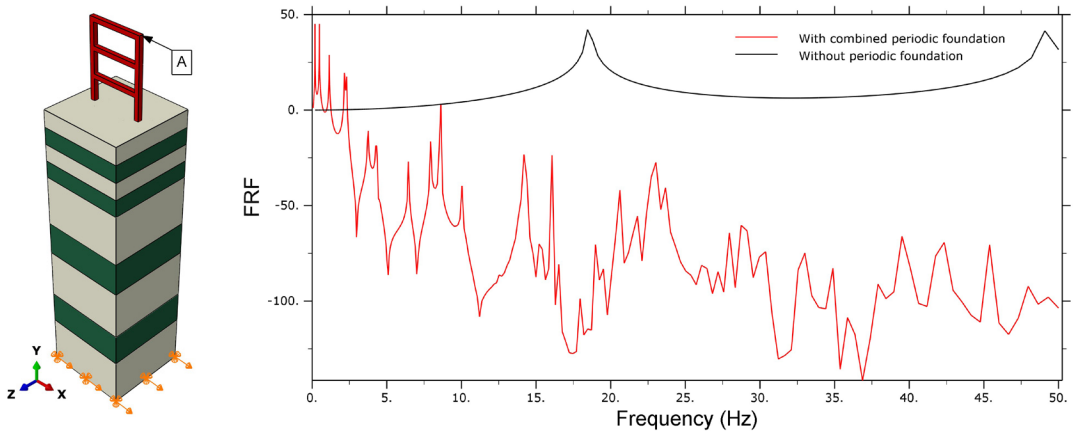
Use of periodic foundations for seismic isolation of structural systems

In India, traditional base isolation devices such as rubber pads have been used for more than two decades to reduce the response of structures due to the horizontal components of seismic waves. Such base isolation systems are generally not suitable for providing adequate protection against the vertical components of seismic waves and also result in large relative horizontal displacement between the foundation and the super-structure during seismic events. In addition to the base isolators, seismic dampers are used to act as energy dissipation devices and thereby improve the seismic performance of structures. Use of seismic dampers such as friction dampers often results in permanent drifts in systems on which they are installed. Other seismic dampers such as elastomeric dampers are temperature sensitive and are difficult to control to a high level of accuracy. Hence the feasibility of a new structural base isolation technique is being currently investigated in our group through a DST funded project on the use of periodic material based foundations namely 'periodic foundations' for structural systems. Results from the ongoing research show that the periodic foundations are highly effective in reducing the seismic response of structural systems for a wide range of seismic wave frequencies. The feasibility of these foundation systems would greatly reduce the damaging effects of both horizontal and vertical seismic waves on the superstructure and would also eliminate the large relative displacement between the foundation and the superstructure after seismic events.



A: Response record point

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