

Architectural Material & Detail Structure

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Concrete

Preface

CONCRETE, Monolithic vs Fragmentary

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Matter & Light

In the essence of the architectural project or the final built work resides an inherent duality: the place and the architect. The place always imposes itself, and architects adapt our method, gaze and, with it, a personal interpretation that will prevail during the process. This duality between the immovable state of reality – the context and the territory –, and our interpretation of it is combined in the project and, finally, is realised in the built work.

The architectural work, as a combination of matter and light. The volume (matter) in as far as the inanimate object: silent and still. And light (indefinite space), like a void defined by matter: alive, moving, dynamic.

In order to reach this symbiosis between matter and light, between the definition of space and the habitable space, the architect works in a place with a context, a place that imposes itself and that cannot be ignored and that must be addressed.

This architectural process is managed through many types of documents. A language is generated by the architect (personal and specific) from the place. It is the origin of a story that, in some cases, will arrive at its ultimate goal: to become spaces can be inhabited by people and can shelter new stories.

If the solid is not defined, there can be no habitable void. Without matter, there is no light, and therefore, no life. Nor architecture. Recognising a place and the process of adapting ourselves to it affords the architect the ability to provide it with life. It gives us the opportunity to bring matter to life through a correct interpretation of light.

Tectonic & Stereotomic

Construction materials owe their qualities to a specific technical procedure: tectonic (carpentry) or stereotomic (stonework, masonry). Therefore, the construction system that addresses the detail must be honest with the requirements of the material.

We can classify the materials into two groups according to the way it relate to each other. We work with aggregated materials (steel, wood, prefabricated ...) and mouldable materials (in situ concrete, cast steel, adobe ...). When it is about shaped or aggregated materials, is the joint's construction detail that defines the expression of the aggregation unit relative to the set. In the case of amorphous or malleable, detail expresses unwillingness to recognise the moment when two materials meet and that is why these are considered stereotomic or monolithic materials. We see in some examples the ability of architecture to generate ambiguity between the construction system used and its final appearance; always through the development of the constructive detail in the design process.

Concrete “in situ” & Precast Concrete

The difference between the reinforced concrete “in situ” and the use of precast concrete is that in the former case an amorphous material is set up in the construction site and in the second, one that is already shaped. One has the advantages of monolithic, while the other allows manipulation. The first takes advantage and accepts the imperfection of the construction site and the second benefits from the precision required by the design process.

In the case of precast concrete construction the weather conditions (temperature or humid-

ity) do not affect its use in construction, but in the transport of its parts.

Precast concrete has many advantages for the architect and the project's execution:

Planning: it allows the architect to face up a project from its inception along with the craftsman-builder, optimising obstacles, reducing costs and avoiding contingencies.

Customisation: it allows customising the finished material textures and more complex mixtures. The use of architectural concrete provides versatility and flexibility in the design, also as regards sizes, shapes, colours, etc.

Time and Cost Control: it allows talking about prices and closed deadlines since the time of contract signing.

Optimising Performance: it decreases of the execution work's time, guarantees the safety during manufacture and installation, achieves reliability in all the phases of the project and minimises deviations from the project.

Absence of Residues: precast concrete work does not provide residue in the construction site nor in its manufacture, since it can be reused as raw material without affecting the characteristics of the finished product.

Continuity & Discontinuity

Monolithic concrete expression “in situ” gives the appearance of a moulded object to the construction, that is, the arising of a work through extracting materials.

A key feature of the precast concrete is its discontinuity. Opposite to reinforced concrete “in situ”, a prefabricated building will never be a

single piece, and the resolution of its joints will determine the system behaviour.

Mould & Material

Whereas the construction system is based on industrial production, which considerably increases the quality of their physical and chemical characteristics: strength, surface finish, adhesion, corrosion resistance, etc.

It is a material manufactured by moulding and capable, without forgetting the characteristics of the raw material, to adopt any shape and thus to conform the pattern that will be repeated.

