

# CONSTRUCTIVE FEATURES OF THE HISTORIC ARCHITECTURE AT VALENCIA CITY

Camilla Mileto<sup>a</sup>, Fernando Vegas<sup>a</sup>, Valentina Cristini<sup>b</sup> and Maria Diodato<sup>c</sup>

<sup>a</sup>Instituto Universitario de Restauración del Patrimonio de la Universidad Politécnica de Valencia

Unidad de investigación, restauración y difusión del patrimonio arquitectónico. Loggia

<sup>b</sup>Politécnica de Milán

<sup>c</sup>Universidad de Trieste

CONTACT AUTHOR: Camilla Mileto, cami2@cpa.upv.es

**ABSTRACT:** *This paper presents research in to some of the historic building and architectural features found within the City of Valencia. The material culture of the city has come under focus, not only due to the historical construction techniques used in the buildings of the city, but also due to the city's heritage value, both of which illustrate how Valencia has been a true witness of the past. This study aims to contribute towards the stock of architectural knowledge on the city and proposes that the preserved state of existing architecture acts to document Valencia's history, which gives the city its identity and character. This paper shows the initial results of the research: a study on the brick fabrics dating from the 17th and 18th centuries and a study on the historic ceilings of the city.*

**KEYWORDS:** Valencia, historic center, historic architecture, vernacular architecture, preservation, protection, brick fabric, historic ceilings, catalogation, method

## INTRODUCTION

The historic centre of the city of Valencia, which was founded during the Roman period and latterly enlarged during Arab and Christian periods, had always been located within the walls of the city that were built in the 14<sup>th</sup> century. The inner area of the historic centre, which initially comprised houses, assorted buildings, convent gardens and agricultural fields, was under increasing pressure for space until the 19<sup>th</sup> century, when the city walls, then devoid of use, were demolished. The construction activity during the previous centuries consisted of the erection of buildings on empty land and the progressive modification of existing buildings that were enlarged both in layout and height. Both this architectural fruit of the city's growth and the complex transformation that took place can still be seen in the present historic centre of Valencia, although more recent building and reforms have, in many cases, masked and hidden them from the eyes of the observer. This local architecture that weaves the historic tissue of the city together still represents the most striking feature of the old city.

Valencia, as with any other historic centre, does not owe its character and identity exclusively to the big monuments that have become common reference points among the built historic tissue of everyday homes. Rather, the city's character and identity can mainly be found in other historic buildings that more truly transmit the history of the city, the atmosphere of the streets, the construction tradition, the cultural and social circumstances that formerly were reflected in citizens of the time's architecture etc. In many cases, this constructed culture, this material history, is not reflected simply in the building facades that served as a mediator between public and private spheres, but in the substance of the inner building, where the construction tradition still lives even if modern trends have resulted in the progressive modernisation of the facades.

Until recently, the protection of this immense and in largely unknown heritage was not really given any serious consideration. The current system in place to preserve the historic architecture of Valencia comprises three degrees of protection: integral (general preservation of all parts of the building – used only for the historic monumental buildings), structural (preservation of facades, roofs and staircase - designed to keep the height and typology of the building) and architectural (preservation of the façade only - designed to preserve more the urban appearance than the substance of the building). This protection system neither helps in any way to deepen the real knowledge of the historic buildings nor the material culture of the city. On the contrary, it perpetuates the ignorance of the traditional construction systems and ends up convincing people of the irrelevance, poorness and inconsistency of the city's local architecture. Additionally, both the abandonment of some buildings and the poor state of repair of some parts of the city have led to an unjustified depreciation of a large number of historic non monumental buildings, which are becoming increasingly scarce in number and stand helplessly awaiting the threat of imminent demolition, caused by the need of reform and modernisation within the city.

On the contrary, the historic dwelling, an apparently common building in this built historical tissue, needs to be understood as a complex organism in which history is reflected not only in the facades (which are being updated with the passage of time as per the requirements of social appearance) but also as an ensemble of history materialized in its inner structures (ceilings, staircases, roofing...) These interiors are very often older than their own facades, with their inner finishing of floor tiles, renderings, plastered false ceilings, window-frames, etc. The actual facade is almost never studied beyond its composition or colour, with no thought given to the character that lies in its materials and their performance over time, its texture, bonding system, construction techniques, and so on. The lack of a careful study of these constructed

