

REF A02 SEISMIC STRENGTHENING OF SCHOOL AT BOLOGNA, ITALY

PROJECT	SEISMIC STRENGTHENING OF A SCHOOL BUILDING
LOCATION	Crevalcore, Bologna, Italy
CLIENT	“Marco Polo” Junior high school
ENGINEER	SG LAB, Italy
IMPLEMENTATION	2012



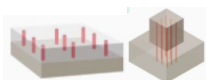
Applications	Slab strengthening (overlay) & addition of seismic infill walls
Design	EN 1992-1-1, EN 1998-1 & national regulations
Hardware	HIT-RE 500, Hilti SafeSet™ System, drill bits
Software	PROFIS Engineering
Services	Hilti training to the design team

CHALLENGES

- Brownfield Project
- Building was severely damaged due to Earthquake
- Seismic strengthening of existing building
- Stiffening of existing floors
- Addition of infill walls for lateral resistance

HILTI TOTAL SOLUTION

- ✓ Optimized & qualified post-installed solutions
- ✓ Seismic interventions introduced
- ✓ Eurocode and national regulations for design
- ✓ Post-installed rebar for slab overlay and end-anchorages



LOAD / CONDITIONS: Static and Seismic

PROJECT HIGHLIGHT



The intervention increased the seismic resistance of the building from 10% to 110%

PROBLEM STATEMENT AND OBJECTIVES

The building was severely damaged during the **2012 Emilia Earthquake**. The flexible, partially prefabricated structure was largely undamaged after the seismic event. However, non-structural components were seriously damaged. Therefore, it was decided to strengthen and stiffen the existing structure. **The main seismic interventions consisted of stiffening the floors and the addition of shear-infill walls.**

DESIGN APPROACH

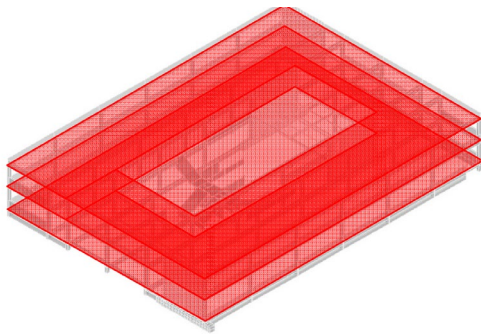
Post-installed rebars with HIT-RE 500 were used for the overlay on the floors as well as the connection with surrounding walls. The connection of the shear infill walls with the existing reinforced concrete frames was decided to increase the lateral resistance of the building.

SOLUTION AND FINAL OUTCOME

The seismic intervention **increased the seismic resistance of the building from 10% to 110%** compared to the requirement for a comparable new school building according to latest codes & standards.

Usage of mortar (**Hilti HIT- RE 500**) and installation tools (**Hilti SafeSet System™**, drill bits, etc.)

Application : Stiffening of floors



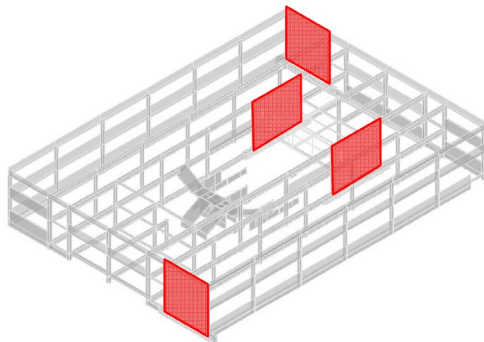
Seismic interventions



Installation



Application : Addition of infill walls



Slab overlay and End-anchorages

