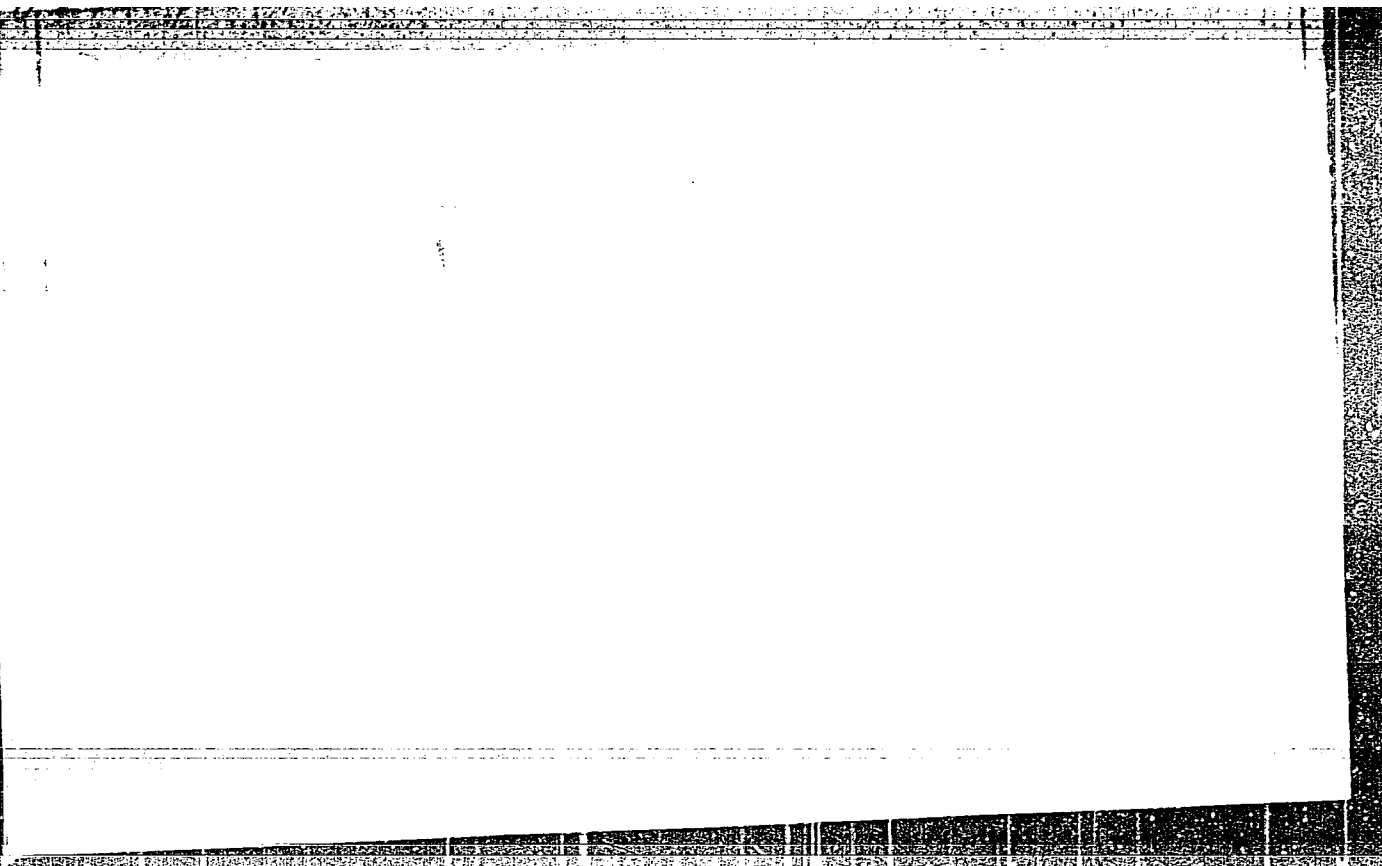


**"APPROVED FOR RELEASE: 08/31/2001      CIA-RDP86-00513R001858320003-1**



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Virginia, R.V.

1235. Methods of termination of rubber cord  
load strength

FD-1731

*UZINA, R. V.*

USSR/Chemistry - Tire cords

Card 1/1 : Pub. 50-7/18

Authors : Uzina, R. V., Ionova, T. V., Vasil'yeva, S. A.

Title : The effect of a high hygroscopicity of viscose cord on the quality of automobile tire casings

Periodical : Khim. prom., No 1, 34-39, Jan-Feb 1955

Abstract : The harmful effects of a high moisture content in viscose cord are described. It is recommended that the Main Administration of Cord Production ["Glavkord"], Ministry of the Consumers' Goods Industry, initiate work on the reduction of the hygroscopicity of viscose cord. Three references; one USSR, since 1940. One figure, 11 graphs. 2 tables.

Institution : Scientific Research Institute of the Tire Industry

UZINA, R.V.; DOSTYAN, M.S.; GUSEVA, V.I.; KALININA, A.A.

Latex-carbon black compounds for impregnation of tire cord. Kauch.  
1 rez. 16 no.12:11-18 D '57. (MIRA 11:3)

1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti.  
(Rubber) (Tire fabrics)

(1=) 1-1, X. V.

6784  
S.A. 150/000/000/001/001  
Acq/001

75-9420  
Translation from: Referativnyi Zhurnal, Moscow, 1998, No. 8, p. 544, 12151

Author: Zaylitseva V.I., Priborov N.G., Kuznetsov V.G., Kuznetsov E.G., Belyavskiy D.B., Priborov S.A., Ustinov A.V.

Title: Vinyl-Pyridine Rubbers and Latexes and Outlook on Their Use

INTRODUCT: Yaroslavl, preprint (Sovetskoye Tekhnichesk. obozr. khim. i tekhn.) 1998, No. 5, pp. 22-25

NOTE: Copolymers of butadiene and 2-acrylyl-5-vinyl pyridine (BVP) were obtained at 90 and 50°C polymerization temperatures and studied. Resistance to wear and heat generation of VPK-vulcanized rubbers exceeds considerably that of vulcanized products from butadiene-styrene rubbers (BR). Rubbers containing 10-15% 2-acrylyl-5-vinyl pyridine have high quality characteristics. Impregnation of cord with VPK latexes ensures high adhesion strength of viscose and cotton with natural, SIS and SBR rubbers. Compared to standard SBR impregnation, VPK impregnation increases the adhesion strength of rubber and cord 1/2

oved by a factor of 1.5-2 under static conditions and much more under dynamic conditions. The samples, polymerized at 90°C exceeds the quality of analogous polymers obtained at 50°C.

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

AUTHORS: Uzina, R.V., Basin, v.Ye., Dostyan, M.S. SOV/138-58-7-4/19

TITLE: The Strength of the Bond Between Tyre Cord - Adhesive and Rubber (K voprosu o prochnosti svyazi sistemy kord - adgeziv - rezina)

PERIODICAL: Kauchuk i rezina, 1958, nr 7, pp 13 - 18 (USSR)

ABSTRACT: The authors consider that theories which regard the adhesion between polymers as being a function of intermolecular and chemical interaction satisfy experimental finding better than other theories. The basic point of failure in the system, tyre cord - adhesive - rubber is usually at the interface between the adhesive and the rubber. In order to increase the strength of bond at this point, it is essential to raise intermolecular action by incorporating substances with active functional groups which will bring about chemical bonds between the adhesive and rubber. The adhesive or material with which the cord is impregnated must have sufficient cohesiveness to withstand dynamic deformations, have high elastic modulus, high peel strength and good thermal resistance.

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SOV/138-58-7-4/19  
The Strength of the Bond Between Tyre Cord - Adhesive and Rubber

The method of "luminescent analysis" (Ref 5) with ultra-violet light was used to study the boundaries at which failure occurs. Figure 1a shows characteristics of adhesive failure at the adhesive-rubber interface and Figure 1b of cohesive failure. Further studies were made of threads of the cord from tyres which had failed under high magnification - Figure 2.

The usual impregnating material for cord is non-polar (natural latex or divinyl-styrol), and does not increase adhesion between cord and rubber. Addition of polar substances to this, non-polar, latex increases adhesion. Figure 3 shows this gain in strength with up to 30% addition by weight of, Curve 1, resorcinal formaldehyde and, Curve 2, casein. Figure 4 shows the improvement with different percentages of (4a) carboxyl groups and (4b) vinylpyridine groups in the latex with different rubbers - the top curve being natural rubber, the middle SKB and the bottom SKS-ZOAL in each case.

The addition of albumens or caseins in latex raises the intermolecular action with cellulose and the addition

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SOV/138-58-7-4/19  
The Strength of the Bond Between Tyre Cord - Adhesive and Rubber

of resorcinal formaldehyde increases chemical interaction - Figure 5a. Curves 1 for the latter and Curves 2 for casein. Figure 5b shows the result of similar additions on the strength of the bond to SKB rubber. Addition of resorcinal-formaldehyde to latexes which already contain functional groups must be made with discretion and can, in some cases, decrease the bond strength through increased intermolecular action within the film of impregnant itself. Figure 6 illustrates this.

The question of introduction of vulcanising agents into the cord impregnating material is considered. Data suggests that sulphur should not be added since it will migrate into the cord from the rubber in any case. Addition of sulphur to impregnants of latex-casein composition worsen the resistance to repeated compression, as shown in Table 1. Addition of an accelerating agent DMASK to latex-casein or latex-resorcinal-formaldehyde impregnants improve this resistance - Table 2.

Further work confirms the importance of good bonding between cord and rubber with field tests - Figure 7.

Other figures show the influence of additions of resorcinal-

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SOV/138-58-7-4/19

The Strength of the Bond Between Tyre Cord - Adhesive and Rubber

formaldehyde on the breaking strength, modulus and proportional elongation of latex films and, similarly, for additions of carboxyl functional groups - Figures 8 and 9, respectively.

