

**Professionalising site managers and team leaders in the specific management**

**of** **building renovation sites in Europe**

Contract Nb. 2020-1-FR01-KA202-080105 (2020-2023)



**IO1: Transnational model for the positioning, support and professionalisation of site managers**

**IO1-A2. Identification, in each partner country, of the specific skills expected of site managers and team leaders by companies specialising in building renovation.**

**FIELD RESEARCH**

**SPAIN**



Asturias (Spain), 28th May 2021

## Annex 6. Synthesis of the field research findings

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| **Executive Summary**  (max 1 page)   * Brief presentation of the national field research: target groups involved (number of participants per target group category, occupations, genders, etc.), methods of investigation, description of interviewers, etc. * Main conclusions regarding the evolution of the functions of site managers and team leaders on renovation sites in your country, with regard to concrete work situations and potential lack of skills and competences. * Main recommendations for the training paths to be developed (training contents, methods, recognition of learning outcomes). |

| **Key areas of investigation** | **National synthesis and analysis of the answers**  **collected from interviews** |
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| 1. Profile and activities of the companies having participated in the survey. | 15 interviews were conducted with representatives of 12 construction companies, all of them SMEs, specialized in the rehabilitation of buildings and operating in the north of Spain, in the autonomous community of the Principality of Asturias :    [García Rama SA,](https://translate.google.com/translate?hl=es&prev=_t&sl=es&tl=en&u=https://garciarama.com/) a building construction **and promotion company, specialized in residential rehabilitation.**  Profile of the interviewee: Administrator    [LOS ÁLAMOS SA,](https://translate.google.com/translate?hl=es&prev=_t&sl=es&tl=en&u=https://alamos.es/) a construction-developer company, among whose renovation actions the façade is preserved because it is protected.  Profile of the interviewee: site manager  [QUIRÓS ARQUITECTOS](https://translate.google.com/translate?hl=es&prev=_t&sl=es&tl=en&u=http://quirosarquitectos.com/) is simultaneously an architecture studio and aconstruction company , specializing in the rehabilitation of buildings, with conservation of the cataloged façade, as well as premises for sanitary uses: surgical blocks with laboratories, operating rooms ... although they alsorehabilitate homes, commercial premises, parking lots ...  Profile of the interviewee: architect and administrator.  [GÓMEZ FAN JUL](https://translate.google.com/translate?hl=es&prev=_t&sl=es&tl=en&u=http://www.gomezfanjul.es/) , a construction company dedicated to all types of construction.They carry out civil works, structure, masonry, reforms, roofs, facades ...  Profile of the interviewee: administrator.  [**VEGALPA**](https://translate.google.com/translate?hl=es&prev=_t&sl=es&tl=en&u=https://www.vegalpa.com/)**, a**company specialized in the rehabilitation of buildings with cataloged facades, where the facade is preserved and rehabilitated, while the rest of the property is newly built.  Profile of the interviewee: administrator  **REHABITAS ,**a construction company specialized in the rehabilitation of the traditional Asturian building park: Indian houses, traditional houses ...  Profile of the interviewee: administrator and project manager.  [**IGUAR**](https://translate.google.com/translate?hl=es&prev=_t&sl=es&tl=en&u=http://iguar.es/rehabilitacion-y-reforma/)**,**a construction company that covers both residential and non-residential building work (nursery schools, sports centers, supermarkets...), as well as civil works.  Profile of the interviewees: a person in charge of the integrated management services and two project managers.  **CRESA**, belonging to [the Puentes Group](https://translate.google.com/translate?hl=es&prev=_t&sl=es&tl=en&u=https://www.grupopuentes.com/) , is mainly dedicated to all kinds of rehabilitation, repair of pathologies and waterproofing.  Profile of the interviewee: in charge of work and documentary control.    **AURELIO PÉREZ ,**his main activity is the energy rehabilitation of houses: including the rehabilitation of facades, houses, terraces ...  Profile of the interviewee: site manager.    **Barredos CONTRATAS ,**and mpresa construction with various fields of activity such as the restoration of heritage, civil works, new construction ...  Profile of the interviewee: foreman.    [**EL CORTES INGLÉS**](https://translate.google.com/translate?hl=es&prev=_t&sl=es&tl=en&u=https://www.elcorteingles.es/empresas/obras-proyectos-e-instalaciones/)**, a**company with a construction area that carries out the complete rehabilitation work. He usually works **turnkey**works. Especially for public and private organizations, and also for individuals.  Profile of the interviewee: site manager.    [FCC FOMENTO DE CONSTRUCCIONES Y CONTRATAS](https://translate.google.com/translate?hl=es&prev=_t&sl=es&tl=en&u=https://www.fccco.com/es/) , Its activities cover all areas of engineering and construction, and is a benchmark in the execution of civil works (roads, railways, airports, hydraulic, maritime, tunnels, bridges) and building works residential and non-residential such as hospitals, football stadiums, museums, offices.  Profile of the interviewee: construction manager |
| 1. Essential and sustainable change observed at renovation worksites during the last years. | In the last 10 years there has been an evolution towards a specialization in**buildings with an energy envelope**, with new more resistant materials, to improve not only the efficiency and sustainability of the building, but also the comfort and health of the inhabitants.  There has been a major change in the model based on **customer requirements**. Twenty years ago the renovations of buildings were merely conservation, in which there were very serious pathologies of landslides or leaks, which madethe houses unsafe and unhealthy for their inhabitants. And there was an evolution not only aimed at conservation, but also at the **improvement of**building **envelopes**, with **new, more resistant materials**that also improved the aesthetics of the façade: platelets instead of paint, etc. And in the last 10 years there has been the boom in energy rehabilitation: **putting insulation wherethere was none before**. This means that, in addition to solving all those pathologies suffered by the buildings, the neighbors isolate the energy consumption in the building with a passive component. And this greatly improves the quality, comfort and habitability of homes. In other words, it improves the health of its inhabitants. In other words, **it is not about improving sustainability, but also improving comfort and health,**because you eliminate all the pathogens that were produced before by condensation... Actions for which people did not call you before: harmful microorganisms breathed in their homes without knowing it.    The use of renewable energy systems (pellets, aerothermal, geothermal, solar panels...) is another factor that affects new rehabilitation works in order to carry out more sustainable constructions.    There has also been a significant increase in the budgets allocated to rehabilitation works and an important change in the technology that is used both at the level of construction solutions such as all the new related to ecological construction, energy reuse, PassivHaus and more. Recently something about circular economy. Before, absolutely nothing was classified and now everything is separated: on the one hand the rubble, on the other the wood, metals, plastics, insulation ...  Before it was rehabilitated for use, however , now it is rehabilitated for use with certain conditions, which have to **comply with the regulations**that regulate the Technical Code: insulation of ventilation, lighting , acoustics ...  Before, more buildings were abandoned and destroyed, but **now more are being rehabilitated**.  In terms of accessibility, a greater commitment is observed by all parties, including the executing agency.  