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Advancing Timber for the Future Built Environment

SUSTAINABLE AND TEMPORARY USE OF VACANT BUILDINGS AND SITES THROUGH SIMPLE AND MODULAR STRUCTURAL MEASURES

Christophe Sigrist[1], Joaquim Escoda Llorens[2], Edyta Augustynowicz[3]

ABSTRACT: Temporary uses of vacant buildings can significantly enhance the attractiveness of locations, generate societal value, and conserve valuable land resources. Researchers at BFH have developed a modular system designed specifically to facilitate the quick and simple temporary "furnishing" of vacant spaces. These modules comprise lightweight timber elements and layered finishing components that can be easily assembled by just two people without specialized tools. Innovative joints enable the repeated assembly, disassembly, and adaptation of modules to suit different temporary uses over time. Central to this system is a parametric planning, fabrication, and visualization tool that simplifies project acquisition, streamlines feasibility assessments, and enhances planning efficiency.

The project contributes to sustainable urban densification by providing flexible and practical construction solutions. It actively encourages collaboration among property owners, municipalities, and initiators of temporary use projects. The modular construction kit is currently undergoing practical testing as a full-scale prototype at DISPO, demonstrating its applicability for diverse scenarios. Potential customers include property owners of vacant buildings, municipal authorities, and organizers of temporary usage initiatives. The scalable and adaptable modular system offers significant market potential, particularly suited for temporary structures intended for recurrent purposes, such as sporting events, emergency housing, or temporary accommodation within warehouse settings

KEYWORDS: modular constructions, temporary use, multi-detachable connections, digital planning, digital fabrication

1 – INTRODUCTION

According to the Federal Office for Urban Planning in Switzerland [1], unused sites collectively amount to an area equivalent to the city of Geneva. Approximately 80% of these 17,000,000 m² sites exceeding 1 hectare each are situated within urban regions. Additionally, numerous smaller vacant areas further increase the potential for revitalization. Smaller vacant plots totalling around 3,500,000 m² correspond roughly to 1,000 medium-sized commercial warehouses (approximately 3,500 m² each), presenting large potential for temporary utilization. Furthermore, approximately 6,500 office spaces are continually advertised for lease, offering additional opportunities for interim use.

Empirical evidence over the past two decades demonstrates how temporary uses generate significant social and economic benefits, fostering urban identity and addressing societal needs through accessible and flexible solutions [2]. There is a political drive to conserve building land as a resource and prioritize densification, which makes temporary use even more important. Additionally, there's a growing emphasis on retaining and adaptively transforming existing structures, promoting shorter utilization cycles instead of complete replacements. As such, modular wooden elements can sustainably enhance the existing building fabric [3].

The adaptive reuse of vacant buildings and sites holds significant importance to society, offering great potential for innovative temporary spaces that encourage dynamic work environments and creative initiatives. These interventions can sustainably utilize available resources, generating ecological, economic, and social value [4]. The initial developments focus on "house-in-house" solutions; however, they can also be adapted for external applications. This scalable modular system holds substantial market potential for flexible and recurring applications, such as sports events, emergency housing, and temporary accommodation in underutilized spaces.

Until now, no straightforward tool exists for efficiently planning, designing, and implementing high-quality, standardized "house-in-house" solutions tailored to specific needs. The project's goal is to develop an innovative system comprising a sophisticated modular kit and digital configurator, enabling quick, cost-effective adaptations of vacant warehouses and large spaces for

[1] Christophe Sigrist, Bern University of Applied Sciences BFH, wood division AHB, Biel, Switzerland, christophe.sigrist@bfh.ch

[2] Joaquim Escoda Llorens, Bern University of Applied Sciences BFH, wood division AHB, Biel, Switzerland, joaquim.escodallorens@bfh.ch

[3] Edyta Augustynowicz, Bern University of Applied Sciences BFH, wood division AHB, Biel, Switzerland, edyta.augustynowicz@bfh.ch

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diverse new uses with minimal planning effort and achieving market readiness. A proven and experimental step by step development of light, temporary structures for a restricted duration of life [5] was adopted to testing and improving intermediate solution again in this project. This means that a substantial part of the research is directly carried out on the prototype in adding and removing layers, adapting and altering connections to get direct feedback on the improvement achieved on intermediate solutions.