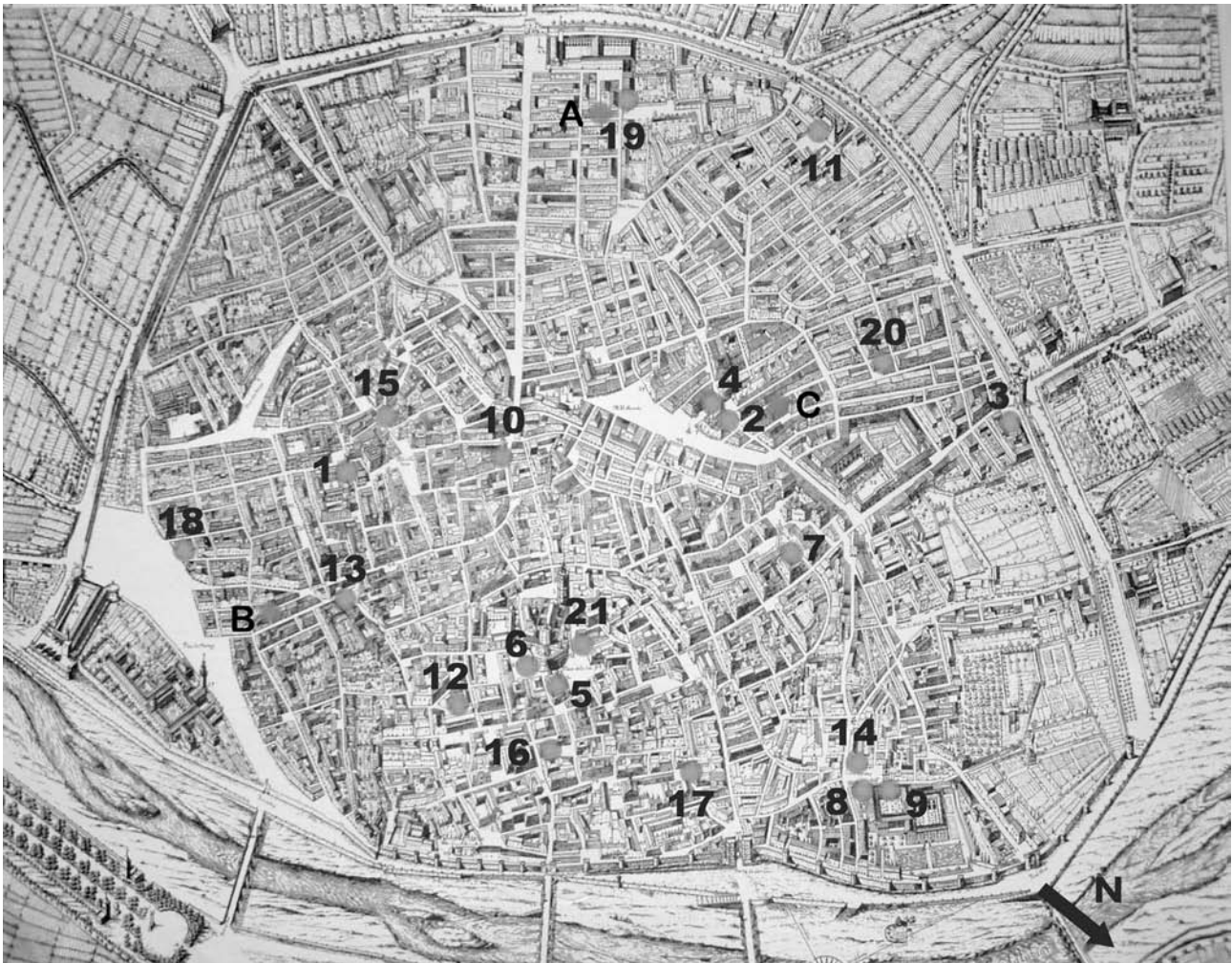


Figure 1. Map of the buildings samples signed on "Plano de la ciudad" of José Fortea (1738), based on Father Tomas Vicente Tosca's city map (1704). 1- Patriarca's church; 2-4 Santos Juanes church; 3- Santa Ursula's church; 5- Virgen de los Desamparados church; 6- Cathedral; 7- San Nicolas church; 8-9 Carmen's church; 10- San Mariin's church; 11- Pilar's church; 12- San Esteban's church; 13- San Tomás y Felipe Neri's church; 14- Pineda's Palace; 15- San Andrés church; 16- Catalá's Palace; 17- Cerveró's Palace; 18- Aduana's Palace; 19- Genoveses church; 20- Escuelas Pias church; 21- Vestuario's building. A- Plaza del Pilar's building; B- Palace of Marqués de Caro; C- Calle Exarchs building

features, which all represent the city's architectural substance and imbue it with character and essence, has driven us to initiate this research, the initial stages of which is presented here.

### THE RESEARCH AND ITS METHODOLOGY

The research that is being carried out consists of studying the material culture of the city through construction features that can be found in the built historic tissue of various anonymous buildings in Valencia. Attention was, and continues to be paid, above all, to historical non monumental buildings, so as to understand and deepen knowledge of those features that define and identify them. All aspects of local material culture are being examined: building materials, construction techniques and the architectural features derived from them, the production processes of materials, their manufacturing and performance, the historical, economic, social and cultural circumstances that led to the adoption of one material above another, and so on.

To date, research has mainly been focussed on to two specific areas: the brick fabrics dating to the 17<sup>th</sup> and 18<sup>th</sup> centuries and historical ceilings<sup>1</sup>. These studies are already in an advanced stage and will soon be complemented by research in to other areas, which is being carried out following the development of a workshop created as a result of the PhD course directed by Camilla Mileto and Fernando Vegas during the 2005-2006<sup>2</sup> academic year. This new research is investigating issues such as rammed earth, brick, ashlar and stone fabrics, roofings,

urban pavements, window-frames and ironwork, etc. In each case, the ultimate objective of the research is not simply to catalogue these architecturally interesting construction features, but above all to research the constructed material and architectural culture related to these features.

In all of these cases, a similar research method is being applied. It begins with the cataloguing and detailed study of those features on buildings that can also be found in clearly dated buildings (mainly monumental ones), and then continues by studying how these features are influenced or repeated in the built historic tissue of anonymous dwellings across the city. In each case, in addition to the study of construction techniques, materials, production systems, performance, etc., research is also being conducted in to the social, cultural and economical reasons that stand behind these features, with particular attention being paid to how these very issues affected the changes that took place in the construction tradition of the city. In this research, the constructed feature is understood to be neither a typological nor a built element as such, but rather a true material trace of the constructed history of the city, a document and witness of a history full of details in which these social, cultural and economical issues appear. The peculiarity or individuality of each studied case is not interpreted as an exception to the rule, but rather as enrichment to it that leads to a deeper knowledge of the constructed reality that is Valencia. The constructed and stratigraphical detail (Mileto, 2000), the marks of the working tool on the material and the trace of the artisan all represent

