COMPOZITE TIP BETON REALIZATE PRIN VALORIFICAREA UNOR DEȘEURI
CONCRETE TYPE COMPOSITES OBTAINED BY SOME WASTES REVALUATION

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The paper brings information obtained by own researches regarding manufacture and characterization of some concretes in which the binder was Portland cement with variable content of fly ash. As aggregate, an old crushed concrete was used, which substituted partially or totally the conventional aggregate (of ballast-pit). A polycarboxilic type superplasticiser (dosed as 0.9% relative to the cement content) was used for all the concretes.

Based on the experimental data, some useful correlations between compositions and properties (mechanical strength, impermeability, and freeze-thaw resistance) could be established. These allow the assessment that it is possible the manufacture of some concretes by simultaneous use of the fly ash and recycled concrete, without significant change in the principal properties (mechanical strength, impermeability, freeze-thaw resistance). Such waste valorization has favorable influences on the environment.

Lucrarea aduce informaţii obţinute prin cercetări proprii, referitoare la prepararea şi caracterizarea unor betoane în care liantul a constat din ciment portland cu conţinut variabil de cenuşă de termocentrală, iar ca agregat, s-a utilizat beton vechi, concasat, care a substituit parţial sau integral, agregatul de balastieră, convenţional. Betoanele au fost aditivate cu 0,9% superplastifiant policarboxilic.

Pe baza datelor experimentale, se pot stabili corelaţii utile compoziţie – proprietăţi (rezistenţă mecanică, impermeabilitate, rezistenţă la îngheţ-dezgheţ). Pe baza acestora, se poate aprecia că este posibilă valorificarea simultană a cenuşii de termocentrală şi a betonului vechi (concasat), prin obţinerea unor betoane care, pentru anumite caracteristici compoziţionale, prezintă proprietăţi (rezistenţă mecanică, impermeabilitate, rezistenţă la îngheţ-dezgheţ) apropiate de ale unui beton de referinţă, preparat cu materiale convenţionale. O astfel de valorificare a deşeurilor menţionate are, desigur, implicaţii favorabile asupra mediului.

Keywords: *concrete, recycled aggregate, fly ash, properties*

1. Introduction

The environmental protection is one of the significant requirements of the present society, achievable through: the decrease of natural resources and energy and the decrease of the inclusively by their valorization.

The construction activity is strongly implied in the environmental condition, because this uses raw materials in proportion of approximately 50%, approximately 40% from total energy consumption and generates 50% of the total wastes volume [1, 2].

Taking into account the important volume of wastes generated by the construction activity and demolitions, the valorization of these was of great interest long time ago [3, 4] and continues to be in researcher attention [1, 2, 5-17]. One interesting possibility is the use of the old crushed concrete as substitute of the natural aggregate in the new concretes. By such use some favorable influences are provided [5, 11, 12]:

- the diminish of the old concrete volume which must be deposited;
- the diminish of the conventional aggregates consumption and of their extraction on the environment;
- the diminish of CO_2 volume in the environment; the preparation of the aggregate from old concrete absorbs one CO_2 quantity – by crushing the specific surface area of old noncarbonated concrete increases and this is available for carbonation;
- the reuse of the metallic components separated from old concrete.

The majority of the researches in this field refer to the possibility of use of the aggregate from the old crushed concrete as partial substitute of the coarse fraction from conventional aggregate. The main properties of the recycled concrete aggregate as density, porosity, water absorption, grains sharp, abrasion and crushing resistance, influence the properties of the new concrete made with such

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aggregate [1,5, 12].. Besides the recycled aggregate their dosage is of great importance [5-8].

The density of the recycled aggregate (RA) is smaller (with approximately 7-9%) than those of the conventional aggregate, because of a mortar adherent layer at the great grains of aggregate. Porosity and water absorption are higher because of the same mortar adherent layer. Porosity values of 4-5% for RA in comparison with 0.5-1% for natural aggregate (NA) are mentioned [1]. The shape of the recycled aggregate grains is generally, rounded; the residual mortar from the old concrete contributing to border smooth of the original aggregate.

Testing concerning the crushing and abrasion resistances showed that these properties are weaker for the recycled aggregates comparatively with those of some conventional aggregates [1]. This is explained also by the presence of residual mortar layer at the surface of the recycled aggregate grains which represents an interface zone with minimum resistance at mechanical abrasion and crushing stresses [9, 12, 16, 17].

For the durability of concretes, in general, therefore also for those made with recycled aggregate, besides the mechanical strengths, the behaviour of these in changeable conditions of environment concretised as corosion and freeze-thaw rezistance is important.

Majority of the researches made regarding the use of the recycled aggregates for new concretes and their influences on the properties of new concretes, provide as maximum degree of conventional aggregate substitute, a value of 30% [1, 5, 7, 11, 12]. Higher substitution degree negativelly influence the properties of new concretes the more the RA content is greater.