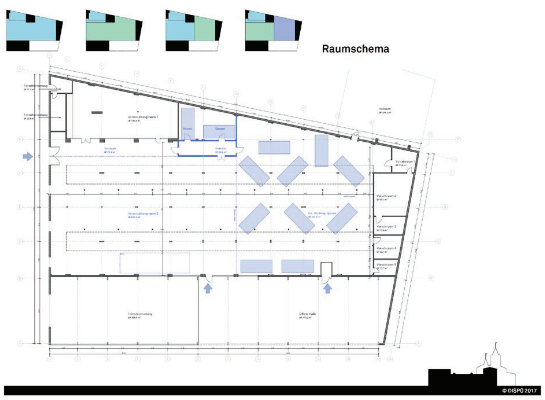

Figure 1. Example of intermediate use of a vacant warehouse by placing lightweight modules

The project was launched in mid-2022 as a large research program between academic institution BFH and industry partners, including SMEs specializing in architecture, timber construction, multi-layer timber panel manufacturing, and building physics. Convincing owners, authorities, and neighbourhoods is a key issue in the success of any innovation. The "àDisposition" project aims to achieve this by creating a modular construction kit integrated with an intuitive digital configurator. This tool simplifies planning and efficiently demonstrates project viability, as well as prepares files for production, significantly reducing the time and resources required for implementation. The developed modular kit and the digital design-to-production workflow have been tested and assessed for different use cases as 1:1 prototypes constructed within a large vacant warehouse (DISPO) near Biel "Fig. 1".

2 – SOCIAL IMPACT OF TEMPORARY USES IN URBAN DEVELOPMENT

This research investigates how temporary uses can empower diverse social groups to address local urban challenges in a participatory manner. The project adopts a transdisciplinary approach that connects architectural flexibility with social inclusion. Through the development of an affordable rentable and demountable modular system and an intuitive configurator tool, the research facilitates community participation in urban adaptations and spatial planning processes.

The conceptual approaches developed in this study are validated empirically by selected users in exemplary use cases. The implementation phase at DISPO in Nidau "Fig. 2" serves as a prototype environment, where various stakeholders – including operators, users, and regulatory authorities – actively participate in refining this approach. This iterative process identifies best practices to optimize methodologies and enhance implementation strategies.

The prototype applications generated by this project contribute to social innovation by fostering social cohesion, facilitating diverse structural configurations, and improving the usability of public and semi-public spaces. By embedding temporary uses within a broader socio-spatial context, this research highlights the role of adaptive urban interventions in promoting sustainable and inclusive urban development.

Figure 2. DISPO Hall, a vacant warehouse near Biel, serving as the assembly site for the project's first prototypes.

Another focus of the project is to unlock the economic and social potential of vacant properties by converting them into versatile and cost-effective spaces, such as creative hubs, co-working spaces, studios, and event venues. By replacing unprofitable vacancies with vibrant social spaces, the project ensures these locations serve meaningful purposes rather than remaining underutilized.

3 - PROJECT DESCRIPTION

3.1 MAIN PROJECT GOALS

Until now, there has been a lack of a simple tool for planning, designing and implementing high-quality, needs-based, standardised 'house-in-house' solutions to be able to adapt industrial warehouses and large spaces to new uses quickly, cost-effectively and without a great deal of planning effort. This is where the "àDisposition" project comes in: As part of the project, an innovative tool consisting of a technically sophisticated modular construction kit and a digital configurator is being developed to customise the interiors of unused properties based on an efficient process in a simple, cost-effective and situation-appropriate manner and adapted to the desired use.

The project aims at developing four major innovations: 1) a modular construction kit, 2) a digital planning and visualization tool, 3) the definition of use requirements and validation by prototyping and 4) a lean process for planning and realization of unused spaces.

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1) **The modular construction kit** is designed around fundamental principles: lightweight construction, simplicity (low-tech), scalability, and flexibility. The system prioritizes ease of use, durability, and diverse connection options suitable for assembly by non-professionals. Its primary goal is to offer a highly adaptable, efficient, and robust solution for temporary usages, while also maintaining excellent structural integrity and appealing aesthetics. The system consists of simple rectangular elements, serving as walls, floors or slabs. When combined together they form segments, which can be assembled into 3-dimensional modules. Once with layers, they create adaptable rooms “Fig. 3”.

Figure 23. Definition of Element – Segment – Modul – Room

The kit consists of two main types of minimalistic elements: components and layers. Components form the structural framework, ensuring global stability, defining architectural shapes, and contributing to visual quality. Adaptable layers, on the other hand, determine the bioclimatic properties and interior finishes.

