

Reuse of Steel Case Study no. 3

The deconstruction for reuse issues of steel girders



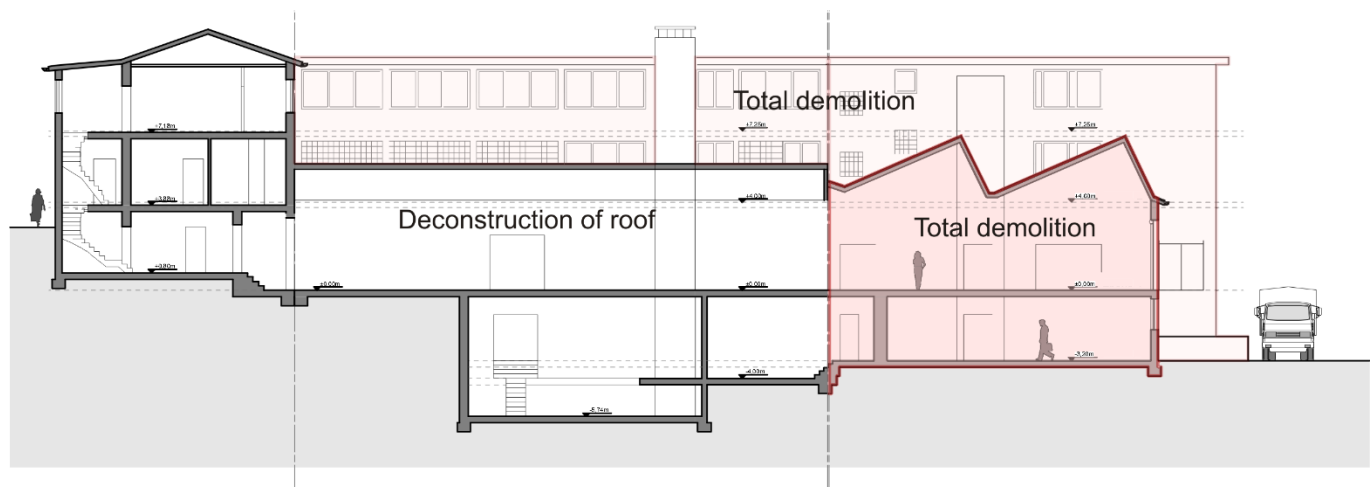
Project summary

Client: Gebr. Becker GmbH, Wuppertal, Germany
 Contractor: Paul Kamrath Ingenieurrückbau GmbH
 Demolition concept: Dr. Paul Kamrath
 Purpose of reuse: New building with old structure
 Original steelwork: ca. 1920
 Implementation: 2018

Description of the existing building

The single storey hall was part of an old fabrication plant and located in Wuppertal, Germany. The production company has two fabrication sites. Due to growth over the years, this site was planned to be demolished and to be replaced by modern fabrication buildings afterwards.

Total there existed 2 halls as well as an office building. While the office building and the greater part of the fabrication halls from the 1950s were planned to be demolished, the oldest hall was planned to keep for historical reasons. Unfortunately, modifications in the 1950s combined the bearing constructions of the office building with the historical hall. Because the



fabrication started once in this hall, there was a deep interest, to keep as least the roof-structure and to integrate this as a remembrance to the beginning of the company.

The demolition project is divided in three parts: (1) The demolition of the 1950s hall, (2) the deconstruction and saving of the roof structure of the 1920s hall including the demolition of the remaining hall and (3) the demolition of the office building.

Deconstruction

The construction of the roof structure consists of steel-timbering. Up-on the bearing structure, the roof was built of wood with a regular sealing of old tar-based cardboard. Due to the filigree steel-structure preliminary cardboard and wood were deconstructed by man-power. Afterwards, all jointings of the girders to columns were dismantled. Only the horizontal links retained for stability reasons.



The links were dismantled just in time when the girders were removed.

To keep the steel timbering intact after the deconstruction it was evident, to build a construction to store the elements. This construction was fabricated of steel.

Conclusions

The following key aspects of the project have been identified:

intact. For demolition the boundary condition are safety of neighbouring buildings and a focus on raw materials, while the deconstruction focuses on the construction itself to be kept intact. Thus, there is an increase of hand-made work instead of the use of excavators.

In fact, both methods lead to the same rates of steel-reuse from the material view. If the costs are considered, the costs of deconstruction for reuse are much higher. Probably there are savings for the new building using the dismantled parts.

Nevertheless, deconstruction for reuse is possible even for single-storey-halls originally built the early 20th century. For this case, it was helpful, that the new use for the girder-structure is at the same site. Especially if only parts of structures are identified for reuse, it is evident to find a suitable building to integrate the used parts later. This building needs to fit the geometrical dimensions.

As long as the used structures are integrated on the same site, an additional benefit is the omission of any transports. Thus, there is a high saving of energy.