PROVISIONS FOR GREATER REUSE OF STEEL STRUCTURES

Factsheet no. 8: Bus station Schiphol – Nord, Amsterdam, The Netherlands

Project summary



Year of construction: Original year of construction approx. 1942 Opening: 18 May 2015 Location: Loevenstijserandweg, Amsterdam Client: Schiphol Asset Management, Schiphol Contractor: Schiphol Asset Management, Schiphol Architecture: Claessens Erdmann architects and designers, Amsterdam Structural design: Royal HaskoningDHV, Rotterdam Implementation: Heijmans Schiphol, Flamingoweg Steel construction: Aa-Dee Machinefabriek Staalbouw Nederland, Schijndel

Project description

The design of the type T2 hangar dates from World War II. The British Royal Air Force wanted to have a large capacity hangar that could be built up quickly upon invasion of the European continent. Only then would one be able to get the conquered and perhaps destroyed airports quickly operational again. In addition, these hangars are built on a total of 53 Royal Air Force airports. After dismantling several airports after World War II, many T2 hangars have been demolished and sold. After the war there was an abundance of RAF and USAAF T2 hangars in England. Airport Rotterdam Zestienhoven bought one copy.



For this copy, a third life has arrived at Schiphol, but now in the function of bus station. Already in 1958 this T2 was taken at Zestienhoven airport. At that time, they wanted to build a new hangar, but new construction was



too expensive. The opening of the new aircraft hanger has taken place on May 19, 1958, and was then used until the late nineties. There were stories that the hangar was used as storage shed.



After this, the hangar was rebuilt, by the Ministry of Justice, to the Rotterdam detention centre. Next to the hangar, a new front building and air cages appeared, with the cell complex on the inside, built-up from sea containers. On 27 June 2003, the Rotterdam detention center was taken into use, with a maximum capacity of 212 people. After seven years of intensive use was demolished. The new Detention Center Rotterdam will be completed before the summer of 2010. The T2 hangar was then dismantled and stored in a hall at Schiphol, to be resurrected as a bus station in early 2015.

For the third life, the restored structure of the reused hangar, originally 73 m long and 37 m wide, is stretched to 100 m by increasing the heart-to-center distances of the rafters.







By placing the frames slightly further apart, the bus station has got a length of over 100 m. New girders made of castellated beams have been laid over the rafters; the roof is made of translucent plastic so that it is light within the daytime. In the evening there is a special lighting.



It was obtained a new function of an old building, with a visible link with the airport. In the old design the columns were closer together; the grid sizes have been made larger, and with that the construction. Due to the open character we have had to take into account upward forces. By using PV panels on the roof, which are randomly distributed, all frames have become unique in terms of execution; this was necessary to accommodate the construction of the panels.

Castellated beams have been used for purlins, approx. 2000 m of IPE200 / 265 IPE 360/45, manufactured by Aa-Dee itself with a robot line. Construction of already welded corner lines / strips that had no function in the new use have been removed. The assignment was to do this in such a way that old appearance remained visible. Thus, parts have been left for decorations that have no function, such as a half burnt corner line and strip.





Production consisted of restoration: cutting out and replacing corroded parts. Each replaced part / bolt was numbered and documented with photos.

Pre-assembly: 2500 bolts and nuts;

Assembly: approx. 6000 bolts and 6000 nuts and 480 anchors + 2200 nuts;

Mounting of 200 m gutter (600 x 450).

Not supplied by Aa-Dee but interesting: there are 440 PV cells (solar panels) installed on the roof, making the bus station as a whole energy-neutral. These are not placed on the roof in a repeating pattern to prevent flickering of the sun when passing under the translucent roof. As a result, almost all trusses have become unique in order to accommodate the construction of the PV panels. There are 138 light fittings, each with two types of LED lamps 6, white down and various colors upwards. This makes it possible to change the colors remotely.



Conclusions

The following key aspects of the process have been identified:

- Reuse of the whole existing building means that the steel for the new project come from what is already on site;
- The availability of drawings and specification of the building can save time, facilitate the design process and increase reuse opportunities;
- Good quality data on the existing structure is essential. The existing drawings can be checked with on-site measurements;
- Deconstruction of a building, rather than demolition, is economically viable but managing the materials with the necessary care requires supplementary time; this must be considered in the whole schedule.
- Deconstruction requires space for storage of the reclaimed materials.

In conclusion, the reuse of the steel in this building contributed significantly to improving its environmental performances, and offers a model for other projects.

Further information

- Busstation Schiphol Noord, Inzending Staalprijs 2016, <u>http://www.nationalestaalprijs.nl/deelnemende-projecten/detail/utiliteitsbouw/busterminal-ov-knoop-schiphol;</u>
- <u>https://youtu.be/TtHJLrjKq2U</u>.