Finally, consideration is given to the nature of the adherents in relation to adhesion. A roughened cord surface improves adhesion. Channel black in the rubber composition is good and substances such as benzyl chloride, and benzotrichloride lead to stronger bonds through increased chemical reaction. The effect of small additions of the latter into the rubber composition is shown in Figures 10 and 11, the cord impregnant in this case being divinyl-2-methyl-5-vinylpyridine latex. There are 10 figures and 12 references, 9 of which are Soviet, 2 English and 1 German.

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promyshlennosti (Scientific Research Institute of the Tyre Industry)

Card4/4

1. Tires--Design 2. Tires--Mechanical properties 3. Polymers  
--Adhesion 4. Tires--Test results

UZINA, R.V.; BASIN, V.Ye.; DOSTYAN, M.S.

Problem of bond stability of the system cord-adhesive-rubber.

Kauch. i rez. 17 no. 7:13-18 Jy '58.

(MIRA 11:7)

1. Nauchno-issledovatel'skiy institut shianoy promyshlennosti.

(Rubber)

(Adhesion)

**AUTHORS:** Uzina, R.V. and Basin, V.Ye. SOV/138-58-11-5/14

**TITLE:** Gas Permeability of Rubber-cord Material (Gazopronits-ayemost' rezino-kordnykh sistem)

**PERIODICAL:** Kauchuk i Rezina, 1958, <sup>vol. 19</sup> Nr 11, pp 18 - 21 (USSR)

**ABSTRACT:** Permeability of gas through a polymer film results from absorption into the film, diffusion through the film and desorption on the other side. Initially, the gas is fully absorbed into the film and there is no desorption. The rate of diffusion then gradually increases and finally attains a constant rate. The factors involved are strongly influenced by temperature and are related to the energy of activation of the material. Permeability tests were made using a Varburg apparatus, the diffusion chamber of which is shown in Figure 1. The diameter of the rubber-cord specimen is made the same as that of the perforated plate in the chamber, 103 mm. The rubber-cord specimen is surrounded by a ring of plain rubber which is vulcanised to the test specimen, as in Figure 2 and provides an edge seal of the same thickness as the specimen. In order to measure gas penetration along the cord, other specimens were prepared as in

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Gas Permeability of Rubber-cord Material

SOV/138-58-11-5/14

Figure 3, where a thread of cord material is bonded between two rubber layers and protrudes through them at the ends of the thread.

The permeability of the sample is determined by formula (1) from pressure difference in a manometer connected to the chamber below the sample which has area  $A$  and thickness  $d$ . The specific permeability  $Q = P/d$  for a sample of unit thickness is given in Eq (2), where  $P_1 - P_2$  is the pressure difference by the manometer on

conclusion of a test of duration  $H$  seconds at a temperature of  $T$  abs. Formula (3) gives the quantity of gas  $Q$ , penetrating along a thread or capillary of area  $S$ .

Figures 4 and 5 plot quantity of nitrogen gas diffusing through natural rubber - viscose cord samples with the cord impregnated with various latex impregnating mixes, and also the quantity diffusing through plain film made from the same latex compositions. Quantity is plotted against pressure in Figure 4 and against temperature in Figure 5.

The fact that the impregnated cord samples and the latex film samples have similar curves, suggests that permeability is determined primarily by the rubber covering layers and

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Gas Permeability of Rubber-cord Material

SOV/138-58-11-5/14

the layer of impregnating material. Table 1 shows the influence on permeability of various polar additives to films of latex compositions used for cord impregnation. Table 2 - the influence of various impregnating compositions on the permeability of natural rubber - viscose card specimens. Permeability is sharply reduced by addition of casein or resorcinol formaldehyde to the latex impregnant. Table 3 gives permeability of rubber-cord specimens with natural, natural plus butyl and of chloroprene rubbers in conjunction with cotton, viscose and with nylon cords in both impregnated and unimpregnated conditions. Chloroprene rubber shows very low permeability as compared with natural rubber. The influence of the depth of impregnation into the cord fabric and into individual threads from the cord is shown in Table 4. Diffusion through the cord fabric in a direction perpendicular to the fabric is influenced little by depth of impregnation but permeation along the threads is strongly influenced by this factor. In the event of a puncture or damage to the tyre, causing the ends of the cord threads to

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Gas Permeability of Rubber-cord Material

SOV/138-58-11-5/14

be exposed, permeation along the threads could be considerable if they are not deeply impregnated. Table 5 shows the quantity of gas permeating along the threads of rubber-cord samples made up with cords of cotton, of viscose and of nylon material in both impregnated and unimpregnated condition. There are 5 figures, 5 tables and 13 references, 7 of which are Soviet, 5 English and 1 French.

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promyshlennosti (Research Institute for the Tyre Industry)

Card 4/4

IONOVA, T.V.; UZINA, R.V.; BOGOMOLOVA, N.A.; MOGILEVSKIY, Ye.M.; ROGOVIN, Z.A.

Effect of the chemical composition of reagents on the bond strength  
between viscose cord thread and rubber. Tekst. prom. 18 no.8:35-37  
Ag '58. (MIRA 11:10)  
(Rayon) (Textile chemistry) (Tires, Rubber)

UZIN, Semen Vladimirovich; LIPETS, Yu.G., red.; MALKES, B.N., mladshiy  
red.; NOGINA, N.I., tekhn.red.

[What the map does not show] O chem molchit karta. Moskva,  
Gos.izd-vo geogr.lit-ry, 1959. 94 p. (MIRA 12:8)  
(Names, Geographical)



GZINA, R.U.

AVTORI: M.V. Kuznetsov, V.L. Zubov, L.I. Spentsov, L.I. Zolotarev, A.B. Sokolavskiy, M.S. Bulova, S.A. Mikh, V. G. Zharovskiy, I.L. ...

Preparation of latexes obtained by the copolymerization of butadiene and 2-methyl-5-vinylpyridine, and their use for impregnating various kinds of materials. ...

ABSTRACT: The addition of copolymers of butadiene and 2-methyl-5-vinylpyridine, and also of copolymers consisting of butadiene-styrene, and 2-methyl-5-vinylpyridine, increases the bond strength between the rubber and the cord by 80 to 100% (Ref 5-8). ...

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process was carried out at 50°C (isopropylbenzene hydroperoxide was used as initiator). Copolymerization proceeded at 50°C. Further on, 0.005% methyl-p-aminophenol was added as polymerization inhibitor. ...

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in conjunction with rubbers based on natural, butadiene (SBR) and with butadiene-styrene (SBS-XAN) rubbers. The quantity of 2-methyl-5-vinylpyridine contained in the latex affects the bond strength between the viscose cord and the rubbers (Figure 3). ...

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Table 4 gives the data on the strength of bonding of the viscose cord with various tyre rubbers. The strength of bonding was particularly satisfactory when natural rubber was used and when the latexes were polymerized at 50°C. ...

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15(9)

SOV/63-4-1-6/31

**AUTHOR:** Uzina, R.V., Candidate of Chemical Sciences

**TITLE:** The Stability of the Bond in the Systems Fabric-Rubber and Methods for Its Improvement (Prochnost' svyazi v sistemakh tkan'-rezina i puti yeye povysheniya)

**PERIODICAL:** Khimicheskaya nauka i promyshlennost', 1959, Vol 4, Nr 1, pp 42-49 (USSR)

**ABSTRACT:** The factors determining the stability of the bond between rubber and fabric are the following: the nature of the adhesive, its physical-chemical properties and the nature of the glued surfaces. The type of the emulsifier, the polymerization temperature, the length of the hydrocarbon chain of the polymer, etc. influence the stability of the bond between the impregnated cord and the rubber. A latex polymerized from divinyl and styrene at low temperature in the presence of salts of the paraffin acids, like SKS-30ShKhP, increases this stability. In the USSR carboxyl-containing latexes for the impregnation of tire cords have been synthesized [Ref 2, 3, 8, 11]. They are polymerization products of divinyl, styrene and methacrylic acid, like SKS-30-1, or divinyl and methacrylic acid, like SKD-1. The

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SOV/63-4-1-6/31

The Stability of the Bond in the Systems Fabric-Rubber and Methods for Its Improvement

introduction of protein substances into the latex increases the stability on the interface cord-impregnated layer due to the interaction of the polar amino-groups of the protein and the hydroxyl groups of the cellulose. The addition of resins to the adhesive increases the stability on the interface adhesive-resin. Isocyanates enter into reactions with the hydroxyl groups of cellulose as well as with the double bonds of the rubber. The physical-mechanical properties of the latex films are determined by the use of various emulsifiers and the reduction of the polymerization temperature; by an increase of the polar groups in the latex; by the introduction of an active filler. The smooth surface of synthetic fibers reduces the stability, whereas the hairy cotton fibers increase it. In the system cord-adhesive-rubber the principal destruction takes place on the interface adhesive-rubber. A chemical bond must be established on this interface, therefore, either by using adequate resins, like isocyanate resin, or by introducing various substances into the coating rubber and the impregnating compounds, which form the chemical bond during vulcanization. Caseine and hemoglobin are the principal protein additions

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The Stability of the Bond in the Systems Fabric-Rubber and Methods for Its Improvement

to latexes [Ref 21, 22, 34]. Recently latex-resorcin-formaldehyde dispersions are replacing the latex-protein dispersions [Ref 39]. Latex-carbon black dispersions have been developed recently containing also protein and resorcin-formaldehyde components for the impregnation of viscose and cotton cord. Several polyisocyanates are used for impregnation: triphenylmethane-triisocyanate, hexamethylene-diisocyanate diisocyanate, etc. In the USSR a water-soluble resin "89" has been synthesized, which is the condensation product of metaphenylenediamine and epichlorohydrine. The adhesion of the high polymers is explained as due to molecular-chemical, electrical, and diffusion factors [Ref 44-46]. Most investigators studying the systems cord-adhesive-rubber adhere to the molecular-chemical theory [Ref 2, 5, 6, 7, 48]. There are 6 tables, 8 graphs, and 49 references, 20 of which are Soviet, 22 English, 4 German, 1 American, 1 French and 1 Japanese.