In addition to functionality, the modular construction kit emphasizes high-quality design. Its modular character makes it suitable for varied urban applications, ensuring environments are adaptable, sustainable, and responsive to evolving user needs.

Beyond functionality, the construction kit prioritizes high design and spatial quality, creating adaptable environments that balance aesthetics with performance. Its modular nature supports diverse applications in urban settings, ensuring that spaces remain flexible, sustainable, and responsive to changing needs.

2) **A digital configurator** with advanced 3D planning and visualization capabilities simplifies the entire workflow, from initial planning to the final production of modules. It integrates various tools within Rhino, Grasshopper, providing interfaces with other software such as CadWork for detailed planning and Lignocam for manufacturing. Structural analysis is conducted using a Karamba plugin, ensuring compliance with current design standards for connections and load-bearing requirements.

The primary goal of this configurator is to streamline the design-to-production process. A user-friendly, web-based interface enables clients without design or engineering expertise to efficiently layout and visualize their projects. Additionally, users can rapidly assess environmental impacts, building physics, structural performance, and associated costs. This accessible approach aims to broaden market reach and facilitate wider adoption of the developed modular solutions.

3) Within this project **requirements for different utilization scenarios and to validate the developments by prototyping are defined**. Specific layer sequences are carefully planned to meet various fire protection, sound insulation, and climatic standards. Specific materials for these layers are used or combined to enhance the minimal required load-bearing structure, maintaining modular flexibility. “Fig. 4”.

Figure 4. Layers presented in grey to be composed and adapted according to the requirements of the temporary use case considered.

At DISPO in Nidau, full scale prototype testing assesses the practical suitability of the modular system for various uses. During this testing phase, climate measurements are taken to validate the accuracy of theoretical models.

The concepts developed within this study undergo empirical validation through practical application involving selected user groups and specific use examples to investigate and reach the goals presented in chapter 2. This prototype phase incorporates feedback from key stakeholders, including operators, end-users, and regulatory authorities. The findings from these tests are systematically documented and iteratively refined, resulting in optimized solutions.

4) A **streamlined process, from initial planning to the final implementation** of usable spaces, is developed and tested. Due to efficient and fully digital planning and execution, the modular system remains cost-effective, even for small-scale projects, and can easily adapt to various geometries of the unused halls and use cases. The production of these modules can occur anywhere globally.

While many modular lightweight construction systems exist on the market [6],[7], [8], none offer a standardized solution adaptable to diverse spatial situations and applications with consistent connections, similar to the USM shelving system designed by Fritz Haller [9]. This project translates the modular furniture concept into a spatial modular system based on two-dimensional element construction, differing significantly from traditional three-dimensional container modules.

3.2 BUSINESS TARGETS

The modular construction kit presents market opportunities through selling elements and renting prefabricated room modules. The system's standardized design and fully digital planning process significantly reduce time and cost, addressing a market need for temporary and minimally invasive use of existing vacant buildings. This unique approach provides a competitive advantage and a creates unique selling proposition (USP).

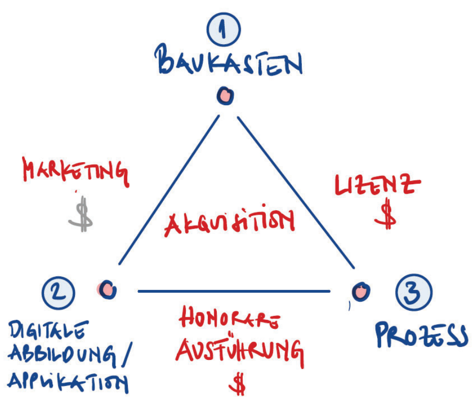

Figure 5. First thoughts linking building kit, digital representation (configurator) and process optimisation (digital chain) and opportunities for earnings as a base for the business plan.

The three core components the - modular construction kit, configurator, and workflow processes - are closely integrated and developed iteratively by the project team "Fig. 5". To ensure continuous improvement, market expansion, and sustained maintenance of the configurator and modular system, a dedicated start-up company will be established. Additional partners, such as UX designers and graphic specialists, will be involved towards the end of the project to enhance usability and market appeal in the implementation phase of the project.

