

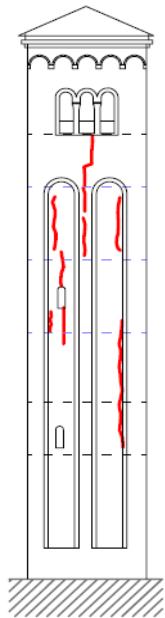




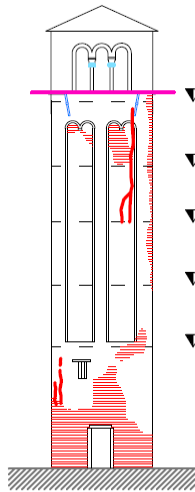
Schedatura dei campanili di Venezia

Terremoti e beni culturali in area veneta: quale tutela?

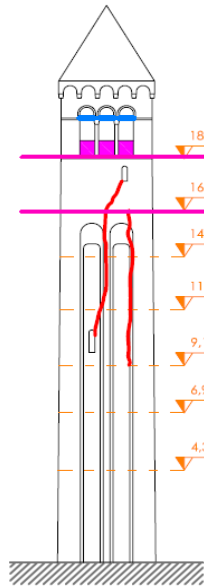
Campanili di Venezia antecedenti il sec. XIV



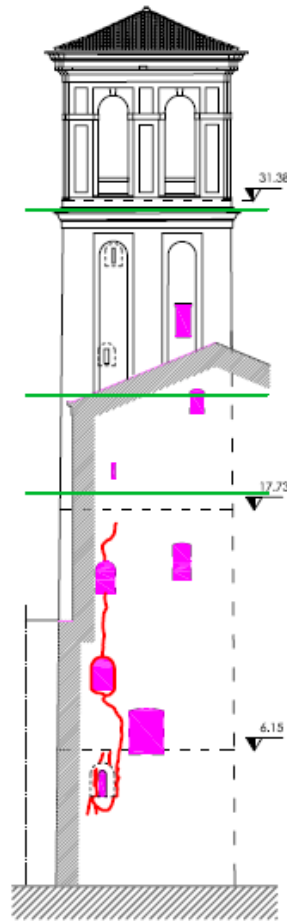
S. Zaccaria
IX° sec.



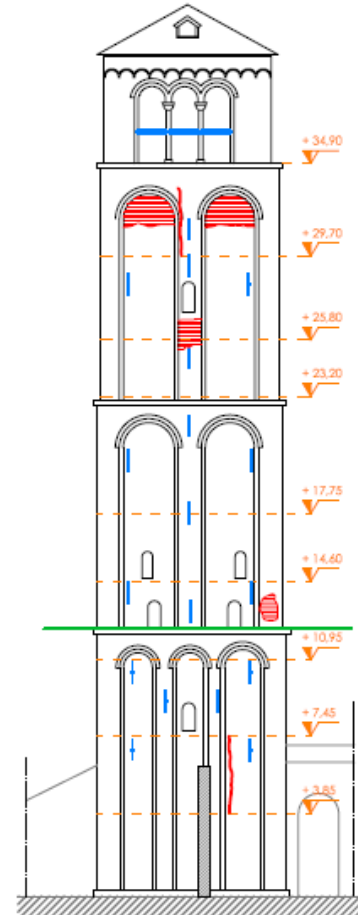
Misericordia
X° sec.



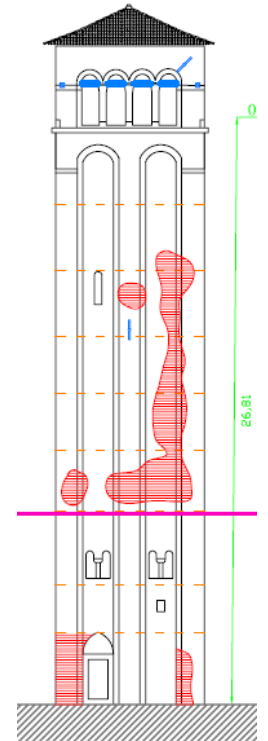
S. Samuele
XI° sec.



Gesuiti
XII° sec.



S. Donato
XII° sec.

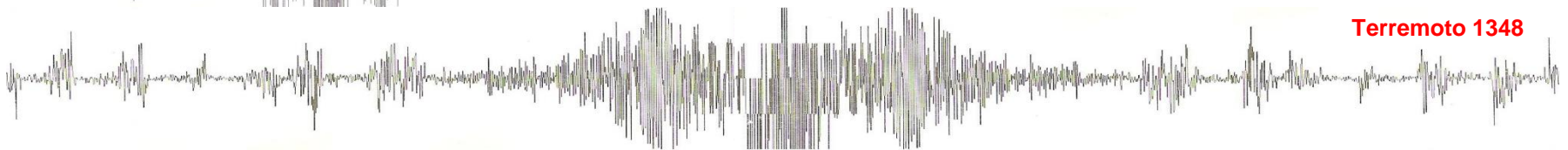


S. Giacomo
XIII° sec.

Terremoto 1117



Terremoto 1348



Terremoti e beni culturali in area veneta: quale tutela?

Lesioni da sollecitazioni sismiche



S. Zaccaria



S. Donato



Gesuiti

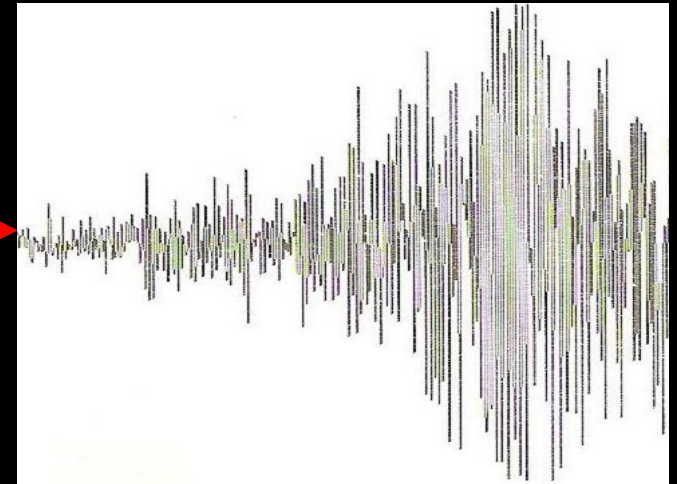


S. Giacomo

Terremoti e beni culturali in area veneta: quale tutela?

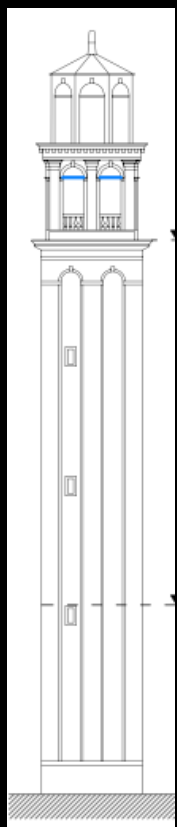


Risalire dalle lesioni alle
azioni ...

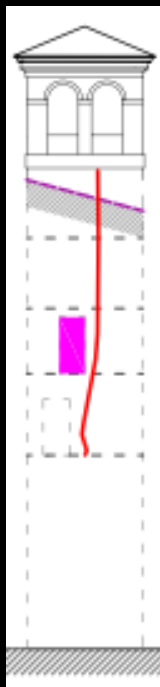
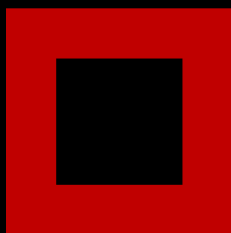


Terremoti e beni culturali in area veneta: quale tutela?

