



**Italian Joint Reconnaissance Mission**

# Türkiye

May 8<sup>th</sup> – 13<sup>th</sup> 2023

In collaboration with:

TED  
ÜNİVERSİTESİ



ODTÜ  
METU



**Daily Report**  
**May 10<sup>th</sup> 2023**

Under the auspices of the  
Italian Department of Civil Protection



**PROTEZIONE CIVILE**  
Presidenza del Consiglio dei Ministri  
Dipartimento della Protezione Civile

## Daily report, May 10th 2023

On the 10<sup>th</sup> of May, eight teams consisting of engineers, and other personnel with technical expertise, were divided into seven working groups. Each group was assigned an engineer from either METU or TED university of Ankara and was tasked with performing post-earthquake inspections of school buildings (mainly primary or middle schools) located in the provinces of Hatay, Maras, Antep and Adana. This meant that each group was responsible for around twenty-five buildings, whose positions and color-coded assignments are shown in Fig. 1.

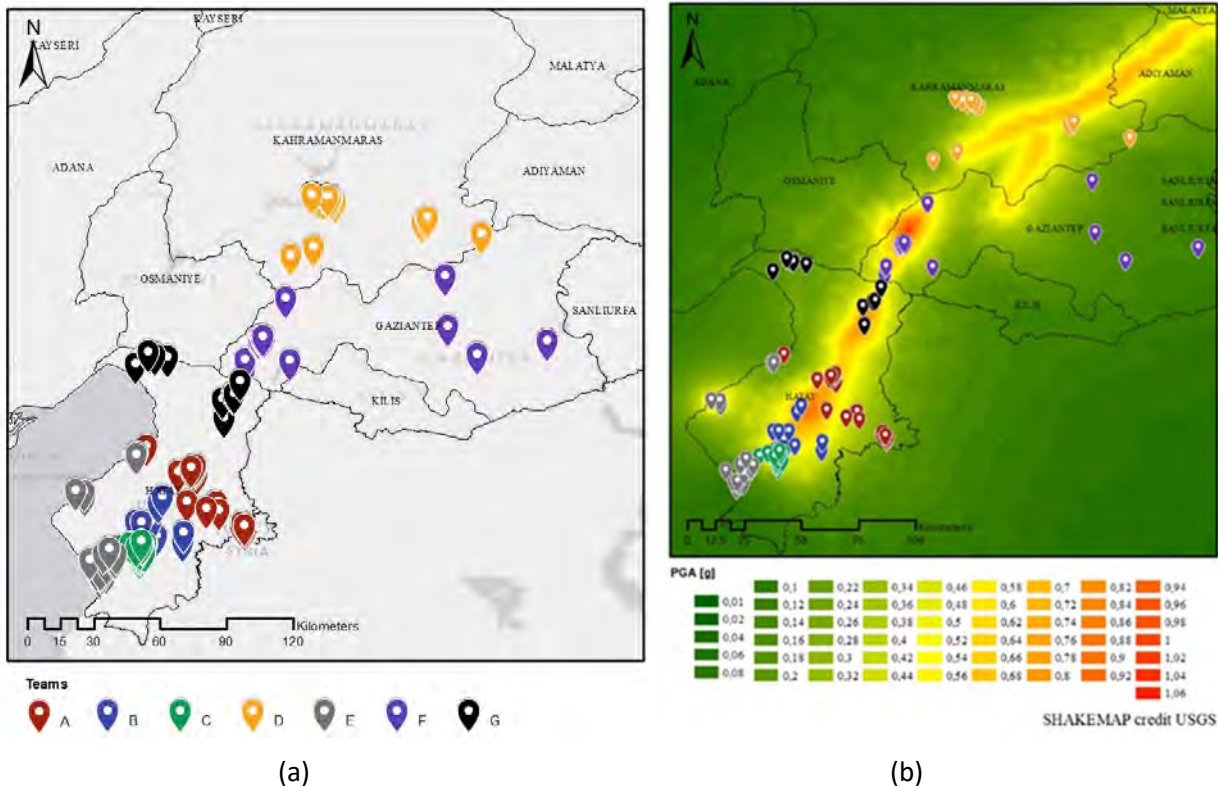


Fig. 1 Positions of the school buildings assigned to the seven groups for post-quake inspection (a); Positions of the school buildings and shake map of earthquake 6 February 2023 from USGS (b)

By the end of the day, the tally showed that the seven groups had performed inspections on 56 schools. For the most part, these activities made it possible to obtain such information as the year of construction and that of retrofit design, as well as the type of retrofit or strengthening strategy adopted in each case. The table below provides a list of school names where this information is reported under three columns.