Card 3/3

UZKIY, N.I.

Using new modern construction elements in housing construction. Transp.stroi. 9 no.10:13-15 0 '59.  
(MIRA 13:2)

1. Glavnyy spetsialist Tekhnicheskogo upravleniya.  
(Precast concrete construction)

BOGUSLAVSKIY, D.; KUTSENOK, B.; UZINA, R.; DOSTYAN, M.

Synthesis and use of carboxyl-containing latices for the  
impregnation of tire cords. Report No.1. Kauch. i rez. 18  
no.1:6-13 Ja '59. (MIRA 12:1)

1.Vsesoyuznyy nauchno-issledovatel'skiy institut sinteticheskogo  
kauchuka imeni S.V. Lebedevai Nauchno-issledovatel'skiy institut  
shinnoy promyshlennosti Yaroslavskiy shinnyy zavod.  
(Tire fabrics) (Carboxyl group)

AUTHORS: Ionova, T. V., Uzina, R. V., S/183/60/000/01/010/031  
Mogilevskiy, Ye. M., Rogovin, Z. A., B004/B014  
Segalevich, N. A.


TITLE: The Effect of the Composition of the Avivage on the Strength of  
the Linkage Between Tire Cord and Rubber

PERIODICAL: Khimicheskiye volokna, 1960, Nr 1, pp 30-31 (USSR)

TEXT: This paper is intended to explain the problem as to whether the application of the avivage to tire cord strengthens the adhesion between the latter and the rubber impregnation, or whether the avivage applied to the cord diffuses through the impregnating film and changes the contact between the latter and the rubber. The experiments were performed with a special viscose monofilament and 14V viscose cord. The fibers were treated with the avivages Nevvol and Avirol, and a simultaneous experiment was conducted without an avivage. The specimens were impregnated with latex albumin, and the strength of linkage of the specimens with SKB rubber was determined from the loosening of fibers under static and repeated compression. Table 1 shows that in the case of both specimens (monofilament and cord) the linkage with the rubber is loosened by avivage, especially in the case of Avirol. Next, the authors studied the diffusion of Avirol prepared by sulfonation of butyl oleate with radioactive

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The Effect of the Composition of the Avivage on the Strength of the Linkage Between Tire Cord and Rubber S/183/60/000/01/010/031  
B004/B014

sulfuric acid. The accompanying diagram of the measured radioactivity illustrates that Avirol diffuses through the impregnating film (latex albumin or latex resorcinol formaldehyde). There are 1 figure, 1 table, and 5 references, 3 of which are Soviet. 

ASSOCIATION: VNIIV (Vsesoyuznyy nauchno-issledovatel'skiy institut  
iskusstvennogo volokna - All-Union Scientific Research Institute  
for Synthetic Fibers) NIISHP (Nauchno-issledovatel'skiy institut  
shinnoy promyshlennosti - Scientific Research Institute of the  
Tire Industry)

Card 2/2



S/138/60/000/002/007/009  
A051/A029

AUTHORS: Uzina, R.V., Basin, V.Ye.

TITLE: A Study of the Nature of Destruction in Cord-Adhesive-Rubber  
Systems

PERIODICAL: Kauchuk i Rezina, 1960, No. 2, pp. 28 - 35

TEXT: The authors point out two types of destruction which may occur in the cord-adhesive-rubber system: 1) lamination at the interface between cord-adhesive and adhesive-rubber, 2) destruction of the rubber, the cord and the adhesive film. The present article deals with the first type of destruction only. The work carried out by the authors in this connection was directed at selecting and perfecting a method for determining the location of the destruction and at the study of the interface lines between adhesive-cord and adhesive-rubber, using the usual methods. The types of rubber, impregnation compositions and the cords used are listed in Table 1. The method applied is fully outlined, whereby the luminescence analysis method, described in References 1 - 3, was utilized. Cross-sections of the samples were studied under the microscope in order to determine the depth

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S/138/60/000/002/007/009  
A051/A029

A Study of the Nature of Destruction in Cord-Adhesive-Rubber Systems

of penetration of the rubber into the tissue. A number of microphotographs are submitted. Each interface is discussed individually and supplemented with the microphotographs taken. The adhesive film is also discussed. It was established that no destruction takes place along the cord-adhesive interface in the system cord-adhesive rubber. It was shown that the main forms of lamination which take place in the cord-adhesive-rubber system are: a) the cohesive type: along the adhesive film layer, b) the mixed type: with part of the adhesive migrating onto the rubber and part of the rubber migrating to the cord, c) the adhesive type: along the interface adhesive-rubber. Therefore, the interface between the adhesive and the rubber and also the adhesive film is considered as the weak part of the system. In going over the results of the experiments, the authors state that the derived conclusions are not unexpected, since most of the work carried out for the strengthening of the rubber-cord system in the USSR was directed primarily at this weak spot, i.e., the adhesive-rubber interface. There are 8 sets of microphotographs, 5 tables and 12 Soviet references.

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promyshlennosti  
Card 2/2 (Scientific Research Institute of the Tire Industry)

83294

S/138/59/000/010/006/010

A051/A029

15.9130

AUTHORS: Boguslavskiy, D.B.; Dostyan, M.S.; Uzina, R.V.

TITLE: The Application of Carboxyl-Containing Latexes in the Impregnation of Tire Cord. Communication 2

PERIODICAL: Kauchuk i Rezina, 1959, No. 10, pp. 27 - 32

TEXT: Brief reference is made to the first of two articles, where the results of carboxyl-containing latex synthesis and the application of these latexes to increasing the bond stability of rubber-fabric systems (Ref. 1) was discussed. The importance of selecting the right dosage of resorcin-formaldehyde resin in developing the composition of the impregnating materials was stressed, since the adhesiveness and the physico-mechanical properties of the viscose cord depend on it. Figure 1 shows that with an increase in the dosage of the resin in the latex the bond strength of the rubber and the cord increases. The tensile strength and the impact-resistance decreases with an increase in the non-uniformity of the cord resistance. The optimum dosage which would guarantee sufficient adhesiveness of the cord in carboxyl-containing latexes without noticeable changes in the physico-mechanical properties and in the fatigue stability was found to be 12 weight parts of

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S/138/59/000/010/006/010

A051/A029

The Application of Carboxyl-Containing Latexes in the Impregnation of Tire Cord.  
Communication 2

resorcin-formaldehyde resin to 100 weight parts of rubber. The effects of the pH value, drying temperature and new impregnating compositions of the cord on the bond stability of the rubber-cord and the tire quality were investigated. Impregnating compositions based on carboxyl-containing latexes of the divinyl-styrene and divinyl-type were studied. Rubbers based on CWC-30AM(SKS-30AM), natural rubber and CRB (SKB) were produced. The experimental conditions are outlined. The effect of the pH value of the impregnating material could be regulated by adding potassium hydroxide to increase the pH to over 9, and by adding acetic acid for obtaining a pH value less than 9. Figure 2 shows graphically the effect of the pH of the impregnating composition on the bond stability of the cord and the rubber. When the pH is over 9 the adhesion of the cord to the rubbers made of natural rubber and butadiene-styrene oil-filled rubbers decreases noticeably. Figure 3 shows that the physico-mechanical properties of the adhesive film drop with an increase in the alkalinity of the medium. This is explained by the change in the condensation conditions of the resorcin-formaldehyde resin. This is also assumed to be one of the causes of the decrease in the bond stability indices. Figure 5 shows that at low drying temperature (100 - 110°C) the impregnation of cord with carboxyl-containing la-

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A051/A029

The Application of Carboxyl-Containing Latexes in the Impregnation of Tire Cord.  
Communication 2

texes has little effect. By increasing the temperature to 170°C the bond stability of the cord and the rubber made of natural and synthetic rubber continuously increases and at temperatures of 190 - 200°C it drops abruptly. This is assumed to be due to the peculiarities of the interaction of the resorcin-formaldehyde resin with the high polymers containing carboxyl groups in the molecular chain. Table 2 lists the bond stability indices of the viscose cord with casing rubbers, depending on the type of latex in the impregnating composition. The data proves that by using the new latexes the bond stability of the cord-rubber increases in static as well as repeated deformations. The extent of the stability of the cord-rubber bond, where the cord is impregnated with different latexes, depends on the type of polymer in the casing rubbers, which is explained by the different compatibility of these polymers at the impregnated cord-rubber interface. Stand and operation tests showed that the use of viscose cord in tires, which have been impregnated with carboxyl-containing latexes, increases the bond stability between the tire elements and also increases the tire durability. The bond stability of the cord-rubber, when carboxyl-containing latexes are used as the impregnating material, depends to a great extent on the pH of the impregnating composition and

X

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S/138/59/000/010/006/010  
A051/A029

The Application of Carboxyl-Containing Latexes in the Impregnation of Tire Cord.  
Communication 2

on the drying temperature of the impregnated cord. The use of the above-mentioned latexes instead of butadiene-styrene latex CKC-30III(SKS-30Sh) for the impregnation of the tire cord greatly increases the bond stability between the rubber and the cord and increases the durability of the tire. The advantage of the divinyl-carboxyl-containing latexes CKD-1 (SKD-1) over divinyl-styrene CKC-30-1 (SKS-30-1) is proven. There are 6 graphs, 4 tables and 12 references: 9 Soviet, 3 English. X

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promyshlennosti i Yaroslavskiy shinnyy zavod (Scientific Research Institute of the Tire Industry and Yaroslavl' Tire Plant)

Card 4/4

S/138/59/000/012/003/006

AUTHORS: Peyzner, A. B., Uzina, R. V., Fernor, N. A., Khazanovich, I. G.