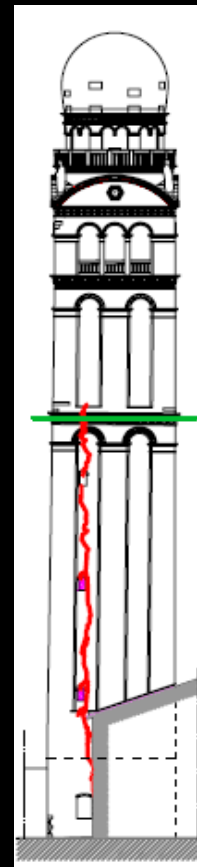
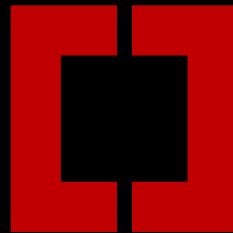
Riduzione della resistenza alle azioni sismiche di torri fessurate



0,113 g



0,046 g



0,017 g



Terremoti e beni culturali in area veneta: quale tutela?

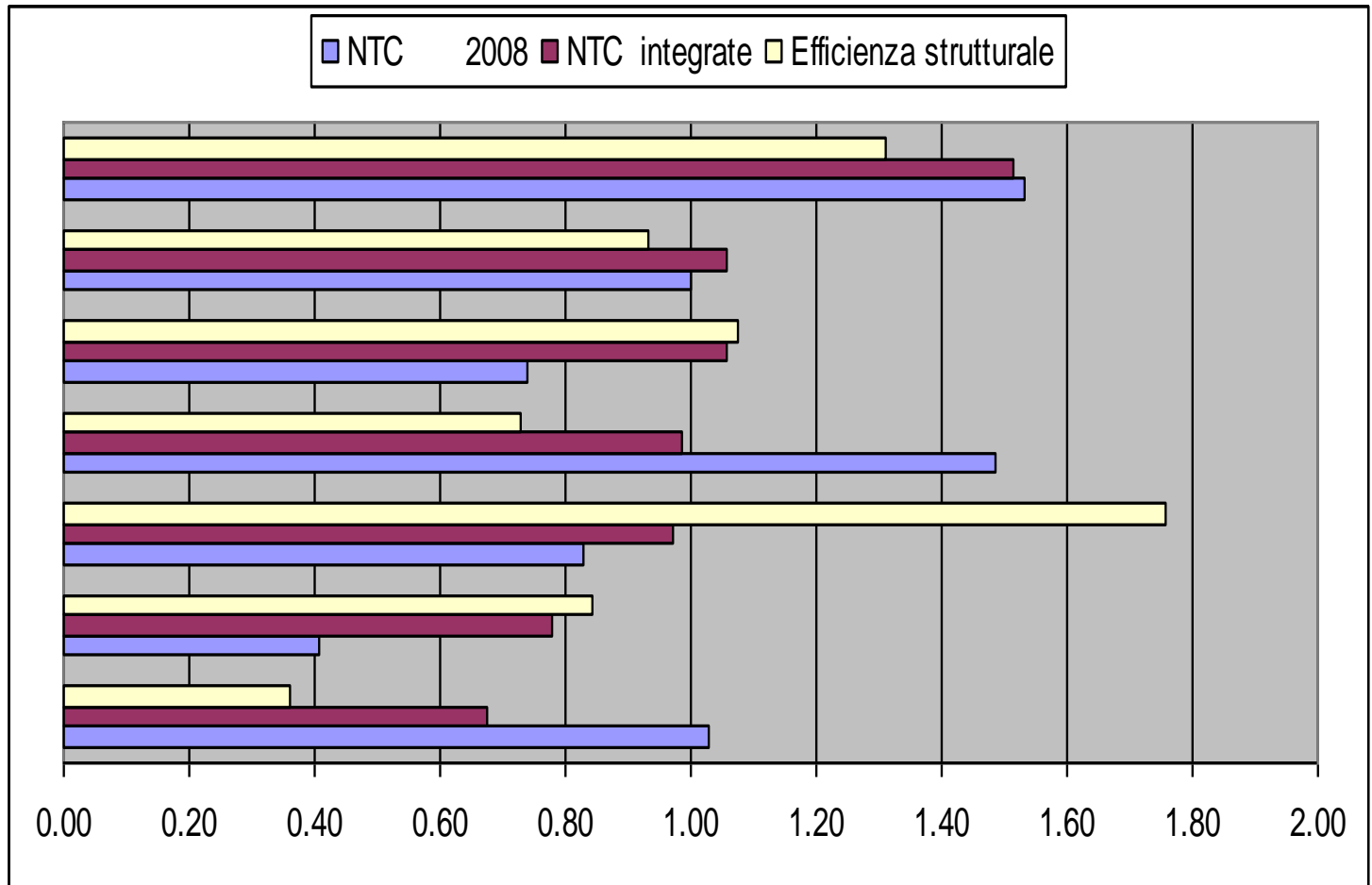
CONFRONTO TRA INDICI SISMICI

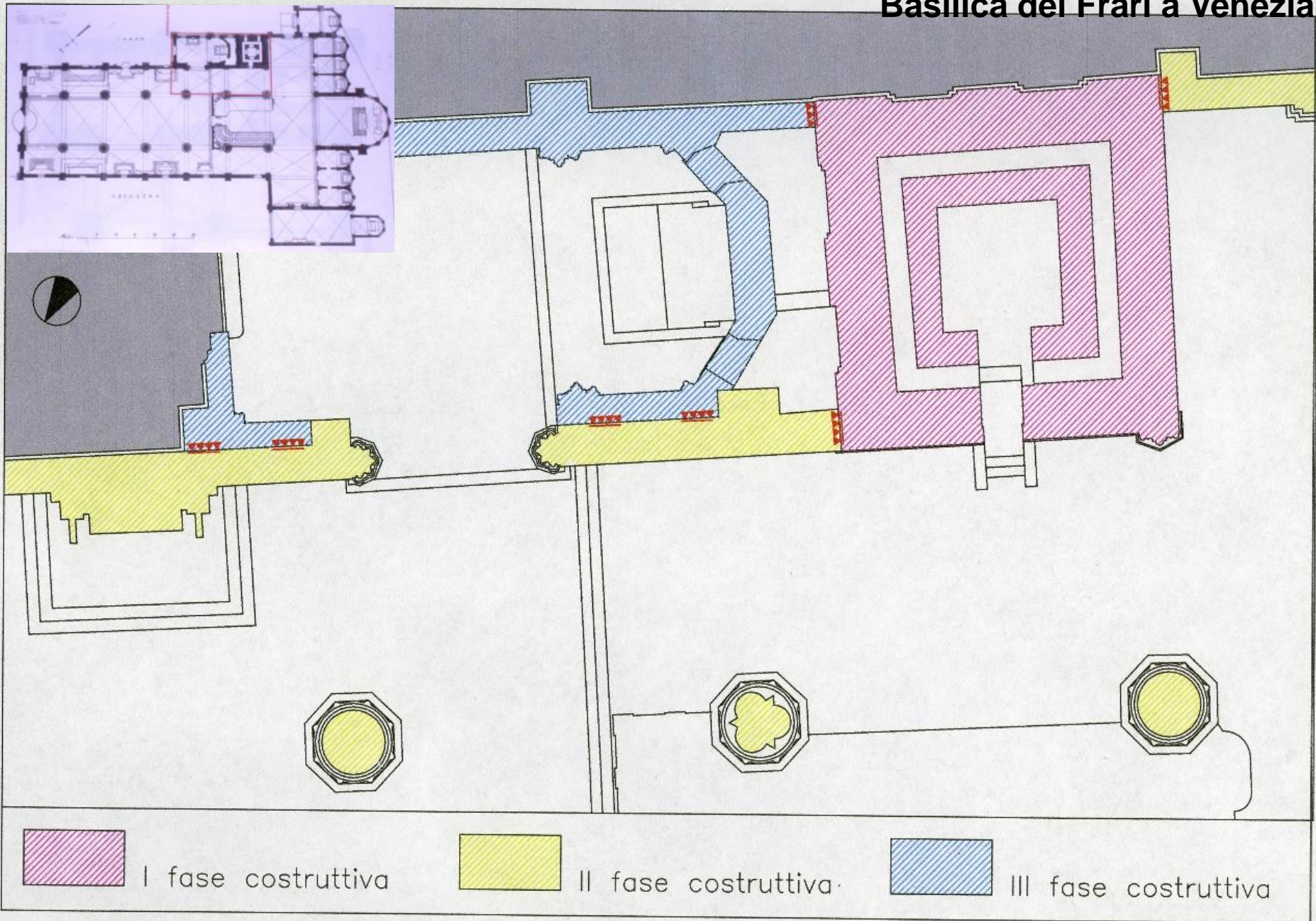
	NTC	2008	Efficienza strutturale
Campanile			
San Geremia	1.03		0.36
San Francesco della Vigna	0.41		0.84
Santa Caterina di Mazzorbo	0.83		1.76
San Giacomo dell'Orio	1.49		0.73
Madonna dell'Orto	0.74		1.08
Sant'Aponal	1.00		0.93
San Donato a Murano	1.53		1.31

