FROM A FULLY AUTOMATED STRUCTURE MONITORING TO A NEURAL NETWORK DATA INFERENCE: THE FALLERSLEBER TORBRÜCKE IN BRAUNSCHWEIG 1999 – NOW.

Heinert, Michael[1], Reiser, Stefan[1] & Niemeier, Wolfgang[1]
[1]Technische Universität Braunschweig, Institut für Geodäsie und Photogrammetrie, Gaußstraße 22, 38106 Braunschweig, GERMANY

Abstract: The inference of a trained neural network allows determining the quantitative input-output-relations. For a monitored structure does this mean, that it is possible to create input-output-functions deductively. Such inference yields for a structure e.g. the relations between temperature, humidity and air pressure on the input side and deformation on the output side. Accordingly, it is possible to get rid of the climate impact within the deformations time-series. The resulting time-series describe the remaining deformation of a structure instead of its elastic answer on the climatic impacts.

Since summer 1999 the IGP monitors fully automated one of the busiest bridges above the moat in the Braunschweig city centre. About 180 reflector marks on the abutments and the bridge body are measured three times a day using an automatic total station. Automatic weather observations allow the corrections of the geodetic measurements. Any disturbances of the measurements like outliers, offsets and noise can be reduced by an adaptive Kalman-filter. The customer has got access to the times-series in all states of the processing of every reflection mark via a secure www-server that is updated every day.