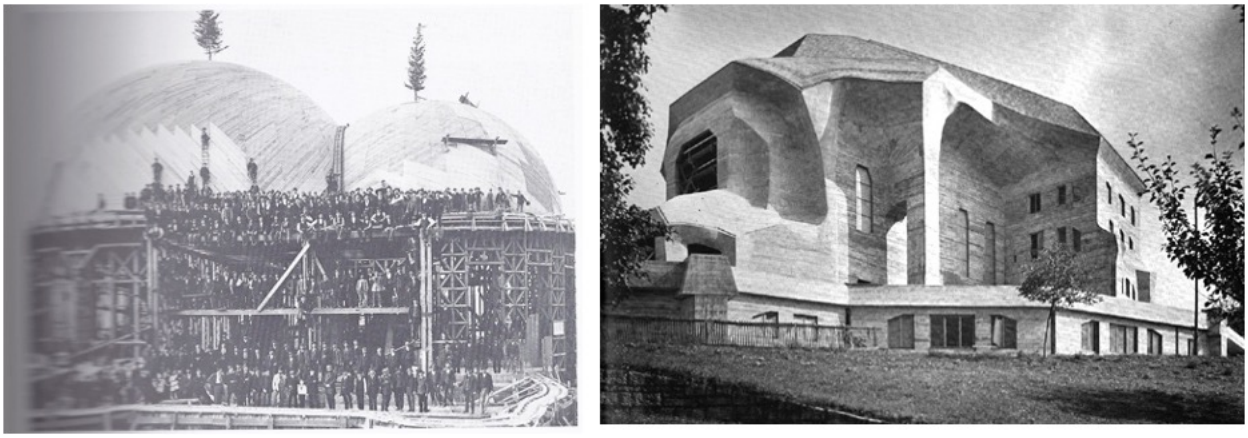

**FIGURE 5.** Work party with workers in 1st of April, 1914, Dornach, Switzerland and Goetheanum in Dornach, Switzerland

## CONCLUSION

Concrete is more than a modern material — it is a timeless substance. It builds and signifies simultaneously. Through its plasticity, it offers both resistance and expressiveness, order and accident, weight and lightness. This dual condition — technical and poetic — is what makes concrete one of the most radical and meaningful materials in contemporary architecture.

This paper has shown how concrete transcends its structural role to emerge as a critical and sensorial language. Through the perspectives of Frampton, Zumthor, Pallasmaa and Ando, we have seen that concrete is not neutral, nor passive: it engages, communicates, resists and transforms [1] [4] [5] [15]. Its roughness, its imperfection, and its capacity to embody time turn it into a material of memory and metaphor.

The analysis of Rudolf Steiner's Goetheanum reinforces this reading, presenting concrete as a sculptural and spiritual medium [8] [12]. Here, construction becomes symbolic gesture — an act of metaphysical presence. Like other works discussed throughout this text, the Goetheanum shows that the most relevant architecture of our time is not only that which solves problems, but that which poses questions.

In this sense, concrete is more than matter: it is built thought. It is the tension between structural gravity and conceptual lightness. In its dense silence, its visible imperfections, and its tactile presence, lies its potential as a critical, expressive — and ultimately, living — architectural material.

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