Masonry beams -structural behaviour and loadcarrying capacity

The study dealt with masonry lintels. Laboratory experiments, code-calculations and structual analyses have been carried out on lintels being strengthened by ordinary reinforcement as well as prestressed reinforcement. In essence, two alternative concepts of prefabricated lintels have been investigated. Alternative 1 was a monolitically burned lintel, that is a one (long) stone solution, with optionally carved mortar strips in order to appear as masonry. Two such (long) lintels were produced by Wienerberger/Bratsberg. Alternative 2, the principal concept, was a lintel composed by socalled construction stones, which allows reinforcement bars to be used in combination with concrete grouting. Four test specimens were produced, two with ordinary reinforcement and two with prestressed bars. In order to achieve representative quality, the lintels were made by a professional mason. The lintels were masoned/cast in an up-right position, as columns. Afterwards, the steel-bar reinforcement was threaded into the holes of the construction stones and grouted. The two prestressed specimens were tensioned after 28 days of curing and grouted after prestressing. Subsequent to testing in the laboratory, the specimens and the test procedure was simulated by nonlinear analyses with relevant material modelling available in DIANA. Based on experimentally verified results, structural analysis of similar lintels, both with ordinary and prestressed reinforcement, in masonry facades have been performed. With respect to crack-resistance and deterioration, prestressed lintels are recommended.