Tab. 1 Edifici visionati

School name	Construction year	Year of retrofit	Type of retrofit
İSMET AYŞE BEHZETOĞLU AL	1997	2019	addition of RC shear walls
OĞULCAN TUNA MTAL	1981	2019	addition of RC shear walls
FATİH İLKOKULU A BLOK	2001	no	no
EŞREF MURSALOĞLU İLKOKULU C BLOK	2007	no	no
TAYFUR SÖKMEN SÖKMEN KARADENİZ İLKOKULU	2010	no	no
8 TEMMUZ ORTAOKULU	1997	2021	addition of RC shear walls
HACI SENİHA BAHADIRLI İLKOKULU	1994	2012	addition of RC shear walls
GAZİ MÜRSEL İLKOKULU	2019	no	no
REYHANLI LİSESİ OKUL+İDARİ BİNASI	n/a	n/a	n/a
BAŞLAMIŞ İLKOKULU	1998	2021	addition of RC shear walls
YEŞİLKENT ANADOLU LİSESİ	n/a		
SEKİZ OCAK İLKOKULU A-BLOK	1999	2023	addition of RC shear walls
MEHMET AKİF İLK/ORTA OKULU A-B-BLOK	1972	Retrofit underway	
BAHRİ ÇELEN ANADOLU LİSESİ	1996	2021	addition of RC shear walls
HÜRRİYET ORTAOKULU	1961	2022	addition of RC shear walls
HALK EĞİTİM MERKEZİ	1996	2022	addition of RC shear walls
SEHİT MEHMET SARIASLAN İLKOKULU	1999	2016	addition of RC shear walls
ESENTEPE MEHMET AKAR İLKOKULU B BLOK	2005	no	
ESENTEPE MEHMET AKAR İLKOKULU X BLOK	2005	no	
	(presumed)		
HAYRETTİN ÖZKAN ORTAOKULU	Early 90s	no	
DR.MUSTAFA GENÇAY İLKOKULU	Early 90s (presumed)	2021 (presumed)	Inspection did not provide evidence of any retrofit
HATAY EROL BILECIK MESLEKİ VE TEKNİK ANADOLU LİSESİ	n/a	-	Unable to verify realization of retrofit
YEŞİLPINAR ORTAOKULU	n/a	-	-
ANTAKYA LİSESİ	n/a	-	-
MUSTAFA GENÇAY LİSESİ PANSİYON BİNASI	n/a	-	-
İMAM HATİP LİSESİ OKUL BİNASI	1981	2008	addition of RC shear walls
CUMHURİYET LİSESİ OKUL BİNASI	1973	2010	RC jacketing
AYŞE GÜMÜŞER İLKOKULU	1995	2022	addition of RC shear walls
PİRİ REİS ORTAOKULU	n/a	n/a	n/a
ZEKİ KARAKIZ ORTAOKULU	2001		
MAREŞAL FEVZİ ÇAKMAK İLKOKULU	1979	2003	addition of RC shear walls and expansion joint
TEKEBAŞI KURTULUŞ İLK VE ORTAOKULU	2000/2007	2022	addition of RC shear walls
TEKEBAŞI ZEYNELABİDİN CİLLİ İLK VE ORTAOKULU	1999	2023	addition of RC shear walls
EZC.MERYEM KARAÇAYLI İLKOKULU	2000	2022	addition of RC shear walls
DR.ALAEDDİN CİLLİ İLKOKULU	2000	2022	addition of RC shear walls

