Preliminary Study on Dynamic Response of Accelerometer Housings and their Influence on Strong-motion Data Recordings.

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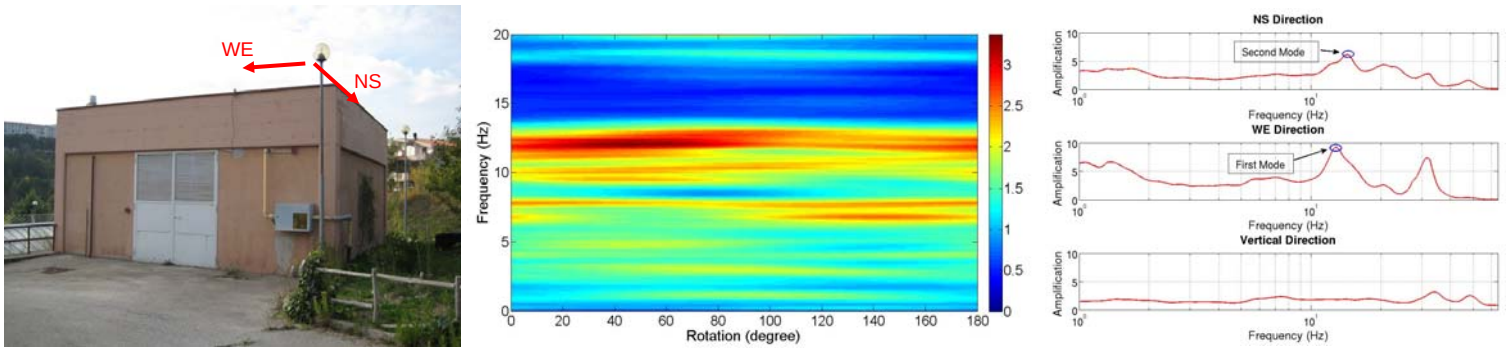
The time-histories recorded at stations placed within or near buildings could be not representative of the true free-field ground motions: these could be contaminated by the presence of the buildings. These effects are known for years for large structures, but little attentions have been paid for small structures.

Most of the accelerometric stations of Accelerometric National Network (RAN) are located within the electric grid sub-stations housing. The main types of housings are masonry, reinforced concrete and pre-cast concrete housing. Generally, they may have one or two floors.

Recent studies (Ditommaso *et al.*, 2009) about the influence of the dynamic response of those housings on the accelerometric recordings using the rotational HVSR technique showed that this could be a problem, revealing a strong contamination of recordings by the dynamic response of the housing Fig. 1.b.



(a) (b) (c)

Figure 1: (a) PTZ Station; (b) Rotational HVSR; (c) Transfer function of PTZ housing

(a) (b) (c) (d)

Figure 2: Example of ENEL housings: (a) San Demetrio; (b) Bussi; (c) Cittaducale; (d) Scafa

Starting from these interesting results, for the station located in Potenza (PTZ Station Code), in order to understand the influence of small structures on accelerometric recordings, after the L'Aquila Earthquake (6th of April 2009), we analyzed the main recordings and performed the dynamic characterization of some housings (and the related pillars fixed into the ground on which accelerometer is located). All considered housings are located close to the epicenter: Bussi (BSS code), San Demetrio nè Vestini (SDM), Scafa (SCF) and Cittaducale (CTD).

Municipality	Typology	Housing Fundamental Frequency (Hz)	Pillar Fundamental frequency (Hz)
Scafa	*Pre-cast*	*10.5*	*70*
San Demetrio	*Masonry*	*6.7*	*60*
Bussi	*Masonry*	*9.5*	-
Cittaducale	*Masonry*	*7.3*	*105*

Table 1: Dynamic characterization of housings and pillars

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References:

Ditommaso R., Mucciarelli M., Gallipoli M.R., Ponzo F.C. (2009) *Effect of a single vibrating building on free-field ground motion: numerical and experimental evidences.* Bull Earthq Eng. DOI:10.1007/s10518-009-9134-5