PETCHENKO, O.I., prof.

Nomenclature for the presentation and movement of the head in labor. Ped., akush. i gin. 23 no.6:56-57 '61. (MIRA 15:4)

1. Zaveduyushchiy kafedroy akusherstva i ginekologii vrachebnogo fakul'teta Krymskogo meditsinskogo instituta (rektor - dotsent S.I.Georgiyevskiy [Heorhiievs'kyi, S.I.]).
(OBSTETRICS--TERMINOLOGY)

E

Country : RUMANIA
Category: Analytical Chemistry. Analysis of Inorganic Substances

Abs Jour: RZhKhim., No 17, 1959, No. 60507

Author : Petcov, R., Raducan, G.
Inst : -
Title : Determination of Zirconium in Alluvial Sands

Orig Pub: Rev. chim., 1958, 9, No 7, 459

Abstract: A sample of the analyzed sand (1-2 gr) is heated with 30 ml of a mixture (1 : 10) of H_2SO_4 and HF, the residue is treated 3-4 times with water with evaporation to dryness, then calcined and fused with 10 gr of molten borax. After cooling the melt is dissolved in 150 ml HCl

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Country : RUMANIA
Category: Analytical Chemistry. Analysis of Inorganic Substances

Abs Jour: RZhKhim., No 17, 1959, No. 60507

(1:5), boiled and diluted with water up to 250 ml volume. In the gravimetrical determination of Zn, to 100 ml of the obtained solution are added 10 ml of conc. HCl and 50 ml of 16% hydrocyanic acid, keeping the solution for 30 minutes on a steam bath at 85°. The precipitated residue obtained after cooling is filtered out on a filtering crucible No 3, washed first with 2% HCl solution that contains 5% of hydrocyanic acid, and then 2-3 times with ethanol, and dried at 110-120°. The calculating factor for ZrO_2 is equal to 1772. For the photometric determination of Zr, from the primary solution (obtained in

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E-12

Country : RUMANIA

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Category: Analytical Chemistry. Analysis of Inorganic Substances

Abs Jour: RZhKhim., No 17, 1959, No. 60507

dissolving the raw sample) two 10 ml samples are taken to each of them 2 ml of 25% solution of $NH_2OH \cdot HCl$ are added. The samples are then heated for 2.3 [sic] minutes on a water bath (in so doing the samples become colorless), cooled, followed by the addition of 2.5 ml of 10% HCl. Then to one of the samples is added 1 ml of 0.05 M solution of complexon III (for the masking of Zr). 5 ml of 0.1% solution of alizarine red are then added to both samples followed by keeping samples on a water bath for 3 minutes, cooling, diluting with water up to 50 ml

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Country : RUMANIA

Category: Analytical Chemistry. Analysis of Inorganic Substances

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Abs Jour: RZhKhim., No 17, 1959, No. 60507

volume, and conducting photometric test at 570 mμ, employing the sample containing complexon III as a reference sample. -- B. Manole

Card : 4/4

Petcov, N.

The manufacture of DDT. N. Petcov. Rev. chim. (Bucharest) 6, 521-7(1955).—Various processes for producing DDT are discussed and the variables affecting the reactions are analyzed. Gary Gerard

BITTNER, J.; OLINESCO, Eleonora; PETCOU, Rica-Maria

Experimental data on the maintenance of viability and toxinogenic capacity of Cl. perfringens, type A, after contact "in vitro" with large quantities of penicillin. Arch. Roum. path. exp. microbiol. 22 no.1:137-151 Mr '63.

(CLOSTRIDIUM PERFRINGENS)
(TOXINS AND ANTITOXINS) (PENICILLIN)
(CULTURE MEDIA) (PHARMACOLOGY)

PETCOV, NECULAI

The decomposition of sodium amalgam. Constantin Calitinu, Aurel Popovici, Cornelia Leonte, and Necula Petcov. *Acad. rep. populare Romîne (Iaşi), Studii* [illegible] No. 1/2, 189-99(1954).—Conditions were investigated in which external elec. current was applied to the graphite-Na-amalgam local cells to decomp. the latter. The decompn. speed of Na amalgam could be doubled. The external elec. current was useful only when the current, through each graphite electrode, was below ≈0.700 amp. The thickness of the amalgam layer on the electrode could not exceed 5 mm. This method permitted the utilization of a smaller amt. of Hg and at higher concn. of NaOH in the industrial cells, even with external elec. energy. If the initial current on each electrode, and the amalgam layer thickness did not exceed a predetd. value, for the decompn. of Na amalgam by the conventional effect of graphite, the speed was an inverse function of the initial p.d. between graphite and amalgam. It was proposed that this p.d. could be diminished by lowering the graphite in amalgam more than is usual at present. — T. Z. Denesy

PETCOV, N.; RADUCANU, D.