In the present paper some information obtained by own researches concerning the caracterisation of some concretes made with unitary Portland cement or with fly ash addition and recycled aggregates resulted from old crushed concretes.

2. Experimental

2.1. Materials

Portland cement used for manufacture of investigated concretes was of type CEM I 52.5R, having the main physical-mechanical characteristics presented in Table 1. *The fly ash* used in some concrete compositions came from CET Govora and had the main characteristics presented also in Table 1.

Table 1

Main characteristics of Portland cement and fly ash/ *Caracteristici principale ale cimentului şi cenuşii de termocentrală*

Portland cement/ *Ciment portland*				
Specific surface area *Suprafaţă specifică* (cm^2/g)	Initial setting time *Inceput de priză* (min.)	Final setting time *Sfârşit de priză* (min.)	Compressive strength/ *Rezistenţa la compresiune* (MPa) 2 days/ *zile*	Compressive strength *Rezistenţa la compresiune* (MPa) 28 days/ *zile*
3500	90	135	36.0	64.0
Fly ash/ *Cenuşă de termocentrală*				
Compound *Component*	(%)	Compound *Component*	(%)	Hydraulic activity indicative/ *Indice activitate hidraulică*[x] (%)
SiO_2	51.8	SO_3	2.87	108.8 – 28 days/ *zile*
Al_2O_3	23.4	K_2O	2.04	
Fe_2O_3	8.54	Na_2O	0.69	
CaO	6.4	TiO_2	0.68	112.7 – 90 days/ *zile*
MgO	3.13	P_2O_5	0.15	
$S_{sp.}$(m^2/g)	2.642			

[x)] Hydraulic activity indicator was determined accordingly to SR EN 460-1
Indicele de activitate hidraulică s-a determinat conform SR EN 450-1

Table 2

Granulation composition of the natural aggregate/ *Compoziţii granulometrice ale agregatului natural*

Sort	Passing (%) on the sieve of/ Treceri (%) pe site cu ochiuri de:							
	0,125 mm	0,25 mm	0,5 mm	1mm	2 mm	4 mm	8 mm	16 mm
0-4mm	0,4	1,9	22,8	57,9	81,9	99,2	99,9	100
4-8mm	0,4	0,6	1,3	3,3	9,6	49,4	99,3	100
8-16mm	0,0	0,1	0,2	0,2	0,3	0,6	18,3	94,7

Table 3

Granulometry of the recycled aggregates/ *Compoziţii granulometrice ale agregatelor reciclate*

Sort	Passing (%) on the sieve of/ *Treceri (%) pe site cu ochiuri de:*							
	0,125 mm	0,25 mm	0,5 mm	1mm	2 mm	4 mm	8 mm	16 mm
0-4mm	8,6	15,3	29,0	48,5	73,2	99,6	100	100
4-8mm	0,3	0,4	0,5	0,5	0,6	7,0	95,4	100
8-16mm	0,7	0,7	0,7	0,7	0,7	0,7	3,2	98,1

Table 4

Characteristics of the aggregates – natural and recycled/ *Caracteristici ale agregatelor - natural şi reciclat*

Characteristic *Caracteristica*	Aggregate type/ *sort Tip agregat, sort*			
	AN, 4-8 mm	AR , 4-8 mm	AN , 8-16 mm	AR , 8-16 mm
ρ_a (g/cm^3)	2.646	2.534	2.676	2.55
ρ_r (g/cm^3)	2.493	2.284	2.605	2.347
WA_{24} (%)	2.33	4.32	1.01	3.38
LA (%)	-	-	34.6	38.4

Table 5

Compositions for the prepared and investigated concretes/ *Compoziţii ale betoanelor preparate şi cercetate*

Concrete indicative *Indicativ beton*	Binder/Liant				Aggregate / *Agregat*		Water *Apă* (l/m^3)
	Cement/*Ciment*		Fly ash /*Cenuşă*		kg/m^3	sort, type / *sort, tip*	
	%	kg/m^3	%	kg/m^3			
B_2^x	100	350	0	0	1850	0-4 mm ballast-pit/ balastieră *4-8 mm şi 8-16mm ballast-pit/balastieră*	166
B_3	80	280	20	70	1850	Total – ballast pit/ *Total balastieră*	166
B_4	70	245	30	105	1850	Total – ballast pit/ *Total balastieră*	166
B_7	100	350	0	0	1850	0-4 mm ballast-pit*/ balastieră* 4-8 mm şi 8-16mm recycled/ *reciclat*	166
B_8	70	245	30	105	1850	0-4 mm ballast-pit/ balastieră 4-8 mm şi 8-16mm recycled*/ reciclat*	166
B_9	100	350	0	0	1850	0-4 mm recycled/ *reciclat* 4-8 mm şi 8-16 recycled/ *reciclat*	166
B_{10}	100	350	0	0	1850	0-4 mm ballast-pit (50%) + recycled(50%) *0-4 mm balastieră (50%) + reciclat (50%)* 4-8 mm şi 8-16 mm recycled/ *4-8 and 8-16 mm reciclat*	166

The natural (conventional) aggregates were of ballast-pit resulted from river bed Argeş. The granulation compositions for 0-4 mm, 4-8 mm and 8-16 mm, determined according to SR EN 833-1, are presented in Table 2. The *recicled aggregates* resulted from an old demolition concrete, crushed, sorted and washed to obtain the fractions 0-4 mm, 4-8 mm and 8-16 mm having the granulations (determinated according to SR EN 933-1) presented in Table 3.

