



STRUČNA

ONLINE KONFERENCIJA:

POTRES I ODRŽIVA GRADNJA
TEHNIČKI ASPEKTI

1.7.2020.



**HRVATSKI
SAVJET ZA
ZELENU
GRADNJU**

CROATIA GREEN BUILDING COUNCIL

climate - energy - mobility

Sustavi i rješenja za sanaciju potresom pogođenih građevina

Nenad Karalija

Mapei Croatia d.o.o.

fibran[®]

 **MAPEI**[®]

 **DAIKIN**

YTONG

 **PlanRadar**



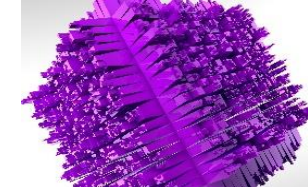
Teme današnjeg *Webinara*:

MAPEI SUSTAVI I RJEŠENJA ZA SANACIJU POTRESOM POGOĐENIH GRAĐEVINA, Nenad Karalija, Mapei Croatia

- Karakteristike potresa 20. 3. 2020. i oštećenja na objektima koje je prouzročio
- Najadekvatnija rješenja za oštećenja nastala uslijed potresa
- Sustavi za sanaciju od potresa kompatibilni s održivim sustavima toplinske zaštite ovojnice
- Inovativni ekološki sustavi za sanaciju i pojačanje pregradnih zidova u javnim objektima (vrtići, škole, bolnice)