In the rehabilitation of buildings, a change has also been noted in terms of the**incorporation of new materials and installation systems**related to thermal insulation, especially exterior. S and is much using **dry work**: drywall, withPladur, because it shuns brick: it is more agile, more progress is made not to do so slashing. Much more effective window joinery is being incorporated... And all the carcinogenic insulating materials that were used are now being replaced by others. All by legal regulations.  Other things that have changed is that site managers are less and less on site, and those in charge are in charge. The site manager keeps track of time and money for various sites. Before, the construction manager had control of time and money and the day-to-day execution. That has changed, now it is not profitable, then a **greater responsibility**has been transferred to the construction **managers**.  Requirements in their day they had the works was n very aligned with the powers that were in charge of that time. A manager knew exactly what to do.Now, however, they do not get to everything in the work. The current trend is to use subcontractors, who are specialized in a specific subject, and that knowledge is not transferred to the manager. A manager has no problem with a brick, or with a structure. Before he rethought and now, however, he supervises the end, but he does not live the process that he used to do. The current managers have been formworkers or have been bricklayers, so in the renovations where more specialization is required they have not had that experience. And it is something that does not concern them, because as someone is already coming, the specialist who is going to do it, because he does not control it. |
| 1. Specificity of role and profile of site managers and team leaders at renovation worksites observed through work situations (to be listed). | Depending on the volume of work that is, larger or smaller, the responsibilitiesof control and command vary. In a low-volume work, the manager and the foreman are hardly distinguished and, in general, the manager is responsible for everything ; However , in a work of greater volume in the execution phase, there are more people in charge who are divided into roles , such as the project manager, the project manager and the head of each of the teams (foreman ), in addition to other possible as a construction manager, the Health and Safety Coordinator ...    The site **manager**is the one who manages the entire site. It has the power of contracting companies, managing subcontractors. In some companies it has been mentioned that construction managers are currently doing the work of managers to fill the technological deficiencies of the latter, which causes them a higher workload.    The **commissioned work**is the key figure of the construction site, is the soul of the work, if the manager is not good and formed the work does not go well.    Functions of the work manager:  - The manager has the mandate to **organize the workers**. It is the one that controls all foremen / team leaders and they assigned the tasks s plays undertake. It also controls all the staff of the subcontractors: it passes the attendance list first thing in the morning; controls the pits and is in permanent communication with the project manager.  - The pits must be very well **organized**, the order in which they are developedand simultaneously to avoid stops and optimize yields.  - it is responsible for interpreting the **planning**of the work (specification) andto run in time and with the required qualities.  - It is also important that they have good **professional knowledge**of all the pits of the work and that they know how to **detect pathologies**in all types of materials to consult with the technicians how to proceed if this is the case. They have to know what is or can be important and what is not.  - They also have to be knowledgeable about the **control tests**that are carried out on different materials such as wood, concrete ...    - It has its responsibilities in quality and prevention: it controls that everything that is specified in the quality and prevention sheets is taken into consideration when the work is being carried out.  - You must know the applicable regulations: they are the ones who control, for example, the **urban**regulations of each building. Also the uses and customs regarding regulations, such as what loading and unloading hours, how much you can exceed; It is also very important that you know the**regulations on waste management,**discharges to public roads, the treatment of dangerous substances. And they are the ones who must know it to detect who is not doing the management well and give the orders to whom it corresponds.  - The **prevention of occupational hazards**is also essential. Prevention is above all.  - Managers also have to have **good communication skills**, because they have to manage with clients. It is not worth that a manager is highly qualified if he lacks the skills to deal with people. He has to communicate adequately with those who are at his command, as well as with those who are above him (architects, engineers...), and even with the client himself, who is the final consumer.  - You also have to have **digital skills**to transmit incidents in the shortest possible time.  - They also have **logistics skills**: they are the ones who organize, order and control the receipt of orders for materials, giving priorities to optimize the cost of shipments: decide when the material is supplied, control delivery notes, quality certificates, if the product / material / machinery has been delivered in condition. They are also the ones who **optimize the material**, due to the issue of the circular economy and due to costs.  - A person in charge controls the **demolition**, **shoring and shoring**processes.  - Above all, a manager has to react to the unforeseen events that arise in the rehabilitation works, which are many.    **Roles of team managers / foremen**  - A foreman has to know how to coordinate the group of people he is in charge of. You have to know how to assign tasks according to the competencies of each one to be able to carry out the work successfully.  - In addition, you have to take into account the type of rehabilitation you are doing: a rehabilitation of a home is not the same as a restoration of heritage. In the rehabilitation of heritage, it is necessary to comply with the requirements demanded by the Administration of Culture.  - The foreman has to focus on the officers he is in charge of.  - The foreman performs measurements, stakeouts and monitors the safety of his equipment (PPE, collective measures...). Above all, it controls the quality of the work assigned to it.  - In case of encountering pathologies or unforeseen events, we speak with the site manager if there is one or directly with the technician, to explain what is happening and find the solution together with them.  - They have to have a lot of experience on site.  - Communicates with the work manager.      **Significant stresses.**  Foremen is not exposed n to significant tensions, only one in the task of enforcing the preventive measures of their dependents.  However, managers do face tense situations throughout their daily work. The most mentioned ones are detailed below :    - The **management of subcontractors**, because they have to make, in some way, implement the measures that are adopted in your company.  - The **management of a non-compliance**with customers is also problematic.  - Another problem encountered in urban contexts is the **incidents that occur with neighboring communities**: those who work in rehabilitation do not work in the open, they do so in a context in which more buildings coexist.You have to be continually managing conflicts that are generated between neighboring communities. And it is the managers who carry out this**mediation work**.  - The biggest problems that rehabilitation works usually have is that **they take place in the urban area**and this leads to tensions because you do not have a good unloading area, you do not have where to park trucks, you have to fight against traffic and city conditions .  - In structural rehabilitation works it is important to **secure the structures on which they work**. The manager must know very well how they have to be supported and there must be a calculator. In addition, you have to control well the time it will take because it always plays against the work, generating a lot of tension. It is necessary to ensure that it interrupts the rhythm of the work as little as possible.  - One of the greatest tensions pu eden produce in office is derived from the**delivery.