A S B E S T O S B U L L E T I N

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PART 1. ASBESTOS MINING.

CANADA

166 ASBESTOS. F.E. Hanes and O. Vagt. Canadian Mining J. Feb.1976 p.133/34.

The strong demand and tight-supply situation along with rising prices in the last two years stimulated expansion and development at properties in Canada and throughout the world. Proposed developments in many parts of the world have not kept pace with normal growth in consumption, and Canada continues to be in a favourable position to supply a large proportion of projected increases in world demand.

The outlook for increased sales is encouraging because the recession in the major industrial nations appears to have troughed, and the demand for asbestos should increase in the near and mid-term.

Preliminary figures indicate that total 1975 shipments will be 1.14 million short tons as opposed to over 1.8 million tons in 1974. Exports accounted for about 95 per cent of total shipments. Pre-1975 production levels are expected to be reached before the end of 1976.

A national asbestos emission standard of two fibres per cubic centimetre for the mining and milling sectors is being developed. Initially, standards will apply to crushing, drying, milling and storage. Ontario enacted controlling legislation to limit emissions to two fibres per cubic centimeter for fibres five microns in length or greater.

The Reeves mine near Timmins, owned by Canadian Johns-Manville Company Ltd, closed in February 1975 because of difficulties in complying with the new provincial asbestos fibre emission standard.

At the Cassiar mine in British Columbia a new tramline and concentrator were placed in operation. The most recent diamond drilling at Cassiar's Clinton mine in the Yukon Territory failed to confirm additional ore reserves and, as a result, production is expected to cease in mid-1978.

167 MAJOR WORLD PRODUCERS. F.E. Hanes and O. Vagt. Can. Min. J. p.134.

The major world asbestos producers and their approximate percentage share of production are Canada (40), U.S.S.R.(31), Republic of South Africa (9), Rhodesia (4), U.S.(3), People's Rep. of

China (3), Italy (4) and Others (6). Canada produces over 1.8 million tons of fibre and the U.S.S.R.about 1.5 million tons. Russia exports approximately 20 per cent of its production, almost evenly distributed between the Comecon countries of Eastern Europe and Western European countries. To meet rising demand, the U.S.S.R. is participating with Bulgaria, Czechoslovakia, Hungary and others in the development of the new Kiyembayez field where capacity is expected to be 500,000 tpy of fibre by 1982. The Republic of South Africa produces approximately 330,000 tpy of asbestos of which 50 per cent is crocidolite, 25 per cent is amosite and 25 per cent is chrysotile.

Asbestos deposits in Greece, Mexico, Colombia and Brazil are in various stages of exploration and development.

In the United States, two mines remained closed after operations ceased in 1974. These are the Johns Manville Corporation mine at Coalinga, California, and the Copperopolis mine, owned by Pacific Asbestos Corporation,Ltd, in Calaveras County, California. In Vermont, the mine owned by General Aniline and Film Corporation was purchased by employees and is operating under the new name of Vermont Asbestos Group Inc. Stricter environmental standards for all sectors of the U.S.industry will be applicable in 1976. In general, technical adaptation to the regulations should be satisfactory.

Developments in other countries, with the exception of the U.S.S.R., have been erratic. The world asbestos supply shortage, particularly for fibre groups 4-6 (asbestos-cement grades), is expected to continue through 1976. The expected return of shipments to normal levels by Canadian producers in 1976 will alleviate the supply/demand imbalance, but may not completely solve the situation. This will be particularly true if the projected economic upswings in the U.S. and some EEC countries fully materialize.

168. MCADAM CAMPBELL CHIBOUGAMAU HAVE LIVELY ASBESTOS SITUATION. The Northern Miner, Feb. 26, 1976, Vol 61, No: 50.

With the general asbestos picture brightening and its own Lac Roberge project at Chibougamau moving close to the production stage under the direction of Riocance, McAdam Mining Corp, is looking on a second lively asbestos project in that area. Under a deal just made with Campbell Chibougamau Mines, McAdam can earn a 50% interest in what is known as that companys' Q project- 96 claims in Roy Twp, and only five miles due west of the main asbestos project and on the same ore making peridotite sill.

This group which is being taken on for its asbestos potential, consists of 3,831 acres that completely surround the mining concession of Chibougamau Asbestos Ltd and on which drilling in 1956-7 indicated some 4.000.000 tons of asbestos ore.

169 ASBESTOS CAMPAIGN. Mining Journal. March 5, 1976. Vol. 286, No: 7333.

Cassiar Asbestos Corp. Ltd. and the United Steelworkers of America, with the encouragement of the provincial Government, have set up two committees to deal with environmental problems arising from asbestos mining activities at Cassiar in North Western British Columbia. This follows suggestions by a special officer appointed by the provincial Department of Labour to investigate a work stoppage over health issues last December.

The Committee at Cassiar is made up of union and company representatives and members of the local community. It will examine all factors affecting the well-being of workers and the residents of the local community, and will distribute a newspaper to all concerned on a regular basis. The Victoria based committee will include government representatives.

170 PRODUCERS' SHIPMENTS OF ASBESTOS-JANUARY 1976. Statistics Canada. Vol.46. No:1

	January 1975 Metric tons	1976 Metric tons
Quebec Plants		
Milled - Fibres		
Group 3 (spinning)	1 109	800
" 4 (shingle)	21 314	19 154
" 5 (paper)	7 503	8 295
" 6 (stucco)	13 501	14 593
" 7 (refuse)	34 036	43 688
All grades - Total	77 463	86 530
Newfoundland, Ontario, British Columbia and Yukon plants	26 105	24 316
Canada, total	103 568	110 846

171 UNITED ASBESTOS INC. Asbestos Feb. 1976. Page 30.

Net income for United Asbestos Inc., Montreal, Quebec, for the year ended March 31, 1975, was $5,525,645 or 78¢ per share against $3,042,976 or 43¢ per share for the previous annual period.

U.S.A.