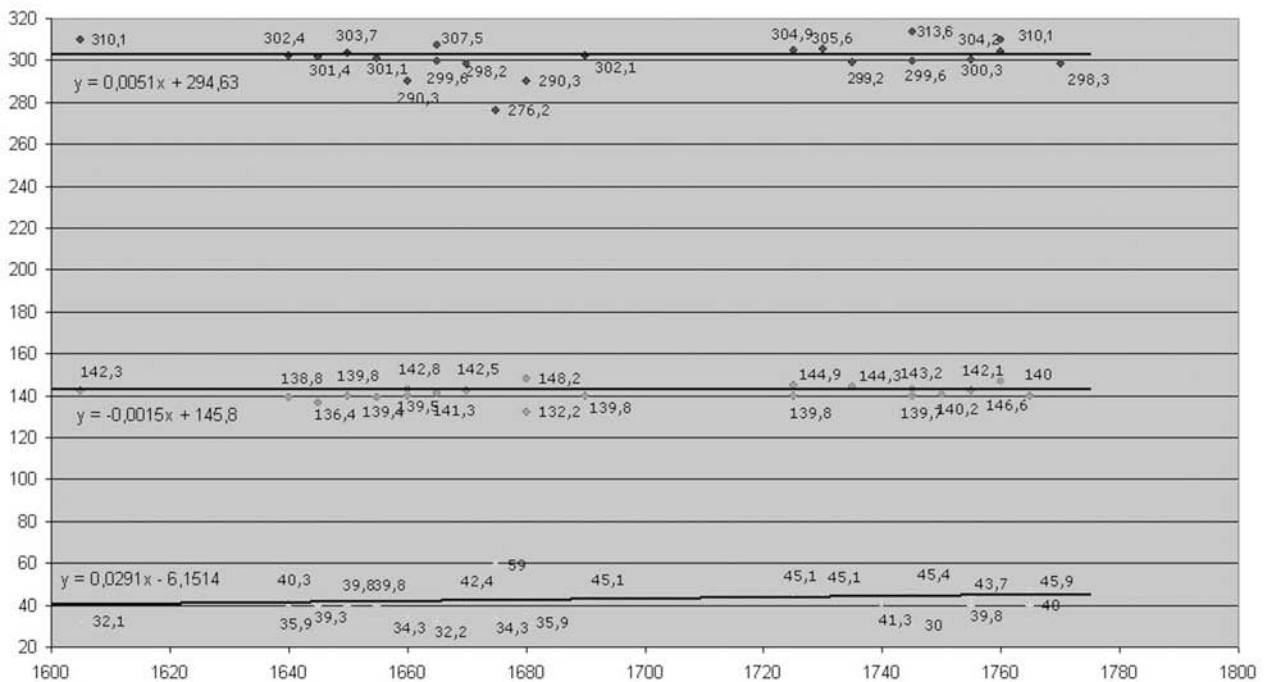


Figure 2. Bricks measure's evolution (ages cross with thickness, height and length, in mm). The stage is between the 17th and the 18th centuries, in which the variety of bricks is not remarkable, in spite of the possible treatments of the surfaces

fundamental data that adds to and forms part of this deep knowledge (Mileto and Vegas, 2006).

This detailed study, which aims to meticulously unveil the architectural and building culture of the city, deepens the knowledge that has been gained of a key part of the city's heritage. It also raises consciousness, not only of the high value that can be gained from this culture, but also of the need to preserve it well for the future. This research proposes that a new conservative approach to develop a preservation mentality towards the historic centre of the city be adopted, which is highly needed for the conservation of the culture and identity of Valencia, not only to maintain and build up the knowledge of its own past, but also to preserve its character and atmosphere in the future. The research does not aim to freeze the city in its present state, but rather to understand the culture(s) that have built it, to get to know them better, to appreciate them more and to preserve them for the future, always with an awareness to seek that necessary compatibility as needs evolve over time.

In following pages, a summary of two of the most advanced case studies is presented, that is: the brick fabrics between the 17th and 18th centuries, and the historic ceilings of the city of Valencia.

## HISTORIC MASONRY: TRACES IN VALENCIA'S CITY CENTRE

### 1. The context and the development of the technique

The manner in which bricks were put to use in the founding and early growth of Valencia, dating back to the Roman era, can still be seen in the city. However, due to urban expansion, a clash arose in the use of this particular technique. (Martí, 1999). It was not until the middle ages that wide spread circulation of brick *know-how* took place (Martí, 1999), and knowledge of widespread brick usage developed. During this era of economic decline, the use of limestone decreased, as more and more people developed masonry skills (as it was cheaper) and this compensated the loss of Roman traditional skills. Muslim architecture consequently inherited (after the Muslim conquest of Spanish peninsula in 711 AD) these earlier technologies, and at the same time incorporated the use of clay, both in construction using raw earth or

by using firing. Building traditions consequently became very mixed up over time, starting from the rule of *Almohade* until the Christian Reconquest in 1231, which resulted in a change over in Muslim/ Catholic culture and construction techniques (Barceló, 2000).

Given the economical conditions of the time, specially the loss of skilled labour, it is remarkable that the usual manner of construction was earth walls reinforced by bricks, in essence a brick structural framework, filled in with rammed earth. The development of this practice, known as *tapia valenciana*, showed how the use of quick, easy and hybrid masonry techniques flourished. The result of this can be seen today in the urban tissue of clay architecture, which shows a progressive increase in the use of brick masonry despite the use of simple/reinforced rammed earth walls.

During the 16th and 17th centuries, several factors contributed to make masonry more mainstream (Barceló, 2000: 45). The role of bricks changed from being an auxiliary aid to the core building material. This also arose due to necessities such as the building of churches, caused by reform of the Catholic Church and the loss of Muslim labour, produced by the expulsion of the Islamic working-class in 1606.

The use of bricks grew constantly from the 18th to the 19th century, caused by both the expansion of the city and by improvements in their manufacture, as can be seen today in the district of *Example*, in the south west part of the city. The workshops in Paterna, Manises and in the surroundings of Valencia slowly abandoned their traditional handcraft techniques in favour of a more industrial and controlled brick production process.

### 2. Masonry: traditional "modus operandi"

It is an interesting exercise to compare certain aspects of Valencian brick making techniques, taken from 21 buildings (both civil and religious constructions), in the city centre<sup>3</sup>. The study, carried out using both direct (ie on site measuring and dating processes-) and indirect analysis (consultations of documents, books and handbooks), has shown there are distinctions and differences between the masonry in the buildings.





