ASBESTOS BULLETIN

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Editor: Dr. C. Z. Carroll-Porczynski

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CANADA

1. Asbestos – under pressure
The Northern Miner Nov. 27, 1980
Brian Nolk

The next few years will be difficult for Canada's asbestos industry. Economic and political pressures are forcing most of the producers to reassess their mining and milling operations and their traditional export markets, and at the same time, to wage a public education campaign to combat the growing hysteria in the public press over asbestos.

As the pressures increase over the next few years, the industry will go through a kind of trial by fire. However industry spokesmen are confident asbestos mining will remain one of Canada's largest and most profitable mining sectors well into the 21st century. After all, asbestos (and asbestos companies) are known for being able to take the heat.

The short term picture is grim though. Production for the first eight months of 1980 amounts to only 826,000 metric tons, down 15% from the same period last year when 956,000 metric tons were produced. The annual figure could be as low as 20% less than the 1979 total of 1,501,000 metric tons.

These declining sales figures have forced several companies to lay off asbestos workers. Asbestos Corp., the second largest producer in the country, lost 12 weeks' production from March 4 to May 26 when its 1,500 workers went on strike. Even so, the market remains so soft the company will suspend all operations at its Thetford Mines facilities between Dec. 31 and Jan. 26 and will reduce the work week from six days to five for the next six months.

A total of 530 mine and mill workers are out of work in Quebec's Eastern Townships, the heart of Canada's asbestos industry, and inventories of unsold fibre are high. Carey Canada, for example, is saddled with 15,000 tons of fibre, compared with normal circumstances when supply barely keeps pace with demand.

The largest factor in the down-turn is the general recession, which has slowed construction activity across North America and much of Europe. Since these two markets account for about 70% of Canada's production, and since the largest single end use of asbestos is in asbestos-cement construction materials, this decline was inevitable.

M. E. Taschereau, president of Asbestos Corp. warns, "consumption of asbestos-cement in the United States and Western Europe has reached its maximum and may gradually decline in future years." He gave the negative publicity concerning the health hazards of asbestos and the growing preference for more sophisticated construction materials as the reasons for this development.

With American and European consumption levelling off after a partial rebound in 1981, Canadian producers hoping to grow must look further afield for new customers. Several industry analysts see the stagnant traditional markets being more than offset by increased demand from developing countries. Mr. Taschereau states, "We know of new asbestos-cement plants either in operation or being installed in Tunisia, the Middle East, the Philippines, Nigeria, Malaysia and Sri Lanka to name only a few. There is no more appropriate product than asbestos-cement for a developing country to supply its needs for pipe, siding and roofing."

J. R. M. Hucheson, president of the Quebec Asbestos Mining Association and chairman of the board of Johns-Manville Canada, concurs, "There is marked growth in less sophisticated market areas, such as the developing countries, being one of the first commodities they can produce themselves, and at a low cost. I must add there is also a growing market for asbestos-cement in other countries who have a more advanced economy, especially in the Far East."

These new, high-growth markets are by no means wide open to Canadian exporters. Many of the less stable economies of the Third World suffer from shortages of hard currencies and have a less than desirable track record of meeting their credit obligations.

Another wild card in the export game is the Soviet Union, long the largest asbestos producer in the world (2,581,755 metric tons in 1978, according to the U.S. Bureau of Mines), which is expected to increase its exports to countries outside the traditional Communist bloc "captive market". Although the U.S.S.R. is not expected to make a dent in the world fibre markets for at least five or 10 years, few producers would wish to find themselves involved in a price war with the Soviet Union a few years down the road.

A second and less predictable factor in plotting the future of Canadian asbestos is the number of increasingly hostile government regulations being adopted or considered by governments around the world and at home.

In Ontario, the royal commission on asbestos hazards has opened amid strident accusations of industry neglect from workers and their union representatives. The Ontario Workmen's Compensation Board is tabling evidence linking 40 deaths and 100 disabilities to asbestos exposure at one Johns-Manville plant in Scarborough alone. There is no doubt the extensive coverage of these situations by the news media is adversely affecting consumer confidence in asbestos products.

At the same time, however, the results of the most comprehensive scientific study yet conducted into the relationship between asbestos exposure and lung cancer have been published recently. The results will hopefully restore much of the lost consumer confidence, and help to balance government arguments for more stringent and extensive dust control standards.

The 14-year study of asbestos workers in Quebec, which was established in 1966 as part of a program at McGill University, does point to a direct relationship between increased exposure and increased risk of developing lung cancer. However, the conclusions link the risk of exposure of one fibre per cubic centimetre, a condition widely experienced in Canadian mills, to be

"the equivalent of smoking just a few cigarettes per week."

"There are forces at work in Europe, in the European Economic Community countries that could have a detrimental effect on the asbestos industry if they regulate in a discriminatory manner," states Mr. Hutcheson. "Similarly, there are forces at work in the U.S., in the Occupational Health Safety and Health Association, in the Environmental Protection Agency and in the Consumer Product Commission, that are very active, and their activity represents a definite threat to our industry," he says.

M. Dorais, former AMAQ president goes even further. "If the anti-asbestos movement were to continue to evolve through the 1980s at the same rate and in the same way that it has during the 1970s, there is no doubt the asbestos situation, already sufficiently critical, would become untenable, causing serious repercussions for mining production."

Existing legislation has already crippled the short fibre market, which accounts for more than half the production in Quebec. Manufacturers of flooring felts, for example, which once contained 85% asbestos, have been driven by regulatory pressures to use fiberglass and other substitutes. Other uses of short fibres are under similar pressures to switch.

Mr. Hucheson insists there must be a line drawn somewhere. "Until substitutes come along that can match the unique qualities of asbestos, and there has not been any, some uses are just going to continue, that is unless society decides it does not want them at all and pays the higher price for it."

2. Advocate's earnings close to $1 million

In the first nine months of this year, Advocate Mines earned $990,000 (16.5¢ per share), compared with a net loss of $6,633,000 ($1.11 per share) for the same period last year.

The improvement is attributed to increased recovery of fibre at its Newfoundland asbestos mine, cost reductions, and profit participation received from Consolidated Rambler Mines of $1,303,000. The latter amount is subject to a Newfoundland tax of $260,000.

The company foresees a profit for the year, if all continues to go well, Chairman and President E. R. E. Carter states in the interim report. Potential future tax credits resulting from previous losses are about $7,628, the report indicates.

3. Brinco acquires 98% of Cassiar

Brinco Ltd. advises that it has acquired 98% of the outstanding shares of Cassiar Resources pursuant to its $16.15-a-share purchase offer which expired Nov. 18 (N.M., Nov. 13/80). Steps are not being taken to acquire the remaining Cassiar shares under provisions of the Canada Business Corporations Act.

The asbestos mining operations of Cassiar in north-central British Columbia are expected to contribute substantial cash flow and earnings and provide a base for future growth. Brinco vice-president N. M. Peters says.

The company intends to consolidate the mining and exploration activities of Cassiar with those of its wholly owned subsidiary Brinex Ltd., which will change its name to Brinco Mining Ltd. and operate out of Vancouver. J. D. Little, currently president and chief executive officer of Cassiar, will fill the same position with Brinco Mining, while J. C. O'Rourke, now vice-president mining of Brinco Ltd., will become executive vice-president of Brinco Mining.

4. Cassiar net lower after increase in taxes

Net earnings of Cassiar Resources for the first nine months of 1980 were $8.3 million compared with $9.6 million for the same period in 1979. The decrease from the previous year is the result of the higher tax rate for the current year, J. D. Little, president, says. The comparative earnings per share were $1.51 and $1.75 respectively.

The company has announced a fibre price increase effective Jan. 1, 1981. This price adjustment will result in approximately a 12% increase in sales revenue for 1981. Sales for the third quarter of 1980 were 28,481 tons which exceeded production by approximately 1,000 tons. Included in sales revenue is $860,000 received from the sale of jade. Jade is found as a by-product in mining asbestos ore. Prior to this year, the quantity of jade sold has not been significant, Mr. Little says.

Waste removal costs has escalated, so the amortization rate has been increased from $10 to $10.75 per ton of ore mined from July 1. Diamond drilling to date from the exploration adit has indicated a faulted extension or a separate ore lens containing in excess of 5,000,000 tons of asbestos-bearing material and economic evaluation will continue, concludes Mr. Little.

Working capital at Sept. 30 totalled $24,063 compared with $15,138 a year earlier.

