ACADEMIA ROMÂNĂ - FILIALA TIMIŞOARA

UNIVERSITATEA „POLITEHNICA” DIN TIMIŞOARA
DEPARTAMENTUL DE CONSTRUCŢII CIVILE ŞI INSTALAŢII

RECO

CENTRUL DE CERCETARE PENTRU REABILITAREA CONSTRUCŢIILOR

AICPS

ASOCIAŢIA INGINERILOR CONSTRUCTORI PROIECTANŢI DE STRUCTURI - FILIALA TIMIŞOARA

SIMPOZION

SUSTENABILITATEA CONSTRUCȚIILOR: SOLUȚII EFICIENTE PENTRU PROIECTAREA/EXECUȚIA ŞI REABILITAREA CLĂDIRILOR

a XIII-a ediție a “ZILELOR ACADEMICE TIMIŞENE”

TIMISOARA MAY 2013

CONSTRUCTII SUSTENABILE

- Sinteza lucrarilor–

Prof. dr. ing. C. BOB

Lucrari prezentate in sinteza

1. **Materiale de constructii sustenabile**:
   - **Beton performant**: I. Buchman
   - **Tendinte in noile tipuri de betoane**: L. Iures, S.Enache, N Dorneanu
   - **Cenusa de termocentrala**: L.Iures, C.Badea, D.Metes
   - **Teste la taiere si intindere**: R.Chendes, R.Courard, S.Dan

2. **Durabilitatea si reabilitrarea podurilor**:
   - **Durabilitatea podurilor existente**: C.Badea, L.Iures, C.Jiva, E.Jebelean
   - **Reconfigurarea unui pod**: A.Bota, A.Tecsa, D.Bota
   - **Dezvoltarea degradarii podurilor**: C.Jiva, C.Badea, D.Nita

Lucrari prezentate in sinteza

3. **Sustenabilitatea structurilor din lemn**:

- **Sustenabilitatea lemnului**:
  C.Furdui, I.Furdui, L.Fekete, E.Partenie
- **Consolidare grinzi lemn**:
  I..Furdui, C.Furdui, L.Fekete, D.Diaconu
- **Utilizarea compozitelor la structuri din lemn**: L.Fekete, C.Furdui, I.Furdui

4. **Consolidarea structurilor**:

- **Influenta noilor standarde asupra reabilitarilor**:
  S.Dan, C.Bob, C.Badea, L.Iures
- **Expertizarea si reabilitarea unei structuri mixte**:
  S.Pescari, R.Gavrilescu, S.M.Dobrota, C.Bob
- **Cadre din beton armat cu zidarie de umplutura**:
  S.Marginean, A.Scurt, C.Bob
- **Consolidarea cadrelor**:
  A.Scurt, S.Marginean, C.Bob
- **Sisteme durabile in reabilitari**:
  Z.Dan

BETON PERFORMANT PREPARAT CU CIMENT CEM I 52,5R

Iosif BUCHMAN

Prof. dr. ing.

UNIVERSITATEA ñPOLITEHNICAòTIMIķOARA

Characteristics of the hardened concretes

Table 4

Type of concrete		Apparent density, kg/m^3	Tensile resistance of bending, f_t N/mm^2	f_t^{ISC}/ f_t^{RC}	Compressive resistance, f_c N/mm^2	f_c^{ISC}/f_c^{RC}
with CEM I 42.5R	**RC**	2354	10	3.82	113.6	1.68
	ISC	2545	38.2		190.7	
with CEM I 52.5R	**RC**	2330	8.72	4.06	145.81	1.60
	ISC	2559	35.41		234.01	

RC : reference concrete (no fibres); **ISC** : industrial special concrete (with fibres)
f_t^{ISC}, f_t^{RC} : tensile resistance of bending for ISC and for RC
f_c^{ISC}, f_c^{RC}: compressive resistance for ISC and for RC

Fig.1. Aspect of the reference concrete section after breaking at bending

TENDINȚE INTERNAȚIONALE ÎN NOILE TIPURI DE BETOANE

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[1]Asist. dr. ing.,[2] Student Politehnica International

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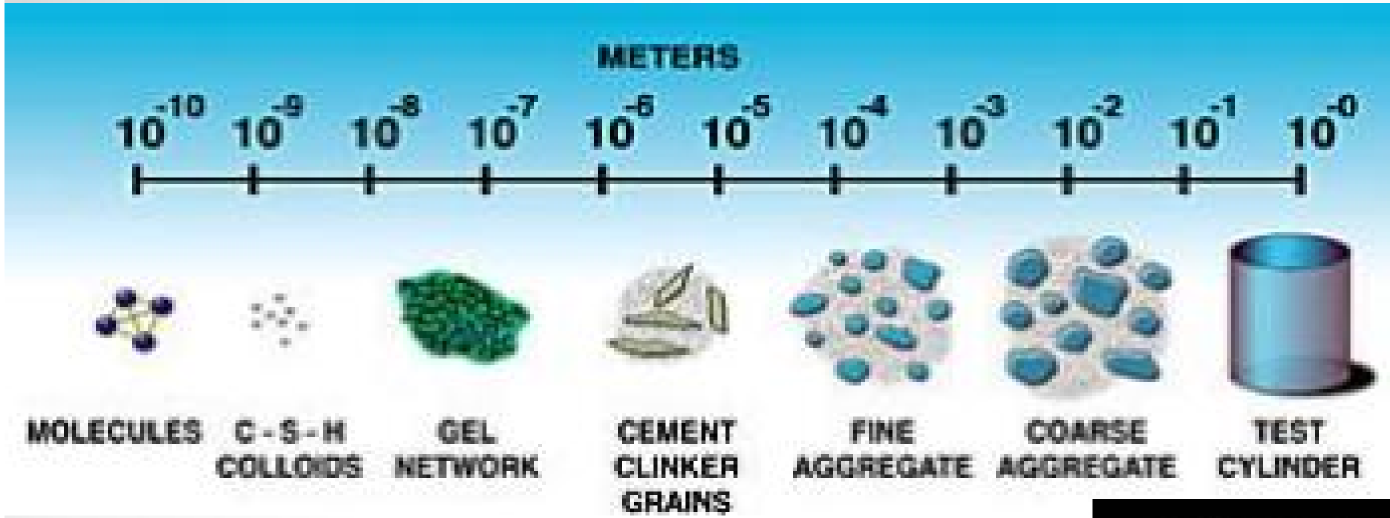
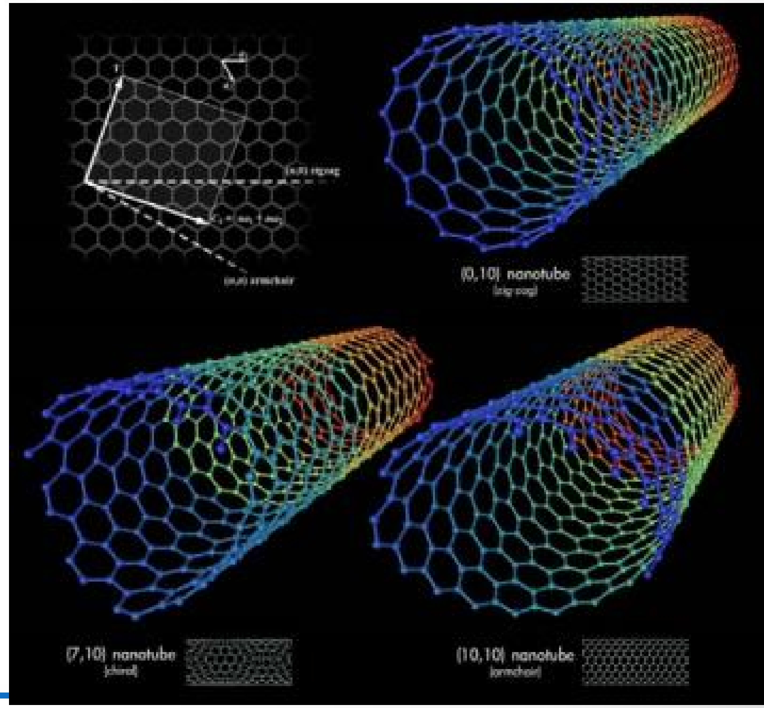