**In contract works, where the promoter is another entity, the times are usually quite short or the project is not well defined from the beginning, forcing you to continually make modifications, and this generates a lot of tension, which leads directly to those in charge of construction site and foremen.  - In rehabilitation works, workers are also exposed to more risks that have not been evaluated, and this also generates a lot of stress for the manager.There are more accidents in rehabilitation works than in new construction. Prevention of occupational hazards is essential.  - Another tense situation derives from your responsibilities as a **quality controller**.  - One of the greatest tensions is when the manager finds that the **project**does not correspond to reality and must solve the incidents. They give you some plans and those plans are usually old and do not include the reforms that have been carried out over the years, they do not coincide with the real work you are facing. With what you are going to find facilities that are not reflected in the plans that have been provided; others that have to be and do not appear; windows that originally had some measurements and now have others ...  - D uring the **excavation and foundation**phase, because you have to hold the façade very well and place the interior and exterior supports well.  - The **demolition**is a phase that generates a lot of tension. Especially in partial demolitions, because you don't know how they are and what you are going to find. The manager has to detect s risk and shore. It is responsible for situations d and risk that may occur for not having taken appropriate decisions.  - There are many **clashes**between managers and team leaders / foremen .Many times the latter see things in the work in a biased way, without the global vision of everything that is happening in the work; they lack the synergies that exist with other types of facilities, with the structure, with the partitioning... Then they tend to collide.  - The **lack of training**and knowledge is the greatest difficulty they face.  - The need to resolve situations derived from: modifications of items or project items added ; n ew solution is technical, energy (concerning energy ed, ecology circular economy ...) , n umerosa new regulations , n eed technical support much more usually than new construction  - The **findings unexpected**generate a lot of tension. Sometimes in heritage restorations, when you are removing, for example with a load from a wall, you can find frescoes from 400 years ago; or when you are raising a slab you find a tombstone ... Or you are doing a more modern rehabilitation work, for example making a door and you find that it is a load-bearing wall, and it is not contemplated ... then a tension is generated, because In all these cases you have to stop what you are doing, notify the person in charge, or failing that, the technician and tell him what is happening. |
| 1. Criteria of professional performance of site managers and team leaders listed by interviewees (when preparing, executing and checking the quality of renovation). | **Site manager / Site preparation phase**  First of all, you have to **make sure that the safety conditions of the work are adequate**, which is essential, apart from the fact that there has to be a senior technician or a safety coordinator. The person in charge is the last link that has to monitor the safety conditions at the beginning of the work.    Then you have to say **what personnel will be required**to carry out that job.  You have to plan all the work very well, to be able to place orders well in advance and thus have the material available on time.  Identify the **right materials**. In the specific case of rehabilitation, there are many materials that must be used and not others that are used in the new construction. For example, if we are facing an old wall, and that wall has an old stone of a very soft limestone, then if we put a very resistant mortar we can load the wall. In rehabilitation you have to have **a special sensitivity**. In a large work there will surely be a project manager, or a surveyor, or an architect, but in a small work you will not have a technical direction so high, so it will be the person in charge who realizes it of those details.    The manager also has to be aware of what the **stakeout is**. That is, coordinate the start and how that cut is going to be executed. When is the right moment within that work to rethink and explain to each one what they have to do.    The person in charge is also the one who **plans the assembly of auxiliary means**, which is what entails the greatest risk for workers because there are jobs at height. For this reason, they must be very clear about the elements to be installed so that the people who are going to operate on them have total safety.      **Site manager / In the execution phase**  The first thing to do is ensure that **security conditions**remain adequate.  In the case of **demolition,**which in rehabilitation is a very delicate issue, at certain moments of the rehabilitation there can be really dangerous situations.Situations that did not exist before starting the work, but that during the execution have become very dangerous. Many times we are demolishing a building from the inside, and it is time to remove the intermediate floors, and they remain as in the air, and until the shoring is carried out, we must have an exquisite security surveillance. It is a time when the manager has to dedicate himself to security almost exclusively.    In major works, of course there will be technical coordination above all, but in medium or small works the person in charge has to be in charge of these issues and make a **forecast of materials and equipment to guarantee safety.**We cannot expose ourselves to realizing in the middle of the work that props are needed.    Obviously, it must also have **controlled and monitored each of the pits**that are in the work and **transfer to the workers the activity they have to execute**, taking into account the capacities of each one of them to optimize times, guarantee the quality of the jobs and minimize risks.    You have to **solve problems**when they arise. For example, a pipe from another building that you cannot touch; a channeling of electricity that raises doubts…; You come across a partition that you thought was a wall… Well, in that case the team leader cannot make decisions on his own and has to rely on the manager.    It continually proposes improvements because in most cases the projects are notsufficiently adapted to the real situation, logically agreed with the project manager.  A good manager has to be a **good communicator**, who is capable of reporting what problems he is encountering on a weekly basis on the construction site;**foresee what problems are going to come, analyze them and anticipate them.**  They are also the ones who take care of the **stakeout**, and with the foremen they measure and stake out, they control where the facilities are going... These stakeouts are very important when it comes to executing the work well.  If it is an energy rehabilitation, the person in charge must know about insulation.If it is a restoration of listed buildings, you have to know about mortars, skids ...    You have to ensure that there is nothing pending before executing another phase so that you do not have to repeat it again.    **In the quality control phase**  **Control the quality of the service. Traceability**.  It **supervises that the work has been carried out in accordance with the agreement**with the technicians with whom it communicates. Also the client at some point gives him verbal instructions.  Coordinate the **removal of those elements that you have to remove as you finish the work**. This is also a very complicated part: to dismantle as the works are finished to continue in another part, but keeping the safety of the rest.    They have to check daily that different standards are met. For example, that the concrete temperature is adequate; do a tightness test on a terrace; the pressure tests of the pipes, control of singular encounters (encounters with walls so that there are no cracks, that the thermal insulation does not have cuts and there are no capillary condensations…).      **Team leaders / foremen**  The **team leader / foreman**, on the other hand, is the one who has to be in charge of ensuring that the officers and laborers are well equipped with personal **protective equipment**.    You also have to **anticipate problems**. If you see something strange, you have to tell the manager to see what is done.    It is also important in the team leaders / foremen, the **coordination of the operators and optimization of human resources**. There are people more qualified to do certain things than others who are qualified for something else, and he is the one who has to optimize these skills of the operators for the benefit of the results of the work.  Basically, the **foreman**comes to have the same functions as the construction manager with regard to the specific works of that pit. The foreman is already a person who has a trade, who knows how to direct a group and who knows the qualities and the preparation that the start-up of the work needs.  For this reason, from the first day they provide you with the **plans**, you have to**rethink**the work, try to get the necessary **materials**to execute them, and then supervise the **qualities**, the latter especially in an important way . |