Situacija nakon potresa u Zagrebu





Mapei iskustvo

Earthquake
Assisi

Earthquake
San Giuliano di
Puglia

Earthquake
L'Aquila

Earthquake
Christchurch

Earthquake
Emilia

Earthquake
Amatrice

Earthquake
Mexico city

1997

2002

2009

2011

2012

2016

2017



FRP
System



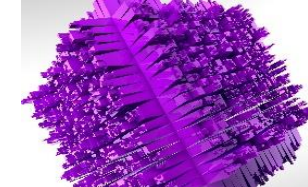
FRG_FRCM
System



HPC
System



MAPEWRAP EQ
System



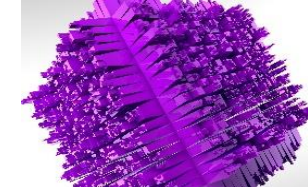
Pristup i postupci sanacije

Utvrdivanje stanja

Konsolidacija

Ojačanje konstrukcije

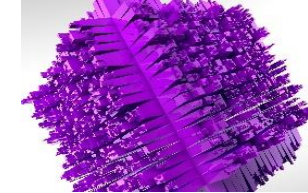




Ojačanje konstrukcije

Ojačanje FRCM sustavom

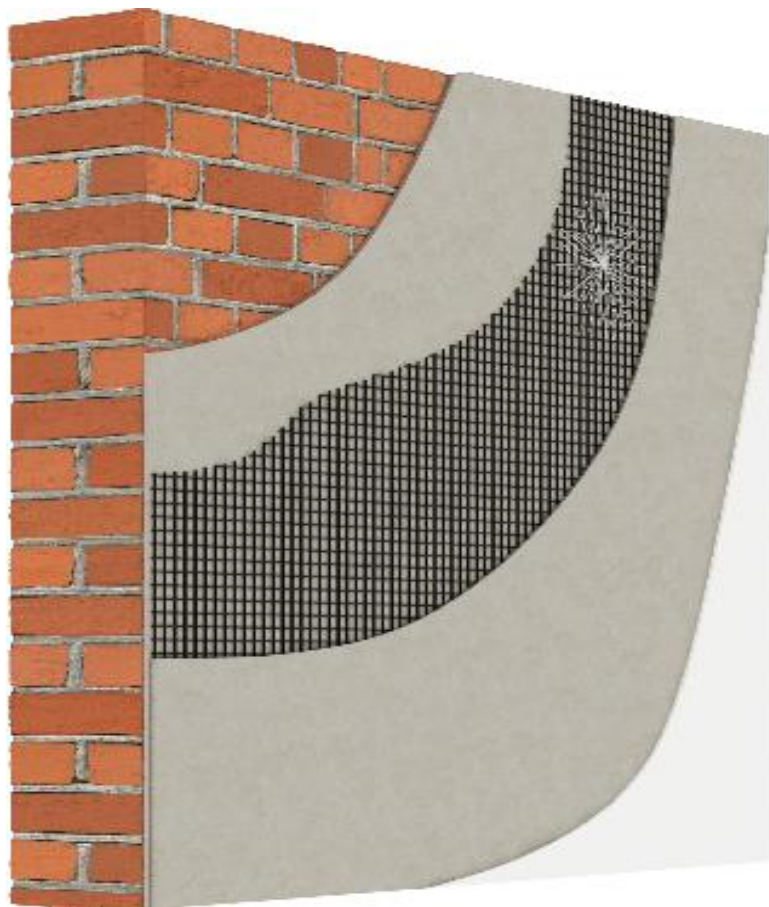




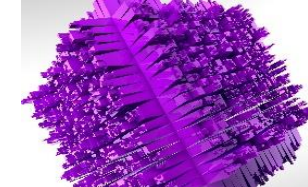
Ojačanje konstrukcije

FRCM sustav

FRCM
Fibre Reinforced
Cementitious Matrix

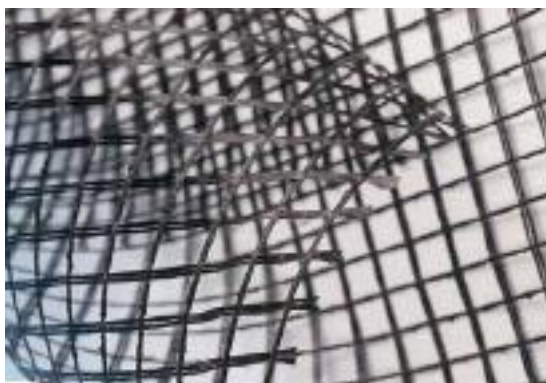


- Debljina sloja **1,5 cm**
- Visokovrijedne mreže (staklo, bazalt, karbon)
- Velika prionjivost
- Mala potreba za sidrenjem
- Mala težina



