1. **Validation of outcomes reached from the Desk Research with the group of experts**

According to the agreed methodology, desk research findings were validated by the group of sector experts. Focus group was organised with zoom on-line platform, on 18th  May 2021. It took about 90 minutes.

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| Name  | Organisation  | Occupation  |
| 1  |  Giacobbe Palmerio |  Training school Chieti |  Director |
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| Summary  |
| During the Focus Group, the experts commented on the results of the interviews carried out and shared and validated the results obtained; they provided input to create ad hoc training paths to overcome the difficulties/needs reported by the interviewees. A total of 26 interviews were conducted within the framework of the research. The companies and subjects involved (employers, site managers, team leaders, technicians and workers) are located throughout Italy. In the following grid, for each question you will find the result obtained by interview and the comments of the experts |

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| **Key results of the national Desk Research**  | **Opinion/Validation of the findings** **Additional ideas and proposals made by the Focus Group Experts**  |
| To your view, what are the main drivers of evolution for the renovation of buildings worksite environment during the last years? What is essential for you within these evolutions in terms of sustainable change at worksite? | Search results | Respondents emphasised that the factors that have enabled the evolution and renewal of the yards are technological skills and knowledge of the new ones used. They also stressed the importance of digitalisation. This is because the construction site is constantly updating and evolving and therefore workers who want to keep up with the times must have skills in these areas. Another factor that has led to the evolution of construction sites is the safety factor: not the knowledge of simple regulations, but the dissemination of a safety culture.In summary, these are the main points that emerged from the interviews* new technologies and new materials
* digitalisation
* dissemination of safety culture in the workplace
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| Expert comments | Experts added to what respondents reported the problems related to Covid-19. Anti-Covid regulations have introduced new safety procedures and new working methods slowing down work processes on construction sites and causing prices to rise. |
| What is essential for you within these evolutions in terms of sustainable change at worksite? | Search results | For the interviewed, the factors contributing to sustainable change on construction sites are green awareness (re-use and recycling of waste materials, investment in environmentally sustainable materials, use of renewable energy) and the continuous updating of workers' skills on new green materials and their impact on the environment. |
| Expert comments | The experts have nothing to say about what emerged from the interviews, but they emphasised the importance of the technical and professional updating of workers, especially with regard to the laying techniques of these materials. |
| How do you define the specific role and profile of site managers in building renovation projects in your company (today and in the future) ?  | Search results | The interviewees were able to distinguish what the role of the site manager is today and what it should be in the near future also because of the evolution of construction sites linked to environmental sustainability and the introduction of new technologies. According to the research the following emerged:The role of the site manager today * He is a key role for production in construction: a construction company can only survive by having good site managers.
* He is a professional figure who organises the daily activities and scheduling of works.
* He is a good communicator with good technical knowledge: he knows safety regulations, can intelligently assess economic issues, defines the workforce and manages the supply of materials and equipment for the work.

The role of the site manager tomorrow * He or she will have to play a central role in the construction industry, but as well he/she will have a better knowledge of IT systems in order to be able to use drawing and accounting programmes and also BIM.
* They should be a central figure for the new generations of workers.
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| Expert comments | For the present, the experts believe that the site manager must be a good communicator and have good interpersonal skills. For the future, the site manager should continue to have good interpersonal skills in order to manage relationships with all the figures on the site and to manage optimally the conflicts that can be generated; s/he should be available to the continuous updating of his/her skills, but they expressed perplexity about the knowledge of BIM. For the experts, the site manager does not have to be a BIM expert but simply has to have the knowledge to be able to read and understand BIM files. This knowledge also depends on the degree of familiarity that the site manager has with the technology, so it would be necessary to adapt ad hoc training courses based on the administration of an entry questionnaire. |
| How do you define the specific role and profile of team leaders in building renovation projects in your company (today and in the future) ?  | Search results | The interviewees, as they did for site managers, also made a distinction between what the role of the team leader is today and what it should be in the near future also because of the evolution of the sites linked to environmental sustainability and the introduction of new technologies. According to the research the following issues emerged: The role of the team leader today * The team leader has to know and intervene directly in all the work phases. He must know how to distribute work activities correctly, taking into account workers' skills and workloads.
* He must be a point of reference for the whole team: he must be a leader.