| 1. Managerial and organizational challenges / barriers and corresponding skills required fromrenovation site managers and team leaders, including digital competences today and in the future.   Examples of concrete work situations. | The construction site has always been very alien to digital issues. On the one hand, we must start from the basis that the profile of construction managers is usually **people with an average of 55 years and it is difficult for them to get hold of the technology**: they usually have a basic level of qualification and have joined the job very young. Sector, from the age of 14.  The training they have been acquiring is punctual and above all they have been trained on site.    Furthermore, in the case of small-volume works it is often difficult to find anadequate space to handle these devices. Nor is it something relevant because your site supervisor handled with flat manuals, which has already given facts and he only has Interpret arlo s and a correct time, but manually. In addition, with the heavy workload on a construction site, there is no time to face problems with digital support because it is not practical: consulting digital media sometimes requires a lot of calm and patience, and they lack them for the workload. The issue of budgets, which is what may require the most digital skills, is not usually handled by the manager. Only Smartphones are frequently used with WhatsApp applications , telephone, email ...    **However, obviously, there is a digital challenge,**but not only at the professional level, but also at the level of the company itself. The **company**is the first thathas to be tailored to the digitization and making workers also be digitized.  Given the nature of the rehabilitation works, the person in charge is, in most cases, the only representative of the construction company on site. This implies that a large part of the document management, quality control and coordination falls on it (much more than in new construction), as well as the detection of all the "novelties" that occur as this type of project is carried out. Construction site.  An **important barrier**is that many new games and changes come out, on which the manager does NOT have decision-making power, nor training to undertake.That these new decisions reach you in a timely manner is of vital importance .For this, communication must be fast and fluid. So you need a lot of **computer and telematic knowledge**.  The person in charge must be able to issue to the Project Manager and Project Management all the new aspects that arise during the execution. At the same time, it has to receive and interpret all the new information and changes issued by the parties with decision-making power over the work. In general, you have to handle drawings, request material orders and evaluate offers, control schedules, control budgets and communicate with technicians. For this, the management of word processors, spreadsheets, data compressors, video and photography editing, management of plan viewers, real-time communication systems (skype, videoconferences,)...... must be part fundamental of those in charge of rehabilitation works. As well as training in energy reuse and new construction systems.  What does represent a **barrier**for them is that all that work then they have to take to the office and digitize it, and it becomes an arduous task for them, theyreject it because they have to dedicate many hours to it. The manager is a field worker, not an office worker.  **To meet these challenges normally**, the site manager assumes that they must help and collaborate more with the site manager in these tasks, simplifying themso that they can dedicate more to controlling the site. The computerization actually concerns at the level of project management and in large works, not so much in those of small volume.    The use of photographs in real time facilitates communication between the person in charge and the technician of the work, giving a solution in real time.    Currently, that a manager has computer skills is a plus because he can solve a problem, but it is not essential, but it does help to lighten the communication of the company without having to leave the work to go to the office.    **The most demanded organizational and control competencies in rehabilitation works are the following:**  The perfect profile of a manager is someone who knows the work from below, who has grown professionally in it. Perhaps the most important thing is the control you exert over execution times. The most important thing about a manager is that he knows how long it is going to take to execute something.Today the most expensive of a work is labor, so it is critical that the Custom adocalculate knows well how long a given work to estimate human, material ...  They have to control the finishes well. And before finishing, they have to watch that there are no problems, cracks, badly executed encounters, water leaks... that the waterproofing and thermal insulation are well executed. When it is executed, no, but before finishing or covering it, you have to see if it is well done.  They have to have a lot of psychology to work with many work teams with many personalities and characters, cultures and languages.  **It is essential to have a good or**rganization of work: how it is done, I when done and who does it and what is done.  The **stakeout**is very important. They have to have some mental agility. If you make a mistake in the staking, the problems all cascade.  They have to be good at **interpreting shots**and know how to adapt it to the work.  Being able to detect that something is wrong. They don't have to solve everything, but they don't have to cover it up either. It must be evidenced and notified to correct it.  For major rehabilitations, **knowledge of structure and prevention**are essential.Also **learn about new systems to re-use energy**and / or systems that require less energy for the same use of the building. In short, **higher technical knowledge than usual for a new construction manager**.  Also **greater knowledge in computing and remote communication**.  In rehabilitation works, the **demolition**phase is unique, although the technician is usually very present, the person in charge is the one who coordinates everything: he is the one who hires the company specialized in demolition and controls that the required safety measures are adopted.    All the logistics of the work depends on the person in charge and the project manager, the person in charge at the foot of the pit and the project manager from the office. He is also the one who asks for the materials. He does not define them, he is the project manager, but he is the one who controls the orders.    The manager is also in charge of ensuring that the workers of the different pits know how to place and execute the work well. A manager has to **know everything about what he gives orders**, he has to know everything about the work, especially in the execution phase.    A good manager must have **leadership skills**: he is the one who directs the workers in the execution of the works, and the project manager is the one who technically solves the work. |
