



Versamertobel Bridge,
Graubünden Canton,
Switzerland

Allplan Engineering in practice

BRIDGING THE GAP FOR MORE THAN A CENTURY

Still to be seen in the background: the old Versamertobel bridge from the 19th century, or to be more precise, 1897.

As an example of steel bridge building at the turn of the century, the structure is of considerable historic value, but it is no longer up to the demands of current times. The bridge has been deemed worthy of preservation and therefore has escaped being torn down and instead continues to serve the traveler as an additional link for slower traffic. The old bridge has now been bypassed and supplemented with a modern high-capacity,

post-tensioned concrete structure that spans between elegant combined abutments/inclined piers over the Versam Gorge. This bridge design resulted from close cooperation between the client (Graubünden Canton Highways Department) and the architect. The brief had to consider the dramatic surroundings, the slender lines of the adjacent existing steel bridge, the difficulties of construction and the requirements for durability.



The impassive, steep terrain required a particularly accurate assessment of the construction process by the engineers of dsp Ingenieure & Planer AG.

The cross sections of the superstructure and the inclined pier vary along their lengths and each are at their heaviest where the deck meets the inclined pier. The superstructure at this point is a hollow box girder deck, while the clear span continues from there as a beam and slab deck. The bridge was built from both ends without the use of intermediate temporary supports. The inclined piers had to be tied back by tension rods during construction. The bulk of the superstructure was built in three stages.

The impassable, steeply sloping landscape required the engineers of Swiss consulting engineers dsp Ingenieure & Planer AG to think clearly through the construction process. Because the economic viability of the design to a large degree depended on a well-considered and efficient construction process, questions about the installation (land requirements, lifting plant, site access, integration with the existing bridge) as well as the methods of temporary support were critical during the preliminary design phase.

The result of this intensive project planning and its eventual realization is an impressively shaped bridge with great material and structural clarity.

PROJECT INFORMATION AT A GLANCE

- > **Focus:** Bridges
 - > **Software used:** Allplan Engineering
 - > **Project data:**
 - > **Client:** Amt für Verkehr und Tiefbau (Department for Transport and Civil Engineering), canton of Solothurn
 - > **Scope of work:** Project and engineering consultancy
 - > **Realization:** 2010 – 2012
 - > **Cost:** approx. CHF 4.5 million
 - > **Overall length:** 112.30 m
 - > **Abutment to abutment:** 80 m
 - > **Width:** 8.80 m
 - > **Max. height above ground:** over 70 m
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"Allplan was a great help to us in this challenging bridge project. It was particularly useful for the 3D depictions of the design of the foundations in steeply sloping ground, as well as for the complex geometrical details and for eliminating reinforcement collisions."

Oliver Müller, Dipl. Bau-Ing. ETH/SIA, P.E.
at dsp Ingenieure

All the drawings were prepared using the BIM solution Allplan, which confirmed in particular on this project its credentials as an easy-to-use, intuitive 3D design tool. This was apparent in considering the steep ground around the foundation excavations, at the connection of the inclined pier to the superstructure and with the geometry of the prestressing member anchorages (cable deflectors at mid-span) to avoid reinforcement conflicts.

The dimensions of the details – in particular those of the inclined piers – were carefully checked against 3D simulations in Allplan and using physical models.

DSP INGENIEURE & PLANER AG

Founded in 1985, Swiss consulting engineers dsp Ingenieure & Planer AG have offices in Zurich, Greifensee and Uster and are an independent engineering and consulting firm owned and managed by its senior staff. Their core areas of work are construction engineering and infrastructure. Services provided by the consultancy cover the whole planning and design process from concept to commissioning.

ABOUT THE COMPANY

ALLPLAN is a leading European vendor of open solutions for BIM (Building Information Modeling). For more than 50 years, the company has supported the building industry with a pioneering software

portfolio and is playing a key role in promoting its digitalization: innovative, geared to the requirements of customers – and with the highest "made in Germany" quality.

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