Seismic design of non-structural components in a building in Japan: Who should take the initiative in practice?

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In design of buildings, structural engineers take care of principal structural components, such as beams, columns, braces, resisting walls, foundations, etc. Through the experiences of many earthquake disasters, the design techniques and regulations for these principal components have been improved to a certain level. On the other hand, non-structural components, such as ceilings, piping, equipment etc., have not been considered well although the damage risk and threat to occupant's life have been pointed out for long time. The seismic safety of ceilings, piping, and escalators are supposed to be secured by architects, equipment engineers, and mechanical engineers, respectively. Unfortunately, falling non-structural components caused a considerable number of casualties in the 2011 Tohoku earthquake. Consequently, regulations for ceilings of large-span buildings and escalators have been amended. However, there was no major revision in the fundamental regulation for non-structural components. This regulation sometimes fails to consider the resonance effect between a building and a non-structural component with similar natural periods. To achieve the comprehensive seismic safety of buildings, we have to discuss and address a problem of vertical division system in a building design.