



Transfer of know-how from older construction workers to young ones
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Traditional restoration being applied to antique buildings in Europe

Handy Guide

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1. Introduction

General Context

The construction sector plays an important role in the European economy. It generates almost 10% of GDP and 20 million jobs¹, mainly in micro and small businesses. Because of its economic importance, the performance of this sector can significantly influence the development of the economy as a whole. The quality of construction works also has a direct impact on the quality of life of European citizens. The competitiveness of construction companies is therefore a key issue not only for growth and employment in general but also for the sustainability of the sector. All stakeholders will be increasingly faced with the need for a skilled workforce. The massive retirement of skilled people by 2020, representing more than two thirds of jobs in construction², industry and transportation, will also be compensated. The chronic shortage of skilled labor can be explained partly by the low attractiveness of the youth on the building sector and, secondly, by the growing need for skills corresponding to specific qualifications that education and training (as well as the labor market) struggling to meet. The transition to an efficient economy in the use of resources and low carbon balance will be accompanied by major structural changes in the sector will have to adapt and anticipate the needs for skills and competences in these areas. In the area of renovation of existing buildings should be intensified efforts to increase energy savings.

The sector concerned is increasingly becoming a specialized and industrialized activity and it is a fact that is provoking a losing of traditional trades and what is more critical, of these workers' know-how. This process is involving an important loss of knowledge, mainly the one related to the restoration of buildings, needed in Europe particularly, due to the noticeable ageing of the European real estate and the relevance of the urban planning and patrimony conservation of the European downtowns. This means that some types of activities such as the restoration of façade lining (with stone, brick, rendering, etc.), staircases made by traditional materials, restoration of vaults and roofs, carpentry, etc. that required specific work proceeds and knowledge, nowadays they are tending to disappear because of the predominance of the current new construction, that requires a higher specialization and fragmentation of tasks. Paradoxically, the current change in the construction sector towards the restoration of the buildings due to stagnation of the

¹ COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL, Strategy for the sustainable competitiveness of the construction sector and its enterprises, COM2012(443)final

² «Skills Supply and demand», CEDEFOP, 2010, p. 93 – http://www.cedefop.europa.eu/en/Files/3052_en.pdf

new constructions because of, among others, demographic factors, is causing that an important number of workers from these traditional trades, have a lack of competences to address proper restorations, applied specially to old buildings.

The Project

In this general context, restoration activity is increasing in Europe, being currently higher in monetary terms to the residential sector. However, senior workers are about to retire and with their retirement, valuable knowledge on renovation of antique buildings could get lost. To avoid this, and to guarantee a proper restoration in Europe by providing a new generation of qualified workers, the project Construction Inheritance plans to develop an Open Educational Resource for teaching and transferring knowledge, skills and competences from senior generations of workers to new generations ones.

The project partners take into account processes, materials and techniques applied in real restoration works of the European architectural heritage as the basis for the development of the training content and its learning outcomes. As a result, an APP for training to be used in mobile devices (Smartphone and/or tablets) as a complement of existing training in national VET systems, to upgrade trainees' skills for activities of refurbishment in Europe will be conceived.

The Handy Guide and its Methodological Approach

The practical guide has been conceived with the main aim of providing a global vision about the main topics for all groups of interest of this project: trainees, VET institutions, enterprises, VET and employment authorities, workers, professional associations and society in general.

In order to get the information needed, the partners opted for an approach based **Semi-structured interviews** and **Job Observations / Case Studies**.

Semi structured interviews

Interviews based on pre-established questionnaires with open questions, adjustable to specific situations in every country. This questionnaire consisted of 5 different thematic areas identified in the interview script:

- Enterprises and customers

- Worksite and regulations
- Materials and techniques
- Management of Human Resources
- Training.

Every thematic area was tackled through different open questions. The partners work at different hierarchical or institutional levels, such as, for example:

- 1) A « national » representative (construction federation, institution in charge restoration ...).
- 2) Two company managers specialized in restoration of housing heritage.
- 3) A training centre manager.
- 4) A worksite supervisor or a worksite team leader.

Hence, the partners opted for interviews based on pre-established questionnaires with open questions, adjustable to specific situations in every country. The interview script should support the investigator and it should assist to record the interviews and complete the table at the end of the interview (recommendation to solve the summary task) or for filling the grid of the interview script while proceeding with the interview. There was no obligation to answer to all the questions proposed. Adaptation of the questions according to the profile of the person in front of the interviewer was required. Any chronological order to questions was not imposed. The main idea was to make a person express him-/herself in front of the interviewer and then fill the interview grid. Additional questions could sometimes be useful to go deeper into investigation.

To carry out the interviews, a period from one hour to one hour and a half to each interlocutor was foreseen. It was advised to formalise results after each interview by filling in the grid given. In fact, the formalisation usually took a lot of time, especially if one recorded the interviews. Starting from the common methodological framework based on identic investigation grids, each partner had to carry out, for each interviewed people, 5 individual interviews minimum.

Country	A representative of a construction federation of institution in charge restoration	Company managers specialized in restoration of housing heritage	Training centre manager	Worksite supervisor or a worksite team leader.	TOTAL
FORMEDIL PUGLIA (IT)	2	2	2	0	6
BZB (DE)	1	1	1	2	5
FLC (ES)	1	2	2	1	6

CENFIC (PT)	0	2	1	2	5
CCCA-BTP (FR)	1	4	1	0	6
Centre IFAPME (BE)	2	1	0	2	5
TOTAL	5	10	7	5	33

Job Observations / Case Studies

An up-close, in-depth and detailed examination of a key restoration case in each country (6 in total), in order to identify working processes, good practices and main challenges faced in the different work stages. This was carried out with the participation of key agents that participated in the process to carry out observation with the support of an “Observation grid”, that will be agreed by partners. This job observation / case studies contained a description of the building, type of trades involved, the materials more frequently utilized, the chronological processes of the work with the description of the work site activities, a sample of techniques and materials utilized during the processes.

The Results

The results are presented by themes and by country as agreed in common, to highlight potential specificities of each of them (part one). Thanks to the exploitation of the interviews, the characteristics of the job profiles concerned, main evolutions of company needs as well as organisational, financial and human evolutions have been identified. The second part present the different case studies with a special focus on the techniques utilized, the problematic identified as main issues and on the solutions chosen by the companies. These components contain, in fact, indications of potential directions to take for the improvement of existing training paths dedicated to the restoration of buildings, as contractually foreseen within the project.

