

## Abstract

The timber engineering has reached over the last decades a level that is comparable to steel and concrete construction. This lead due to longer span and increasing load to highly stressed connection. Not only is the load increasing but also the variety of connection types, the calculation as well as the transportation and fabrication condition and possibilities.

The main goal of this bachelor thesis is to develop the basics to integrate highly stressed connection in the engineer's daily work to ensure sound and economical solutions. First and foremost this paper studies the important conceptual aspects and derivate from it significant conclusion concerning the mechanism of connection. The focus is on raising the awareness of potential problems, which occur in such connection. Developing new connection types or presenting standard connection details is not part of this thesis.

The main emphasis is instead placed on study and evaluating the use of "Mega-Newton-Connection". The thesis is however more focused towards the general conceptual design than the design consideration in the current building codes. Based on the analysis of already constructed projects, the load limits of joints in timber constructions are examined and it is discussed how highly stressed connection have been dealt with thus far. With this new insight, it is possible to focus on certain interesting topics regarding conceptual design and examine those more thorough.

Parallel to the theoretical approach, a real project of a waste recycling facility in Baar is designed. During the preliminary design phase a costs estimation of the 105x136m roof construction is completed. The focus is, besides the structural concept, placed on the highly stressed connection, which are designed according the previously gained knowledge. To assess the cost efficiency of the used timber construction, the structure is further compared to a roof system in steel.

It could be shown that "Mega-Newton-Connection" in timber engineering can be successfully integrated in the daily activities of a structural engineering office. Essentially to the implementation is a sound understanding of the mechanism of connection in timber engineering. A comprehensive knowledge of the basic requirements during all the design phases of a project, as well as an understanding of the quality assurance is however essential. This bachelor thesis reflects the current state of art and is used by PIRMIN JUNG as a basic document for the design of connection in timber engineering.

### Keywords:

Mega-Newton-Connection, timber engineering, connection concepts, connection types