METERS
10^{-10} 10^{-9} 10^{-8} 10^{-7} 10^{-6} 10^{-5} 10^{-4} 10^{-3} 10^{-2} 10^{-1} 10^{-0}
MOLECULES
C - S - H COLLOIDS
GEL NETWORK
CEMENT CLINKER GRAINS
FINE AGGREGATE
COARSE AGGREGATE
TEST CYLINDER


(0,10) nanotube
(zig-zag)
(7,10) nanotube
(chiral)
(10,10) nanotube
(armchair)

INFLUENŢA CENUŞII DE TERMOCENTRALĂ ASUPRA COMPOZIŢIEI BETOANELOR AUTOCOMPACTANTE

Liana IUREȘ[1], Cătălin BADEA[2], Dorel HETEŞ[3]

[1]Asist. dr. ing.,[2] ķ .l. dr. ing[3], drd. ing.

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Fig. 1. Fly ash deposit

Fig. 2. No vegetation ï fly ash deposit

COMPARATIE INTRE TESTELE LA TAIERE SI CELE LA INTINDERE PENTRU MASURAREA ADERENTEI UNUI MORTAR CU DIFERITE PROCENTE DE FILERE DE CALCAR FOLOSIT CA SISTEM DE REPARATIE

Remus CHENDEŞ[1], Luc COURARD[2], Sorin DAN[3]

[1]Ing. UNIVERSITATEA "POLITEHNICA" TIMISOARA

[2]Prof. dr. ing. UNIVERSITATEA DIN LIEGE

[3]S.I. dr. ing. UNIVERSITATEA "POLITEHNICA" TIMISOARA

Comparison between pull-off and shear test results

Table 4

Repair mortar	RH	Pull-off strength (ů) [MPa]	Shear stress strength (Ű) [MPa]	Ratio Űů	Other researches	
R1	60%	3.26	6.18	1.90	2.0 from (9)	2.4 from(4)
	90%	2.48	5.62	2.27		
R2	60%	2.70	6.88	2.55		
	90%	2.32	4.49	1.94		
R3	60%	2.53	2.61	1.03		
	90%	2.08	2.81	1.35		
R4	60%	1.25	2.64	2.11		
	90%	1.47	6.74	4.59		