CONFRONTO TRA INDICI SISMICI

	NTC 2008	NTC integrate	Efficienza strutturale
Campanile			
San Geremia	1.03	0.68	0.36
San Francesco della Vigna	0.41	0.78	0.84
Santa Caterina di Mazzorbo	0.83	0.97	1.76
San Giacomo dell'Orio	1.49	0.99	0.73
Madonna dell'Orto	0.74	1.06	1.08
Sant'Aponal	1.00	1.06	0.93
San Donato a Murano	1.53	1.51	1.31

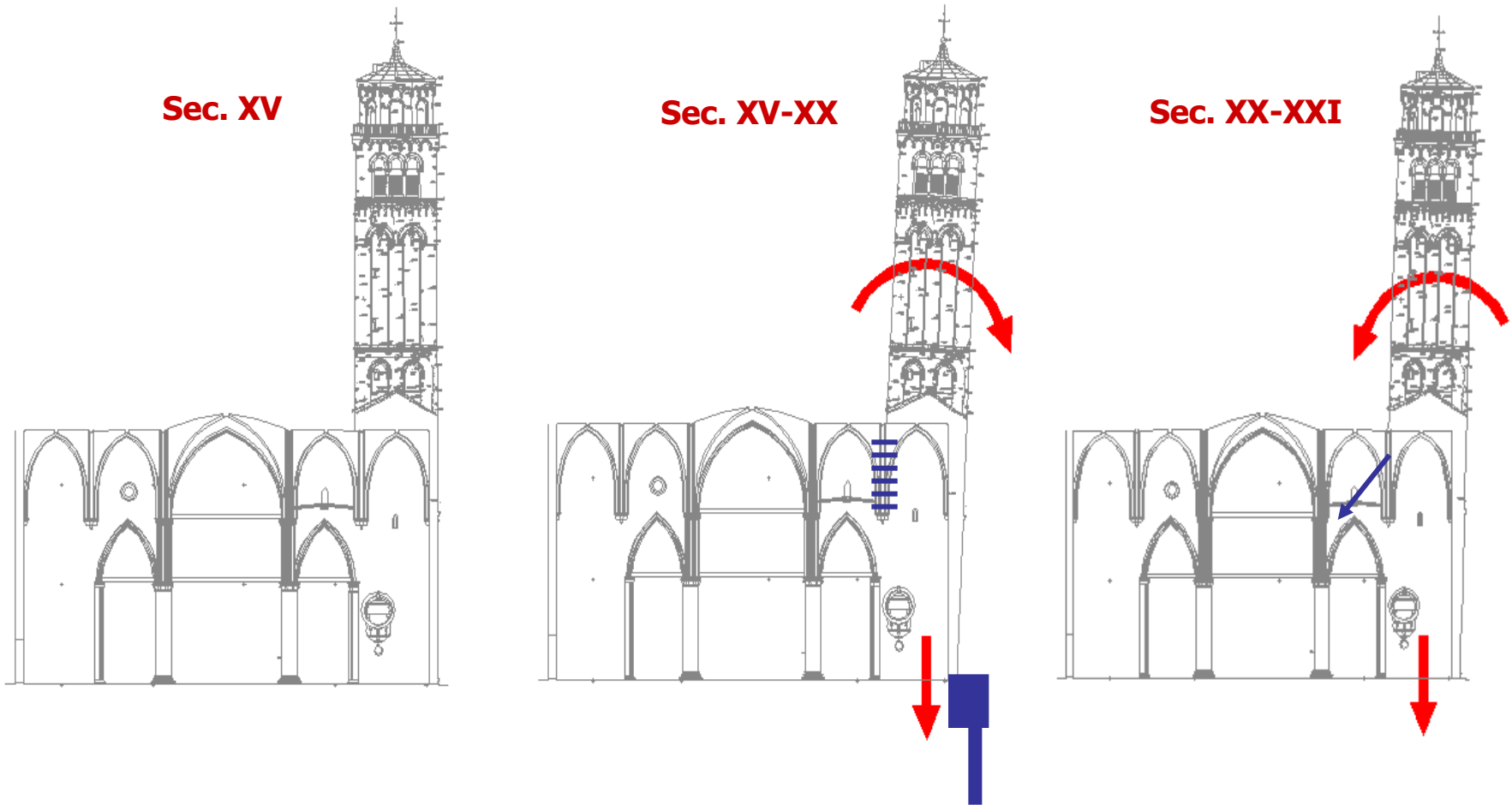
CONFRONTO TRA INDICI SISMICI





Basilica dei Frari a Venezia

MODIFICHE NEL TEMPO DEL COMPORTAMENTO STRUTTURALE



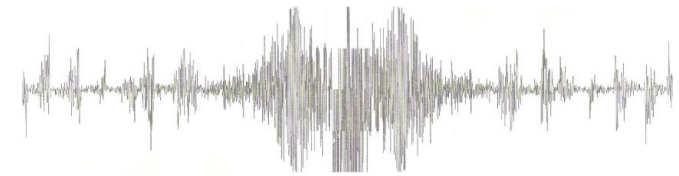
Basilica dei Frari a Venezia

12.07.2004

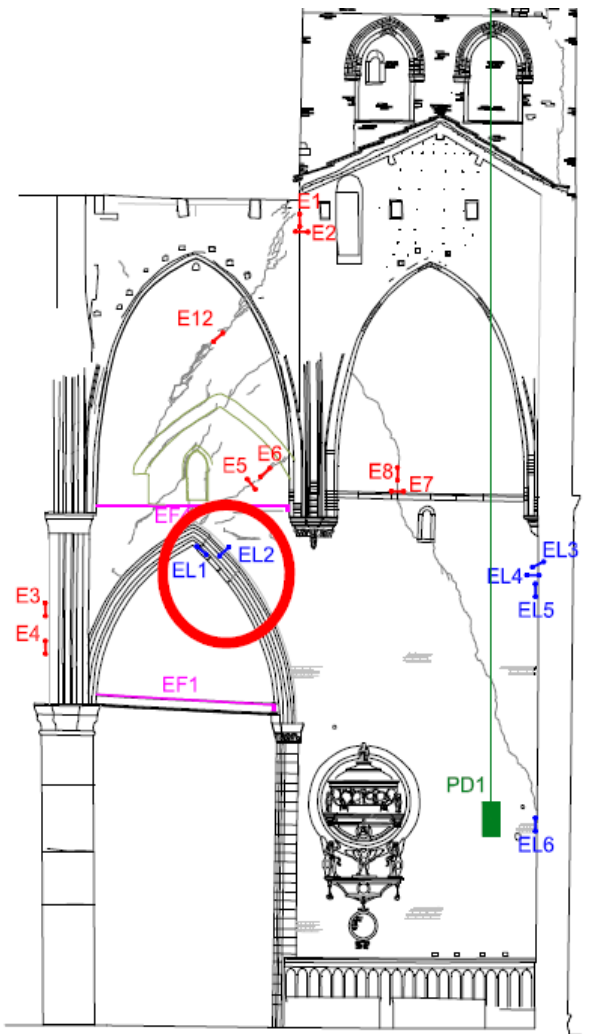