The configurator generates revenue through licensing. Full licenses provide access to planning, visualization tools, and decentralized local production capabilities. Exclusive access to the full configurator version is available for research partners, further enhancing the USP. Additionally, a beta version for exclusive B2B partners and a teaser version for customer acquisition will be offered. The configurator facilitates orders and supports further development of customized "house-in-house" solutions, expanding market reach.

A simplified, lean workflow is established, significantly reducing the planning effort from initial feasibility checks to final production. Clients benefit from the ability to quickly conduct variant studies and directly assess associated costs, streamlining project implementation. The roadmap for the client is depicted in "Fig. 6".

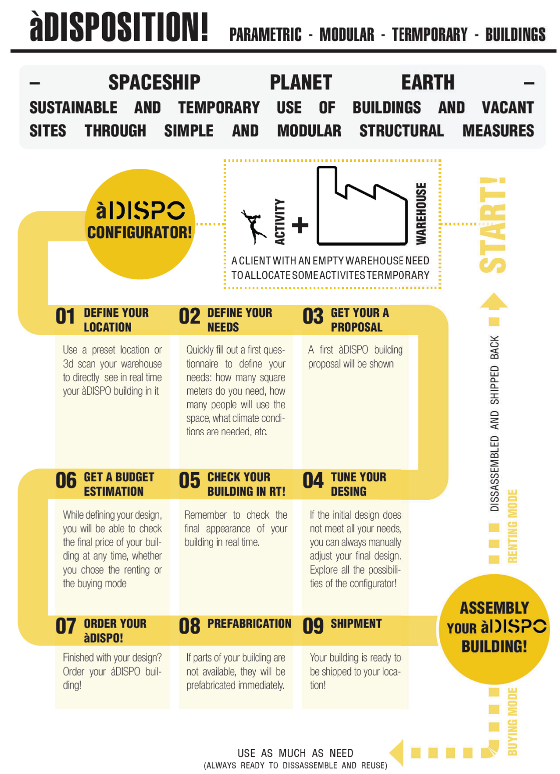

Figure 36. Infographic diagram showing the process of using the àDisposition modular system.

3.3 VALIDATION OF THE TOOLKIT FOR INTERIM USE SCENARIOS

Experiences from the past two decades clearly demonstrates that temporary uses can generate significant social and economic benefits. Interim uses increasingly influence site development, often helping to create a distinct identity for places. They offer low-threshold access for a wide range of needs and objectives, providing flexible and adaptable spaces for various user groups. This project builds directly on that understanding, practically connecting architectural challenges with social-scientific perspectives and actively involving a diverse range of stakeholders.

Using the modular construction kit and digital configurator, the project supports participatory development processes, enabling stakeholders to shape spaces according to their specific needs and ideas. Project concepts are evaluated for feasibility through selected user groups and practical examples, ensuring that theoretical ideas are grounded in practical reality. The project explicitly adopts a transdisciplinary approach,

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embracing social and structural diversity to include people from varied social backgrounds.

Conceptual ideas will be developed collaboratively with the involvement of all relevant stakeholders, including operators, users, and regulatory authorities. These ideas are then put into practice at the DISPO site in Nidau, where they serve as a real-world testing ground for the project's methods and approaches.

The aim of the project is to provide comfortable spaces for many different usage scenarios. For this reason, the modular system allows for multiple configurations with different dimensions, features and finishes, which can be tested with the configurator. Customized solutions are developed to precisely meet the unique requirements of each scenario. Various distinct utilisation scenarios were conceptualised, designed, and will undergo full-scale prototyping "Fig. 7".

Figure 47. Examples of different configurations for four possible use scenarios.

The collected data will enable an assessment of the solutions' suitability for temporary use applications. Additionally, user surveys, concept evaluations, and iterative optimizations form an essential part of the validation process, offering valuable insights to refine both the design concepts and the supporting tool.

3.4 CHALLENGES FOR JOINTS AND FASTENERS

Connections are crucial in this modular building system and form a significant research topic within this project. The main challenge is ensuring structural integrity without compromising ease of disassembly and reassembly without wear and tear. Permanent or non-reversible connections are avoided beyond element level. Connections must be intuitive and require few tools for assembly. Various standard and customised connection types will be explored and tested through prototypes.

Inspired by the USM system, the connections must be designed to be robust, intuitive, and stable without requiring specialized knowledge. Multi-layer elements should be securely fastened to accommodate different functional and environmental demands.