Figure 3. San Andrés church. Detail of the double joints in the masonry of the front of Calle Procida. First part of 17th century

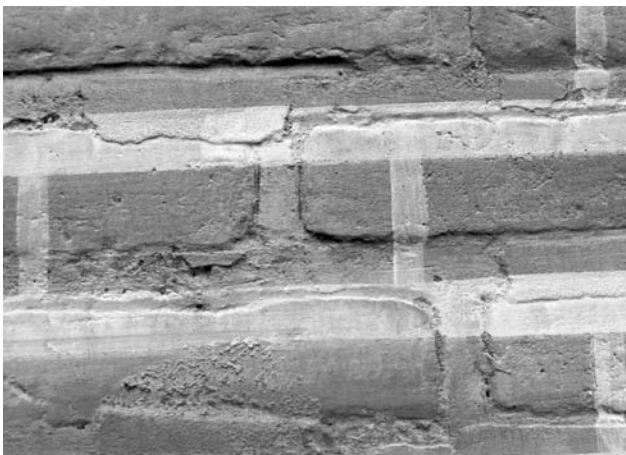


Figure 5. Aduana's Palace- 1758-1770. Front of Calle Colon/Plaza puerta del Mar Detail of the clash between the masonry and the painted pattern. Traces of original joints frame, lightly marked, changed with the restoration of 1996

A particularly remarkable aspect of this subject, was the fact the bricks were generally of uniform size, despite the fact that the usage of plaster, masonry patterns and joints, all varied greatly. Indeed it is also possible to study in some depth the various features of both bricks and mortar, such as colour, thickness, texture and mixture. By indexing this information, a sequence of different combinations between bricks, amount of mortar used in joints, and plaster can be observed.

### 3. Results and conclusions of the study

Thin bricks, typical of the earlier roman and medieval constructions, are characterised by pasty and pale colours, more close to a yellowish tone than reddish one. This peculiar feature was caused both by baking bricks at low temperature and by using poor quality and sandy raw materials. Over time, better features were incorporated into the bricks: for example, in Muslim workshops, higher quality materials began to be used which made bricks stronger, such as increasing the percentage of clay and quartz. These bricks are red or orange in tone, non porous, very resilient and are dark and well fired. It is therefore possible to determine a relationship between thick bricks with a specific type of plaster made just to cover and protect the walls. In walls that have more resistant features, only a thin protective plaster layer is visible over the clay's surface, not a real coating. Comparing different buildings, especially from 17<sup>th</sup> until 18<sup>th</sup> centuries, allows for the interesting analysis of brick thickness to amount of horizontal mortar: the thicker the brick, the less mortar used.

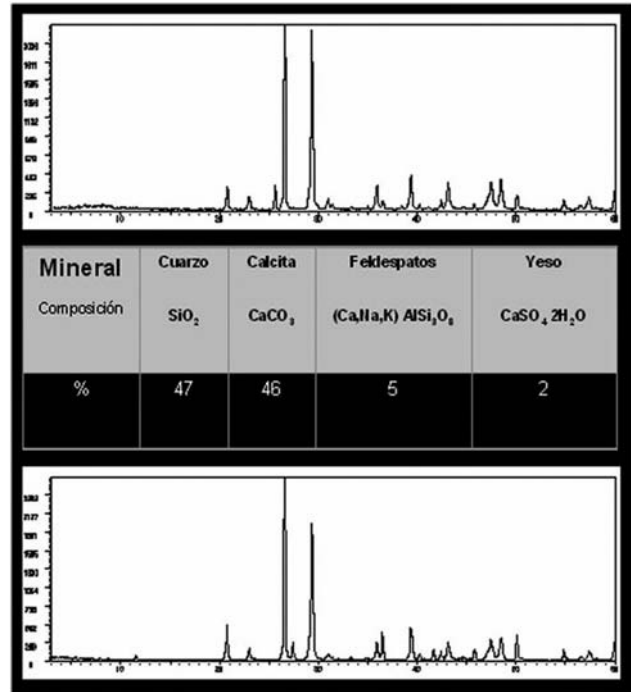


Figure 4. Analysis of joints mortar: results and composition

Another unusual aspect is the relationship between the ratios of vertical and horizontal mortar joints. The perpendicular joint is always thinner compared to the parallel one, especially so after the 18<sup>th</sup> century, and, the thicker the brick, the thinner the depth of the vertical joint. On the other hand, the presence of a deep horizontal joint (around 40-52 mm) involves two different types of coating: the plastering of the walls (16<sup>th</sup> century) or the filling of the joints (17<sup>th</sup> century). In case of thin horizontal joints (around 20-37mm) two further types of finishing can be observed: a thin veil or coat of lime, painted red (almagra) or simply a sham brick finishing.

The first technique is called “agramilado” and was used with squat and dark bricks, (32-41mm thick) with wide horizontal joints (40-52 mm) and thick vertical unions (20-29mm)]. This method required the huge space between the bricks to be filled in, not merely for aesthetic reasons but more for the protection of the bricks' outlines and edges. The final result of the filling, called “zaboyado”<sup>5</sup>, was a structural and finishing coat, with good levelling at the surface, due to the padding of the main joints.

Further analysis was also made possible with the support of an optical microscope belonging to the University of Granada. This allowed detailed study of the differences between the main structural joints, made by lime mortar<sup>6</sup>, and the filling mortar, made also with lime mortar but with a high percentage of alum and gypsum.

Plastered masonry can be identified by brick lines with large horizontal joints (25-48 mm) but very thin vertical joints (5-17 mm). In this case the rendering has a honey-ochre tone, a finishing carried out on purpose to give a limestone effect.

