CONSOLIDATION OF OVERHANGING DECORATIVE ELEMENTS.

IS IT:

- [ ] *Product*
- [X] *Technology*
- [ ] *Equipment*

APPLICABLE FOR:

- [X] *Restoration*
- [X] *Rehabilitation*
- [ ] *New Construction*

APPLICABLE ON:

- [ ] *1. Foundations and underground structures*
- [X] *2. Vertical structures*
- [ ] *3. Horizontal structures and vertical connections*
- [ ] *4. Roof and terraces*
- [ ] *5. Façade and building envelope*
- [ ] *6. Finishes and completion elements*
- [ ] *7. Integrated services*
- [ ] *8. General strategies for building recovery*

Related companies: *No companies; Constructive solution.*

DESCRIPTION

When it is necessary to fix and stabilize overhanging decorative elements, cantilevered (vertical) stone or artificial stone that protrude from the facade walls, minimizing the alteration of the surface to be treated.

WHY TO USE

To ensure stability and prevent spalling.

HOW TO USE AND APPLY

By reinforcement of the tensioned face of the stone element, converting the whole into a CFRP reinforced beam (anchored to the firm base wall), cantilevered.

1. Open slits 4 or 5 mm thick and 50 mm deep, with a water-cooled disc. Vertically, from the back side.
2. Deepen the cut until reaching the firm factory wall to be able to anchor the pulled end of the carbon fiber laminate.
3. Clean the slit vigorously and place the CF laminate with resin in the open gap with disc, so that it is anchored to the firm wall from below.
4. Depending on the planned calculation, this operation will have to be done in four or five grooves as appropriate.
5. Since the laminate has a section of 1'2*25mm2, it is completely lodged inside the groove and does not appear on the surface of the stone.
6. Subsequently, if deemed necessary, the stone cut can be reworked with repair grout.
7. If the cut could not reach the firm area of the brick masonry wall, the anchoring would be done by means of driven "CF wicks" that would overlap the lower area of the laminate.
8. The driving would be done after drilling with a drill bit from the base of the open fissure to accommodate the laminate.

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TECHNICAL CHARACTERISTICS

It is an action that converts the stone (natural or artificial) into a block of "reinforced stone" on its tractioned face. The opposite, compressed face does not require special reinforcement since the stone works perfectly in compression.

The overturning bending moment is usually of relatively low value, taking into account the dead load caused by the existing slump, wind pressure and, if applicable, seismic stress.

The solution involves almost "invisible" tensile reinforcement, carried out from the outside, with carbon fiber with a more than sufficient capacity to absorb tensile stresses.

And also the reinforcement of the stone base to the brickwork with dry connectors of the Steel Dry type (Mapei).

RECOMMENDATIONS AND OTHER INFORMATION

Correct anchoring of the CFRP must be ensured: either by one of two methods, the direct method, by driving the laminate itself through the interior of the surface, lodged in the open cracks, or by driving and overlapping the CF "strands" that transmit the traction to the lower anchorage zone.

Usually, in order to proceed with the opening of cracks until reaching the firm anchorage area, it is necessary to proceed, as in the case presented here, to cut the area of the roof gutter and part of the crown of the wall in order to have space to manipulate the refrigerated disc cutting device. The affected area will then have to be repaired and reworked to return it to its original state.

EXAMPLES

A detail corresponding to the rehabilitation project of the facade of the "noucentista" building, catalogued as a heritage building, of the San Ignacio de Sarrià school in Barcelona, is provided at the end of this data sheet.

REFERENCES / SOURCES AND LITERATURE

Alícia Dotor. Arquitecta

AQUIDOS. Architecture | Urbanism | Management.

“Proyecto rehabilitación fachada Colegio de San Ignacio- Barcelona. 2020”

Josep Baquer. La fibra de carbono en refuerzo de estructuras de hormigó. Segunda edición 2021. IEE

WEBSITE OF THE COMPANY

www.aquidos.com

www.aceweb.cat

IMAGES AND CAPTIONS




Fig.1-4: The images show the characteristic stone decorative elements of the buildings of the early 20th century, which show movements and cracks, since they are supported only by their own weight. ©*Josep Baquer*

Details of project

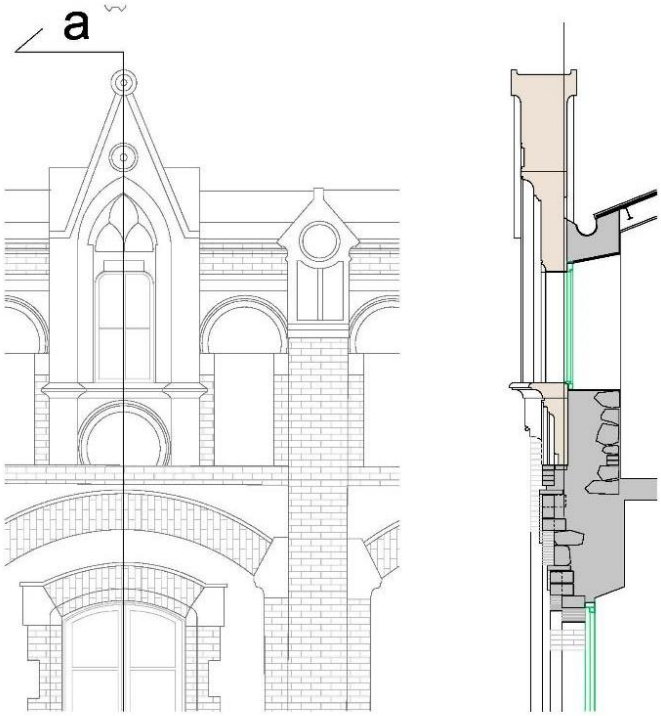

Fig.5: Elevation and section of the decorative element to be consolidated, where its weaker points can be easily appreciated. ©*Josep Baquer*