The design and implementation of connections that allow for systematic disassembly and reusability remain largely underdeveloped. Current practice in modern timber construction favors connections that are optimized for rapid assembly and high structural integrity. However, such systems typically do not support reversible joining, limiting the potential for component reuse or modular adaptability. At present, there are no established standardized solutions or "patentable" systems enabling the additive integration of new layers or the creation of fully detachable element connections. Addressing this gap is essential for advancing circular construction principles, promoting material reuse, and enabling flexible adaptation of timber structures over their life cycle [10].

3.5 STRUCTURAL AND FUNCTIONAL LAYERING

Components in building systems typically consist of load bearing (structural) and non-load-bearing layers, each fulfilling specific functions. The definition of performance requirements - specifying what the component must achieve - is essential for determining layer composition and structural dimensions.

A representative example is the optimisation of timber floor systems in residential buildings [11]. In this case, the critical load-bearing function of floors was evaluated, considering various material combinations to enhance performance. The analysis differentiated functions and performance of separate layers, particularly when rigidly connected. Results showed that optimized configurations are applicable to similar systems, including roofs and walls, broadening their use in multi-layer timber construction "Fig. 8".

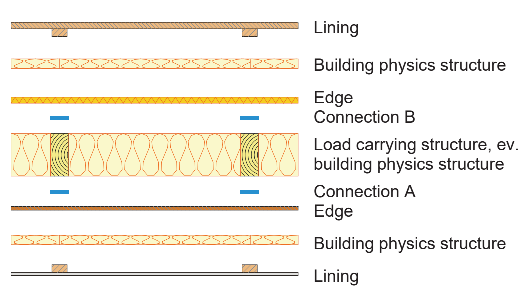

Figure 8. "Exploded view" of a floor built-up following the principle of `onion system`

The system developed in this project adopts an additive construction method that combines modularity with an "onion principle," providing spatial, temporal, and functional flexibility “Fig. 9”. Room sizes can be adapted as needed, and functional layers - such as those for structural stability, fire protection, and acoustic performance - are only installed when required. This layered approach optimizes both material use and assembly efficiency while ensuring compliance with technical requirements. The wall layers are attached to the wall components, the floor and roof layers are simply supported and held in place by their self-weight.

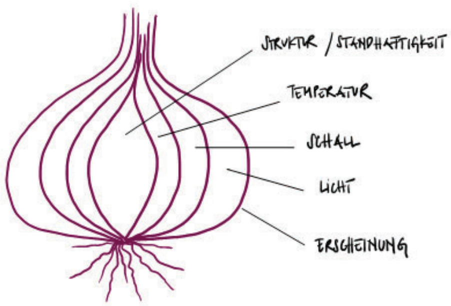

Figure 59. “Onion principle” showing suit of layers as structure, aspects building physics, appearance.

4 – FIRST RESULTS

4.1 THE MODULAR CONSTRUCTION KIT

The development of the modular construction kit has significantly advanced since the beginning of the project. The wall elements and their layers have been tested extensively through multiple assembly and disassembly cycles, allowing refinement of various connection methods.

Figure 10. Assembly of the elements that can be carried out by two un-skilled workers at most, not exceeding 25kg per worker. No special equipment is necessary.

The complete room can be assembled manually by two persons, as planned. Using simple clamping connections and specialized positioning components, the entire module can be installed and be ready for use in less than half a day. A complete gable wall, consisting of three elements, can now be installed or removed within approximately 20 minutes.

Engineered specifically for non-professional assembly, each component and layer weighs as little as possible, allowing easy and safe handling by a single person. The maximum allowable load to be handled by two persons is limited to 50kg in total to enable manual installation by two persons without the need for heavy machinery. The assembly process follows a simple plug-and-play approach, requiring no adjustments or specialized tools, making it intuitive and quick for users to build “Fig. 10”.

Figure 116. Basic load carrying structure formed by L-shaped profiles to receive layers (left) and experimentation on gable wall.

The developed modular construction kit follows the onion principle, relying on detachable connections to enable flexibility, rapid assembly, disassembly, and conversion. The system consists of elements, layers, segments, and modules, all designed to be lightweight. Structural member solutions using L- and T-shaped profiles “Fig. 11” for the element frames to receive inner and / or outer layers independently have been successfully implemented, demonstrating the structural adaptability of the system. Additionally, different roof configurations, including inclined and flat roof segments, have been constructed to illustrate the potential of the modular approach.

