

GROOF
Greenhouses to Reduce CO₂ on roofS

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North-West Europe
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PART 1 : ACCESS
TO THE ROOF
AND REMOVING
THE OLD ROOF
COVERING



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INTRODUCTION



Figure 1 View on the support building from the north west corner

The construction of the rooftop greenhouse pilot in Germany has started early 2020 and we from ebf GmbH are sharing in a multiple part series in detail how the construction took place, which obstacles were met, how we overcame them and in general what solutions and measures were taken to achieve the proper construction of a rooftop greenhouse while minimizing the environmental impact.

The first part of this series is about the beginning of the construction phase consisting of the preparations and the deconstruction of the old roof covering.

One of the more crucial aspects of building a rooftop greenhouse is getting access to the construction level. The higher the roof the more complicated the access itself. And of course, the construction cost increases with every additional meter. Installing the rooftop greenhouse on the first floor therefore facilitated the construction.

The building itself was constructed in the 60s and showed clear signs of a need for renovation (Figure 1). The previously established horticulture business on the site went bankrupt and was not able to maintain proper maintenance in the last years. After the end of the construction of the rooftop greenhouse the support building will undergo a full renewal to match the adjoined buildings

Despite the looks of the facade, the core of the building structure, especially the brickwork, was still in a predominantly good condition. Due to the large openings (doors and gates) throughout the building, large and heavy lintels were already in place serving a well laid out structure for the reinforcement for the greenhouse platform.



Figure 2 ETFE Film in the Rooftop Greenhouse

The gabled roof was asymmetric which meant for an uneven wall ending. The north side wall came out to be close to 55 cm lower than the south end. This needed to be evened out with the reinforcement structure. The old chimney was not in use anymore since the heating system was reorganized into a central heating for the whole site. From ground to the top it measured approximately 10 m and could not be integrated into the greenhouse structure. It was deconstructed carefully, stone by stone. The material was later repurposed as a ground cover in another greenhouse on site.

The roof consisted of heavy beams carrying cross struts on which the corrugated covering plates were installed. The covering material contained asbestos as it was custom back in the day when the building was constructed. The removal of the rooftop had therefore to be done by a specialized company. After the installation of the scaffolding, the removal of the old roof covering was the next step. The left-over material of a previously installed insulation was heavily contaminated with asbestos dust and was conjointly disposed with the asbestos plates themselves.



Figure 3 : Cracks in the wall due to the heavy load from the wooden beams

Due to the aforementioned asymmetry of the roof the load of the wooden beams on the walls had not been even which resulted in some minor damage to the walls underneath (Figure 3) resulting in cracks surrounding the bearing of the wooden beams in the brickwork.

Since the load of the greenhouse structure supporting platform is expected to be more balanced, any further problems to the brick structure could be mitigated.

Measurements of the building's foundation confirmed the old technical drawings to be more than strong enough for any subsequent construction which were planned. This is mainly due to the common practice in 60s Germany, where large amounts of concrete were used for any construction leading to oversized foundations especially in the agriculture and horticulture business.

The removal of the wooden beams became complicated due to their heavy weight. As it can be seen in Figure 5 and 6 the space around the greenhouse is limited. No permanent crane could be installed to help with the removal of old material and subsequent installation of new construction materials. This work was executed by an experienced carpenter, who managed this work without heavy machinery.

After the removal of the roof covering it was discovered that the wooden structure was still in good shape so the larger beams were repurposed in the supporting structure of the greenhouse platform, saving cost and reducing the environmental impact of the construction itself.

After this, the building was cleaned and the debris and rubble from the old building covering were removed. With this final act the first step of construction was completed.

In the next article we are going to talk about the construction of the greenhouse platform which will be released two weeks from now.

VISUALS



Figure 4 Deconstructed chimney



Figure 5 Support building surrounded by scyffolding, roof covering already removed

VISUALS



Figure 6 Underlying roof structure after the removal of the corrugated roof plates, visible is the crawl space which will later serve as the technic room for the rooftop greenhouse



Figure 7 Safety measures for the roof structure before final and safe removal

PARTNERS



Do not hesitate to visit GROOF website : www.groof.eu

Discover GROOF Guidelines : <https://www.urbanfarming-greenhouse.eu/>
This is a summary of GROOF's experience in designing and building an energy efficient rooftop greenhouse.