For the two aggregates types – NA and RA – the main physical-mechanical characteristics – absolute and real volumetric weight (ρ_a) and ρ_r, according to SR EN 1097-6, Los Angeles indicative (LA) – characteristic for crushing resistance – according to SR EN 1097-2, water absorbtion coefficient (WA_{24}) – according to SR EN 1097-5. The obtained results are shown in Table 4.

The densities of the RA fractions are smaler than for the same fractions of NA, according to another experimental data [6], explainable by the more porous mortar layer adhering at the RA grains. The higher values of water absorbtion by the recycled aggregate are arguments for this. And as concequence, LA indicative which caracterizes the crushing rezistance is greater for recycled aggregate.

2.2. Concrete compositions. Characterisation methods

Using as binders – unitary Portland cement and cement with 30% fly ash admixture and as aggregates – natural ballast-pit aggregate (AN) and recycled aggregate (RA), concretes having the compositions showed in Table 5 were prepared. For a beter workability of the concretes (afected by the recicled aggregate), at a constant water/binder ratio, a polycarboxilic type superplasticizer admixture was used in a dosage of 0.9% related to the binder. This dosage was determined as optimum in a prior research [13]. A water/binder ratio of 0.48 was considered for all concretes.

The main properties for fresh and hardened concretes presented in Table 5 were determined.

The *consistency* was determined by slump method, acording to SR EN 12350-2.

Compressive strength was determined on cubic specimens with side of 150mm, prepared and cured acording to SR EN 12390-1 and SR EN 12390-3. Hardening durations were 7, 28 and 90 days.

Water permeability was determined acording to SR EN 12390-8. Specimens similarly prepared to those for compresive strengths determination were cured initially in water for 28 days and after that, were exposed for 72 hours at water pressure of 8 atm. After that, the specimens were splited and the water penetration depth was measured.

Freeze-thawing resistance was determined on the same type of specimens used for compressive strengths determination. The specimens were initially cured for 28 days in water and after that, they were exposed at 100 cycles of freeze-thawing accordingly to SR 3518: 4 hours at -4^{o}C and after that, 4 hours at 20±2^{o}C. In parralel, similar specimens were cured in water till the end of the freeze-thawing cycles, these reprezenting the reference specimens. On the two series of specimens the compressive strengths were determined. The freeze-thawing rezistance was estimated as the percentage diminish of the compressive strength of the specimens exposed to freeze-thawing related to the references strength.

3. Experimental rezults. Interpretation.

3.1.Properties of fresh concretes

Slump determination, as an indicative of concretes consistency led to the rezults shown in Figure 1.

It can be observed the diminish of the slump for the concretes with recycled aggregate, the higher the substitution degree of NA with RA is. This sugests the greater consistencies for the concretes with recycled aggregate in comparison with that of the concrete with NA. More factors connected with aggregates characteristics could contribute to this.

The greater content of fine fractions (<0.5 mm) assignes a better filling of the voids produced throu coarser grains. For the same dosages of cement, the compactness of the concrete made with recycled aggregate will be greater than that of the concrete with natural aggregate. Additionally, the residual, more porous mortar layer existing at least on the RA grains, absorbs to a certain extent from mixture water leading to a greater consistency of concrete.

The data shown in Table 4 support this by the greater values of water absorbtion by the recycled aggregate, in comparison with natural aggregate.

For B_8 concrete containing the same type of aggregate with B_7 concrete but having as binder, cement with 30% fly ash, the slump is smaler so the consistency is greater. The fly ash contributes to this, by partial absorbtion of water by their fine grains.