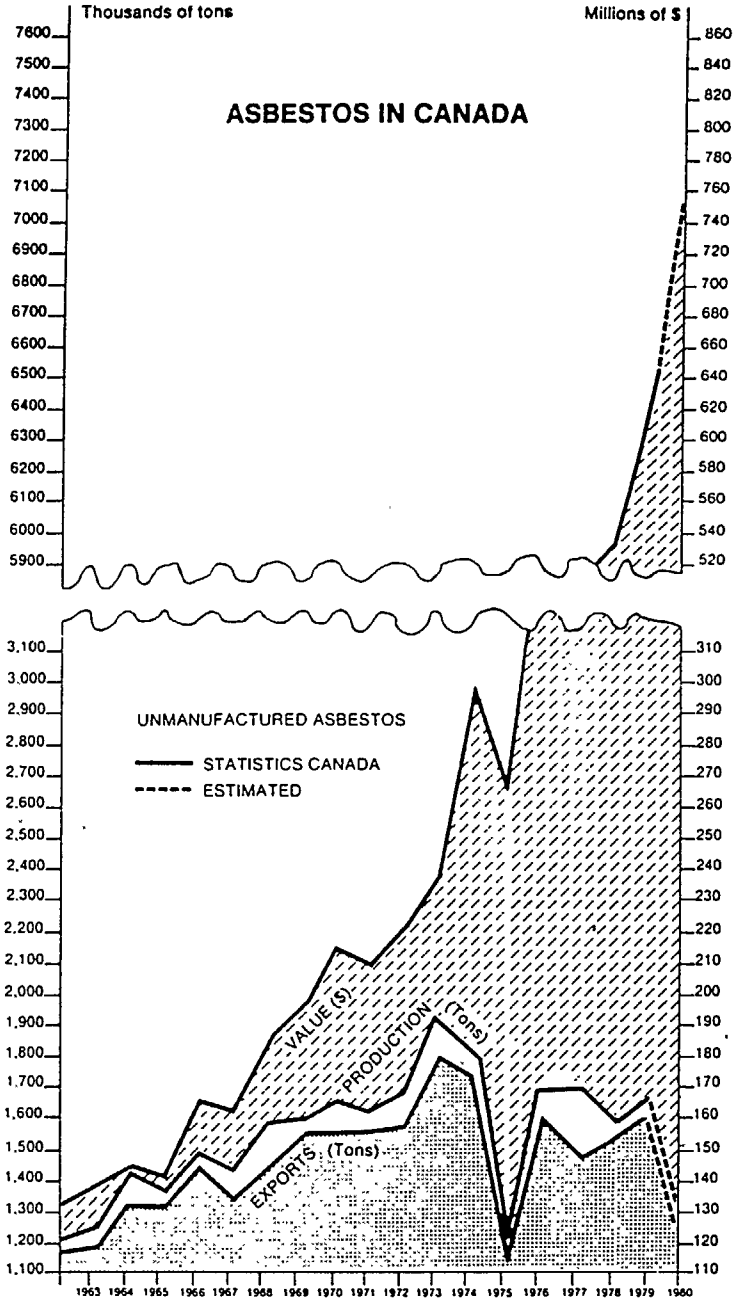
5. United Asbestos earnings grow
The Northern Miner Nov. 27, 1980

Earnings of United Asbestos Inc. are continuing their upward stride. For the six months ended Sept. 30, net income came to $5,810,899 or 82¢ a share, a 15% improvement over the same period last year. Revenues grew by 7% to $14,335,105 from $13,342,268.

Second quarter performance exceeded that of the first quarter. Net income for the three months to Sept. 30 rose 22% to $3,167,629 or 45¢ a share, from $2,592,963 or 36¢ a share in 1979; while revenues showed a gain of nearly 12% at $7,571,208 vs. $6,772,820.

6. Advocate Mine
The Northern Miner Nov. 27, 1980

Asbestos operation received good news earlier this year when it was announced that the board of directors and the participating companies have decided to make the necessary investment to see the operation through its current difficulties caused mainly by a mining situation



which will necessitate the removal of very large amounts of waste material.

7. Lake Asbestos beautifies area
QAMA Bulletin No. 3, 1980

Lac d'Amiante du Quebec Ltee has planted pine and spruce saplings to cover a waste dump at Black Lake, Quebec. Several tests of grass sowing have been carried out, an operation made difficult by the very nature of the soil which is mostly sterile stone. Having obtained good results on a few acres of land, a hydraulic sowing truck has been developed to spread a mixture of grass, weeds, clover, mulch and fertilizers on the terrain. The program, which requires major investments and continuous work, provides for the covering, within 20 years, of a total of 145 acres.

8. Canadian Patent 1,077,176. Neutralizing Waste Sulphuric Acid
Centre de Recherche Industrielle du Quebec

Magnesium is recovered from asbestos tailings in the form of magnesium sulphate by treatment with sulphuric acid contained in waste waters from titanium dioxide manufacture or steel pickling. The magnesium sulphate thus obtained can be used as fertilizer additive.

9. Canadian Asbestos Shipments September 1980

	Metric tonne	Value $000	Cumulative Totals Metric tonne	$000
Asbestos Milled Fibres, Group 3 GR				
United Kingdom	711	874	2,700	3,360
France			184	245
Germany West			596	835
Italy			91	113
Netherlands			1	1
Spain	36	46	112	137
Bulgaria			101	93
Czechoslovakia			1,374	1,712
Turkey			91	115
Fr. Africa Nes			19	24
Hong Kong			12	23
India	30	33	606	751
Peoples R. China			234	381
Japan	30	40	1,229	1,512
Korea, South			207	262
Australia			6	8
Argentina			81	130
Brazil			599	746
Colombia			9	11
Mexico			190	241
United States	159	199	2,599	3,325
Total	966	1,191	11,041	14,024
Asbestos Milled Fibres, Group 4 & 5				
United Kingdom	12,572	9,965	38,235	30,875
Ireland			1,141	1,080
Austria	1,249	1,017	5,750	4,331
Belgium-Luxembourg	1,905	1,416	10,458	7,582
Denmark			1,638	933
Finland	73	66	635	578
France	3,874	3,061	33,201	23,801
Germany West	1,383	1,084	27,767	21,234
Greece	500	432	1,178	989
Italy	1,976	1,597	21,540	17,443
Netherlands	328	291	3,580	2,891
Portugal	350	274	4,102	3,295
Spain	1,575	1,115	8,417	6,163
Sweden			23	11
Switzerland	436	347	7,260	5,665
Bulgaria			199	192
Czechoslovakia			2,828	2,392

	Metric tonne	Value $000	Cumulative Totals Metric tonne	$000
Romania			1,869	1,535
Yugoslavia	468	397	5,136	4,412
Emirates, U.A.			522	418
Iraq			36	20
Israel			595	515
Kuwait			501	448
Lebanon			699	612
Syria			550	474
Turkey			347	333
Egyptian A.R.			5,496	3,877
Kenya			73	55
Nigeria	2,690	1,982	14,123	10,100
South Africa			25	13
Tanzania			328	209
Algeria			4,486	3,269
Angola	345	241	1,387	1,027
Zaire			211	159
Morocco	337	297	927	710
Senegal			489	362
Bangladesh			180	116
Sri Lanka	2,150	1,497	3,908	2,750
Hong Kong			180	101
India	1,621	1,386	15,611	12,730
Malaysia	1,083	845	15,821	11,364
Singapore	81	70	524	435
Burma			306	183
Indonesia	1,837	1,380	6,659	4,927
Japan	2,127	1,361	27,738	16,748
Korea, South			153	60
Philippines	70	55	890	551
Taiwan	271	142	8,847	7,722
Thailand	533	421	5,282	4,290
Australia	91	74	10,643	8,900
New Zealand			2,712	1,823
Argentina	272	277	2,801	2,270
Brazil	90	53	1,497	982
Chile	425	378	1,987	1,497
Colombia	376	308	12,497	8,394
Ecuador	200	157	2,350	1,912
Paraguay	100	78	100	78
Peru	575	443	2,325	1,689
Uruguay	8	5	398	280
Venezuela	150	116	728	510
Belize			299	214
Costa Rica			513	323
Cuba			2,106	1,720
Dominican Rep.	85	63	1,602	1,164
El Salvador			1,057	771
Guatemala	150	116	399	249
Honduras			272	168
Mexico	2,068	1,494	24,292	18,897
Neth. Antilles			108	106
Nicaragua			581	411
Panama			120	53
United States	3,935	2,702	46,127	34,782
Total	48,359	37,003	407,365	307,173
Asbestos Shorts, Group 6–9 Grades				
United Kingdom	957	205	22,818	4,870
Ireland			874	366
Austria			1,892	441
Belgium-Luxembourg	1,060	243	7,038	2,143
Denmark	18	3	214	26

Finland		73	8	322	38
France		1,557	417	16,075	3,688
Germany West		2,311	673	25,661	6,502
Greece		18	3	531	158
Italy				585	126
Netherlands		324	61	8,278	1,601
Portugal		192	48	3,041	865
Spain		35	7	3,419	1,039
Sweden		54	20	728	262
Switzerland		490	121	4,382	1,305
Czechoslovakia				564	227
Yugoslavia		90	37	793	323
Israel				19	4
Syria				18	2
Turkey				273	37
Kenya				154	38
Nigeria		500	141	6,556	1,646
Algeria				1,998	832
Angola		400	100	980	255
Zaire		160	45	319	84
Bangladesh				113	26
Sri Lanka				951	387
Hong Kong				150	17
India		269	45	1,431	328
Malaysia				227	80
Singapore				445	108
Burma				118	43
Indonesia				183	68
Japan		3,413	1,032	69,459	20,322
Korea, South		90	14	1,490	355
Philippines				709	264
Taiwan		372	97	6,019	2,040
Thailand		599	250	5,219	1,943
Australia		70	10	723	121
New Zealand				102	16
Argentina		660	207	6,328	1,609
Brazil		596	95	5,379	903
Chile		120	34	1,842	365
Colombia		550	98	5,690	1,277
Ecuador		112	28	1,167	349
Paraguay		50	13	50	13
Peru		200	50	1,481	309
Uruguay		24	7	597	148
Venezuela		827	174	3,466	879
Dominican Republic		24	3	239	74
El Salvador				620	198
Guatemala		100	25	279	53
Mexico		411	97	7,354	1,697
Puerto Rico		20	3	137	20
United States		23,883	4,754	198,164	39,984
	Total	40,629	9,168	427,664	100,871

U.S.S.R.

10. "Uralasbest" in the Final Year of the Current Five-year Plan

A. A. Korolev
(translated from Russian)

Ural asbestos mining–milling combine is the leading concern in the asbestos industry. This combine produces 62.4% of the Soviet asbestos, and accounts for 30.2% of the world's asbestos output. It also provides all the asbestos exported from the Soviet Union. The main grades produced are P-3-60, P-4-20, P-5-65, M-6-40. The combine incorporates 20 sections and subsections, including two asbestos mines, three asbestos milling plants, anthophyllite asbestos mining, asbestos millboard factory, mechanical works, large building panels and other structural building materials factories. The total personnel numbers about 19,000, including 15,000 of labour force.