Ojačanje konstrukcije

Ojačanje FRCM materijalima



MAPEGRID G220
MAPEGRID G120

MAPEGRID B250

MAPEGRID C 170
MAPEGRID C 200

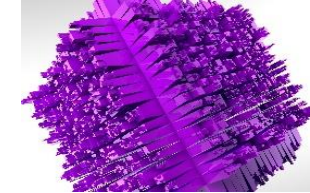


PLANITOP HDM MAXI
PLANITOP HDM RESTAURO

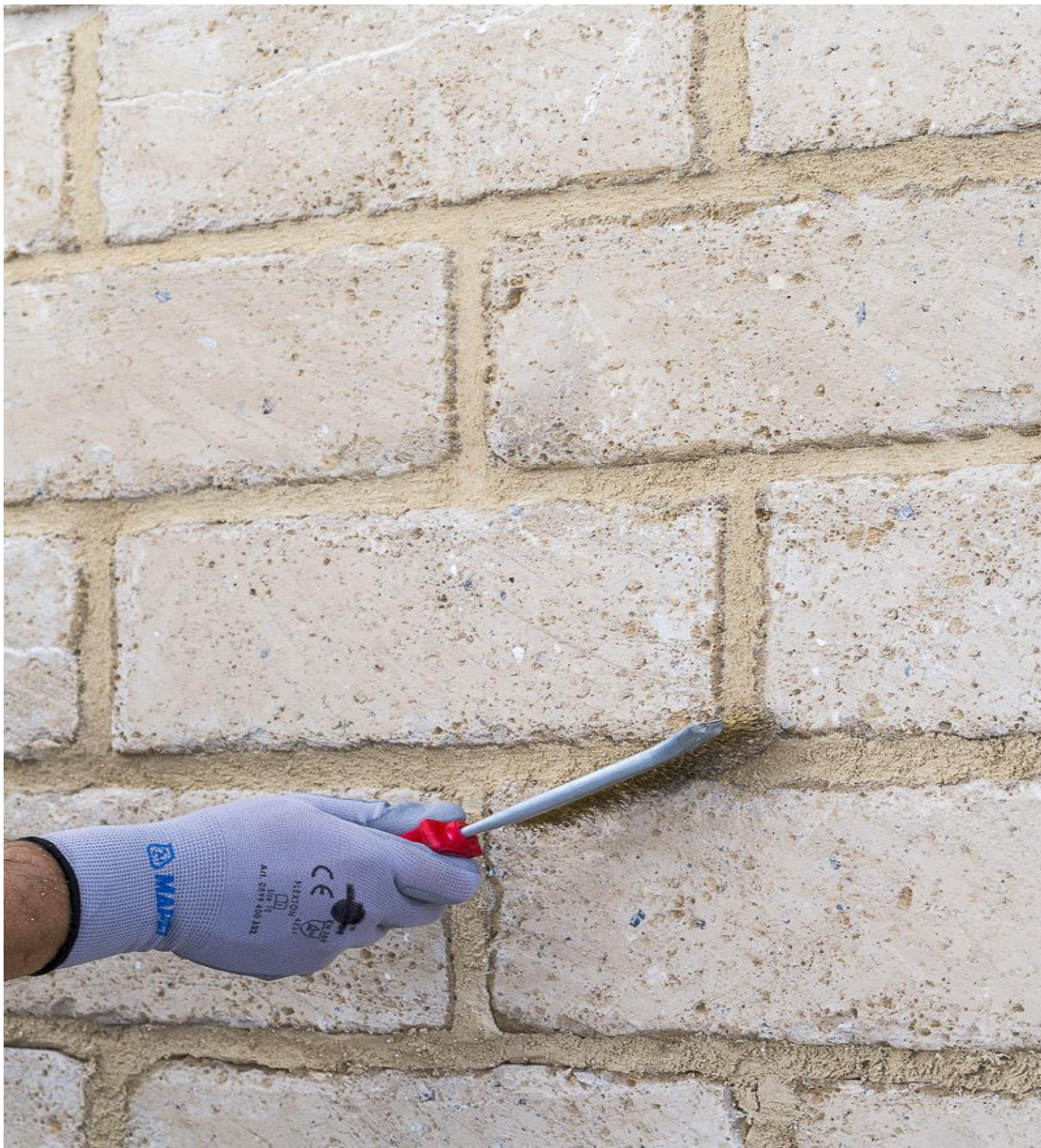
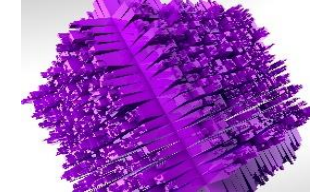


Kod sanacije i ojačanja nosivih zidova možemo se susresti s dvije situacije:

- 1. Nosivi zid s pukotinama**
- 2. Nosivi zid bez pukotina**



Žbuka se uklanja pažljivo, strojno ili ručno. U širini oko 30 cm sa svake strane pukotine.

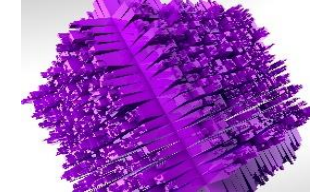


Sljubnice (fuge)
potrebno je zapuniti
mortom kako
injekcijska smjesa ne
bi izlazila kroz njih.



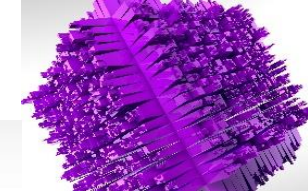
Potrebno je izbušiti niz rupa promjera 20 - 40 mm, do dubine $\frac{2}{3}$ debljine zida na kvadratnim udaljenostima 50x50 cm.

Ako je zid deblji od 60 cm, izbušite rupe s obje strane zida.



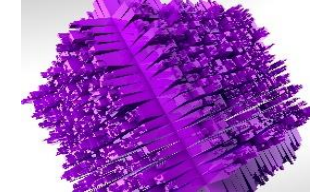
Prije samog postupka injektiranja, dan ranije, potrebno je zasiti vodom unutrašnjost konstrukcije kroz prethodno pričvršćene injektore (od najviše prema najnižoj poziciji).

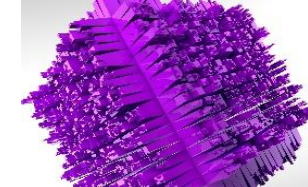
Smjesa za injektiranje injektira se pod niskim pritiskom od 1 do 1,5 bara; od najniže prema najvišoj poziciji.

