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It is observed that the selected port sites have much higher ground motions than specified by the default spectrum of IS1893 part-1:2002. It is also revealed that the port sites Mundra, Kandla and Navlakhi are most susceptible to seismic risk. Dahej and Hazira ports are comparatively at lower risk. The Indian standard (IS1893 part-1:2002) thus underestimates the fragility of wharf at selected sites, stating it to be functional for DBE and MCE. The site specific spectrum obtained at selected sites indicates the wharf as deficient in terms of serviceability during its design life. Hence, site specific spectrum is necessary for seismic design of port structures. There is also a need to review the existing Indian standard in context to ground motions.