The role of the team leader in the future* He will have to be more informed about materials, dry system technology and the use of IT tools.
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| Expert comments | The experts stressed the importance of continuously updating the skills of the team leader (continuous training). As the construction site of the future will be a smart construction site, all workers involved must have digital skills and be able to read technical drawings. In addition, the team leader must have good coordination skills. |
| Could you please list some significant professional situations where site managers and team leaders have difficulties or where you observe significant tensions? | Search results | All respondents reported different situations in which site managers and team leaders had experienced problems and/or had experienced difficulties. When comparing the various situations, it was noted that in most cases the difficulties encountered were due to the following points: - Some situations are due to a difficulty in procurement needed to perform work. Lack of materials prevents work from progressing and lack of an element blocks the whole process- Difficulties occurred due to role management and operational leadership with suppliers and workers resulting from lack of knowledge of technical standards (most common) and study and understanding of projects (sometimes)- Many difficulties arose when the site manager or team manager was younger than the age of the workers- A situation of difficulty that is repeated very often is in the management of subcontracted teams and craftsmen, especially on issues of safety in the workplace and also relations with the safety coordinator.- A difficulty that is repeated on the various sites is due to the relationship between the site managers and team leaders and the technicians as the former have a more practical view of the project while the latter often have a more didactic and theoretical view. |
| Expert comments | The experts analysed the answers very carefully and finally deduced that the difficulty related to the age difference can be overcome by having the young site manager or team leader accompanied by a more experienced one in order to accompany him/her through the growth process. All the other considerations made by the interviewees can be overcome by a good training course that touches on all the aspects mentioned and by continuous focus groups at the site even several times in one week. |
| What are the criteria of the professional performance related to site managers and team leaders at each step: preparation, execution and quality check of the work achieved? | Search results | The survey shows that site managers and team leaders are evaluated on many work aspects. The most important ones can be summarised as follows: * Ability to assess the quality of work performed
* having logistical and organisational skills and being able to manage unforeseen events and keep the timing of work under control
* Being able to read and understand technical documents
* Have communication skills
* To know and be able to apply occupational health and safety legislation.
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| Expert comments | Experts have nothing to report on the criteria of professional performance as they are in total agreement with respondents |
| What are the principal managerial/ organizational challenges and barriers faced for site managers and team leaders related to building renovation sites, including digital skills today and in the future? | Search results | The interviewees were able to identify the managerial and organisational challenges and barriers that site managers and team leaders face every day on construction sites. The discussion was generalised to all types of construction sites including those related to building renovation sites especially those related to energy efficiency. The following points emerged from the discussion, divided into barriers and challenges:Regarding the barriers, the respondents again highlighted the issue of the age and experience of team leaders and site managers and their previous training experience. Another difficulty is due to the unwillingness of young workers to become site managers or team leaders; few are afraid to take on roles of responsibility, as the sector is unattractive and seen as a "dirty" place and last choice for a career. The biggest barrier is due to the difficulty of communication between designers and contractors with site managers and team leaders. Concerning the challenges, they pointed out that site managers and team leaders of adult age (over 45) will have to learn new working methods and have to learn how to use digital tools. The whole system has to modernise and use new working techniques and abandon the idea of the past (I keep doing this because it has always been done this way). Therefore, increasingly digitalised processes will have to be accepted. A very important challenge is also to open up to completely different cultures and also to the inclusion of women on the site who can play different roles and positions. |
| Expert comments | Experts are in total agreement with the respondents about the main managerial/organisational challenges and barriers faced by site managers and team leaders |
| How do you face them in the context of your company? | Search results | Several answers were given by the respondents. The one on which they all dwelt was that challenges must necessarily be met through vocational training courses. In order to face some challenges, especially those due to the acceptance of different cultures and women, some are organising meetings outside the work context to make workers better know each other and to favour the insertion and integration of workers from different cultures.Another point on which everyone agrees is that of focusing on young people and motivating them to learn a trade. Unfortunately, it is increasingly difficult to find such people because the construction sector is not very attractive. In many realities, the challenges have been met by introducing weekly and in some cases daily meetings to improve communication and improve site management. In these meetings everyone can express their difficulties both on a technical level (reading the project) and on an operational level (especially for the use of new tools and technologies). |
| Expert comments | The experts are in total agreement with the interviewees, but they are very doubtful about the weekly meetings as they are hardly ever held because this kind of culture is missing in Italy. |
| What kind of managerial and organisational skills are the most demanded on renovation sites and in which concrete work situations? | Search results | In terms of the managerial and organisational skills most required of these two figures on renovation sites in the various work phases, respondents answered that the most important ones are:* Technical and logistical organisation of work
* Knowledge of health and safety aspects in the workplace
* Management skills for respecting time and costs
* Relational skills to manage relations also with the various professional figures involved and create a serene climate
* Problem solving skills
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| Expert comments | For the experts the site manager and the team leader are seen as small managers so they are in total agreement with all the points reported by the interviewees |
| What are the principal technical challenges and barriers faced for site managers and team leaders related to building renovation sites, including skills needs related to energy saving and circular economy (today and in the future)? | Search results | The interviewees were able to identify the managerial and organisational challenges and barriers that site managers and team leaders face every day on construction sites. The discussion focused exclusively on renovation sites, with particular reference to energy saving and the circular economy.The following divided points emerged from the discussion regarding barriers and challenges:For barriers the following points were identified:* difficulty in understanding the circular economy
* lack of knowledge about the characteristics of bio-based materials
* lack of knowledge about the correct procedures for the installation of energy efficiency elements (especially thermal coats and windows)
* lack of knowledge about techniques for reusing waste materials