TITLE: The Basic Factors Determining the Type of Divinyl-Styrene  
Latex in Tire Cord Impregnation

PERIODICAL: Kauchuk i Rezina, 1959, No. 12, pp. 10-14

TEXT: The effect of the emulsifier, the polymerization depth, the polymerization temperature, the plasticity of the polymer, the ratio of divinyl and styrene in the polymerizing mixture on the strength of the bond of the rubber-cord system in the polymerization of divinyl-styrene latexes was studied. 1) The emulsifier: It was found that by replacing Nekal with soaps of paraffinic acids and hydrated colophony the strength of the bond system is increased significantly. This is explained by an increase in the physico-mechanical properties of the adhesive film and by the intensity of the intermolecular interaction at the adhesive-rubber interface (Ref. 7) (Table 2). In switching over to low-temperature polymerization latexes the stated advantages are retained. 2) The polymerization depth: The bond strength of the impregnated cord decreases in the case of divinyl-styrene latexes of low-temperature polymerization at a conversion depth of 60%.



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S/138/59/000/012/003/006

The Basic Factors Determining the Type of Divinyl-Styrene Latex in Tire Cord Impregnation

3) The polymerization temperature: It was found that the highest bond stability was obtained at a temperature of 20°C (Fig. 3). This is explained by the combination of good elastic properties of the polymer at low-temperature polymerization and a certain branching of the chains observed in a switch-over from 5 to 20°C. At 20°C the polymerization takes place more rapidly, the 60% conversion depth is reached after 9 hours instead of 24 hours (Fig. 4). 4) The polymer plasticity: With an increase in the polymer plasticity the bond stability of the system and the physico-mechanical properties of the adhesive film pass through their optimum value at a plasticity of 0.15-0.25 according to Karrer (1,500-2,800 g hardness according to Defoe) (Fig. 6). This is explained by the fact that the high plasticity of the polymer ensures favorable conditions for molecule diffusion from the adhesive into the rubber lining, but does not ensure the necessary mechanical properties of the adhesive (Refs. 4, 9). A decrease in the plasticity of the polymer raises the mechanical properties of the adhesive and thus limits the mobility of moleculars and lowers their diffusibility which leads to a decrease in the bond strength. A polymer with an average plasticity (0.15-0.25 according to Karrer) ensures the best adhesion. ✓

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S/138/59/000/012/003/006

The Basic Factors Determining the Type of Divinyl-Styrene Latex in Tire Cord Impregnation

5) The styrene ring content: The presence of styrene in the divinyl-styrene latex (over 30 weight parts) does not increase the strength of the adhesive-rubber system. Fig. 7 shows that an increase in the styrene content in the polymerizing hydrocarbon mixture increases the physico-mechanical properties of the film adhesive; the stability of the bond between the impregnated cord and the rubbers reaches its optimum value at 30 weight parts of styrene. At a styrene content of more than 30 weight parts the adhesive hardness increases. This brings about unfavorable conditions for the diffusion of the adhesive polymer rings and for the polymer compatibility. 8) Selection of the divinyl-styrene latex type for the impregnation of the tire cord: As a result of the investigations conducted a specific latex is recommended for this purpose. The CKC-30WKhP (SKS-30ShKhP) divinyl-styrene latex was obtained according to given specifications and was found to surpass the CKC-30W (SKS-30Sh) latex both in the bond strength between the impregnated cord and the rubbers and by the physico-mechanical properties of the adhesive film (Table 3). The authors point out that by using the recommended latex the strength of the bond between the individual parts of the tire, the durability of the tires in stationary tests and the roadability of the

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S/138/59/000/012/003/006

The Basic Factors Determining the Type of the Divinyl-Styrene Latex in Tire Cord Impregnation

tire during performance is improved. There are 3 tables, 8 graphs, 10 references: 7 Soviet and 3 English.

ASSOCIATION: Vsesoyuznyy Nauchno-issledovatel'skiy Institut sinteticheskogo kauchuka im. S.V. Lebedeva i Nauchno-issledovatel'skiy institut shinnoy promyshlennosti (The All-Union Scientific Research Institute of Synthetic Rubber im. Lebedev and Scientific Research Institute of the Tire Industry) ✓

Card 4/4

S/190/60/002/006/001/012  
B015/B064

AUTHORS: Berlin, A. A., Uzina, R. V., Shmurak, I. L.

TITLE: On Some Factors Influencing the Adhesion of Rubber on the Tissue Fiber, Steeped With Latex Albumin Mixtures

PERIODICAL: Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 5 pp. 832-837

TEXT: The adhesive power between rubber and tissue is of special importance in the production of tissue-reinforced rubber products such as car tires, bands, assembly lines etc. To increase the adhesive power, the cotton- or man-made fiber tissue is steeped with albumin containing latex mixtures in the USSR. A method of producing a water-soluble modification of keratin (keratein) from industrial waste products was developed (Ref. 6) in the laboratoriya vysokomolekulyarnykh soyedineniy MTIMMP (Laboratory of Highmolecular Compounds MTIMMP). The waste products are treated with strong reduction-, or oxidizing agents, with the S-S cystine bond of the keratin macromolecules being torn; thus, the water-soluble keratein forms. Investigations carried out by the authors (Ref. 7)

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On Some Factors Influencing the Adhesion  
of Rubber on the Tissue Fiber, Steeped With  
Latex Albumin Mixtures

S/199/60/002/006/001/001  
B015/B064

showed already that keratin is a complete substitute for casein that has hitherto been used for the above-mentioned steep solutions. The present paper mentions some of the results obtained on the behavior of keratin and other latex albumin mixtures used for tissue steeping. The adhesive power of rubber on steeped tissue may be assumed to depend on the content of amino acids with polar side chains in the albumin molecule. In this respect, keratin does not very much differ from casein and albumin (Table 1, values of adhesive power between CKB-(SKB-), CKC-ZOAM (SKS-ZOAM-), and HK-(natural-) rubber and tissue steeped with casein, keratin and albumin containing mixtures respectively). Since albumins represent polymeric electrolytes, their properties are influenced by the pH. Experiments showed that an increase of the pH of the steeping mixtures reduces the adhesive power of rubber on steeped tissue. The increase in the ionization of the albumin molecules taking place in alkaline solutions was assumed to bring about a directioning of the molecule chain and formation of a net structure. These assumptions were confirmed by determining the value  $b/a$  (Table 2) ( $b$  = longer axis of the extended molecules,  $a$  = short axis), as well as by measurements of the flow time (in dependence

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On Some Factors Influencing the Adhesion  
of Rubber on the Tissue Fiber, Steeped With  
Latex Albumin Mixtures

S/190/60/002/006/001/012  
B015/B064

on pressure) on casein- and keratin solutions through a capillary. The  
"longer" the albumin molecule is the longer will the flow time be. The  
poor adhesive power of rubber on tissue steeped with solutions of a higher  
pH is due to a deterioration of the mobility of the "extended" albumin  
molecule. There are 4 figures, 2 tables, and 15 references: 9 Soviet,  
4 US, 1 German, and 1 Austrian.

ASSOCIATION: Moskovskiy tekhnologicheskii institut myasnoy i molochnoy  
promyshlennosti (Moscow Technological Institute of the Meat  
and Milk Industry). Nauchno-issledovatel'skiy institut  
shinnoy promyshlennosti (Scientific Research Institute of  
the Tire Industry)

SUBMITTED: January 23, 1960

Card 3/3

S/138/60/000/009/004/012  
A051/A029

15.9360 2109, 1526, 1451

AUTHORS: Dostyan, M.S.; Sandomirskiy, D.M.; Uzina, R.V.

TITLE: An Investigation Into the Effect of the Adhesive Properties on the Bond Stability in the Cord-Adhesive-Rubber System

PERIODICAL: Kauchuk i Rezina, 1960, <sup>vol 19</sup> No. 9, pp. 20 - 26.

TEXT: The authors conducted a study on model systems of adhesive-cord (cellulose) and adhesive-rubber in order to determine the role played by each factor in fabric processing, i.e., by the properties of the adhesive film itself, or by the interaction of the adhesive with the fabric or with the rubber lining. The cellulose film used in the study was produced from regenerated viscose on a textile lining (percal), according to a method developed by VNIIV. The width of the film was 0.2 mm and the adhesive layer was applied to the film by impregnation and subsequent drying at 125 - 135°C. Butadiene-styrene-based latexes, such as CKC - 30Ш (SKS-30Sh) and CKC-30-1 (SKS-30-1) with different content of methacrylic acid, were used as the objects of investigation. As components of the impregnation compositions the following substances with polar functional groups were used: proteins (casein, albumin, gelatin), resorcin- and phenol-formaldehyde resins, sulfur, water-soluble accelerators and active fillers in the form of dispersions

Card 1/4

S/138/60/000/009/004/012  
A051/A029

An Investigation Into the Effect of the Adhesive Properties on the Bond Stability  
in the Cord-Adhesive-Rubber System

of channel gaseous carbon black. These were investigated as to their role and nature of interaction with the combining surfaces, i.e., the cord and rubber. The following conclusions were drawn: compounds with polar functional groups increase the stability of the bond between the adhesive and the surfaces in the model systems and the physico-mechanical properties of the adhesive layers. Active fillers of the channel carbon black type, accelerators and also latexes containing carboxylic groups in the molecular chain of the polymer increase primarily only the physico-mechanical properties of the adhesive layers. The weak spot in the system is the boundary-line adhesive-rubber and the adhesive layer (Refs. 4,8). The bond is not broken at the boundary adhesive-cord. Thus, the attention in improving the properties of the impregnation compositions should be directed at: 1) increasing the bond stability at the adhesive-rubber interface, 2) increasing the physico-mechanical properties of the adhesive layer. The bond stability at the adhesive-rubber interface is determined by both the properties of the adhesive and the rubber. Experimental data show that the main effect on the bond stability increase at the adhesive-rubber interface is obtained from the presence of substances with polar functional groups in the adhesive, and the occurrence of intramolecu-

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S/138/60/000/009/004/012  
A051/A029