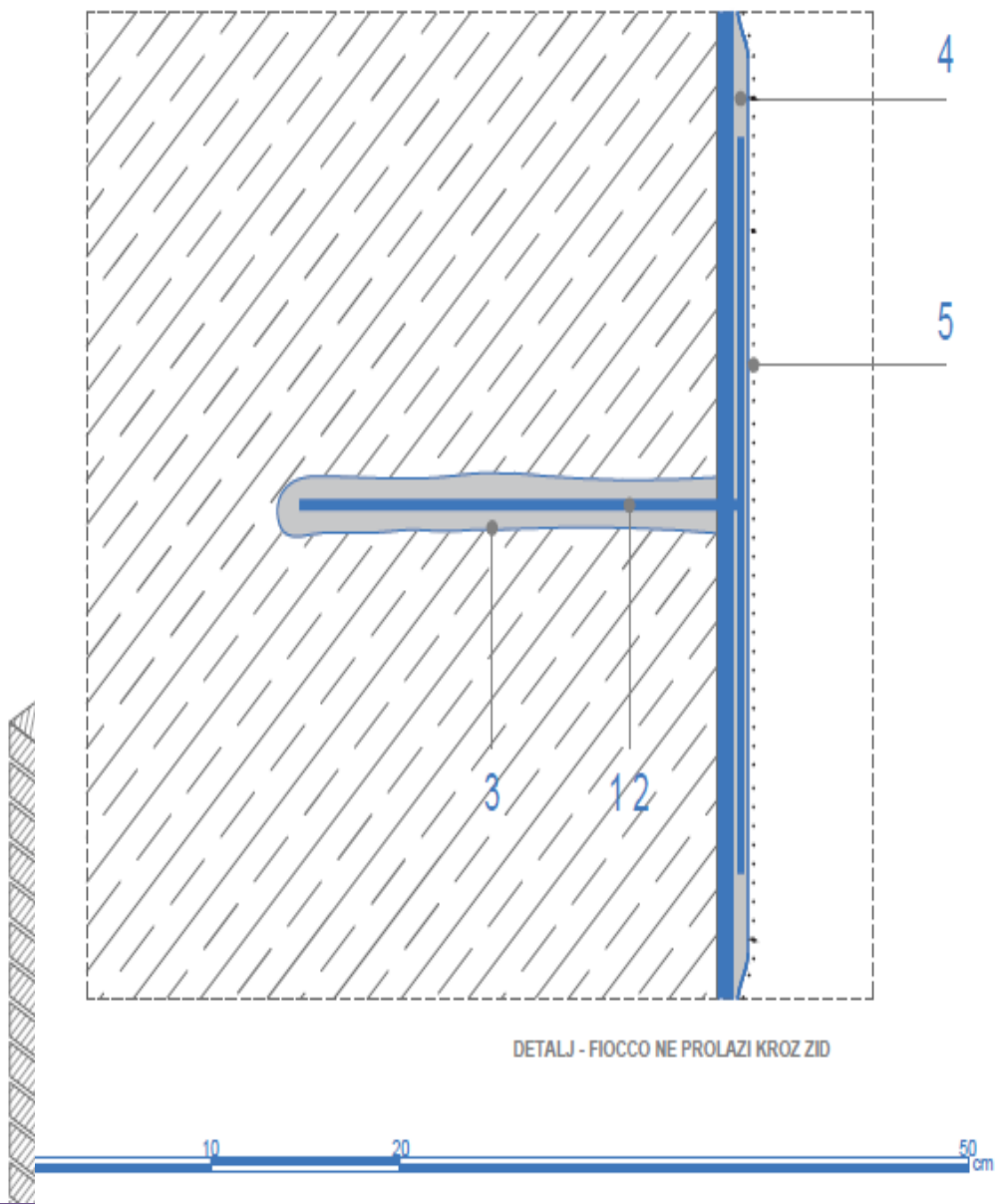


Kada prelazimo na ugradnju FRCM sustava?