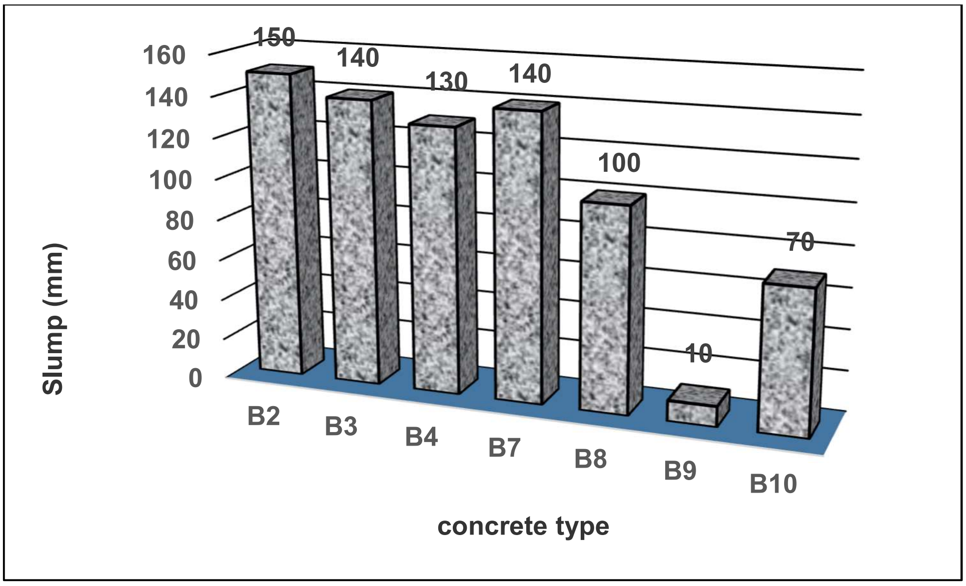


Fig. 1 - The influence of the concretes composition on their slump/ *Influenţa compoziţiei betoanelor asupra tasării.*

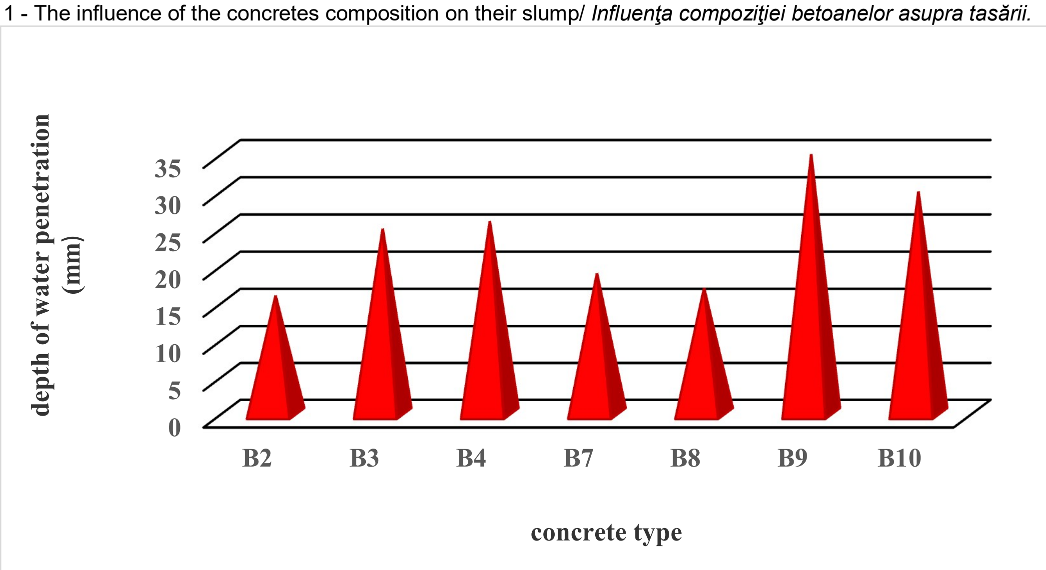


Fig. 2 - Water penetration depth for the concretes with natural and recycled aggregates/ *Adâncimea de pătrundere a apei pentru betoanele cu agregat convenţional şi reciclat* .

3.2. Properties of hardened concretes

3.2.1. Water permeability

Water permeability of hardened concrete directly bound by porosity, significantly influences mechanical strengths and durability of this. The data in Figure 2 show greater values for the permeability of the concretes B_3 and B_4 with blended cement (with fly ash) and natural aggregate. Concretes B_{10} and B_9 made with Portland cement and recycled aggregate – entire in B_9, distinguish themselves by the greatest permeabilities.

Taking into account the concretes with AR and the reference, the folowing variation serie for this properties can be established:

$B_2 < B_8 < B_7 < B_{10} < B_9$

Greater porosity of recycled aggregate wich also contains rezidual mortar on the grains surface contributes to greater permeability of the concretes with such type of aggregate.

3.2.2. Compressive strength

The data related to yhe compressive strengts developed by the investigated concretes show smaler values for the concretes with recycled aggregate (Fig. 3). The greater the diminish of compressive strength the greater the substitution degree of NA with RA, accordingly to the serie:

$B_2 > B_7 \approx B_8 > B_{10} > B_9$

Such data are in good correlation with those brought in another papers [5, 6, 15, 16], in which an optimum substitution degree for NA with RA of 30% is mentioned. Such a value can be exceeded without changing of mechanical strength, if the recycled aggregate proceeded from a more rezistent old concrete than the one is prepared from [5].

Smaller mechanical strengths of the concretes with recycled aggregate are correlated with the greater porosity and water absorbtion for these concretes as well as the presence of a weaker binder-aggregate transition zone due to rezidual mortar existing. The differences between mechanical strengths decrease in time as result of late cement hydration inclusively by consumption of the water kept in the more porous aggregate [5].