13:04:00

M 5.2

Alpi Giulie

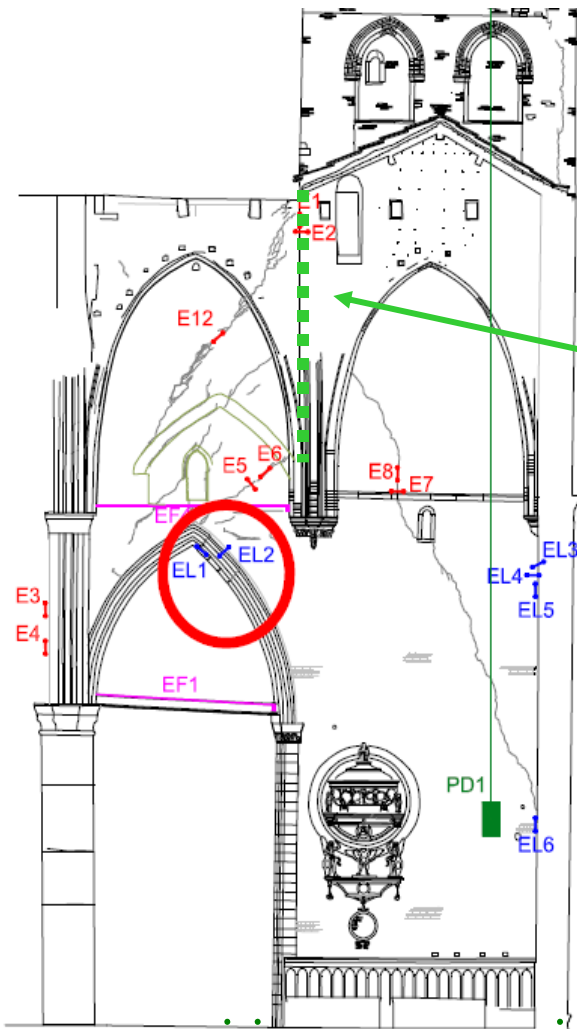


	EL1	EL2
12/07/2004 12:00	-0.15	0.09
12/07/2004 18:00	-0.11	0.23
	0.04	0.14

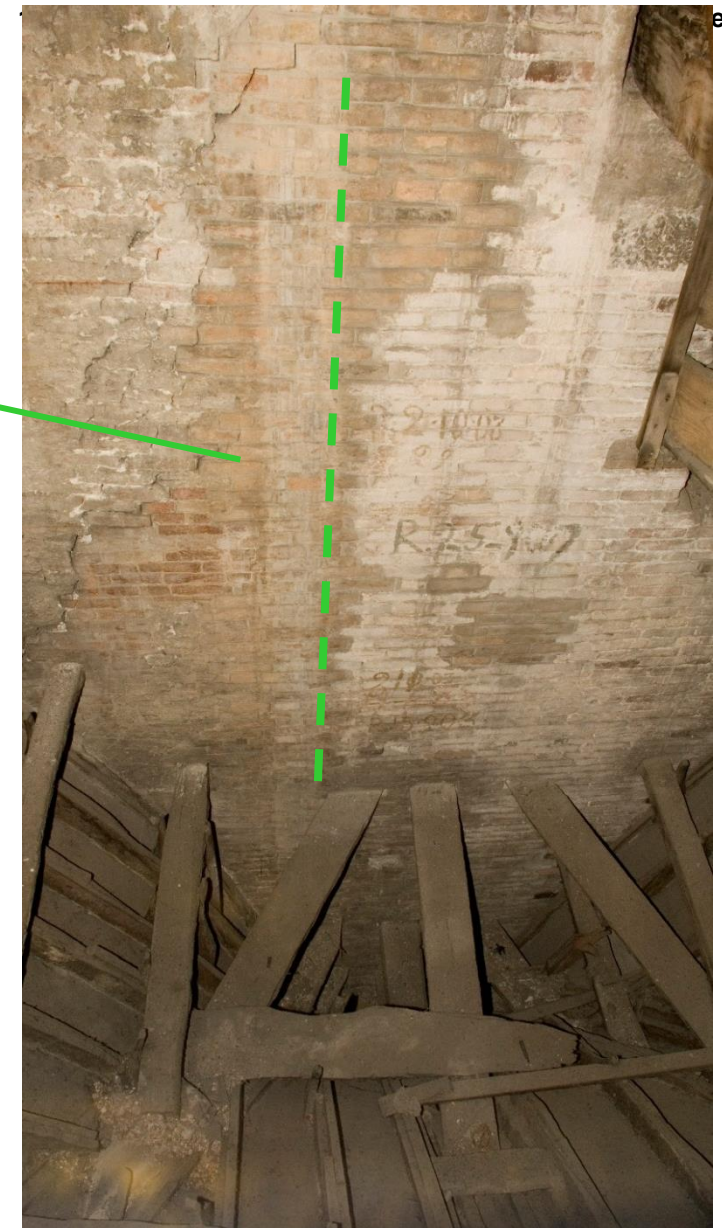


Scivolamento della chiave dell'arco dopo il sisma del 12.07.2004

Basilica dei Frari a Venezia

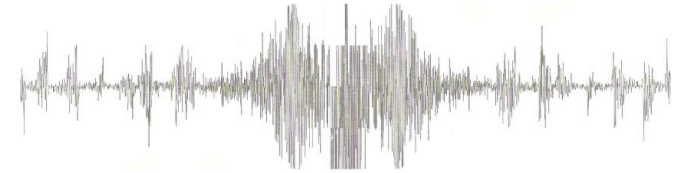


Isolamento del
campanile dalla
struttura della basilica



Basilica dei Frari a Venezia

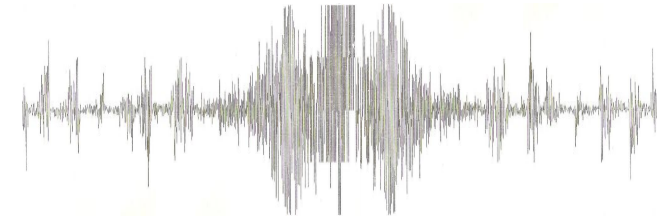
12.07.2004 13:04:00 M 5.2 Alpi Giulie



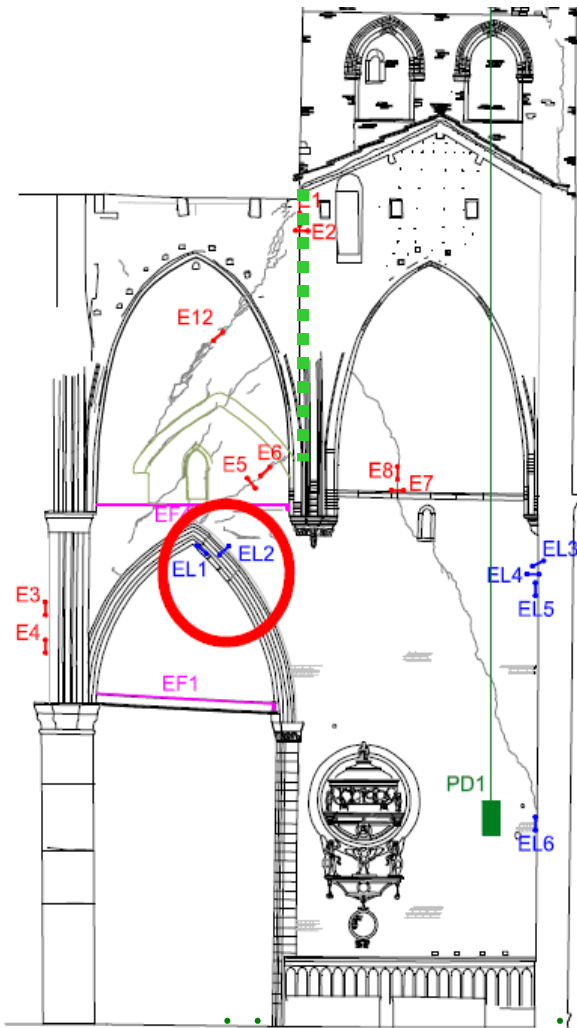
	EL1	EL2
12/07/2004 12:00	-0.15	0.09
12/07/2004 18:00	-0.11	0.23
	0.04	0.14