172 U.S. PRODUCTION & CONSUMPTION. Asbestos.Feb.1976.Page 20.

Preliminary figures from the U.S. Bureau of Mines indicate that production of asbestos (all Chrysotile) in the United States during

1975, at 100,000 short tons, was 11% less than in 1974 although the total value, at $14,520,000, was 6% higher than in the previous year. The average value per ton rose from $122.00 to $145.00. Apparent consumption reached 629,000 tons, 73% less than in the prior year, reflecting the effects of the 7-month miners' strike in Quebec. Canada continued to be the major supplier of asbestos consumed in the U.S. Based on imports for the first nine months of 1975, South Africa supplied 14,000 tons of Crocidolite (up over 24%) and 4,900 tons of Amosite (down 40%).

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173 ASBESTOS: WORLD PRODUCTION, BY COUNTRY:
Mineral Trade Notes, Vol. 72, No: 10. October '75.p7 & 8.

(Metric tons)

Country 1/	1973	1974 p/
North America:		
Canada (sales)	1,690,064	1,654,705
Mexico	15	6
United States (sold or used by producers)	136,110	102,088
South America:		
Argentina	620	e/600
Brazil	47,000	44,868
Europe:		
Bulgaria e/	1,500	1,500
Finland 2/	6,337	5,593
Italy	149,255	150,256
Portugal	e/130	180
U.S.S.R.e/	1,280,000	1,350,000
Yugoslavia	9,391	12,247
Africa:		
Egypt	329	e/300
Mozambique	566	-
Rhodesia, Southern e/	80,000	80,000
South Africa, Republic of	332,650	335,422
Swaziland	36,900	32,421
Asia:		
China, People's Republic of e/	210,000	210,000
Cyprus	31,706	e/25,000
India	11,300	19,332
Japan e/	14,000	10,000
Korea, Republic of	5,707	5,710

Country 1/	(Metric tons) 1973	1974 p/
Asia:		
Taiwan	5,308	3,596
Turkey	4,718	e/5,000
Oceania:		
Australia	41,472	e/56,400
Total	4,095,078	4,105,224

e/Estimate. p/ Preliminary.
1/In addition to the countries listed Czechoslovakia, North Korea and Romania also produce asbestos, but available information is inadequate to make reliable estimates of output levels.
2/Includes asbestos flour.
3/Gross weight.

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Patents of Interest:

174 U.S. PATENT NO: 3,875,504. CONTROLLING THE MOISTURE CONTENT OF ASBESTOS ORE. Johns-Manville Corp.

The moisture content of a moving bed of asbestos ore is continuously determined by sampling, measuring the moisture content of the sample by means of a conductivity meter, and employing the resulting signals to automatically control the moisture content after the crushing stage.

175 CANADIAN PATENT NO: 956,849. METHOD OF OPENING CHRYSOTILE ASBESTOS.

Shredded asbestos ore is dispersed in water with addition of polyacrylis acid or a similar polyelectrolyte containing free carboxylic groups. The resulting suspension is agitated to effect opening of asbestos fibre bundles. The fibrils are coated with the polymer; then the coating is insolubilised; and the fibrils are separated from the aqueous medium.

176 CANADIAN PATENT NO: 949,947. APPARATUS FOR COMMINUTING ASBESTOS. Johns-Manville Corp.

Two pressurised streams of an asbestos slurry are brought together along a common axis at high velocity, and the merged stream is passed at high velocity through a narrow zone extending radially from the common axis, where solid posts extend into the zone to further disintegrate the asbestos.

PART 2. ASBESTOS CEMENT.

177 INFLUENCE OF MINOR COMPONENTS OF CEMENT CLINKER AND OF THE CHARACTER OF THEIR MICROSTRUCTURE ON THE PROPERTIES OF ASBESTOS CEMENT. I. I. Bernei (Kalintu Polytechnical Inst.), T. V. Kuznetsova and K. L. Soboleva (Sterlitamak Soda-Cement Combine).

The cement is the dominant component of the cement-asbestos-water compositions because of its paramount influence on the technological properties of the asbestos cement suspension and the quality of the final product.

Study of the influence of the composition of Portland cement clinker on the properties of asbestos cement is of special importance. For this reason samples of asbestos cement products were prepared using a filtration chamber under conditions simulating the industrial process (1). The starting materials were clinkers from the Sterlitamak Soda-Cement Combine ground to a specific surface area of 2700-2800 cm^2/g, asbestos from the Bazhenovo deposit and recuperated water. The asbestos consisted of a mixture of grades, viz. 40% of P-5-65, 40% of P-5-50 and 20% of M-6-40.

The samples were stored for 7 days in moist atmosphere (100% relative humidity) at 22 ± 2°C, and tested for their bending strength, bulk density, water absorption and calcination loss. Other parameters investigated were the filtration resistance of asbestos-cement suspensions, the thickness and weight of the asbestos cement layer, the loss of materials in the filtrate, the bulk density of the intermediate product, and combined with chemical and petrographic analyses of the clinker.

The evaluation of the experimental data was carried out by the mathematical statistical methods. The influence of single factors on the properties of the material was determined on the basis of the value and significance of the pair correlation coefficient (2). We found that changes in the chemical composition of the clinker within the range KH = 0.9-0.94, n = 2.1-2.2 and p = 1.15-1.3 had little effect on the properties of the asbestos cement suspension and the quality of the asbestos cement product. The pair correlation coefficients were of little significance.

A more pronounced influence on the technological properties of the asbestos cement suspension and the physico-mechanical characteristics of the final product proved to be exerted by the minor components of the clinker (MgO, Na_2O, FeO) and by the character of the microcrystalline structure of the clinker. The coefficient of the correlation between the strength of asbestos cement and the MgO content in the clinker amounted to

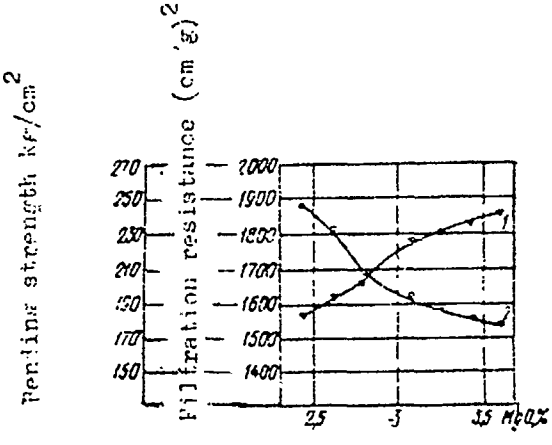

Figure 1. Effect of magnesium oxide on the filtration resistance of asbestos cement suspension (curve 1), and on the bending strength of asbestos cement articles (curve 2).