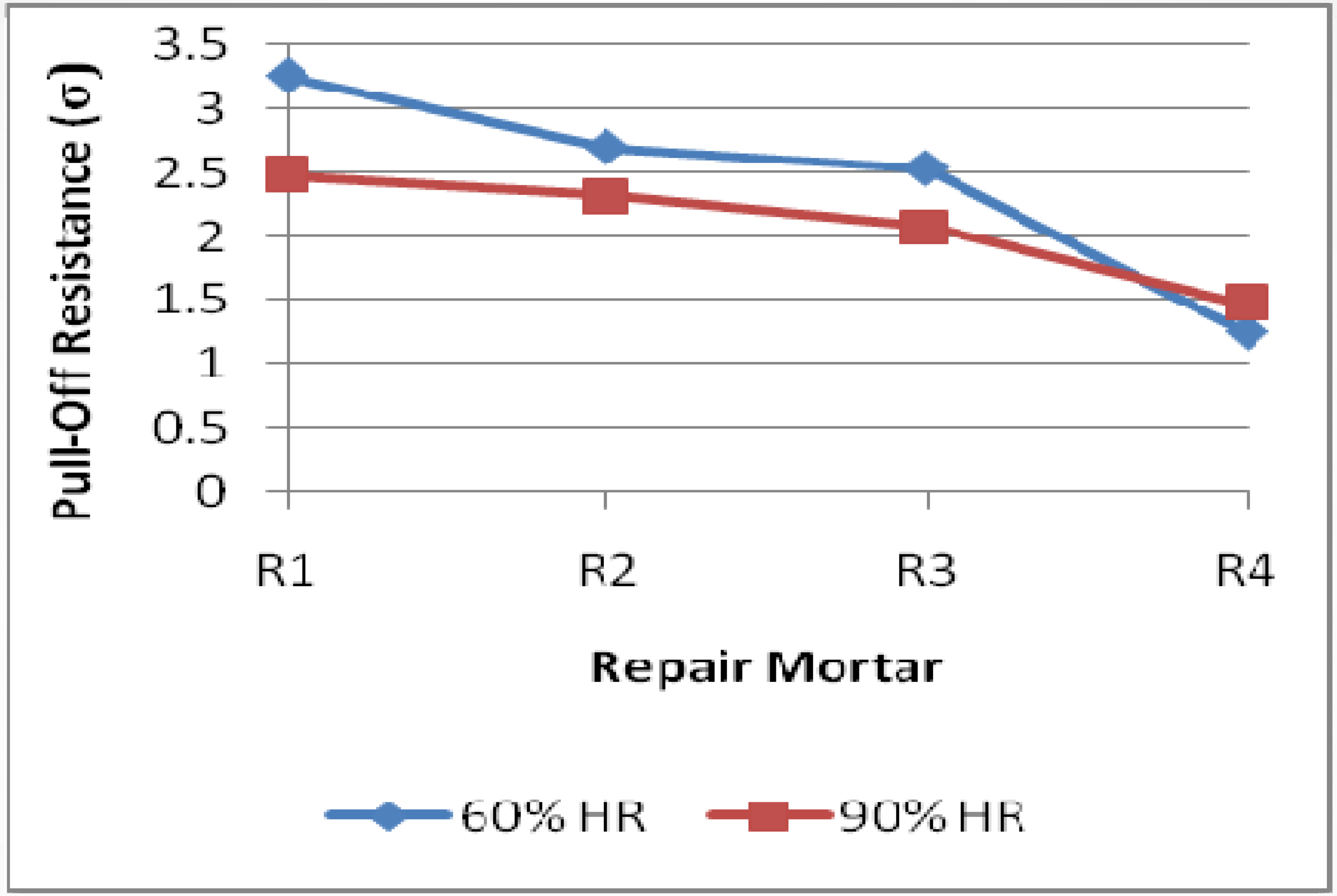

Figure 1. Pull-off test interpretation

DEZVOLTAREA ÎN TIMP A UNOR DEGRADĂRI LA PODURILE DIN BETON ÎN EXPLOATARE

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Based on the studies and research carried on at the Faculty of Civil Engineering and Architecture of Timisoara, CCIA Department [2], there has been proposed a calculation formula for the carbonation depth, χ, as follows:

$$x = \frac{150 \cdot \alpha \cdot \beta \cdot \delta}{R_b} \sqrt{t}$$

where: α - is a coefficient introducing the influence of the cement type;
β - is a coefficient taking into account the environmental conditions of the structure;
δ - is a coefficient introducing the influence of the carbon concentration;
Rb ï is the compression resistance of the concrete, in N/mm2;
t ï is the time or the exposition duration, in years.

Table 1 Calculated values of the carbonation depth.

Nr. Crt.	Experimental elements and concrete bridges	Duration (years)	Carbonation depth x (mm) calculated with the relation:			Concrete class (Mark)
			Relation (1)	Relation (2)	Relation (3)	
1	Prestressed concrete girder with adherent reinforcement	18	3.96	4.89	11.36	C28/35 (B450)
2	Reinforced concrete girders across the in , demolished in 1988	80	8.33	22.36	38.72	C12/15 (B200)
3	Reinforced concrete girders bridge across the at Jebel, on DN, demolished in 1993	75	8.11	21.65	51.96	C12/15 (B200)
4	Reinforced concrete bridge across the at Bozovici, on DN57B, realized in 1958	43	7.91	16.39	39.34	C12/15 (B200)
5	Reinforced concrete bridge across the at Faget, on DJ 682, realized in 1936-1938	63	7.57	13.49	47.62	C20/25 (B350)
6	Reinforced concrete bridge across the at Beregsau on DN 59A, built in 1964	37	7.39	10.34	27.48	C16/20 (B250)
7	Reinforced concrete across the in , built in 1908	93	11.23	24.11	57.86	C12/15 (B200)
8	Prestressed concrete bridge across the Bega Veche Stream at Nirad on DN 69, built in 1964	37	7.39	6.09	18.77	C25/30 (B400)
9	Reinforced concrete bridge across the Eruga Stream at Bocsa on DN 58B, built in 1958	44	8.47	10.28	22.10	C16/20 (B250)
10	Reinforced concrete bridge at Beregsau,	37	6,21	10,34	14,13	C16/20 (B250)

RECONFIGURAREA TRASEULUI LA "POD UZINA DE APĂ“

Adrian BOTA[1], Alexandra TECŞA[2], Dorian BOTA[3]

[1]Assoc. Prof. dr. ing. UNIVERSITATEA “POLITEHNICA” TIMIķOARA, [2]design eng. SC APECC SRL TIMIķOARA, [3]design eng. SC APECC SRL TIMIķOARA

