Comments on the data for ETH-tests on masonry spandrels

Katrin Beyer, December 27, 2020

There is one file per test unit, which contains the data from the conventional instruments (LVDTs, load cells, …). The data is provided in xls-files. The instrument name is given in the Line 3, the unit in the line below. The data follows from the 5th line onwards. The position of the instruments and the equations for any derived channels are included in Reference [2].

In addition, there is one file which gives the global shear force – rotation history as plotted in the Reference [1]. The rotation corresponds to the average rotation of each pier (which was meant to be the same but in the experiment was not exactly identical). The final drift was computed as the average rotation of the North and South lever beams:

THETA = (THETA_BEAM_N+= THETA_BEAM_S)/2

The pier rotations THETA_BEAM_N and THETA_BEAM_S are included in the xls-files with the conventional measurement data. The pier rotation was computed from the LVDTs mounted underneath the lever beams and contains therefore any deformations of the steel beams, the connection of the steel beams to the steel plate supporting the piers and the pier itself. If only the deformation of the spandrel is of interest, this should be computed from the optical data.

The shear force in the spandrel could be computed from the North and the South pier. In theory both shear forces are identical, in reality they are not exactly identical. Plotted was the average shear force:

SHEAR= (SHEAR_N+SHEAR_S)/2

The shear forces SHEAR_N and SHEAR_S are included in the xls-files with the conventional measurement data.

Some comments:

- The provided data is processed data. If the field contains a NaN (« Not a number », conventional measurements), the data has not been recorded or judged untrustworthy.
- Conventional data: The first column gives an index which was added during the post-processing and numbers the entries consecutively. The second column gives the load step (LS). An integer number corresponds to the load steps, i.e., the points when the loading was halted and cracks marked and photos taken. Example Figure 9 in [1]:
    - Load step 4 identifies the entry for a drift of +0.025% (index i=1493)
    - Load step 5 identifies the entry for a drift of -0.025% (index i=1757)
    - All entries in between (i=1494-1756) carry as load step number « 4.5 » indicating that these entries belong to the loading phase from LS4 to LS5.

If you use the data, please cite:

[1] Beyer K, Dazio A (2012) Quasi-static cyclic tests on masonry spandrels, Earthquake Spectra 28(3): 907-929. http://dx.doi.org/10.1193/1.4000063

[2] Beyer K, Abo-El-Ezz A, Dazio A. (2010) Quasi-static cyclic tests on different types of masonry spandrels, IBK Report No 327, Institute of Structural Engineering, ETH Zürich, Switzerland.

Any questions: Please contact me via katrin.beyer@epfl.ch