An Investigation Into the Effect of the Adhesive Properties on the Bond Stability  
in the Cord-Adhesive-Rubber System

lar interaction forces between the functional groups of the adhesive and the rubbers of the van der Waal's or hydrogen type brought on by these forces. These forces can occur only in sufficiently close position of the adhesive and rubber substances to each other. Therefore the diffusion processes and compatibility of the polymers probably affect the bond stability (Ref. 9). A study of the adhesive film properties depending on the composition showed that a high modulus at low deformations (up to 100%) is characteristic of the impregnation films. Thus, the films of the effective impregnation materials have a modulus of no less than 20 - 30 kg/cm<sup>2</sup> at an elongation of 50% (the model of casing rubber in similar deformations is not above 10 - 12 kg/cm<sup>2</sup>). With an increase in the film modulus the bond stability of the system increases (Ref. 3). Based on conducted experiments it is assumed that the high-modulus adhesive layer plays the part of the linking bridge between the cord and the low-modulus rubber and accepts part of the tensions occurring in the system, which works under conditions of repeated deformations. Properties of the films such as tear-resistance, temperature-resistance and thermal resistance have a great effect on the increase in the system's resistance. Thus, the strengthening of the adhesive film is one way of improving the properties of

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S/138/60/000/009/004/012  
A051/A029

An Investigation Into the Effect of the Adhesive Properties on the Bond Stability  
in the Cord-Adhesive-Rubber System

the impregnation materials. Based on modelling the cord-adhesive-rubber system, it was shown that the components introduced into the impregnation compositions must comply with the following conditions: 1) ensure a high bond stability mainly at the adhesive-rubber interface. Substances containing polar functional groups may act as these components. 2) Ensure a complex of physico-mechanical properties of the adhesive films, such as a high modulus (no lower than 20-30 kg/cm<sup>2</sup>) in the region of deformation of 50 -100%, a high tear-resistance, thermal stability and temperature stability. The application of active fillers, latexes with functional groups in the polymer chain, and in some cases, vulcanization accelerators, help to increase the adhesive film properties to the greatest extent. A rational selection of the impregnation composition, which would ensure an increase in the bond stability in the system cord-adhesive-rubber, can be accomplished by the simultaneous introduction of substances with polar functional groups and active fillers into the latex. There are 7 figures, 2 tables, 9 references: 8 Soviet, 1 English.

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promyshlennosti (Scientific-Research Institute of the Tire Industry).  
Card 4/4

S/138/62/000/004/002/008  
A051/A126

AUTHORS: Ionova, T.V.; Suleymanova, Z.I.; Uzina, R.V.

TITLE: The effect of double saturation of viscose cord on its properties and adhesive strength to rubber

PERIODICAL: Kauchuk i rezina, no. 4, 1962, 3 - 7

TEXT: The significance of the preliminary saturation of viscose cord with hot water is discussed (Ref. 1). Experimental data are obtained for single saturation under tension, showing that tearing elongations and adhesive strength of the viscose cord to rubber are reduced. A further study is made of double saturation under tension to determine its effect on the properties of the cord. The 11B (11 V) and Super-cord were used in the experiments. Latex-resorcin-formaldehyde-carbon black saturation compositions with an 11.5% concentration were used as the main saturation bath, based on three types of latexes: CKC-30 (SKS-30), ШХП (ShKhP), CKД-1 (SKD-1), and ДМВН-10А (DMVP-10A). Lining rubbers based on NR and CKC-30 AM (SKS-30AM) were used to study the cord-rubber strength of adhesion. The cord was processed on the JY-1 (JU-1) laboratory saturation-tension machine [designed and constructed - СКБ КОО (SKB KOO) at the Ivanov  
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S/138/62/000/004/002/008  
A051/A126

The effect of double.....

Plant for Textile Machinery], (Fig. 1). Experimental data revealed that the physico-mechanical properties of the 11V viscose cord, preliminarily processed with water, are higher as compared to those without this preliminary process. In the case of the super cord, similar results were obtained for both. Further data showed that the application of 11.5% concentrated latex compositions did not increase the adhesive strength in the cord-rubber system. Diluted latex compositions do increase the strength of adhesion. Optimum strength of adhesion indices are obtained for concentrations of about 3%. The use of aqueous 1 - 2% solutions of diamines for preliminary saturation of the viscose cord with the SKS-30SnKnP latex in the main saturation leads to a considerable increase of the cord-rubber adhesive strength and of the physico-mechanical properties. A composition of lower concentration is recommended for the preliminary saturation to decrease the composition viscosity and enable the substance to penetrate the thread depth. Testing of the preliminary saturation method with diluted latex compositions at the Dnepropetrovsk Tire Plant confirmed the following conclusions: the use of diluted latex compositions in preliminary saturation increases the cord-rubber adhesive strength; the use of water reduces the latter. The use of aqueous diamine solutions has a favorable effect on the adhesive strength. Preliminary saturation,

Card 2/4

3/138/62/000/004/002/008  
A051/A126

The effect of double.....

both with water as well as with diluted latex compositions improves the physico-mechanical properties of the cord. There are 4 tables and 5 figures. The reference to the most recent English-language publication reads as follows: 2. M.W. Wilson, Tappi, 43, No.2, 129 (1960).

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promyshlennosti  
(Scientific Research Institute of the Tire Industry)

Fig. 1: Motion diagram of the cord thread on a laboratory saturation-tension machine IU-1:

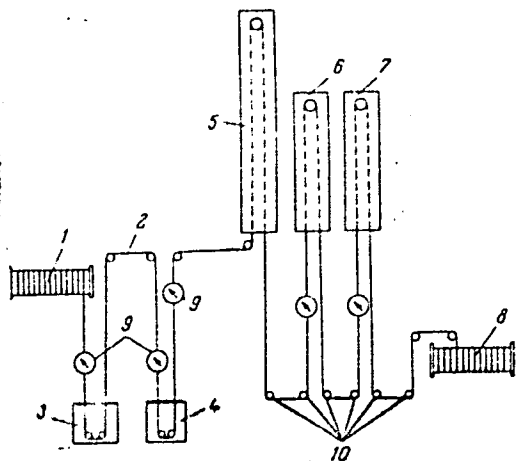
1- unravelling spool, 2- thread, 3- preliminary saturation vat, 4-main saturation vat, 5-drying chamber, 6- tension chamber, 7- fixation chamber, 8- reeling spool, 9- tension measuring devices, 10- directing rollers

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A051/A126

The effect of double.....

Fig. 1:



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lit. 89  
S/138/62/000/012/005/010  
A051/A126

15 9/30  
AUTHORS:

Boguslavskiy, D. B., Shmurak, I. L., Borodushkina, Kh. N.,  
Berlin, A. A., Uzina, R. V.

TITLE:

The effect of active-polymer additions to case mixes on the  
strength of adhesion in rubber-cord systems

PERIODICAL: Kauchuk i rezina, no. 12, 1962, 15 - 18

TEXT:

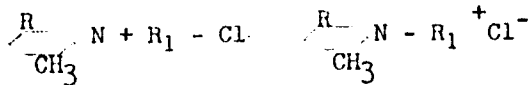
The effect was studied of carboxyl-containing and methylvinylpyri-  
dine rubber, and of chlorosulfopolyethylene polymer additions to case mixes  
based on 100% butadiene-styrene oil-filled rubber on the adhesive strength of  
systems with viscous cord saturated with various synthetic latexes. The intro-  
duction of carboxyl-containing rubber into БСК (BSK) case mixes increases the  
adhesive strength continuously in the systems with viscous cord saturated with  
CKC -30-1 (SKS-30-1) and CKД-1 (SKD-1) latex compositions. Maximum adhesive  
strength is obtained for rubbers, where the BSK is completely replaced by the  
SKS-30-1 rubber. Additions of carboxyl-containing SKS-30-1 rubber affect the  
adhesive strength of the rubber-cord even more in the case of cord saturated with

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S/138/62/000/012/005/010  
A051/A126

The effect of active-polymer additions to...

methylvinylpyridine compositions. Obtained data showed that methylvinylpyridine latexes of high-temperature polymerization do not offer satisfactory adhesive strength of the cord to rubber, based on butadiene-styrene oil-filled rubber. The effectiveness of the additions increases with an increase in the carboxyl-group content in the adhesive, and pyridine-group content in the case rubber. Experimental results have led to the conclusion that a further increase of the adhesive strength of rubber to cord can be accomplished by introducing reactive groups into the adhesive and case mix which, in turn, increase the inter-molecular and chemical interaction at the contact region. Formation of a connection, at the contact region, such as:



in the case of combinations of pyridine adhesives and rubber containing additions of chlorosulfopolyethylene or other chloro-containing polymers, is assumed possible. Thus, it is further concluded that the use of an adhesive containing functional groups in combination with active additions in the case mixes leads

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The effect of active-polymer additions to...

S/138/62/000/012/005/010  
A051/A126

to new possibilities for increasing the adhesive strength in rubber-cord systems.  
There are 4 figures and 3 tables.

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promyshlennosti i  
Yaroslavskiy shinny zavod (Scientific Research Institute of the  
Tire Industry and Yaroslavl' Tire Plant) ✓

Card 3/3



BOGUSLAVSKIY, D.B.; UZINA, R.V.; BORODUSHKINA, Kh.N.; SUCHKOVA, M.G.

Effect of the compounding ingredients of carcass rubbers on the adhesive strength of rubber-cord systems. Kauch.i rez. 21 no.1: 29-33 Ja '62. (MIRA 15:1)

1. Yaroslavskiy shinnyy zavod i Nauchno-issledovatel'skiy institut shinnoy promyshlennosti. (Tire fabrics) (Adhesives)

UZINA, R.V.; SHMURAK, I.L.; DOSTYAN, M.S.; KALININA, A.A.

Effect of the compounding formula of the resorcinol-formaldehyde resin used in compositions for cord impregnation and the conditions of its condensation on the adhesive strength of rubber-cord systems. (MIRA 14:6)  
Kauch.i rez. 20 no.7:24-28 J1 '61.