2. Consolidation of the interviews: identification of common characteristics by thematic issue

The research, carried out in every partner country in the field of traditional restoration being applied to antiques building in Europe (housing) between December 2015 and June 2016 has led to the identification and description of the evolutions related to:

- Companies and customers.
- Organization and regulations of worksites.
- Materials, products and applications.
- Management of human resources.
- Training and transmission of know-how in companies.

We mean here for restoration: the rehabilitation of old buildings (housing) while preserving their appearance, their architectural interest and heritage value. In the restoration field traditional techniques and ancient materials are used without neglecting technological innovations and comfort.

These thematic areas are logically linked: we start from the analysis of the current situations to identify training needs. Every thematic area is tackled through different open questions.

CONSOLIDATION THEMATIC AREA A: COMPANY and CUSTOMERS

<p>A.1 Which are the main characteristics and differences between an enterprise which works in the field of traditional restoration and other enterprises of the construction sector?</p>	<p>A.2 Which are the exigencies and the demands of clients in the restoration field? How the activities of restoration are chosen?(Home or household renovation characteristics, building date, type...)</p>	<p>A.3 How the relationship customer/enterprise take place? How do you take into account the client's exigencies? (Appropriate services responses, manage particular exigencies, time, resources available, and balance between demands, organization's expectations and workers competencies and so on...) NB: This question is especially addressed to enterprises</p>
<p>Most of the partners underlined that the way to approach a work of restoration is not the same that we find in new construction field: the factor of "surprise" is always present. A "classic" building company uses to work on a planned and defined project plan, while a restoration company, rarely carries out the executive project plan as it was expected at the beginning.</p> <p>Interdisciplinary is another very important characteristic, as a dialogue between the different trades and crafts. A good knowledge of the building, his history, the traditional techniques utilized is crucial, but also the ancient building work in the region (materials, elements functions....). If the corporate culture is the same in new building and restoration companies, the work's approach is something completely different. It's not possible to take a</p>	<p>The clients often demand the use of techniques that respect the building originality (including architectural details to maintain).</p> <p>There are two types of customers :</p> <ol style="list-style-type: none"> 1) Those who have precise needs and who are accompanied by an architect. 2) Those who wait for the contractor to suggest them works to be done. <p>There should be a difference between renovation and refurbishment. The first field is restricted to the works of the administration and some private works, accessible to architects and companies with experience, while the second one is opened to all the architects and companies, mainly in regard to modernization, actualization to the current regulations, changes to other uses, and in this one there is more demand, both in dwellings and commercial premises as well as in other type.</p> <p>The partners agreed that restoration of façades and</p>	<p>The customer / contractor relationship should be of full partnership. Customer needs are always in first, but we must realize them, and guide them through the experience of the contractor. Not everything that is asked is executable.</p> <p>It's a common occurrence for the private customer to be trapped between his wishes and the requirements of the public bodies.</p> <p>Customers' demands are quite high. Mostly entrepreneur knows the customer personally. Customer is often convinced that the company is meeting his/her expectations. Cost bargaining is often not that tough like with new buildings.</p>

<p>normal building team and ask them to do some restoration when the opposite is possible... but without the same productivity. Basically, the difference consists in time and observation. A company specialized in the field of restoration is first of all company which has knowledge, a specific one, and which is not only profit-oriented. Heritage needs time and it goes against productivity and cost-effectiveness wanted by every business.</p> <p>Moreover, the partners agreed about the fact that there are several differences both at project level and executive level. In the new buildings field, project matches the final product and goes on following standardized steps; in the restoration field, project proposals are implemented through all the items resulting from the daily activity.</p> <p>In addition, in constructing new buildings there are mostly subcontractors involved. With existing (old) buildings the entrepreneur is often directly involved him-/herself and with own employees.</p> <p>Generally, the difference is that the restoration and refurbishment company tends to be a small company or freelance workers bounded to an internal refurbishment company, opposite to the bigger companies that work in the new constructions.</p>	<p>roofs is demanded to a larger extent.</p> <p>The interlocutors mention that private customers in this field normally are characterised by a very high requirements concerning works and they have a very high expectation on the work.</p> <p>Demands often made by the customers:</p> <ul style="list-style-type: none"> - Making use of historic correct materials - Sensibility by the craftsman concerning the entire historic built volumes, which is worked with. - Restoring in the sense of preservation of historic buildings and with that e.g. focusing on energy saving issues - Often multidisciplinary consulting <p>Among the project priorities, there is the protection of the static nature of the artefact and the aesthetic and decorative enhancement of the architectural asset, according to the requirements of the public bodied in charge of the protection of cultural heritage.</p>	
<p>General conclusions There are not many big enterprises in this sector. There are mostly SME and very small businesses. The bigger ones are often family-owned companies.</p>		

In the restoration field, the company has to consider and meet different aspects and requirements:

- Energetic aspects
- modernization
- improvement of the comfort of living
- conservation of historic constructions
- elimination of harmful substances
- change of the mode of use

For all the partners, the restoration intervention is a very delicate operation, because it aims at preserving the architectural and aesthetic value of both exterior and interior areas, by providing the artifact with all comfort and by respecting the standards dealing with the removal of architectural barriers and energy efficiency.

In restoring private buildings, the artifact must be preserved through the guidance of a technical expert who succeed in creating the right balance between respect for the asset and modern needs, by using appropriate materials, by considering the proper distribution of internal space and by respecting the comforts required by modern construction techniques.

The entrepreneur's role is to suggest solutions that respect the authenticity of the building without favoring only the economic aspects. In general, the client's expectations are very high and in the average the clients are attentive both to aesthetical issues and the quality of material used. The company should succeed in in orienting the customer towards the most appropriate solution, which should be also shared by technicians, authorities and clients.