ÇÖĞÜRLÜ İLKOKULU	2000/2002	2023	addition of RC shear walls
JAN SUPHİ BEYLUNİ LİSESİ	2001	2021	addition of RC shear walls
ATATÜRK ANADOLU LİSESİ	1978	2021	addition of RC shear walls
NAMİK KEMAL İLKOKULU	1996	2022	addition of RC shear walls at the first floor only
MIZRAKLI ATATÜRK ORTAOKULU	n/a	n/a	n/a
NİZİP YİBO DERSLİK OKULU	2017	No	-
NİZİP YİBO PANSİYON BİNASI	2017	No	-
NİZİP YİBO DERSLİK OKULU	2019	No	-
NİZİP YİBO PANSİYON BİNASI	2019	No	-
OĞUZELİ YİBO DERSLİK OKULU	1973	2006	addition of RC shear walls
OĞUZELİ YİBO PANSİYON BİNASI	1973	2006	addition of RC shear walls
MEHMET AKİF ERSOY MTAL B BLOK	1983	No	-
TEKİRSİN İLKÖĞRETİM OKULU	n.d	n/a	n/a
ANTAKYA TİCARET LİSESİ OKUL LİSESİ	n/a	n/a	n/a
KUZEYTEPE ATATÜRK İLKOKULU	n/a	n/a	n/a
DEMİRBİLEK İLKOKULU EK BİNA	n/a	2023	addition of bidirectional RC shear walls in addendum to the building
OVAKENT İLKOKULU A BLOK	1989	2022	addition of RC shear walls
OSMAN ÖKTEN ANADOLU LİSESİ	1980	n/a	Planned but never constructed
NİZAMETTİN ÖZKAN İLKOKULU B-BLOK	n/a	n/a	n/a
ŞEHİT NİZAM AKDENİZ İLKOKULU A BLOK	2019	n/a	addition of RC shear walls
HÜSEYİN ÖZBUĞDAY LİSESİ OKUL+SPOR SALONU	1968	2010	addition of RC shear walls

## Report and photographic material: earthquake damage on the case study school buildings

In the following paragraphs, some particular features of the damage patterns encountered during the inspections are described, for buildings such as the one in Fig. 2.

- **İSMET AYŞE BEHZETOĞLU AL**

The building was classified as moderately damaged, and was temporarily closed to scholastic activities, due to flexural cracks observed on beams of the frames in the longitudinal direction, such as the one shown in Fig. 3 with a crack width of 0.5 millimeters. The building avails of a strengthening system composed by additional RC shear walls, placed near the central part and spanning the entire height of the building



Fig. 2. -. Front view of the building.



Fig. 3. - Position on a flexural crack on a beam.

- **OĞULCAN TUNA MTAL**

This building does not exhibit earthquake damage. All that can be observed is some separation of the masonry infill around the gym area, that was probably caused by some existing case of foundation settlement, as shown in Fig. 5. The building exhibits a strengthening system consisting of RCC shear walls spanning the entire height of the building



Fig. 4 Front view of the building



Fig. 5 – Separation of the masonry infill.

- **REYHANLI LİSESİ OKUL+İDARİ BİNASI**



Fig. 6 – Front view of the building.



Fig. 7 – Partial collapse of the roof cover.

This building was closed to scholastic activities. It exhibits ubiquitous cracks on all sides, that only seem to concern the finishing mortar. The roof cover has evident damage, with part of it on the front side being displaced with some the roof tiles falling over.



- Scuola DR.MUSTAFA GENÇAY ILKOKULU



Fig. 8 Left panel: front view; right panel: view from the inside, collapsed external infill masonry walls and plastic hinging of the adjacent columns with clear disorganization of the concrete nucleus due to lack of adequate passive confinement



Fig. 9. Soft storey effect due to partial collapse of the front infill walls; plastic hinging of the columns.

- **ESENTEPE MEHMET AKAR İLKOKULU**

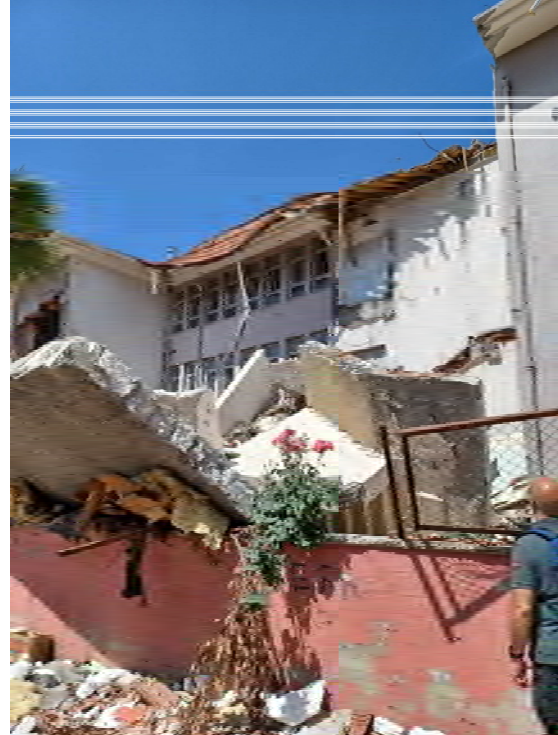


Fig. 10 Incipient (left) and total collapse (right) of the external structures bearing the emergency evacuation stairwells.