During the current year new equipment was introduced to operate open-pit mines, in particular five excavators (capacity 8 m^3 each), four drills, five traction aggregates (weight 380 t), etc.

The asbestos milling factories obtained new separators based on the fluidized bed principles, multi-screen sifting machines, ventilated fiberizers, asbestos dedusting machines (AS-1600), centrifugal pneumatic sifting machines, periodical action sifting machines (capacity 100 ton/hour). The installation of the new equipment was accompanied by the development of new technological procedures. The transport was equipped with automatic traction locomotives.

The rationalization of the asbestos technology involved 1,581 workers (labour 1,100); about 1,246 schemes were introduced. Attention was also paid to the fuel economy, and to the saving of the electrical energy.

Major savings were achieved in the production of rolled ferrous sheets used in the construction and repair of the equipment, and in the welding technology. In the field of explosives considerable savings were attained by using explosive mixtures containing cheap ammonium saltpetre and combustible materials; 30% of the total explosives consisted of such inexpensive compositions.

The five-year plan was exceeded (no absolute figures are given).

11. U.S.S.R. Patent 730,656. Milling Asbestos Fibres

A. I. Teplyashin et al.

Milling of asbestos fibres for use in asbestos-cement articles is carried out in presence of tetra-ethoxysilane. Ultrasonic vibrations are also applied. The adhesion of asbestos fibres to cement is enhanced, and the strength of the fibres is increased.

REPUBLIC OF SOUTH AFRICA

12. Msauli Asbestos 1979 results

Net income after taxation for the year ended December 31, 1979, was R3,495,000 compared with R4,112,000 in 1978. R2,580,000, equivalent to 40¢ per share was distributed to shareholders vs. R3,387,000 and 52.5¢ a year earlier. Msauli owns the entire issued share capital of African Chrysotile Asbestos Ltd., which sells Chrysotile asbestos fiber produced from its mine situated in the Ka Ngwane homeland, formerly known as the Barberton District in the Transvaal. General Mining and Finance Corporation Ltd. continues to render administrative, secretarial and technical services to Msauli.

A significantly improved level of sales (90,574 tons vs. 80,707 tons) continued throughout the year, mainly due to a shortage of competing fibers in some markets. Demand in 1979 was strong and sales were limited only by the production capability of the mine. A continuation of steadily improving geographical distribution of Msauli fiber is expected, especially in the light of a growing shortage in the supply of certain Chrysotile grades. Additional fiber cleaning equipment installed during 1979 has been successful and the mine is now well placed to satisfy a variety of stringent and specific customer requirements.

13. Republic of South Africa – Asbestos production

Coal, Gold & Base Minerals Sept./Oct. 1980

	Production MT		*Exports R value FOB*	
Mineral	*July*	*August*	*July*	*August*
Amosite	4.695	3.917	1.535.617	1.779,110
Chrysotile	8.769	9.563	1.238.271	1.637,053
Cape crocidolite	10.445	10.218	4.492.128	4.502,017

U.S.A.

14. Imports

s. tons	*1978*	*1979*
Asbestos, amosite		
South Africa	1,270	428
Total	**1,290**	**509**
Asbestos, chrysotile		
Canada	578,750	533,886
South Africa	6,245	2,773
Total	**585,786**	**537,036**
Asbestos, crocidolite		
South Africa	18,446	14,691
Total	**18,590**	**15,243**

15. Asbestos Production, Quarterly Statistics Imports, Exports

			1978*	1979*		
	1977	1978*	December	March	June	September
Mine production						
Chrysotile .....tonne	50,601	62,383	24,887	13,444	15,980	22,463
IMPORTS						
Chrysotile.....tonne	53,555	30,107	5,277	2,753	3,378	5,467
Canada.....*tonne*	*53,155*	*28,459*	*4,845*	*2,753*	*3,268*	*5,369*
Others.....*tonne*	*400*	*1,646*	*431*	–	*110*	*98*
Value.....$'000	25,243	14,363	2,272	1,017	1,840	2,838
Amosite .....tonne	11,129	8,490	3,326	1,568	640	1,035
Others.....*tonne*	–	–	–	–	–	–
Value.....$'000	4,717	3,543	1,386	668	268	488
Other types .....tonne	9,583	3,464	1,004	858	725	135
Value.....$'000	4,050	1,472	390	296	355	25
EXPORTS						
All types and grades .....tonne	20,510	37,094	9,421	10,075	7,751	12,550
Value.....$'000	14,264	16,829	3,409	3,501	3,050	3,466

16. Woodsreef shareholders approve new consolidation
The Northern Miner Dec. 4, 1980

It's been a case of "back to the drawing board" for Woodsreef Mines (TSE), as a result of which a more attractive-sounding package of restructuring and financing has emerged than previously contemplated.

Shareholders at a special meeting held in Toronto on Nov. 26 have approved a one-for-five stock consolidation and a change in the company's name to Transpacific Asbestos Inc.

Mr. Clay expects to have the new issue cleared with the TSE by year-end or early January. The plan is to raise approximately $10 million.

Meanwhile, the company has just completed a private placement of $2,050,000 of 11% convertible debentures. "Now we have the funds to get on with the main job on hand – the wet milling process and the elimination of funded indebtedness," Mr. Clay said.

This means that Woodsreef Minerals can exercise its option to purchase 45% of the recently patented wet milling process for asbestos (which eliminates environmental and health hazards) from its 58%-owned Australian subsidiary, Woodsreef Mines; the latter retains a 5% interest in the process.

It also means the go-ahead for the construction of the long-planned wet prototype mill in Australia.

YUGOSLAVIA

17.

An expansion plan is now underway at the Kolubara asbestos mine and plant located near Kragujevac in Serbia, Yugoslavia, and operated by the Stragari mining and industrial combine. Around 836m. Dinars (£12m.) is to be invested to extend the asbestos board factory and to build an asbestos paper factory. The scheme should be completed by late 1982, and will quadruple the capacity of the Stragari combine to 15,000 tpa of processed asbestos.

FRANCE

18. Asbestos Imports

	1978	1979
Canada	43,185	59,836
U.S.S.R.	38,029	24,857
South Africa	8,330	16,328
Total	110,612	126,476

GREECE

19. Kozani Asbestos

In the industrial minerals sector, MABEM, a subsidiary of the State-owned Hellenic Industrial Development Bank, is currently developing a large asbestos deposit at Zidani in the Kozani region, close by the Xeralivado chromite mine. Capital investment in the project is expected to reach $67 million.

The deposit is associated with serpentinised Alpine peridotite in which the asbestos occurs as chrysotile. The deposit grades on average 2.5% asbestos, that is to say 2.5 tonnes of chrysotile per 100 tonnes of serpentinite, and the proposed mining plan allows for a cut-off grade of 1.5%. Reserves are approximately 100 million tonnes, sufficient to provide 4 million tonnes of mineable grade material annually over 25 years. Recent drilling has indicated good grade asbestos down to a

further depth of 200 m and has also outlined a second, smaller deposit in the same locality.

The processing plant and related facilities are scheduled for completion late in 1980 with maximum capacity expected to be attained towards the end of 1981. Four grades of asbestos – 4, 5, 6 and 7 – will be produced with grade 4 accounting for 15% of total output and grade 7, 10%. Of the total annual production, 75% will be exported, principally to Europe.

The processing plant is located less than 1 km by road from the deposit which is to be mined by conventional open pit methods. A series of benches have been prepared between the 720 m and 580 m levels with bench widths ranging from 16 m reducing to 8 m at the base of the pit. The overburden ranges in thickness between 5 m and 40 m and comprises soft sand and silt with only occasional thin conglomeratic horizons. Waste stripping has been accomplished successfully using two O & K RH75 hydraulic front shovels and two Caterpillar 992C 10 m front end loaders. For actual mining, two Schramm rotary drills have been purchased to prepare the ground for blasting. Both ore and waste haulage will utilise a fleet of five 80 tonne capacity Caterpillar 775 trucks. The project stands to benefit from its proximity to the Kardia power station based on the large lignite deposits of the Ptolemais basin.

PART 2A. ASBESTOS-CEMENT

20. Special device for repairing broken asbestos-cement pipe couplings

Ford announces their new A/CME band repair especially made for the quick and permanent repair of broken or leaking asbestos-cement couplings of all diameters. Available to fit metric and other standard pipe, the Ford A/CME band repair device features a special rubber strap of the proper width and size to replace the broken steel clamping mechanism to assure the watertight, permanent repair of all leaks. The one hundred per cent all stainless steel construction insures maximum strength and corrosion resistance as well as lightweight easy installation. For specific information write about A/CME bank repair device to:

The Ford Meter Box Company, Inc.
P.O. Box 443
Wabash, Indiana 46992 U.S.A.

21. "Tekhnologiya Asbestotsementnego Proizvodstva, Uchelnoe Posobii" (Technology of Asbestos-cement Production, Textbook)

V. M. Kolbasov
(Moskovskii Khimiko-Teknologicheskii Institut; Moskow, 1979, 45 pp. (Russian): rub. 0.12

22. The Behaviour of Asbestos-cement Pipes under Various Water Quality Conditions. A Progress Report, Part I

R. W. Buelow et al.
Proc. AWWA Annu. Conf. 1979 (Pt 2), 777–783

Conditions under which water does not attack asbestos-cement pipes and those under which the water attacks these pipes are listed. Calculations of the Aggressive Index alone are not sufficient to predict the behaviour of asbestos-cement pipes. Metals, such as zinc, iron or manganese in the water can change the behaviour of asbestos-cement pipes.