Ordinates: bending strength R_u(kg./cm^2) and coefficient of filtration resistance K (cm/g)^2;
Abscissa: MgO % in Portland cement clinker.

-0.55; the increase in the MgO content resulted in a decrease of the bending strength.

Figure 1 shows the graphic representation of this relationship (curve 2). The most pronounced negative influence of MgO on the strength of asbestos cement occurs when the MgO contents in the clinker increases from 2.7% to 3.1%. This effect is due to the weakening of the adhesion of the cement to the asbestos fibres with the increasing MgO content. This is corroborated by the worsening of the filtration characteristics of the suspension; in particular, the filtration resistance coefficient increases with the increasing MgO content as shown in Figure 1 (curve 1).

The strength of asbestos cement depends to a still greater extent on the form of the alite crystals (Table 1). We have classified clinkers depending on the form of the alite crystals as follows; group I comprises clinkers containing elongated alite crystals (axis ratio 2:1); group II comprises clinkers containing hexagonal alite crystals (axis ratio 2:1); group III clinkers containing tabular alite crystals; group IV mixed tabular and indefinite crystals; and group V comprises clinkers containing indefinite alite crystals (3).

The strength of asbestos cement decreases from group I to group V; the coefficient of the correlation between the strength of asbestos cement and the alite form $r = 0.74$. On the other hand, the filtration resistance increases from group I to group V; thus, the filtration characteristics are worsening and, hence, the structure of the resulting asbestos cement layer is also worsening. This appears to be the main cause of the decrease of the asbestos cement strength.

The bulk density of the asbestos cement depends to a considerable extent on the conditions of the fining of the clinker and on the presence of FeO and Na_2O. Thus, the bulk density decreases with the increasing FeO content in the clinker ($r = -0.31$); this is apparently caused by two factors; firstly, the increase in the FeO content is accompanied by the increase in the C_3A content in the clinker (4); secondly, the increase in the FeO content results in sharply increasing loss of the starting material in the filtrate (as indicated by our experimental data).

The distinct dependence of the bulk density of the asbestos cement on the form of belite crystals was also established. As in the case of alite, clinkers were divided into five groups, viz. group I containing dense spheroidal belite crystals; group II dense indefinite crystals; group III low-density crystals having some jagged edges; group IV strongly jagged crystals; and group V clinkers containing separate lamellar belite crystals. The bulk density of the asbestos cement

decreases from group I to group V. The bulk density of samples produced from group IV-V clinkers does not comply with the requirements of the standards.

The technological properties of asbestos cement suspensions and the characteristics of final products depend also on the intermediate phase, in particular on its dark intermediate component identified by numerous authors as an aluminate phase crystalising in the form of dark rectangular crystals in the absence of alkalis and in the prysmatic form in the presence of alkalis (5).

Our experimental data indicate that the increase in the content of this intermediate phase results in a decrease in the bulk density of the asbestos cement ($r = -0.32$), and in an increase in the loss of the starting material in the filtrate ($r = +0.3$). The bulk density of asbestos cement samples produced from clinkers containing 6-9% of the intermediate phase does not exceed 1.55-1.59 g/cm^3.

The influence of the intermediate phase on the bending strength of asbestos cement products and on the filtration resistance of the suspension is somewhat complex. The general trend is that these properties are worsening with the increasing content of the intermediate phase in the clinker. Some experiments, however, indicated that in the presence of a considerable amount of the intermediate phase, the resistance to filtration was at a minimum, whilst high strength of the final products was achieved. Thus, more research work is necessary, and differentiation of the intermediate phase with respect to its crystalline characteristics should be performed to obtain more accurate results.

Thus, any evaluation of Portland cement for use in asbestos cement products should take into account the microcrystalline structure of the clinker and the presence of minor components in it. This conclusion is fully corroborated by the results of extensive industrial investigations (see Tables 1 and 2).

On the basis of investigations carried out at the Sterlitamak Soda-Cement Combine, control was introduced of the quality of Portland cement. The starting materials are classified according to the microstructure of the clinkers produced from these materials and on the basis of their minor components. First grade clinkers must have definite crystalline characteristics with predominance of elongated and hexagonal alite crystals, spheroidal dense belite grains, and a light intermediate phase.

In conjunction with other measures, the use of clinker having an optimal microstructure resulted in stabilisation and considerable improvement of the quality of Portland cement and,

hence, improvement of asbestos cement articles. In recent years, the quantity of rejected roofing sheets dropped from 7.1% in 1971 to 2.5% in 1973, whilst the percentage of the top grade products increased from 60.2 to 80%.

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(1) I. I. Bernei. Theory of the formation of asbestos cement articles. Stroiizdat, Moscow, 1969.

(2) L. Z. Rushinskii. Mathematical evaluation of experimental data. 'Nauka', Moscow, 1971.

(3) Yu. M. Butt and V. V. Timashev. Portland cement clinker, Stroiizdat, Moscow, 1967.

(4) Kuznetsova, R. T. Krivoborodov and K. L. Soboleva. Petrographic control of clinker quality. 'Nauchnye soobshcheniya NIItsementa', 1965, No.19(50).

(5) V. P. Ryazin, Yu. S. Malinin and K. L. Kolsnova. Properties of compound NC·A_3 and its effect on the hydraulic activity of clinker. Tsement, 1972, No.11.