CONSOLIDATION THEMATIC AREA B: WORKSITE (Organization and Regulations)

<p>B.1 Which are the main specificities of a worksite in the field of the restoration? (Environmental conditions, available space, accessibility...)</p>	<p>B. 2 Which are the most common problems? Which are the main difficulties that you face during the works implementation?</p>	<p>B.3 How do you match tradition and innovation?</p>	<p>B.4 How do you manage the work force and the team's work?</p>	<p>B.5 How do you deal in renovation works with the existing regulations requirements? (H&S regulations, technical regulations, energy efficiency regulations, labor code and so on)</p>
<p>Some of the interlocutors mentioned the fact that restoration sites are often located in the old town, where it is difficult, if not impossible, to enter with ordinary vehicles. In some cases, it has been necessary to use small vehicles for transporting materials. Thus, the logistics is much more critical. The narrowness of the space available represents another critical aspect, because of its closeness to other artefacts and other inhabitants, too.</p>	<p>Many partners underlined to meet many difficulties to access to construction sites due to reduced spaces. For the same reasons, the loading and unloading of material could be a delicate phase of materials (this is particularly true in renovations of buildings placed in historical centres). Usually these works arise unforeseen events that require flexibility and adaptability. The partners pointed out that a major problem is the lack of qualified workers. During disassembly work, it is always possible to discover problems. We will have to solve them afterwards. We never start</p>	<p>Knowing local materials, which are often very different from standardized ones, enables the use of innovative products, reconciling them with the physical and chemical properties of the original media (stone, tuff, plaster).</p>	<p>First, the company should consider to include sufficient time before to get familiar with the premise and its attributes (diagnosis, anamnesis). After that: a detailed planning of sanitation (in terms of time and consecutive processes). In addition, all participating parties have to be involved (plan sufficient time for this). Restoration company often has a single team. Sharing thoughts and actions among workers enables to not come back to the same detail every day since workers already know what must be done. The problem arises only in case of a new</p>	<p>The partners agreed that on the basis of the original features of the artefact and safeguard of the overall appearance, current standards have to be met, matching the recovery of the original elements with the new parameters and with the new requirements of the regulations. For example, restoring the original fixtures in a residential artefact and ensuring the standards of energy efficiency, require to proceed with the restoration of the wooden structures and the insertion of industrial glass, with suitable factors of transmission, tailored products, obtaining in this way, both the conservation of original element and the best</p>

<p>Especially from the static point of view, it is very important to understand how the various buildings are connected to set the static consolidation processes, as for example during the making-over of the roof and the drain rainwater.</p> <p>It is necessary to understand the critical issues of the site and the building to be restored; this is the best way to operate properly. In some cases it is necessary to establish a collaboration with neighbours' sites alongside the restoring interventions, in order to avoid further problems which may extend the working time.</p> <p>The diagnostic phase as a crucial importance in the restoration sites: it is essential in the preliminary stage of restoration. This phase aim at analysing the</p>	<p>from a neutral ground. Of course, precautions has to be taken into account in order to preserve the building. We must pay attention not to damage the property we have to restore. The partners agreed about the fact that is necessary to pay a lot of attention working on architectural heritage building sites: supervision is very important as very insignificant gestures could cause important damages (often irreversible).</p>		<p>team work. Thus, workers cannot be improvised. The strong core must be the historic core, internally and steadily trained.</p>	<p>response to modern thermal comfort.</p> <p>In this sector, is foremost important to study all the regulations and apply them without clashing with the interventions that the company wants to run.</p> <p>Safety is more difficult to manage when buildings are damaged because there are more potential risks.</p>
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<p>building and planning properly which are the steps to take further. Also the demolition phase is a crucial one in this framework: it would be better to call it “deconstruction” phase, which allows the worker to comprehend properly how the building has been constructed and how to intervene later on.</p>				
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General conclusions

The partners agreed about the fact that heritage sector is sometimes too conservative and it asks for an adaptation to the conditions and an all-time search for solutions. Accessibility and narrowness of the spaces are two problematic issues often mentioned by the partners when questioned about the worksites aspects. Historical artifacts usually lie in difficult site conditions. Frequently, old town are paved with paving which does not supporting heavy weights, concrete mixers or heavy vehicles. Frequently, the use hand-drawn vehicles to work in the restoration site is necessary. In general, the logistics of a restoration site is very different from a construction site’s one. The main difficulties you may face while working in old town are the difficult access to the area and the lack of parking areas and storage areas. This aspect greatly affects the cost of specific processes which may increase, due to the complex logistics of the site and transport.

The partners mentioned the fact that since the very beginning of the processing companies may deal with unexpected situations, - such as new elements to be restored- and they might consider reviewing the previous project (discovering of archaeological remains, frescoes under the plaster, etc.) Thus, in this filed, companies are often confronted to unforeseen situations and discoveries. This could have serious consequences (unpredicted costs, non-respect of the time schedule ...) On the basis of the original features of the artefact and safeguard of the overall appearance, in different restoration work, current standards have to be met, according to the recovery of the original elements with the new parameters, and with the new requirements of the regulations.

The company must seeks solutions and innovations, joining tradition and own experiences with diagnostics and new technologies.

Usually, the existing regulations requirements (H&S regulations, technical regulations, energy efficiency regulations) limit the aesthetic aspects in order to satisfy the functionality but they can be resolved incorporating technical innovations, to satisfy the necessity or to create strategies to satisfy the demand expressed by the client. Most of the partners underlined the importance of the compliance with safety and security regulations, even though is not always an easy task because of the nature of the worksite described above, the assembly of scaffolds is often more complicate due to the worksite characteristics mentioned beforehand.

CONSOLIDATION THEMATIC AREA C: MATERIALS, PRODUCTS and APPLICATIONS

<p>C.1 Which materials are more frequently demanded by the market? (Ex: Concrete, stone, mortar, wood, tiles) Which are the traditional technics required by the market?</p>	<p>C.2 How do you choose the materials and how do you deal with the supply materials? Is there any specific problem about this issue? Is there any material difficult to find?</p>	<p>C.3 Which are the traditional elements more renovated and/or in need for renovation? Wooden stairs, roofs/ceilings, chimneys, forged handrails, arches, domes...</p>	<p>C.4 How do you deal with the existing regulations requirements while choosing the materials and the technics? (health and safety regulations, technical regulations, energy efficiency regulations and so on)</p>
<p>MATERIAL</p> <ul style="list-style-type: none"> • Lime as a base of plasters and binder material, mortar, ceramic tiles, other ceramic components, additives, binders. • Masonry marble. • Granite and other stones. • Wood and tile: especially for roofs and floors. • Oak wood. • Cladding. • Slates (especially in Belgium, France). <p>The most demanded material are stone, bricks, mortar and wood. In Germany, reinforced concrete more used than in Italy, Portugal or Spain.</p> <p>Apart from traditional material, other innovative material is used more and</p>	<p>The problem frequently mentioned by the interlocutors is the time dedicated to the manufacturing of specific (and not standard) material, sometimes hardly compatible with the duration of the worksite.</p> <p>Some material is particularly specific and, therefore, difficult to find (especially tiles, wood and some ceramic). It must be manufactured according to traditional technics, which requires specific negotiation with suppliers.</p> <p>The material chosen for the restoration is generally rarer and, therefore, more expensive than those industrially produced. Besides it is difficult to be replaced if misused.</p> <p>The suppliers able to meet quickly</p>	<p>The interlocutors mention that the situation depends on the geographical situation and on the regional traditions. Nevertheless, some general trends, common to all the partners, were identified.</p> <p>In general, roofs and façades, as are more exposed to the climatology, require more interventions than interiors. But it is not a systematic rule.</p> <p>Specific parts of buildings have been the most frequently listed by the interviewed experts:</p> <ul style="list-style-type: none"> • Timber floors and more generally all wooden parts • Façades/external walls • Concrete framework • Plastering 	<p>In general, the interlocutors declared that they must cope with general prescriptions, regulations and recommendations. They do not doubt the existing rules but their cost is often pointed out.</p> <p>It is also to be mentioned that the observation of the environmental rules becomes for a certain number of companies a commercial argument. Nevertheless, several interlocutors pointed out the fact that in reality it was difficult to always cope with energy efficiency regulations, whereas the application of health and safety rules is more and more systematic. But this aspects represent an increasing cost that influences the competitiveness and effectiveness of</p>