23. Japanese Patent 80 05,403. Asbestos-cement Plates Reinforced with Steel Wires

Kubota Ltd.

Sandwich-type plates are produced by feeding a mixture of asbestos, cement and sand onto a conveyor; then applying a layer containing steel wires and an acrylic or epoxy resin; and applying another asbestos–cement–sand layer. Then water is introduced from both sides of the laminate. The laminate is subsequently dried and cured.

24. Japanese Patent 80 79,080. Forming Multicolour Coatings

Suzuka Toryo Co.

A substrate with an embossed pattern is created over the whole surface a differently coloured coating, and then the top layer of the coating is removed to expose the protruding parts of the embossed pattern. By this method, a coloured pattern can be produced on, e.g., an asbestos-cement board.

25. Technology of Asbestos-cement Products (Technologiya Asbesto-tsementnykh Izdelii)

V. V. Timashev and Yu. S. Grizak
(Stroiizdat, Moscow) 1979, 335 pp. (in Russian), 075 rub.

26. Concentration and Size of Asbestos Fibres in Water Supplies

J. R. Millette et al.
EHP, Environ. Health Perspect. 1980, 34, 13–25

The result of more than 1,500 analyses of water in the U.S.A. are reviewed. The majority of samples are harmless. In some cases, however, the water-borne asbestos fibre concentration exceeds the 10^{6} fibre/l, the limit. This is caused by natural erosion of asbestos containing rocks, or mine gangues, asbestos-cement piping, asbestos-cement tiles, etc.

27. U.K. Building Materials Trends in Production

Annual Statistics, Central Statistical Office

Asbestos-cement Products in thousands tons

1972	*1973*	*1974*	*1975*	*1976*	*1977*	*1978*
562	600	548	423	444	450	429

28. **Nature, Structure and Properties of Asbestos-cement Dust**
J. Baeten, J. Helsen and A. Deruyttere
British Journal of Industrial Medicine 37: pp. 33–41, 1980

Total dust samples produced by machining three commercial asbestos-cement products (autoclaved sheet, non-autoclaved sheet, pipe) were examined for their dimensional, surface, and physicochemical characteristics. Microscopic inspection of dust fractions with different settling characteristics in air allowed determination of the simple dimensional features that apply to respirable fibres – that is, the true diameter, length, and aspect ratio and the coil diameter, coil length, and coil aspect ratio. The respirable fraction as a percentage of the total dust varied with the type of machined product: 8.5% for non-autoclaved sheet, 10.5% for autoclaved sheet, and 35% for pipe.

Quantitative X-ray diffraction of different granulometric fractions showed that the asbestos content decreases with fraction size (thus the asbestos content will change with distance from the dust source). Electron microscopic examination of fine dust (aerodynamic diameter $<7\ \mu m$) showed that only about 10% of the inspected particles were optically virgin. From these observations it has been calculated that the threshold limit value of 2 fibres per cm^3 of air corresponds to a total dust concentration of 1.2, 0.6 and 0.1 mg/m^3 and to a maximum admissible respirable dust content of 0.1, 0.06 and 0.04 mg/m^3 for non-autoclaved sheet, autoclaved sheet, and pipe respectively. The surface of optically virgin fibres may still be contaminated by calcium containing particles, as shown by analytical transmission and scanning electron microscope. Dust from the autoclaved product contains fewer calcium coated fibres. The physicochemical behaviour of dust, as shown by dissolution kinetics and adsorption of carcinogens from tobacco smoke, is comparable to the behaviour of cement rather than of pure asbestos. In general, asbestos-cement dust differs consistently from pure asbestos. Conclusions, drawn from studies on pure asbestos, cannot be applied as such to asbestos-cement dust.

29. **Japanese Patent 80 02,343. Lightweight Roofing Material Resistant to Weathering**
Mitsubishi Cement Co.

Roofing material is produced by moulding a slurry containing Portland cement, sand and asbestos (10–30%); coating with another slurry containing Portland cement, sand, asbestos (10–30%) and, optionally, pigments. The laminate is pressed, autoclaved, dried and coated with a weathering-resistant material, e.g. acrylic resin. The bending strength of the product is 535 kg/cm^2. The water absorptivity is 17%. The density is 1.63 g/cm^3.

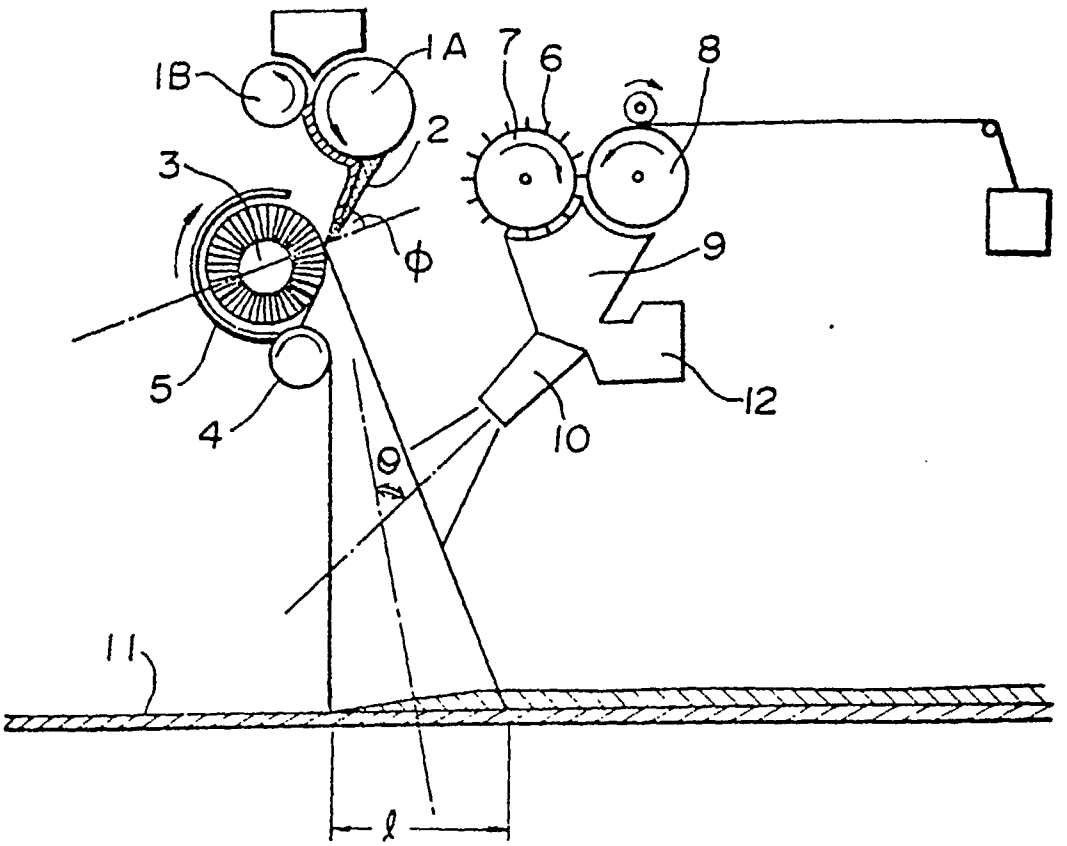
PART 2B. GLASS REINFORCED CEMENT

30. **U.S. Patent 4,194,946. Process for Continuously Preparing Fibre Reinforced Cement**
Asahi Glass Co. Ltd., and Nakashima Mfg. Co.

Disclosed is a process for continuously preparing a fibre reinforced cement.

31. **U.S. Patent 4,204,644. Spraying Apparatus for Preparing Glass Fiber Reinforced Cementitious Product**
Inventor: Mikio Kozuka, Yokohama, Japan

A spraying apparatus for preparing a glass fiber reinforced cementitious product comprises a roll type cementitious mortar spray mechanism and a chopped strand spray mechanism which sprays a glass fiber chopped strand into the cementitious mortar stream sprayed by the roll type cementitious mortar spray mechanism.



32. U.S. Patent 4,214,027. Process for the Production of Fibre Containing Plaster Boards
J. Bold, S. Franks & A. Knauf
Gebr. Knauf Westdeutsche Gipswerke

A monolithic fibre-reinforced board which is sufficiently thick to be suitable for use as a floor element is disclosed.

33. The Development and Introduction of Glass-reinforced Concrete Pipes to the World Market
J. W. Heavens
Pipes & Pipelines International, April 1980, 18–23

A review of technology developed by ARC Concrete Ltd. for the production of glass-reinforced concrete pipes. Tables below indicate usable tensile strength of various cement reinforcing fibres, and the Figure 1 shows the effect of adding glass fibre to concrete.

Table 1. Typical properties of reinforcement materials

	(a) Specific gravity	(b) Elastic modulus (GPa)	(c) Tensile strength (MPa)	(d) Useable* strength (MPa)	(e) Specific useable strength (d/a)
Asbestos	2.7	175	3,000	2,500	926
Glass fibre	2.5	80	1,400	1,100	440
Polypropylene fibre	0.9	8	900	80	89
Steel	7.8	200	500	300	38
Nylon fibre	1.1	4	400	40	36

* Useable strength in concrete matrix = yield strength or strength at 0.01 strain if elastic modulus is less than that of concrete.

Table 2. Effective cost per unit of useable strength

	(a) Useable strength (MPa)	(b) Efficiency factor*	(c) Cost per tonne (£)	Effective cost (bc/a)
Glass fibre	1,100	1	1,500	1.4
Asbestos	2,500	10	500	2.0
Steel	300	3	250	2.5
Polypropylene	80	1?	400	5.0

* Efficiency factor = approximate percentage by weight to achieve 15 MPa flexural strength.