- **ESENTEPE MEHMET AKAR İLKOKULU**



Fig. 11. Out of plane collapse of the infill walls on both floors.

- **HATAY EROL BILECIK MESLEKI VE TEKNİK ANADOLU LİSESİ**



Fig. 12. Overturning of internal masonry separation walls

- **AKBEZ MTAL B BLOK**

The load-bearing structures were not significantly damaged: only mild cracking was observed.



Fig. 13: Light damage at the interface of the infill walls

- **SEHIT MEHMET SARIASLAN ILKOKULU**

Ongoing retrofit operations that were not completed by the time of the earthquake.



Fig. 14: Additional RC shear wall.

## Report and photographic material: earthquake damage on residential buildings

In the urban areas surrounding the buildings under inspection, various damage patterns and failure mechanisms were observed. Some typical examples are presented here.

In the city of Erzin some column damage was observed near the staircase of an RC terrace.



Fig. 15: Column damage

The following damage was observed in the city of Antioch (Antakya):



Fig. 16. Shear failure of an RC shear wall and plastic hinging at the top of the ground floor columns.



Fig. 17. Partial collapse of a large portion of a dormitory building, due to heavy damage of several consecutive columns at the ground floor.



Fig. 18 Collapse of the external infill walls and damage to the perimeter beams lacking direct column support.

In the city of Atakoy, shear failure was observed in many RC columns in the vicinity of the stairwells



Fig. 19 Shear failure of several RC columns near the stairwells



Tab. 2 Team

<b>NAME</b>	<b>AFFILIATION</b>
Marco DI LUDOVICO	Univ. degli Studi di Napoli Federico II
Carlo DEL GAUDIO	Univ. degli Studi di Napoli Federico II
Marta DEL ZOPPO	Univ. degli Studi di Napoli Federico II
Marco GAETANI D'ARAGONA	Univ. degli Studi di Napoli Federico II
Giorgio BALZOPoulos	Univ. degli Studi di Napoli Federico II
Roberta APUZZO	Univ. degli Studi di Napoli Federico II
Marco GIULIVO	Univ. degli Studi di Napoli Federico II
Vincenzo MANFREDI	Univ. degli Studi della Basilicata
Romina SISTI	Univ. degli Studi di Napoli Federico II
Antonio GRELLA	Univ. degli Studi di Napoli Federico II
Luigi DI SARNO	Univ. degli Studi di Napoli Federico II
Antonio MANNELLA	CNR-ITC
Domenico NINNI LAZZARO	CNR-ITC
Francesca FERRETTI	Univ. di Bologna
Piero COLAJANNI	Univ. degli Studi di Palermo
Jennifer D'ANNA	Univ. degli Studi di Palermo
Marielisa DI LETO	Univ. degli Studi di Palermo
Gianni BLASI	Univ. of Salento
Gabriele GERRINI	Univ. degli studi di Pavia
Silvia PINASCO	Univ. di Genova
Stefano BRACCHI	Fondazione Eucentre
Davide BELOTTI	Fondazione Eucentre
Numan EREN	Fondazione Eucentre
Guney OZCEBEB	TEDU - Turkish Education Association University
Erturk TUNCER	TEDU - Turkish Education Association University
Mehmet Firat AYDIN	TEDU - Turkish Education Association University
Cem AKGUNER	TEDU - Turkish Education Association University
Ömer Can PAMUK	TEDU - Turkish Education Association University
Erdem CANBAY	METU - Middle East Technical University
Yunus IŞIKLI	METU - Middle East Technical University
Firat YURTSEVEN	METU - Middle East Technical University
Yalın ARICI	METU - Middle East Technical University
Ozan Cem ÇELİK	METU - Middle East Technical University
Norgen MUKA	METU - Middle East Technical University