<p>more frequently:</p> <ul style="list-style-type: none"> • Plasterboard or Drywall (gypsum wallboard). • Material preventing from humidity (waterproofing or insulating material). • Surface hardness for stones. • Breathable painting. <p>Traditional local material is not to be neglected.</p> <p>TECHNICS</p> <ul style="list-style-type: none"> • Above all traditional masonry, without concrete in restoration. • Application of traditional mortars. • Alliance of wood and stone. • Alliance of plasters and mortars. <p>The interlocutors talked more about traditional material than about traditional technics.</p> <p>Nevertheless, necessity of specific tools and of specific storage conditions for historic stones or oak beams for example.</p> <p>TYPE OF WORKS (varying considerably from one country to another and from one region to another).</p> <ul style="list-style-type: none"> • Stone Masonry • Vaults • Partitions • Old Tiles 	<p>specific demands are not too many. In particular only few suppliers are specialised in the imitation of old material, whereas the original one becomes more and more difficult to find. This becomes a real problem especially when material needed is very local and its industrial production would not be profitable in a longer term. The difficulty of finding appropriate specific material is mentioned more frequently in the Spain, Portugal and Italy than in Belgium or Germany. Moreover, the tendency to standardization is more perceptible in these two last countries than in the Southern Europe.</p>	<ul style="list-style-type: none"> • Basement • Balcony (especially metal parts) • Vaults and ceilings • Pavements (external and internal) • Lintels and jambs of doors and windows • Various decorative parts <p>More generally: all the damaged parts, especially due to improper coating and humidity (external and internal).</p> <p>Different junctions, deformations and disruptions to be repaired, due to wear, bad technics or inappropriate material having being used in the past:</p> <ul style="list-style-type: none"> • With metal parts • With roofs • With openings, etc. <p>Other frequent operations:</p> <ul style="list-style-type: none"> • Grout injections for aggregation of mortar • Cleaning of different external and internal elements (walls and others). • Repairing or incorporation of power lines or gas networks, heating, air-conditioning, etc. • Strengthening of supporting structures, recovery of walls 	<p>the small companies. Several German and French interlocutors underline that due to excessive regulations, blended to other factors, many companies declared bankruptcy these last years.</p> <p>Besides, existing rules are not always adapted to specific worksites, like historical roofs, water mills or other old buildings dedicated to restoration or conversion into new functions.</p>
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<ul style="list-style-type: none"> • Wooden Roofs • Chimneys and fireplaces. 		<p>and ceilings.</p> <ul style="list-style-type: none"> • Interventions against smog, dust and water intrusions. • Protections against animals and birds. 	
<p>General conclusion</p> <p>The materials employed in restoration works are related to a handicraft or artisanal production that changes many of their characteristics in relation to the current industrialized production systems: for example, the tiling brick, the lime mortar, the manually produced tiles, the glass and the ceramic...</p> <p>Regarding materials, the heritage sector is forced to turn towards new technologies. This sector, as a job provider, need to unite classicism and innovation.</p> <p>Insulation, an actual concern, bring together ancient materials and techniques with actual requests. The materials are roughly the same but are sometimes used differently.</p> <p>Significant differences from one region to another (it is more appropriate to talk about regional than national differences).</p> <p>No standard negotiations with suppliers, to get specific initial components to be customized according to individual demands.</p> <p>Restoration of heritage is difficult to be standardized, even if new material, technics and technologies are used.</p> <p>The quality and the frequency of restoration varies considerably from one region to another, and even within the same region the differences can be significant. In some unique buildings, external stone, ceramic or glass finishes that would need restoration are often removed and not restored due to the lack of valuation of their owners or to the lack of public funds.</p>			

CONSOLIDATION THEMATIC AREA D: MANGEMENT OF HUMAN RESOURCES

D.1 What are the quantitative needs in term of work force and management in the enterprises in the field of restoration?	D.2 What are the professional profiles demanded for renovation of antique buildings works?	D.3 What are the competences and the skills requested? What are the lacking competences of the young people?	D.4 What are the crafts where there is lack of skilled work force?	D.5 What are the main difficulties in attracting young people to this field of work?	D.6 How do you organize the hiring process?
<p>The interlocutors did not specify their needs in quantitative terms. Practically all of them focussed on fact that a part of traditional workforce must be adapted to the execution of restoration works, but cannot be dedicated exclusively to this kind of worksites, given that few companies are specialised only in restoration.</p> <p>In some countries, like Belgium, Germany and France, interim specialist are often researched to meet company needs when</p>	<p>The interlocutors underline that two different aspects must be taken into consideration:</p> <ul style="list-style-type: none"> • General organisational and commercial skills (often listed as essential): <ul style="list-style-type: none"> - Obtaining necessary licences (municipal, regional, etc.) to be declared as able to restore monuments. - Understanding customer needs and expectations. - Drafting projects with all technical, organisational and financial 	<p>In general, the required competences are: the perfect command of their specialities, prominent interest for the well-done work, a balanced personality, an appropriate time management that combines the production pace with the self-commitment of providing the greatest quality.</p> <p>In particular it would be very advisable that they have sufficient knowledge about art history and, specially, about the trends and contemporary architectonical styles of</p>	<p>There is a lack of some highly specialised workers like:</p> <ul style="list-style-type: none"> • Having artistic abilities. • Technicians with manual skills in various crafts, including carpenters, tilers, etc. • Bricklayers specialised in ancient masonry. • Roofers specialised in ancient techniques. • Stone cutters. • Plaster restorers • Wood restorers. • Carpenters. • Locksmiths and metal workers. <p>Many interlocutors highlighted that the skills needs varied from</p>	<p>In the countries like Spain or Italy, there is a lack of interest for antique constructions, considered “old” and that usually it is considered more appropriate to demolish them.</p> <p>Besides, the image of the construction crafts is rather negative among younger people and restoration activities are not an exception according to the majority of the interlocutors.</p> <p>The level of wages or work conditions were not listed as an obstacle by the persons</p>	<p>The interlocutors listed all the common means for any kind of recruitment procedures, like:</p> <ul style="list-style-type: none"> • Contacts with vocational schools and centres, • Job announcements. • Employment centres. • Apprenticeship. <p>Nevertheless, concerning restoration activities, the persons interviewed pointed out the importance of the methods like:</p> <ul style="list-style-type: none"> • Personal contacts, • Recommendation of colleagues or professional organisations,