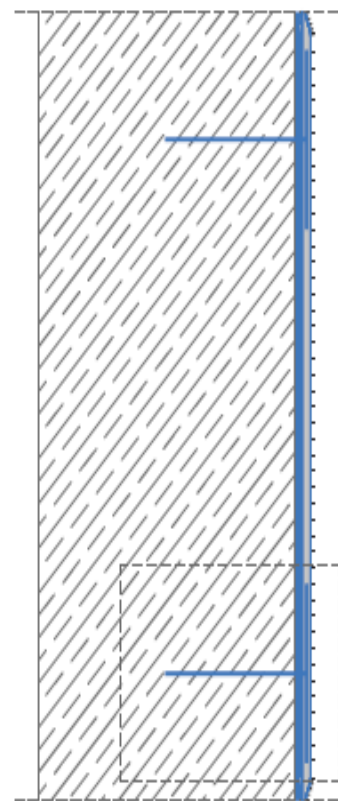
Nakon 4 do 5 dana od injektiranja, pristupa se ugradnji FRCM sustava.



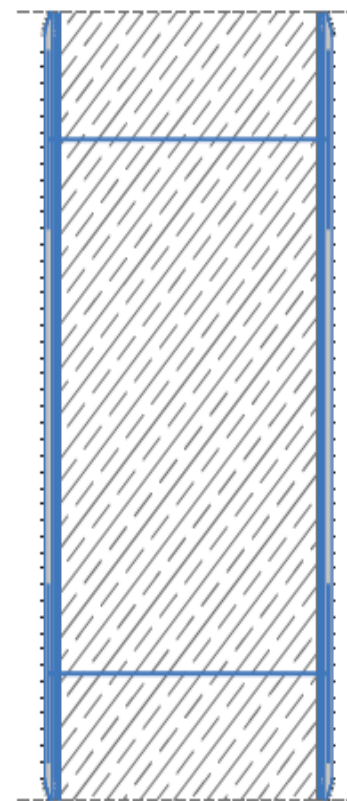




DETALJ - FIOCCO NE PROLAZI KROZ ZID



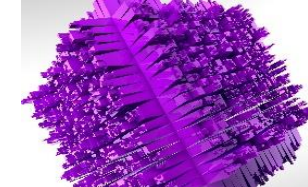
FIOCCO NE PROLAZI KROZ ZID



FIOCCO PROLAZI KROZ ZID



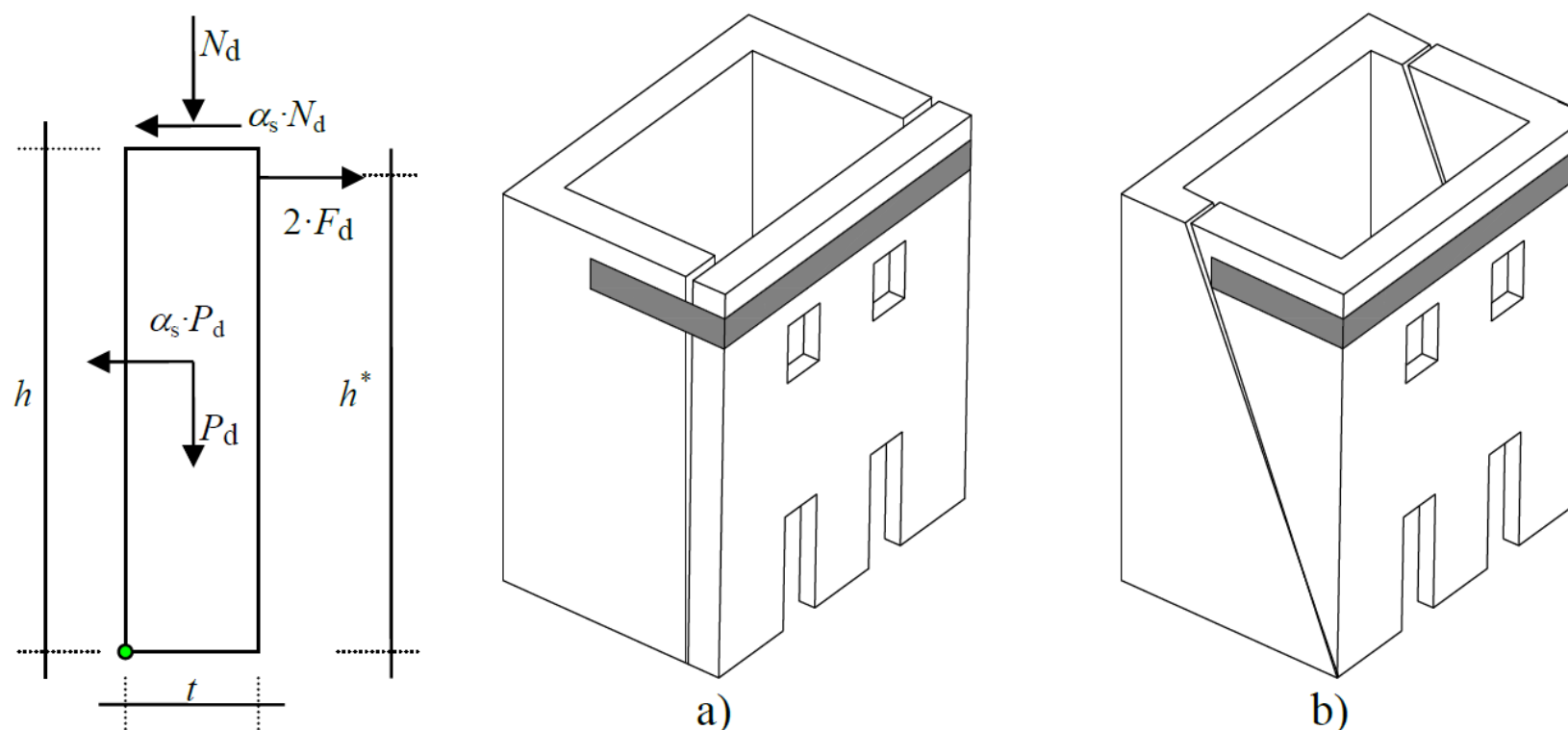
50 cm



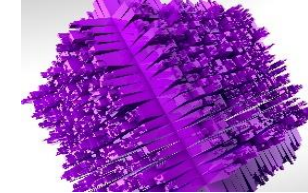
Ojačanje konstrukcije

Ojačanje zidova FRP materijalima- sprječavanje ispadanja zidova izvan ravnine