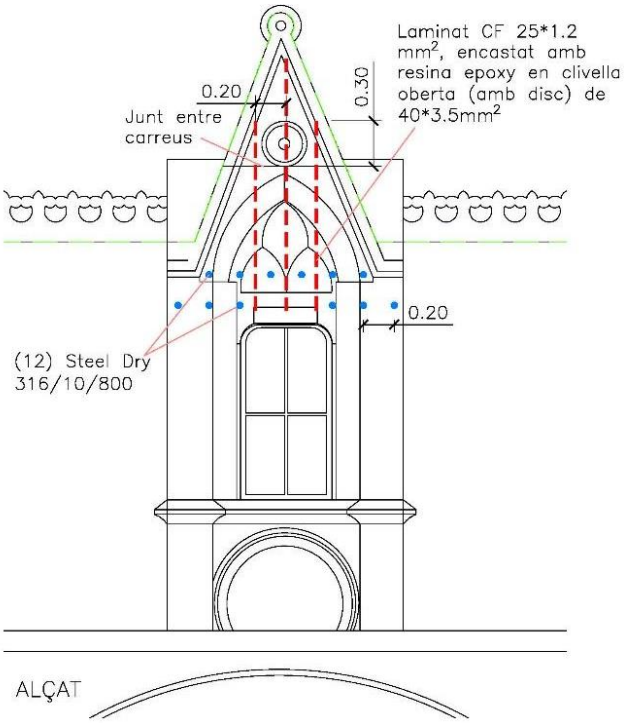

Fig.6: Elevation showing the proposed reinforcements for a good connection of the different components of the decorative element.

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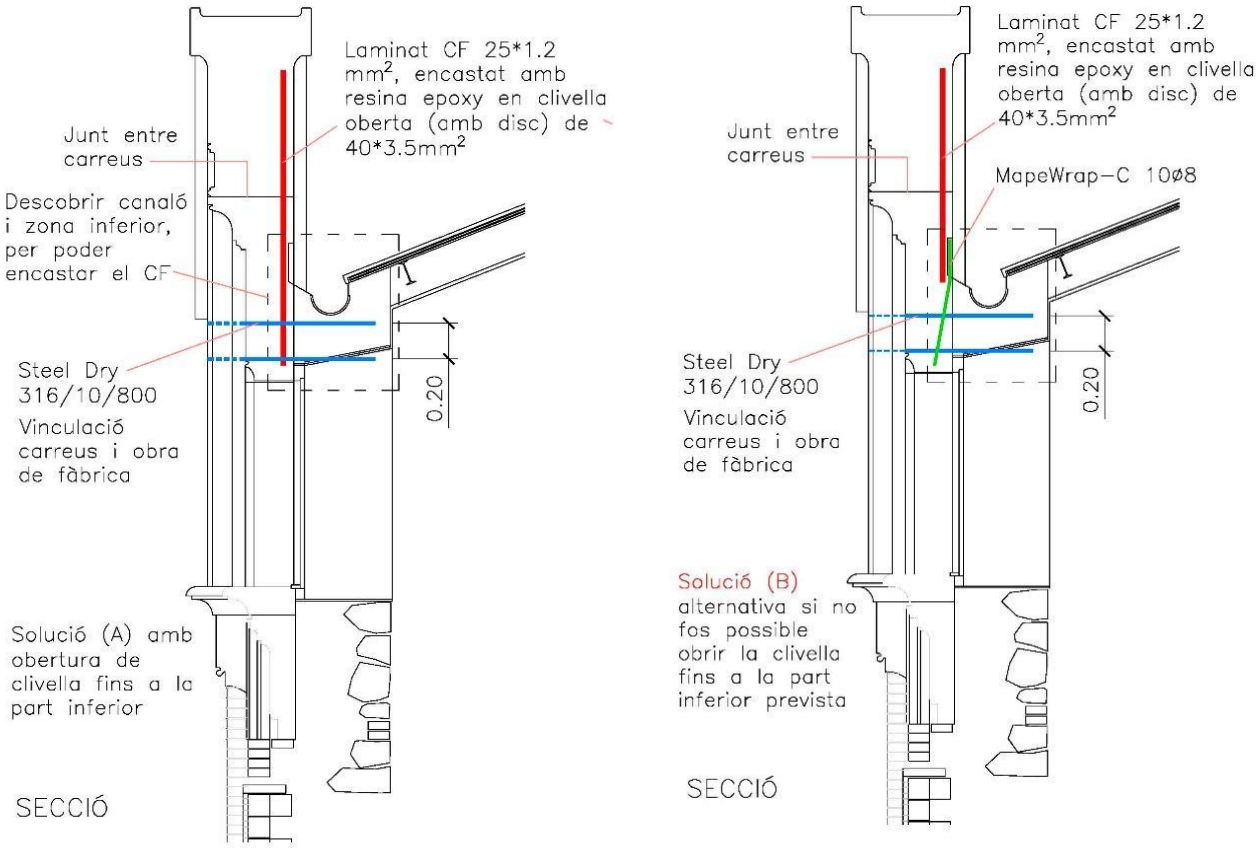

Fig.7-8: Section of two alternative solutions for the proposed reinforcements, depending on the situation in which the elements are located and their accessibility to the different components. ©*Josep Baquer*