<p>restoration worksites are open, especially concerning rare specialities for which the sustainability of the job cannot be guaranteed.</p>	<p>dimensions. - Establishing financial draft and justifying it. This professional group must be highly graduate, including architects (underlined in Italy). • Technical skills (specific and very heterogeneous): they are specific, but must be built up on the traditional crafts. This group must be constituted of highly skilled workers (often with additional training in the fields of restoration). Both have to understand the complexity of the worksite foreseen.</p>	<p>the building that is being restored. Several interlocutors have also underlined the necessity to be creative, imaginative, able to understand not only his/her own activities, but also all the others and to work in an interdependent environment that is more complex compared to new buildings.</p>	<p>one region to another and that it would be difficult to draft national or even regional needs. Some German companies underline the lack of experts specialised in demolition, as well in use and recycling of harmful substances. Moreover, in Germany and in France, several interlocutors highlighted the lack of specialists mastering techniques in line with energy efficiency or refurbishment.</p>	<p>interviewed.</p>	<ul style="list-style-type: none"> • Previous observation of specific skills (sometimes defined as artistic or meticulousness)
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General conclusion

The interlocutors underline that restoration is based on traditional crafts assorted with specific additional skills. But restoration is not an autonomous field of construction activities. The companies need complete workers able to have good technical and transversal knowledge, not only of the building process, but also of how to deal with various issues. It was underlined many times that on restoration sites there is no clear division of activities. Polyvalent workers are needed. Obviously, there are elements of specific restoration that require different skills (restorers), but the workers must understand the chain of operations and take into account the tasks of their colleagues and subcontractors (mutual trust is an important criteria when working together). Concerning workers, not only soft transversal, as well as specific technical skills are important, but also a state of mind that must be open to arts, history and transversal aspects when conceiving worksites and activities. Architectural background is generally appreciated when the workforce have to deal with customers and suppliers.

CONSOLIDATION THEMATIC AREA E: TRAINING AND TRANSMISSION OF KNOW-HOW

<p>E.1 How is the process of learning to work in the field of restoration of historic buildings? Is your company providing training? If yes, how do you provide the training?</p>	<p>E.2 What is your opinion about the current training offer (initial and continuing)? Does the existing training offer (initial and continuing) match market needs? What are the skills related to these trades not covered with official training?</p>	<p>E.3 Do you work in collaboration with training centres? If yes, how do you organize this collaboration?</p>	<p>E.4 Which are the training needs that you can identify in the field of restoration (housing)? What could be improved in the current training supply to better match the reality of the sector? Which are the specific training needs that you can identify in the field of traditional restoration (housing)? <i>(Training gaps to be covered with the project.)</i></p>	<p>E.5 Which are your proposals concerning the development and the evolution of the training offer in the field of restoration?</p>
<p>A large majority of interlocutors do not give an opinion on the quality of the learning process specific to the restoration of historic buildings. Their observations are rather general and concern any kind of training paths. A certain decreasing interest for training activities in companies is observed through testimonies brought</p>	<p>The opinion about the contents, methods and global quality of training to restoration of buildings is quite similar from one country to another. In Germany, the experts consider that the existing training is better for new construction than for restoration. Thus, restoration and renovation as well as history of building technique with related materials,</p>	<p>In general, the interlocutors give few details on their collaboration with training centres. Thus, in Germany, in spite of apprenticeship considered as predominant model of vocational training, the interlocutors interviewed within the framework of this survey declared not to be in contact with training centres (their partners are rather chambers of craft).</p>	<p>The results of the investigation highlight that the field of restoration is considered by the interlocutors as quite forgotten by the training centres in the partner countries, in spite of needs. Training needs concern not only technical skills, but also soft skills, whatever is the level of qualifications. The most required training</p>	<p>To provide workers not only with an in-depth knowledge of specific material or technics, but also with a solid mastery of chains of operations. Capacity of dialoguing and of negotiating with suppliers is absolutely essential, taking into account the specificity of the material required for the worksites concerned. In Portugal for example, it was</p>

<p>up from Germany, where some companies were involved in training in the past, but are not any longer. In Spain, Italy and to a certain extent also in Belgium and in France, the companies train to the restoration of buildings on site in a rather informal way, without a more formal recognition of learning outcomes.</p>	<p>constructions, history of arts are too short included within training paths. Instead, industry standards are at stake with numerous regulations and rules for thermal and acoustic insulation, for example. Parallel to this, the interlocutors mention that some specific training offers lacks components on the practical implementation of the tasks within concrete worksite situations and do not sufficiently take into account transversal or soft skills of the workers. Thus, the experts sometimes underline that many trainees have not been able to apply in concrete work situations what they have learnt in training centres. Besides, in Italy, there are a lot of institutions involved in art restoration and very few training institutions propose courses in building restoration. In Belgium, the interlocutors have point out that pedagogical activities should</p>	<p>In Italy, in Portugal and in Spain, the companies are not used to have steady educational contact with training centres. The area of restoration is not an exception from this rule. In Spain, few companies declare that they provide training, but some of them stress the collaboration with training centres, like the FLC, whereas in Italy, in the majority of cases, the interlocutors declare not to work with schools or training centres.</p>	<p>concerns the staff in stonework, ironwork, cast-iron forge, plastering, installation of drywalls on older supports, as well as several more specific profiles blending modernism and ancient arts. Trainings for highly skilled workers are to be differentiated from trainings for technicians who should be specialists in artistic architecture, interior design, antique furniture, etc. Besides, they have to be trained to traditional material used in restoration and renovation to be able to negotiate properly with customers and suppliers. Training in work situations, to facilitate contacts and exchange of know how between older and younger workers, is to be promoted and to be structured better. Besides, the interlocutors expressed the following needs:</p> <ul style="list-style-type: none"> • To incorporate more systematically traditional 	<p>highlighted that the new generation of engineers is trained in rehabilitation area, but it is necessary to train architects to rehabilitation skills. In Germany, the companies interviewed consider that all training must refer to reliable standards. They also propose to create specific apprenticeship dedicated to restoration of architectural heritage, in particular in the following fields:</p> <ul style="list-style-type: none"> • Stone masonry settlement • Wooden structures • Settlements of coatings and traditional materials. <p>In all countries, the interlocutors mentioned quite often that courses in general knowledge and art history should be promoted in order to put them closer to the architectural heritage and to the restoring activity. Short courses to train workers with technical and practical knowledge and skills are also recommended.</p>
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	become more vocational guidance oriented.		skills useful for restoration in practical training. <ul style="list-style-type: none"> • To introduce with more force new technologies into training paths (e.g. video tutorials on YouTube). 	
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General conclusion