Fig 3. Cross section of the designed bridge

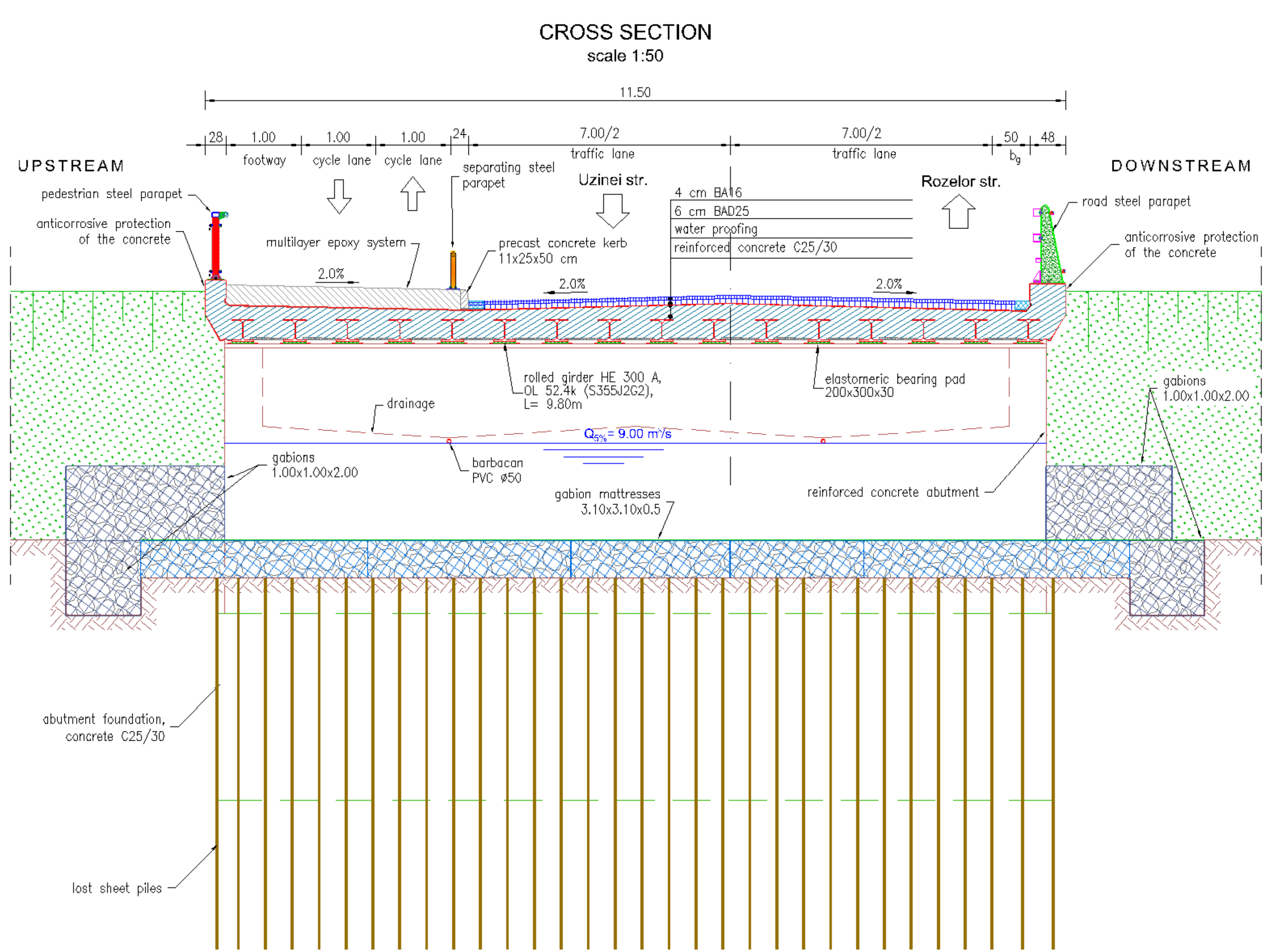

Foto 4. Partially concreted carriage way and transition plate

INFLUENŢA NOILOR STANDARDE ASUPRA REABILITĂRII STRUCTURILOR EXISTENTE DIN ZONE SEISMICE

Sorin DAN[1], Corneliu BOB[2], Cătălin BADEA[1], Liana IUREŞ[3]
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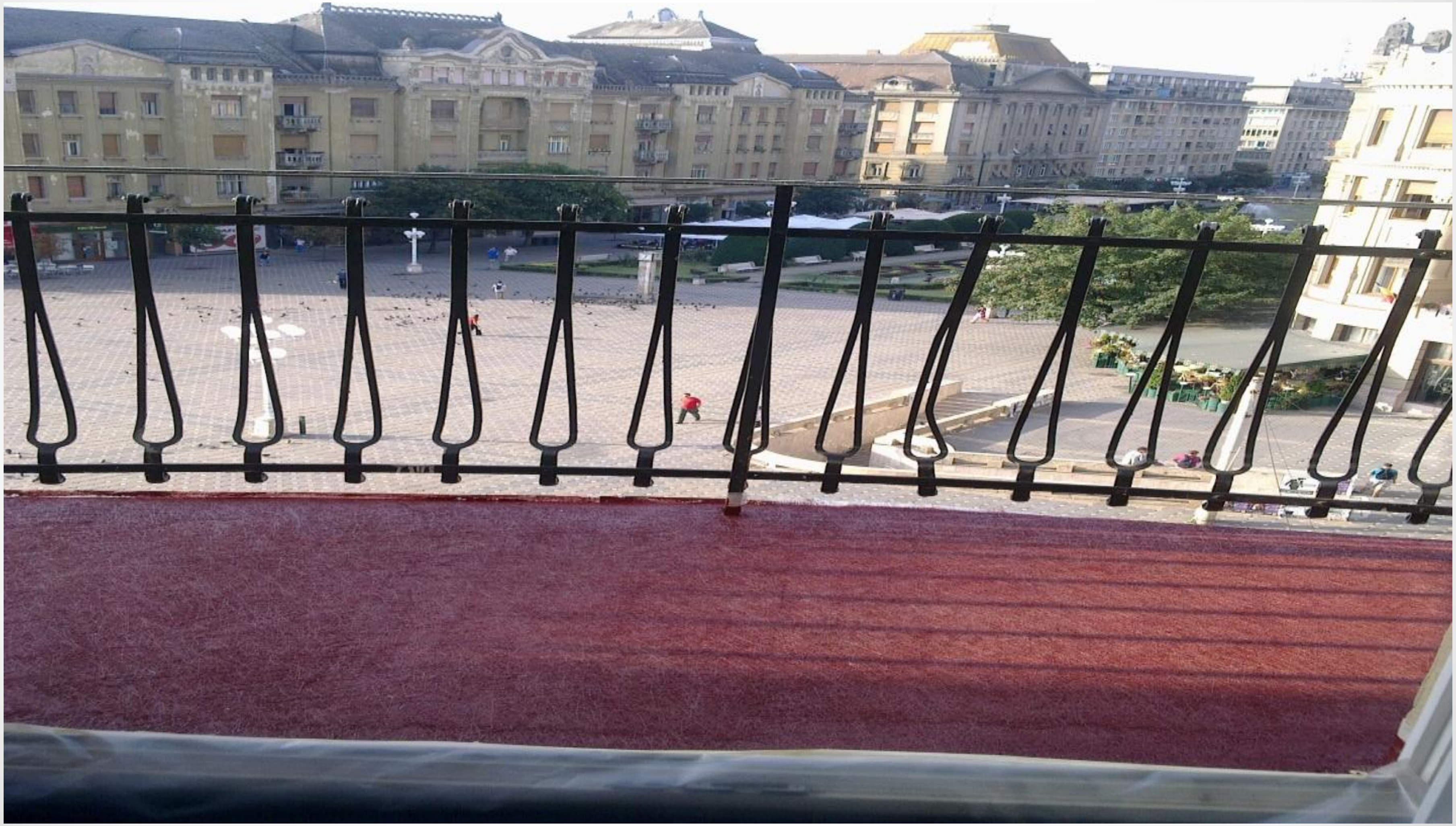
Analysis results for columns   Table 2

Columns	N_{Ed} [kN]	M_{Ed} [kNm]	M_{Rd} [kNm]	σ_{Ed} [N/mm^2]	Initial structure		Strengthened structure	
					f_{co} [N/mm^2]		f_{cu} [N/mm^2]	
Ground storey	1010	114	300	7,4	9,5	1,28	-	-
Storey I	820	95	130	12,1	6,5	***0,54***	12,5	***1,03***
Storey II	629	80	143	8,4	6,5	***0,77***	12,5	***1,49***

Fig. 2: CFRP confinement of columns

SISTEME DURABILE DE REABILTARE TERASE ŞI BALCOANE LA CLĂDIRI VECHI, ÎMBUNĂTĂŢIREA COMPORTĂRII LA SEISM A STRUCTURILOR ŞI DETALII DE ETANŞARE FAŢADE

