

**Burstwiesenstrasse, Zurich (CH)**



**Project**

During the refurbishment of the building covering numbers 17 to 21 Burstwiesen Strasse in Zurich, it was discovered that 2 downstand beams in the basement garage did not have sufficient reserve load capacity. The span of the beams was 7.50m. The bending resistance of both of these beams had to be increased.

**Solution**

The beams were strengthened using a tensioning system. Because the clear height of the basement could not be reduced and the existing concentrated reinforcement at the bottom of the downstand beams was not to be damaged by drilling for anchors, the two tensioning systems were applied on the sides of the beams. The anchorage was formed using threaded rods which were fixed into the adjacent walls.



Parties involved in the Project:  
 Client: Wincasa AG, Winterthur  
 Civil Engineer : wlv Civil Engineer e AG, Zürich  
 Contractor: SIKA Bau AG, Kirchberg  
 Tensioning System: StressHead AG  
 Year: 2010

**Reussmatten development, Sins (CH)**



**Project**

When a development with several multi-occupancy buildings and a communal basement garage was built, the punching shear reinforcement was found to be missing from 2 of the columns. Both of these columns therefore had inadequate punching shear resistance and had to be post-strengthened.

**Solution**

The punching shear resistance was increased by installing 3 plates on top of each deck slab. Since the seating area of an apartment in a multi-occupancy building was directly above, the anchors and plates were fully mortared in and are no longer visible.



Parties involved in the Project:  
 Client:  
 Civil Engineer : T. Leuthard, Ingenieur HTL,  
 Merenschwand  
 Contractor: SIKA Bau AG, Kriens, VSL-Schweiz AG  
 Tensioning System: StressHead AG  
 Year: 2006

## VEBO multi-use building, Oensingen



### Project

During alterations to the VEBO (Disabled Integration Society) multi-use building, 3 stressed cables were accidentally cut during drilling. The original prestressing force had to be restored under confined space conditions.

### Solution

The deck slab was strengthened with post-tensioned CFRP plates from below and from above directly on its surface. The installation level of 5cm maximum was crucial because the existing installations could not be changed. The original prestressing force was finally restored.



#### Parties involved in the Project:

Client: VEBO Oensingen  
Civil Engineer : TSW Ingenieure und Planer, Olten  
Contractor: SIKA Bau AG, Kriens, VSL-Schweiz AG  
Tensioning System: StressHead AG  
Year: 2004

## Holcim AG, Würenlingen (CH)



### Project

Silos are used for storing a range of products such as foodstuffs, crude oil, cement, etc. The operations to fill and empty the contents cause stresses on the silo structure which were not well known until a few years ago. This was the reason for developing post-strengthening with the StressHead system, which acts as a chemical bond.

### Solution

StressHead AG, in collaboration with Sika AG and VSL-Schweiz AG, developed a special anchor for post-strengthening of silos with tensioned CFRP plates.



#### Parties involved in the Project:

Client: Sika Services AG  
Civil Engineer : Arthur Hauser AG, Kleindöttingen  
Contractor: SIKA Bau AG, Kriens, VSL-Schweiz AG  
Tensioning System: StressHead AG  
Year: 2004

**Auto Rondo, AMAG Zug (CH)**



**Project**

When the AMAG Zug building was extended, the sales and operational areas were rearranged. An opening was cut in an existing concrete wall. The wall around the new opening had first to be strengthened.

**Solution**

Two post-tensioned CFRP plates were applied on both sides of the wall. The end anchorage of the plates was formed by concentrated transfer of forces into the concrete.



Parties involved in the Project:  
 Client: AMAG Zug AG  
 Civil Engineer : PlüssMeyerPartner AG  
 Contractor: Arnet AG, Root, SIKA Bau AG, Kriens  
 VSL-Schweiz AG  
 Tensioning System: StressHead AG  
 Year: 2003

**Aupoint Brandstetter, Salzburg (A)**



**Project**

The load bearing structure of the factory roof was damaged due to a fire. The 14m long prefabricated RC trusses had to be strengthened in the area affected by the fire. The strengthening operations had to be completed in 1½ days so that production would not be affected. The requirements for low component depth and structural fire protection also had to be met.

**Solution**

External post-tensioning with a tensioning force approximately the same as the live load stress was a suitable method. All the conditions were met in full with post-tensioned CFRP plates.



Parties involved in the Project:  
 Client: Brandstetter GmbH  
 Civil Engineer : Dipl. Ing. N. Baueregger, Salzburg  
 Contractor: GPS-Himberg bei Wien, SIKA AG, Österreich  
 Tensioning System: StressHead AG  
 Year: 2003

**Audi plant Hungary, Győr (H)**



**Project**

An existing facility at Audi Hungary was equipped with a new machine tool. Vibration and temperature changes caused excessive differential deformation of the existing expansion joints. This differential deformation had to be eliminated around the new machine tool. The gaps could then be sealed and the individual base panels of the floor slab could be joined together.

**Solution**

The gaps in the base panels were grouted and joined with post-tensioned CFRP plates.