| 1. Identification oftechnical challenges / barriers and corresponding skills required from renovation site managers and team leaders, including energy saving and circular today and in the future.   Examples of concrete work situations. | Those responsible are not affected energy efficiency and circular economy beyond the coordination of facilities: they receive instructions and execute them. However, the flood of technology that comes to the manager is such that he finds it difficult to manage it well.    **Energy Efficiency: c**on the issue of **energy efficiency**, managers comes to them a significant workload to meet new materials that have to be faced,  **the new placement procedures and application; new systems…**; and how to control it all.    An example of new systems is the installation of air recovery systems, something that will be the order of the day in the near future, together with a home automation system: " and how do I put the sensor..." and  " what type of pipeline to use…” and the manager full of doubts, with a significant stress load.These situations are causing problems to see how to put these pipes in the ceiling. And in the end it is the manager who has to solve it, hole by hole, room by room ...    Energy efficiency has many legs. It is not just a matter of putting a solar thermal energy panel on the roof, it is not just placing some windows, or closing a facade well. **Energy efficiency is controlled when all regulations are controlled and you have to know how to interpret them.**When it comes to energy efficiency, **Thermal insulation**is the key. But you have to know how to place them.Because if bridges are left, significant condensation problems will arise, and they can make a home unhealthy. In order for a manager and a team leader / foreman to be able to make certain decisions that are relevant for these purposes in the rehabilitation works, they must have knowledge of:    - **Materials: structural repair mortars**, they are more expensive than normal mortars, but they are the ones used in this type of intervention.And you have to know how to make them, with the correct amounts of water, know how to apply them, in a certain time, give them a prior primer... You have to know them and know how to apply them.Because sometimes it is a very complex application and managers and team leaders have to know how to do it.    - Other material, for example, **lime mortars.**They were the mortars that were used before, and there are many old house walls that are built with them. For example, palaces, listed buildings... They are less rigid mortars and allow certain deformations. The expansions that exist in large structural elements, or differential settlements produced by the change in humidity of the ground... That is why it is important to use lime mortars in the rehabilitation, even if they are more expensive. It is more waterproof than a cement mortar, another advantage, they have more capillarity, and thus buildings breathe better, and that is essential in a rehabilitation.    - In rehabilitation it also happens that when we have unreliable structural elements, architects tend to put a flooring and introduce **lightened mortars**. It is important that managers and foremen know at least that these things exist in rehabilitation and that they also know how to apply them.  Companies are incorporating the **Passivhaus**standard in their renovations andare interested in being instructed in it because it may be the future.  Construction is evolving towards **prefabricated construction**, which is going to affect the workforce. Before there were concrete blocks, with which the ships were made, now cellular plates are used that are installed much faster.    **Renewable energy.**For the coming energy efficiency technology, the use of renewable energies, such as changing boilers to optimize consumption, the foremen themselves will require additional training of thermal, renewable facilities, some knowledge basic to know how to coordinate the activities that normally do not belong to the same company. It is difficult for a company to integrate everything, so it is common for them to have external suppliers, each one expert in something. And it would be nice if the construction managers**controlled a little without reaching the level of experts.**    **Circular economy.**Regarding the circular economy, the decision to reuse waste normally falls to another area of ​​the company, usually management. Yes, the person in charge must have **knowledge of the management, storage and transport of waste.**Since the waste to where it is generated to be deposited, the whole chain that complies with the rules applicable. You have to have special knowledge regarding **hazardous waste**. For example, asbestos, they have to know how to detect its presence, stop work and apply a special procedure.    It must also **ensure that the waste is reusable in good condition.**  In the rehabilitation works of listed buildings or buildings of cultural interest, companies tend to recover noble materials that can be reusable, such as wood for windows, beams or lintels, the structure of the staircase...; also stone. In addition, the materials with which the house was originally built are used, and the manager has to know how they are used.    **To address these challenges**, companies agree that information and training are essential. In addition to making it necessary more than ever for the communication of those in charge to flow with the competent technical personnel in making decisions during execution.    Site managers and team managers / foremen have to **continually retrain**and train in the new systems that are being incorporated. Currently they are trained in the labor of technical suppliers.    Other barriers that managers and team leaders / foremen face and that have been mentioned:  -Energy reuse technologies  -Energy production technologies  -Energy consumption reduction technologies  -How to apply the circular economy to construction  -Management of communication and computer tools  -More knowledge of PRL and structural assurance.  -More complex execution systems than conventional ones up to now. |
| 1. Identification of legal and normativechallenges / barriers and corresponding skills required from renovation site managers and team leaders.   Examples of concrete work situations. | Currently, there is an excess of regulations, which also changes a lot and has a direct impact on the cost of the work. When it is being rehabilitated, a budget is provided to the client, but a budget that logically does not include hidden defects and the regulations force companies to go beyond the budget.    Site managers and team leaders control some of the regulations, because they have to know where they are going, but it is not their main function, but that of senior technicians. The only information that the manager receives from regulations is the day-to-day. For example, from the Technical Code they know what the project manager has told them or what is described in the technical reports. “You have to do this like this to comply with the Technical Code”, you hear this continuously, but they don't know where it came from. And the same with the rest of the regulations: Low Voltage Regulation, the Regulation of ACS installations, all the regulations of supply companies. The manager does not have the information nor does he know where to get it from.    The business structure in general is the one that has to deal with the changes that are taking place in the regulations. To do this, the first thing to do is detect what rules there are, which are many. It would be good to make a **normative compendium**of them. They are rules that greatly affect the construction process and are unknown. **The company, therefore, has to detect which rules are applicable to it and then by job position see which are those that concern them**.    For example, **waste management**, the **management of water**(not emit discharges or public roads or sewers), the rules of PRL, the Custom ado has to meet the **technical standards of the CTE**(installation materials), the **own techniques of use of the products to be installed,**the **urban regulations,**or the municipal ordinances where the work is carried out. And from there, cascading, **there are endless rules that the manager must know.**That it would be very good for the organization to bring it together, and make a scandal for all the rehabilitation companies and serve as a support guide. And see how these apply to operators, and you are only for managers, and you are for both... etc.  In rehabilitation there are no specific regulations on how it is done or not done.There are recommendations, but nothing more. What there are are limits set by the urban catalog, which says if the building is listed what can be done.Everything else is training and experience of the team that is going to intervene.      