M.Sc.Eng. Zeno DAN
Key Account Manager Sika Romania

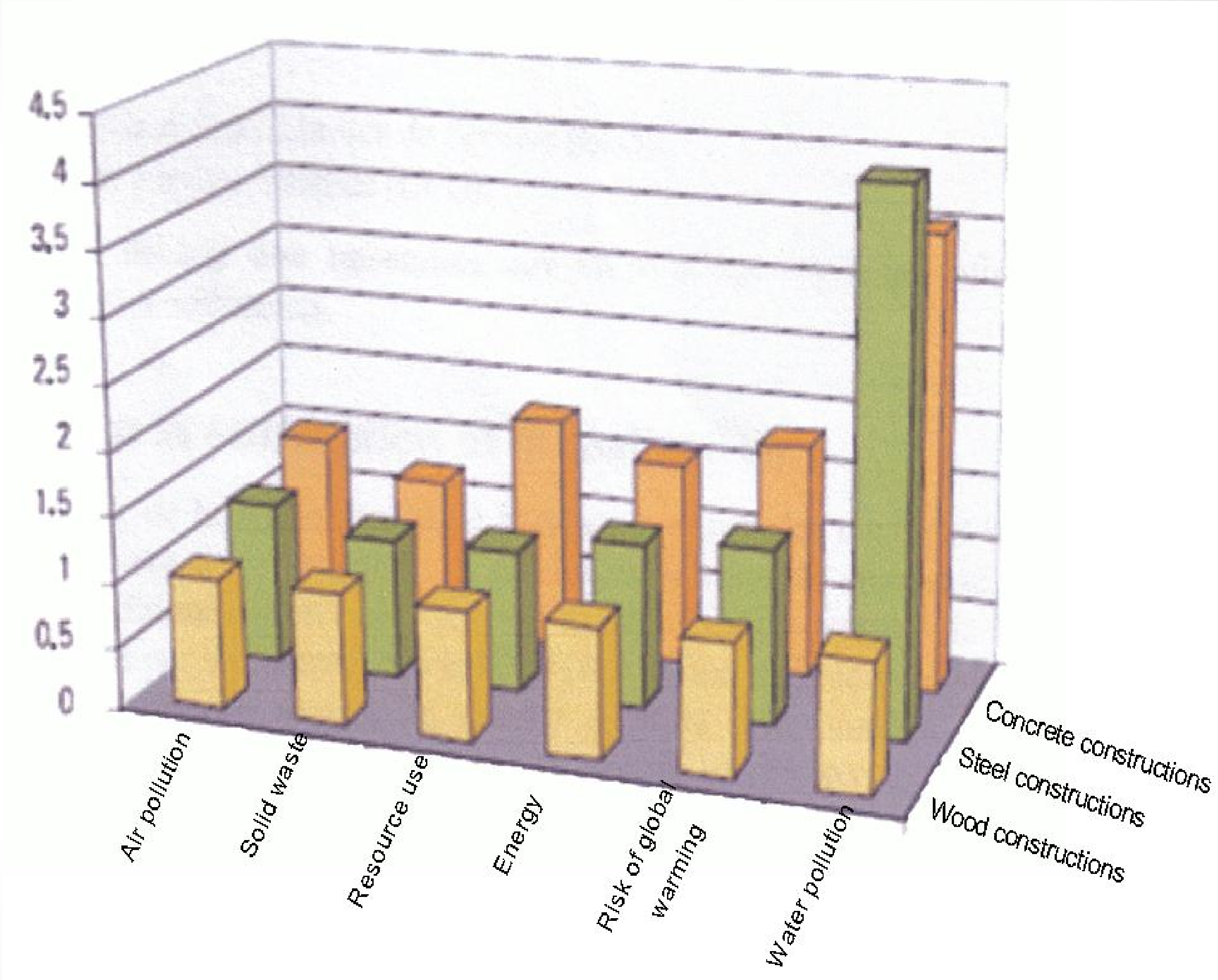


SUSTENABILITATEA LEMNULUI SI A PRODUSELOR DIN LEMN IN INGINERIA CONSTRUCTIILOR

Cornel FURDUI[1], Ioan FURDUI[2], Luminita FEKETE-NAGY[3], Eva PARTENE[4]

[1]Prof. dr. ing., [2]Drd. ing., [3]S.l. dr.ing., [4]Drd. ing.,
UNIVERSITATEA “POLITEHNICA” TIMIķOARA

Fig. 4. The consequences of using different materials in buildings for the environment



CONSOLIDAREA CU FRP A GRINZILOR DE LEMN LAMELAT

Ioan FURDUI[1], Cornel FURDUI[2], Luminita FEKETE-NAGY[3], Dan DIACONU[4], Aurel GRUIN[5]

[1]Drd. ing., [2]Prof. dr. ing., [3]S.l. dr.ing., [4]Asis.dr. ing. UNIVERSITATEA “POLITEHNICA” TIMIŞOARA , [5]Dr.ing. INCD URBAN-INCERC TIMIŞOARA

Experimental results on consolidated elements Table 2

Element Type	Experimental results				
	Loads		Displacement under loading		Ratio of displacements
	$P/2_{max}$ N	ΔP, -	$f_{max,}$ mm	f , mm	Δf, -
GL 2	41100	-	88.55	-	0.46
GL 2C	48450	1.18	76.88	41.15	-
GL 3	38000	-	99.22	-	0.41
GL 3C	49870	1.31	58.54	40.84	-
GL 5	46750	-	74.06	-	1.05
GL 5C	62590	1.34	127.35	77.95	-
GL 6	40150	-	63.80	-	0.59
GL 6C	89920	2.24	86.00	37.93	-
GL 7	39050	-	64.98	-	0.58
GL 7C	59140	1.51	68.02	37.8	-
GL 24/2	41100	-	88.85	-	0.46
GL 24/2C	48450	1.18	76.88	41.15	-
GL 24/3	36870	-	60.58	-	0.688
GL 24/3C	60470	1.64	79.04	41.72	

Fig. 9. Failure mode aspects of the items tested

UTILIZAREA RASINILOR EPOXIDICE SI A MATERIALELOR COMPOZITE LA INTREVENTII ASUPRA STRUCTURILOR DIN LEMN

Luminita FEKETE-NAGY[1], Cornel FURDUI[2], Ioan FURDUI[3],
[1]S.l.dr. ing., [2]Prof. ing., [3]Drd.ing.,UNIVERSITATEA "POLITEHNICA" TIMIȘOARA

Values of the coefficient of wood-adhesive compatibility

Table 1

Coefficient	Class of service		
	1	2	3
d_{dry}	Ó1	Ó1	Ó1
d_{wet}	-	Ó0,6	Ó0,8
$k_{a,w}$	0,4é 0,6	0,6é 0,8	>0,8

EXPERTIZAREA SI REABILITAREA UNEI STRUCTURI MIXTE

Asistent univ.ing. **Simon PESCARI**[1],
Ing. **Rodica – Claudia GAVRILESCU** [2], Ing. **Andreea – Maria DOBROTA** [3],
prof. dr. ing. **Corneliu BOB**[4]