Colorimetric determination of SiO_2 in great quantities.

R. 252 (REVISTA [illegible]) (Bucuresti, Romania) Vol. 9, No. 4, Apr. 1[illegible]

SO: Monthly Index of East European Accessions (EEAI) LC Vol. 7, No. 7, 1[illegible]

PETCOUR

7

4E3d
4E4j
Chem

3943. Determination of nitrogen oxides in (U.S.S.R.) factories manufacturing sulphuric and nitric acids. D. D. Petrov. *Rev. Chim., Bucharest*, 1956, 7 (4), 233-239.—The method consists in comparing the colour of the issuing gaseous mixture (NO plus NO_2) with seven standard tubes containing graduated concn. of NO_2 from 0 to 0·3% in steps of 0·05%. Since the oxidation of NO to NO_2 is more rapid the higher the initial concn., the velocity of test gas through the tube must be sufficiently high to enable the initial NO_2 content to be read correctly. Once the initial NO_2 reading is obtained, the inlet valve to the tube is closed, and 10 to 15 min. is allowed for the NO to NO_2 oxidation, when the reading is again taken.

H. Sher.

Many

Petcov, R.

3
4E3d-1

61. Colorimetric determination of large amounts of silica. R. Petcov and G. Răducanu. *Rev. Chim., Bucharest*, 1957, 8 (2), 450.—The determination of SiO_2 as molybdosilicic acid (I) depends on all of I being present in the form of the α-acid, *i.e.*, under conditions where $(H^+)/(MoO_4^{2-}) = 1{\cdot}5$ to 2. If the relation is > 3, then the β-acid is formed. *Procedure*—The finely powdered material to be determined (0·2 g) is spread on a solidifying melt of 9 g of KOH and 3 g of KNO_3 in a nickel crucible. The crucible is heated at redness (600°) for 20 min., and, after cooling, the contents are dissolved in boiling water and made up to 1 litre. A 10-ml aliquot is treated with 1·5 ml of 2 *N* HCl and 2 ml of NaF soln. (2·5%). To remove excess of F, 0·3 g of $AlCl_3$ (cryst.) is added after 10 min. and mixed well and, when the $AlCl_3$ is dissolved, 3 ml of ammonium molybdate soln. (5%) is added. The soln. is made up to 100 ml and the colour is measured after 1½ min., with a 1-cm cell and S43 filter, or the soln. can be compared with standard picric acid (0·6 g per litre; 1 ml = 1 mg of SiO_2). The advantages claimed for this method are rapidity (90 min.), and the fact that it does not require a platinum crucible. The max. error is ±4·6%.

H. Sutton

RACOVEANU, N.; LIVOVSCHI, L.; DUMITRESCU, I.; PETCU, A.

Automation equipment of a deep pumping well. Probleme automatiz 4: 193-200 '63.

PETCU, A.

lattice defir[illegible] by the aid of absorption and [illegible]
only. Studii cerc mat 16 no.1:[illegible] 1964.

L 39015-66

ACC NR: AP6029591 SOURCE CODE: RU/0022/66/011/004/0177/0183

AUTHOR: Priscu, Radu (Engineer; Specialist); Petcu, Andreea (Engineer; Designer); Constantinescu, Florin (Engineer; Designer)

ORG: Hydropower Study and Planning Institute (Institutul de studii si proiectari hidroenergetice)

TITLE: Behavior of the Secul-Resita Dam in the first two years of operation

SOURCE: Hidrotehnica, gospodarirea apelor, meteorologia, v. 11, no. 4, 1966, 177-183

TOPIC TAGS: waterway engineering, concrete

ABSTRACT: The authors describe the measuring apparatus installed at the Secul-Resita buttress dam and present the results of the measurements taken during the first two years of operation of the dam. The factors observed are: evolution of temperatures in the concrete, amount and distribution of subpressure, displacement of building blocks in the crest, and opening of the contraction joints. Orig. art. has: 8 figures. [Based on authors' Eng. abst.] [JPRS: 36,844]

SUB CODE: 13 / SUBM DATE: --Dec65

Card 1/1

PETCU, Aurel, ing.