A prior processing of the crushed old concrete by which the rezidual mortar layer of the grains surface is remoted can lead to the improvement of mechanical strengths [17].

The concretes B_3 and B_4 made with blended cement (with 20 and 30% fly ash) developed smaler mechanical strengths than the reference B_2. But, after 90 days, mechanical strengths for first two concretes become greater than that of the reference. To their increase contributes also the fly ash reaction with basic medium.

3.2.3. Freeze - thawing rezistance

The data regarding the freeze - thawing rezistance (100 cycles) of some concretes made with recycled aggregate as substitute of natural fractions 4-8 and 8-16 mm (B_8 and B_7 as well as those of some concretes containing blended cement with 20 and 30% fly ash (B_3, B_4 and B_8) are presented in Figure 4. They show differences in comparison with the reference B_2.

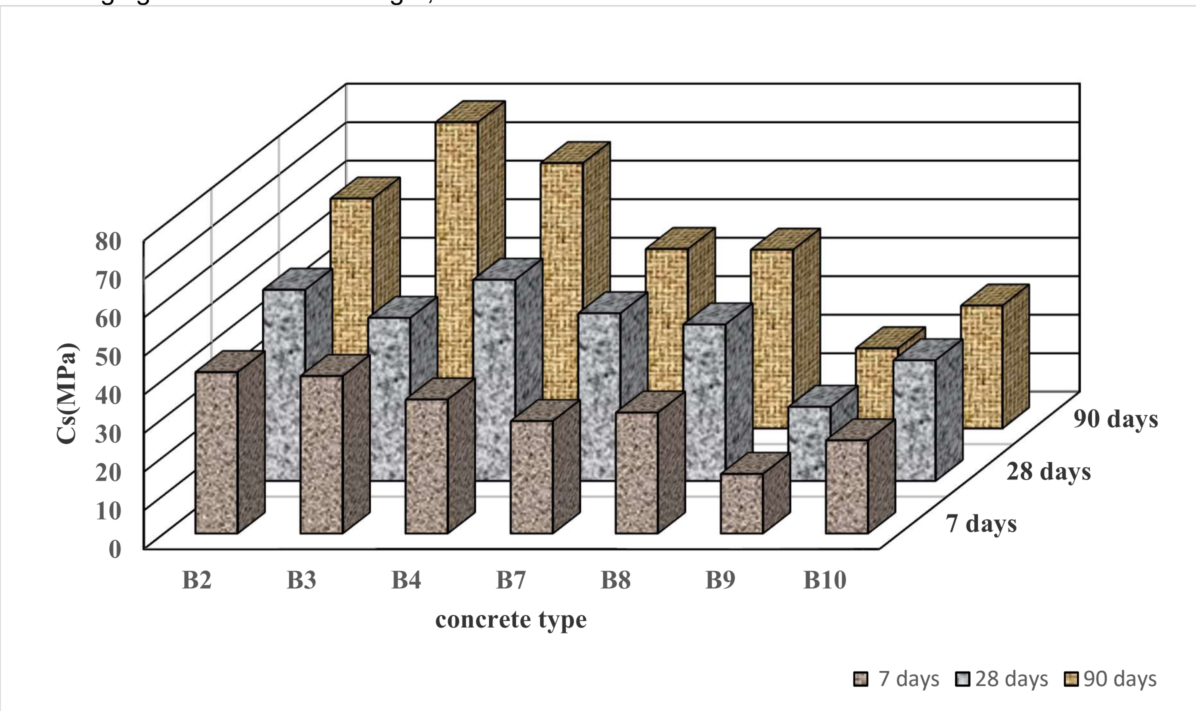


Fig. 3 - Compressive strengths of the concretes with fly ash and/or recycled aggregate in comparison with the reference/ *Rezistențe la compresiune ale betoanelor cu cenuşă de termocentrală şi/sau agregat reciclat, comparativ cu betonul de referință.*