Efficiency of strengthening – after repair

Table 4.a

After strengthening							
Beams dimensions [mm]	Bending moments						
	Support			Mid span			Strengthening material
	M_{Ed} [KNm]	M_{Rd} [KNm]	$R_3 = M_{Rd}/M_{Ed}$	M_{Ed} [KNm]	M_{Rd} [KNm]	$R_3 = M_{Rd}/M_{Ed}$	
500x600	372,59	478,56	1,28	216,33	248,46	1,15	1 Sika Carbodur S1012
350x450	487,97	384,18	0,78	213,67	200,60	0,94	1 Sika Carbodur S1012
270x370	269,49	228,89	0,84	149,26	137,75	0,92	1 Sika Carbodur S1012
180x250	159,89	173,24	1,08	83,33	59,53	0,72	1 Sika Carbodur S1012

Efficiency of strengthening – after repair Table 4.b

After strengthening				
Beams dimensions [mm]	Shear forces			
	V_{Ed} [KN]	V_{Rd} [KN]	$R_3 = M_{Rd}/M_{Ed}$	Strengthening material
500x600	443,33	353,33	0,8	2+1 Sika Wrap Hex 230C
350x450	587,15	587,2	1,0	1+1+1 Sika Carboshear L4/20/50
270x370	338,53	298,0	0,88	2+1 Sika Wrap Hex 230C
180x250	82,10	82,1	1,0	1+1 Sika Wrap Hex 230C

EVALUAREA EXPLOZIEI DE GAZE ASUPRA ELEMENTELOR METANTANCURILOR

Mariana POP[1], Corneliu BOB[2]
[1]S.l. ing., UNIVERSITATEA ORADEA, [2]Prof. dr. ing. UNIVERSITATEA “POLITEHNICA” TIMIķOARA

