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Exchange between construction/deconstruction workers and education professionals on the BIM use at EOL practices: Strengths and challenges

Belgium Report

Centre IFAPME Liège-Huy-Verviers

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Introduction

Building Information Modelling (BIM) is an innovative and transformative technology in the construction industry, offering a 3D digital representation of the physical and functional characteristics of buildings and infrastructure. BIM facilitates improved collaboration, efficiency, and sustainability throughout the lifecycle of a project, from design and construction to operation and maintenance.

Europe has been at the forefront of BIM adoption, with varying degrees of implementation and maturity across countries. The Directive 2014/24/EU on public procurement, adopted by the European Union in 2014, plays a pivotal role in promoting the use of BIM across Europe. This directive encourages member states to consider digital tools, such as BIM, for public works contracts. The aim is to enhance efficiency, transparency, and innovation in public procurement processes.

A.2.1 has provided detailed research to conform a report on the current status of BIM uses providing an overview of the status of BIM in Belgium, Germany, Greece, Italy, and Slovenia, the countries that are represented in the BIM4D consortium. The second part of the research has been devoted to the use of BIM for deconstruction considering various elements: theoretical perspectives, benefits, current skills needs, challenges, relating policies and links with sustainable waste management.

A.2.2 - Needs assessment on current skills needs of the use of BIM at EOL practices has been implemented via a survey to understand the skills required for effectively using Building Information Modeling (BIM) in the deconstruction phase of construction projects and detect skills needs to design the training within the BIM4D project. The survey has been addressed to professionals and companies who use BIM in their regular work or who have knowledge of the topic or who consider BIM an opportunity for their company.

A.2.3 - Exchange between construction/deconstruction workers and education professionals on the BIM use at EOL practices: Strengths and challenges has been implemented via workshops designed to foster exchange between construction, deconstruction workers, and education professionals regarding the use of Building Information Modeling (BIM) in End of Life (EOL) practices. The focus is on discussing the strengths and challenges of BIM in facilitating sustainable deconstruction and material recovery. A workshop has been conducted in each participating country of the BIM consortium (Belgium, Germany, Greece, Italy, and Slovenia) with construction workers, deconstruction workers and educational experts.

Agenda of the Workshop

The ***BIM4D Deconstruction: The Key to Tomorrow's Projects workshop*** was organized by the Centre IFAPME Liège-Huy-Verviers and took place in person on **Wednesday 9th October 2024** at the construction training centre (ConstruForm) located in Grâce-Hollogne (Belgium).

The event provided a platform for participants to engage in discussions about the future of digital (de)construction and the skills required to address emerging challenges. A diverse group of attendees contributed to the exchanges, fostering a stimulating and collaborative environment. Participants were encouraged to share their professional experiences and insights during roundtable discussions.

Agenda

09:30 Welcome

10:00 Introduction to the challenges of deconstruction and the role of digital tools

10:30 Small-group discussion workshops:

- Digital Integration in Deconstruction
- Strengths and Challenges of Digital Tools in Deconstruction
- New Skills for Current and Emerging Professions

11:30 Group debriefing session

12:00 Closing remarks and networking lunch

Venue Address

ConstruForm – Pôle Energie

23 Rue de Wallonie, 4460 Grâce-Hollogne, BELGIUM

Profile of the participants

Through a strategic approach involving the distribution of a wide range of invitations and proactive networking, we successfully brought together a highly diverse group of participants for the workshop. This effort ensured that individuals with various backgrounds, expertise, and perspectives were present, contributing to a richer and more engaging exchange of ideas.

- **Number of participants:** 37 participants

- **Breakdown of professional roles:** A short description of the participants by category
  - 8 construction and deconstruction professionals
  - 13 construction experts
  - 16 educational experts

Content of the discussion

After an introductory presentation of the BIM4D project and the challenges of deconstruction and BIM, workshop participants were divided into three pre-assigned discussion groups (identified by a coloured sticker on their badge). Each group was invited to respond to a series of questions posed by a facilitator and then to summarise its conclusions in a visual format, which was later presented to all participants at the workshop's closing session.

Below is an overview of the discussions held within each group.

1. Digital Integration in Deconstruction – Group 1

Questions

Based on your experience, what are the most important digital technologies that you believe can transform deconstruction processes at different stages? How can they be better integrated?

How do you think digital tools (especially BIM) can improve the efficiency and sustainability of deconstruction projects and in which stages? Can you share any relevant examples?

In what ways do you think BIM can transform the deconstruction process?

What difficulties have you encountered when trying to adopt digital tools in deconstruction?

How do you see the future of digital integration evolving in the deconstruction industry over the next 5-10 years?