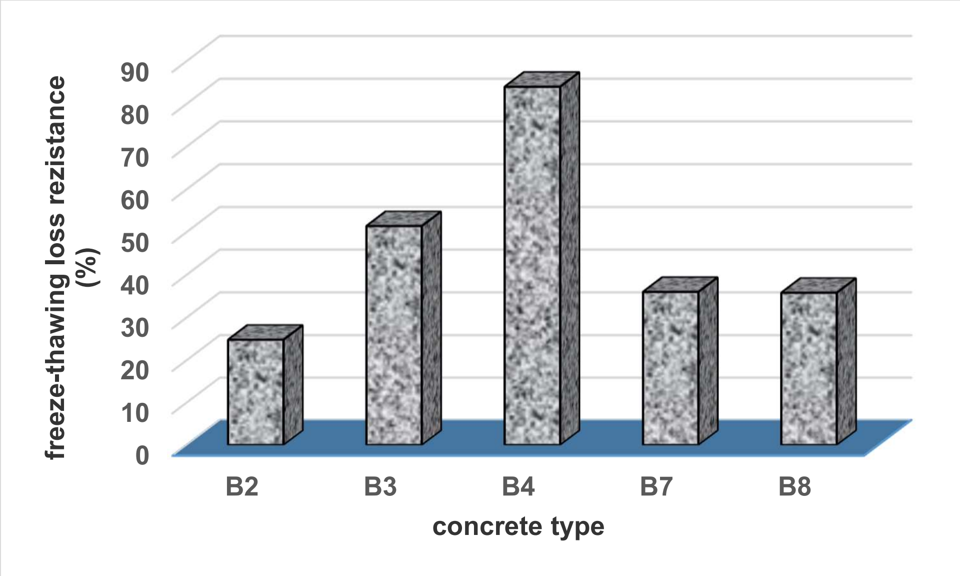


Fig. 4 - The influence of aggregate nature (natural - B_2, B_3 and B_4 and recycled – B_7 and B_8) on the freeze-thawing resistance (100 cycles)
Influenţa naturii agregatului (natural – B_2, B_3 şi B_4 şi reciclat – B_7 şi B_8) asupra rezistenței betoanelor la îngheţ-dezgheţ repetat (100 cicluri).

Losses of strength after repeated freeze-thawing are greater for the concretes with Portland cement and recycled aggregate (B_8 and B_7), in comparison with the reference (B_2), in good correlation with greater water absorbtion for the first two (see also Figure 2). Less durable to freeze-thawing stress were also the concretes with natural aggregate and blended cement with fly ash (B_3 and B_4). For these concretes too, the freeze-thawing resistance is in good correlation with the greater values of water absorbtion. For confirmation, the diminishing serie for the permeability (water penetration depth) of concretes considered in Figure 4 is shown:

B_4 > B_3 > B_7 > B_8 > B_2
26 mm 25 mm 19 mm 7 mm 16 mm

For the strength loss by repeated freeze-thawing, it can be formulated the following increasing serie in good correlation with the decreasing serie for the permeability:

B_2 < B_8 ≈ B_7 < B_3 < B_4
24.8% 35.6% 35.8% 51.4% 84%

By comparison of the behaviour at freeze-thawing of B_4 and B_8 concretes containing the same binder – cement with 30% fly ash and NA – the first and NR - the last, it has been ascertained a beter freeze-thawing resistance for the last. So, it can be considered a more pronounced negative influence on the concrete durability of fly ash content. The influence of the aggregate can be inferred if the behaviour at freeze-thawing of B_4 concrete (containing blended cement with 30% fly ash and NA) and B_8 respectivelly (containing the same binder but with mixed aggregate – NA and RA). From this results a favorable influence of the recycled aggregate (coarse fractions 4-8 and 8-16 mm).

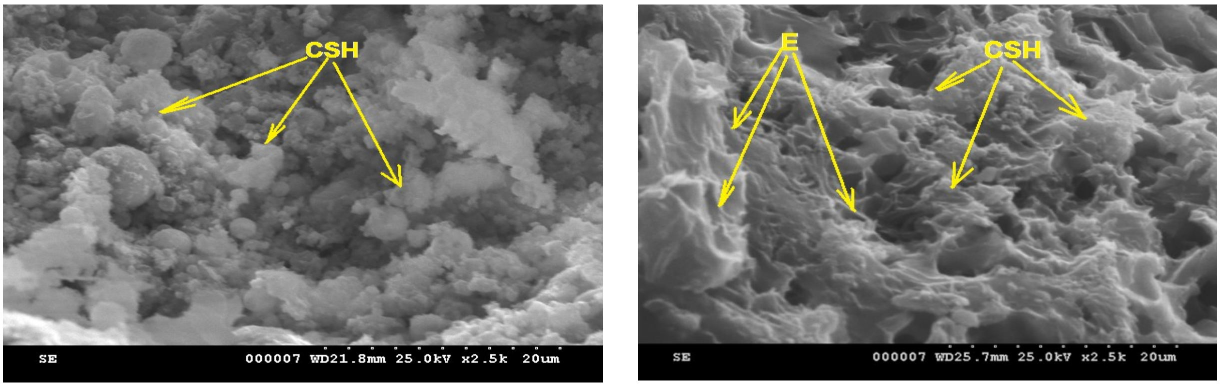
Some information regarding the morphological characteristics and, indirectly, on composition and structure for certain concretes – B_4 and B_8 – cured in normal conditions up to five months and of another serie of specimens exposed at 100 freeze-thawing cycles after a previous hardening for 28 days in normal conditions, were obtained by electron mycroscopic analysis SEM. These evidenced some diferences for the specimens normal hardened and exposed at freeze-thawing respectivelly, in correlation with compositional characteristics.

For *B_4 concrete*, containing binder with 30%fly ash and normal aggregate, SEM images for the two curing conditions are shown in Figure 5.