Numbering, switching, and signaling in interurban telephone automation. Telecomunicatii 7 No.6:250-254 N-D '63.

PETCU, Aurel, ing.

Bucharest, Telec [illegible], No [illegible], Nov-Dec [illegible], [illegible]74

"[illegible], [illegible], in [illegible] publication in the [illegible] Telephone Automation."

PETCU, Emanoil, corresp.

Reparations [illegible] 10 Mr 165.

PARHON, C.C.; POPESCU, Ilie; BIRZA, Elena; PETCU, Georgeta

Investigations on the interfernece of glutathione in energy metabolism. Rumanian M Rev. no.1:214-220 Ja-Mr '61.
(METABOLISM pharmacology) (GLUTATHIONE pharmacology)

REBUSAPCA, D.; SOARE, R.; MASALA, Gh.; PETCU, Gh.; HRISTACHE, I.

Machine building industry, a creation of the People's Democratic Regime of Rumania. Bul Inst Politeh 26 no.4: 29-37 Jl-Ag '64.

1. Chair of Political Economy, Polytechnic Institute, Bucharest.

RUMANIA/Human and Animal Physiology - Internal Secretion. Epiphysis. T

Abs Jour : Ref Zhur Biol., No 3, 1959, 12925

Author : Parhon, C.C., Petcu, Georgeta

Inst : AS RPR

Title : Influence of Epiphyseal Extracts on Excretion of Creatine in the Urine

Orig Pub : Studii si cercetari fiziol. Acad. RPR, 1957, 2, No 3-4, 305-308

Abstract : No abstract.

Card 1/1

CONSTANTINEANU, M.I.; PISICA, C.; PETCU, I.; GAVRILESCU, E.; CONSTANTINEANU, R.

Massive attack provoked by Hyponomeuta mahalebella Guenee on the bois-de-Sainte-Lucie (Prunus mahaleb L.) in the southwest of Dobruja and its natural enemies. Anal St Jassy II 10:113-120 '64.

CHIRITEA, Constantin; PETCU, Ion

Good and useful way for the Rumanian workers to spend their free time. Munca sindic 6 no.5:20-23 My '62.

1. Director al clubului Uzinele de tractoare, Brasov (for Petcu).

GUTU, C., ing.; PETCU, M., ing.; SOCI, Antoaneta, ing.

Calculation of the economic effects of the electric interruptions in cotton spinning mills and in cotton fabric finishing. Ind text Rum 13 no.8:309-314 Ag '62.

PANOIU, N.; CARABOGDAN, I.; SINGER, G.; SCHWARTZ, M.; PETCU, M.

A 10 t/h lignite-burning boiler with inverted stoker grate. Energetica Rum 9 no.10:396-402 O '61.

1. Institutul de energetica al Academiei R.P.R., Uzina de utilaj petrolier si chimic, Bucuresti.

(Steam boilers) (Lignite)

GUTU, G., ing.; PETCU, M., ing.; SOCI, A., ing.

Calculation of the economic effects of electric accidental interruptions. Energetica Rum 11 no.10:525-531 O'63.

PETCU, M.; NAGY, C.; MANEA, S.

Prognosis of electric energy and power. Rev electrotechn energet 8 no.1:131-148 '63.

PETCU, M.

GUTU, G. RUMANIA

Bucharest, Studii si Cercetari de Energetica [illegible] Energetica Generala si Electroenergetica, No 2, 1962, pp. [illegible]

"Damages Caused by the Interruption of Electric Power in the Manufacture of Polyamide Synthetic Fibers."

Co-authors:

PETCU, M.

SOCI, A.

PETCU, Mihai; NAGY, Csaba; MANEA, Sora

Prognosis of electrical energy and power. Pt. 2. Studii cerc energet A 12 no.4:535-551 '62.

~~PETKU, Mihai~~[Petcu, Mihai]

Outlook for the conditions of loading electric power systems. Rev electrotechn energet 6 no.1:195-205 '61.

(Electric power distribution)

GUTU, Constantin; PETCU, Mihai; SOCI, Antoaneta

Criteria for estimating economic effects caused by voltage variations. Rev electrotechn energet 9 no.3:357-366 '64

AVRAMESCU, Aurel, acad.; DRAGAN, Gleb; ADAMUT, Iosif; PETCU, Mircea

Switching overvoltages modeled by a quadripole. Rev electrotechn energet 9 no.3:331-339 '64

ADAMUT, Iosif, ing.; PETCU, Mircea, ing.

