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Needs assessment on current skills needs of the use of BIM at EOL practices

SLOVENIA Report



CCIS CCBMIS

16.10.2024



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Introduction

Building Information Modelling (BIM) is an innovative and transformative technology that is reshaping the construction industry. It provides a 3D digital representation of the physical and functional characteristics of buildings and infrastructure, enabling enhanced collaboration, efficiency, and sustainability throughout the lifecycle of construction projects—from design and construction through to operation and maintenance.

Europe has been a leader in the adoption of BIM, although implementation varies significantly across countries. The European Union's Directive 2014/24/EU on public procurement, adopted in 2014, has been instrumental in promoting the use of BIM across member states. This directive encourages the integration of digital tools like BIM into public works contracts, aiming to improve efficiency, transparency, and innovation in procurement processes.

As part of the BIM4D project, a comprehensive research initiative (A.2.1) was conducted to assess the current status of BIM usage. This research focused on five countries—Belgium, Germany, Greece, Italy, and Slovenia—providing a detailed overview of BIM implementation in these regions. Additionally, the research explored the use of BIM in deconstruction, considering theoretical perspectives, benefits, current skills needs, challenges, and connections with sustainable waste management.

In Slovenia, the CCIS CCBMIS team organized two feedback events to engage industry professionals and gather input on BIM usage in the End-of-Life (EOL) phase of buildings.

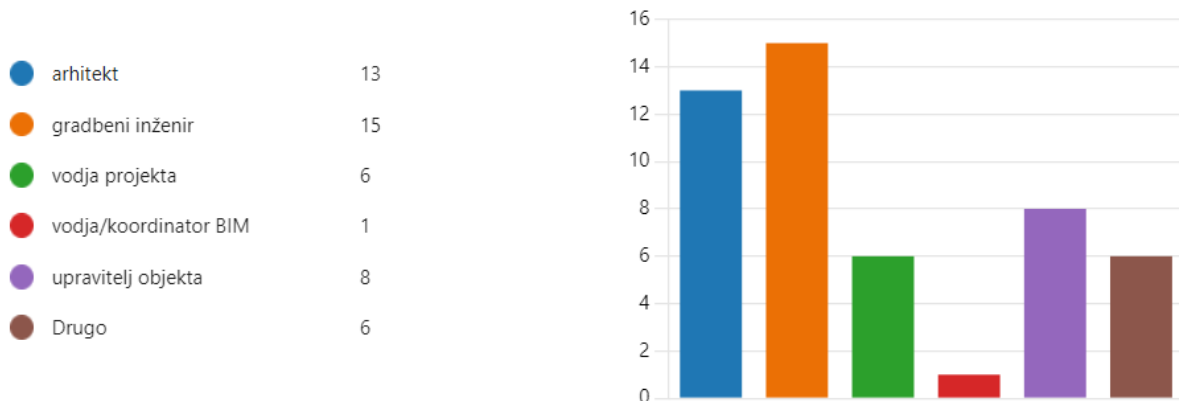
The first event (20.9.2024) was an online workshop that brought together few professionals from the construction sector. This informal online discussion focused on the strengths and challenges of BIM in facilitating sustainable deconstruction and material recovery. Participants reviewed survey results and shared their experiences, needs, and solutions. The event offered a platform for exchanging ideas and enhancing understanding of how digitalization can support EOL processes in Slovenia's construction industry. The feedback provided by participants was invaluable and has been integrated into this report to create a more comprehensive analysis.

The second feedback event, held approximately 20 days later (11.10.2024), was an in-person validation workshop. This session took place during a larger BIM event, bringing together a broader group of stakeholders to further discuss the data collected and refine the conclusions. This face-to-face workshop provided an opportunity for final consultation and more in-depth discussion of the thematic data, helping to validate and strengthen the findings of the research.

Profile of the participants to the survey



49 people participated in the survey and the chart below reports the percentage of the current role / position of the participants.



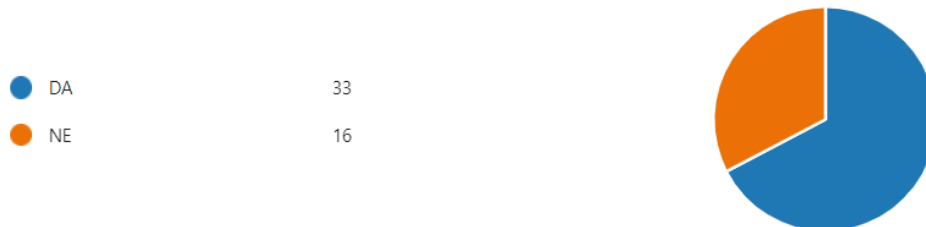
Respondents to the BIM4D survey from Slovenia represented various roles within the construction sector, including directors, architects, construction engineers, BIM coordinators, and project managers. This variety illustrates the broad interest and applicability of BIM across different roles. For Slovenia, the diversity of job positions indicates a growing recognition of BIM's relevance, from executive decision-makers to technical managers. However, a challenge remains in ensuring that all levels are aligned in terms of understanding and implementing BIM practices.