The surface finishes that can be achieved with precast concrete can be summarised as follows:

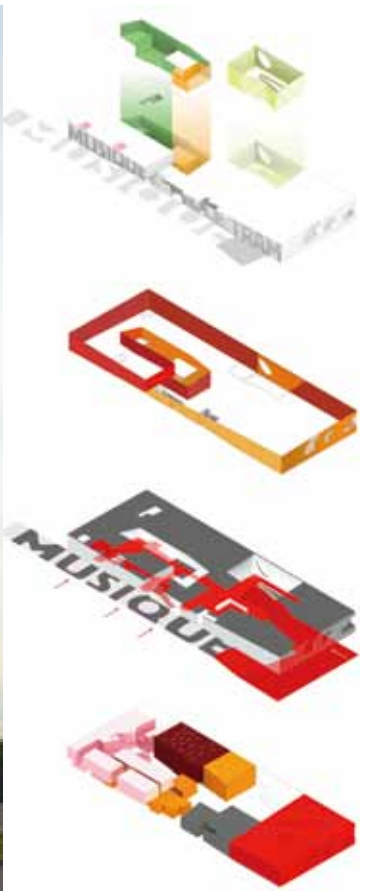
- 1. Smooth:** surface finish of the mould directly.
- 2. Texturised:** finishing of the panels by employing the negative moulds of the textures to be obtained. Choosing reliefs or finishes that prevent the formation of deposits of dirt is recommended.
- 3. Sand blasting:** with this treatment it can be obtained a façade's surface finish on which can be appreciated from a fine sand finish up to a coarse one, depending on the degree of intensity of mechanical treatment, consisting on the sandblasting pressure over the panel's face side.
- 4. Arid relief:** exposed arid finish, ranging from a few tenths of a millimetre to several millimetres, by the employment of a paper or primer that retards the setting of concrete.
- 5. Acid washing:** this is achieved by applying a dilute acid or other products.
- 6. Polished:** with this mechanical treatment panels with a completely smooth appearance can be obtained.

Joint & Monolithic

In the section “Tectonic & Stereotomic” it points to the concept of ambiguity in architecture relative to that the eyes can see. Ambiguity cannot get confused with being dishonest or inconsistent with the construction systems and materials we use. The concept of ambiguity responds to the possibility for an architect to get a result – connected to the concept of the building and the expected atmosphere to be transmitted – through work and development of the constructive detail and the conformation of the materials going beyond its characteristics by definition.

The classical played with the effect of perspective and a single material. Today we have the opportunity, thanks to industrialisation, to refine the details of the union between different materials and pieces.

In the precast concrete exists the problem – or not – of the joints. Far from thinking that initially with it the sense of monolithic is rejected, it should unite their efforts, as we said, the study of the details of joints that generates the union of pieces or patterns. By studying the shadows produced by the textures on a surface we can hide and therefore perceive a single volume or, on the contrary, accentuate and even modify. The possibilities are endless. In this book a few examples of buildings with precast concrete façades that meet any of the above-mentioned characteristics are collected.



Music School and Areas for Culture

Location: Maizieres-les-Metz, France
Architect: Dominique Coulon & Associés
Photos: Eugeni PONS, Guillaume WITTMANN
Built area: 3,400m²
Key materials: Façade – in-situ concrete

Overview

The music school is a monolithic block 100 metres long and 40 metres wide. It is sited perpendicular to the main road, projecting into the public area by 16 metres. The building is set against a forest of giant sequoias, also aligned perpendicular to the main road. The group forms a doorway marking the entrance to the town.

There is a broad forecourt area that disappears underneath the building. The public uses the monumental staircase leading to the inside courtyard and the main foyer. This is a wide area, open to the sky, treated with phosphorescent paint. In the evening it continues to glow with a strange light.