Contamination of the insulation. Energetica Rum 12 no. 3:135-138 Mr '64.

PETCU, N .

Best wa ys of separating gas from oil. p. 162 .

PETROL SI GAZE. (Asociatia Stiinţica a Inginerilor si Technicienilor din Romina si Ministerul Industriei Petrolului si Chimiei) Bucuresti, Rumania; Vol. 9, no. 4, Apr. 1958

Monthly List of East European Accessions (EEAI) LC Vol. 8, no. 9, Sept. 1959

Uncl.

RUMANIA / Chemical Technology. Chemical Products and Their Applications. Chemical Processing of Natural Gases and Petroleum. Motor and Rocket Fuel Lubricants. H-23

Abs Jour: Ref Zhur-Khimiya, No 3, 1959, 9672.

Author : Potcu, N.
Inst : Not given.
Title : Optimum Conditions for Separating Petroleum Oil and Gas.

Orig Pub: Petrol si gaze, 1958, 9, No 4, 162-165.

Abstract: Formulas are suggested for calculating the composition of the gaseous and liquid phase in the hydrocarbon mixture taken from oil-wells in drilling for petroleum. Results are given for a two-step division of a mixture of petroleum

Card 1/2

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The Influence of the Flow Rate of Petroleum Gases through Activated Coal on the Recuperation of Gasoline. Petrol Si Gaze (Petroleum and Gases), #3:100: Mar 55

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PETCU, N. Some considerations on combustion in oilfield boilers. p. 1[illegible].

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So: Eastern European Accession Vol. 5 No. [illegible] April 1 56

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Vol. 6, no. 10, Oct. 1955
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So: Eastern European Accession Vol. 5 No. 4 April 1956

PETCU, N.

Possibilities of obtaining liquefied gases in cracking stations. p. 373. Petrol Si Gaze. Bucuresti. Vol. 6, No. 8, Aug. 1955.

SOURCE: East European Accessions List (EEAL), LC. Vol. 5, No. 3, March 1956.

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PETCU, N. Possibilities of obtaining liquefied gases in cracking stations. p. 73.

Vol. 6, no. 8, Aug. 1955
PETROL SI GAZE
Bucuresti, Rumania

So: Eastern European Accession Vol. 5 No. 4 April 1956

~~PETCU, N.~~ PETCU, N

The effect of various impurities in the gas on the efficacy of gas injections. N. Petcu. *Petrol şi Gaze* (Bucharest) 6, 468–71(1955).—On compressing, the gas of an contains oil and H_2O impurities which must be removed to secure optimum operating conditions. A "separator" for this purpose is described in detail. Gary Gerard

LFH

PETCU, N.C.

18389. POSSIBILITY OF PRODUCING LIQUEFIED GASES AT NATURAL GASOLINE PLANTS.
Petcu, N.C. (Petrol si Gaze (Petrol & Gas, Bucharest), 1955, vol. 6, (8), 373-380; abstr. in Ref. Zh. Khim. (Ref. J. Chem., Moscow), 1957, (14), 48938). An analysis is made of the possibility of producing liquefied gases, and of increasing production by using active carbon of the Supersorbon TS type. The possibility is indicated of producing liquefied gases from low grade gases at compression plants.

ROMANIA

PETCU, P., Pharmacist

Department of Botanical Pharmacognosy, School of Pharmacy, Cluj (Catedra de farmacognozie-botanica, Facultatea de Farmacie, Cluj)

Bucharest, Farmacia, No 6, Jun 63, pp 359-370

"Research on the Dynamics of Vitamin C Cumulation in Several Species of Berberis."

ROMANIA

PETCU, P., Pharmacist.

Bucharest, Farmacia, No 4, Apr 63, pp 243-250.

"Phytochemical Investigations on the Plant Berberis Silva-Taroucana C. Schneid, Acclimatized and Grown in the Botanical Gardens of Cluj."

(1)

STOIA, I., dr., doctor in stiinte medicale; RIMNEANTU, P., dr.; GHENOIU, O. dr.; PETCU, R., dr.

Factors causing recurrences in chronic evolutive polyarthritis. Med. intern. (Bucur.) 17 no.1:61-64 Ja '65

1. Lucrare efectuata in Centrul metodologic de reumatologie, Bucuresti (director: dr. I. Stoia).

STOIA, I., dr.; MARIN, D., dr.; GEORGESCU, A., dr.; ERATU, I., dr.; NITESCU, S. dr.; LEFTER, I. dr.; NICULESCU, D., dr.; IAREMSCHI, M, dr.; PETCU, R.

