framatome

Dynamic Stability Check

Global building stability check for seismic excitation and airplane crash (APC)

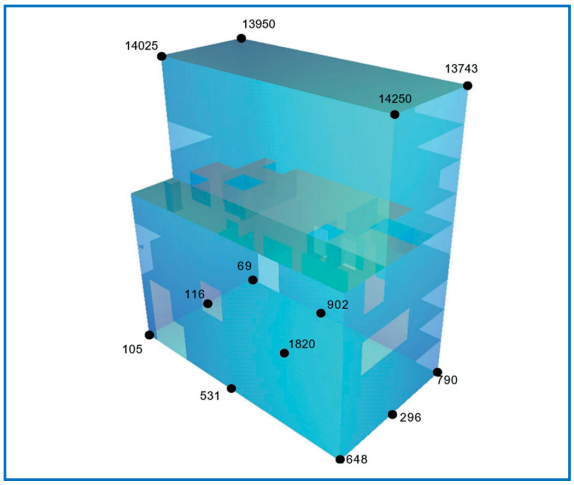
Framatome's technical solution to verify the global building stability (overturning effects) due to seismic excitation and airplane crash

Challenge

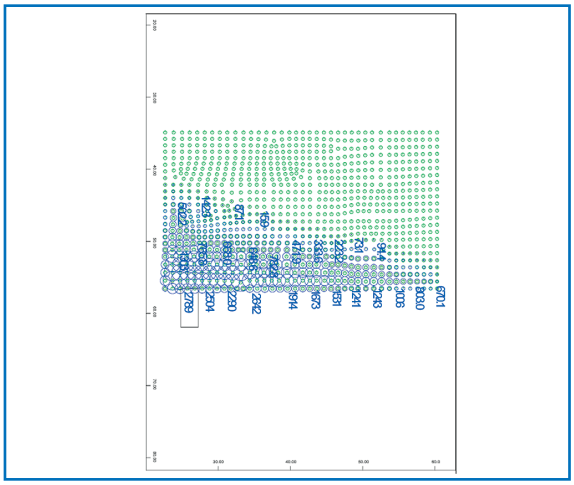
- In case of large overturning forces the global building stability can not be always confirmed using design check based on equivalent static loads (maximum Base Shear values) acting on the building structure

Technical information

- The global stability check of the building is performed using nonlinear dynamic calculation
- Direct time integration analysis with Rayleigh damping method used
- The nonlinear soil spring elements are applied at each nodes of foundation raft to consider the uplift effects
- Analysis considers embedment of building structure
- Evaluation of relative displacement to check the interaction between separated building structures
- Design check for the bearing capacity of the foundation raft affected by uplift effects.



FE building model used for the stability check



Foundation uplift area modeled using nonlinear soil springs

Customer benefits

- A less conservative non-linear calculation method confirms that the structural inertia forces prevent the building structure from stability collapse in case of dynamic loads action
- Reduction of construction cost for reinforcing the building foundation
- Update and optimization of building design

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