20.05.2012 2:03:50 M 5.8 Modena

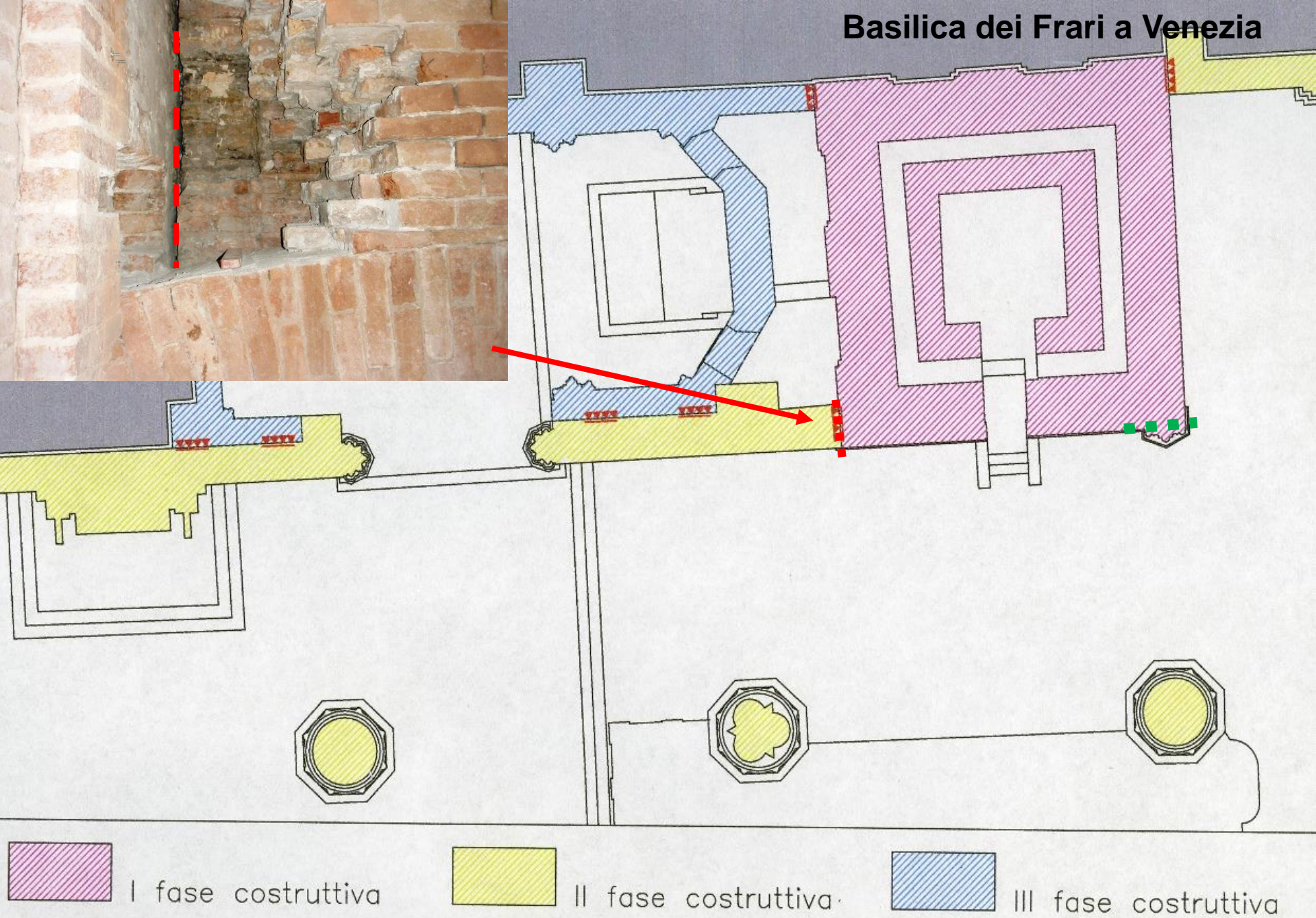


	EL1	EL2
20/05/2012 00:00	1.01	0.88
20/05/2012 06:00	0.98	0.89
	0.03	0.01



Scivolamento della chiave dell'arco dopo il sisma del 20.05.2012

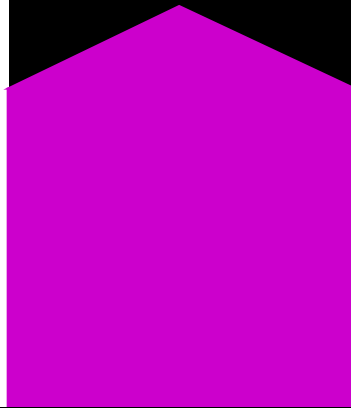
Basilica dei Frari a Venezia



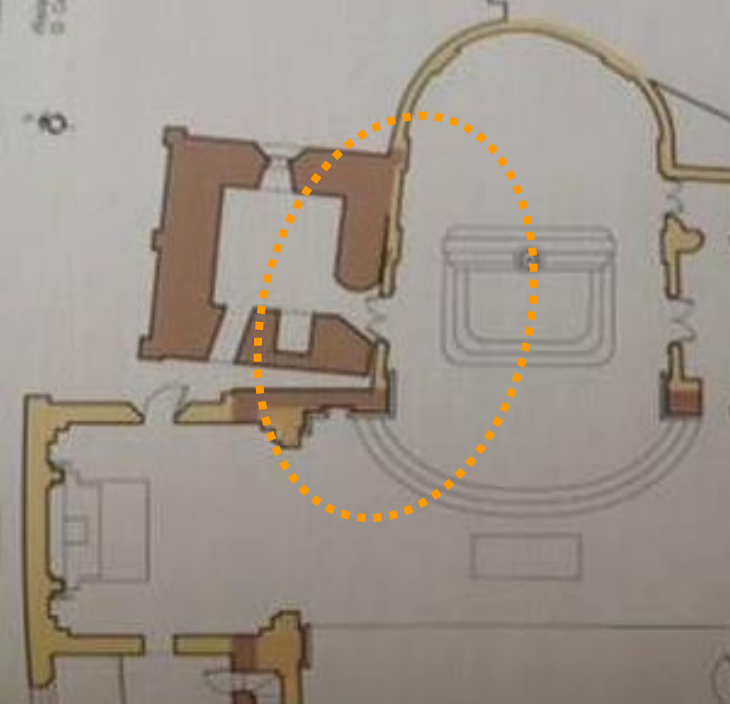
Terremoti e beni culturali in area veneta: quale tutela?



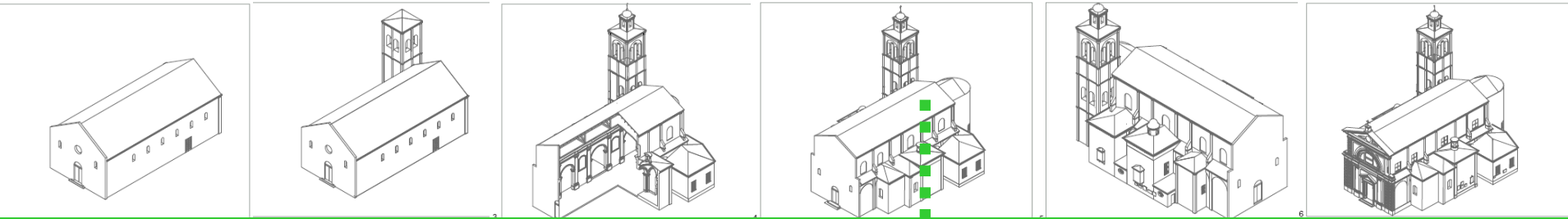
Interrelazione tra chiesa
e campanile



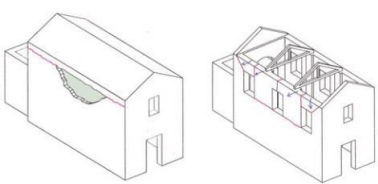
Duomo di S. Felice sul Panaro



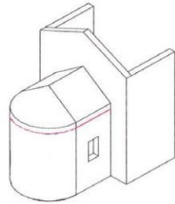
Terremoti e beni culturali in area veneta: quale tutela?