The role of dysmetabolic components in activation of arthroses and spondyloses. I. Med. intern. (Bucur.) 16 no.6:653-657 Je'64.

1. Lucrare efectuata la Centrul metodologic de reumatologie, Bucuresti (director: dr. I.Stoia).

[illegible], V., inz., [illegible] industr. [illegible].

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PETCU, V., ing.

Examples of designing continuous girders of monolithic reinforced concrete in the plastic field. Rev constr si mat constr 15 no. 12: 618-622 D '63.

PETCU, Valeriu (Bucarest)

Utilization conditions of hyperstatic ferroconcrete structures in calculations based on their plastic state. Archiw inz lad 8 no.1:3-18 '62.

PETCU, Valeriu

The plastic hinge in the plastic design of reinforced concrete structures. Rev mec appl 9 no. 1:101-116 '64.

1. Institute of Building Research and Construction Building Economics, Bucharest.

PETCU, Valeriu

A new concept in the plastic design of reinforced concrete structures. Studii cerc mec apl 14 no. 6: 1259-1276 '63.

1. Institute of Building Research and Construction Building Economics.

PETCU, Valeriu

Plastic calculation of reinforced concrete circular plates stressed by symmetrical loads. Studii cerc mec apl 15 no.1:159-188 '64.

1. Institute of Building Research and Construction Building Economics, Bucharest.

PETCU, Valeriu

Plastic overload coefficient in the calculation of hyperstatic reinforced concrete structures. Rev mec appl Roum 9 no.6:1391-1413 '64.

1. Institute of Building Research and Construction Economics, Bucharest.

FETCU, Valeriu

Generalization of the indirect method of plastic calculation of reinforced concrete structures. Studii cerc mec apl 14 no.2: 441-446 '63.

1. Institutul de cercetari in constructii si economia constructiilor (INCERC), Bucuresti.

PETCU, Valeriu

Direct and indirect methods for the computation of plastics in the reinforced-concrete structures. Studii cerc mec apl 13 no.5:1273-1278 '62.

1. Institutul de cercetari in constructii si economia constructiilor (INCERC), Bucuresti.

PETCU, Valeriu

Plastic hinge in the plastic design of reinforced concrete structures. Studii cerc mec apl 14 no.1:55-69 '63.

1. Institutul de cercetari in constructii si economia constructiilor, Bucuresti.

PETCU, Valeriu

Carrying capacity of the curved reinforced-concrete beams subjected to torsion and bending. Studii cerc merc apl 13 no.3, 651-667 '62.

1. Institutul de cercetari in constructii si economia constructiilor (INCERC), Bucuresti.

PETCU, Valeriu

A basic principle in designing statically indeterminate structures of reinforced concrete in the plastic range. Studii cerc mec apl 12 no.5:1017-1023 '61.

1. Institutul de cercetari in constructii si economia constructiilor (INCERC), Bucuresti.

BALAN, St.; PETKU, V. [Petcu, V.]; REUTU, S. (Bukharest)

Studying the behavior of Vierendeel beams in the elasto-plastic range using chromoplastic models. Stroi. mekh. i rasch. soor. 2 no.2:19-22 '60. (MIRA 14:5)

(Girders--Models) (Plastics)

PETCU, Valeriu

Principles of the plastic calculation of reinforced concrete frames. Studii cerc mec apl 14 no.3:705-714 '63.

1. Institutul de cercetari in constructii si economia constructiilor, Bucuresti.

PETCU, Valeriu

Bases of the statically nondetermined reinforced-concrete structures of equal plastic safety. Studii cerc mec apl 13 no.4:891-902 '62.

1. Institutul de cercetari in constructii si economia constructiilor (INCERC), Bucuresti.

PETCU, Vlaeriu

Carrying capacity of the statically nondetermined reinforced-concrete beams with variable cross section. Studii cerc mec apl 12 no.4: 853-859 '61.

1. Institutul de cercetari in constructii si economia constructiilor (INCERC), Bucuresti.

(Girders) (Concrete) (Strength of materials)

80410

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RUM/8-59-1-9/24

AUTHORS: Bălan, St., Răutu, S., Arcan, M., Petcu, V.