To face these obstacles, it is **the company that identifies the regulations, suggests which professionals are affected and then, on the subject of occupational risk prevention, it is an external auditor**(the safety coordinator) who carries out this control.  In the case of construction managers, they should contact their superior technicians, who should anticipate what they will need. You don't actually form them, but you inform them of what they will have to know how to do. For example, when data and telephony supplying companies come, each one requires a different type of installation from the others, and the houses have to be prepared to receive any supplying company, because as there is freedom of choice, the client may need make use of all of them throughout the life of the home. The manager must know what each of these installation companies need.  Normally on their web pages you usually have information about the installation requirements and you are guided by them.  But the regulator is generally clueless.  For example, concrete control do not usually have much knowledge. On the waybill have to control what time to come out of the ground, when it has come to you, how long it will take him out... Like the concrete is passed. And they learn because you tell them. Nobody teaches him, at some point he was informed by a project manager. And then they know forever. |
| 1. Identification ofhealth and safetychallenges / barriers and corresponding skills required fromrenovation site managers and team leaders, today and in the future.   Examples of concrete work situations. | The health and safety competencies required of managers are very high. There is a legal minimum of 60 hours training, but you must also know other more specific things such as the prevention of work at height, demolition and demolition... that is, you should control the specific part of occupational risk prevention for each one of the occupations that take place in the work. Many of the jobs that are hired, the manager has to trust that they are applying the preventive measures well.  They have their own risk assessment, which includes falling objects (helmet), stepping on sharp objects (boots), if there are loud noises (helmets), if there is a dusty environment or projecting polyurethane / plasters (glasses), chemical substances , biological risks in a demolition, you come across syringes, explosives (many times when digging you find bombs) ... During the demolition, the risks are important, because you have to take down the façade as the work progresses ... The manager directs the work, but those who carry them out are the experts. He ensures that the workers, including the subcontractor, comply with the security measures.  **Their main job is for workers to do work safely and well. That the brick is well placed, that the concrete is well vibrated, etc. and sure, that neither of them nor he himself suffer risks.**  The differential component of a rehabilitation with a new plant construction is that it starts from a **demolition**, in 99%. First we demolish and then we see how we do. During the demolition, thousands of problems can arise: there are things that must be preserved and others that do not, and the manager must always be there controlling the safety of the workers and the work, seeing what is done and what is not done, what is there what to recover and what not ... And the most important thing: the regulations on how you have to lower an excavation, how to proceed: how often do you have to review a felling of a facade? What inspection do you have...? When is it really down? ¿To what forces it is subjected a facade? ¿What collateral forces influence you? A person in charge has to know how to check if the felling plan is being done correctly, that if the screws have to be retightened after 23 days, then let it be done. Orwhen do you have to unsupport a slab.  It is a regulation that nobody looks at, and nobody touches, especially in small works. In the larger works, yes, because the project manager is on it, but not in the small ones. This is really important to study, because it interferes with your rehabilitation work.  The VI Construction Agreement includes specific training in the **prevention of occupational hazards for demolition and rehabilitation works**(demolitions, clearing rubble, renovations, facades with interior emptying / demolition-shell facades- ,…).  With the new incorporation of new technologies and materials, it is also necessary that they know the risks derived from their execution and that they know how to adopt the appropriate preventive measures. For example, in work situations such as the installation of solar panels, installations of filtration systems for reuse of water, accumulators of electrical energy, "total" rehabilitation of building envelopes and / or structures,..... ..  There is also an important lack of **first aid**, but that is at the level of all levels of the work. The workers do not know how to help.  They should even have **traffic training**, that is, knowledge of directing traffic.There are many times when they have to stop traffic to carry out work or put machinery on site, and they have to direct the circulation: place cones, stop signs... And they don't know how to do it. The rehabilitations are usually carried out in the middle of the cities and the entrances and exits must be well organized. |
| 1. Global opinion of the interviewees on the skills and competences of site managers and team leaders, necessary to face current and future challenges within their specific professional contexts.   Identification of the most appropriate learning forms and training paths suggested by the interviewees. | **The first who should be prepared to face all the challenges seen above are the entrepreneurs themselves**. Entrepreneurs today do not have time to make improvement processes. They are very busy managing other things. And last year, also have had to face is to manage the effects of the pandemic on their workforces.  **Adaptability of SMEs.**However, the advantage of SMEs is that they adapteasily, **our structures are more flexible**than those of large companies. **The managers are very close to the employer and assimilate and adapt very easily to what is asked of them**.  **Training and involvement of managers to address the changes.**In order for them to adapt to new challenges, internal training is usually provided. And it s iis a change of business, in charge of work involved in planning meetings with management and technicians to design a to rehabilitation more efficient .Because it **is the managers who first hand make known the problems that may arise when implementing the new models to be undertaken.**  Ideally, all rehabilitation works require the figure of a manager, with general manager training, and who has also completed specific modules focused on rehabilitation.  A commissioned work, in addition to distributing tasks and organizing staff must ensure control of all work and thus must be aware of everything that happens to adopt solutions or less reporting to superiors. You have to check**how the subcontractor is laying the insulation**and if it is doing it right or wrong. Because if you don't do it right, it's useless. And this must be focused on both the rehabilitation of buildings and the restoration of listed buildings.  Experience on site (filming) is also essential for both the site manager and the team leader / foreman.    The **m odalidad learning**to suitable f to is you professional is to be flexible and continuous, and combining the face workshop, focusing on visual and practical activities, with the in formation situ in the work itself, as the projects are implemented of construction and new technologies, systems and materials are being introduced, so that the suppliers themselves are the ones that train the professionals.    We must **avoid training based on theory**. In most cases, people who are on site do not like to study. But nevertheless, they are receptive to improvement.  The **training based on practice**, where someone comes along and tells you how certain things attracts people do, because they learn a lot in a short time.    The training should be a **formal training**, where the objectives are identified, structured knowledge is transmitted and then the training is evaluated and accredited in order to later be eligible for those positions of responsibility.    