It results from this part of the survey that the contacts between companies and VET providers in the field of restauration and renovation of building are rather weak and not regular in all the partner countries. The training paths proposed rarely cover the skill needs required by the companies acting in the field concerned. Thus, the adaptation to the job is made directly in the companies and in a rather informal way.

In order to value the specialized professionals, they should be given more visibility in the partner countries to the skill needs expressed by the companies, to enable the appropriate VET providers to meet them and to conceive suitable training paths.

In fact, skill needs are important and clearly expressed in all the partner countries. The companies need both:

- Reinforcement of initial vocational education by introducing specific components related to the restoration and renovation of buildings.
- Conception of modular and holistic seminars within the framework of continuing training.

It is required to transmit, through training and accompaniment processes of learners, not only technical skills, but also specific professional culture. Moreover, potential employees must bring with them robust social competences.

The future is to be built upon practical training in work situations. Many interlocutors say that the experience is the base of the professional training, but it is not sufficiently exploited for educative purposes. The training, whatever it may be, must always be complemented with the experience in the field. It is crucial to adapt trainings by integrating courses on building inheritance and about the history of construction during the apprenticeship training.

3. Job Observations / Case Studies

Every partner put in place in-depth and detailed examination of a key restoration case in each country (6 in total), in order to identify working processes, good practices and main challenges faced in the different work stages. Every partner followed an observation grid finalized by the CCCA-BTP and containing:

- The description of the building
- The description of the nature of work stage
- Type of trades
- Structural elements
- Materials more frequently used
- Chronological process of the work

This work allowed the partners to focalize on the techniques and materials utilized during the processes, detecting the problematic issue and the solution chosen. The main conclusions are presented within the grid below, country per country.

	Main Working Processes Observed	Main Challenges Faced	Good Practices Identified
BELGIUM: Reassignment of an old watermill from the VII century in a reception centre	<ul style="list-style-type: none"> • Archeologic study of the site. • Preliminary studies on the building to be renewed/restored. • Intervention on the building shell with several complementary crafts: bricklayers, carpenters, roofers, stonecutters. • Dismantling and transportation of historic elements (i.e. mill wheel) to the workshop to make the repair. • Intervention on the inside of the building: carpenters, lime plasterers, electricians. • Dismantling and installation of roofs, stairs, new frames, etc. 	<ul style="list-style-type: none"> • Compulsory agreements to be obtained. • Observation of safety and health rules. • Necessity to treat old and not standard elements, often in a bad shape, like supporting beams. • Disagreements/lacks of understanding between authorities in charge of preservation of architectural heritage and companies present on the worksite. • Clever blending between old components and new materials. 	<ul style="list-style-type: none"> • Transversal co-activity on worksite. • Integration of health and security rules to the production process. • Negotiations with authorities in charge of preservation of architectural heritage.
GERMANY:	Complete process including an exhaustive	• Management of a complex co-activity on	• Finding new solutions if ancient

<p>Restoration of a castle from the XIV century, considered as a worksite school for unemployed youth from the region.</p>	<p>chain of traders (masonry, stone work, plastering, roof plumbing, interior design, sealing) intervening on all structural elements: foundations, walls, gutters, balconies, roofs, ceilings and all kind of interiors.</p> <ul style="list-style-type: none"> • Renewal of the seals draining the basements masonry. • Removing the old plaster and applying a new lime plaster, then painting the façade with a diffusible whitewashing. • Renewing the joints and replacing the gutters. • Repair of the façades. • Establishment of an elevator shaft. • Renewing of window grilles. • Monitoring and surveillance processes, including debriefings with learners. 	<p>historic worksite.</p> <ul style="list-style-type: none"> • A great variety and heterogeneity of ancient and modern materials used, including artistic components (i.e. stucco ceilings). • Complexity of operations requiring professional skills blending ancient and modern techniques. • Facing unexpected situations (i.e. necessity of protecting courtyard walls from the roots of an old chestnut tree). • Steady controls from the architectural heritage authorities (e.g. Mortar to be mixed according to specifications of the protection authority). • Necessity to deal with severe health and safety rules. • Some parts of the worksite were difficult to reach (ex. Stonework of the tower). • Recuperation of old brick from demolition sites and their adaptation to new use. 	<p>components are no more available and new “standard” techniques or material cannot be applied (i.e. installation of specially designed bituminous membranes).</p> <ul style="list-style-type: none"> • Good balance between experienced workers, specialists of rare operations and learners, acting within the framework of the same staffs. • Including learning processes to the traditional restoration activities.
<p>FRANCE Rehabilitation of a roof in a farmhouse of the XVI century in order to create rooms and bathrooms where once there was the granary/attic space.</p>	<ul style="list-style-type: none"> • Put in place of specific shoring scaffolds because of the configuration of the roof • Deconstruction of the old roof in order to put in place of the rehabilitated one • Laying of the ceramic tiles • Creation of the shaped gable dormers in addition to make the rooms lighter 	<ul style="list-style-type: none"> • Necessity to put in place a specific scaffold. The roof has a specific configuration due to an angle which faces a wall on the garden. Impossibility to mount a classic scaffold • Fragility of the structural wooden elements of the roof (cottonwood) • Impossibility to find the proper roof battens because not available on the market anymore. In addition, the battens have to be trapezoidal in order to better fix the ceramic tiles. • The thermic insulation and the airtightness given by the wooden structure is not enough • Re-utilization of some of the original ceramic tiles 	<ul style="list-style-type: none"> • Put in place of a specific scaffolds mounted on metal brackets in order to create a projecting from the wall • An aerial bucket was used in order to avoid any problem concerning the security issues • To cut a battens structure specific tailored by a specialized carpenter • To lay thin battens under the large battens in order to fix the thermic insulant • To put an acrylic seal between every large batten • During the deconstruction of the roof,