TITLE: Study of the Behavior of Constructions by Experimenting With Mockups From Plastic Materials

PERIODICAL: Studii si Cercetări de Mecanică Aplicată, 1959, Nr 1, pp 151 - 172 (RUM)

ABSTRACT: A new method of experimentation with reduced scale mockups has been developed for the studies and calculations of new construction types. The mockups can be made from the same material as the prototype or from some other material. The authors first pose the problem of similarity, indicate with "m" the elements of the mockup and with "p" that of the prototype, and establish the following scales:

scale of lengthes: $\ell_m = \frac{1}{\lambda} \ell_p$ (1),

scale of time: $t_m = \frac{1}{\tau} t_p$ (2);

scale of unitary power: $\sigma_m = \frac{1}{\alpha} \cdot \sigma_p$ (3);

scale of move: $\sigma_m = \frac{1}{\beta} \cdot \delta_p$ (4);

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scale of elasticity modules: $E_m = \frac{1}{\gamma} \cdot E_p$ (5).

Each mockup is made for a certain type of stress, and the problems of similarity have to be examined only for the respective stress. The relations thus become more simple and easier to be solved. The authors then study the cases of a mockup made from the same material as the prototype, where $E_m = E_p = E$ and $\gamma = 1$: a) Static stress in the elastic zone: If the mockup is stressed only by external load, the relations between the mockup values and prototype values are:

$$p_m = \frac{1}{\alpha} p_p; \quad \varepsilon_m = \frac{1}{\alpha} \cdot \varepsilon_p; \quad P_m = \frac{1}{\alpha \cdot \lambda^2} P_p; \quad \delta_m = \frac{1}{\alpha \lambda} \cdot \delta_p \quad (6).$$

If the stresses which provide from the proper weight are not neglectable, they have to respect the similarity relation: $G_m = \frac{1}{\lambda^3} \cdot G_p$, thus $\alpha = \lambda$. This case is not advantageous since the displacements are very small and difficult to be measured. In case the proper weight has to be considered, the similarity relations are:

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$$p_m = \frac{1}{\lambda} p_p; \quad \varepsilon_m = \frac{1}{\lambda} \cdot \varepsilon_p; \quad P_m = \frac{1}{\lambda^3} \cdot P_p; \quad \delta_m = \frac{1}{\lambda^2} \cdot \delta_p \quad (7)$$

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b) Static stresses at heavy axial loads: The deformation scale has to be the same as the scale of the length: $\frac{1}{\alpha\lambda} = \frac{1}{\lambda}$, $\alpha = 1$

and the similarity relations become:

$$p_m = p_p; \quad \varepsilon_m = \varepsilon_p; \quad P_m = \frac{1}{\lambda^2} P_p; \quad \delta_m = \frac{1}{\lambda} \delta_p \qquad (8)$$

c) Static stresses in the elastic plastical zone: It is necessary that $\sigma_m = \sigma_p$, thus $\alpha = 1$. The similarity conditions are given in this case by the relations (8). d) Dynamic stresses: The inertial powers interfere in this case with the external stresses. Accepting the time (2), the acceleration ratio is:

$$a_m = \frac{\tau^2}{\alpha \cdot \lambda} \cdot a_p \qquad (9)$$

and the inertial power ratio is:

$$\frac{I_m}{I_p} = \frac{m_m \cdot a_m}{m_p \cdot a_p} = \frac{\tau^2}{\alpha \cdot \lambda^4} .$$

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Since all forces which act on the system have to be in ratio with $\frac{1}{}$, the scale of time is: $\tau = \lambda$. (Nr 10). If there are concentrated masses

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(M_m, M_p) on the construction, it is necessary that

$$\frac{M_m}{M_p} = \frac{1}{\tau^2 \cdot \lambda} = \frac{1}{\lambda^3} \qquad (11).$$

The authors then proceed to the examination of mockups made from some other material than the prototype. A good material has to be homogeneous and isotropic, to be easily processable, to have a relatively small elasticity module in order to supply easily measurable deformations. a) Static stress in the plastic zone: Using the scale of lengthes (1) and unitary power (3), results for the scales of forces, extension and displacement:

$$P_m = \frac{1}{\alpha \cdot \lambda^2} P_p, \quad \varepsilon_m = \frac{\tau}{\alpha} \varepsilon_p, \quad \delta_m = \frac{\tau}{\alpha \cdot \lambda} \delta_p \qquad (12).$$