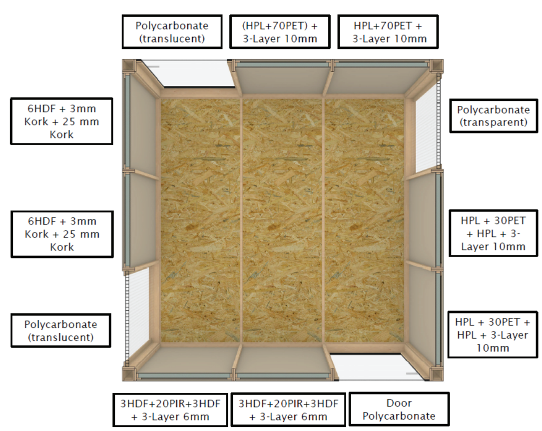

Figure 712. “Equipment” of the first prototype using various single and multiple layers

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The modular structure within the prototype is so far built up of around ten distinct layers, integrating both high-tech and low-tech materials, each with specific properties designed to address different technical and climatic requirements “Fig. 12”. These layers can be installed from either inside or outside, offering multiple combinations to optimize performance based on context. However, specific combinations tailored to particular use cases are still pending testing. The connection system allows individual layers to be installed easily, although further optimization is needed when it comes to securing thicker or multiple layers simultaneously. The detachable connections developed enable rapid assembly, disassembly, and reconfiguration, reinforcing the system’s versatility and alignment with circular construction principles.

Several large-format panels were chosen to form the layers. The selection of materials aimed to be as efficient as possible in terms of building physics requirements, translucency, aesthetics appeal (such as recycled, dark cork panels) and low weight (such as ultra-light cardboard honeycomb and recycled PET insulation panels). Wall elements and their layers were assembled and disassembled several times to test and improve the multi-detachable connection solutions “Fig. 13”.

Figure 138. Different layers tested in prototypes built in DISPO hall providing visual, transparency and sound-insulation properties.

4.2 THE CONNECTIONS

The wall elements and their layers have been tested extensively through multiple assembly and disassembly cycles, allowing refinement of various connection methods. The segments are positioned using simple clamping connections, and specialized components to enable quick and tight assembly of the gable walls “Fig. 14”.

Current joints have shown limitations due to the minimal dimensions of the timber cross-sections, resulting in insufficient fixation, looseness, and challenges during disassembly. Despite these challenges, successful solutions involving multiple detachable joints - including ram sockets, drive-in sockets, and internal steel plates - have been developed to ensure flexibility and reusability. Positioning aids were also created to streamline and simplify the assembly process.

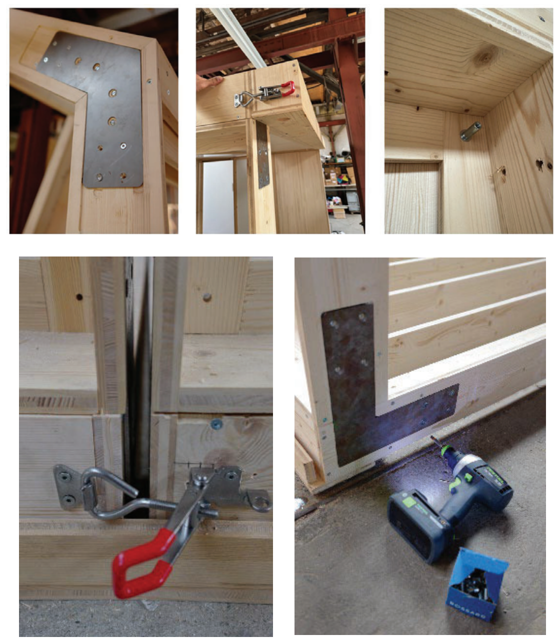

Figure 14. Tested connections: Steel custom made connectors between elements to create segments, quick-release fasteners between segments to create rooms and expandable connections between frame and layers.

4.3 THE DIGITAL CONFIGURATOR

The configurator software has evolved beyond initial expectations, becoming an integrated planning tool that digitally incorporates all design parameters from the beginning [12]. It consists of several interconnected modules, including a parametric planning tool that automatically generates all required elements based on planning decisions, a tool to arrange them in a room, various analysis tool, as well as a tool which automatically generates production files in btl format. Initial prototypes relied on conventional production methods utilizing automatic list extraction and CAD plans for efficiency of the investigations.

