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## IN SEARCH OF ADDITIONAL LOAD BEARING CAPACITY

Due to increasing traffic loads and modifications in concrete design rules existing bridges suffer from the potential risk not complying to the present building codes. In particular bridges with small spans are vulnerable to the increase of traffic load because of the higher ratio of live load compared to dead load. Arcadis is assigned to assess the structural safety of a relatively small pedestrian tunnel where refinements with respect to the analysis- and modeling approach are subsequently adopted.

In this project specific attention is given to the analysis approach to conduct a non-linear analysis with limited resources. This entails that the adopted strategy must be proportional to the size of the object, but reflects the real structural behavior with sufficient accuracy. The chosen analysis approach has to be proportional to the scale of the structure and requires an efficient strategy that determines the capacity to redistribute forces, but entails a limited modelling and computational effort.

The structure considered is a small pedestrian tunnel built up from prefabricated prestressed elements with a cast in place compression layer. The size of the structure does not automatically imply that the structural behavior is straightforward. For this particular object modeling and structural analysis should take into account the effects of prestressing, non-orthogonal reinforcement, orthotropy due to skewness and geometric discontinuities, different concrete properties of the composed slab and different construction phases. Accounting for all these properties in a physically nonlinear analysis resulted in a certain redistribution of forces where the required safety level has been verified. The effectiveness of the modeling techniques and practical use of the applied safety formats play a crucial part in this project and are evaluated.