CNR-DT 200 R1/2013



Slika 5-5 Shema proračuna za jednostavni mehanizam za kolaps odvajanja/prevrtanja zidova



Ojačanje konstrukcije

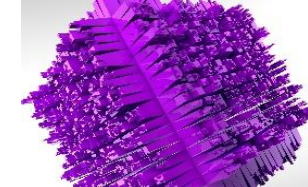
Ojačanje zidova FRP materijalima



Ojačanje konstrukcije

Ojačanje zidova FRP materijalima





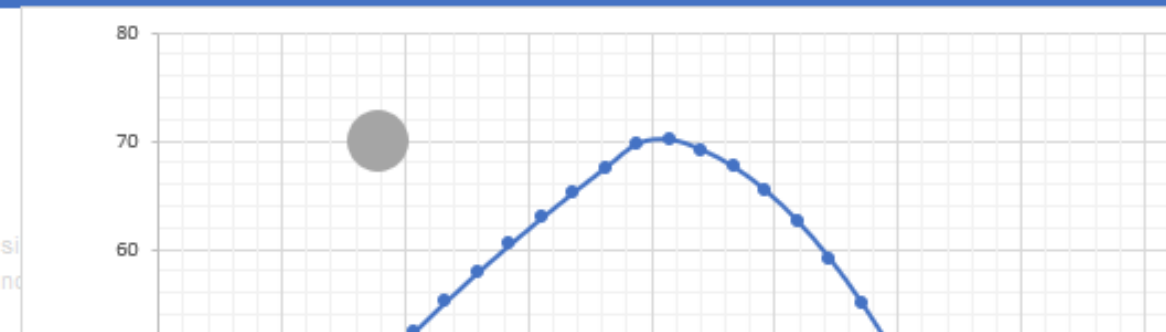
MAPEWRAP EQ SYSTEM

**ANTISEISMIC SYSTEM
FOR SCHOOLS**

Language	
Project name	Example 1
Designer	Strengthening with FRCM
Masonry reference	CNR DT 215 approach