Fig. 5. Model of elements response

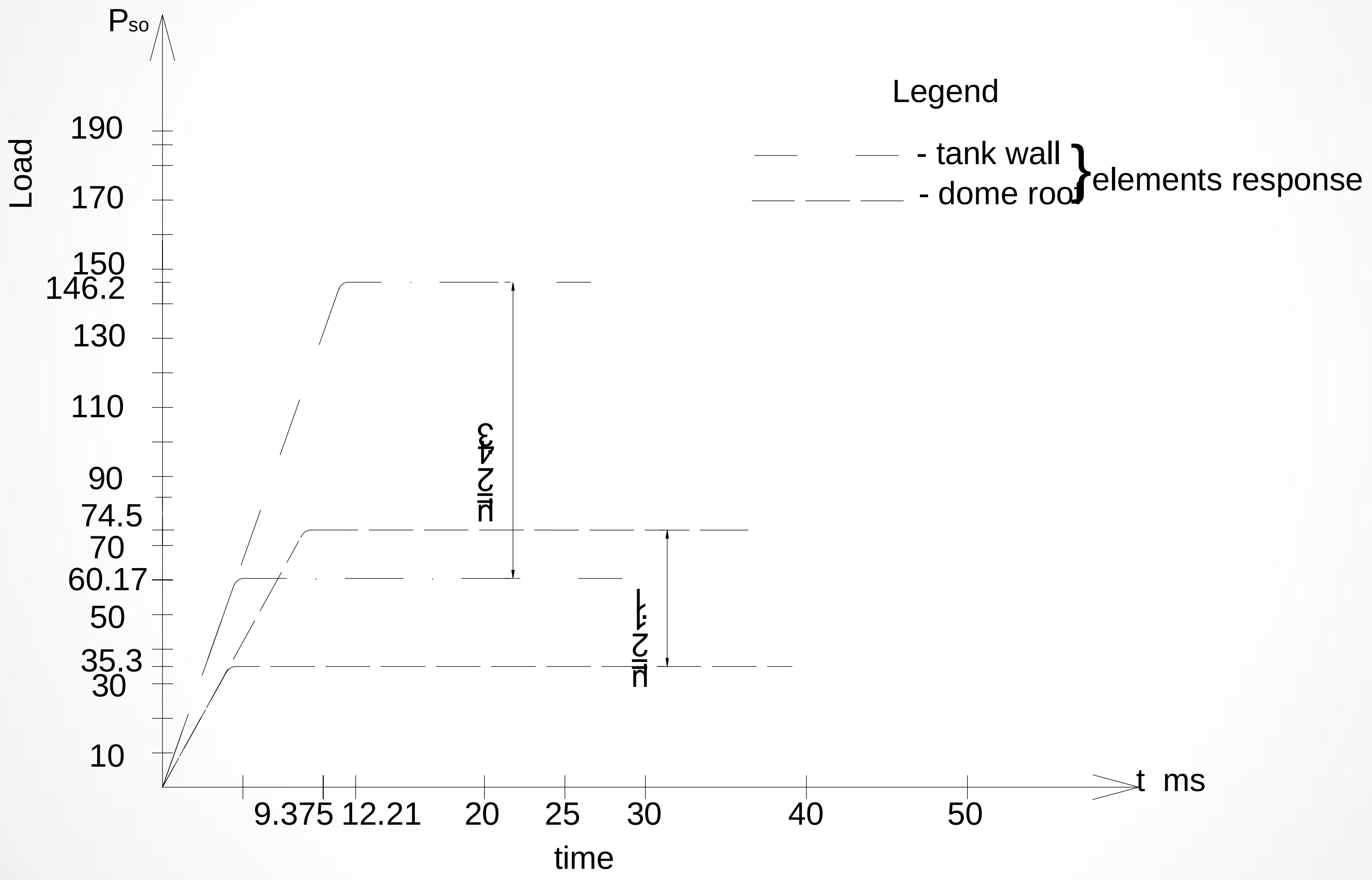
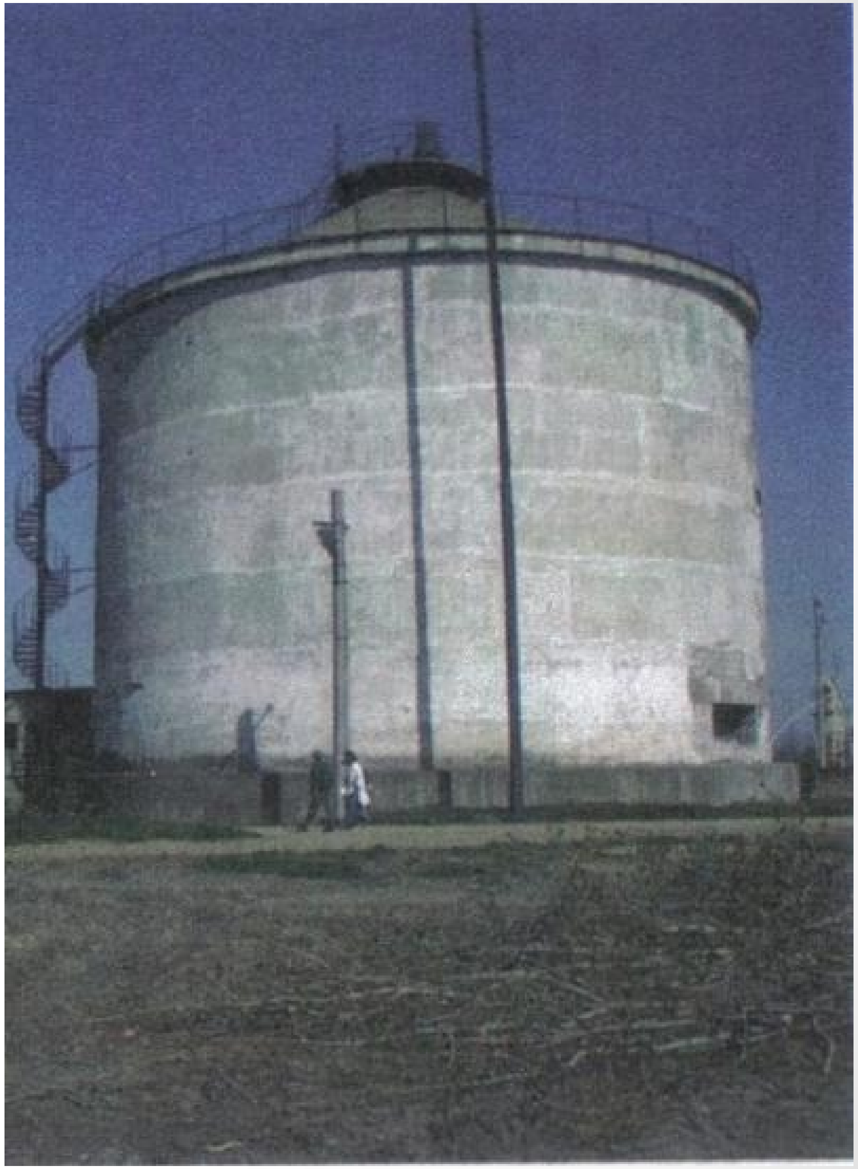
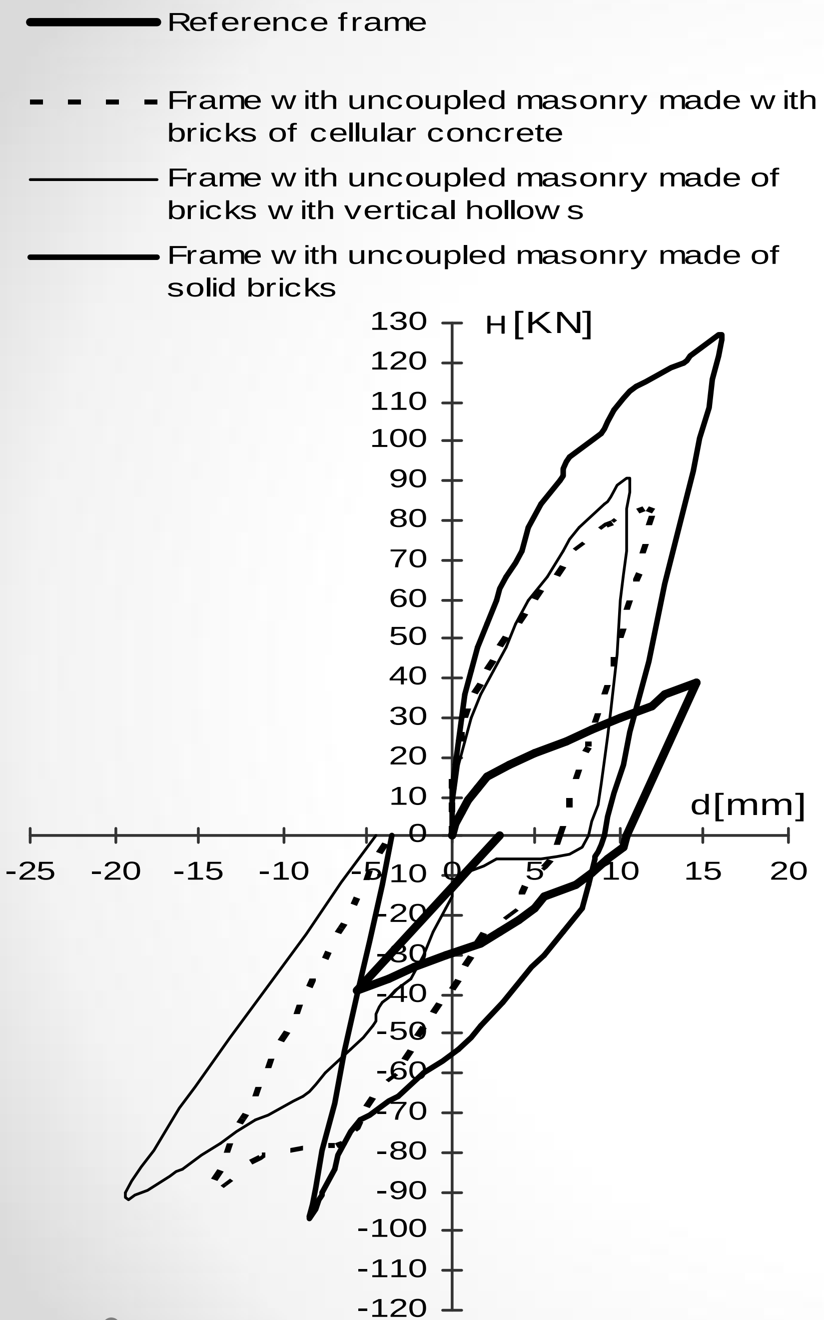