General Observation

Digital Integration in Deconstruction addresses **two essential aspects**, depending on whether the project concerns new construction or the renovation of an existing building.

For **new construction**, implementing Building Information Modeling (BIM) from the early design stages with deconstruction in mind is crucial. This approach, known as "Design for Deconstruction," ensures that buildings are created with materials, components, and structures that can be efficiently dismantled or repurposed in the future. Achieving this requires meticulous planning and the use of specialized digital tools that facilitate lifecycle management and end-of-life considerations from the outset.

In contrast, **renovation projects** present unique challenges, especially when dealing with older buildings that were not originally designed with BIM. For these structures, having reliable, detailed data on the building's components and layout is essential to guide renovation and potential future

deconstruction. Digital technologies such as 3D scanning, drones, and photogrammetry play a vital role here, enabling precise capture of structural information and the creation of a comprehensive digital model. This digital framework enables structured planning of renovations, precise material quantification, and can ultimately contribute to sustainable deconstruction strategies.

By leveraging these digital integration strategies, both new and existing buildings can benefit from a more sustainable and resource-efficient approach to construction, renovation, and deconstruction.

Needs and Challenges

- **Centralized Building Information Repository**: There's a pressing need for a centralized registry of building information—a "building passport"—since current documentation like intervention dossiers is often incomplete. This registry would provide a single point of access to essential building information.
- **Long-term Data Accessibility**: Ensuring that information remains accessible as software and file formats evolve is a significant challenge.
- **Obstacles**: A wide variety of information formats (e.g., intervention dossiers, energy certificates, technical data sheets), lack of digital connectivity, data protection concerns (GDPR), and resistance to change.
- **Training Existing Workers**: Rather than relying only on recent graduates trained in BIM who may lack field experience, it's crucial to train current construction workers at all levels in new digital tools, adapting the training approach to each role.

2. Strengths and Challenges of Digital Tools in Deconstruction – Group 2

Questions

What do you see as the main strengths of using digital technology (especially BIM) in deconstruction phase? Are there any stages where it would be effective?

How could the BIM process add value to the existing digital tools already used in deconstruction?

In your experience, what are the most significant challenges associated with implementing digital tools in deconstruction? How could overcome these barriers?

Observation

Many construction companies, particularly smaller firms, have **limited digital maturity**, which creates a significant gap in digital and deconstruction capabilities between large and small companies. While larger companies often have the resources to invest in advanced digital tools

and specialized training, smaller firms frequently lack both the financial means and expertise to adopt these technologies. This disparity limits the ability of smaller companies to fully engage in digital transformation and hinders their participation in sustainable deconstruction practices, placing them at a disadvantage in a rapidly evolving industry.

Needs and Actions

- **Awareness and Demystification**: Raising awareness at different levels is essential, including basic education for young people, ongoing training for workers, and outreach to companies and the public. Young people are generally more receptive to digital tools, and they could bring these skills to the industry if companies are receptive to their input.
- **Gradual Change and Practical Examples**: Demystification should be done through concrete, incremental examples to avoid overwhelming companies with sudden changes.
- **Learning from Traditional Architecture**: Historically, architectural practices incorporated deconstruction and reuse of materials. Returning to these principles could enhance sustainability.
- **Digital as a Tool for Progress**: Digital tools can drive innovation, carbon reduction, information transfer, and profitability in the industry.
- **Engaging Policymakers and the Public**: Both policymakers and citizens need to be made aware of the value of digital tools in sustainable construction and deconstruction.
- **Skill Development**: Fundamental digital skills should be incorporated gradually into both basic and continuing education. Equipping young professionals with the knowledge to inform companies about these tools is critical, but awareness must be raised before introducing advanced technologies like BIM.

3. Necessary Skills for Existing and Emerging Professions – Group 3

Questions

What skills do you think are currently missing in construction professionals?

What skills do you think are currently missing in deconstruction professionals?

What new professions or roles do you foresee emerging in the deconstruction industry due to increasing digitalization?

What skills will these roles require?

Do you think current educational or training programs adequately address the need for both technical and green skills in the context of BIM and deconstruction?

What gaps do you see in the current offerings, and how can they be addressed?

Identified Needs

- **Broad Awareness of Core Processes:** Deconstruction remains a relatively new and underdeveloped area within the construction sector, highlighting the need to raise awareness about its processes and benefits across the industry.
- **Focus Areas for Sustainable Practices:** Emphasis should be placed on promoting sustainable construction methods, but also deconstruction. This effort requires both widespread awareness and targeted training to build competency in eco-friendly approaches.
- **BIM as a Facilitative Tool:** BIM should be recognized as a means to enhance construction and deconstruction outcomes, not as an objective in itself. This perspective keeps BIM aligned with practical applications rather than isolating it as a purely digital exercise.
- **Gradual Skill Development Pathways:** Basic deconstruction skills should be introduced as a foundation, paving the way for more complex digital competencies. This sequential approach ensures that advanced digital tools are integrated meaningfully and effectively.