Anyway, it is therefore possible to note that the profession of construction -civil engineer and architect prevails in answers collected.

Presentation of the results of the online survey

Current use / knowledge of the BIM

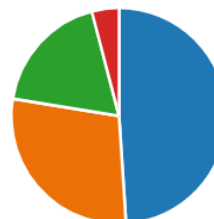
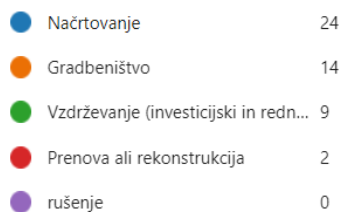
1 - Is your organization aware of the digitalization of the construction supply chain (introduced by the ISO 19650 standard) through the BIM methodology?



A significant portion of Slovenian respondents were aware of the digitalization of the supply chain in construction, guided by ISO 19650 standards. This suggests that larger Slovenian construction companies are already implementing BIM, particularly in design and construction phases. Nevertheless, smaller firms may struggle with the adoption of such standards due to limited resources and expertise. This gap could be bridged through targeted education and support from industry bodies like siBIM and buildingSMART Slovenia, which offer continuous professional development and certifications.

2 - Are you aware of or do you even partially use a BIM process in the following phases?

[Več podrobnosti](#)



Usage of BIM across various operational phases in Slovenia varies, with larger firms more likely to integrate BIM into design and construction, while smaller companies may still face challenges in terms of knowledge and resources. BIM usage for operational and end-of-life phases is still extremely limited. The full integration of BIM across all phases is still developing. However, Slovenia's push towards EU-level sustainability goals, combined with efforts by organizations such as the Slovenian BIM Association (siBIM), indicates potential growth in this area.



3 - Have you ever used a BIM digital twin to manage one or more of the following aspects of a construction project?

● Upravljanje gradbišč	11
● Časovni raspored	21
● Stroški in plačila	19
● VZD	15
● Rušenje	4



BIM digital twins are already quite often used in the processes of time allocation, organisation of work flow on construction sites, in the management of costs ad payments and in the maintenance of buildings, to a limited extend also in deconstruction. It is in this area, dealing with dynamic information, that there is an opportunity for a breakthrough in the circular economy of construction.

Perspective for the future

4 - Are you interested in developing an internal BIM process to digitalize company processes?

[Več podrobnosti](#)

[Vpogledi](#)

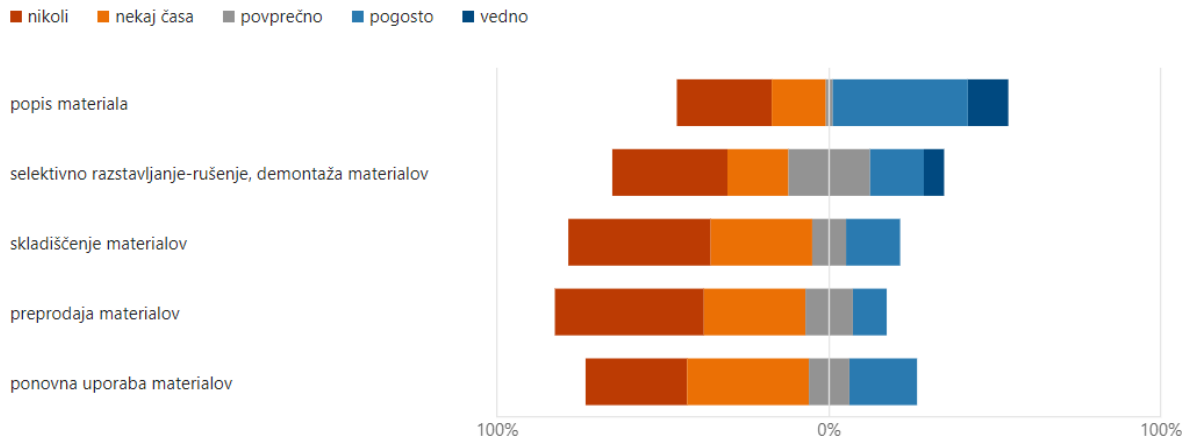
● DA	36
● NE	13



The majority share of the participating organizations expressed a high level of interest in developing internal BIM processes. The awareness of the existence of BIM in the Slovenian space is encouraging, digitalisation is recognized as a useful technology.

