

## Project lead

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## Corporate partners



## Funding authority



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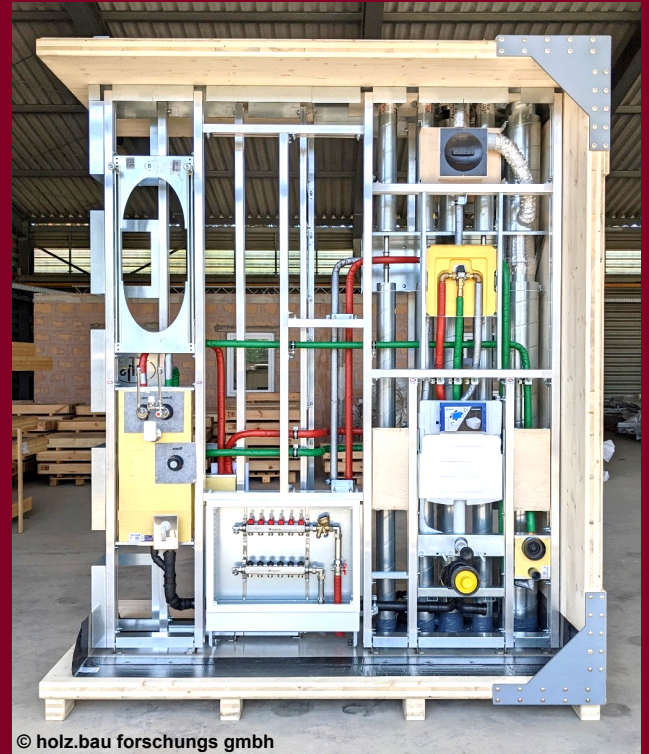
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## FFG Collective Research Project

# CLT\_Plumbing\_Design

Computer-aided planning process for automated design of wet rooms for solid timber constructions



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## Abstract

The scale of current timber projects, particularly with regard to the Solid Timber Construction Method with cross-laminated timber (CLT), underlines the steady rise of "industrialised timber construction", which has not even stopped at multi-storey residential buildings.

While structural design aspects have been improved in recent years, only little attention has been paid to mechanical, electrical and plumbing (MEP) systems so far. However, the integration of water-bearing pipes and surface seals must be carried out with great care, since a permanent exposure of the timber construction to moisture caused by leaks can lead to biological degradation of the wooden structure and complex repair of the load-bearing timber members.

To minimise the above-mentioned problems, a holistic view of the planning and implementation process is required, starting with the architectural interior design and extending to topics such as plumbing, drywall installation, sealing, fire protection, sound insulation, accessibility, prefabrication and much more.

The FFG research project "CLT\_Plumbing\_Design" focused on the design and implementation of the plumbing process in wet rooms of multi-storey residential buildings, taking into account the points mentioned above.

Based on over 1000 analysed floor plans, standard typologies were defined and subsequently timber construction-suitable MEP installation concepts for bathrooms and toilets were developed. These concepts are characterised by a compact and accessible pipe routing combined with appropriate sealing concepts. The proposed solutions contribute to significantly higher protection of the load-bearing timber structure, are suitable for prefabrication and can also be applied to solid structures made of mineral materials. In addition, a free online-tool has been developed to make these concepts (including comprehensive information) available at a very early stage in the design process.

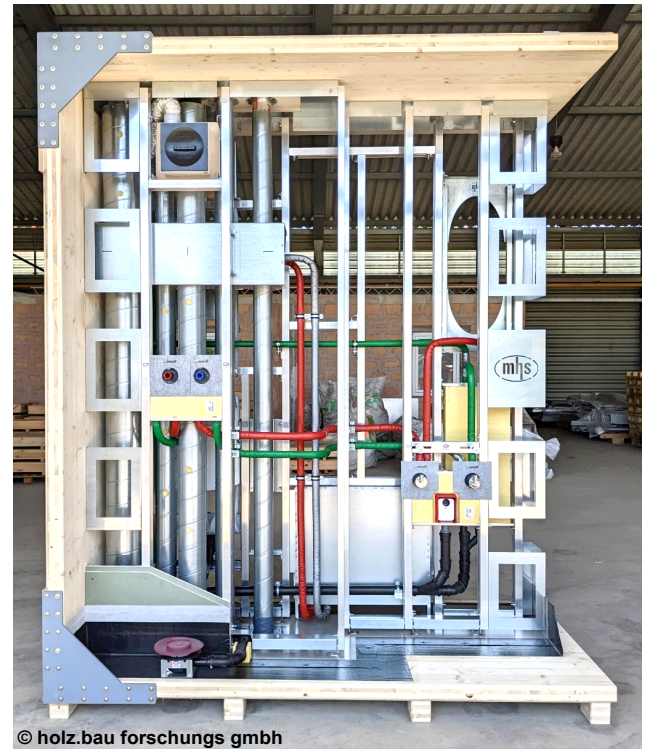
This allows the planner to obtain a bathroom/toilet MEP installation design (suitable for timber construction), including pipe routing, required shaft sizes and facing shell dimensions, based on room dimensions and planned sanitary ware, in a matter of minutes.

The tool also addresses the important issues of accessibility and adaptability. As a result, the configured layouts, as well as details and BIM models of the standard typologies, including plumbing, are available for download. Additional Dynamo scripts are provided for fully automated bathroom modelling of the configured rooms in the BIM software Autodesk® Revit®.

As a result of the configurator many aspects and rules of the execution and detailed planning are already taken into account during the draft design, thus largely eliminating the usual constant changes during the design process. This significantly reduces time and cost, improves quality and minimises the risk of damage to the load-bearing timber structure.

For more information, see:

[https://www.bspwiki.at/doku.php?id=clt:special:building\\_services:plumbing\\_design](https://www.bspwiki.at/doku.php?id=clt:special:building_services:plumbing_design)



**Pictures:**

Mockup of a timber construction-suitable MEP installation