



Fire resistance of cast iron columns of Vinohrady brewery

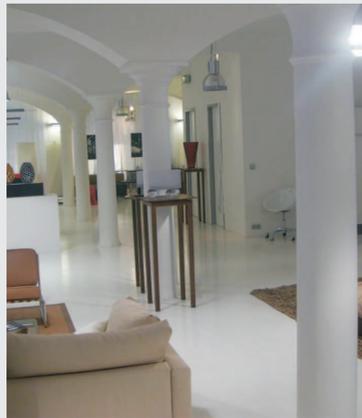
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A procedure for the structural appraisal of cast-iron columns exposed to fire is presented and applied to design of the columns used for reconstruction of the Vinohrady brewery in Prague. The transfer of heat is modelled by the FE 2D procedure which takes into account the hollow section and of the improvement by filling by concrete and to utilise the intumescent coating protection. The buckling resistance is predicted by generalised column curve formulation for Eurocode EN 1993-1-1:2005 modified for the cast iron and for the elevated temperature.

Reused cast iron columns after reconstruction



Rebuild of columns

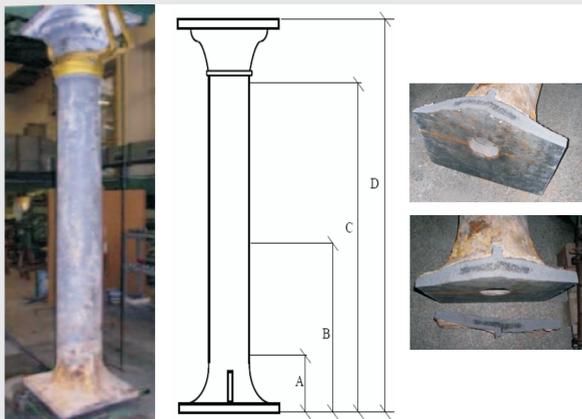


Show room at ground floor

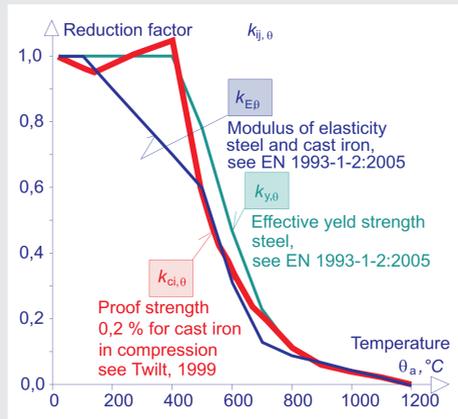


Design office at the first floor

To results of proposed resistance model at elevated temperature



Mechanical test at ambient temperature



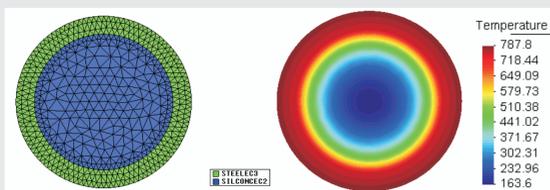
Reduction factor for cast iron at elevated temperature

| Temperatures and reduction factors of 0.2% proof strength | | |
|---|----------|--|
| Column condition | Temp. °C | Reduction factors of 0.2% proof strength |
| Fire unprotected | 864 | 0,08 |
| Concrete filled | 769 | 0,14 |
| Intumescent coated | 411 | 1,00 |
| Coated plus filled | 314 | 1,00 |

| Fire resistance | | |
|--------------------|---------|-----------------|
| Column condition | R60, kN | Reduction to, % |
| Fire unprotected | 395 | 8 |
| Concrete filled | 687 | 15 |
| Intumescent coated | 4530 | 99 |
| Coated plus filled | 4547 | 99 |

Major result of fire design in 60. min of fire

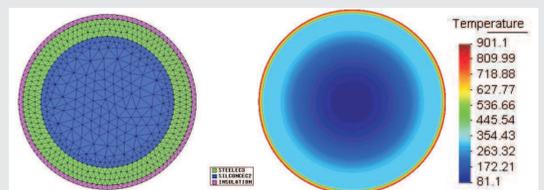
Results of FE transfer of heat model for R60



Fire protection by concrete infill



Fire protection by intumescent paint



Fire protection the concrete infill and intumescent painted