During our general analysis of coated masonry, it was interesting to make a careful study of a finishing technique where bricks were not completely covered. At the time of the Academic Revival in 17<sup>th</sup> century, a special masonry treatment came in to use that had quite thick bricks (40-45 mm) and medium-size horizontal and vertical joints (30-7 mm). This coating was made by painting a pattern of sham bricks, which was more regular and shaped than real bricks. In addition to the regular treatment, the joints are more geometrical, better measured and clearer.

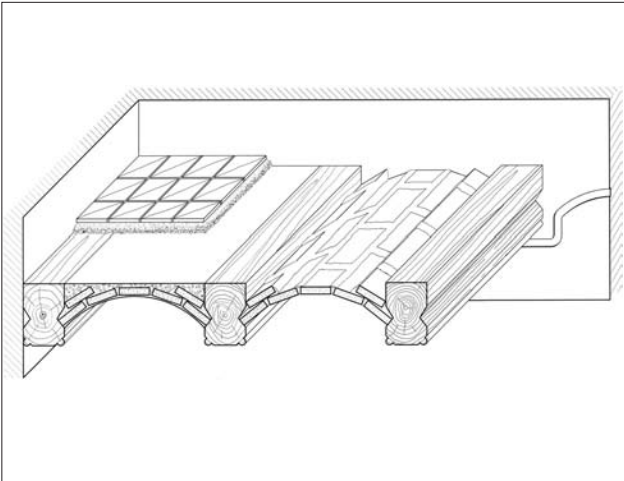


Figure 6. Constructive detail of a ceiling structure with revoltones

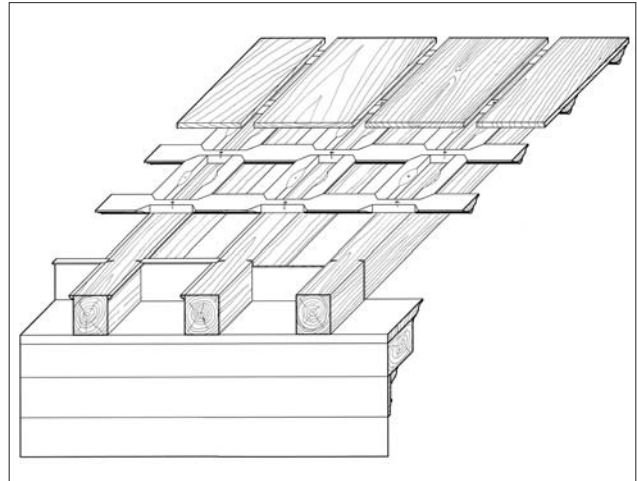


Figure 7. Constructive detail of a coffered structure

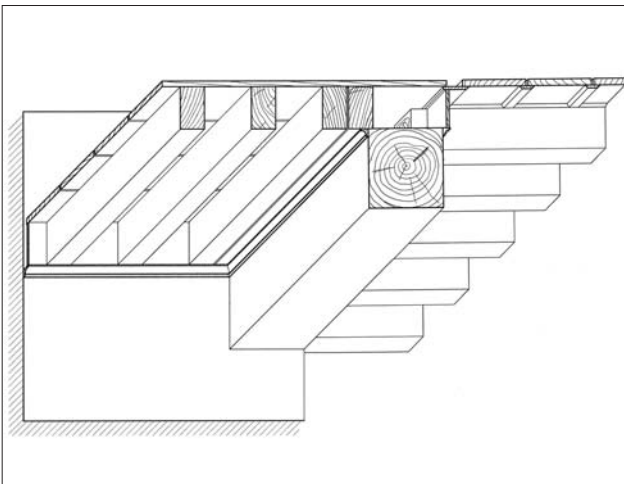


Figure 8. Constructive detail of a beams and boarding structures

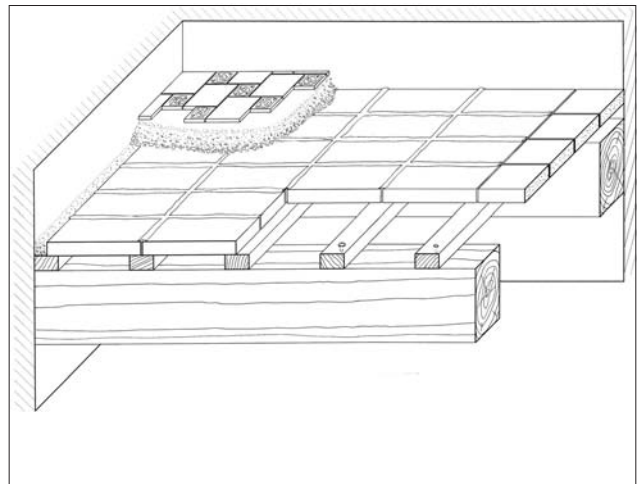


Figure 9. Constructive detail of a socarrats structure

This extraordinary variety of masonry processes, as revealed by these studies into historic bricks and mortar in the city centre, is a relatively unknown special heritage of the technical and traditional labour culture of the city. Increased knowledge on these techniques is essential, not just for the sake of academic interest, but more to improve to preservation goals of the city.

#### ANALYSIS AND DESCRIPTION OF HISTORICAL CEILINGS IN VALENCIA

As is the case with many other European cities, in Valencia the passing of different eras and traditions in history has resulted in buildings of different periods being erected in close proximity to each other. Indeed the differences of these buildings can be noted not just in their facades but also in their interiors. This particular research focuses on ceilings of buildings built between the 15<sup>th</sup> to the 20<sup>th</sup> century located within the former area bounded by the Christian walls of the city. The aim of the research was to study a selection of historical ceilings by classifying them according to their distinctive features.

The analysis carried out in this study is based on the survey of 221 structures located in 33 different buildings. This sample size allowed us to recognize recurring characteristics and to divide the structures into four groups (*revoltones*, coffered structures, beam and board structures, and finally *socarrats*) and two sub-groups (non-structural coffered ceiling and *revoltones* with 45° rotated beams). However, a detailed statistical analysis was partially hindered by the uncertain dating as

well as the non-uniformity of the sampling, which consisted of 136 *revoltones*, 61 coffered structures, 16 beam and board structures and 6 *socarrats*.