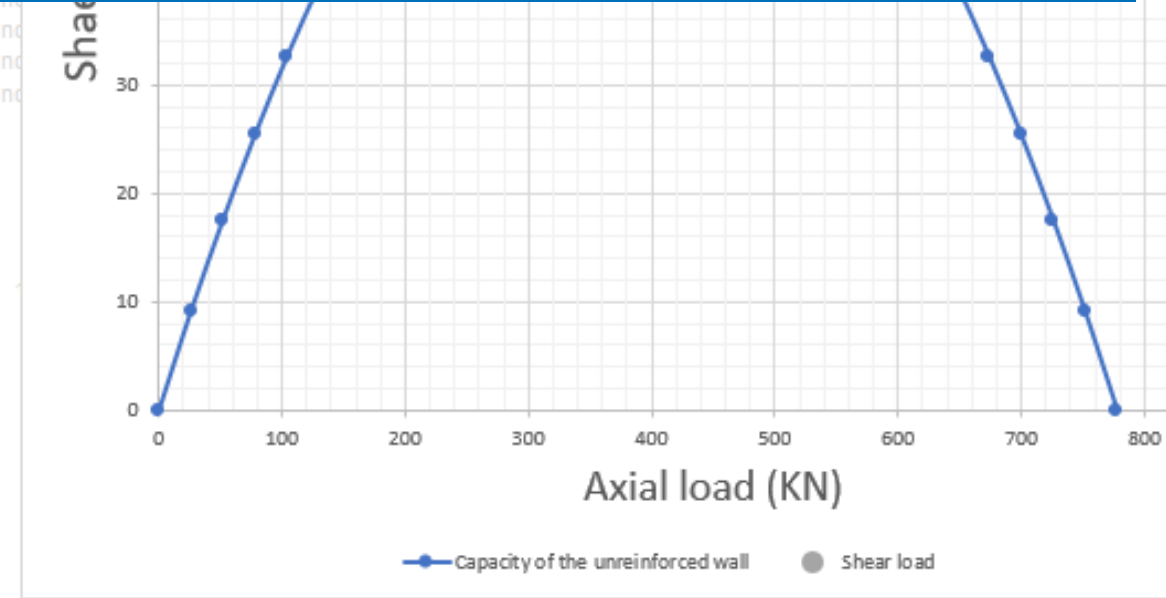
EXISTING SECTION

Type of existing masonry			
Masonry type: Regular			
Knowledge level			
Linear elastic analysis		no	
Safety factor	γ_m	1	
Confidence factor	FC	1,35	



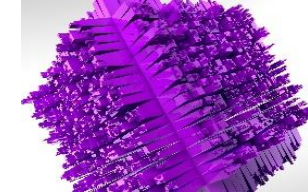
POMOĆNA TABLICA ZA PRORAČUN POJAČANJA

Mortar of good characteristics	<input type="checkbox"/>	1,00	-
"Ricorsi o listature"	<input type="checkbox"/>	1,00	-
Transversal connection	<input type="checkbox"/>	1,00	-



Reference values of the mechanical parameters according to: Circular 2 February 2019			
Average compressive strength	f	1,926	N/mm ²
Average shear resistance of masonry	τ_o	0,037	N/mm ²
Average shear strength in the absence of normal tensions	f_{vo}	0,096	N/mm ²
Average value of the normal modulus of elasticity	E	1500	N/mm ²
Average value of tangential modulus of elasticity	G	500	N/mm ²
Average specific weight of the masonry	w	18	kN/m ³

Geometric-mechanical parameters of the masonry			
Height of the masonry panel	H	3,45	m
Width of the masonry panel	L	1,25	m
Ratio between height and width of the masonry panel	b	1,500	-
Thickness of the masonry panel	t	0,38	m
Own masonry weight	W	39,822	KN
Axial load (including own weight)	N_o	178,00	kN
Axial stress	σ_o	0,37474	N/mm ²
Maximum compressive strength	N_{max}	777,59	KN



SVE NOVOSTI PRATITE NA NAŠIM DRUŠTVENIM MREŽAMA



PRATITE NAS NA  **YouTube**
MAPEI CROATIA TV



HVALA NA PAŽNJI!

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YTONG