Table 1

Investigated factor	Form of alite crystals				
	elongated	hexagonal	tabular	tabular and indefinite	indefinite
Strength of asbestos cement articles in laboratory, in kg/cm^2	250	230	196	178	165
Filtration resistance coefficient, in cm^2/g	1520	1600	1720	1800	1860
Strength of industrial asbestos cement products in kg/cm^2	173	170	163	157	154
The strength coefficient of the batch ($K = R_H/\text{sigma}^2$)	67.1	65.8	63.9	62.8	61.3

Table 2

Investigated factor	Form of belite crystals				
	round dense	indefinite	low-density crystals	jagged	lamellar
Bulk density of asbestos cement samples prepared in laboratory, in g/cm^3	1.64	1.63	1.61	1.59	1.58
FeO content in clinker, in %	0.04	0.09	0.17	0.27	0.31
Na_2O content in clinker, in %	0.32	0.34	0.36	0.42	0.44
Content of dark intermediate phase, in %	3	3	2.9	4.5	5.4
Bulk density of industrial asbestos cement, in g/cm^3	1.63	1.62	1.61	1.59	1.58

178 SEDIMENTATION STABILITY OF ASBESTOS-CEMENT SUSPENSIONS WITH A CARBONATE MICROFILLER. O.Z. Zolov'ev. Stroit. Mater. Ikh Proizvod., 1974, 1, 49-54.

Addition of finely comminuted chalk (10-30 wt.%) to a suspension containing asbestos (13.5 wt.%) and cement (86.5 wt.%) increases the stability of the suspension. Polyacrylomide is added as a flocculant.

179 LOW-GRADE ASBESTOS-CEMENT COMPOSITIONS. Zevin L.S. et al.Tr.Nauch.-Issled. Inst.Asbesta,Slyudu,Asbestotsem. Izdelii Proekt. Stroit.Predpr.Slyud.Prom.1974,30, 73-81.

Low-grade chrysotile asbestos (M-6-30 to 7-450) from the Bazhenovo deposit can be used in the production of asbestos-cement articles. The fibres are short.They contain, apart from chrysotile, the lizardite and brucite phases as well. The chemical composition is (in weight %): SiO_2 36.2-38.5, Al_2O_3 1.27 - 1.33, Fe_2O_3 5.89-7.69, CaO 0.85-1.41, MgO 37.69 - 38.89, SO_3 0.17; Calcination loss is 13.63 - 15.07 wt.%. The zeta potential of the asbestos surface

in contact with the liquid phase is +3 to +10 mV, and the specific surface area is 18600-22000 m^2/kg.

180 EFFECT OF SOME HETEROPOLAR SURFACTANTS ON THE PROPERTIES OF ASBESTOS CEMENT. O.I. Gracheva and Ya.T. Berkovich,Tr. Nauch.-Issled.Inst.Asbesta, Slyudy,Asbestotsem. Izdelii Prockt. Stroit. Predpr.Slyud.Prom.1974, 30, 3-13.

The effects of four surfactants were studied, viz. (1) equalising agent A, (2) leucotrope O, (3) sodium lauryl sulphate, and (4) dispersing agent NF (a naphthalenesulphonic acid-formaldehyde polymer) Organic cations from the cation-active surfactant (1) were adsorbed on the negatively charged surface of asbestos fibres. The addition of sodium lauryl sulphate (3) resulted in an increase in the absolute value of the negative zeta-potential at the asbestos surface in contact with a liquid phase. For this reason the filtration rate of the asbestos-cement suspension was increased. The initial structure formation depends on the adsorption of the surfactant on the asbestos surface.

181 JAPANESE PATENT NO: 75 88,119. COATING INORGANIC DECORATIVE BOARDS. Fuji Plywood Works Co. Ltd.

Inorganic decorative boards or panels (e.g. asbestos panels) are coated with a composition containing a water-soluble polymer (e.g. sodium alginate), a water-soluble silicate (e.g. sodium silicate) and optionally a pigment. Then the coating is treated with a solution of an acid (e.g. 1% HCl) or an acidic salt (e.g.2% $AlCl_3$ solution) to render the coating water-insoluble.

182 BRITISH PATENT NO: 1,385,512. LAMINATED BUILDING PANELS. J.W. Elischer.

Lightweight strong building panels consisting of a core containing foamed cement and polystyrene beads, and asbestos-cement sheet facing (on both sides); ⅛in.-thick 'Hardiflex' ashestos-cement sheets are used.

183 JAPANESE PATENT NO: 74 131,211. LOW-MELTING PHOSPHATE FRIT. Denki Kagaku Kogyo K.K.

Frit suitable for forming vitreous coating on metals, asbestos-cement tiles, concrete, etc., consists of a mixture of phosphates of sodium, potassium, lithium, magnesium and zinc , alumina and titania. The frit is mixed with minor amounts of borax, iron oxide pigment and methyl cellulose solution. The resulting slip is applied onto asbestos-cement tiles and heated at 550°C.

184 U.S. PATENT NO: 3,832,280. COATING ASBESTOS FIBRES WITH ALUMINIUM SULPHATE. American Smelting and Refining Co.

Quebec chrysotile fibres are coated with aluminium sulphate to increase the filtration rate of asbestos-cement slurries. The coating is effected by contacting asbestos fibres in air with atomized spray of an aqueous solution of aluminium sulphate. The consumption of aluminium sulphate is 25-50 lbs per ton of asbestos fibres.

PART 3. ASBESTOS TEXTILES.

185 JAPANESE PATENT NO: 74 40,868. MOULDING COMPOSITIONS CONTAINING THERMOPLASTIC RESINS. H. Korekane & A. Yoshihioka.

Thermoplastic resins, especially polyamides, are reinforced with single filaments or bundles of chopped inorganic fibres combined with long inorganic filaments and twisted. Suitable inorganic fibres include asbestos, mineral wool, glass fibres or metal fibres. Suitable continuous filaments are glass, carbon and steel filaments.

186 JAPANESE PATENT NO: 73/20/892. PRODUCTION OF ASBESTOS YARN. Nippon Asbestos Co. Ltd.

In the production of asbestos yarn, Chrysotile asbestos is chemically opened to form a paste, the paste formed into a film on a support in the presence of an acid salt and the film peeled off the support and either slit or directly twisted.

187 CANADIAN PATENT NO: 964,018. PRODUCTION OF ASBESTOS YARN. Raybestos-Manhattan, Inc.

In the high speed manufacture of high-strength asbestos yarn, asbestos strands in a coagulating bath are elongated by about 400%, the elongated strands passed through a zone of low tension for final coagulation and the strands merged into a multi-ply yarn.

