TRADITIONAL EXTERNAL TIMBER CLADDING IN MEDITERRANEAN CLIMATES.

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ABSTRACT: The study analyzes the traditional external timber cladding in the Mediterranean climate, in order to better break down their behavior through time of some of them. An analysis of timber cladding used outdoors is made, considering 3 case studies of houses (from year 1900 onwards, as traditional architecture) taking into account the way this coating has responded and developed as time has passed; and performing typologies of wood cladding in Mediterranean climates. It details the species of wood used, sections and details of their placement forms, finishes and protection that everyone possesses. Finally a number of features and recommendations for the use of this noble material in this specific type of climate is obtained, allowing to make the best use of the material (wood) in housing construction, with specific data regarding what happens to each of the case studies.

KEYWORDS: Facades, timber cladding, wood, traditional architecture, mediterranean climate.

1 INTRODUCTION

The most typical traditional architecture in the Mediterranean climate is primarily based on stone, adobe and brick, but wood was also used. Let us agree that the traditional architecture generally uses local materials, and the use of wood is more frequent in floors and roofs. These local materials are extracted, produced and processed. Its use is frequent because of wood accessibility, avoiding the concern of transporting materials further afield, as in those days it was very difficult and also very expensive, which is why builders had choice but to use materials at their disposal, regardless of the quality or the outcome in construction. For this, examples of timber cladding in the Mediterranean climate and their behavior over time are discussed.

We define the Mediterranean climate as countries that are mainly located on the environment of the Mediterranean Europe and Africa, Central and South America, California, southwestern Australia, South Africa (Cape Town) and the coast of Chile.

The cladding reflects the skin covering the buildings, it is the visible face and so in this study we focus in detail in some of its parts because we can see how this part of the facade has deteriorated and reacted to the degrading weathering.

The study clearly shows cases that are enrolled in traditional architecture, and how wood is used in cladding, by determining the size of the pieces of siding, wood species used, the way they have degraded (pathologies developed), and the kind of finishing and protection that has been used.

2 TIMBER CLADDING

Wood facades can be classified into different types depending on their characteristics, these are:

- **Form of placement**: Horizontal (Tingle, overlapped and tongue and groove), Vertical, Diagonal or Mixed.
- **Joint treatment**: opened or closed.
- **Appearance**: Surface finish such as paints, varnishes and oils.
- **Protection**: Most of the traditional architecture does not use protection.

We see that in most cases of traditional architecture in this weather, the horizontal overlapped siding sheathing, creating a closed joint, meaning it has more leakage which does not allow the passage of water (since strong winter rainfall levels are characteristics during winter). This is why all cases of study have this specific type.

3 CASE STUDIES

Three case studies in different countries with this type of weather have been considered.

1. Sant Cugat, Spain. 2. Istanbul, Turkey. 3. Temuco, Chile.

![Fig. 1 Photographs of case studies: (A) House in Sant Cugat, Spain, (B) House in Istanbul, Turkey, (C) House in Temuco, Chile.](image-url)
The three case studies have been chosen because in each of their countries, they are representative works of the traditional architecture, using predominantly timber-cladding material, maintained in good conditions through the years. In Spain, the use of wood is less common as opposed to the cases of Turkey and Chile. The 3 houses are all made of timber cladding, not being made of the same species because each used timber available in their surroundings. They were also built in the same range of time between 1900-1920. Therefore, they have the same number of years without any substantial change in each. The form of placement is horizontal overlapping, with closed joints; with finishing paint (the pores of the wood closes with this product) and using organic products as forms of protection. The study mainly focuses on wood behavior through time.

Case A (Sant Cugat - Spain).
Single-family house built in 1902, with siding made of Canadian Oregon pine (exported) with a section of 3” x 1” overlap, with its structure made completely of wood. This house has a painting surface protection, which has helped keep the wood in a much better condition over the years. The house shows problems mainly in its south wall, where some rotting has generated, causing warping of wood in both the liner and in the windows.

Case B (Istanbul - Turkey).
Single-family house built approximately in 1910, registered in a semi-detached housing with perimeter walls of fire. Its siding is made of oak brought from their own forests, with a section 5” x 1” overlapped, the entire structure is made of wood. This house has a painting finishing, which allows the wood to be maintained in better shape; additionally, the fact that the south facade is hidden by firewalls, therefore the exposed facades deterioration is lower. Further deterioration by moisture in the joints of the wood sheathing (overlap), the windows and bowindow is presented.

Case C (Temuco - Chile).
Single-family house built in 1920. The species of wood used is oak. The section of siding is 3” x 1”, overlapped. Similarly to case A (Spain), it presents a further deterioration in the north facade (change of hemisphere) due to rain, sun and humidity, which are very high in different seasons. We see that the coating has flaws in the joints, warping and roting due to moisture in the windows sill due to the accumulation of rainwater in the winter time.

4 DISCUSSION AND ANALYSIS

The movements of the wood in the north and south facades depending on the continent (northern in South America and southern in Europe), where more moisture damage and movement of wood is presented due to the increased presence of moisture and rainfall that comes more directly. This climate is characterized by the very distinct seasons, being these facades (north and south respectively), which suffer most in summer (high temperatures and high relative humidity) and winter (low temperatures, rainfall and the presence of high relative humidity). They have clear damage in the joints of the timber cladding, with sheiling of the paint and cracking in the windows and doors.

<table>
<thead>
<tr>
<th>Wood Species</th>
<th>Case A</th>
<th>Case B</th>
<th>Case C</th>
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<tbody>
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<tr>
<td>Oak</td>
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Fig. 2 Summary information on types of timber cladding on case studies.

5 CONCLUSIONS

We can say that wood is an excellent material for use in facade, as long as relevant maintenances are made in time, because it is a natural material and thus its shape changes depending on the amount of moisture absorbed or released.

Dimensions of 3” x 1” are proposed, due to its mobility options and also because its number of joints (closed) does not allow the passage of water. The form of fixation is important; the use of copper nails is suggested (well performed) as its reaction with the tannins of the wood does not stain.

Painting is what works best in finishes, keeping it properly, since it closes the pores of the wood and prevents the passage of water, unless the crack and the water penetrates the cladding in the same way.

Protection products are water soluble and organic products.

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7 REFERENCES