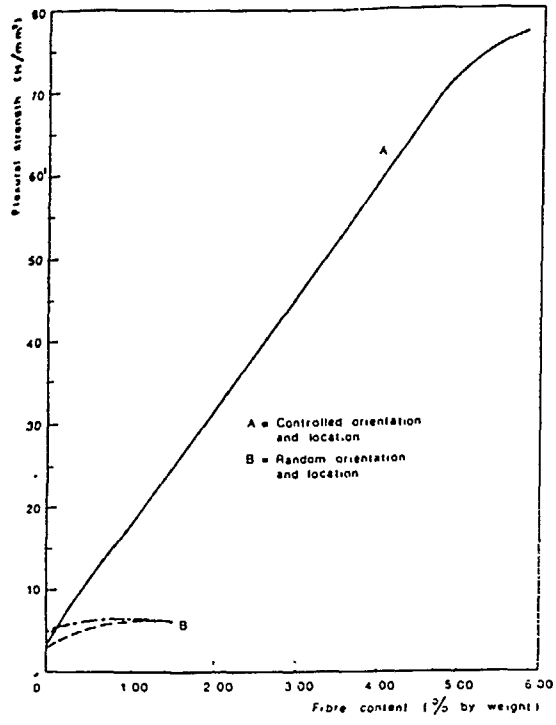


Fig. 1. Fibre reinforced concrete. Effect of adding glass fibre to concrete.

34. U.S. Patent 4,203,788. Methods for Manufacturing Cementitious Reinforced Panels
Inventor: Theodore E. Clear, 903 Harrison

Reinforced facings, including reinforcing webs entrained in hydraulic cement via a slurry bath, adhere to a nailable lightweight aggregate cementitious core to form a panel web. The reinforced web is formed on abutting conveyed carrier sheets, and the web is transversely cut, between the sheets, while moving or when stopped, in response to sensing of the sheets. The cut panels, on respective sheets are stacked for curing without damaging the panel edges and in a manner to minimize panel flex. Slurry bath, facing applicators, and cutter and stacking apparatus are included.

35. British Patent 1,568,589. Glass Fibre Cutter
Fujita T., Kikuchi T., Nakazawa K.
(to Nitto Boseki Co., Ltd.) June 4, 1980

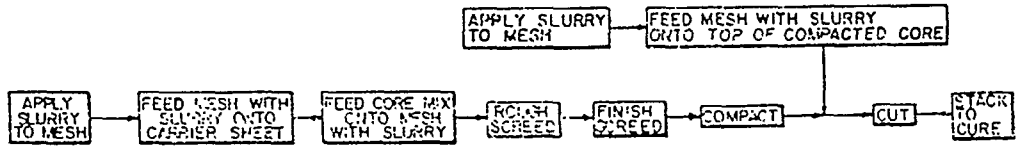
Continuous filaments are chopped into finite fibres of predetermined length by a driven roll equipped with spaced, parallel, radially extended blades biased into cutting engagement with a resilient filament feed roll. The feed roll is driven by the flanges of the cutting rolls.

36. British Patent 1,563,190. Cementitious Compositions
ICI Limited, U.K.

A high modulus of rupture can be achieved by adding water soluble polymers. In addition their impact strength can be improved by adding small quantities of fibres.

37. U.S. Patent 4,205,992. Alkali Resistant Mineral Fibres
Rockwell Intern.

Alkali resistant, synthetic, mineral fibers have a composition consisting essentially of: SiO_2; Al_2O_3; iron oxides (calculated as FeO) CaO; MgO; TiO_2; R_2O; wherein R is an alkali metal.



PART 2C. STEEL FIBRE–CEMENT COMPOSITES

38. U.S. Patent 4,210,009. Reinforcement Fibres
Rocla Concrete Pipes Ltd.

Fine fibres of steel for use as concrete reinforcement are produced by longitudinally slitting continuous steel strip to form narrow strip segments and severing the strip segments at intervals along their length. The strip is slit longitudinally on passing between a pair of nip rollers having intermeshing circumferential tongues and grooves so that penetration of the tongues into the grooves severs the strip longitudinally. The resulting strip segments are passed between chopping rollers which chop them into discontinuous fibres and also deform the thus formed fibre ends to promote anchorage in the concrete.

39. Technical Report – Fibre Concrete Aircraft Parking Ramp at McCarran International Airport
Charles W. Josifek.
The International Journal of Cement Composites, Vol. 2, No. 4, pp. 235–238

During October and November 1979, the new 18 acre (7.2 ha) aircraft parking ramp of steel-fibre reinforced

concrete was constructed at McCarran Airport in Las Vegas, Nevada. This ramp is the largest of its kind in the world constructed of fibre concrete.

Construction Operations:

Fibre concrete for the ramp was mixed in 7 yard^3 (5.32 m^3) batches using a modified Rex 8 yard^3 (6.08 m^3) central batch plant with a tilt-up mixer. Minor plant modifications included a free-standing 96 ton (86.4 t) storage silo for the fly ash, and a conveyor belt for feeding fibres on to the central belt used for carrying aggregates, cement and fly ash to the mixer.

The steel fibres were added directly to the conveyor from their plastic shipping bags, each of which contained 66 pounds (29.7 kg) of fibres.

Using fly ash permitted a 38% reduction by volume in the amount of cement required in the concrete. In addition, the advantages of using fly ash in place of cement include improved concrete curing properties through a reduction in hydration heat and the possibility of related concrete cracking, better concrete internal workability and external handling properties, conservation of relatively scarce Portland cement and petroleum based construction materials such as asphalt, savings of 77–80% of the cost of Portland cement not needed, and the constructive use of a waste material which otherwise would have to be removed from the environment.

PART 3. ASBESTOS TEXTILES AND ALTERNATIVE MATERIALS

40. U.S. Patent 4,208,244. Asbestos Dispersions
TBA Industrial Products Ltd.

Asbestos fibre dispersions for the production of strands or filaments are prepared by dispersing asbestos in an aqueous medium containing a soap and excess of free higher fatty acids (containing at least 12 carbon atoms). A smooth and homogeneous dispersion is obtained.

41. U.S. Patent Application 58,658. Flexible Formulated Plastic Separators for Alkaline Batteries: NASA

Non-woven substrate, such as mats of asbestos inert with respect to the aklaline electrolyte, is coated with a composition containing a polyphenylene oxide polymer, and organic additive (e.g. hydrolysed polyester), inorganic filler (titanates, mixed silicates, zirconates), and polyethylene spheres or wood flour as an organic filler.

42. U.S. Patent 4,214,028. Resinous Polymer Sheet Materials having Surface Decorative Effects
Congoleum Corp.

Title sheets are produced by embossing, e.g. asbestos felt sheets provided with smooth acrylic coating. The colouration is provided by inorganic pigments.

43. Spanish Patent 483,612. Flame-resistant Composition for Clothing
R. F. De Paula Perella

Fabric fireproofing composition comprises ammonium sulphanate, carboxymethyl cellulose, amyl acetate, micronised asbestos, mica or silica; the balance is water. The composition is applied to the fabric by spraying. The retention is 1–2 years.

44. Technology and Production of Manmade Mineral Fibres
R. Klingholz Gruenzweig, Hartmann, and Glasfaser AG
Ann. Occup. Hygiene 20: 153–159 Oct. 1977

The main production methods used for manmade mineral fibres (MMMF) are drawing, a combination of blowing and centrifugal force, and flame attenuation. These methods determine the fibre size and the probability of occurrence of fibres within the respirable range. 2 refs.

45. Comparison of Asbestos with Other Fibres Industrial Minerals Sept. 1980

Felt type	*Retail cost per roll ($)*	*Squares*	*Single square (one layer) ($)*	*Material cost per square ($)*	*Installed cost per square ($)*	
					Range	*Average*
Organic felt	10.00	4	2.50	7.50 (three layers)	100–160	126.00
Asbestos felt	23.50	4	5.75	11.50 (two layers)	115–160	132.50
Fiberglass felt	28.50	5	5.60	16.80 (three layers)	110–160	140.00
Membrane single-ply	35.70	1	35.70	35.70 (one layer)	–	150.00

Fibreglass is the biggest possible replacement, for example *Refrasil* (Hitco Materials). *Thermo-Sil* (Garlock Inc.), and *Zetex* (Newtex Industries Inc.) have temperature resistance of 550°C to 1600°C with good physical properties. Ceramics such as *Nextel* (3M), *Thermo-Ceram* (Garlock Inc.), and *Fiberfrax* (Carborundum Co.) are good in the temperature range 1,200/1,500°C; polymers such as *Nomex*, *Kevlar*, and *Teflon* (all the Dupont Co.) are good for 300/500°C range; carbon such as *Celion* (Celanese Plastics and Specialties Co.) is very expensive. Asbestos is still regarded as the most cost effective material since, for example, if fibreglass is exposed to the surface it draws in water and promotes decay.

PART 4. FRICTION MATERIALS

46. U.S. Patent 4,218,361. Friction Material
Carlisle Corp.; Molded Materials Co.

Material having high wear resistance, heat resistance and mechanical strength, is produced from asbestos fibres, a phenolic resin, blast furnace slag fibres, rubber particles, a filler and ferrous or non-ferrous metal particles. This material is suitable for use in brake linings and pads.

47. U.S. Patent 4,212,906. Method for the Production of Carbon/Carbon Composite Material
R. Fisher & N. Smith. Dunlop Ltd.