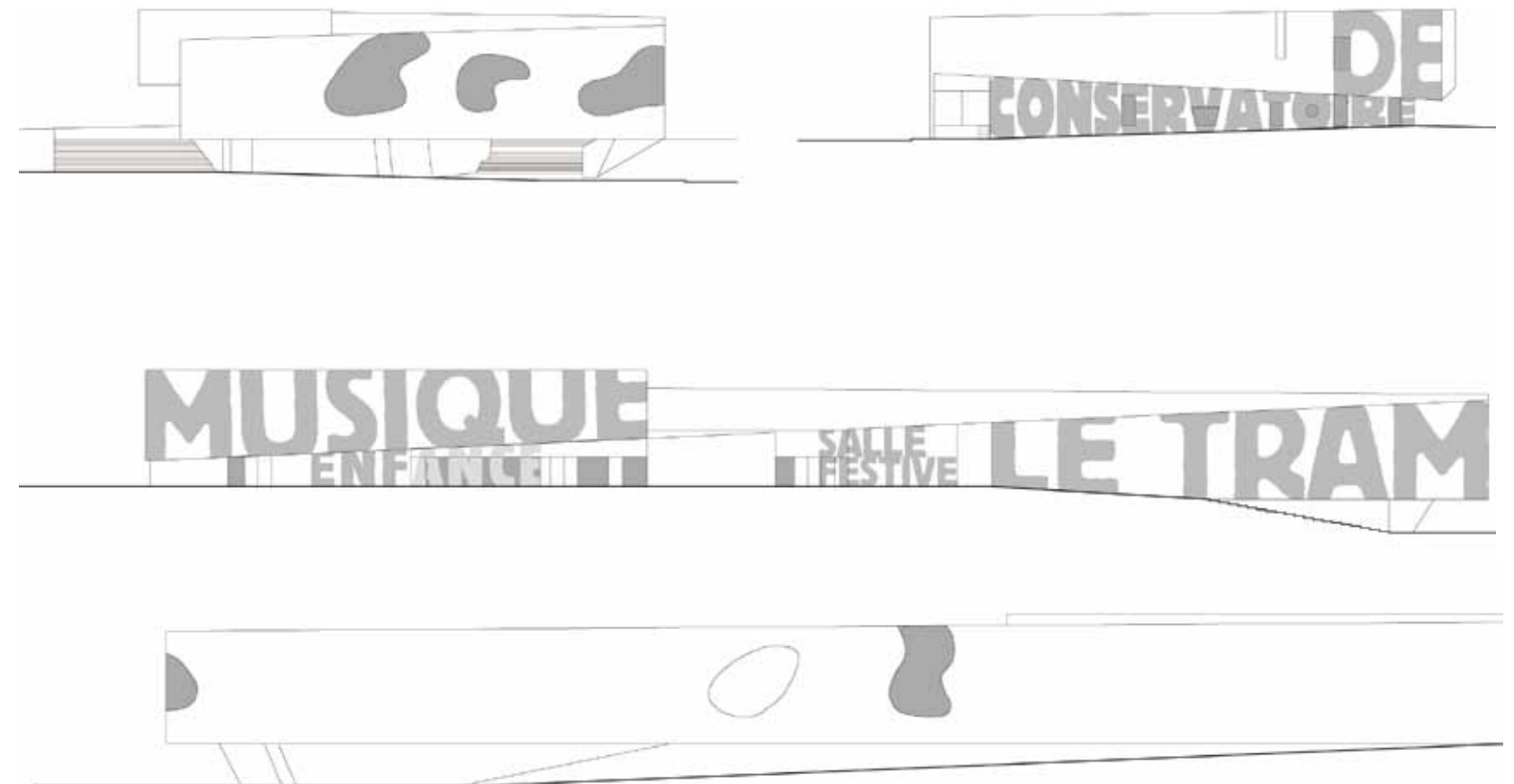
The building houses a mixed programme. It comprises premises for local teenagers, an extra-curricular centre for schoolchildren, a community hall, an auditorium, and a music school. These functions are brought together in a monolithic building. The programming complexity is managed on the inside in a single building. The juxtaposition of the combined