The value of α is: $\alpha = \rho \cdot \lambda$ (Nr 13). b) Static load at heavy axial stresses: The similarity can be guaranteed if the influence of the proper weight can be neglected or is replaced by an external stress By posing the condition:

$$\frac{\delta_m}{\delta_p} = \frac{\ell_m}{\ell_p} = \frac{1}{\lambda},$$

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one obtains the supplementary relation: $\alpha = \gamma$, and the relations

$$\delta_m = \frac{1}{\lambda}\delta_p; \quad P_m = \frac{1}{\gamma \cdot \lambda^2} \cdot P_p; \quad \varepsilon_m = \varepsilon_p; \quad p_m = \frac{1}{\gamma} p_p \qquad (14).$$

c) Static stress in the elastic-plastical zone: To obtain a similarity between the bahavior of the mockup and the prototype in the elastic-plastical zone, there is a relation necessary between the elasticity modules of the materials used for the construction of the mockup and prototype (Figure 1):

$$\sigma_m = \frac{1}{\alpha}\sigma_p; \qquad E_m(\sigma_m) = \frac{1}{\gamma} E_p(\sigma_p) \qquad (15)$$

By knowing the values α and β, the relations between the other parameters are:

$$\varepsilon_m = \frac{\gamma}{\alpha}\varepsilon_p, \quad P_m = \frac{1}{\alpha \cdot \lambda^2} \cdot P_p, \quad \delta_m = \frac{\gamma}{\alpha \cdot \lambda}\delta_p \qquad (16)$$

d) Dynamic stresses: Knowing the coefficients α, ρ and γ, the acceleration ratio is:

$$a_m = \frac{\gamma \cdot \tau^2}{\alpha \cdot \lambda},$$

Card 5/ 11 an the time scale:

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Study of the Behavior of Constructions by Experimenting With Mockups From Plastic Materials

$$\frac{1}{\tau} = \frac{1}{n} \sqrt{\frac{1}{\rho} \cdot \gamma}.$$

(17)

Experiments with plastic mockups are being carried out in many foreign laboratories. The new plastics allow the observation of the plastified zone by a decoloration of the material. This method has been called "Chromoplasticity". Plastics used for the construction of mockups are polyvinyl-chloride varieties, developed at the Institutul de cercetări chimice "ICECHIM" (Chemical Research Institute) by a team led by State Prize Winner N. Goldenberg. Three plastic varieties have been used: 1) "SDE", 2) "SDP-1", and 3) "SDP-2"; "SDP-3" and "SDP-4". SDE: perfect elastic behavior for $\sigma < p$, elasticity module at bending: $E = 36,000$ kg/sq cm, proportionality limit: $\sigma_p = 550$ kg/sq cm, flow limit: $\sigma_c = 600$ kg/sq cm. "SDP-1": becomes white if the tensional flow limit has been reached. Elasticity module at bending: 30,000 - 36,000 kg/sq cm, flow limit: at tension: 550 - 700 kg/sq cm, at compression: 600 - 800 kg/sq cm, at bending: 550 - 750 kg/sq cm. The flow limit values within this interval, depend from the thermal treatment of the material. "SDP-2", "SDP-3" and "SDP-4": elasticity module at bending: 20,000 - 35,000 kg/sq cm, flow limit: at tension: 450 - 500 kg/sq cm,

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at bending: 480 - 600 kg/sq cm. The values of the elasticity module and flow, depend from the thermal treatment of the material. "SDP-2", "SDP-3" and "SDP-4" become white at tension and black at compression. The characteristics diagrams of the second and third varieties are very similar to the theoretical diagrams of Prandtl, being almost perfectly elastic for $\sigma < \sigma_c$ and perfectly plastic for $\sigma = \sigma_c$ (Figure 2). The first experiment has been carried out within the Chair of Mechanical Constructions of the Institutul de Constructii (Institute of Constructions) in Bucharest with the "SDE" plastic, by checking the frequency of the proper vibrations of a seven-story frame (Figure 4). The plastic mockup has been built in a scale of 1:30. The concentrated masses have been reduced to 1/40,000 and the time value scale was $t_m = \frac{1}{\sqrt{E_d}} t_p$. The experiments have proved that the hypothesis of the infinite rigid spars of the frame is admissible. New statical computation methods of tower constructions have been checked by another experiment [Ref 2], accomplished with "SDE" material. By using "SDP-1" material, the moment of the appearance of the first plastic joint, the points of the appearance of the joint, their order and the computation of the bearing capacity have been checked by a frame (Figure 6), loaded symmetrically [Ref 2] Based