		<ul style="list-style-type: none"> • Creation and copy of the dormers 	<p>the workers had to select and sort out the good ones in order to be re-utilized giving a homogenous aspect to the roof.</p> <ul style="list-style-type: none"> • Copy of the original dormer made by a specialized stone cutter. Adaptation of the wooden elements of the wood to the dormers.
<p>ITALY Restoration of the Palazzo Calo' Carducci. The realization of the building dates from the early eighteenth century and is situated in the Old town of Bari.</p>	<p>The state of deterioration necessitated a first property site preparation, clearing of debris, removal of superfetative structures in static precarious conditions and the rationalization of static defense works. It was also necessary to provide for the additional works of "static consolidation of the building as part of the healing and restoration of authorized by the Municipality of Bari and in accordance with the project approved by the Superintendence for Architectural Heritage and the Landscape of Bari.</p> <p>Main working processes :</p> <ul style="list-style-type: none"> • Superfluous demolition • Works of consolidation of foundations • Walls of new construction works • New floors in reinforced concrete • New metal slabs • Decorations of restoration • New fixtures • Interior design 	<ul style="list-style-type: none"> • Management of a complex co-activity on historic worksite • HISTORICAL RESEARCH-based archival and bibliographical sources, cartographic, photographic, to define a cognitive framework able to determine as closely as the design choices and thus justify the restoration work proposed • Significant, or dimensional definition (direct and indirect methods) and verification of these materials, with an understanding of the methods used for the building, and identification of any visible structural instability and degradation of the materials. • Implementation of reinforced plaster while skiving of the old deteriorated mortar and removal of all unstable blocks. Cleaning the surfaces by low pressure washing and thorough brushing of the surfaces. Inclusion of tuff, the same size and type of existing (recovery), Grouting of conessure with mortar based on hydraulic lime pozzolan and possibly additive with anti-shrinkage substance to perform undercut according to the existing appeals. Any of distilled or deionised, more washed walls nuclei with mortar of lime pourable, pozzolan brick debris and terrigenous pigments in existing 	<ul style="list-style-type: none"> • Negotiations with authorities in charge of preservation of architectural heritage. • Preparation of the wall by removing the plaster for the laying bare wall weaving, Pointing of joints and rincocciatura for filling any voids, wetting of the surface up to saturation. Execution of perforations in rotation only by means of drills in order to create a mesh on the veneer. Subsequent insertion of improved for ribbed bars. Network Application electrowelded, hot galvanized , fixed by means of the cuffs made on the anchoring bars. Construction of mortar with premixed mortar , cement-free , composed of lime and eco pozzolan , natural sand and inorganic fibers of up to 4 cm thick • Pickaxing the plaster where present and demolition of unstable parts of the adjacent walls to injury, to be performed by hand to a minimum width of 60 cm at the turn of the wound, without the use of jackhammers, for a width and a depth suitable in order to verify the stability of the structure and then be able to allow the re-stitching of the lesions. Execution of the technique "undo-redo" for phases

		<p>holes or pre-made.</p> <ul style="list-style-type: none"> Restoring the continuity walls with the ‘undo-redo’ technique. If the injury is through the surgery must be performed before a parameter and then the other, taking care, at run time of the first surgery, to prepare cross-members (diatones) for the brick masonry connection reconstruction of the second vestments. 	<p>and for the entire wall thickness of the male, after the removal of the existing masonry to the predetermined width, the cleaning of the surfaces by washing, the removal of the internal filling elements for the realization the connection with the new masonry veneer on the opposite (in the case of cavity walls) and the rincocciatura with calcareous tufa and hydraulic mortar of lime chippings.</p>
<p>PORTUGAL Rehabilitation of a wooden floor in an apartment of the neighbourhood of the city centre of Lisbon (Mouraria) in a building built in 1906. Mouraria has an irregular urbanization, characterized by narrow streets and alleys and a multitude of stairs.</p>	<ul style="list-style-type: none"> Removal of the existing flooring Analysis of the structure of existing wooden beam and floor levelling analysis Treatment of existing materials, strengthening of the support beams and floor levelling Placement of the new floor 	<ul style="list-style-type: none"> The wooden beams were too degraded but could not be removed because they supported the ceiling of the lower floor The old floor was some height differences a result of wear of the beams. Problems related to the worksite. The space available for the assembly and operation of the yards is very low or non-existent least beyond the accessibility that in most cases, present in the conditioned work area. 	<ul style="list-style-type: none"> The wooden beams were treated with burned oil, then proceeded to the splices to strengthen the structure. Levelling the beams with wood in order to obtain a regular floor Specific measures to minimize the negative impacts had to be taken in particular as regards issues related to the occupation of the road, with the damage of public space with the production of waste, sludge and dust in the streets as well as to the production of noise and the visual impact.
<p>SPAIN Internal and external renovation of Edificio Canalejas, historical building built between 1887-1891 and situated in the city centre of Madrid. Since 2004, the property, of high heritage value, remains empty and</p>	<ul style="list-style-type: none"> Removal of installations and unique elements, previous to the demolition (classification of original unique elements and dismantlement for the study of a replica or restoration, conservation of the protected elements and high artistic-historical value parts of the building : plaster, skylight, stonework, ironwork, façades) Demolition y excavation. 	<ul style="list-style-type: none"> The decorative plaster elements were partially damaged due to the damp caused as a consequence of the abandonment of the building since 2004 Due to the artistic and historical value of the stained glass, it was necessary to dismantle it in order to preserve it from the demolition and integrate it in the new construction, after a meticulous process of restoration 	<ul style="list-style-type: none"> The damaged plaster parts have been restored through new elements obtained from silicone molds done on the healthy parts, in order to reproduce the original symmetry. Dismantlement of the stained glass piece by piece and restoration process in the workshop: elimination of supporting bars coming from a previous restoration, cleaning, reproduction of