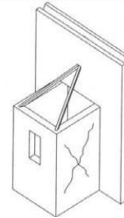
19 - ELEMENTI DI COPERTURA: AULA



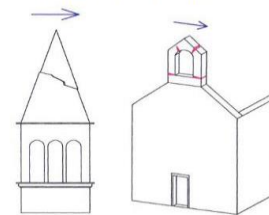
21 - ELEMENTI DI COPERTURA: ABSIDE



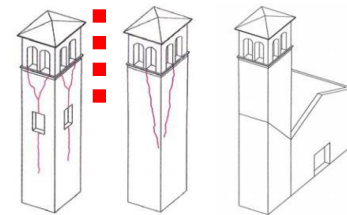
23 - MECCANISMI DI TAGLIO NELLE CAPPELLE



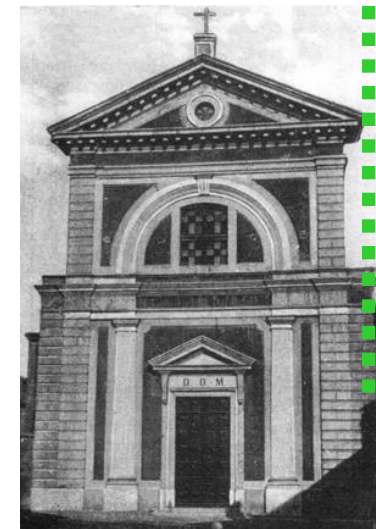
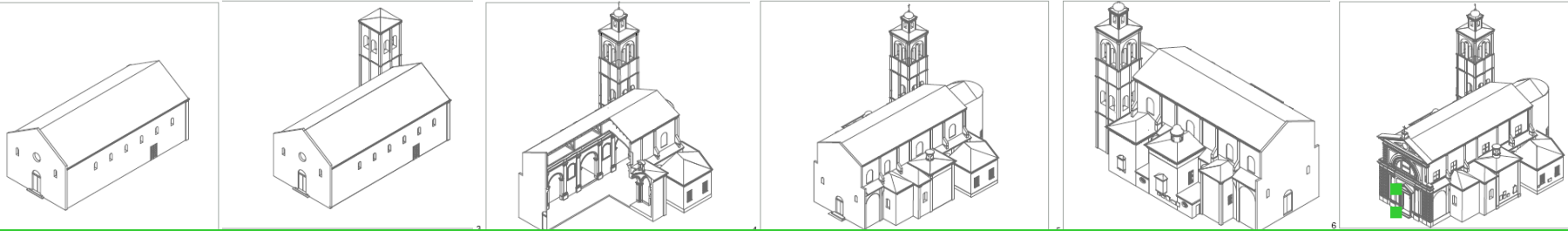
26 - AGGETTI (VELA, GUGLIE, PINNACOLI, STATUE)



27 - TORRE CAMPANARIA



Meccanismi di danno



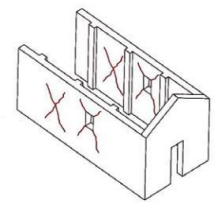
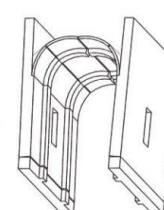
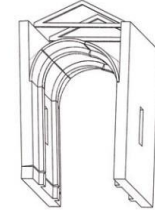
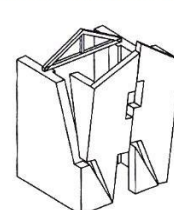
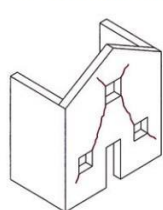
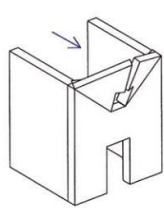
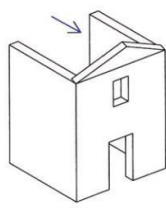
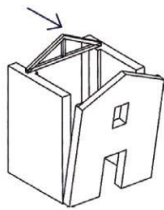
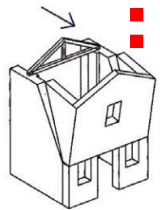
1. RIBALTAMENTO DELLA FACCIATA