A good manager must have a **lot of experience in rehabilitation works**. In a rehabilitation work, no matter how much training the manager receives, he will find different construction techniques, or in other words, he will find **different construction defects**. And no matter how many years you have been working, you will never see it all. In each rehabilitation work the manager finds something different. That is why you need a person with a lot of tables.  - **Demolitions**.  - You also have to know about **measurements and stakeouts**  - **Structural reinforcements**, which is something very complex.  - **Shoring, shoring, placing overhangs ...**  - **Interpretation of plans.**  - **New facilities**to be **installed**, from sanitation (the simplest) to telecommunications or the elevator (more complex).  - It has to **interact with a lot of companies: both subcontractors and supply**companies (municipal water companies, electricity companies, telecommunications companies) with which it has to continuously interact on site, favoring their installation; And that without forgetting**the municipal ordinance**, interacting with the local police (permits, etc.). And that is not in any project. And they are companies that you have to work with because they are essential for the success of the work. And to this we must add all the subcontractors that you have called, and of course the person in charge who is managing the times, the order, controls that people do things, security, how they execute them, they have to have **knowledge of everything**: if the materials used are adequate... Logically the project manager had to have told him before and discussed it with him, but the reality is that time devours you, and that person in charge has to take care of himself same.  - It is important that you **handle computer tools such**as Word, Excel, email, surf the internet to download technical sheets..., handle Autocad .Now a manager has to have an Internet connection. It does not seem that it is the case that you have to go through the work with a Tablet, at least for now, it is enough that they have their space with a computer. They have to know how to handle Autocad because all the plans are already digital, they hardly work with paper. It is enough with a level that allows you to consult, edit, print, dimension... You do not need to know how to draw. Structural calculation tools are not going to be used, not that, theoretically it has to be given to them by the site manager.  - Pathologies (dampness, condensation , concrete, wood ... ) and new construction standards (from facing facade to ventilated facade ,passivhause )  - Prevention of occupational hazards    Training must be organized within the working day, as is done with the prevention of occupational hazards, and if it is first thing in the morning, the better. It is very difficult for anyone to acquire technical knowledge of the level you have or higher, after a 9-10 hour work day, and add more than 2 or 3 hours of training daily.    When designing training itineraries for managers and team leaders specialized in building renovation works, we face the following challenges:    **- E vitar get bored, surprise and capture their attention.**Usually the managers are professionals who know their world well and who know a lot and it is difficult to surprise them, so they are reluctant to train. You have to find a balance between the extremely technical and the extremely simple, because they get bored.  **-**  - Q ue training itself is attractive, t engan exclusivity. If you do not complete a manager training, you will not be able to access certain positions of responsibility on a construction site. The training that the training gives you is what makes you want to train. Because if not, what else does it give people to train or not if in the end they are going to work the same way.    - A practical learning, based on the theory, but practical. Ask them to carry out**practical cases**, projects in which they see how they control a work. Let them develop their skills. Give them some guidelines and have them say how they would plan it, what inconveniences could arise in each phase... Let them show their creativity, give free rein to their way of working. I do this with my workers, I show them a roadmap and they already know where they are going to start and everything goes easier. Let them reason why things are being done.    - In order to make it compatible with the working day, the ideal is a **blended training**, which allows you to dedicate a few hours of study a week whenone can . And where the face-to-face part is very direct and addresses a specific issue: for example, a demolition for an energy rehabilitation is not the same as when the entire building is thrown away and the facade is preserved. That is another case to deal with separately.  **Team Leader / Foreman**  Know the trade: rethink and know how to do things and then demand them.Guarantee good execution.  He must have a gift of people and leadership skills (no more leadership skills, than people skills). It has to be balanced.  Know how to direct the work.  Be the best by working to set an example to the rest of the team.  Ensure that there is always a good atmosphere in the team: create harmony in the group. |
| 1. Identification of the recruitment difficulties and methods practiced currently by the companiesinterviewed to find appropriate site managers and team leaders for renovation sites. | Construction companies recruit construction managers and foremen, either through internal promotion, through personnel who evolve in their own company; Either through outsourcing or contacts with people with whom you have already worked, measuring the experience in the position.  When companies find a good manager, they retain him so that he does not go to another company.  It is getting harder and harder to find good people. Workers young require many rights, but do not fulfill their obligations. In fact, the people who work best are those who are older. Companies are noticing the generational change a lot. To find a good young professional, you have to go through 20 bad ones first, when people from before were involved and worked differently.    In order to recruit new young personnel in tasks of responsibility, there would have to be support for the companies from the Administration to compensate for the loss of time involved in having a newly trained person with no experience in the work doing an internship. Something that compensates themhaving a person who does not perform as well as another more experienced one. L as companies must open their doors, but you have to help offset expenses.  Managers work today usually start their way in building youth and are formed in the work. |
| 1. Identification of the ways in which the companies interviewed cover their training needs addressing site managers and team leaders, in line with current and future evolutions. | Small-sized companies carry out ongoing training for their workers on site, by technicians with higher qualifications, or by specialized companies that provide a new construction system / material or installation, and during the working day. Sometimes they send their workers to outside courses, but these are rare.  Those that are larger, have internal training plans and usually make use of the continuous training credits granted annually by the Ministry of Labor to each company. This training is always carried out within the working day and in our own facilities. Unless they are very specific courses that are taught on specific dates and places by other institutions.  Some companies have mentioned that they give metallic prizes to the best solutions or ideas contributed by the workers. |
