**DYNAMIC SEISMIC ANALYSIS OF ANCHORED SHEET PILES**

**ABSTRACT**

The chosen topic is the use of steel sheet pile systems in seismic zones. Currently the use of steel sheet piles in seismic zones is not really common. This is due to the lack of calculation methods support from in force standards and the prevalence of concrete as traditional construction method. We will deal with the first part.

Nowadays the calculation methods used for steel sheet piles in seismic zones are essentially pseudostatic methods for the geotechnical verification and pseudostatic or dynamic calculation for the structural verification. Note that no dynamic calculation is available for the geotechnical (stability) verification.

For the dynamic calculation, first an accelerogram has to be chosen, applied to a 1D model (a soil column) and then modified to match a target spectrum on the surface. Then the verification of the structural elements with the complete 2D model can be undertaken. For the input signal modification usually Rayleigh damping is used, however the signal can be modified in the frequency domain to match the spectrum at the surface.

For the pseudostatic calculation, a horizontal seismic coefficient is chosen according to applicable standards, then the analysis is performed and safety factors are obtained. For the consideration of energy dissipation in the system a reduction factor can be used. This factor must agree with the applicable standards, and ranges between 1 and 2 for European structural standards (Eurocodes). However the value assigned to anchored steel sheet piles is 1 so no reduction is allowed, since they are considered as stiff structures.

For steel sheet piles standards from other countries as Japan are using values between 2 and 3 and recent researches point out values between 1.8 and 2. These values seem reasonable for flexible steel structures such as steel sheet piles.

To be able to provide reasonable values for the reduction factor the utilization of dynamic results is suggested. In order to establish a value to be used in the pseudostatic approach the bending moments in the steel sheet pile wall for the dynamic analysis can be used as target to find a reduction factor for the pseudostatic analysis.

Further investigation on the ductility of the soil-structure system including steel nonlinear behaviour and the hydrodynamic loads will be required.