188 GLOVES, CLOTH (ASBESTOS).

U.S. Army Natick Labs, Natick, Mass.01760, Feb.11, 1972. 15p plus 4p. amendment. Fed.Spec.HH-G-450D (superseding HH-G-450C). Available from Gen.Services Admin., Washington, D.C. $0.15. This specification covers two types of asbestos gloves.

PART 4. ASBESTOS FRICTION MATERIALS

189 JAPANESE PATENT NO: 75 108,353. POLYIMIDE-BASE FRICTIONAL MATERIAL. Tokico Ltd.

Frictional material having high abrasion-resistance at high temperatures is produced from 60% of asbestos, 20% of a polyimide, and 20% of a non-metallic inorganic filler. The mixture is moulded under a pressure of 600kg./cm^2 at 180°C. The curing is effected at the same temperature within 2 hr.

190 WEAR OF PHENOLIC RESIN-ASBESTOS FRICTION MATERIALS. M.H. Weintraub et al. Am.Chem.Soc.,Div.Org.Coat.Plast. Chem.,Papers 1974, 34, No.1, 389-394.

Correlation was found between the curing state of a resin binder in brake linings and their wear rates. The reactions at the rubbing interface were the factors governing the wear rate. The effect of resin type and additives was discussed.

191 RESIN COMPOSITES HAVING IMPROVED SLIDING PROPERTIES. S.Yamaguchi. Purasuchikkusu,1975, 26,No.5,74-83 (in Japan)

Epoxy, polyester, tetrafluoroethylene, polyacetal resins were filled with asbestos, carbon and glass fibres, and molybdenum disulphide as a solid lubricant, and their sliding properties, resistance to wear, tensile and binding strength were determined.

192 DETERMINATION OF THE RHEOLOGICAL PROPERTIES OF FRICTIONAL ASBESTOS-RUBBER MATERIALS. A.A. Veshchev and N.P. Shanin. Kauch.i Rezina, 1975, No.5, 27-29 (in Russian)

Rheological properties of asbestos-rubber compositions (containing asbestos grade 5) are adequately characterised by tests with a plunger viscometer equipped with acute-angle constructing channels and inner thread.

PART 5. REINFORCED PLASTICS.

193 JAPANESE PATENT NO: 75 26 857. ASBESTOS-REINFORCED RESIN SHEETS. Ube Cycon Ltd.

Aqueous slurry containing chrysotile asbestos fibres and a resin e.g. acrylonitrile-styrene copolymer, in a ratio of 1:4, is processed to form 3-4 mm sheets, which are dried at 130°C, and then hot-pressed. The sheets have a tensile strength of 1000 kg/cm^2, a flexural strength of 1500 kg/cm^2, and an impact strength of 12 kgcm./cm^2.

194 U.S. PATENT NO. 3,867,189. IMPERMEABLE, NON-POROUS POLYARYLENE SULPHIDE LAMINATE. Phillips Petroleum Co.

Polyphenylene sulphide is slurried with asbestos; the slurry is moulded and heated. The product is provided witha non-porous coating of polyphenylene sulphide by spraying or immersion. The polyphenylene sulphide is prepared by reacting p-dichlorobenzene with sodium sulphide.

195 HANDLING ASBESTOS. CHRYSOTILE ASBESTOS IN PLASTICS. J.L.Myers J.Paint Technol.1975, 47 (611), 63-67.

A review is given of literature relating to health hazards associated with asbestos, especially chrysotile asbestos used in composites with plastics; 13 references.

196 U.S. PATENT NO: 3,764,576. MOULDING COMPOSITIONS BASED ON POLYBUTYLENE TEREPHTHALATE. Celanese Corp.

Polybutylene terephthalate is improved (especially with respect to resistance against warpage) by addition of 5-30 wt.% of glass fibres, 1-5 wt.% of asbestos fibres and 10-65 wt.% of acicular calcium metasilicate.

197 JAPANESE PATENT NO: 75 101438. PELLETISED ASBESTOS-RESIN MOULDING COMPOSITIONS. Ube Industries Ltd.

A thermoplastic resin (e.g. an acrylonitrile-styrene copolymer) is blended with asbestos fibres in a ratio of 3:7 to 4:1. A liquid (e.g. water containing a non-ionic surfactant) is added, and the mixture is extruded at a temperature below the melting point of the resin to form pellets, which are dried.

198 MODIFICATION OF ASBESTOS SURFACE IN ASBESTOS FILLED POLYETHYLENE. M.M. Revyaks and A.Ya.Markina. Khim.i.Khim. Tekhnol. (Minsk), 1975, 8, 154-157 (In Russian)

The flexural strength and Brinell hardness (and to a lesser extent the tensile strength) of asbestos-filled low-density polyethylene were improved when the asbestos fibres were pre-treated with a polysiloxane containing tetrabutoxytitanium as a curing agent.

199 CZHECHOSLIVAK PATENT NO: 155,625. TWO-COMPONENT EPOXIDE CEMENT WITH POWDERED METAL FILLERS. J.Mleziva et al.

Material having high impact strength (e.g. 3.3.kg.cm./cm^2) and good bending strength (410 kg/cm^2) is obtained by filling an epoxy resin containing curing agents with a powdered metal, (e.g.aluminium) and a flaky or fibrous filler (e.g.talc, microground asbestos or mica).

200 BREAKING BEHAVIOUR OF POLYETHYLENE COMPOSITES. G.Lang and S. Wintergerst. Kunststoffe, 1974, 64, No:11,671-675(in German)

Tensile tests were carried out and electron micrographs of fracture surfaces were obtained to investigate polyethylene composites containing glass or quartz spherules, glass or asbestos fibres, mica or talc platelets.

201 JAPANESE PATENT NO: 74 59,151. POLYVINYL CHLORIDE-ASBESTOS COMPOSITES. Mitsubishi Monsanto Chemical Co.

Asbestos is treated with an unsaturated, mono-or dicarboxylic acid, and then vinyl chloride is polymerised in the presence of the asbestos fibres. The product can be additionally treated with an alkali. It is used as a reinforcing agent for PVC

PART 6. BUILDING MATERIALS

202 BRITISH PATENT NO: 1,371,824. COMPOSITE FIBRE MATERIAL. G. Howarth.

Sheets, pipes, building elements, etc., are produced from a blend of asbestos fibres and fine, corrosion-resistant steel fibres, using a cementitious binder. Very high strength and good resistance to corrosion by atmospheric agents, soil, or aggressive media, is achieved.