In SEM image Figure 5a there are visible irregular hydrates often agglomerated, representing the silicate hydrates little structured. They contain inclusively compounds resulted by fly ash reaction with calcium hydroxide resulted by cement hydration.

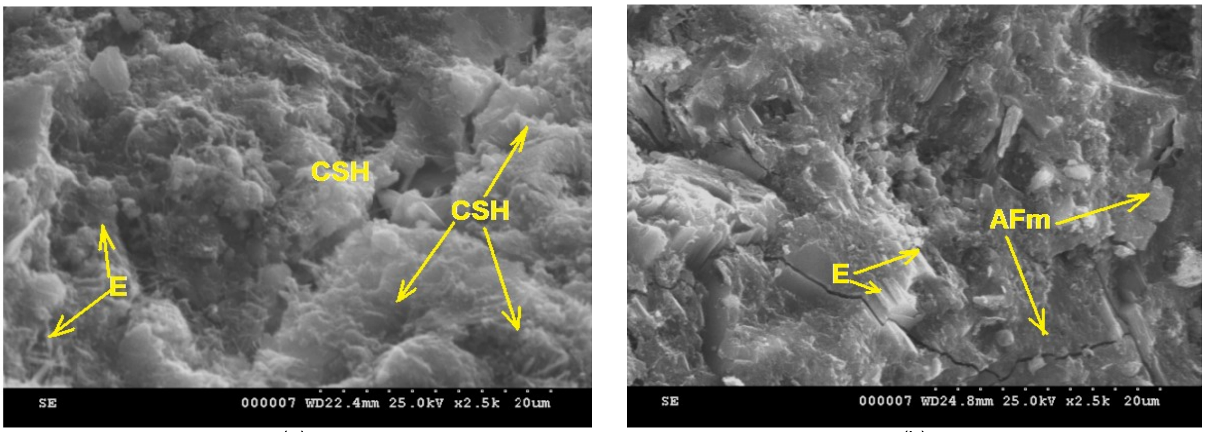
SEM image, Figure 5b, for the same specimen exposed at repeated freeze-thawing show morphologies less ordered of the hydrates and the presence of certain voids. These could result by displacement either of small aggregate grains as well as of some fly ash grains, caused by water freeze.

SEM images of B_8 concrete containing recycled aggregate are presented in Figure 6. Both for normal conditions hardening (Fig. 6a) and after 100 cycles of freeze-thawing (Fig. 6b) it can be considered a more ordered more compacted microstructure in comparison with B_4 concrete. This could contribute to a better behaviour at freeze-thawing of B_4 concrete.



(a) (b)

Fig. 5 -SEM images for B_4 concrete samples: a – reference, normal hardened for five months (x2500); b – exposed at 100 freeze-thawing cycles after previous normal hardening for 28 days (x2500)/ *Imagini SEM ale probelor de beton B4: a - martor, întărit normal 5 luni (x 2500); b – expus la 100 cicluri de îngheț-dezgheț, după întărire prealabilă, normală, 28 zile (x 2500).*



(a) (b)

Fig. 6 - SEM images for B_4 concrete samples: a – reference, normal hardened for five months (x2500); b – exposed at 100 freeze-thawing cycles after previous normal hardening for 28 days (x2500)/ *Imagini SEM ale probelor de beton B8: a - martor, întărit normal 5 luni (x 2500); b – expus la 100 cicluri de îngheț-dezgheț, după întărire prealabilă, normală, 28 zile (x 2500).*

As a feature for micro structural characteristics of the specimens exposed to repeat freeze-thawing is the more frequent presence on SEM images of some needle formations which can be assigned to ettringite crystals. On the images of specimens hardened in normal conditions, such formations are rarer. The explanation may be a lower rate of hydration and structuring processes in freeze-thaw conditions. In these conditions ettringite transformation formed as first hydro aluminate sulphate in monosulphated hydrate is hindered.

4. Conclusions

The experimental data showed that the old concrete, resulted by demolitions, could be revaluated in new concrete production, as (partial) substitute of the natural aggregate – fractions 4-8 mm and 8-16 mm.

New concretes made with Portland cement and mixed aggregate – NA, fraction 0-4 mm and RA, fractions 4-8 mm and 8-16 mm develop satisfactory properties for certain uses.

Compressive strengths – initially, smaller than those of a reference - subsequently, after 28 and 90 days significantly increase.

It can be evidenced the good physical-mechanical behaviour of B_8 concrete, prepared with mixed aggregate and binder containing 30% fly ash. By compressive strengths, water permeability and freeze-thawing resistance, this concrete much resembles with B_7 concrete, made with the same type of aggregate but, containing Portland cement as binder. Considering such concrete realization, two wastes are revaluated – fly ash and old crushed concrete.