Implementation Strategies

- **Creation of New Professions**: There is a need to establish new specialized roles focused on inventory management, dismantling, material storage, and component reassembly. These roles will support a structured approach to deconstruction.
- **Enhancement of Existing Roles**: Targeted training for architects, contractors, public authorities, and clients is essential to integrate deconstruction practices into the core principles of project foundations.
- **Securing Funding for Practical Projects**: Dedicated funding is necessary to support pilot projects that will make these new roles and deconstruction practices viable and scalable.
- **Social and Employment Impact**: This initiative has the potential to create impactful job opportunities, including roles that do not require highly specialized skills, making the field more accessible to a broader workforce.

Main conclusions

To advance digital integration and sustainable deconstruction, embedding **deconstruction thinking at every stage of the project lifecycle** is a top priority. For new buildings, this involves planning for future dismantling from the outset; for renovations, it means maximizing resource reuse by reintegrating salvaged materials. This approach aligns with broader goals of resource efficiency and environmental responsibility.

Equally important is the **need for concrete projects and relatable examples**. Demonstrating successful cases of digital integration and sustainable deconstruction in real-life settings will help engage stakeholders, build awareness, and showcase the tangible benefits of these practices.

Comprehensive training across all levels is essential for effective implementation. Training must extend beyond new graduates to include existing employees at various expertise levels, ensuring that all participants in construction and deconstruction understand and contribute to sustainable practices.

As the sector evolves, **developing and recognizing new professions** is also a significant priority. Specialized roles in material inventory for recovery, dismantling, material stock management, and reassembly will be crucial for professionalizing the industry and meeting the unique demands of sustainable construction. The validation of these roles will help establish a skilled workforce dedicated to deconstruction and digital practices.

Another key priority is to **foster a culture of collaboration and digital transformation**. Moving the sector toward digital maturity requires a collaborative approach among large and small companies, public authorities, and training institutions. A gradual, step-by-step digital integration strategy will allow companies and workers to feel supported as they transition to new processes.

To build support and societal understanding, it's essential to **engage policymakers, companies, and the public**. Educating these groups on the benefits of sustainable deconstruction and digital integration—especially their impact on resource management and the environment—will help secure long-term buy-in.

Lastly, **promoting innovation as a driver of both sustainability and profitability** is crucial. Emphasizing digital tools as pathways to efficiency, carbon reduction, and improved information sharing can help stakeholders view digital transformation as a valuable opportunity for positive change and financial growth.

Photos or Screenshots


LOVE nature


dans la déconstruction
(à chaque étape du
schéma)
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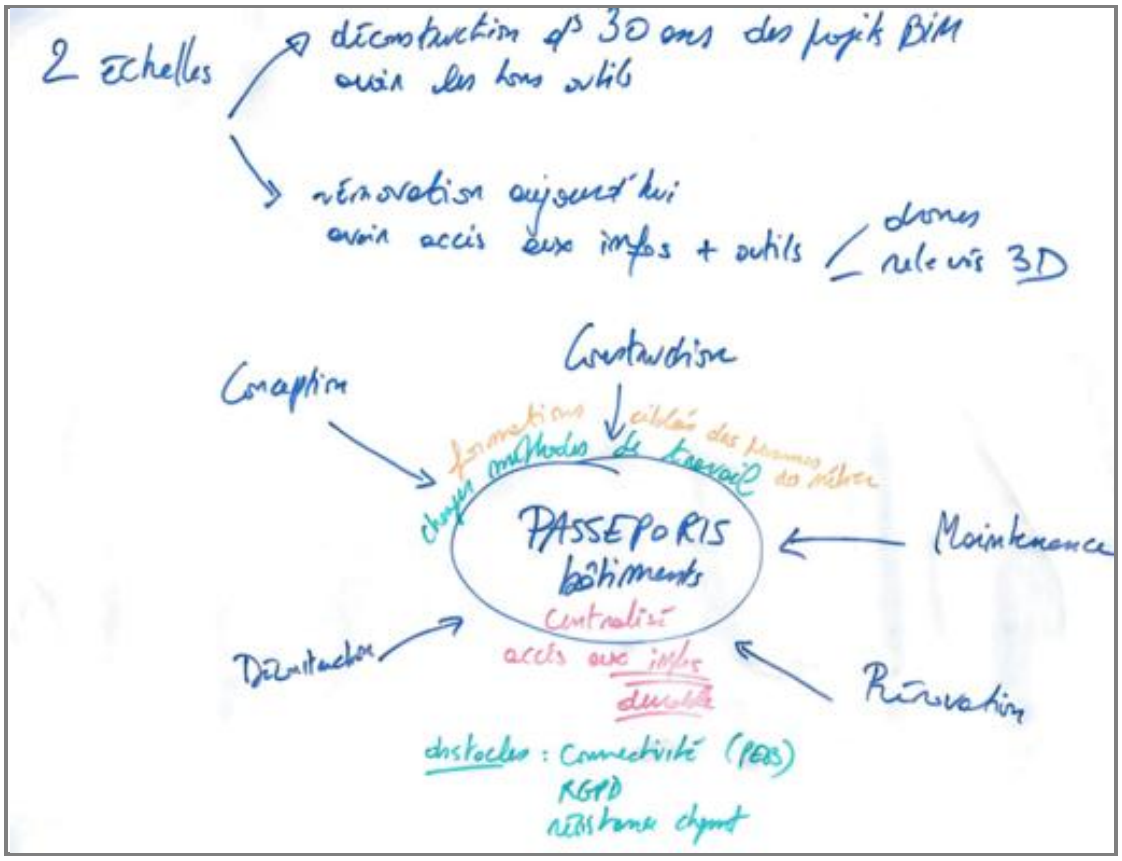