203 JAPANESE PATENT NO: 75 17,427. SYNTHETIC DOLOMITE BOARD. Fukushima Kagaku Kogyo K.K.

A slurry containing $Ca(OH)_2$ and $Mg(OH_2)$ is neutralised with CO_2, and a fibrous material, such as asbestos, is dispersed in the slurry; optionally with addition of an alkali soap based on fatty acids. The mixture is formed into boards, heated and dried to obtain a non-inflammable building material.

204 GERMAN PATENT APPLICATION NO: 2,344,072. FIRE-RESISTANT AND WEATHER-PROOF FACADE LINING FOR BUILDINGS. Frenzelit Asbestwerke GmbH.

A paste is prepared from cement, milled asbestos and an organic fibrous material; spread on rough sieves or filtering cloth; and dried under vacuum to form sheets suitable for lining facades of buildings. The sheets can be impregnated with natural or synthetic resins or with water glass.

205 WADEX PRESSURE PIPE IN GPR. European Plastics News. March 1976, p.5.

In an unusual application for glass fibre reinforced plastics pipe, British Company, Whittaker Ellis Ltd, is to lay 1400 metres lengths for water pumping mains operated under pressure.

The pipe is to provide a water intake from the River Tyne produced by Stanton and Stavely (part of the British Steel Corporation). Its construction is begun with deposition of a gel, layer on a rotating mandrel. This is followed by feeding E glass fibres through a sand-rich isophthalic polyester resin mix.

Silica sand is fed onto resin-wet surface to give a sufficient wall thickness and at suitable stages glass fibre roving is applied parallel to the longitudinal length of the pipe.

206 LONG-LIFE SAFETY OF PVC WATER PIPE. Modern Plastics Int. Dec '75 p4.

207 JAPANESE PATENT NO: 75 126,765. INTERIOR FLOOR TILES. Yamanashi Kasei Kogyo Co. Ltd.

Decorative floor tiles are produced by printing a non-woven cotton fabric with a PVC-base composition containing various pigments to form a desired pattern. The fabric is then coated with a polyamide film and backed with asbestos paper using an adhesive.

208 BRITISH PATENT NO: 1,360,214. POLYSTYRENE-ASBESTOS FLOOR TILES. Dunlop Ltd.

Floor tiles having good scratch resistance, diminished age-yellowing and improved impact resistance are produced from preferably 15% by weight of comminuted polystyrene; 2.5% of butyl benzyl pnthalate; 2.5% of a mixture of di-alkyl phthalates containing 7-9 carbon atoms in each alkyl; 30% of asbestos fibres; 46.6% of ground limestone; and 3.4% of tall oil pitch as a stabiliser and processing acid.

209 JAPANESE PATENT NO: 74 45,954. POLYVINYL CHLORIDE-ASBESTOS COMPOSITES. Mitsubishi Monsanto Chemical Co.

Asbestos for use as a filler in PVC compositions is pre-treated with an emulsion of a copolymer derived from vinyl chloride and an unsaturated mono- or dicarboxylic acid (e.g. acrylic acid), additionally containing sodium lauryl sulphate and potassium persulphate, at pH adjusted to 3 with NaOH. The mixture is stirred for 24 hrs, at room temperature, neutralized and freeze-dried. The resulting white powder is added to PVC in an amount of 5%. The tensile strength is increased by 10% compared with samples containing untreated asbestos.

210 GERMAN PATENT NO: 2,000,151. FELT ROOFING MATERIAL IMPREGNATED WITH BITUMEN OR COAL TAR. Permanite Ltd.

Fire-Resistant roofing material having reduced flow tendency when heated contains a layer of felt (pref. asbestos) impregnated with bitumen or coal tar, bonded to a glass fibre fabric coated on both sides with bitumen containing powdered jute waste; the underside coating carries coarse sand particles firmly adhering to the laminate, and on the top side gravel particles.

211 BRITISH PATENT NO: 1 395 398. ROOFING FELT. Isola Fabrikker A/S.

The felt comprises glass fibers, optionally mixed with other inorganic fibers such as asbestos, a binder, and 0.5 to 50% by weight of a vulcanized rubber powder.

212 BRITISH PATENT NO: 1 397 683. DECORATIVE GLASS FIBER REINFORCED CEILING PANELS AND TILES. Owens-Corning Fiberglas Corp.

The outer surface of the tile or panel is covered by a nonwoven sheet of thermoplastic fibers which is bonded to the tile during molding. The sheet masks any irregularities in the tile as well as providing a more uniform surface for subsequent painting. Instead of painting, a finish coating may be obtained by interposing a plastic sheet between the nonwoven facing sheet and tile so that the heat and pressure applied during molding causes the plastic to flow at least partially through the nonwoven sheet, forming a smooth finished surface.

PART 7. ASBESTOS PACKING, SEALING & COATING COMPOSITIONS.

213 U.S.S.R. PATENT NO: 476,289. GASKETS. G.V.Poroshin et al.

Asbsestos fibres are treated with a 8-15% solution of a fluorine-containing rubber or an ethylene-propylene rubber in an organic solvent (the weight ratio rubber:asbestos is 1:2 to 1:3). Then the solvent is removed and other powdered components are admixed. By this method, the acid resistance, the impact strength and the elastic properties of the gaskets are improved.

214 GERMAN PATENT APPLICATION NO: 2,408,624. THERMALLY INSULATING SEALING MATERIAL. Frenzelit Asbestwerke GmbH.

Thermally insulating materials or sealing elements (gaskets, cords, etc.) are produced from a mixture of asbestos fibres and alumino-silicate fibres, optionally with additions of cotton or rayon fibres.

