### Column with increased slenderness ratio

The creation of a double-height space by the removal of part of the floors in a reinforced concrete structure presents the problem of the strength of the columns whose buckling length is doubled by the removal of the slab. While the reduction in column loading resulting from the removal of the floor is a positive factor, it is not always sufficient to offset the doubling of the slenderness ratio. Designers must then reinforce the column to increase its radius of gyration and accommodate the structure’s new static state. This new state may also be due to a substantial increase in loading resulting from a simple change of use.

Very often, the solution of “bolstering” the existing column by encasing complementary steelwork is not satisfactory. Firstly, it increases the size of the reinforced concrete columns which are already of substantial dimensions, and secondly, it is tedious to execute. Reinforcement with steel sections or plates is economic and simple to implement. The reinforcements are delivered to site in lengths suitable for manual handling and dry-joined by bolting, welding or bonding. It is advisable, as far as possible, not to mix fastening methods without examining the consequences!

If one wishes to reduce the section of the column to the minimum, one can shore the structure, remove the reinforced concrete column and replace it with a compact HEM-type section or quite simply with a solid steel round or square column as described in the following fact sheet.