Report with the results of the Seminar hold in Rodez, April 25th 2013

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Made by Les Compagnons du Devoir

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A. INTRODUCTION

During the seminar participants has widely discuss regarding the main placing methods for the most common stone elements in the stone industry. Where there is an European normative for the placement of the particular element, consortium obviously decided to include this method. Besides being compulsory its use, in these cases the proposed method has been already discussed in an EU level, having into account not only the needs of construction or restoration companies, but also safety and environment protection criteria.
For those cases where there is no normative in EU level participants check if there is a national normative in the participants countries. In this case, participants analysis its suitability to meet the Eruopean stone industry needs. If the method was considered suitable, it will be selected as the proposed method. It was always the case in the few cases where there is not an EU normative and there is a national normative.

For the cases where there was no national or EU normative participants analysed the code of practices introduced by the different partner organizations, according to a distribution of tasks already approved previously. One by one the methods for placing the most common stone materials were analysed and a decision was taken for all elements regarding which will be the placing method to promote and to use when developing the multimedia products of this project.

Participants, besides deciding on the selected method for placing each stone product, have agreed on how these material would be represented in the multimedia products to be developed, Multimedia Resource Centre and Flash Cards.

B. SELECTED METHODS FOR THE DIFFERENT ELEMENTS

1. External cladding:

a. Mortar cladding for external facades

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Mortar will be used together with a wire in the upper and lower sides of the stone to ensure security performance of the placing of the stone.

According to German normative when the thickness is more than 55 mm the stone pieces must rest over any material. In general it is considered convenient for material over 20 mm not to be only hanged. However, the normative and practices differ from country to country. For the multimedia material consortium will include the reference to these 2 measures.

The mortar used to place the stone, can be traditional or industrial. It use depend on the type of stone and the geographical area.

b. Ventilated facades with punctual anchorage

Safety: It is important to highlight the use of normalized scaffoldings.

For representing it must be used both horizontal and vertical anchoring, 2 joining point in each direction. A plastic support must be used also.

The graphic material must include 4-5 different examples of punctual anchors.

How the worker organises the work in the façade must be clearly represented, putting special attention to the choosing of the starting point and how the façade joins the special elements of the façade: windows, doors, corners, etc.

c. Ventilated facades with substructure

The substructure is sometimes placed by the stonemason, sometimes by another professional in the site, a stonemason must know how to place it. It is important that it is placed exactly so that the proper fixing of the stone is ensured.
The substructures can be divided in three general types:

- Vertical
- Horizontal
- Grid (mixed)

In the substructures 2 type of supporting elements are used. The stronger ones are fixed to the slab and they support the main wait of the stone, the second one, lighter is fixed to the walls and they just stabilize the load and provide additional isolation for wind, temperature, etc.

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For the graphic representation, 2 anchors can support the load on the slab and other 2 (stabilizers), smaller ones, for wind, thermal reasons, etc (non-load bearing) go on the wall. The joining to the slab must be rigid, and that which goes to the wall has a union which allows a certain amount of movement. When the horizontal support has to bear a large load it is important not to separate the spaces as it could bend the support.

Regarding the kind of structure, the most used materials are aluminium and stain steel. The use of corrosive material is very dangerous because of after placing the stone they will be hidden and the damages cannot be detected. Plastic cannot be used because of safety reasons.

Regarding the order to be used in the placement, the substructure is place firstly, then the isolation is placed closed to the wall. Where the anchor is located, the isolation must be cut in order to the anchor stay in contact with the wall and not reduce its supporting capacity.

2. Internal cladding:

a. Mortar cladding for internal facades

The considered maximum high without the use of anchors is 3 meter high. For a thickness form 10 mm to 20 mm the use of anchorage can be avoided, after that thickness the use of anchors is recommended. However, it depend on the country, in some countries depend on the thickness, but in other ones depend on the size of the tiles: over 3600cm (60cmx60cm) the use of anchors is compulsory or recommended (code of practice), depending on the particular country.

Related to mortars and glues, there are 3 main types:

- Cement
- Dispersion adhesive.
- Reaction resin.

Mortars must be put in the whole slab, using trowel teeth. If there is not a previous study about the supplier we must test it before use. When we use resin, because of its high cost we can put a thin lay of resin in the whole slab and then put a bigger amount in a few point. This avoids a change in the colour between the different places in the slab.

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The sealing can be done with cement based mortar or special elastic mortar. When the level of humidity will be big around it, it is recommended the use of elastic mortar to avoid the humidity enters through the joining by capillarity.

3. Singular elements:

a. Fireplaces

The French model must be the represented one in the multimedia products, which is the most common and a complete one. However, all partners must send at least 3 quality pictures to represent the different styles and kind of stone of each country.

Further to the design, the norms regarding the sizes of the different components must be included in order to the fireplace works properly.

b. Grave stones

The most common and important methods are the French and Scandinavian methods. Swedish partner must send the placing method in Sweden, because it is different than in France and represent the Scandinavian style. French partner will develop complete information regarding the French model, the most common in Central Europe. German technique is similar to French one, so there is no need for further materials. Spanish partner must send only pictures and due to being a very simple method multimedia materials are not required in the stone sector.

c. Window sills

A clear detail of the joining of the stone to the window sills must be developed because of its important for the building, due to being a weak point for humidity and other problems in the construction. The methods are similar in the different countries.

d. Balusters

Two types will be represented:

- Balusters for stairs
- Balusters for balconies

The traditional method of placing consists in inserting the stone in the stair or floor, and the new ones consist in performing the joining by using a non-corrosive metal to

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fix the baluster. The first method (inserting the stone) is mainly used for restoration. In some countries, as France, the limestone products are always fixed with metal pieces. In Croatia, the use of resin and silicone is common for joining and sealing. Both methods must be represented, inserting the stone in the stair or floor and forming the joining by using a non corrosive metal to fix the baluster.