#### 1. Revoltones

This technique was the most commonly used, not only in Valencia City, but also all over the region. Its large geographical spread can be explained by the fact that it is the most recent. However, data analysis on it was affected because, even though there are more samples of this technique than any of the others, it represents only a small percentage of the structures that exist today. The technique's main advantage is the simplicity of its construction. In fact, after positioning the main beams, the stability of latterly positioned bricks is guaranteed by mortar alone without the need for any external support, even if vault width exceeds 1m, until the keystone was positioned. The second relevant factor was the decreased use of wood, an important material that began to become scarce at the beginning of the 18<sup>th</sup> century. The success of this kind of floor can also be seen to be the result of the use of a variant of iron beam of standardized dimensions that was used to replace wooden ones; in this case the flanges are the support of the vault.

The *revolton* sub-group technique of rotated beams is not very common, although it did have the fundamental advantage that the beam did not need any shaping to hold up the small vaults. On the other hand, the supporting wall had to be specially prepared by arranging the bricks properly or inserting two stone quoins.



Figure 10. Examples of different types of ceiling decoration: geometrical themes with alternated bands of three different colors; imaginary animals and human figures; others decorations (coats of arms and epigraphs)

Beams could be made of solid wood or compounded by two wings nailed to a central core, independently of whether the lower edges were decorated or not. This second solution was usually preferred, since it was easier to nail a list than to carve the wood; moreover it was possible to save on material, since smaller sections were needed. An interesting variant was the beam compound of two pieces: a small wing nailed to a bigger part, where an incision was made in order to support the vault. Even if it were reasonable to suppose that this variant was used for consolidation, this hypothesis is untenable given that all the beams work in the same manner and the finish and patina are similar.

The Castilian word *revoltón* refers to the small vaults that link one beam to another. All the vaults that were examined are made of a single layer of brick arranged *in folio*; their number can vary approximately between 4 and 8, but sometimes the key consisted of a half-brick row. In order to make the vaults more stable, a second brick row lay at its ends. The original filling between the exterior and interior parts of the vault was of gypsum and scrap material conglomerate, which recently, on occasion, has been substituted by reinforced concrete.

We can differentiate the decoration of beams from vaults. The first, if present, was reduced to the carving of one or two visible edges to produce a moulding. The usual vaults' ornament were the following: floral paintings, graffiti, or modular panels made of plaster of Paris where elements representing heads of warriors inscribed in garlands alternated with winged figures and cornucopias were quite frequent.

## 2. Coffered structures

This kind of floor, together with the beams and boarding structures, is given the generic term *alfarje*, which indicates the elements' orthogonal nature. The beams supported two groups of perpendicular elements nailed to them, which improved the double directional behaviour structure: 2-3 m long beams and shorter lists over which lay 3-4 cm boards, either parallel or perpendicular to the beams. All this structure was first covered with earth or clay and then by the flooring. The lacunar depth and complexity depended only on the quality of the list: thickness was usually around 2-6 cm (though sometimes this was higher, a typical feature in *artersonados*), while the trapezoidal section could be flat or moulded. Due to its variety, this type of floor dominated rooms of very different usage, such as lobbies, passages and halls.

The cornice is associated with the coffered structure because it is present in more than 45% of the samples. It does not have any structural function, was nailed to the beams and concealed the beam support inside the wall. Cornices varied a lot in shape and could be formed either by solid wood or wood with a hollow profile.

An important structural element was the brackets, which can be divided into two groups: those which support main beams and those which support parametrical beams. The first type was generally made of wood and had a complex shape, while the second was always a stone corbel with a simply curved face.



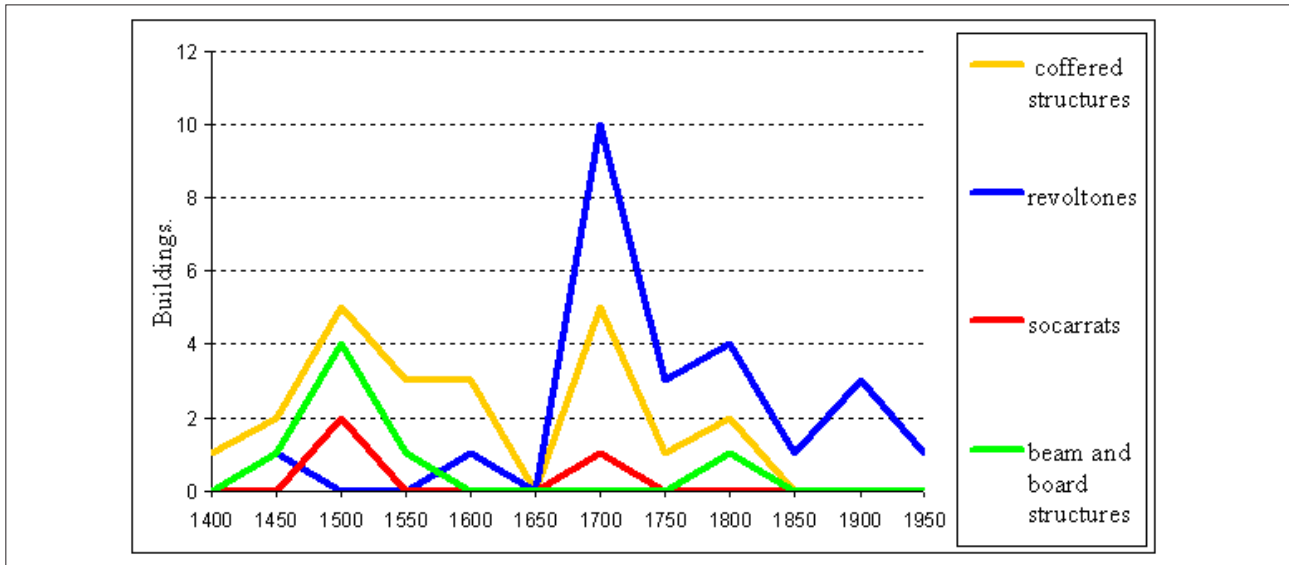


Figure 11. Diagram of the frequency of the different types of ceilings structures through the centuries in the city of Valencia

### 3. Beams and boarding structures

This is the simplest kind of ceiling, since, after the beams were positioned, the plank covering was simply nailed to them and covered with earth or clay. Boards were usually 30 cm long and 4 cm thick and were placed side by side without any fixed joint or butt strap in the interior part of the vault. To prevent the filling material from falling through it is likely that some type of list or paste was used to cover the gap.

