EDITORIAL

It is the fashion nowadays to design fully ductile earthquake resistant structural frames for modern buildings using sophisticated mathematical models and ultra high k- computational devices. The resulting numbers are painstakingly converted into drawings of reinforcing, from which a structure is eventually built. Following close behind the concreting gangs are those sub-contractors who install the items generically known as the mechanical and electrical services. Numbers of these gentlemen drill, chase and cut away vital structural parts indiscriminately for their wares (sometimes aided and abetted by Architects), on the assumption that the structural integrity of the building is of infinitely less importance than getting dirty water away from a handbasin. Competent practitioners attempt to foresee where conduits, ducts, pipes and drains will go, and make provision for them, but all too frequently the need for some lines is forgotten about or thought of only when the concrete has hardened. Then the diamond drillers are brought in - often without the knowledge of the Engineer (who would only cause trouble!). These men delight in showing how easy it is to cut cleanly through the No. 10 HY60 bars, ¾" column hoops and beam stirrups. To the amazement of the Engineer (whose careful aseismic ductile frame analysis has been carried out to a precision of 7 places of decimals), the structure refuses to fall down, or even crack. And the diamond drillers go away, laughing, well pleased with their work.

Will there be a day of reckoning? Will it be for us to face, or will that be for some unknown generation?

In many buildings, when you remove the ceiling pans, the sight is similar to what is seen when you renew the batteries in a transistor. Close and careful integration of the mechanical and electrical services is needed at the design state, not only with one another, but also with the demands of the structure. Such work must be carefully done, and is very time consuming. Design guides are badly needed to cope with horizontal, skew or sloping sleeves through columns and beams. Can sleeves be put through ductile hinges? How much conduit, at various angles, can a shear wall be filled with, and still function as designed? How far can drilled-out sleeves be acceptable? Drilled-in expansion bolts are commonly used for fixings. There is a danger the drilling may cut or notch reinforcing, with consequent stress raising and risk of failure. It is difficult to police their use, but they can be banned from all beams or columns. Is this justified?

Until we can be sure of the answers to such questions, concern about the level of earthquake resistance in the overall design may be meaningless. The continuing integrity of the structural members will ever be of fundamental importance.

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