A method for the deposition of carbon on a fibrous compressible substrate to produce an all-carbon composite article comprises locating the fibrous substrate in a furnace provided interiorly with a ram, bringing th ram into contact with the substrate so that the substrate is subjected to pressure by the ram and cracking a hydrocarbon gas in the furnace to deposit carbon on the pressurised substrate.

48. Japanes Patent No. 80 03,366. Composite Binder for Ceramic Products
Takeda Chemical Industries Limited

Title binders are asbestos-polyol composites. The polyol can be polyethylene oxide. It is dissolved in solvent and mixed with asbestos fibres. The solvent is then evaporated. In an example, this binder was mixed with magnesium oxide and heated to 1200°C to obtain a forsterite-containing ceramic material.

PART 5. ASBESTOS REINFORCED PLASTICS, SUBSTITUTES

49. Composites of Cellulosic Fibres with Polyolefins or Cement. A Short Review
M. D. Campbell et al.
Ind. Eng. Chem. Prod. Res. Dev. 1980. 19 (4), 596–601

The tensile properties of polyethylene reinforced with various fibres (including asbestos) were studied. The effect of humidity was examined. 45 References are quoted.

50. U.S. Patent Application 79,914. Flexible Separator for Alkaline Batteries
U.S. National Aeronautics and Space Administration

Battery separator consists of a porous substrate, such as an asbestos sheet, coated with a composition containing a polyphenylene oxide polymer, an organic additive (e.g. polyethylene) and an inorganic additive (e.g. a titanate, silicate, zirconate, etc.).

51. Effect of Surfactants on Adhesion of Butadiene Latex to Asbestos Fibres
L. N. Erkova and I. N. Konovalova
I Z V Uyssh. Uchebn. Zaved. I Khim. Tekhnol., 1980 23 (3), 348–351 (in Russian)

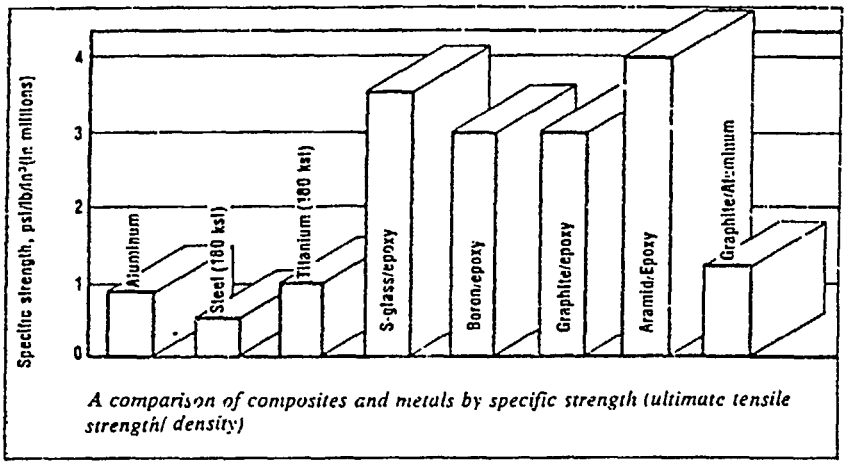
Anionic surfactants (e.g. sulphanol, sodium dodecyl sulphate or sodium alkylsulphonates) increase the adhesion of polybutadiene to asbestos fibres. Cationic or non-ionogenic surfactants have adverse effect.

52. Japanese Patent No. 80 02,346. Decorative Boards containing Polydiallyl Phthalate
Fiji Polymer Industries Co.

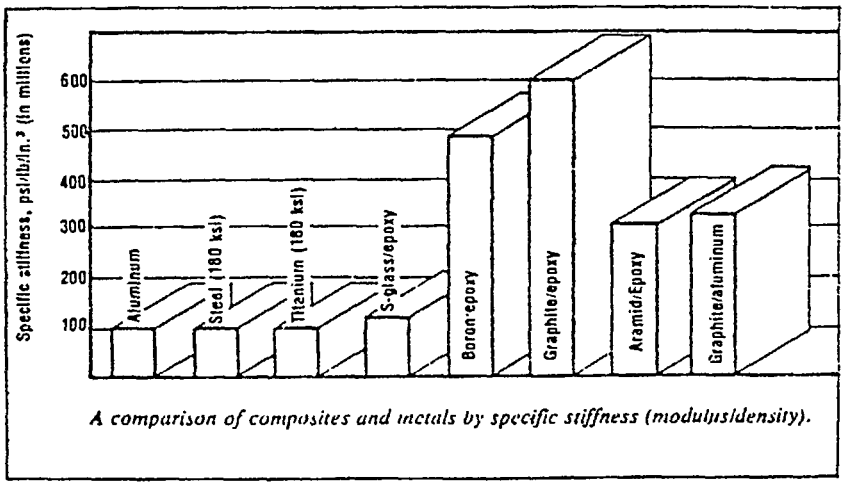
Alkali-resistant decorative boards are produced by impregnating paper with the title polymer, and laminating the paper with plywood or asbestos. The diallyl phthalate is combined with triallyl isocyanurate.

56. The Reinforcing Fibers – Performance at a Price
Advance Composites Jan. 1980
R. H. Wehrenberg

Increased demand for lighter weight, stronger and stiffer materials has resulted in an abundance of fibers and grades from which designers can choose. But the primary concern is still cost.



A comparison of composites and metals by specific strength (ultimate tensile strength/ density)



A comparison of composites and metals by specific stiffness (modulus/density).

Composite data shown are for 0° unidirectional laminates. Source: Advanced Composite Design Guide, Air Force Flight Dynamics Laboratory, Wright Patterson Air Force Base. Aramid is Du Pont's Kevlar 49.

PART 6. BUILDING MATERIALS – PLASTIC PIPES, COMPOSITES

57. Building Materials
Edited by V. M. Bhatnagar
Construction Press, Lunesdale House, Hornby, Lancaster, U.K.

This volume contains the carefully edited papers presented at the 1980 European Conference on Building Materials.

Contents:

Effect of calcium chloride content of concrete on reinforcement. P. Abbaticchio, V. Amicarelli & M. Petrella.

New basic concepts in the evaluation of the aggressiveness of natural waters. G. I. D. Halleux.

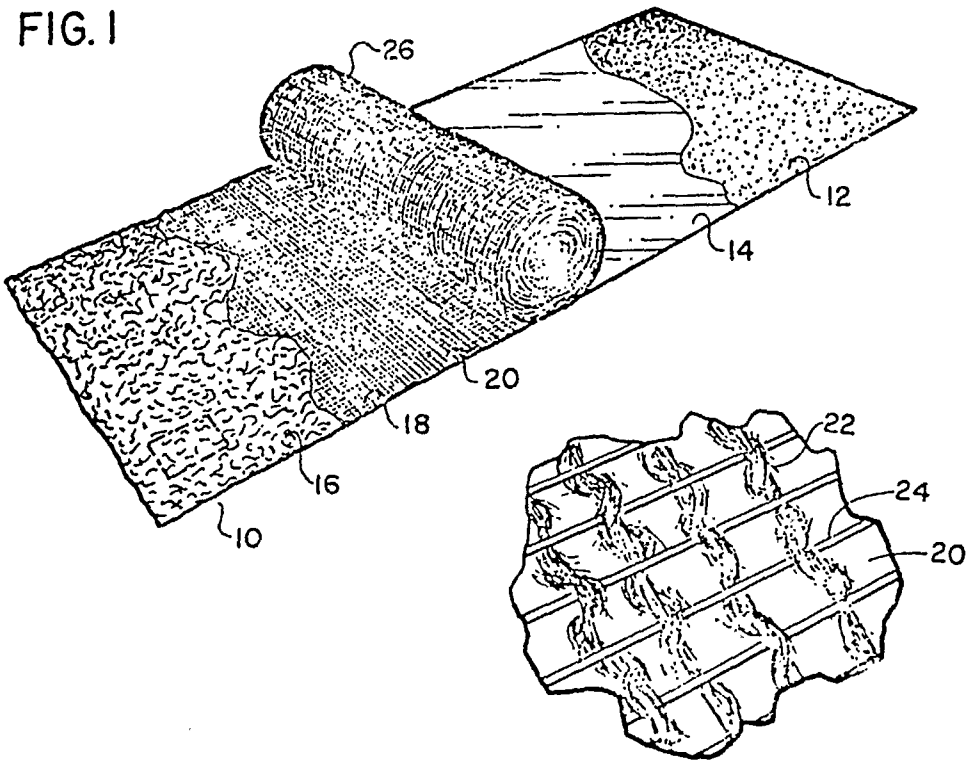
Concrete – its application for new types of precast constructions. P. Knaze & J. Slimak.

Influence of steel-fibre shape on the strength properties of fibre-reinforced concrete. K. Komlos.

58. U.S. Patent 4,213,516. Acoustical Wall Panel
Am. Seating Co.

An acoustical panel comprises a core material formed of a plurality of stratified layers of glass fiber pressed together under heat and pressure to form a board having a front surface and a rear surface, the average density of each layer increasing from the front surface to the rear surface and being in the range of approximately two-six pounds per cubic foot respectively is disclosed.

FIG. 1



59. U.S. Patent 4,212,913. Roof Coating System
J. P. Auten

A roof coating system of high tensile strength and resilience comprises an underlayer of coating material, an intermediate layer of woven fiber glass fabric, and an overlayer of the coating material bonded to the underlayer with the intermediate fiber glass fabric layer embedded between the underlayer and overlayer, the woven fiber glass fabric including strands of bulked yarn in a relatively loose weave, and the coating material comprising an acrylic resin emulsion.

60. Japanese Patent 80 51,756. Tiles
Kobayashi Bloek Kogyo K.K.

Thin tiles with high resistance against impact and cracking are produced from clay with addition of asbestos fibres, optionally obsidian spheres and water glass. The tiles are subsequently fired.