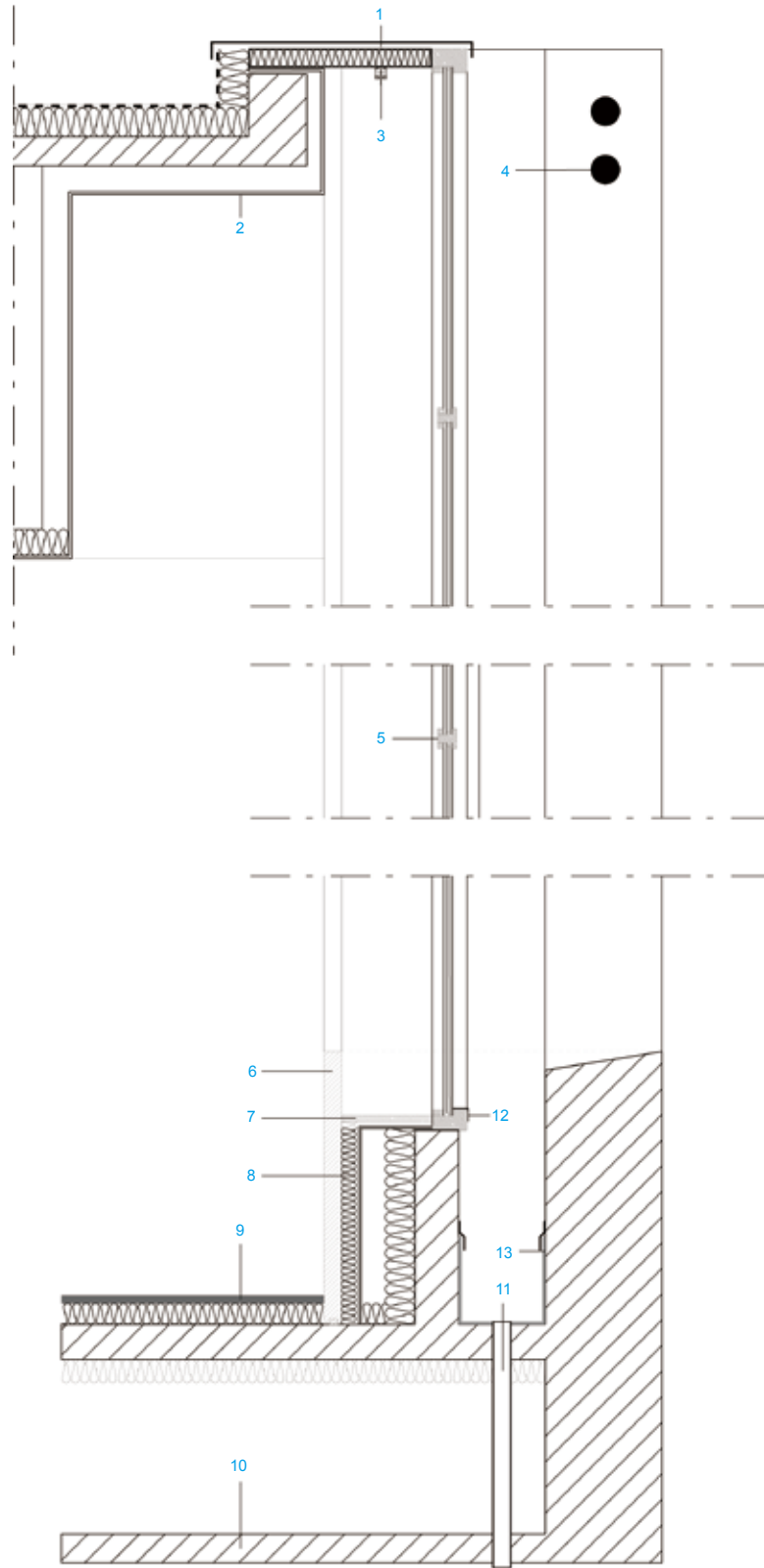
programmes greatly enriches the building, with each entity standing out in contrast to the others.

The outside of the building reveals little of the programme on the inside – only the large bay windows allow a glimpse of the community hall. It is possible to catch sight of the ephemeral movements of the dancers. There is abundant natural light, with the highly coloured patios providing their own special light. This configuration of patios also protects the areas from disturbance from the nearby motorway.