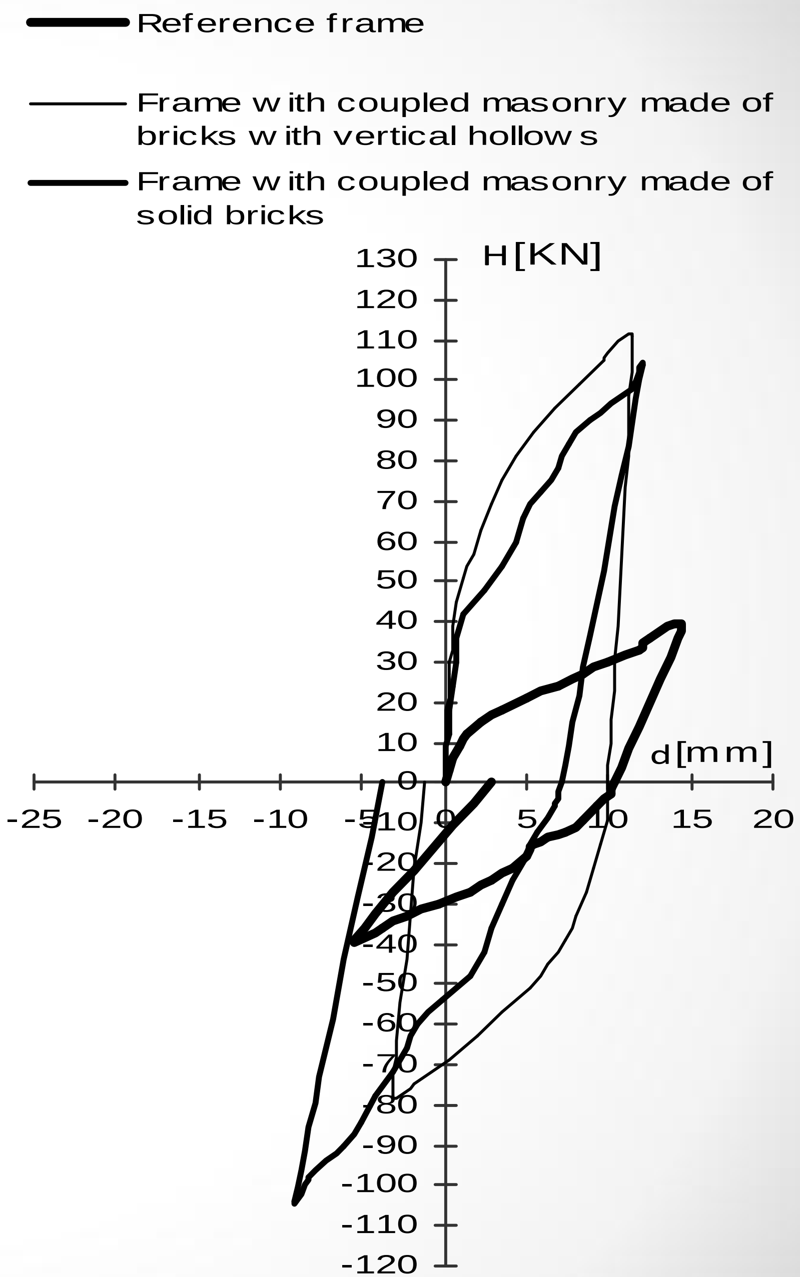
Fig. 2. Methane tank from Wastewater Treatment Plants Oradea



COMPORTAREA CADRELOR DIN BETON ARMAT CU ZIDĂRIE DE UMPLUTURĂ

Sorin MĂRGINEAN[1], Adriana SCURT[2], Corneliu BOB[3]
[1] ķ.l. drd. ing., UNIVERSITATEA din ORADEA,
[2] Prep. drd. ing., UNIVERSITATEA din ORADEA
[3] Prof. dr. ing., UNIVERSITATEA “POLITEHNICA” TIMIķOARA


Reference frame
Frame w ith uncoupled masonry made w ith bricks of cellular concrete
Frame w ith uncoupled masonry made of bricks w ith vertical hollow s
Frame w ith uncoupled masonry made of solid bricks
H [KN]
d[mm]


Reference frame
Frame w ith coupled masonry made of bricks w ith vertical hollow s
Frame w ith coupled masonry made of solid bricks
H [KN]
d[mm]

CONSOLIDAREA CADRELOR DIN BETON ARMAT CU ŞI FĂRĂ UMPLUTURĂ DE ZIDĂRIE

Adriana Scurt[1], Sorin Mărginean[2], Corneliu BOB[3]

[1]Prep.drd. ing. UNIVERSITATEA ORADEA, [2]ş.l.drd. ing. UNIVERSITATEA ORADEA,

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Fig.2 Reference frame, frame with coupled masonry made of bricks with vertical hollows and frame with coupled masonry made of bricks with vertical hollows after strengthening

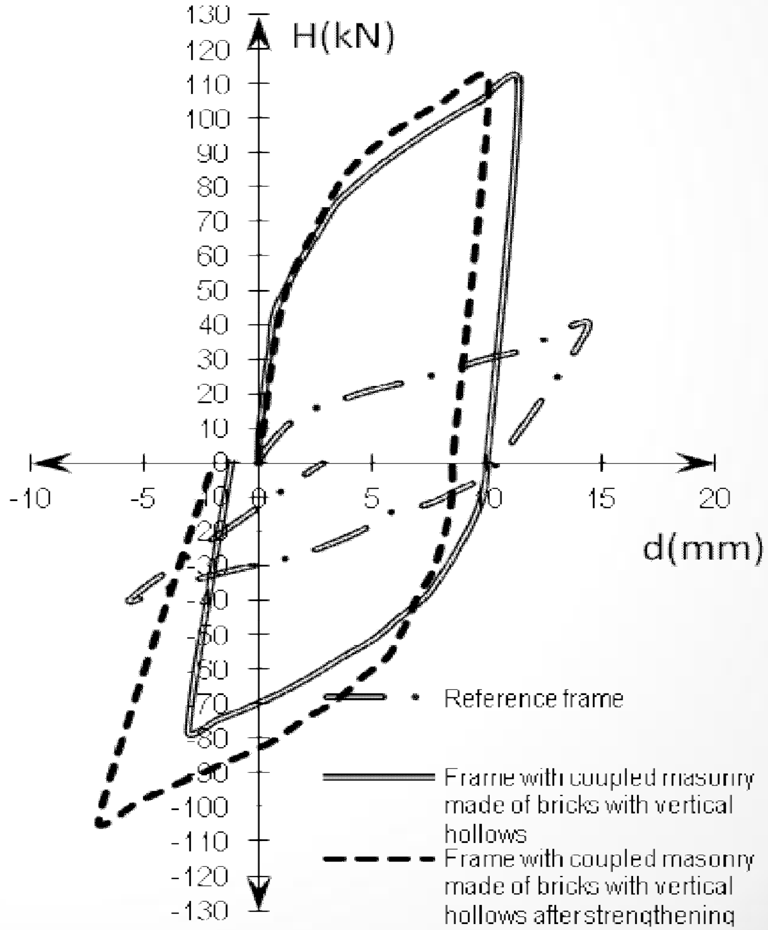

Fig.5 Strengthening of composite structure

Thank You for Your Attention!