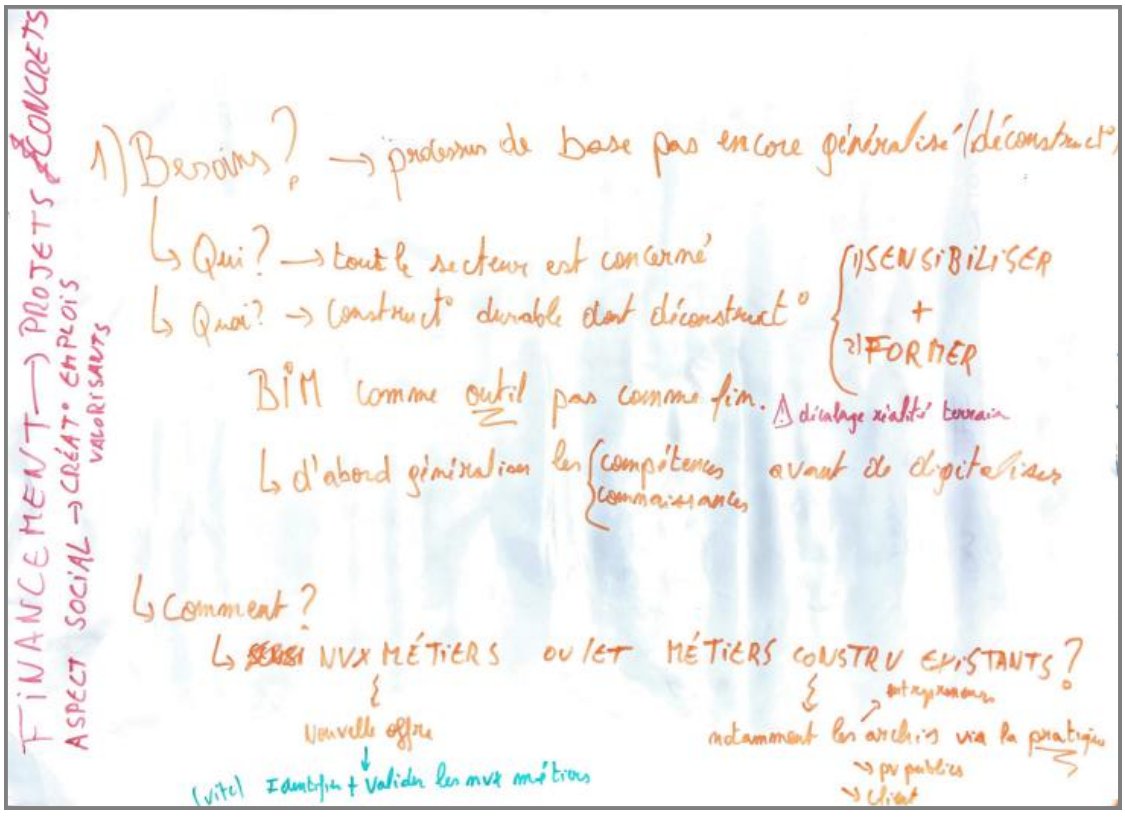

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