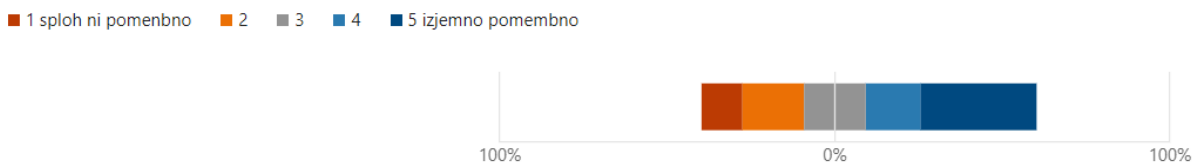


5 - To what extent is your organization active in one or more of the following phases of the demolition process?



The diversity that companies show in their participation in end-of-life practices also reflects the diverse needs for specific knowledge and training in digital skills.

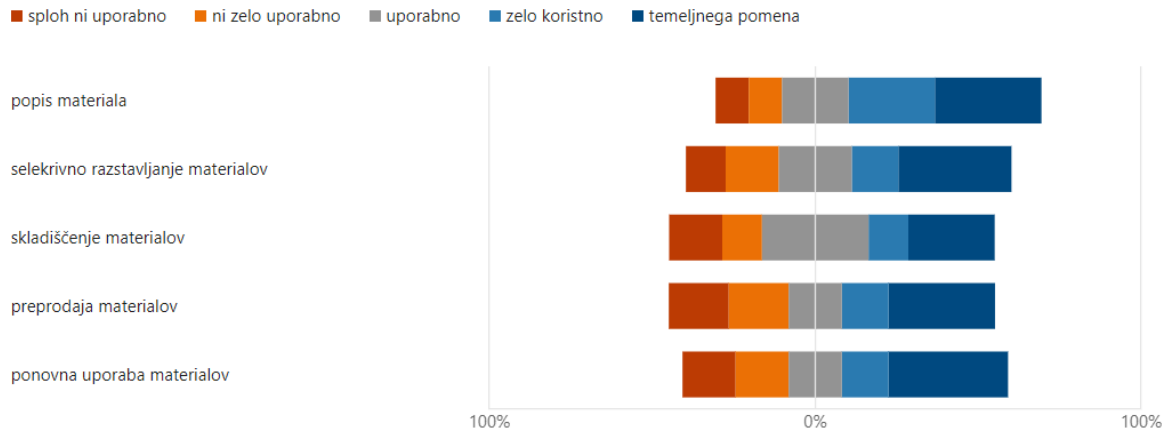
6 - How critical is it for your organization to have detailed component data in BIM libraries for effective end-of-life management?



Most companies understand detailed component data in BIM libraries as a prerequisite for effective end-of-life management. However we can conclude that this needs to be addressed in future trainings and education and have proper understanding of information stored in BIM data objects of the module.

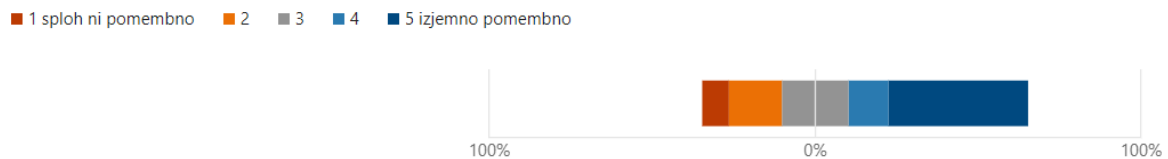


7 - To what extent would it be useful for your organization to have a digital platform linked to a BIM model to manage the following aspects of demolition?



Participants are mostly aware of the benefits of using a digital platform linked to the BIM model for the rapid development of digital services in all aspects of demolition. As we are aware much companies already use platforms such as PlanRadar, Dalux, etc.

8 - To what extent do you see a need to upskill your existing workforce in digital data and information management (BIM)?

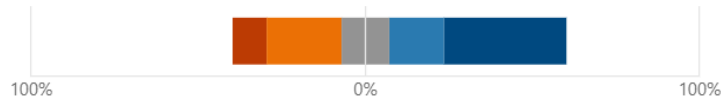


It is clear that most of respondent organisations are very aware of the critical importance of implementing an upskilling strategy to keep their workforce properly skilled and competitive in BIM and digital data management to comply with market digital skills demand.