| 1. Identification of the main skills likely to beimproved by site managers and team leaders concerned through their further (incl. In-job) training. | - Organization of work  - Layouts and measurements  - Urban regulations of each building  - The interviewees mentioned the following competences:  - R egulations of customs  - Standard tive local, regional and national  - Effective communication  - Conflict resolution  - Regulations for waste management and treatment of hazardous substances  - Prevention of occupational hazards  - Digital skills at the basic user level : Autocad , Presto, Excel, Word ...  - Logistics skills  - Material optimization  - Technical training of construction details  - Execution monitoring  - Personnel control  - Relations with subcontractors  - Social skills to coordinate teams, especially if they are multicultural  - Quality and environmental control  - Demolition  - Falling  - Shoring  - Structures  - Special materials and their application (resins ...)  - Humidity  - Pathological processes that occur in buildings, which in the end are the reasons why a rehabilitation is carried out: capillarity in basements, water seepage through the roof that has rotted the wooden beams and that it is necessary to intervene... Well All these processes while a demolition is being carried out, many things can be seen, and here the person in charge must be able to transfer the pathologies that are found to the medical office.  - Waste management and circular economy. In a rehabilitation work that has wooden floors, brick partitions, tile roof, concrete pavement... the person in charge has to ensure that all these wastes are well separated because it minimizes recycling costs and also allows them to optimize them for other activities, such as rubble used to fill non-structural areas. This allows us to save a lot of money.  - Conflict resolution: it is important because on site there are many confrontational situations due to the clash of interpretations or theapplication of security measures on site.  - Isolations  - Waterproofing  - Facilities  - Interpretation of plans  - Knowledge of the materials and how they are worked. What is each material for?  - Resolution of contingencies  - Knowledge of how all the work pits are executed |

| **Topics** | **Key conclusions reached** |
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| 1. Identification of the work situations in which the role and functions of worksite managers and team leaders in building renovation evolve in the most significant way (in the partner country concerned). | Control of risks in construction.  Carrying out stakeout in the pits and organizing the intervention of the surveying services. Use computer applications for organization and control in carrying out stakeout on site following instructions and under the supervision of the person in charge.  Control the laying of formwork, passive reinforcement and concrete, following the instructions of the responsible superior.  Control d conditioning field and implementation of cimentaci ng of containment elements of the complementary elements of the foundation and of different types of structure which includes building reinforced concrete structures and precast various materials-, of in accordance with the technical documentation and following the instructions of the responsible superior.  Control and management of the execution of the building envelope: flat roofs, sloping roofs and facades, in accordance with the technical documentation and following the instructions of the responsible superior.  Control and management of the execution of partitions, installations and finishes in buildings in accordance with the technical documentation and following the instructions of the responsible superior.  Organization and GESTI ng building works, according to the technique and following the instructions of the responsible superior documentation.  Control of specific techniques for building rehabilitation works :  - RP1: Organize the prior conditioning of the demolition and rehabilitation pits, to allow specific interventions in the foundations, structure, envelope, buried evacuation network, partitions, finishes and facilities, collecting the pertinent information from the superior or person in charge, and from according to the corresponding plans of the work  - RP2: Coordinate the development of the works with the users of the buildings under renovation, within its scope of competence, to minimize the inconvenience generated by the works, mediating in the conflicts that arise and using efficient communication procedures  - RP3: Direct demolition / deconstruction activities on site, respecting the procedures and safety conditions in accordance with the corresponding demolition, rehabilitation and health and safety plans  - RP4: Direct the specific rehabilitation works on site to allow the established quality and planning objectives to be achieved, coordinating the different teams and intervening trades, arranging provisional measures for the transfer of loads and supervising compliance with the measures established risk prevention  - RP5: Supervise the rehabilitation of the underground sanitation network and the treatment of buried walls and slabs, so that it is carried out in accordance with the specifications contained in the documentation of the rehabilitation project, complying with the quality and safety and health conditions of according to the corresponding plans of the work  - RP6: Supervise the rehabilitation of the foundations, structures, facades and partitions, as well as the reinforcement of containment of the foundations and adjacent building structures, so that they are carried out in accordance with the specifications contained in the documentation of the rehabilitation project, complying with the quality and health and safety conditions in accordance with the corresponding work plans  - RP7: Supervise the rehabilitation of the roofs so that it is carried out in accordance with the specifications contained in the documentation of the rehabilitation project, complying with the quality and safety and health conditions in accordance with the corresponding plans of the work  - RP8: Supervise the rehabilitation of finishes, carpentry and locksmiths, and facilities, so that it is carried out in accordance with the specifications contained in the documentation of the cve  Control and management of the rehabilitation works of the underground sanitation, demolition / construction network in buildings in accordance with the technical documentation and following the instructions of the responsible superior. |
| 1. Recommendations for the training paths to be developed in line with the work situations of site managers and team leaders concerned, as well as with the skillsneeds identified: Verification and further development of the hypotheses identified during the desk research. | The introduction of regulations related to energy efficiency, circular economy, waste management, prevention of occupational risks, quality and the environment, is generating the appearance of new competences that affect the person in charge of applying, coordinating, monitoring and control them in building rehabilitation and restoration works. Therefore, the training itineraries of these professionals should consider aspects such as:  - Control of the work process  - Analysis and control of the execution of fellings and demolitions, humidity, foundations and floors, factories, wooden structures, reinforced concrete and steel  - In conservation and restoration works, legislation and regulations, continuous coatings, ornamental elements ...  - Innovation in building structures.  - Innovation in building envelope, partitions and finishes  - Acoustic conditioning  - Air conditioning  - Accessibility  - Energy efficiency  - Construction waste management  - BIM  - Drones  - Communication and conflict resolution skills  It is necessary to integrate the identified principles into the training processes of a practical component, implementing their development under the principles of circular economy, use of materials, risk prevention and energy efficiency. Organize the training itineraries using these concepts for their organization and implementation.  The sector is facing the biggest change to date (change from new construction to rehabilitation, passivhaus, lower volume works in general, circular economy, new technologies, energy efficiency and legislative changes). Both the manager and the team leader will need great agility in handling new information and specific work data.  For this we should add a "new" aspect for these professionals:  -Multimedia knowledge, video conference, online transmission of information packages (compress / decompress files).  -Management of office type packages (text editor, spreadsheets).  Since, if the need of the sector due to the large and new changes is high, the particularity of the rehabilitation works and Passivhaus, accentuatesthis need for the rapid (“almost immediate”) handling of information on a bi-directional basis. Due to the clear difficulty of facing the numerous changes and inconveniences that occur in the aforementioned works, added to those of the new construction works |

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| **List of References (if any)** |