2. MECCANISMI NELLA SOMMITÀ DELLA FACCIATA

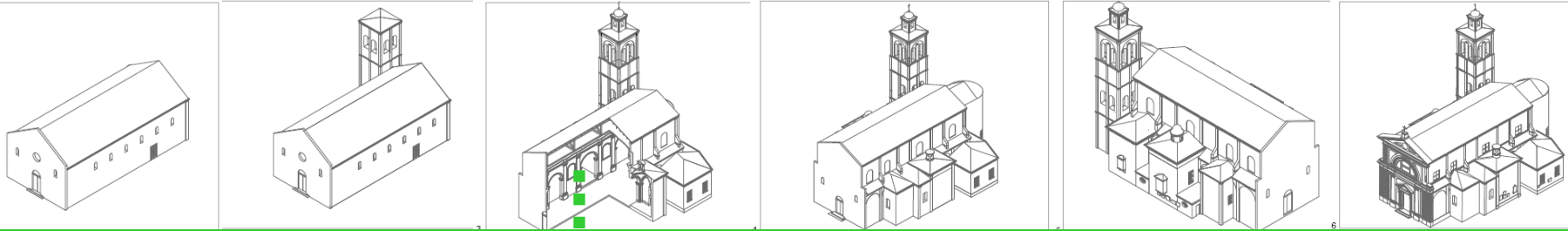
3. MECCANISMI NEL PIANO DELLA FACCIATA

5 - RISPOSTA TRASVERSALE DELL'AULA

6 - MECCANISMI DI TAGLIO PARETI LATERALI



Meccanismi di danno



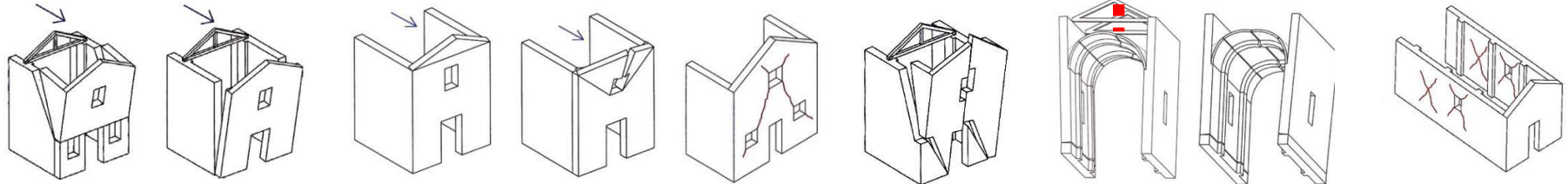
1. RIBALTAMENTO DELLA FACCIATA

2. MECCANISMI NELLA SOMMITÀ DELLA FACCIATA

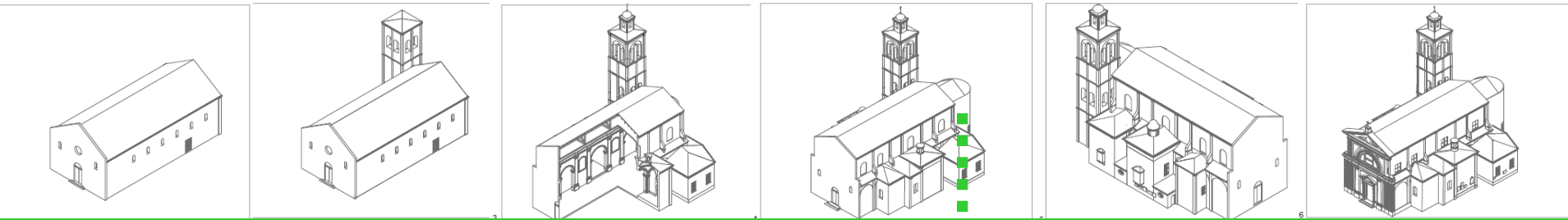
3. MECCANISMI NEL PIANO DELLA FACCIATA

5 - RISPOSTA TRASVERSALE DELL'AULA

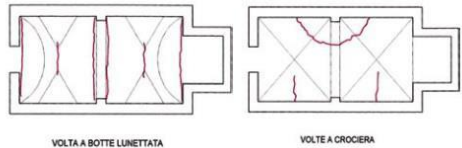
6 - MECCANISMI DI TAGLIO PARETI LATERALI



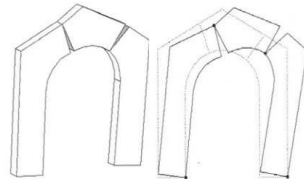
Meccanismi di danno



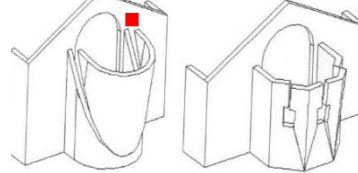
8 - VOLTE DELL'AULA O DELLA NAVATA CENTRALE



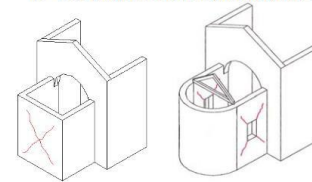
13 - ARCHI TRIONFALI



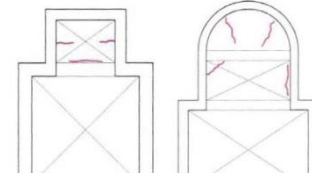
16 - RIBALTAMENTO DELL'ABSIDE



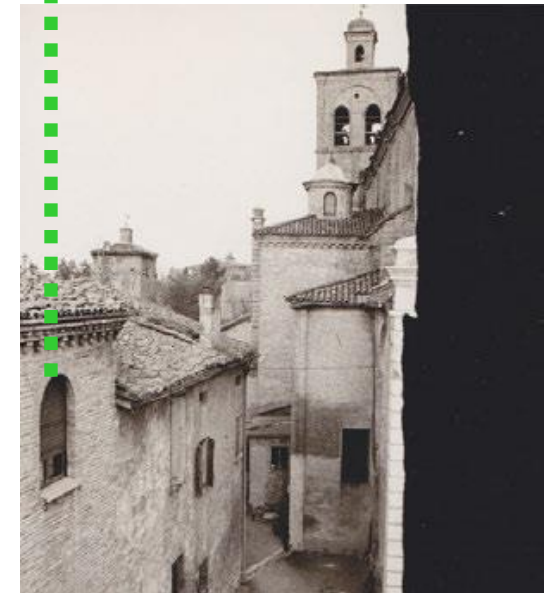
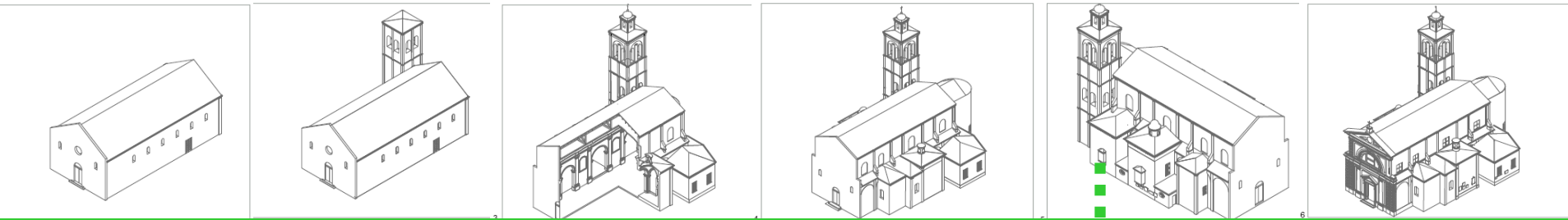
17 - MECCANISMI DI TAGLIO NELL'ABSIDE



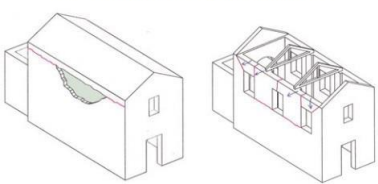
18 - VOLTE DEL PRESBITERIO O DELL'ABSIDE



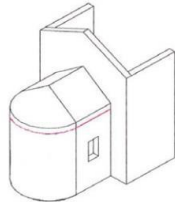
Meccanismi di danno



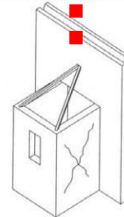
19 - ELEMENTI DI COPERTURA: AULA



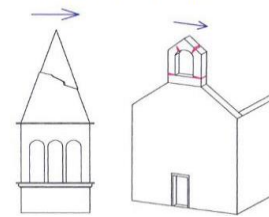
21 - ELEMENTI DI COPERTURA: ABSIDE



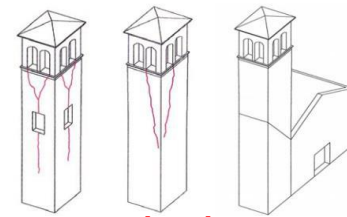
23 - MECCANISMI DI TAGLIO NELLE CAPPELLE



26 - AGGETTI (VELA, GUGLIE, PINNACOLI, STATUE)