9 - To what extent do you think there is a need for an upskilling of the workforce for the digitalization of building demolition

1 sploh ni pomembno 2 3 4 izjemno pomembno



Respondents (representative of organizations and companies) are also clearly aware of the need for employees to learn, acquire new skills and develop new competences in order to be able to adapt to new technologies, methodologies and roles in processes of demolition and EOL processes, and thus the green transition in construction.

10 - Do the BIM models used by your organization include detailed information on the disassembly and recyclability of materials?

DA 5
NE 44



Detailed information on dismantling and recyclability is rarely included in BIM models in Slovenia. They might appear to a limited extent, mostly in prefabricated building projects. The development of a recyclability dataset, dismantling and selective demolition practices and protocols represents a significant opportunity for a green transition in the construction industry.

11 - Is there a process in place to update the BIM model throughout the lifecycle of the building to reflect renovations and changes accurately?

[Več podrobnosti](#) [Vpogledi](#)

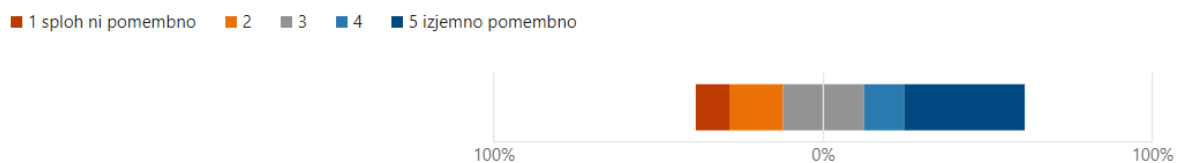
DA 14
NE 35





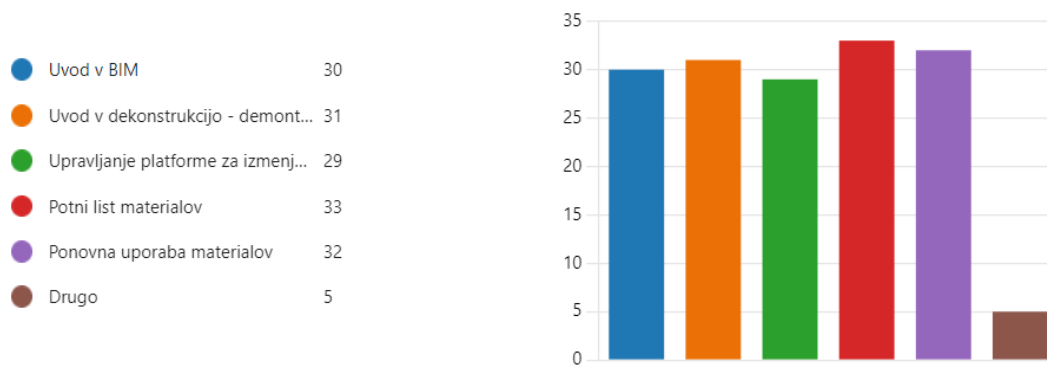
Most Slovenian respondents do not have in their companies and organizations a process or set protocol in place for updating the BIM model throughout the life cycle of the building to reflect renovations and changes. Such a dynamic and real-time process is only practised in newly built buildings that have already been designed in BIM and upgraded at the initiative of investors or managers who are aware of the benefits offered by the new technology.

12 - Do you think it is important to have a BIM model that can simulate the deconstruction process to optimize material recovery?



In the perspective of optimising material recovery, sustainable deconstruction practices and green transition the majority of respondents is aware of the importance of BIM model that can simulate the deconstruction process. This is perhaps also related with effort of EC to improve current practices and change the trend, with issuing in September 2024 renewed CDW waste management Protocol.

13 - What topics would interest you in a training course on BIM and building end-of-life?



There is clearly a high level of interest in all the proposed training courses, which demonstrates the intense need for further training in BIM.

Conclusions

Key Insights from the Survey

- **BIM awareness and use**

The majority of respondents indicated a strong awareness of digitalisation within the construction supply chain, particularly through the ISO 19650 standard, which defines best practices for managing information throughout the lifecycle of a built asset using BIM. However, the actual use of BIM in the different phases of the deconstruction process is still limited. This suggests that while awareness is high, the translation of this awareness into action, particularly in end-of-life (EOL) practices, is still developing.

- **BIM for digital twins in deconstruction**

Only a small percentage of participants had experience using BIM digital twins to manage construction projects, particularly in the deconstruction phase. This indicates an opportunity for further growth in the use of BIM as a tool to optimise resource recovery, waste minimisation and sustainable practices in demolition.

- **Interest in digitising business processes**

Many organisations expressed interest in developing internal BIM processes to improve business workflows. This signals a willingness across the industry to adopt more advanced digital tools, but also highlights the gap in workforce upskilling to meet this demand, particularly in the specialised context of EOL and deconstruction.