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on a computation of G.I. Rozenblat [Ref 3], the appearance order of the plastic joint should be, as shown by Figure 6. According to the calculation of the first order, the breaking load is

$$P_r = \frac{8\,M_c}{\ell}, \quad M_c = 103 \text{ kg. cm}, \quad P_r = 82.4 \text{ kg.}$$

According to the calculation of the second order [Ref 6], the breaking load is $P_r = 72.6$ kg. The real breaking load resulting from the experiment was 76 kg. The results obtained from mockups can be used for the construction of normal size if:

$$\eta = \frac{1}{1 + 1.6\left[\frac{N_1}{P} \cdot \frac{y_1}{\ell} + \frac{N_2}{P} \cdot \frac{y_4}{\ell}\right]}$$

is equal for both, the model and the construction. Since this condition is not satisfied, there is no similarity between the mockup and the construction, which has an influence only upon the bearing capacity. The bearing capacity of the prototype is:

$$P_{rp} = \alpha \cdot \lambda^2 \cdot P_{rm} \cdot \frac{\eta_p}{\eta_m},$$

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representing the influence of the axial loads upon the bearing capacity of the frame. The η coefficient is 0.98 - 0.99 for the prototype and 0.85 - 0.95 for the mockup. In case of a metal prototype with $\lambda = 50$, $E = 2,100,000$ and $\sigma_0 = 2,400$, and a mockup of "SDP-1" with $\sigma_c = 550$kg/sq cm, $E_m = 36,000$ kg/sq cm, the following result is being obtained:

$$\frac{\eta_p}{\eta_m} = 1.12.$$

The experiment supplies the appearance points of the plastic joint, their order and the bearing capacity. Another experimental frame [Ref 5] is shown by Figure 8. Two mockups have been made, the one from "SDP-2" and the other from "SDP-3". The results are shown by the table on page 162. A series of experiments have been conducted with photoelasticity. Photoelastic mockups are made from "Dinox F-110", an optical active epoxy resin, produced in Rumania [Ref 6]. The behavior of a girder with rectangular holes made of "SDP-1" and of "Dinox F-110" has been studied simultaneously. The authors have examined: a) the bearing capacity; b) the influence of the concentration of tension in the hole corners upon the bearing capacity; c) the regions of entrance into the

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plastic zone; d) the coincidence of these regions with the maximum stress, resulting from the photoelastic mockup. Mockup Nr 1 (Figure 10) has $\frac{L_o}{H} > 5$, thickness 6.5 mm, square-shaped holes with the side $\frac{H}{3}$, dimension of solid section $\frac{H}{3}$ x 6.5 mm. Mockup Nr 2 (Figure 11) had $\frac{L_o}{H} > 5$, thickness 6.5 mm, rectangular holes with $\frac{H}{2}$ base and $\frac{H}{3}$ height, dimension of solid section $\frac{H}{7}$ x 6.5 mm. The experimentation with mockup Nr 1 has proved that the loss of the bearing capacity of the bar was due to the unitary forces of tension in the lower section, in the region of the two central solid sections. Figure 12 shows the distribution of the tension in the elastic field. Accomplishing the calculations, P = 112 kg, at which the plastification has appeared, thus resulting for the "SDP-1" mockup: σ = 530 kg/sq cm. The calculation of the unitary tension force has been accomplished by considering the value of the material band: $\tau_{0,1}$ = 5.25 kg/sq cm/cm. The thickness of the mockup from "Dinox-110" was 5.5 mm and the power by which the isochromatic table has been established was P = 18.7 kg. The maximum tension has appeared not in the mainly stressed middle section but in the solid section. The experiment with mockup Nr 2 has proved that the loss of the bearing capacity was due to the shearing of the solid section (see Figure 11). Regarding the bearing capacity, the loss has been produced at

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the mockup Nr 1 at P = 125 kg and at mockup Nr 2 at P = 100 kg. Other experiments have been conducted with a curved bar exerted to horizontal symmetric forces (Figure 15) and a frame exerted to a horizontal force. Plastic materials allow a study of a wide range of problems, regarding the kind of loss of the bearing capacity. Chromoplasticity makes the direct detection of plastic deformation zones possible which cause the rupture. The experimental results have been checked by theoretical calculations and photo-elastical experimentations. Chromoplastic experiments are very simple and can be accomplished without special devices, except the load arrangement.

There are: 22 photographs, 2 diagrams, 2 graphs and 6 references, 5 of which are Rumanian and 1 Russian.

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