1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti.  
(Tire fabrics—Testing) (Phenol condensation products)

BASIN, V.Ye.; BERLIN, A.A.; UZINA, R.V.

Effect of the compatibility of adhesive polymers with casing rubber on the adhesive strength of rubber-cord systems. Kauch.i rez. 21 no.9:12-17 S '62. (MIRA 15:11)

1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti.  
(Adhesion) (Polymers) (Tire fabrics)

BOGUSLAVSKIY, D.B.; SHMURAK, I.I.; BORODUSHKINA, Kh.N.; BERLIN, A.A.;  
UZINA, R.V.

Effect of active polymer additives to the carcass mixtures on  
the strength of the bond in rubber-cord systems. Kauch. i rez.  
21 no.12:15-18 D '62. (MIRA 16:2)

1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti i  
Yaroslavskiy shinnyy zavod.  
(Tire fabrics--Testing)

SULEYMANOVA, Z.I.; IONOVA, T.V.; UZINA, R.V.

Dependence of the properties of viscose cord on the location  
and intensity of force applied in impregnating and drying.  
Khim.volok. no.1:42-47 '63. (MIRA 16:2)

1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti.  
(Tire fabrics)

E/190/63/005/003/007/024  
B101/B106

AUTHORS: Korshak, V. V., Mozgova, K. K., Shkolina, M. A., Uzina, R. V.,  
Ionova, T. V.

TITLE: Synthesis of graft polymers. XIII

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 3, 1963, 338-341

TEXT: In order to achieve better adhesion between rubber and cord, grafts were made of fiber polymers on viscose or caprone fibers. For this purpose the fiber was either treated with ozone for 10 to 300 min or was heated to 90 - 110°C for 1 - 5 min. Subsequently they were treated with carboxyl containing divinyl latex, divinyl methylvinylpyridine latex, divinyl acrylonitrile latex or with styrene, methylmethacrylate, acrylic or methacrylic acids, 2-methyl-5-vinyl-pyridine or mixtures of these monomers. With acrylonitrile, acrylic or methacrylic acids the homopolymers developed so rapidly that no grafted polymers were obtained. Grafting was achieved by changing the temperature conditions or by using mixtures. Thus an addition of styrene had a strongly inhibiting effect on the formation of acrylonitrile homopolymers. As an example, the increase in strength of the bond between natural rubber and polyamide fiber is mentioned which is due to  
Card 1/2

Synthesis of graft polymers. XIII

S/190/63/005/003/007/024  
B101/B186

grafting of methylvinylpyridine copolymer onto the fiber. The bond strength of the non-grafted fiber was 0.7 kg/cm. After a 40-hr grafting of the fiber with 2-methyl-5-vinylpyridine it increased to 0.87, after 5 hr grafting with the same compound it increased to 0.94, and after impregnation of the fiber with divinyl-2-methyl-5-vinyl pyridine-latex to 1.5 kg/cm. The unfavorable effect of excessively long grafting is explained by the formation of an excessively branched surface layer, thus covering the major part of the nitrogen atoms of the pyridine rings so that they cannot interact with the rubber-fiber interface. There are 4 tables.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute of Elemental Organic Compounds AS USSR)

SUBMITTED: August 5, 1961

Card 2/2

SHMURAK, I.L.; UZINA, R.V.; BERLIN, A.A.

Some characteristics connected to the use of vinylpyridine  
latexes for the impregnation of tire cord. Kauch. i rez. 22  
no.6:27-29 Je '63. (MIRA 16:7)

1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti.  
(Resins, Synthetic) (Tire fabrics)



VYSHESLAVOVA, V.A.; IONOVA, T.V.; SULEYMANOVA, Z.I.; MARKOVA, L.A.; OSOKIN,  
L.L.; ROMANENKO, A.K.; GUSLISTAYA, Ye.G.; DASHEVSKIY, I.Ye.;  
BOGUSLAVSKIY, D.B.; UZINA, R.V.

Specific features in the technological process of viscose cord  
production at the Dnepropetrovsk tire factory. Kauch.i rez. 24  
no.1:1-4 Ja '65. (MIRA 18:3)

1. Dnepropetrovskiy shinnyy zavod i Nauchno-issledovatel'skiy  
institut shinnoy promyshlennosti.

L 2556-66 EWT(m)/EFF(c)/EWP(v)/EWP(j)/T WW/RM

ACCESSION NR: AP5024106

71 UR/0138/65/000/009/0023/0026  
35  
B 678.7:539.612

AUTHOR: Shmurak, I. L.<sup>44.55</sup>; Uzina, R. V.<sup>44.55</sup>; Berlin, A. A.<sup>44.55</sup>

15.44.55

TITLE: Certain factors determining the chemical bond formation on the adhesive-substrate boundary

SOURCE: Kauchuk i rezina, no. 9, 1965, 23-26

TOPIC TAGS: adhesion, adhesive, substrate, interpolymerization

ABSTRACT: Examination of factors determining chemical bond formation on the adhesive-substrate boundary with a view toward increasing the adhesion strength of polymer systems resulted in the following conclusion: A high adhesion strength can be attained as a result of interpolymerization via the functional groups of the adhesive and substrate. "Onium" interpolymerization, which proceeds with a low activation energy and forms no by-products, is of particular interest. This conclusion was confirmed experimentally for cord-adhesive-rubber systems in which, e.g., the adhesive contained butadiene-acrylonitrile copolymers with varying component ratios and the rubber contained chlorosulfonated polyethylene. The close contact between the adhesive and substrate macromolecules, required for interpolymerization, can be achieved by making adhesive macromolecular chains sufficiently flexible. This, in  
Card 1/2

L 2556-66

ACCESSION NR: AP5024106

turn, can be done by reducing the polar group content in the adhesive copolymer. [BO]  
Orig. art. has: 1 figure and 1 table.

ASSOCIATION: Nauchno-issledovatel'skiy Institut shinnoy promyshlennosti (Scientific  
Research Institute of the Tire Industry); Institut khimicheskoy fiziki AN SSSR  
(Institute of Chemical Physics, AN SSSR)

SUBMITTED: 00

ENCL: 00

SUB CODE: ocgc

NO REF SOV: 014

OTHER: 000

ATD PRESS: 4108

Card 2/2

SHMURAK, I.L.; UZINA, R.V.; BERLIN, A.A.

Some factors determining the formation of chemical bonds on the  
boundary of adhesive - substrate separation. Kauch. i rez. 24  
no.9:23-26 '65. (MIRA 18:10)

1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti i  
Institut khimicheskoy fiziki AN SSSR.

IONOVA, T.V.; UZINA, R.V.; STONOVA, Ye.D.

Method for the processing of polyester cord. Kauch. i rez. 24  
no.10:30-32 '65. (MIRA 18:10)

1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti.

L 15322-66 EWT(m)/EWP(v)/EWP(j)/T WW/RM

ACC NR: AP6000970

(A)

SOURCE CODE: UR/0286/65/000/022/0056/0056

AUTHORS: Badenkov, P. F.; Uzina, R. V.; Basin, V. Ye.

ORG: none

TITLE: An adhesive for securing textile materials to rubber. Class 39, No. 176387 /announced by Scientific Research Institute of the Tire Industry (Nauchno-Issledovatel'skiy institut shinnoy promyshlennosti)

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 22, 1965, 56

TOPIC TAGS: adhesive, adhesive bonding, adhesion, resorcinol, formaldehyde, resin, polymer, copolymerization, vinyl

ABSTRACT: This Author Certificate describes a method for obtaining an adhesive for securing textile materials to rubber, on the basis of foam rubber and thermoactive resorcinol-formaldehyde resin. To improve the technological properties of the adhesive, the foam rubber is manufactured from liquid copolymerization products derived from copolymerization of divinyl with methacrolein, divinyl with acrylonitrile, and methacrolein and divinyl with styrene and methacrolein. The components are mixed in the proportions of 5 to 20 wt parts of foam rubber.

SUB CODE: 11/ SUBM DATE: 26Mar63

Card 1/1

UDC: 678.029.42:678.762.2-134.622

FLEROV, V.N.; UZINGER, L.V.; PAVLOVA, L.I.

Effect of a copper additive on the electrical characteristics  
of reversible iron powder electrodes. Zhur. prikl. khim. 37  
no.2:373-379 F '64. (MIRA 17:9)

1. Gor'kovskiy politekhnicheskoy institut imeni Zhdanova.

FLEROV, V.N.; PAVLOVA, L.I.; UZINGER, L.V.

Characteristics of the secondary electrode process in the  
powder-type reversible iron electrodes. Zhur. prikl. khim.  
38 no.3:569-574 Mr '65. (MIRA 18:11)

1. Gor'kovskiy politekhnicheskii institut imeni Zhdanova.  
Submitted February 21, 1963.



137-58-6-12155

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 140 (USSR)

AUTHORS: Benyakovskiy, M.A., Shadrin, V.A., Kulikov, V.I.,  
Uzivenko, A.M., Kustobayev, G.G., Kochnev, M.F.,  
Kutuyev, Ya.S.

TITLE: The Interrelation of the Pressure, the Pull, and the Thickness  
of a Strip Subjected to Cold Rolling (Vzaimosvyaz' davleniya,  
natyazheniya i tolshchiny lenty pri kholodnoy prokatke)

PERIODICAL Byul. nauchno-tekhn. inform. Ural'skiy n.-i. in-t chernykh  
metallov, 1957, Nr 3, pp 114-123

ABSTRACT A three-stand rolling mill of the MMK was employed during  
research concerned with the effect of rolling (R) rate on the  
thickness of a strip (S), the establishment of interrelation of  
pressure and pull during cold R, and determination of the sig-  
nificance of longitudinal and transverse thickness variations in  
the S. A mathematical relationship is established between the  
basic parameters of the technological process of cold R of a S.  
It is established that variations in the tension of the strip mid-  
way between the stands of a mill have a decisive effect on the  
formation and magnitude of thickness variations in the S.