The following points have been identified for the challenges:* Knowing how to correctly choose green and eco-sustainable materials in order to evaluate more advanced solutions
* increase the collection and proper disposal of construction site waste
* ability to propose practical solutions for the reuse of waste materials
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| Expert comments | The experts were in total agreement with the interviewees on the barriers, but they had some disagreement on the challenges, namely when the interviewees identified as a challenge the ability to correctly choose green and sustainable materials in order to evaluate more advanced solutions. For the experts, choosing the right materials is not their job but a task for the designers, so a possible challenge could be to acquire the right skills for the correct installation of green materials and the updating of technical skills and new technologies. Another point where experts disagree with the interviewees is the ability to propose practical solutions for the reuse of waste materials. For the experts, proposing is very difficult and therefore it is up to the technicians to do so, as proposing solutions could entail too much responsibility as wrong choices could invalidate the work. |
| How do you intend to face them? Could you please give examples of concrete work situations where these principal technical challenges are the most obvious and where specific skills are required from worksite managers and team leaders? | Search results | Respondents proposed multiple ways to overcome the difficulties they encounter on construction sites regarding the technical challenges and barriers they face. The most important ones can be summarised as follows:* For everyone, it is necessary to increase their specific skills for the professional installation of the new eco-sustainable materials through continuous updating of skills by means of ad hoc training courses organised not only in the classroom but also on the building site to see the specific difficulties during the work phases
* Increase and foster collaboration between site managers and teams with technicians to overcome technical and communication difficulties. This is possible thanks to the right training that always includes a module dedicated to communication between the various actors where both technicians and workers (site manager and team leader included) are in the classroom at the same time.
* Improving supply management by digitising, computerising the warehouse and thus creating a smarter site
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| Expert comments | For the experts, overcoming the difficulties is not only a matter of knowing how to lay sustainable materials, but also of knowing their characteristics. They totally agree with the other points |
| What are the principal legal and normative challenges and barriers faced for site managers and team leaders related to building renovation sites? | Search results | For the legal and regulatory challenges and barriers, the respondents had some difficulties but nevertheless managed to report some barriers and goals to be achieved. For the barriers they reported the following* The constant evolution of regulations: one should constantly update oneself, but this is difficult due to the pace of work and other skills to be acquired.
* The variety of work situations to be faced: the construction site is not a metalworking company where the work phases are cyclical and standardised, but it is a dynamic place; in fact, organising a construction site in different places and contexts presents different problems, and consequently different regulatory criteria are followed.