The digital configurator and corresponding technological setup have been established to test basic module variants and assess overall system suitability. This version of configurator facilitates straightforward visualization, parameterization, and modelling of adaptable modules, allowing the definition of specific use cases for real-world testing. Embedded within a comprehensive digital workflow, the configurator integrates calculations, visualization, and machine control, significantly streamlining planning processes. It also generates automatic order lists that assist in cost estimation, enhancing project management efficiency "Fig. 15".

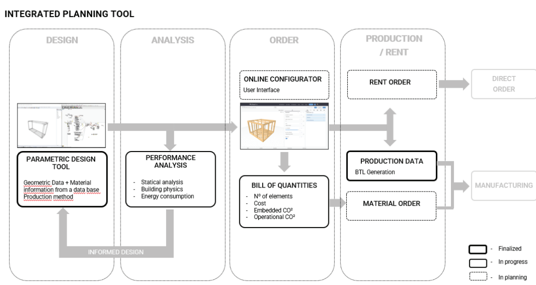

Figure 95. Workflow of integrated planning tool

To validate system performance and to verify the digital workflow, a reduced-scale prototype has been automatically produced in a first step. This prototype was evaluated regarding the digital process, the installation of layers, and the effectiveness of the connections. In addition, a full-scale 1:1 segment has been produced using the new 5-axis milling machine recently acquired by one of the project partners to demonstrate the feasibility of the entire digital workflow and validate the precision and reliability of the system in real construction conditions "Fig. 16".

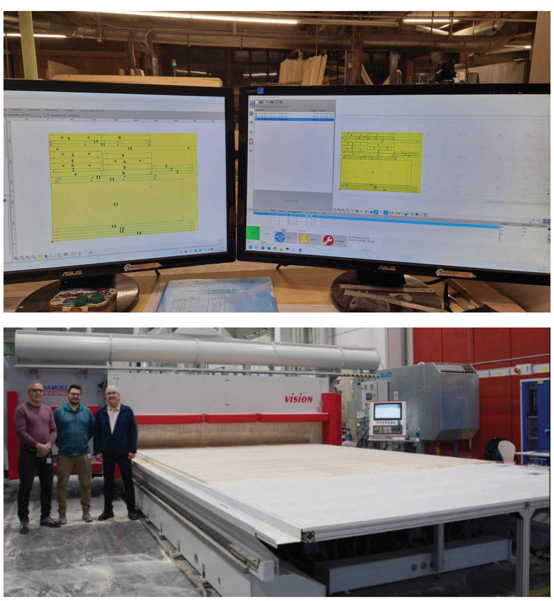

Figure 16. Automatic production of the segment on the 5-axis milling machine at the industrial partner. All the files were automatically generated from the configurator.

In the final round of prototyping this workflow will be also implemented where the whole room will be produced using all tools. The focus is specifically on two aspects: Firstly, the integration of various existing analysis tools into the design process to achieve a more informed design. Secondly, automating the modelling, analysis, and CNC fabrication of different architectural design variations (geometry, shape, materials, etc) using a range of computational tools.

4.4 THE USE CASES

Basic case studies will be conducted to explore critical utilization scenarios through prototyping, simulation, and validation. The prototype developed in the earlier phase has been continuously adapted and modified to test the installation of various layers and the performance of different connection types. This step-by-step approach allows for practical insights into the system's flexibility and assembly processes. Participatory processes involving external stakeholders have been initiated to incorporate real-world feedback and test various scenarios. For these tests, two full modules will be made available, and a two-storey configuration will also be completed to expand the range of testing scenarios.

Climate measurement and modelling capabilities have been simultaneously enhanced. The configurator now allows for simple climate modelling to predict environmental performance under different conditions. For one year, a complete measuring chain has been installed and calibrated to collect accurate climate data. These measurements serve as the bases for refined modelling and simulation work, enabling further optimization of the system for future scenarios and broader applications. This iterative loop between physical prototyping, digital modelling, and real data collection ensures that the system is tested and validated from multiple perspectives, enhancing its robustness and adaptability.

5 – CONCLUSIONS AND FUTURE STEPS

The technological developments achieved so far have significantly streamlined temporary space utilization, laying a solid foundation for future applications. The development of the modular construction kit has progressed to a stage where both the "building kit" and the structural setup are fully available. The system uses a minimal static structure with frame solutions, allowing for flexible configurations. Wall elements can be freely positioned, and floor and ceiling components follow a consistent design, ensuring ease of assembly. The layered structure incorporates large-format panels of varying thicknesses, optimizing visibility, acoustics, and insulation. The modular system is scalable and capable of accommodating two-story structures.