27 - TORRE CAMPANARIA



Meccanismi di danno

Diffusa vulnerabilità

Procedure di verifica inadeguate

Scarse risorse

Tempo limitato

Diffusa vulnerabilità

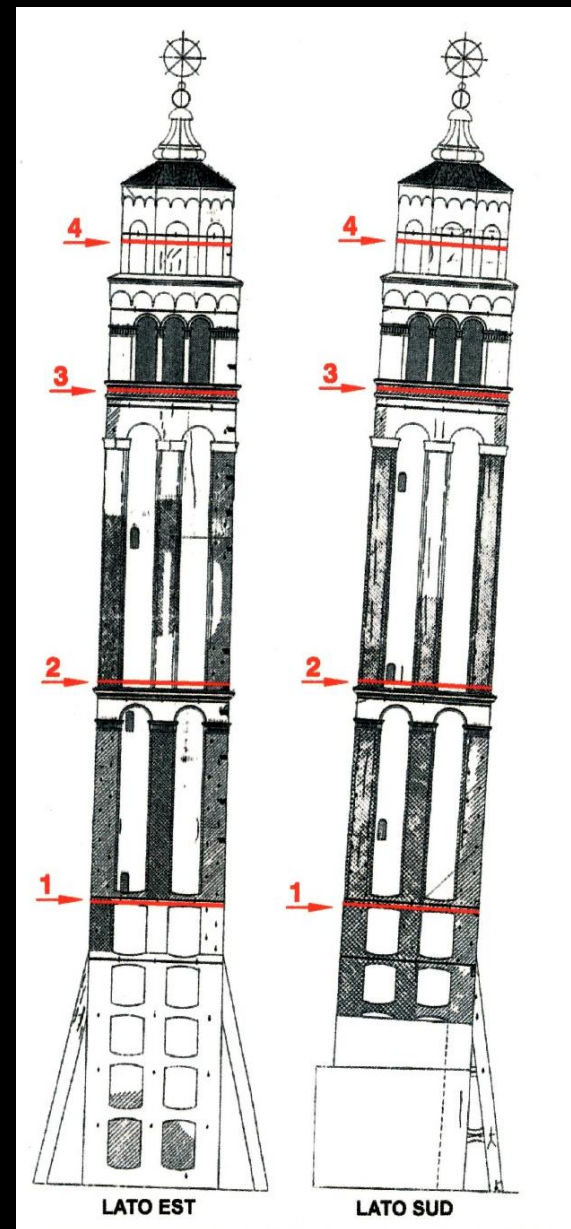
Procedure di verifica inadeguate

Scarse risorse

Tempo limitato

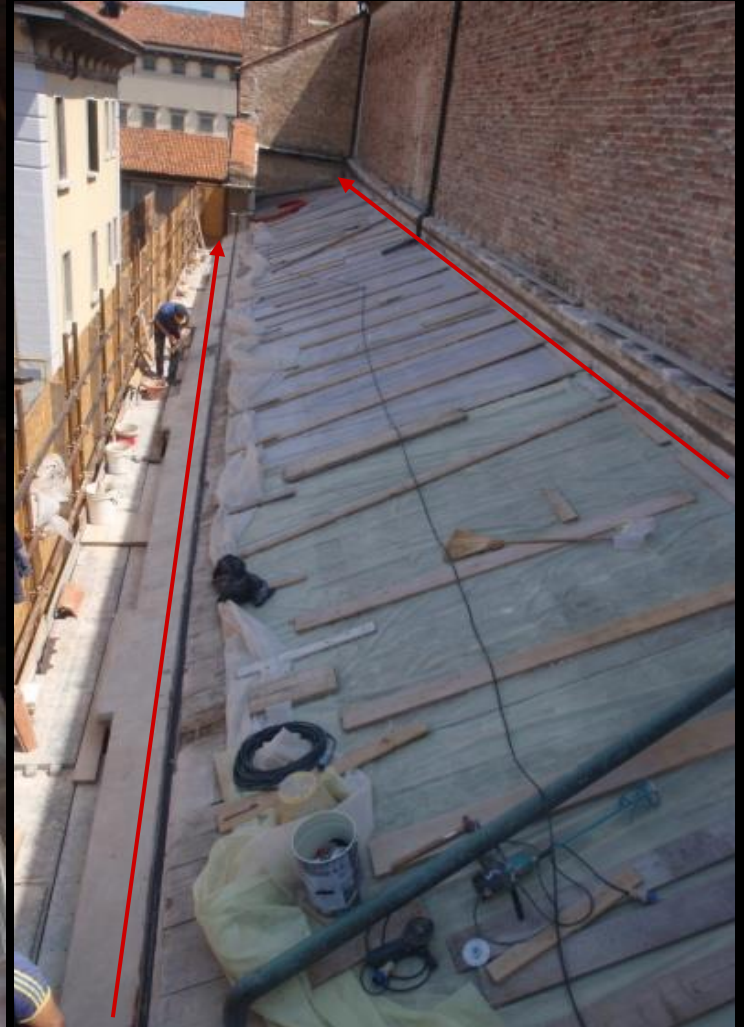
Riduzione del rischio

Campanile S. Stefano a Venezia n.4 cerchiature del fusto € 25.000



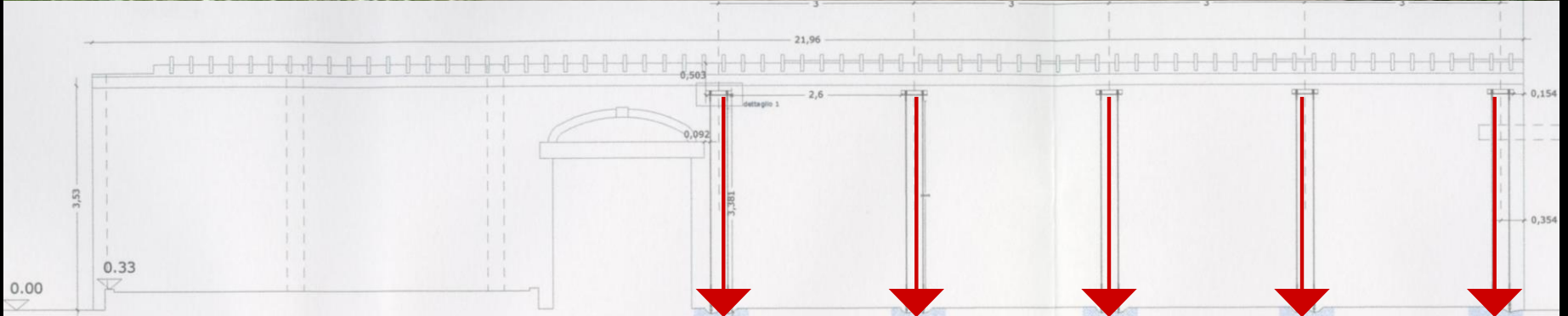
Terremoti e beni culturali in area veneta: quale tutela?

Chiesa S. Maria Maggiore a Venezia presidi della facciata € 30.000



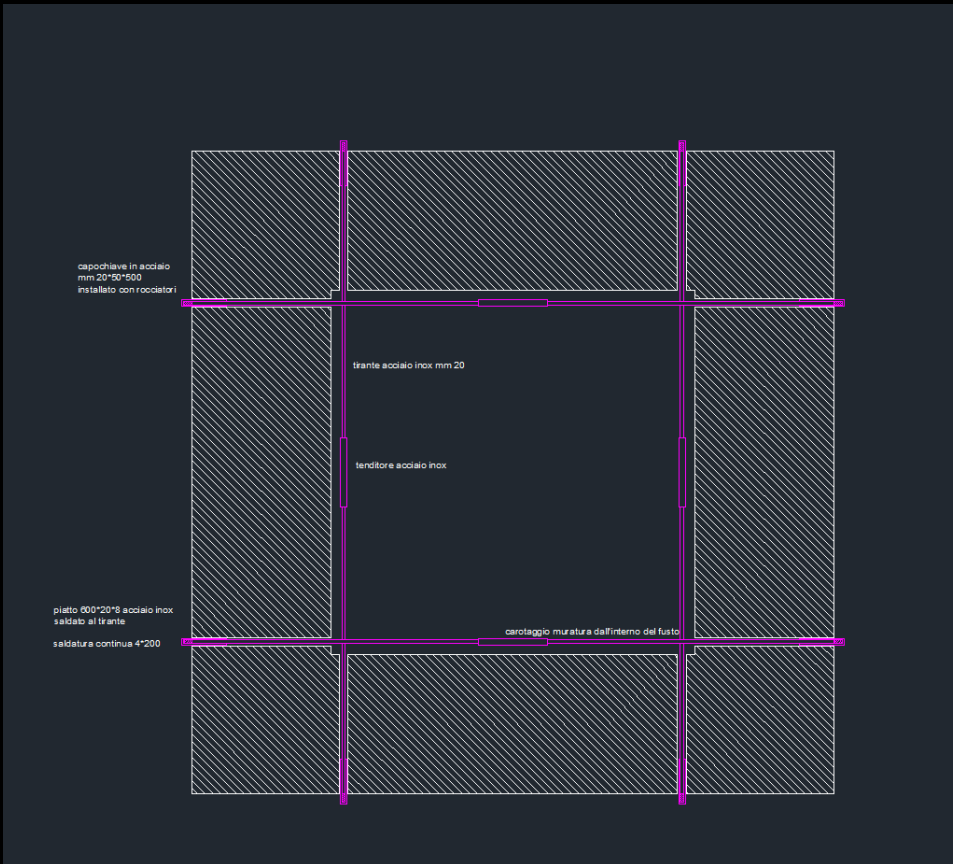
Terremoti e beni culturali in area veneta: quale tutela?

S. Francesco del deserto a Venezia consolidamento cinta muraria € 15.000



Terremoti e beni culturali in area veneta: quale tutela?

Chiesa S. Maria dei Battuti a Belluno installazione n.4 tiranti € 10.000



Terremoti e beni culturali in area veneta: quale tutela?