Card 1/2

137-58-6-12155

The Interrelation of the Pressure, the Pull, and the Thickness of a Strip (cont.)

Fluctuations of R rate at the MMK have practically no effect on the thickness of the S. Variations in the pull produce thickness variations in the S equivalent to 0.01-0.02 mm on the average.

S.N.

1. Steel--Processing    2. Steel--Pressure Distribution    3. Rolling mills--Applications

Card 2/2

Uziyenko, A.M.

PA - 2379

AUTHOR:  
TITLE:

KOZHEVNIKOV, V.P., UZIYENKO, A.M., KUSTOBAYEV, G.G.  
Rise in Productivity of the No 2 Blooming Mill. (Uveliche-  
niye proizvoditel'nosti bluminge no 2, Russian).  
Stal', 1957, Vol 17, Nr 1, pp 47 - 52 (U.S.S.R.).  
Received: 5 / 1957

PERIODICAL:

Reviewed: 5 / 1957

ABSTRACT:

A research-party occupied itself with the study of the work of individual rolling mill train and aggregates, and visualized various measures in order to increase the productivity of the blooming mills. Here no 2 blooming mill is concerned. Reconstruction after 1946 and the therewith connected rise in productivity up to 1955 are described. In 1946, before reconstruction blocks of 6 - 6,6 t on ingots of 210 x 210 and 230 x 230 were bloomed. 9 groups of regeneration soaking pits existed, there followed shears for max 650 t and the billet rolling trains 630 and 450, each consisting of 6 roll stands. Investigations were carried out by the uninterrupted photographing of the rolling process, registering of operations by means of a chronometer, and by determination of the productivity of the aggregates. It proved to be necessary to reduce the total rolling time, to increase the weight of the blocks to be rolled, to increase the permeability of the soaking pits, and to improve the quality of heating, to increase the rolling velocity on the billet rolling trains 450, and to increase the permeability of

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PA - 2379

Rise in Productivity of the No 2 Blooming Mill.

the cooling beds. After having carried out all these measures the rolling-velocity on the train 450 rises by 28 % and billets 97 x 97 mm were produced which are much more rational. 1955 two roll trains were put into operation. The one led from the blooming mill to the billet rolling train 630, and then to 450. On the second the material moves to 630 by means of a tractor, on the roll tables to the bench shears No 2, without moving the train 450, where they are cut up as billets for the sectional iron trains. The rise in productivity amounted to 86,5 % in 1955 as compared with 1946. (3 tables, 4 illustrations)

ASSOCIATION: Metallurgic Combine of Magnitogorsk.

PRESENTED BY:

SUBMITTED:

AVAILABLE: Library of Congress.

Card 2/2

SOV/133-58-10-11/31

AUTHORS: Jziyenko, A.M., Trakneva, I.A., Varshavskiy, A.P.,  
Engineers and Rabinovich, Ye.I., Candidate of Technical  
 Sciences, Zayakin, B.I., Zarzhitskaya, N.G., Engineers

TITLE: Improvement in the Structure of the Top Part of Rimmed Steel Ingots  
 (Uluchsheniye struktury golovnoy chasti slitka kipyashchey  
 stali)

PERIODICAL: Stal', 1958, <sup>Nr. 14</sup> Nr 10, pp 899 - 905 (USSR)

ABSTRACT: A study of the mechanism of formation of the microstructure of the head part of rimming steel ingots and an investigation of methods of decreasing the height of the concentrated segregation zone are described. The influence of the following factors on the structure of ingots was studied: a) the duration of boiling of the metal in ingot moulds; b) addition to moulds of fluxes, and c) additions onto the top of the metal in the moulds of various deoxidants. Investigations were carried out on heats of steels O8kp, St1, St2 and St3, chemical compositions of which are given in the table. The influence of the duration of boiling of the metal in moulds on the distribution of carbon (A), sulphur (B) and phosphorus (V) along the ingot axis is shown in Figure 2 - that on the indices of mechanical properties (yield point, tensile

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SOV/133-58-10-11/31

Improvement in the Structure of the Top Part of Rolled Steel Ingots

strength and relative elongation) of metal from the head part of the ingots of St3kp steel in Figure 3 and the influence of the duration of boiling with and without the use of deoxidants on the distribution of carbon, sulphur and phosphorus in the axial zone along the height of ingots of St3 steel shown in Figure 4, changes of mechanical properties of metal from the axial zone along the height of ingots and of rolled plate (with various boiling times and with the application of deoxidants) are shown in Figures 5 and 6, respectively. Variation in the distribution of non-metallic inclusions ( $\text{SiO}_2$ , MnO and MnS) in the axial zone along the height of ingots of St3kp steel, with various boiling times and with the application of deoxidants are shown in Figure 7. It was found that in order to obtain dense structure of the top part of ingots of steels with low and higher carbon contents, different methods are necessary. An increase of the duration of boiling in ingot moulds and an addition of fluxes on the surface of metal decrease the depth of the position of axial porosity but improve the distribution of segregating elements and plastic properties of the

Card2/4

SOV/133-58-10-11/31

Improvement in the Structure of the Top Part of Rimmed Steel Ingots

axial zone of the head part of the ingots of low-carbon steels 08kp, St1 and St 2. On prolonged boiling of St3 steel, the structure of the head part of ingots improves but simultaneously its external state deteriorates. The use of deoxidants, e.g. 45% ferrosilicon (0.15 - 0.2 kg/t steel) gives in this case satisfactory results. Ingots deoxidised with ferrosilicon possess dense structure and increased plasticity in the head part. During rolling sheets, no laminations are formed. The use of a prolonged boiling and additions of microgranite for low-carbon rimming steel and killing of St3 steel with ferrosilicon permits decreasing standard crop head of ingots by 3-5% without decreasing the quality of the metal in the top part of ingots. There are 7 figures, 1 table and 3 Soviet references.

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SOV/133-58-10-11/31

Improvement in the Structure of the Top Part of Rimmed Steel Ingots

It is stated in the editorial note that the above findings should be additionally confirmed by experiments on a large scale.

ASSOCIATION: Magnitogorskiy metallurgicheskiy kombinat  
(Magnitogorsk Metallurgical Combine)

Card 4/4



ZAYAKIN, B.I.; BIGEYEV, A.M.; UZIYENKO, A.M.; Primalni uchastiye:  
TKACHENKO, I.A., inzh.; RABINOVICH, Ye.I., kand.tekhn.nauk;  
IVANOVA, N.G., inzh.; BIGTAGIROV, K.K., inzh.

Sulfur liquation in large rimmed steel ingots. Izv. vys. ucheb.  
zav.; chern. met. 5 no.7:62470 '62. (MIRA 15:8)

1. Magnitogorskiy metallurgicheskiy kombinat i Magnitogorskiy  
gornometallurgicheskiy institut.  
(Steel ingots--Sulfur content)

VORONOV, F.D., prof.; SELIVANOV, N.M., kand.tekhn.nauk; RABINOVICH, Ye.I.,  
kand.tekhn.nauk; UZUYENKO, A.M., inzh.; TKACHENKO, I.A., inzh.;  
KUSTOBAYEV, G.G., inzh.; IVANOVA, N.G., inzh.; RYABCHIKOV, F.D., inzh.;  
GRUZNOV, A.K., inzh.

Developing a technology for the casting and quality investigation  
of 21-ton rimmed steel ingots. Stal' 22 no.8:709-713 Ag '62.  
(MIRA 15:7)

(Steel ingots)

ANTONOV, S.P., inzh.; BOYARSHINOV, M.I., prof.; UZIYENKO, A.M., inzh.;  
KUSTOBAYEV, G.G., inzh.; RABINOVICH, Ye.I., kand.tekhn.nauk;  
RYABCHIKOV, F.D., inzh.

Improving the quality of rolled metal surfaces made of large  
ingots. Stal' 22 no.8:728-732 Ag '62. (MIRA 15:7)

1. Magnitogorskiy metallurgicheskiy kombinat i Magnitogorskiy  
gornometallurgicheskiy institut.

(Steel ingots)  
(Rolling (Metalwork)—Quality control)

SOKOLOV, V.A., inzh.; UZIYENKO, A.M., inzh.

Increasing the durability of back-up rolls on four-high mills.  
Stal' 22 no.8:737-739 Ag '62. (MIRA 15:7)

1. Magnitogorskiy metallurgicheskiy kombinat.  
(Rolls (Iron mills))

UZIYENKO, A.M.; KUSTOBAYEV, G.G.; DUKHIN, I.S.; SMIRNOV, B.I.; GRISHKO, A.G.;  
GONCHAROVA, R.Ya.

Research at the Magnitogorsk Metallurgical Combine. Stal' 22  
no.8:742-743 Ag '62. (MIRA 15:7)  
(Roller; mills—Equipment and supplies)

TKACHENKO, I.A.; FILATOV, A.D.; UZIYENKO, A.M.; GRUZNOV, A.K.; DEYNEKO, D.I.;  
ARYCHENKOV, V.P.; ZAYAKIN, B.I.

Quick pouring and the quality of rimmed steel. Metallurg 10 no.8:  
17-19 Ag '64. (MIRA 17:11)

1. Magnitogorskiy metallurgicheskiy kombinat.

REF ID: A65013007  
 ACCESSION NR: AR5013007  
 621.771.001

SOURCE: Ref zh. Metallurgiya, Abs. 4D50

Avramov, S. P.; Pozdnyev, A. A.;  
 Ziyenko, I. M.  
 B. D.

TITLE: Conditions for rolling large ingots on a slab mill

CITED SOURCE: Tr. Ural'skogo n.-i. in-ta Chern. met., v. 3, 1954, 167-171

TOPIC TAGS: metal rolling, slab mill, rolling mill

The 1150 slab mill for rolling heavy UNS-21T ingots was studied.

Further information...

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L 57523-65

ACCESSION NR: AR5013007

parts. It was found that motors with vertical rolls with a power of 4000-4500 kw  
may be installed. A motor with this power will make rolling without aids passes possible  
with intense compression of the rolls. The rolls will be made of steel and will  
increase the productivity of the rolled product. The investigations have not exhausted  
the possibilities of the rolls.