61. High-strength uPVC Pipe
Pipes and Pipelines International April 1980

In recent years, the use of pipes manufactured in plastics materials has increased rapidly: in fact, it is estimated that more than 100,000 km of unplasticised polyvinyl chloride (uPVC) pressure pipe alone has been installed in the U.K. Initially, plastics pipes were mainly supplied in small diameters, but current British Standards for uPVC now extend to 24-in. pipe, and diameters of 16 in. and 18 in. are regularly being used. Following some seven years' research and development, IMI Yorkshire Imperial Plastics has introduced a high-strength uPVC pipe (HSPVC) under the brand name "Superpolyorc", which is a development from the company's conventional "Polyorc" uPVC pipe. The new product is stronger and more ductile than conventionally-extruded uPVC pipe, despite reduced wall thickness, which also gives the benefit of lighter weight. It is designed for the conveyance of raw or potable water, or sewage. The performance of the pipe exceeds current British (BS), German (DIN), and US (ASTM) standards for uPVC.

PART 7. ASBESTOS PACKING, COATING, SEALING COMPOSITIONS

62. Sealing, Coating, Substitutes: Higher Cost, Lesser Quality
Q.A.M.A. Bulletin No. 4, 1980
Workshops on Substitutes for Asbestos, U.S.A.

Mr. Eric Wormser, of Gibson-Homans, the largest U.S. manufacturer of sealing and coating compounds, was invited to review the numerous problems posed by the replacement of asbestos in various products. His

analysis was based on the results of several studies and tests conducted by his company in an attempt to find and develop valid substitutes for asbestos.

According to Mr. Wormser, all the money and efforts invested in the search for substitutes have yet to give satisfactory results, particularly in the case of sealing and coating compounds for roofs. In these products, the asbestos fibre acts as a binding agent and helps to increase the cohesion, viscosity, elasticity and plasticity of the mixtures. Being inert, it is not subject to aging, and so enhances the resistance and the durability of the products.

Conclusive experiments

"In spite of the tremendous amount of work that has been done to try to find a substitute raw material that will produce satisfactory roof coatings and roof cements, to the best of our knowledge no one has found such a material. As a result of our company's vast research, by complicated formulating techniques, utilizing a variety of ingredients and techniques, we are now able to produce solvent base asphalt roof coatings and roof cements which do not include asbestos fibre. We do not yet offer these asbestos free roof coatings and cements for sale in the United States because they are about 15% more expensive to produce and we believe they are not as good as comparable products made with asbestos. It is difficult to justify selling an inferior product for more money."

"We are shipping considerable quantities of asbestos free coatings and cements to Sweden, where the use of asbestos fibre in such products has been banned. Therefore, we are gaining experience in the volume manufacture of such products and have the opportunity to observe their performance in large scale use."

Furthermore, Mr. Wormser feels that a ban on the use of asbestos in the manufacture of roof coatings and cements would be a great disservice to the public. "Once the asbestos is bound in the roof coating and cement vehicles, it can do no harm to anyone. Therefore, a ban would not benefit anyone. On the other hand, it would force on the public a flood of very poor products at high prices."

Energy savings

While admitting that it is possible to produce asbestos free products, Mr. Wormser further pointed out that such production goes against the current trends in industry and government policies regarding energy consumption.

"The only method we know for manufacturing reasonably satisfactory asbestos free roof coatings and roof cements is to combine some less than satisfactory substitute fibres with a variety of mineral fillers, wetting agents, plasticizers and synthetic thixotropes."

"We manufacture about 250 different roof coatings, cements and mastics. A variety of techniques must be used to achieve acceptable results in each of these products. The end result in every case is a product that contains considerably less asphalt, tar or other waterproofing oil and much more filler material than when asbestos is used. These fillers contribute nothing to the waterproofing properties or weathering of the products. To the contrary, these filler materials often detract from the desirable properties. These formulas require from 30 to 70% more energy in our plants to manufacture."

63. High-temperature Flexible Seals and Gaskets

Prefabricated flexible seals and gaskets for use in hostile environments at temperatures up to 1000°C are now being manufactured from Refrasil woven amorphous-silica cloth in thicknesses of 1.0, 1.6, 2.0 and 2.5 mm by the Chemical and Insulating Co., Ltd., West Auckland Road, Darlington, DL3 0UR. The material has good chemical stability at high and low temperatures under the action of most acids, excluding phosphoric and hydrofluoric acids, but including sulphuric acid. It is a widely used replacement for asbestos and a practical alternative to glass fabrics and mineral wool which deteriorate rapidly in corrosive environments.

PART 8. INSULATING MATERIALS

64. British Patent 1,562,154. Composition and Process for Forming Filled in Organic Resin Cements in Solid or Cellular Form

Arthur D. Little Inc., U.S.A.

Short fibre reinforced magnesia cements are described.

65. Relation Between Strength and Moisture Content for the Products Made from Cement

Shiibo, Hiroyuki

Fukuoka Daigaku Kogaku Shuho 1980, 24, 37–42 (in Japanese)

The relation between moisture content and strength of autoclaved lightweight concrete and asbestos–Ca silicate boards was studied. In the concrete a rapid increase in compressive strength was observed where the rate of weight loss was 40%. For bending strength of high temperature (110–150°C) and rate of wt loss –30%, minute cracks were generated which caused further reduction of bending strength. In the asbestos board the compressive strength increased where the rate of weight loss was –30%. Reduction in bending strength was not observed accompanying a high temperature rise which was thought to be caused by the effects of the asbestos fibres.

66. U.S. Patent 4,214,032. Insulating Felts Reinforced by Fibrous Materials particularly for the Waterproofing and/or Corrosion-proofing of Metal and/or Concrete Objects

Csikos R.

An insulating felt for waterproofing and/or corrosion-proofing metal and concrete objects, said insulating felt comprising asphalt, a softener, a plasticizer, fine-grained material and a reinforcing material is disclosed. The felt additionally contains a pyrolytic resin. The pyrolytic resin and the asphalt when admixed in liquid phase, at a temperature over the softening point, produce a homogeneous mixture of the asphalt and the pyrolytic resin.

67. **All-round Insulation**
Financial Times Oct. 27, 1980

External and internal insulation systems have been announced by Blue Circle Industries and Biltonglow.

A premixed rendering material for insulating outer walls is based on Portland cement, expanded polystyrene beads and resin additives, and needs only the addition of water on site. Called Thermacote, it is applied by trowel or spray, usually to thicknesses of between 30 and 60 mm, dependent upon the degree of thermal insulation required. This is used in conjunction with Fibrocem Blocmix and Blue Circle High Build, says Blue Circle, to produce a thermally efficient, impact and weather resistant system which may be easily applied by any competent plasterer.

Blue Circle has also launched Thermascreed, a polystyrene aggregate concrete premix for giving thermal insulation to floors and flat roofs. It can be laid by conventional methods or, alternatively, it may be mixed and placed mechanically. When used for floors it can be surfaced with a sand cement screed, and on roofs a thin cement/sand screed to provide a surface suitable to receive most waterproof coverings.

68. **Canadian Patent 1,070,789. Radiation-resistant Cable**
Haveg Industries Inc.

Cable consists of a conducting core sheathed with a moisture barrier layer (such as Mylar), an asbestos layer containing a saturant for heat and radiation resistance, a layer of heat-sealable polyester, and an outer, abrasion-resistant braided jacket sealed to the polyester.

PART 9. REFRACTORY FIBRES

69. **British Patent 1,560,110. Silicon Carbide Coated Filaments and Ribbons**
Avco Corporation, U.S.A.

Silicon carbide is made by depositing silicon from silane/hydrogen vapour onto a graphite fibre core. The properties of the fibres are optimized when the inner sheath is carbon-rich and the outer sheath is stochiometric.

70. **U.S. Patent 4,205,032. Rigid Articles of Refractory Fibres**
Zirconal Processes Ltd.

This invention provides a method of rigidizing articles of refractory fibres by impregnating the woven or felted sheet of Alumina or Zirconia with Zirconium salt, a gellation-inducing agent, e.g. aminoalcohol and a gellation-delaying agent, e.g. magnesium acetate.

71. **U.S. Patent 4,207,408. High Tenacity Phenolic Resin Fibres**
J. Economy, F. J. Frechette & L. C. Wohrer
Carborundum Co.

An infusible cured phenolic resin fibre has a birefringence of at least 2 x 10-3 with an X-ray diffraction pattern off the fibres showing an amorphous halo, wherein at least about 50% of the phenolic hydroxyl groups of the resin are blocked.

72. **U.S. Patent 4 199 336. Method for Making Basalt Glass Ceramic Fibres**
Corning Glass Works

A method of producing glass-ceramic fibres having a diameter not greater than 250 microns and having a fine-grained, mixed magnetite-clinopyroxene crystals phase constituting at least 35% of fibre, comprises melting a raw material batch composed predominantly of a basalt-type material, forming vitreous fibres from such melt while simultaneously forming magnetite nuclei in the glass fibres, and reheating the glass fibres to a temperature between 900–1,250°C for a time not exceeding ten minutes to develop the mixed magnetite-clinopyroxene crystal phase.

73. **U.S. Patent 4 200 485. Method for Making High Purity, Devitrification Resistant, Amorphous Silica Fibres**
Johns-Manville Corp.

A double leaching process for making amorphous silica fibres having excellent resistance to devitrification at temperatures up to 2,500°F is disclosed.

74. **British Patent 1,562,269. Quick Bond Composite and Process**
United Technologies Corporation, U.S.A.