It is important for pieces made of sedimentary stone to pay attention to the different layers, keeping the weak planes against the strong planes in order to avoid they break.

For the sealing of the joining special mortars with repellent must be used.

e. Balconies

Three methods are commonly used:

- Traditional, performing the balcony only with stone
- Using hidden metal pieces
- Using high technology materials based on carbon fibres

Special attention must be made to the sealing in order to avoid the water enters through it.

4. Masonry:

a. Ashlars

These type of work are only used for restoration works in most of the European countries, however in Galicia, Spain, and Croatia people still use this materials for building houses. Partners from France (Le Compagnons du Devoir) and Galicia (AtinServices) will send to Croatia graphic material related to construction made with ashlars, as well as diagrams about how the houses are built. Croatian partner will compile everything and prepare the whole component for this part of the multimedia materials.

b. Cornices

For the graphic representation the techniques used in Cratia will be used, which represent an European and quality standard. Spanish partners must sent pictures of

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cornices, as well as assembly diagrams for Croatian partners perform its whole representation.

c. Arches

Only in few European areas are still being used arches besides restoration works, Galicia, in Spain is one of them. AtinServices must collect and send pictures about assembly diagrams typical for arches in the area. The use of clamps is only necessary if there is a load over the arch.

d. Columns

For assembling columns the same methods as baluster are being used: inserting the stone in the floor and forming the joining by using a non corrosive metal to fix the baluster. Both must be represented in the graphic material to be produced.

5. Internal pavement:

a. Tiles

Slipperiness coefficient is very important, however there is not normative for the internal pavements in the involved countries or in Europe. In Spain and Germany there is a code of practice. The difference on the level between one stone tile and the next one, must be maximum 0.5 mm plus 10% of the width of the joining.

To represent this placing method the German code of practice will be used, which is very similar to the Spanish one. Then, pictures from the involved countries will contribute to give a bigger value to the multimedia material. All partners must send at least 3 quality pictures to represent the different styles and kind of stone of each country.

Regarding seal joining, it is the same than the previous chapters, then the same graphic material can be used.

b. Slabs

The placing method will be the Opus Incertus included in French graphic material. It is used in most countries and gives the biggest resistance in case of movements in

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the wall. All partners must send at least 3 quality pictures to represent the different styles and kind of stone of each country.

c. Stairs

We will represent only the slabs stairs, due to the tiles stairs are very simple to place and are commonly placed by common masons. All partners must send at least 3 quality pictures (or graphics) to represent the different styles and kind of stone of each country, which vary non only because of cultural reasons, but also due to the type and quality of the stone locally available.

6. External pavement:

a. Pavers/cubes

There is a maximum slipperiness coefficient, which depends on the country, In France is 35mm. and this measure will the that used for the graphic material in the project. The technique represented by the Swedish partner will be used for the graphic material, which is similar to that used in other countries.

Two techniques will be represented, the “hard” and “soft” one, consisting the first one in including a mortar bellow the cubes and the second one in using a “soft” laying, build in most cases based in the use of sand.

Due to the method is basically similar whatever style is used, for the multimedia materials the most complex style (circles) will be represented. All partners must send at least 3 quality pictures to represent the different styles and kind of stone of each country, including small and big cubes, limestone, marble and granite.

The graphic materials must clearly describe the process to place the cubes, specially important for its resistance and durability.

b. Slabs

The same system as before described for tiles must be used in the training material. However, information regarding the use of Plots must be included, due to its increasing use. Information thereof will be sent by CTM

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c. Borders/Kerbs

Only the placing with concrete must be represented due to the small stability of those placed with soft laying. Information about round works must be also included, both inside and outside, due to the different technique used for its performance. The material must include borders with vertical and horizontal stone.

d. Stairs

The same placing techniques as described for inside will be represented. More inclination will be used when it is in slab instead of tile. Heating systems will not be represented due to being exclusively used in some North countries.

CTM will produce the graphic material for massive stone and thin stone stairs.

e. Kitchen and bathroom tops

Consortium decided to take them away from the placing methods due to being mostly a work placed by ordinary masons.

f. Water collectors.

Consortium decided to take them away from the multimedia material due to being mostly a work placed by ordinary masons.

C. PARTICIPANTS

In the seminar the following partners and stone professionals have actively participated :

Partner Name	Participant Name
Deutscher Naturwerkstein-Verband	Mr. Krug Reiner
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Asesoramiento, Tecnología e Investigación, S.L	Mrs. Rosa M Rodriguez

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Association Ouvrière des Compagnons du Devoir du Tour de France	Mr. Jean-Paul Foucher
Association Ouvrière des Compagnons du Devoir du Tour de France	Mr. Denis Pekkip
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Klesarka Skola	Mrs. Tamara Plastic
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External Expert France	Mr. Didier Pallix
External Expert France	Mr. Didier Carmes
External Expert Spain	Mr. Santiago López
External Expert Croatia	Mr. Mirko Nizetic

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