



The Means & Methods of Retrofit Construction

By Richard L. Hess, A.E., S.E., SECB, FASCE, CSI, CCCA

The answer to the question: “Who is responsible for the means and methods of construction for a new building?” is obvious. The site is cleared and the contractor basically starts from scratch except for stipulated site features that need to be considered. The initial conditions are an important part of the construction project, but they are usually understood and therefore dealt with in the general conditions and specifications.

In the repair, alteration, or retrofit of an existing building, however, installation or construction of the new elements often require invasive measures that temporarily weaken the building, requiring shoring or a specified sequencing of the construction to provide adequate support before certain tasks commence to complete the construction.

In these instances, it is necessary for the engineer to design the structural elements necessary to support, or shore up, the building element involved. This does not mean that the engineer has assumed the contractor’s responsibility for the “means and methods” necessary to accomplish what is shown on the plans; it just extends the scope of the design beyond what would be considered typical for a new building.

A case in point, at a relatively simple level, is the common practice of cutting new doorways in concrete or masonry walls. Unfortunately, a common practice is to have the contractor cut the opening and then attach a frame made from steel channels inside the opening, attached with bolts inserted into holes drilled into the concrete or masonry wall. This provides little support for the vertical loads on the lintel, no support for

out-of-plane forces on the wall where it was weakened, and no continuity of reinforcing at the new cut-out corner.

The proper solution is for the engineer to design the support bracing for installation before any cutting or demolition takes place. These support elements should be made to resist not only the anticipated loads on the finished structure, but also the forces that could occur during demolition, removal and reconstruction. Wherever possible, the most economical solution will leave the initial support and shoring in place after completion. In some cases, however, subsequent phases of installation will be needed after demolition along with modification or removal of initial construction. This requirement may seem obvious to many engineers who do this type of work, but examples of the incorrect approach can be seen repeatedly.

Another example is the design of foundations and subterranean construction for additions or modifications, where shoring will be required. If the engineer simply designs the proposed new underground elements without consideration of the shoring, its subsequent design may create conflicts that necessitate redesign or an uneconomical solution where elements that could have served as both shoring and final support will be wasted.

In most small and medium sized projects, this sequencing of work cannot be left to the contractor; they do not have the structural engineering expertise to analyze the structure at these intermediate stages.

Providing this direction on the engineer’s plans does not shift responsibility for the contractor’s performance of the work outside of these specific requirements. In fact, it pro-



Restoration of an 18th century exterior masonry wall. Jack under lintel – wall is rebuilt on concrete footing. Courtesy of Mark Mendel.

tests both contractors and the engineer from additional liability by providing the means to avoid damage and accidents that would be more likely to occur if the directions were not given. ■

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