In Valencia, in the Palacio d'En Bou, an individual group of ceilings with a unique characteristic can be found. All of them are made up of huge boards, mounted parallel to the beams and decorated on the intrados with moulded fillets of polygons.

### 4. Socarrats

This technique is not very widespread within the city, but, due to its simple construction process, is far more common in the countryside. Their given name, *socarrats*, is improper, however, because the elements are common bricks. They are known by this term because of their structural importance and ornamental nature. The real *socarrat* is an element decorated with baked clay of specific quality and dimensions, which spread around the Valencian area during the 16<sup>th</sup> century (Soler Ferrer, 1988: 237).

The wooden structure is composed of main beams, perpendicular joists that support the bricks and a filling lime mix. The weight of this type of structure influences the beam section geometry; indeed the average ratio of height to width of the beams' section is 2, while in the other cases it is around 1.5.

### 5. Decoration

Ornamentation is not very common and it depended on the importance of the room below. Over the centuries, decoration was chosen without any relation to the type of structure. Generally, however, it consists of a pictorial layer made of tempera diluted with water and emulsified with egg or animal glue (Fernández Cabo, 1997: 72).

We can attempt to arrange the different motifs in a chronological order by dividing them in to two main groups. The first includes geometrical themes with alternating bands of two or three different colours that create optical illusions. The second has features of interfaced branches, imaginary animals and human figures, and is called *plateresco* or *candelieri*. Finally, there are some recurring elements: a coat of arms, red and yellow bands, eight pointed stars, and epigraphs.

### 6. Chronological Analysis

The diagram shows the frequency of the different types of ceiling structures over the centuries. It was very difficult to date the ceilings because detailed studies were available only in a few cases. As a result, most of the dates have been deduced from the construction history of the buildings, but sometimes that information was not enough. In spite of the uncertainty this introduced, it is possible to trace out the general historical trend.

As a consequence of the shortage of wood, which began in 18<sup>th</sup> century, the use of *revoltones* became more widespread and popular, and their construction continued until 20<sup>th</sup> century, as seen in the diagram. The increase in the diffusion of the other three groups of structures in Valencia during the 16<sup>th</sup> century coincides with a period of sustained development and economical growth in the city. However, the use of these kinds of ceilings decreased in the 19<sup>th</sup> century due to the introduction of new materials, such as iron and concrete.

### 7. Artesonados

This study does not look at a fifth type of structure: the *artesonados*, despite their importance and rich decoration, since in Valencia there are only few examples concentrated in some buildings, and they have already been already fully researched. The rooms that host these ceilings are very high because they are usually large public halls; this factor makes their observation and survey, as required of an accurate study, difficult. Finally, to fully understand a structure and its joints, it is essential to view them from the inside, and this is possible only if the flooring is taken apart. On this point, it is important to distinguish between real *artesonados* and non-structural ones; indeed, in the first case the wooden beams' interlacement is completed by pyramidal structures that are visible from below, while non-structural *artesonados* are panelled ceilings hung from a different type of floor.

### CONCLUSION

It is hoped that the study of the constructed features in the historic centre of Valencia will not only generate an important data base listing the city's architecture, but also create a protocol for the analysis of this architecture in the future. This should be the first stage of the creation of a new method of restoration, which should be able to adapt to the specifics of individual cases, and which should help to preserve and maintain the rich heritage of material culture of the city that has been given little regard to date. Detailed analysis of these built documents of the past, the spreading of this knowledge and showing that true preservation is possible is a difficult but necessary task, one that aims to contribute to the conservation of this still little known heritage of the city's constructed culture.

## NOTES

<sup>1</sup>These studies have been developed as final graduate thesis, respectively by Valentina Cristini (Cristini, 2005) and Maria Diodato (Diodato, 2006)

<sup>2</sup>“Criterios y técnicas de intervención en lo existente: el proyecto en el paisaje, la ciudad, el edificio y el detalle arquitectónico” (Criteria and Techniques to Preserve the Built Heritage: the Project in the Landscape, the City, the Building and the Architectural Detail), within the PhD program “Patrimonio arquitectónico: historia, composición y estudios gráficos” (Architectural Heritage: History, Composition and Graphical Studies) of the Escuela Técnica Superior de Arquitectura de la Universidad Politécnica de Valencia

<sup>3</sup>On chronological order: *Iglesia del Patriarca* (side front); *Iglesia de los Santos Juanes* (main front of *Capilla de la Comunión* and left side of the second chapel in the church); *Iglesia de Santa Ursula* (main front); *Iglesia de la Virgen de los Desamparados* (tambour); *Catedral* (main front of Sacristia); *Iglesia de San Nicolás* (main front of the Chappel); *Iglesia del Carmen* (main front of *Capilla Nuestra Señora del Carmen* and masonry between the church and the tower); *Iglesia de San Martín* (side front of *Capilla de la Comunión*); *Convento del Pilar* (main front); *Iglesia de San Esteban* (main front of *Capilla de la Comunión*); *Iglesia de San Tomás y Felipe Neri* (side front); *Palacio Pineda* (main front); *Iglesia de San Andrés* (side front); *Palacio de los Catalá* (fachada lateral); *Palacio Cerveró* (fachada principal); *Palacio de la Aduana* (main front); *Iglesia de los Genoveses* (main front); *Iglesia de las Escuelas Pías* (main front); *Casa Vestuario* (main front).