ENCLOSURE

Card



L 44005-66 EWT(m)/EWP(t)/T/ETI/EWP(k) IJP(c) JD/HW  
ACC NR: AP6029871 SOURCE CODE: UR/0413/66/000/015/0022/0022

INVENTOR: Voronov, F. D.; Filatov, A. D.; Gun, S. B.; Selivanov, N. M.; Nosov, V. D.; Savel'yev, G. V.; Goncharov, F. I.; Plotnikov, P. I.; Roshkov, S. A.; Kustobayev, G. G.; Polushkin, V. P.; Arkhipov, V. M.; Uziyenko, A. M.; Kolov, M. I.; Kozhevnikov, V. P.; Shapiro, B. S.; Kalugin, V. F.; Grudev, P. I.; Aksenov, B. N.; Khomyachkov, A. P.; Rudakov, Ye. A.; Kuzema, I. D.; Gornzhin, V. V.; Poydyshev, B. N.; Shternov, M. M.

ORG: none

TITLE: Method of making high-strength steel plates by pack rolling. Class 7, No. 184232

SOURCE: Izobret prom obraz tov zn, no. 15, 1966, 22

TOPIC TAGS: high strength steel, high strength steel plate, high strength steel sheet, steel plate rolling, steel sheet rolling

ABSTRACT: This Author Certificate introduces a method of pack rolling high-strength steel plates and sheets up to 10 mm thick and up to 3500 mm wide in a carbon steel envelope. The method includes cleaning, coating, making of the pack, heating, rolling and subsequent heat treatment. To ensure an accurate thickness of the plates

UDC: 621.771.23

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B

L 44005-66

ACC NR: AP6029871

or sheets regardless of their location in the pack, the thickness of the envelope must be at least 0.6 of the total initial thickness of the high-strength plates of the pack. [ND]

SUB CODE: 13/ SUBM DATE: 18Jun64/ ATD PRESS: 5070

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**"APPROVED FOR RELEASE: 08/31/2001**

**CIA-RDP86-00513R001858320003-1**

**APPROVED FOR RELEASE: 08/31/2001**

**CIA-RDP86-00513R001858320003-1"**

GUSEV, S.P.; UZIYENKO, I.M.

New inhibitor for the etching of steel in sulfuric acid solutions.  
(MIRA 11:11)  
Khim.nauk i prom. 3 no.5:687-688 '58.

1. Moskovskiy institut narodnogo khozyaystva im. G.V. Plekhanova.  
(Steel--Etching)

UZKIY, K., inzhner

How to improve the performance of the stationary flax dryer developed  
by the All-Union Scientific Research Institute of Agricultural Machinery  
Building (SSL-VISKhOM). Tekh.v sel'khoz. 21 no.8:28-31 Ag '61.  
(MIRA 14:7)

1. Vologodskoye oblastnoye upravleniye sel'skogo khozyaystva.  
(Flax--Drying)

KANEPS, G., st. nauchn. sotr.; UZKALNS, V., преподаvatel';  
ERANKA, V., red.

[Mechanization of livestock farming] Lopkopibas darbu  
mehanizacija. Riga, Latvijas Valsts izdevnieciba, 1964.  
152 p. [In Latvian] (MIRA 18:7)

1. Nauchno-issledovatel'skiy institut shkol pri Minister-  
stve obrazovaniya (for Kaneps).

SLIV, E.I.; UZKAYA, M.A.

Effect of elastic properties of supporting elements of a  
gyrotachometer on the frequency of its natural vibrations.  
Izv. vys. ucheb. zav.; prib. 8 no.5:97-102 '65.

(MIRA 18:10)

1. Leningradskiy institut tochnoy mekhaniki i optiki. Rekom-  
mendovana kafedroy teoreticheskoy mekhaniki.

*Aerial and Transmission Lines*

W.E.

**An Approach to the Problem of Optimum Directivity Antenna Design.** ... A. I. Ukhov. *USSR Press*, 10th July 1946, Vol. 33, No. 1. (In English). Given an aerial system situated in space, the directivity achieved will vary with the method of excitation. It is shown that an optimum value associated with a method of excitation which can be determined analytically.

1948



Handwritten text at the top of the page, appearing to be a list of names or identifiers, possibly including "K.A. Herold".

*K.A. Herold - name of a*

by an ideal. ... denote ... every ideal ...  $\chi(R)$  ... by  $I, n$  ... ideal ... are ...  $I, n$  and  $A$  ... the ... intersect ... the ...  $R$  and  $A$  ...  $QA_n$  ... to  $I$  ...  $R=Q$  ... primary ideal ...  $S$  is ... the ring ... ideal's ... given ... Type.

$R$  ...  $n$  ...  $I$  ...  $A$  ...  $QA_n$  ...  $R=Q$  ... primary ideal ...  $S$  is ... the ring ... ideal's ... given ... Type.

PA 7/49T67

UZKOV, A. I.

USSR/Mathematics - Rings

May/June 48

"Rings of Quotients of Commutative Rings," A. I. Uzkov, Moscow, 2 3/4 pp

"Matemat Sbor" Vol XXII (64), No 3

Discusses more general case of problem treated by C. Chevalley (Bull Amer Math Soc, Vol 50, No 2, 1944, pp 93 - 97). Submitted 22 May 1947.

7/49T67

FDB

UE Key, 1941

... mathematics

U2kov, A I

HODGE, W.V.D.; GOLOVINA, L.I. [translator]; GOLOVIN, O.N. [translator];  
UZKOV, A.I., redaktor; AGRANOVICH, M.S., redaktor; KORNILOV, B.I.,  
tehnicheskiy redaktor.

[Methods of algebraic geometry] Metody algebraicheskoi geometrii.  
Moskva, Izd-vo inostrannoi lit-ry. Vol. 1. 1954. 461 p. (MLRA 7:11)  
(Geometry, Algebraic)

UZKOV, A.I. (Moskva)

Decomposability of modules over a commutative ring in direct  
sums of cyclic submodules. Mat. sbor. 62 no.4 469-475 D '63.  
(M RA 17:4)

UZKOV, I.N.

Labor and religion. Nauka i shisn' 24 no.8:35-38 Ag '57.  
(Communism and religion) (MLBA 10:9)  
(Religion and sociology)  
(Work)



Uzkov, I. N.

25-9-20/40

AUTHOR: Uzkov, I.N.

TITLE: Labor and Religion (Trud i Religiya)

PERIODICAL: Nauka i Zhizn', 1957, <sup>vol. 24</sup> # 9, p 42-43 (USSR)

ABSTRACT:

The author points out that religion does not stimulate the average worker for better performances, because he is constantly reminded of his sinful soul and a possible salvation in the other world. Such an attitude prevents him from realizing that work in itself can be a source of happiness on earth and that working is a patriotic and moral obligation.

According to the author, the saying "all for one, one for all" illustrates the right attitude of the socialist worker. Religion, on the other hand, has in the course of centuries developed the wish for profit and personal riches. For that reason it cannot help build up a state in which everyone should have a share in the common welfare.

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Z/056/62/019/007/003/007  
1037/1237

**AUTHOR:** Uzjuk, V. N.

**TITLE:** Control of welded seams by the gamma-ray defectoscopic method in the zertinsky factory. Experience with this method in solution work. (Use of Iridium 192)

**PERIODICAL:** Přehled technické a hospodářské literatury. Hutnictví a strojírenství v. 19, no. 7, 402-403, abstract HS62-5106 (1961, Moskva, Gostoptechizdat STK II-182721a)

**TEXT:** Headline from the journal (p. 111-113). "Radioactive isotopes and nuclear radiations in the national economy USSR III".

[Abstracter's note: Complete translation.]



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137-58-2-3437

*UZLOV, I. G.*

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 2, p 166 (USSR)

AUTHORS: Starodubov, K. F. , Uzlov, I. G.

TITLE: Heat Hardening of the Rolling Surfaces of Wheels (Termicheskoye uprochneniye poverkhnosti kataniya kolesnykh par)

PERIODICAL: Vestn. Vses. n.-i. in-ta zh.-d. transp. , 1957, Nr 5, pp 39-41

ABSTRACT: The Institute of Iron and Steel Metallurgy of the Academy of Sciences of the Ukrainian Soviet Socialist Republic and the Dnepropetrovsk Iron and Steel Mill im. Karl Liebknecht have developed and put into operation a process of heat hardening of the rolling surface of wheels (W) consisting of induction heating of the W rim to the hardening temperature, followed by hardening and tempering. Heating was performed by an induction coil in the form of a 5-turn annular solenoid, the inside diameter of which equaled the outside diameter of the W. Heating was run for 4-6 min until the temperature at the rolling surface attained about 900°C. When heating was completed, the inductors were removed, the rate of rotation of the W was increased to 80 rpm, and hardening tanks were brought up beneath the W. Hardening lasted for 120-150 sec, after which tempering followed. An

Card 1/2

137-58-2-3437

### Heat Hardening of the Rolling Surfaces of Wheels

investigation of the microstructure of the W rim after heat treatment revealed finely dispersed pearlite with lamellar carbide throughout its cross section. Hardness at the rolling surface (at 10 mm depth) was  $H_B$  318 and at 25 mm depth it was  $H_B$  295, adequate to provide high wear resistance to W and elevated resistance to crumbling-out due to fatigue. Not only the rolling surface of the rim was subjected to hardening, but its side edges as well, and this created a strengthened layer in the zones adjacent to the side edges which during service of the W would prevent formation of beads. Hardening of the W with intermittent immersion of the rim in water assures very low residual stresses, as a wheel rotating in the vertical plane is immersed in the water during hardening for 1/5 of the length of the rim, and 4/5 is in the air. Drawings and a brief description of the installation are provided.

A. M.

1. Metals—Hardening    2. Wheels—Rim hardening

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