For the challenges they pointed out the following:* Increasing the continuous training of site staff on new regulations
* Acquiring skills to comply with energy saving regulations
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| Expert comments | As far as barriers are concerned, the experts are in total agreement with the interviewees: it is of utmost importance to keep up to date because of the constant evolution of regulations and the variety of work situations on the construction site is a big barrier in the construction world. On the other hand, as far as the challenges are concerned, more than the site manager or team leader must know the standards, the designer must know them. Site managers and team leaders must know how to lay materials. |
| How do you cope with them in your company? In what kind of work situations? | Search results | legal and regulatory challenges and barriers for respondents are thus addressed and overcome:* With the help of external consultants regarding some contractual issues
* Through refresher courses on safety in the workplace
* With the support of the company's legal department and safety manager
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| Expert comments | With regard to the legal and regulatory challenges and barriers, the experts disagreed with some of the respondents' answers, namely that the barriers can be overcome with the help of external consultants and with the support of the legal department, as these are situations that concern only the employer. On the other hand, they completely agree with the solution of continuous updating through training courses in occupational health and safety. |
| What specific skills are required from site managers and team leaders in building renovation sites related to health and safety rules on worksite (today and in the future)? | Search results | The interviewees underlined that in Italy site managers and team leaders are two figures who have many competences in the field of health and safety in the workplace due to the very strict legislation in force on these topics and to the sensitivity of employers who in some cases impose to follow training courses on health and safety. However, the specific competences for the two figures are the following:* Knowledge and application of current legislation
* Knowledge of all site operations
* Skills for managing interference between contractors (coordination and cooperation between employers)
* Organisational ability to plan the different work phases
* Ability to identify critical points and prevent them
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| Expert comments | For the experts, all the points indicated by the respondents can be translated into a single competence called knowing how to read and understand the operational safety plans (POS) and the risk assessment document (DVR). This competence encompasses all the others. They must also be able to transfer the correct behaviour to other workers. |
| Could you please give some examples of work situations? | Search results | For work situations related to workers' health and safety legislation, they reported* Use of non-standard scaffolding
* Personnel working in a different job from the one planned
* Work situations where workers have had to handle hazardous materials containing fibres (such as asbestos)
* Failure to use the PPE provided in different work situations
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| Expert comments | The experts analysed the respondents' answers very carefully and in the end they are in total agreement with the points made, although they added that many workers (including site managers and tram leaders) do not have a good knowledge of the PPE to be used in the different work phases. |
| Do you consider that your site managers and team leaders possess enough skills and competences to face the challenges and needs we talked about before? And tomorrow, what would be needed to enable them to face new challenges? | Search results | Regarding the skills and competences that site managers and team leaders possess in order to face the challenges discussed so far, the respondents were divided into three types of answers that can be summarised as follows:* Some respondents answered that they do not possess enough skills: for some skills (relational, organisational, leadership) site experience and years of work are important, for others (technology, design, IT) schooling, technical training and continuous updating are important. So there has to be the right balance between training and field experience.
* For others, site managers and team leaders have no competences as these two figures have been neglected in recent years especially no specific training has been provided for these two figures
* For others, team leaders and site managers have the right skills and competences to face these challenges
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| Expert comments | The experts pointed out that in many cases the employer does not correctly identify the most appropriate figure to play the role of site manager or team leader, so they disagreed with the respondents who reported that the two figures have the right skills and competences to be able to deal with these all the challenges analysed. |
| What form of learning (or professional updating) addressing your site managers and your team leaders could be the most adapted to the particularities of your company or your clients? | Search results | As already mentioned in the other points, the respondents confirmed that the most suitable training methods are a mix of classroom and on-site training. However, they emphasised that the best training for young people is always on-the-job training with an experienced site manager/tutor. |
| Expert comments | Respondents agreed with the interviewees about the training to be provided to experienced site managers and team leaders, but raised some concerns about the training of young people. What the respondents reported is half true since it is true that the best training is in the field under supervision, but the more experienced workers could transfer to the younger ones incorrect working habits and methods acquired over the years, and for this reason classroom training is a tool that could help them to work better on the basis of experience gained on site. |
| How do companies currently recruit site managers and team leaders: internal or external promotion, graduates, after specific in-job training? What kind of difficulties do companies currently meet? | Search results | Respondents indicated that recruitment is mostly done through either internal promotion (through professional development) or by searching among technical graduates, especially surveyors, with the help of employment agencies. |
| Expert comments |  Respondents indicated that very often recruitment also takes place by word of mouth. |
| What kind of difficulties do companies currently meet? | Search results | The difficulties reported for the recruitment of these two figures are due to the difficulty of finding already qualified personnel interested in the sector. Sometimes, even if they find qualified personnel both inside and outside the company, they do not want to take on roles of responsibility. A last difficulty is due to the lack of young people who do not want to undertake this kind of career, as already mentioned in some previous points. |
| Expert comments | For the experts, all the points highlighted by the respondents are correct and therefore did not add anything to what was reported. |
| How do companies currently cover training needs of site managers and team leaders towards the evolutions on renovation of buildings? | Search results | The training needs of site managers and team leaders with regard to the evolution of building renovation are covered through * Refresher courses carried out within the building schools of the Formedil network
* Through courses organised by the main manufacturers of building materials and systems
* Through in-house site training organised with the support of the most experienced team leaders
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| Expert comments | In this case, the experts have nothing to report and are in total agreement with the respondents. |
| To your view, what are the main skills that site managers and team leaders specializing in renovation of buildings should improve through further training? | Search results | According to the respondents, the skills that could be acquired and deepened by site managers and team leaders through continuous training are:* Ability to read and understand the project
* Ability to use the computer and graphics programmes to intervene directly on small jobs
* Communication skills and techniques with other site figures
* Management and logistics skills
* Technical skills for digitisation
* Knowledge of new equipment and new materials and laying techniques
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| Expert comments | The experts were in total agreement with the skills reported by the respondents. They only added that the competence related to reading and understanding the project should be extended to the whole contract (costs, time, methods) and not only to the technical documents. |
| Do you know if there is available training offer addressing site managers and team leaders specializing in renovation of buildings? | Search results | Despite the fact that there are 104 construction schools spread all over the territory, in constant contact with construction companies, the respondents answered that they are not aware of training offers for site managers and team leaders because there is little promotion on the territory. |
| Expert comments | Experts point out that construction schools do promotion on the territory but often employers and workers only focus on compulsory training courses related to occupational health and safety. |