<p>unused. In the years that the building has remained closed, damp, leaks or the lack of maintenance have damaged many of the internal elements, albeit the building preserves its external beauty.</p>	<ul style="list-style-type: none"> • Foundation and stabilization of historical façades 	<ul style="list-style-type: none"> • For the purpose of reusing the ironwork elements with artistic value, it was necessary to dismantle them in the works, before the demolition, and bringing them to the workshop for their cleaning and reparation. 	<p>the metallic painting with the original artistic effects, boiling of the glasses for the fixation of the paint, relocation of the lead junctions and soldering.</p> <ul style="list-style-type: none"> • The cleaning and restoration was carried out by a mechanical sanding and polishing, in some cases, and through a bath in chemical solution, in others, in order to recover the original appearance of the ironwork elements.
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CONCLUSION

Main Working Processes Observed

The processes observed are particularly complex from many points of view:

- Complexity of historic buildings themselves
- Complexity of chains of operations in terms of activities and tasks, blending ancient and new techniques, material, methods and organisations of work.
- Multiplicity of operators intervening of the worksite, with the requirement of particular and “no standard” performance of each of them.
- Unpredictability of a certain number of issue emerging on the worksite once it has already begun
- Deep and detailed analysis of the building before the beginning of the works in order to detect its origin and the materials used to build it

Main Challenges Faced

The challenges the most commonly listed by the partners are:

- Management of a complex co-activity on historic worksite
- Research of the right material (original or new one) in order to satisfy the esthetical criteria demanded by the client or by the cultural heritages entities
- Find the right solution to guarantee a proper thermic insulation considering the structure of the given building under restoration
- Emerging of situation not necessarily envisaged before the beginning of the works
- Reusing a part of the material found on the worksite (i.e. knowing how to deconstruct the building without damaging the different components)

Good Practices Identified

The most significant good practices identified are:

- Transversal co-activity on worksite.
- Integration of health and security rules
- Negotiations with authorities in charge of preservation of architectural heritage
- Good analysis during the demolition phase in order to detect how to proceed later on
- Adaptation to “surprises” found on the worksite in order to solve any potential problem
- Coordinating different crafts and trades in order to solve the problematic issue

4. General conclusion

As we could see through this work, the restoration field is characterized by a high degree of complexity both in technical and procedural elements. In fact, in this field must convey high standards of architectural quality as a prevalent form of cultural expression. With space, form and aesthetic impact of utmost significance, the material manifestation of the design must make a positive and lasting contribution to the physical, human and cultural environment.

Given that working with the existing building needs sensitive restoration, re-use or re-modelling of the built environment, we underline some points that we consider as the most significant for the renovation field:

- Envisage inventive programming strategies in terms of use, multiplicity of functions, short-term flexibility and long-term adaptability of the existing buildings.
- Be aware of the much more complex co-activity on the worksites that include restoration compared to the new building worksites.
- Demand of very specific crafts and specialities linked to the restoration of ancient buildings.
- Make certain that the architectural quality and aesthetic impact are respected, specifically concerning space, energy efficiency, materials, light and ambiance.

The main target of this handy guide has been to give a general mapping of the most important issues met by the different operators in every partner organisation to detect common techniques, methods, materials and processes used by traditional trades and crafts at risk of disappearing to undertake building renovations, with a common approach. This work aimed at facilitating the next steps of the project (Knowledge, Skills and Competencies map, Learning Outcomes description, APP “Construction Inheritance”).

The main common conclusions issued from in this work are:

- 1) In restoring private buildings, the artefact must be preserved through the guidance of a technical expert who succeed in creating the right balance between respect for the asset and modern needs, by using appropriate materials, by considering the proper distribution of

internal space and by respecting the comforts required by modern construction techniques. The entrepreneur's role is to suggest solutions that respect the authenticity of the building without favouring only the economic aspects. In general, the client's expectations are very high and in the average the clients are attentive both to aesthetical issues and the quality of material used. **The company should succeed in orienting the customer towards the most appropriate solution, which should be also shared by technicians, authorities and clients.**

- 2) In general, the logistics of a restoration site is very different from one construction site to another. **The partners mentioned the fact that since the very beginning of the processing companies deal with unexpected situations** - such as new elements to be restored- and they might consider reviewing the previous project (discovering of archaeological remains, frescoes under the plaster, etc.) Thus, in this field, companies are often confronted to unforeseen situations and discoveries. This could have serious consequences (unpredicted costs, non-respect of the time schedule ...) On the basis of the original features of the artefact and safeguard of the overall appearance, in different restoration work, current standards have to be met, according to the recovery of the original elements with the new parameters, and with the new requirements of the regulations. **The company must seek solutions and innovations, joining tradition and their own experiences with diagnostics and new technologies.**
- 3) The materials employed in restoration works lay on handicraft or artisanal production and their characteristics change according to the current industrialized production systems: for example, the tiling brick, the lime mortar, the manually produced tiles, the glass and the ceramic... Moreover, the heritage sector is forced to turn towards new technologies. **This sector, as a job provider, needs to unite classicism and innovation.**
- 4) Restoration is based on traditional crafts assorted with specific additional skills. **But restoration is not an autonomous field of construction activities.** The companies need complete workers able to have good technical and transversal knowledge, not only of the building process, but also of how to deal with various issues. It was underlined many times that on restoration sites there is no clear division of activities. **Polyvalent workers are needed.**

The diagnostic phase has a crucial importance in the restoration worksites: it is essential in the preliminary stage of restoration. This phase aim at analysing the building and planning properly which are the steps to take further. Also the demolition phase is a crucial one in this framework: it would be better to call it "deconstruction" phase, which allows the worker to comprehend properly how the building has been constructed and how to intervene later on.

Concerning the VET, the main conclusions taken from the interviews and job observations invite us to propose:

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- 1) To set up campaigns in the Vocational Training centres about the charms of the sector (varied work, promotion possibilities, visualization of the development of the project, enjoyment of the satisfaction that means working for the people-housing, hospitals, schools, auditoriums, etc., generally a higher remuneration than other sector in a normal economy functioning period).
 - 2) To put in place campaigns intended to the construction students of Vocational Training (levels II and III) focused on the professional value that means working in the restoration of ancient buildings.
 - 3) To promote the relation of the Vocational Training centres with the companies in order:
 - a) To provide the students concerned with apprenticeships (or dual training).
 - b) To be informed on the learning needs that appear derived from the appearance of new techniques, materials and tools.
 - c) To involve more workers who are currently working in restoration works as company tutors.

Restoration sector is hopeful and can help young people to get connected to a certain tradition and culture. This will help them to become someone and create a social link.