**Parties involved in the Project:**

Client: Audi Ungarn  
 Civil Engineer : Kempen Ingenieurgesellschaft, Aachen  
 Contractor: STRABAG Ungarn  
 Tensioning System: SIKA AG-StressHead AG  
 Year: 2002

**CS communications centre, Horgen (CH)**

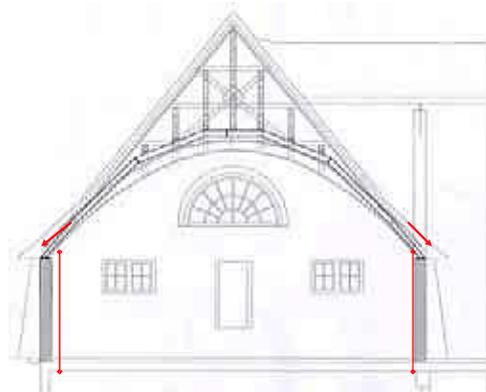


**Project**

The indoor riding arena on the Bocken estate – a listed building -was converted to a communications centre for Credit Suisse. The complex has a basement covering the full building footprint. The murals on the arena façades had to be preserved, the masonry had to be secured and the roofing had to be stabilised.

**Solution**

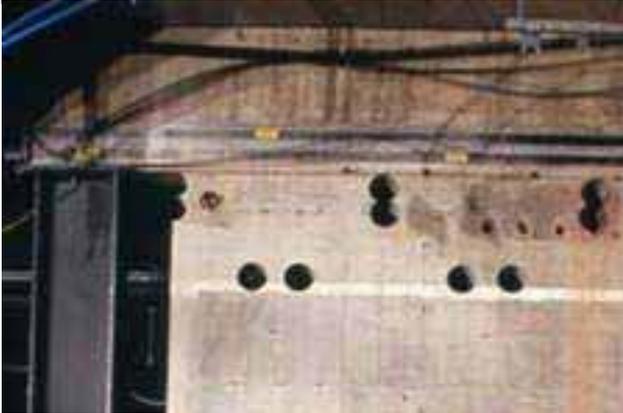
A horizontal tie beam of post-tensioned CFRP plates was installed around the arena supports. The additional loads on the roof trusses were transferred to the newly built basement through masonry piers which were strengthened with internal post-tensioned CFRP plates. To prevent cracks in the façades, the masonry walls were first stabilised vertically and horizontally with CFRP plates.



**Parties involved in the Project:**

Client: Credit Suisse, Zürich  
 Civil Engineer : PlüssMeyerPartner AG  
 Contractor: Dangel & Co AG, Zürich, Sika Bau AG  
 Tensioning System: StressHead AG  
 Year: 2002

**Shopping centre, Emmen (CH)**



**Project**

As part of the general renovations to Emmen shopping centre, various structural alterations were carried out and earthquake strengthening was installed. Some stiffening stairwell cores and wall panels were removed. Therefore other stiffening components had to be strengthened.

**Solution**

So that the forces from a tie rod at the bottom of a wall panel could be correctly anchored, post-applied CFRP plates were routed behind the support and anchored in a concentrated arrangement. The end anchorage of the CFRP plates was formed by a perforated end panel in which the plates were fixed by pressed-on StressHeads.



Parties involved in the Project:

Client: Maus Frères SA  
 Civil Engineer : PlüssMeyerPartner AG  
 Contractor: Anliker AG, Emmen  
 Tensioning System: StressHead AG  
 Year: 2001

**Paper plant, Perlen (CH)**



**Project**

The installation of a new paper machine required an existing opening in a façade to be enlarged. Two existing columns on an upstand beam had to be moved for this.

**Solution**

In the upstand beam support area, the existing columns were drilled through horizontally and the CRRP plates were fed through and tensioned. The end anchors were integrated in the newly constructed columns and the old columns were then demolished.



Parties involved in the Project:

Client: Perlen Papier AG  
 Civil Engineer : PlüssMeyerPartner AG  
 Contractor: Wüest AG, Luzern  
 Tensioning System: StressHead AG  
 Year: 2000

## Orly Center, Amsterdam (NL)



### Project

During the construction phase of an eight-storey office building of prefabricated concrete units, large cracks appeared in the needle beams above the ground floor around the columns. A halt to construction was ordered. The top reinforcement around the columns was inadequate to divert the reaction forces from the façade elements situated above. The forces acted eccentrically to the bearing, as well as the bending stress.

### Solution

The requirement was a post-tensioned strengthening system which would project by a maximum of 3mm behind the façade elements around the columns and could be applied in a very short time. The strengthening works above 12 columns took 1½ days. The building could then be approved.



#### Parties involved in the Project:

Client: Orly Center AG  
Contractor: HABAU, Hoch- und Tiefbau GmbH,  
Heringen  
Tensioning System: StressHead AG  
Year: 2000

## Park Hotel, Vitznau (CH)



### Project

At the Park Hotel in Vitznau, a deck slab was strengthened during alterations and renovations. To enable the additional loads to be absorbed, the deck slab was strengthened with untensioned CFRP plates. Because there was little space available for the anchor at one end of the slab, short transfer of force was necessary.

### Solution

The StressHead CFRP tensioning system was not post-tensioned for this project. The StressHead was used only for transfer of force. With the compact end anchor, the CFRP plate was fixed a very short distance behind the support.

#### Parties involved in the Project:

Client: Parkhotel Vitznau  
Civil Engineer : Leuthard Civil Engineer GmbH, Luzern  
Contractor: Fero-Tekt AG, Buchrain  
Tensioning System: StressHead AG  
Year: 2012