

## Chapter

## 4

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## Retrofitting of School Building Located in Southern Italy

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### Abstract

This paper summarizes the main features of the seismic retrofitting project of a school building located in Montella (AV), Italy. Specifically, it describes the as-built status in terms of structural organization, member detailing, and existing materials properties. Then, it outlines the main assumptions and results obtained from seismic analysis, of both as-built and retrofitted structure. Comments about the construction stage are also reported by describing the main operations put in place with the aim to realize the shear wall system, which is the main retrofitting intervention, and some local strengthening measures consisting in steel plating and jacketing of some under-designed RC members. Some emphasis is placed on the realization of micro-piles and extra foundations of the aforementioned shear walls. Besides its specific interest, the reported project may be intended as representative of a wide class of seismic assessment and retrofitting projects that have been realized in Italy in the last decade.

**Keywords:** school building, reinforced concrete frame, shear walls, micro-piles, steel jacketing

## 4.1 Introduction

A significant share of school buildings have been built during the past decades and are currently in need for retrofitting. Specifically, according to the “registry” (*anagrafe*) realized in 2015 by the Ministry of Education, University and Research (MIUR), the stock of Italian school buildings consists of about 42 000 constructions, 55% of which have been realized before 1976.<sup>1</sup> As it is well-known, almost all the Italian territory is characterized by medium-to-high seismic hazard<sup>2</sup>; Therefore, the intrinsic vulnerability, deriving by the fact that the majority of school buildings have been designed without the modern principles of earthquake engineering,<sup>3,4</sup> leads to significant values of seismic risk, also because of the exposure of young human lives. More than any quantitative data and formal statistics, the consequences of the seismic event occurred in 2002