All connection systems have been designed to facilitate rapid assembly and disassembly. All modular components respect the weight limits - except the floor layer which is slightly above but installed close to the ground - and can be manually handled and installed without specialized equipment. The detachable connection system ensures quick reconfiguration, supporting flexibility for evolving spatial needs. Expansion stages have been optimized to meet varying

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performance requirements. The balance between "high-tech," "low-tech," and modular adaptability has been analysed for versatility. The modular approach with efficient connection technology ensures broad applicability, suitable for different interim use scenarios. Preparations for practical implementation of the findings in third party projects, including integration of the configurator tool, are already underway.

The development of the digital configurator represents a significant milestone. This tool accelerates and reduces the costs of implementing temporary uses in vacant properties, providing instant visual feedback and clear implementation pathways. It offers three primary benefits: it provides a straightforward feasibility check through spatial visualization, simplifies planning and communication, and offers accurate cost estimates (to be completed), ensuring financial and logistical clarity. The tool is embedded in Rhino and Grasshopper and provides connections to Cadwork and Lignocam, ensuring compatibility with industry-standard workflows.

The testing phase of the developed processes - including the functionality of the digital configurator, the implementation of participatory design methods, and the evaluation of specific scenarios with selected stakeholders and users has been successfully completed. Looking ahead, ecological and economic factors will be examined in greater detail. This will include an emphasis on upcycling and recycling strategies to enhance sustainability. In summary, the process-optimized construction kit and configurator offer innovative solutions for time-sensitive projects and urgent spatial needs. By streamlining workflows, enhancing communication, and enabling agile decision-making, this system supports the rapid and effective creation of adaptable spaces.

First onsite climate measurements and building physics simulations and calculations have been conducted, accompanied by the development of a detailed measurement concept to monitor indoor and hall climates. The measurement phase is planned to run continuously, with calibration across different usage scenarios. These refinements aim to enhance the overall performance and adaptability of the system under varying environmental conditions. A formal proof of building physics behaviour is still pending.

6 – ACKNOWLEDGMENTS

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7 – REFERENCES

[1] Walda A., Westermann R, “Die brachliegende Schweiz – Entwicklungschancen im Herzen von Agglomerationen”, In: Bundesamt für Raumentwicklung (ARE), Bundesamt für Umwelt, Wald und Landschaft (BUWAL), Eidg. Departement für Umwelt, Verkehr, Energie und, Kommunikation (UVEK), Report (2004)

[2] Madanipour A., “Temporary use of space: Urban processes between flexibility, opportunity and precarity”, Urban Studies, (2018)

[3] Rotilio M., De Giovanni, G., Giamberardini, S., “Temporary building construction to make cities more sustainable: An innovative "Square Box" proposal”. Journal of Cleaner Production, (2022)

[4] Joja M., “Temporary use of abandoned buildings”, Architecture Papers of the Faculty of Architecture and Design STU, (2021)

[5] Sigrist C., “Experimental development of light, temporary structures”, In: World Conference on Timber Engineering, Shah Alam, Malaysia, August 12-15, 2002, Shah Alam, Malaysia, Proceedings (2002).

[6] Wikihouse, https://de.wikipedia.org/wiki/WikiHouse

[7] B-Ware, https://www.topregal.com/de/hallenbuero-meisterbuero

[8] Minimamoralia https://www.boanoprismontas.com/minimamoralia

[9] Der Weg zum Kultprodukt, USM / Fritz Haller https://www.usm.com/de-ch/ueber-usm/geschichte

[10] Schuster S., Geier, S., “circularWOOD - Paradigmenwechsel für eine Kreislaufwirtschaft im Holzbau”, BBSR online Publication 15/2023, TU München, (2023)

[11] Sigrist C., Gerber C., “Evaluation of floor systems for multi-storey buildings.” In: World Conference on Timber Engineering, Vancouver, Canada, 1-3 August, Proceedings (2000).

[12] Llorens J.E., “Enhancing design and production in modular timber architecture with computational design tools”, Master Thesis University of Applied Sciences BFH, Architecture, Wood and Civil Engineering AHB, June 2024