215 GERMAN PATENT NO: 2,448,786. FLAT SEALING MATERIALS. Reinz Dichtungs-Gesellschaft m.b.H.

Sealing materials produced from asbestos fibres, artificial inorganic and/or organic fibres, rubber binder and a vulcanisation agent, are improved by using fine aluminium powder as a vulcanisation catalyst, whereby compatibility is improved of vulcanised rubber and artificial inorganic fibres, such as glass fibres. By this method, a part of asbestos fibres can be replaced by e.g. glass fibres (asbestos fibres have good compatibility with vulcanised rubber) without affecting the mechanised strength of the product (it can even be increased).

216 CANADIAN PATENT NO: 969,709. COATING FOR PAPER. Domtar Ltd.

Opacity of clay-base coating for paper is improved by the addition of 0.1-10% of asbestos. The brightness of the paper (by TAPPI method) is also improved.

217 JAPANESE PATENT NO: 75 35,225. POLYSILOXANE COATING FOR ASBESTOS GASKETS. Shin-Etsu Chemical Industry Co.Ltd.

Asbestos gaskets are coated with a composition consisting of an organopolysiloxane emulsion, a hardener and an emulsion of an organohydrodiene-polysiloxane and a diorganopolysiloxane containing hydroxy end groups. The release properties, mechanical strength and water - impermeability of asbestos gaskets are improved.

218 GERMAN PATENT APPLICATION NO: 2,327,972. POLYAMIDE-BASE COATINGS. W. Lauer.

Powdered composition for electrostatic or fluidized-bed application contains polyamide powder, antimony oxide as a fire-retardant, azodicarboxamide as a blowing agent, polyurethane (or its starting components), dicumyl peroxide, pigments and/or asbestos fibres. Cellular coatings having good mechanical and thermal properties are produced.

219 JAPANESE PATENT NO: 74 117 533. FIRE-RESISTANT FOAM COATINGS. Matsushita Electric Works Ltd.

A surface to be protected against fire, e.g. plywood, is first coated with a layer containing inorganic fibres (e.g. asbestos), a gelling agent and an alkali metal silicate. Then, an intumescent foam layer is formed from a composition comprising e.g. dicyanamide, pentaerythritol, melamine, vinyl acetate emulsion, titanium dioxide, sodium hexametaphosphate, methyl celluloss, a non-ionic surfactant and water. This coating is foamed and then dried at 80°C.

220. JAPANESE PATENT NO: 75 71,727. INORGANIC COATING COMPOSITION. Toa Gosei Chemical Industry Co. Ltd.

Ceramic-like coating films are produced from a mixture of an inorganic material, e.g. sand, Japanese marble and asbestos fibres, with an organic binder (e.g. an emulsion containing ethyl acrylate-methyl methacrylate copolymer) and a minor amount of activated alumina. The composition can be sprayed on a tile forming a fissure-free coating.

221. JAPANESE PATENT NO: 75 65,533. DECORATIVE COATING FOR WALLS. Gosei Chemical Industry Co. Ltd.

Latex containing an acrylonitrile-butyl acrylate copolymer and an acrylonitrile-ethyl acrylate-methyl methacrylate copolymer, with addition of a minor amount of carboxymethyl cellulose is used as a binder for a mixture of sand, asbestos and a white pigment. The paste is sprayed onto primer-coated tiles and infra red-dried. A cratered water-resistant film is produced.

PART 8. ASBESTOS PAPER & INSULATING MATERIALS.

222 IMPROVED PROCESS FOR MANUFACTURE OF ASBESTOS PAPER. Res. Discl., 1975, 138, 6-7.

Production of asbestos paper from a dispersion of chrysotile asbestos in a neoprene latex as a binder is improved by adding to the latex 1-5% of triethanolammonium dodecylbenzenesulphonate and 0.5-2% of formaldehyde-sodium naphthalenesulphonate condensate, whereby optimal drainage rate is achieved.

223 U.S. PATENT NO: 3,872,205. ROCKET INSULATION. Minister of National Defence of Canada.

Flexible sheets for use in rocket motors for solid propellants are produced by forming a dough from polybutadiene having terminal carboxylic groups, a curing agent and catalyst, asbestos fibres and asbestos floats; partially curing the dough; rolling it into sheets; applying the sheets to the steel walls of a rocket motor casing and low-pressure bag-moulding.

224 CANADIAN PATENT NO: 946,426. INSULATION MATERIAL. U.S. Gypsum Co.

Insulation block for back-up insulation behind refractory bricks in a furnace is produced by shaping a mixture preferably containing at least 60 wt.% of a low-iron mineral wool, 4 wt.% of a cellulosic binder, about 12 wt.% of a fusible clay as a binder, about 5 wt.% of asbestos fibres, and about 1 wt.% of a wax-asphalt sizing, the remainder being water. The shaped body is fired at about 1600°F to burn out the cellulosic binder and to fuse the clay.

225 SODIUM SILICATE-ASBESTOS PASTE FOR INSULATING PARTS OF DIESEL LOCOMOTIVES DURING GAS CARBURISATION. E.G.Rubashina et al. Metalloved. i. Term. Obrab.Metallov,1974,No.11, 60-61.

Paste prepared by mixing asbestos powder with water glass (spec.grav. 1.35 - 1.4) in a weight ratio of 1:3 can protect metal parts at temperatures up to 940-960°C. The paste should be stored with exclusion of air.

226 JAPANESE PATENT NO: 75 86,695. ARC-RESISTANT INSULATORS. Mitsubishi Electric Corp.

Electric insulators having good arc resistance, mechanical properties, thermal stability and resistance to water, are produced by hot-pressing a mixture of asbestos, alumina, boric acid, and zinc oxide and/or calcium oxide.

227 JAPANESE PATENT NO: 75 76,600. ELECTRICALLY INSULATING INORGANIC AND ORGANIC COMPOSITES. Mitsubishi Electric Corp.

Inorganic fibres (such as asbestos) are mixed with an electrically insulating inorganic powder (e.g. quartz) and a binder (boric acid). The resulting mixture is blended with a thermosetting resin (e.g. a phenolic resin) and moulded at an elevated temperature.

PART 9. REFRACTORY FIBRES.