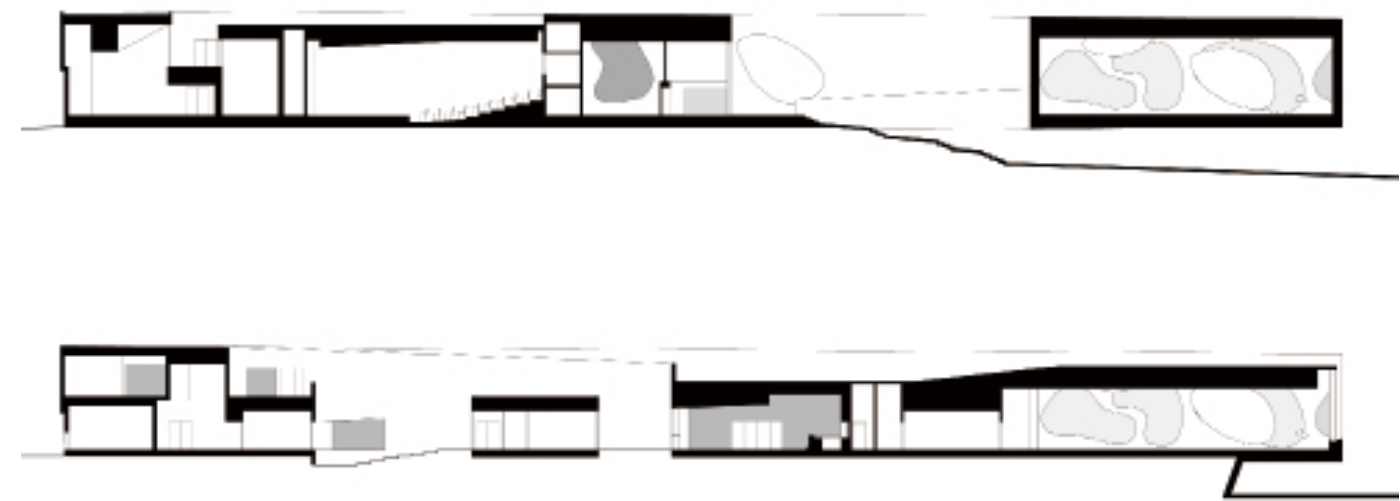
The building is not designed merely as an elongated monolith, however. The outside curls round progressively, finally absorbing the two levels devoted to the music school. This curling adds dynamic impetus to the general outline, and the vanishing lines of the volumes seem strangely disturbed.

The materials used for the interior are precious. The main hall is in light-coloured wood, while the ceiling allows glimpses of wonderful gilded surfaces through the large cavities, which gives the





1. Steel tube for mounting on carpentry concrete parapet
2. Plasterboard
3. Curtain rail
4. Steel drawing
5. Exterior carpentry in lacquered wood
6. Laminated panel board of spruce
7. Lacquered medium shelf
8. Against-plaster wall with 50mm mineral wool
9. Hardwood timber batten
10. Architectural concrete soffit
11. Evacuation of rainwater
12. Lacquered aluminum angle to protect the low amount
13. Tightness of liquid system



light a warm tinge. The auditorium is hung with tensed wires on its three sides. The walls move with the slightest breath of air, revealing their thickness. The adjustable acoustic (controlled shutters) disappears behind this elegant filter. The precious wood used for the flooring (wenge) reinforces the effect of a presentation box. The extracurricular centre for schoolchildren is monochrome; the orange colour saturates the space, and the shiny resin flooring reinforces its highly artificial aspect. The primary logic consists of implementing very marked contrasts among the different areas: contrasting materials, contrasting colours, contrasting light.

The interior and the exterior are totally dissociated, with the rustic look of the outside being the diametrical opposite of the precious interior.

Detail and Materials

The building is in reinforced concrete, cast on the spot, resting on piles. The outer casing has the rustic appearance of everyday concrete – concrete that assumes its defects.