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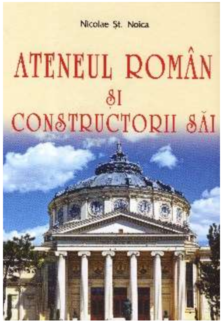
Recenzie/Review



Nicolae St.Noica
ATENEUL ROMÂN ŞI CONSTRUCTORII SĂI

În anul 1865, la iniţiativa câtorva intelectuali : Nicolae Kretzulescu, Constantin Esarcu, Petre S.Aurelian şi V.A.Urechia a fost înfiinţată Societatea ”Ateneul Român” , o adevărată instituţie de cultură care, prin conferinţele sale a însemnat „începutul dialogului pe care intelectualitatea română l-a întreţinut cu publicul”.

Perspectiva unui local propriu s-a deschis odată cu prima donaţie făcută de Scarlat Rosetti de 200.000 lei aur „pentru facerea întru această capitală a unei biblioteci publice”. Se dorea ca proiectanţii să se orienteze după modelul noului Palat al Bibliotecii Imperiale din Paris.

Constantin Esarcu dorea ca „edificiul destinat Artei şi Ştiinţei să fie monumental”. Pentru aceasta s-a organizat „Loteria pentru construirea edificiului Ateneului”. A fost lansată chemarea : „Daţi un leu pentru Ateneu !”. Imediat ce s-a dispus de fonduri, Societatea Ateneul Român a cumpărat la 21 iunie 1886 terenul din strada Episcopiei 6, “precum şi materialul de cărămidă aflat la temeliile sale şi scândurile de împrejmuire a lui”. Pe aceste temelii “pregătite pentru un circ cu manegiu de cai, a fost înălţat Palatul Ateneului Român”. Autorul proiectului a fost arhitectul francez Albert Galeron, proiect care a fost supus expertizei unei comisii formate din personalităţi ale vieţii noastre tehnice : arhitect-inginer Alexandru Orăscu, arhitect-inginer Ion Mincu, arhitect-inginer I.N.Socolescu, inginer-arhitect Grigore Cerkez şi inginerul-şef al Municipalităţii oraşului Bucureşti, N.Cucu Starostescu. Raportul comisiei a fost scris de Ion Mincu, cu modificările necesare. La 26 octombrie 1886 s-a pus piatra fundamentală a Palatului Ateneului împreună cu un act de fundaţie, planul palatului şi medalia comemorativă. Mistria din argint şi ciocanul au fost lăsate prin testament de Scarlat Rosetti. Mistria se află în patrimoniul Ateneului Român. Edificiul a fost ridicat în mai puţin de 16 luni, graţie unei serioase pregătiri tehnice şi organizatorice a specialiştilor noştri. Clădirea Ateneului s-a realizat în două etape : în prima, între 1886-1889 s-a zidit clădirea propriu-zisă, corpul principal, deasupra căreia s-a ridicat cupola. În cea de-a doua etapă, 1893-1897 s-a adăugat o anexă, lipită în spatele edificiului pe strada Poşta Veche.

Din marele vestibul al Palatului se ajunge prin patru “scări încolăcite” în sala mare de conferinţe şi concerte, încăperea de căpetenie a edificiului. Peretele circular al sălii a fost pregătit pentru a fi decorat cu o mare frescă, în care să fie reprezentată istoria ţării. Execuţia celor patru scări din marmură de Carrara a fost contractată cu sculptorul C.Storck.

La 14 februarie 1888, ora 8:30 seara , s-a deschis în noul local ciclul de conferinţe anuale, când Alexandru Odobescu a rostit remarcabila sa prelegere despre “Ateneul Român şi clădirile antice cu dom circular”. Odobescu a arătat necesitatea realizării unei picturi care să evoce fazele principale ale istoriei naţionale. Această dorinţă a vechilor ateneişti a devenit realitate de abia după Marea Unire, şi anume între anii 1933-1937 de către pictorul profesor Costin Petrescu.

Membrii Ateneului, ca semn de recunoştinţă pentru Constantin Esarcu, cel care şi-a pus priceperea şi sufletul în realizarea acestui edificiu i-au instalat un bust în rotonda palatului şi o placă de marmură pe care i-au înscris un Act de mulţumire.

După Marea Unire din anul 1918, se deschide Primul Parlament al României întregite, în prezenţa Regelui Ferdinand, la data de 20 noiembrie 1919 în marea sală de conferinţe şi concerte a Ateneului Român.

Trebuie menţionat că în acelaşi timp cu construcţia Ateneului Român are loc şi construcţia Băncii Naţionale de pe strada Lipscani, avându-l arhitect tot pe Albert Galeron.

Virginia Moldoveanu

1. Menţionez că acest text sumar este extras din carte, având avizul autorului. Vă recomand cu căldură să o citiţi. Evocă documentat, pe înaintaşii noştri, care ne pot fi exemple de urmat.
2. Lucrarea are 160 de pagini, format A3, 150 de ilustraţii color, 27 de portrete, 124 facsimiluri şi 15 planuri, Editura Vremea, tipărită la Arta Grafică.