228 U.S. PATENT NO: 3,917,783. STRENGTHENING BORON FILAMENTS FOR USE IN COMPOSITES. Northrop Corp.

Boron Filaments are subjected to radiation from strip heaters to 300-350°F for 5-30 min. in an atmosphere of nitrogen or in air, or in a nitrogen-air mixture: a sufficient tension is applied to keep the boron filaments straight (horizontally or vertically). By this treatment, the tensile strength of the filaments is increased from 462.5 to 550-590 kpsi, and the variation coefficient is decreased from 15.6 to 7-9%, due to the healing of cracks and other surface defects.

229 ENVIRONMENTAL EFFECTS ON FIBRE-REINFORCED COMPOSITES. R.A. Heller et al. Polym. Eng.Sci., 1975, 15,No:11,781-788.

Laminates produced from Avco tape (epoxy resin reinforced with boron fibres) were subjected to vibration, constant strain-rate and creep tests at varying temperatures.

230 JAPANESE PATENT NO: 75 16,760. PRODUCTION OF SILICON CARBIDE WHISKERS. Showa Denko K.K.

Powdered silica is mixed with a carbonaceous powder (e.g. petroleum coke), and a carbonisable agent (e.g.sawdust) and a caking agent (e.g. rubber) are added in minor amounts. The mixture is pelletised, the pellets are carbonised, treated with oxygen for 40 min. at 500°C and with hydrogen for 5h. at 1500°C to produce SiC. whiskers.

PART 10. MISCELLANEOUS - Asbestos and Health.

231 SOME COMMON QUESTIONS ANSWERED. J.D. Christian. Northern Miner, Dec. 11. 1975, p.13 (Extract of article)- Continuation of abstract from No: 2 issue 1976.

A hazard to the public?
You have asked about the risk of living in Toronto, as compared to Thetford or Regina. Most of the studies on the relationship of asbestos diseases to mortality rates have been carried out in the occupational field, and before absolutely denying any public health risk, scientists agree that more data must be collected over an extended period of time. However, a number of studies have already

been carried out and there is to date no evidence, scientific or otherwise, to suggest that anyone in the general public has ever contacted any disease from exposure to the minute amounts of asbestos released into the community air through the use, or wearing, or weathering of finished asbestos products.

As far as water is concerned the Conference of the International Agency for Research on Cancer, held in Lyon, France, in the fall of 1972 - which I feel should represent as qualified and authoritative an opinion as is available - provided the following information:

Question: "Is there evidence of an increased risk of cancer resulting from asbestos fibres present in water, beverages, foods, or in fluids used for the administration of drugs?".

Answer: "Such evidence as there is does not indicate any risk".

You might well ask at this point "If this is so, then why the great hue and cry?" In the scientific, legal and bureaucratic world, there are those who have a craving to push the panic button and who define "a hazard" as "something which may possibly occur" even though they are unable to produce any evidence to support their contentions. No one denies that there have been - and still are - problem areas. The world today is faced with many, many problems, all of which must be viewed in their proper perspective, and"panic" legislation is not the answer. The asbestos and other industries are working hard to correct the conditions which are thought to create a health hazard. Unfortunately, final proof will not be available for 20, 30 or even 40 years. In the meantime, the best that any prudent person can do is to continue to research all aspects of the problem, to analyse the facts and trends as they become known, and to set goals and standards which will progressively reduce the element of risk and hopefully will finally eliminate it entirely.

232 WORKING CONDITIONS AT FACTORIES PRODUCING ASBESTOS CEMENT ARTICLES. Zh. E. Endibaev and M.T. Tokmuratov. Khim. Tekhnol.Silik., 1974, 46-48; "Nauka" Kazakh SSR, Alma-Ata,SSSR

Mechanical working of asbestos cement articles results in formation of a fibrous dust in concentrations of 150-80 mg m^{-3} (the permissible concentrations limit is 6 mg/m^{-3}). The mechanism of the dust dispersion and fall-out was studied.

233 U.S. PATENT NO: 3,900,611. PARTICULATE MATTER SUPPRESSION USING A SOLUTION OF A SURFACTANT AND A POLYMER. Hemlab A.G.

Dust and particulate matter is prevented from becoming airborne in mines of coal, asbestos, etc., by means of aqueous solutions containing a non-irritant amphoteric surfactant, optionally with addition of an anionic surfactant, and an optionally quaternised polyacryloamide.

234 ASSOCIATION OF TRACE METALS WITH CHRYSOTILE ASBESTOS.
G. Reimschussel. CIM Bull. 1975, 68(760), 76-83.

The carcinogenic action attributed to asbestos may in fact be caused by certain metals present in asbestos. In this connection the presence and behaviour of iron, nickel, chromium and manganese in asbestos (especially in mineral gauge attached to it) was studied. It was found that small amounts of iron and nickel (and sometimes chromium) isomorphously replace magnesium and silicon in the crystal lattice of chrysotile asbestos.

235 U.S. PATENT NO: 3,887,462. DISPOSAL OF AQUEOUS EFFLUENTS CONTAINING ASBESTOS. Dow Chemical Co.

Waste waters contaminated with asbestos are pumped into underground cavities (e.g. brine wells), where asbestos is contacted with finely dispersed limestone and settles.

236 FRENCH PATENT APPLICATION NO: 2,245,926. SHOCK-ABSORBING PLUGS FOR HUNTING CARTRIDGES. S.P.A. Munizioni e Cartucce Martignoni.

Plugs having improved mechanical properties are produced from a mixture of high-density and low-density polethylene, with addition of a carbonaceous filler and asbestos fibres. The plugs are inserted into the cartridges under high pressure.

PART 11.REVIEW OF JOURNALS.

"ASBESTOS", February 1976.
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237 BOLIVIAN BLUE ASBESTOS, p.4.
238 IAIC FORMS STANDING COMMITTEE, p.6.
239 AIA/NA CO-ORDINATES INDUSTRY RESPONSE, p.8.
240 OHSPAC ACCREDITATION COMMISSION, p.10.
241 DUST COLLECTION SYSTEMS, p.12.
242 MARKET CONDITIONS: GENERAL BUSINESS, p.14.
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243 PRODUCTION-IMPORTS-EXPORTS, p.18.
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244 1975 ANNUAL REPORTS: JAMES HARDIE ASBESTOS, p.28.
245 UNITED ASBESTOS, p.30.
246 NEW ASBESTOS PATENTS, p.40.