- **Need for detailed component data**

Having detailed data within BIM libraries was seen as critical for effective end-of-life management, particularly for disassembly and material recycling. Respondents recognise the importance of having accurate component-level information for the circular economy.

- **Continuous workforce training for digitalisation**

The majority of respondents agreed on the need to upskill their workforce, particularly in managing digital data and information related to BIM for demolition. This finding highlights the importance of targeted training programmes to bridge the skills gap and enable companies to better manage the complexities of building demolition and material recovery using BIM.

- **Challenges and opportunities**

While many see the potential of BIM in deconstruction, there are still challenges related to integrating BIM into the various stages of the demolition process. A significant number of organizations do not have detailed processes for updating BIM models throughout the building lifecycle, and many do not include information about disassembly and material recyclability in their BIM models. This gap presents both a challenge and an opportunity to improve the role of BIM in sustainable demolition and material reuse.



How to move from conventional construction technologies to digitally supported technologies practices in the construction industry, which represents a challenge for all involved representatives of the design, operation, production and learning centers in the field of construction and deconstruction? (The content of the discussion at the workshop is given in more detail in report A2.3). **In the perspective of deconstruction, we understand BIM as a planning approach that defines the degree of separation of construction waste at the source.** In our view design phase is the most influential phase where fundamental decisions are made for the circular economy.

Based on our findings, the BIM4D project should focus on (workshops on 20.9.2024 and additional one 11.10.2024, both in Ljubljana):

- The use of BIM advanced software tools and modeling with some already built-in AI functions in deconstruction is only possible as an upgrade of quality engineering approaches. In the case of construction and deconstruction contractors, the latter refers to both qualitative educational advancement in terms of conventional engineering knowledge and skills, as well as the competence to master digital technologies, solutions and services in the context of information and communication infrastructure. It must be followed this through education system in the shortest possible time.
- Of particular importance for accelerating the green transition and the transition from a linear to a circular economy in the construction industry is development of platforms with databases of building materials and substances. It seems necessary to encourage the development of innovative, scientifically research-active operations in the field of recycling, with intensive multi disciplinary cooperation between areas of activities of analysis (testing methods for materials and substances), development of systemically usable BIM with extended recyclability information's, as also sustainable design, production, construction and decommissioning management in the construction industry. As well, introduction of digital Twins as new generation of digital technology in the end-of-life phase - demolition phase plays crucial role for circular economy implementation in construction industry sector.

The **BIM4D project** has uncovered significant opportunities for the integration of Building Information Modeling (BIM) into end-of-life (EOL) practices in Slovenia, particularly in deconstruction and material recovery processes. However, several challenges remain, especially in the areas of workforce upskilling and the full adoption of digital processes across the construction industry.

One critical area where the project could expand its focus is the inclusion of **asbestos management** within the BIM framework. With the upcoming changes to the **EU asbestos directive** and the increasing need for safe handling of asbestos-containing materials (ACM) in older buildings, there is a clear opportunity to incorporate detailed information on potentially contaminated materials and areas requiring special attention in BIM models for renovations.

Asbestos is particularly relevant for older building stock in Slovenia, where the use of **chrysotile asbestos** in roofing and insulation was common. Integrating **asbestos risk assessments and management plans** within BIM models can provide real-time data during deconstruction and renovation projects. This would not only ensure compliance with health and safety regulations but also



streamline the deconstruction process by identifying contaminated areas early, thus reducing risks to workers and the environment.

Key Recommendations for Further Action:

1. **Expand BIM to Include Asbestos Management:** Incorporating ACM data into BIM models can enhance the safety and efficiency of renovation projects. It is crucial to develop detailed BIM datasets that reflect potential contamination zones in older buildings.
2. **Training and Certification:** Specialized training for BIM professionals should include modules on handling hazardous materials like asbestos. This training would enable companies to safely manage asbestos during building EOL processes while adhering to evolving EU regulations.
3. **Compliance with Asbestos Legislation:** Given the upcoming changes in **EU legislation on asbestos** and the significant presence of ACMs in older Slovenian buildings, the Slovenian construction industry must prepare to adopt stringent safety protocols. BIM can be a key tool for ensuring compliance by integrating **asbestos risk management** at the design and deconstruction stages.
4. **Policy and Incentives:** Slovenian public authorities should consider introducing incentives for the adoption of BIM also in larger and public renovation projects (residential areas etc.), particularly where asbestos is a known risk. Clear guidelines and financial support can accelerate BIM adoption, especially in SMEs