<sup>4</sup>“Agramilado es un revestimiento de una fábrica de ladrillo mediante revocos o estucos de distintas composiciones, señalando las nuevas juntas horizontales sobre las existentes debajo, con la misma irregularidad que en origen caracterizaba la fábrica” (S.A., 1999: 215).

<sup>5</sup>“Lo zaboyado es la técnica de rejuntado consistente en rellenar de mortero las juntas de una fábrica de ladrillo, enrasándola.” (S.A., 1999: 215).

<sup>6</sup>The proportion of quartz and lime is in balance 1:1 with a very low quantity of gypsum.

## BIBLIOGRAPHY

Barcelò C. (2000): ‘Valencia islámica. Paisaje y espacio urbano’, in *Historia de la ciudad, recorrido histórico por la arquitectura y el urbanismo de la ciudad de Valencia*, ICARO ED., Valencia, 40-53

Cristini, V. (2005): *Valencia, ciudad vella: ladrillo cara a vista, agramilado, fingido y enlucido. Anàlisi delle murature in laterizio: prassi costruttiva ed evoluzione archeometrica*, Architectural Graduate Thesis, Politecnico di Milano, Tutor: Amedeo Bellini, Co-tutors: Camilla Mileto, Gianfranco Pertot

De Arias y Scala, F. (1897): *Carpintería Antigua y Moderna*, Juan Romá Editor, Barcelona

Delgado Martínez, M. (2003): *Los alfarjes y artesanos de madera valencianos. Aspectos artísticos y constructivos*, Master Thesis, Universidad Politécnica de Valencia, Tutor: Lilibiana Palaia Pérez

Diodato, M. (2006): *Analisi e classificazione dei solai storici della città di Valencia*, Architectural Graduate Thesis, Università degli Studi di Trieste, Tutor: Sergio Pratali Maffei, Co-tutor: Camilla Mileto

Dogliani, F. (1992): *La costruzione del progetto di restauro. Caratteri del costruire in area veneta*, LINT, Trieste

Fernández Cabo, M. (1997): *Armaduras de Cubierta*, Ámbito Ediciones, Valladolid

Martí, J. (1999): ‘La remodelación y expansión del urbe’, in *Historia de Valencia*, Levante EMV and Universidad de Valencia ED., Valencia, 81-100

Mileto, C. (2000): ‘Algunas reflexiones sobre el Análisis Estratigráfico de Fábricas’, in *Loggia. Arquitectura & Restauración 9*, Valencia, 80-93

Mileto, C., Vegas, F. (2006): ‘El edificio y su memoria. Conservación de las huellas del pasado’, in *Estudios/ Património 9*, IPPAR, Lisboa, 72-89

Nuere Matauco, E. (2000): *La Carpintería de Armar Española*, Editorial Munilla Leria, Madrid  
Pérez de los Cobos Gironés, F. (1998): *Palacios y Casa Nobles. Relato sobre las que hubo y hay, de propiedad particular, en la ciudad de Valencia*, Federico Domenech, Valencia

S.A. (1985): *Temas d’etnografia valenciana, Sèrie dirigida per Joan F. Mira, III*, Institució Alfons el Magnànim, Institució Valenciana d’Estudis i Investigació, Alzira

S.A. (1997): *Manuale del recupero del Comune di Roma*, Tipografia del Cenio Civile, Roma

S.A. (1999): *Actas del Congreso Internacional sobre restauración del ladrillo*, IEA. Ed., Leòn

Sanchis Guarner, M. (1983): *La Ciutat de València*, Ajuntament, Valencia

Simó, T. (1983), *Valencia centro histórico. Guía urbana y de arquitectura*, Institución Alfonso el Magnánimo, Diputación Provincial de Valencia, Valencia

Soler Ferrer, M.P. (1988): *Historia de la cerámica valenciana*, Vicent García Editores, Paterna

Vegas, F., Mileto C., Zuccolotto, M. (2001): *Memoria construida. Arquitectura tradicional del Rincón de Ademuz*, ADIRA, Valencia

Villalmanzo Cameno, J. (1990): *Libre de Ordenacions de la Almoyna e Confraria del Offici dels Fusters*, Javier Boronat editor, Valencia

## AUTHORS

**Camilla Mileto** and **Fernando Vegas** are lecturers of Architectural Restoration and Architectural Theory at the Escuela Técnica Superior de Arquitectura (ETSA). Their research topics include the preservation of historic and local architecture and monuments. Valentina Cristini gained her architectural degree at Milan Polytechnic and is presently studying for her PhD at ETSA, Valencia. Maria Diodato gained her architectural degree at the University of Trieste.

Versión española

TÍTULO: *Características constructivas de la arquitectura histórica en la ciudad de Valencia*

**RESUMEN:** *Esta investigación se ocupa de las características constructivas y arquitectónicas de la arquitectura histórica de la ciudad de Valencia. La cultura material de la ciudad ha sido centro de atención desde el punto de vista de las técnicas constructivas y de su valor patrimonial como un verdadero testigo del pasado. Este estudio se propone como una contribución al conocimiento de la arquitectura de la ciudad y a la conservación de su tejido construido como documento de su historia y elemento que proporciona carácter e identidad a la ciudad misma. Adjunto, se presentan los resultados iniciales de esta investigación: un estudio de las fábricas de ladrillo de los siglos XVII al XVIII y un estudio de los forjados históricos de la ciudad.*

**PALABRAS CLAVES:** *Valencia, centro histórico, arquitectura histórica, arquitectura vernácula, preservación, protección, fábricas de ladrillo, forjados históricos, catalogación, método*