Boron fibres are resin bonded to aluminium foil, which then be stacked and melt pressed to form a composite.

75. James Hardie Annual Report – 1980

For the year ended March 31, 1980, Group sales for James Hardie Industries Ltd., Sydney, New South Wales, Australia, rose 57.2% to A$534-million, profit before tax rose 48.6% to $47.8-million and operating profit before extraordinary items increased 25.6% to $27.1-million. Earnings improved from 60.2¢ per share to 66.5¢ per share. In May 1980 Hardie acquired from Turner & Newell Ltd., its 40% interest in Hardie-Ferodo at a cost of $4.4-million. Hardie-Ferodo and the Better Brakes companies are now wholly-owned subsidiaries.

The Fibre Cement Division makes a wide range of building products and pipes throughout Australia and pre-fabricated building kits and panels in Western Australia. This division increased sales and profit in the second half of the year, particularly in the case of pipes, and both the building products and pipes businesses achieved their objectives for the year.

76. Major Insulation Acquisition
Cape News December 1980

For Cape, the acquisition last October of Newalls' insulation business means that a major objective has been achieved to expand the Group's already substantial insulation interests.

The deal was concluded on October 10 when Cape Industries Limited, through Cape Insulation Limited of Stirling, acquired for a maximum consideration of £13.3m the insulation materials business operated by Newalls Insulation Company Limited, a wholly-owned subsidiary of Turner & Newall Limited. An amount of £12.5m was paid in cash on October 10 and any balance due will also be paid in cash following completion of an audit of Newalls' net assets as at September 29, 1980.

The assets now acquired from Newalls include freehold factories at Washington near Newcastle-upon-Tyne (glass fibre and calcium silicate products) and at Middlesbrough on Teesside (rock fibre products).

These activities, involving some 900 employees, are complementary to Cape Insulation's existing manufacturing activities based in Stirling and Glenrothes, Scotland, and Queensferry near Chester.

77. Asbestos Removal – New Association
Cape News Dec. 1980

Although the subject of "asbestos" has receded from the headlines it still remains a matter requiring special care and attention whenever there is the possibility of exposure to hazardous levels of asbestos dust.

Within the asbestos manufacturing industry millions of pounds have been spent to ensure a safe working environment and there are now strict controls on the use of asbestos-containing products.

Even so, one of the major areas of past asbestos usage has been in the field of insulation and fire protection of plant and buildings. Today, whenever such asbestos applications are found to be damaged or suffering from "old age", removal is to be recommended. Also, when old plant or buildings are to be modernized, or possibly demolished, a careful survey must first be made to establish the extent of asbestos lagging or surfaces which may be present. This is to ensure that before a bolt or brick is moved proper precautions can be taken to strip out all *in-situ* asbestos materials quickly, safely and efficiently.

Highly Specialized

Asbestos removal is a highly specialized task and only to be undertaken by highly trained operatives. If asbestos stories are to be found in the press today they are usually about "cowboy" firms and their customers being fined for inadequate workmanship and non-observation of regulations.

With the growing number of fringe operators, Cape Contracts and other leading companies engaged in asbestos removal, have recently sought to protect and maintain the highest possible standards of procedure and workmanship through founding the Asbestos Removal Contractors Association (ARCA). In addition to Cape, the founding members are Envirocor Ltd. of Lichfield, Merryhill Cleaning Contracts Ltd. of Romsey and R.M.W.S. Group Ltd. of Rainham.

78. £½m Group Effort in Arabia
Cape News December 1980

A contract involving Cape Boards, Cape Insulation and Cape Contracts International, valued at some £500,000, has recently been completed in both the U.K. and Saudi Arabia.

KUWAIT

79. Pipe and Irrigation Works
(Open to invited contractors only)

Tender no. RDD/S/101. Supply and installation of transfer pipelines and irrigation systems, as part of the Kuwait effluent utilisation scheme. Details on payment of KD 400 from Central Tenders Committee, P.O. Box 1070, Safat. CD 18 January.

Pipeworks

Tender no. RDD/S/103. Carrying out pipeworks, as part of the effluent treatment scheme on Failaka island. Details on payment of KD 100 from Central Tenders Committee. P.O. Box 1070, Safat. CD 18 January.

NIGERIA

80. Pump and Treatment Plants

Supply and erection of pumping and treatment plants for the Northern Ishan scheme. Details, on payment of N200, from Chief Engineer, Design Department, Bendel State of Nigeria Water Board, Benin City. CD 30 January.

Pipeline Supply

Supply and laying of steel and AC pipelines in South-

em Ishan, Bendel State. Details, on payment of N200, from Chief Engineer, Design Department, Bendel State of Nigeria Water Board, Benin City. CD 30 January.

Water Treatment Plant

Construction of treatment plant structures and ancillary buildings, and the supply and laying of pipes for phase one of Northern Ishan plant in Bendel State. Details, on payment of N200, from Chief Engineer, Design Department, Bendel State of Nigeria Water Board, Benin City. CD 30 January.

Pump and Treatment Plants

Supply and erection of pumping and treatment plants at Warri-Effurun, Ogume, Ibusa-Okpanam, Agenebode-Ivianopodi, Aviara, Agbalokpe, Illah-Ebu, Benin City municipal, Igueben and Ubiaja (Obhulu) schemes. Details, on payment of N200, from Chief Engineer, Design Department, Bendel State of Nigeria Water Board, Benin City. CD 30 January.

YEMEN (SANAA)

81. Water Tenders to be Issued

Tenders for the first phase of the Dhamar and Ibb water and sewerage projects will be available by December 1980. The first phase comprises six tenders for civil and electromechanical works, and pipe supply.

The completed scheme is to serve more than 120,000 people.

The two projects have been allocated YR43 million ($9.4 million) as first-priority schemes in the 1976–81 five-year-plan. A further YR63 million ($13.8 million) is to be put towards construction during the second plan. Additional finance is expected from West Germany's Kreditanstalt fuer Wiederaufbau and the Netherlands government. The International Development Association (IDA) has already approved a $12 million loan.

ZAMBIA

82. Water Supply Network, Prequalification

Construction of a water supply network for Chipata, under three contracts. Contract (1) water treatment equipment; (2) pumping station; (3) civil works. The project is financed by the West German government. Details from Ministry of Agriculture & Water Development, Department of Water Affairs, P.O. Box RW 291, Lusaka. CDs: (1) 20 November, (2) 15 December, (3) 14 January.

CONTRACTS

83. £4.6m Factories by Boskalis Westminster
Financial Times Nov. 10, 1980

Four separate contracts for the building of 63 factory units, with a combined floor space of about 23,000 sq. metres, add up to £4.6m in new contracts just announced by Merseyside-based Boskalis Westminster Construction.

Construction of all the factory units will generally follow a similar pattern and include asbestos-clad roofs with colour-coated metal cladding for part of the side elevations – the remainder being cavity walls faced externally in rustic brick, and internally with insulated blockwork. All infrastructure works, roads, drains, etc., are included in the contracts.

Administration of the two projects in the south will be from the company's regional office at Portsmouth, Hampshire, and those in Liverpool from the company's Bromborough head office.

84. Myton gets £2m worth
Financial Times December 15, 1980

Construction of a distribution depot at Perivale, Middlesex for Countrycross, a wholly owned subsidiary of the Post Office Staff Superannuation Fund, is to be undertaken by Myton (Taylor Woodrow Group). The contract is worth £2m.

The depot will be occupied by Cadbury and will consist of a main warehouse, a goods-in marshalling area, maintenance building and offices totalling about 6,500 sq. metres.

External walls will be of the brick and block cavity type and coloured asbestos cement corrugated sheet and profiled aluminium sheet cladding will be used. Roofing generally is to be of coloured asbestos-cement corrugated sheeting.

SYRIA

85. Khabour Basin studies start

Bulgaria's Agrovodkomplekt is to start detailed studies on the Khabour basin irrigation scheme in the next few weeks. The studies should be completed in two years. The contract is valued at about £Syr70m ($17.8 million).

UNITED ARAB EMIRATES

86. Sogex Wins Al-Ain Sewer Contract

The Paris-based international contractor Sogex has won the MSC sewerage contract for Al-Ain. The firm was low bidder in the retender with Dh221 million ($59.8 million).

SAUDI ARABIA

87. Pipeline Contracts Awarded

Contracts to supply and lay pipeline in Jeddah and Riyadh have been awarded to local and international companies, consultant VBB of Sweden says.

In Jeddah Jung Woo Development Company of South Korea and Saudi Arabian Biokat, a Saudi–Greek joint venture, have won contracts to lay parts one and two respectively of the water distribution programme's sixth stage. The contract values were not revealed. Large pipe used for the work will be supplied by Smiantit Company, and smaller pipe by the local National Marketing. Both firms have previously won contracts in the water distribution scheme.

Dutch win sewerage contract

Rotterdam-based Ogem has won a SR74 million ($22.3 million) contract to build sewage and water-treatment plants and to lay a water-supply network in Dammam. The work is for the 1,664 apartments the company built for the Public Works & Housing Ministry in a $537 million contract signed in 1977. The 32 18-storey blocks were completed in June 1979.

A further contract – to build roads – is to be tendered soon, probably after the Hajj. Ogem also plans to bid for this job. In the past two years the company has had few successes with civil work contracts, partly because of strong competition from South Korean contractors.

IRAQ

88. Arab Firms Win Sewerage Contracts

Contracts for sewerage and water purification schemes in Baghdad have been won by Iraqi and other Arab companies. The six contracts, totalling ID17.2 million ($58.7 million), were signed with the municipality on 5 November, the Baghdad daily Al-Thawra reports.

KUWAIT

89. U.K. Firm Wins Waterfront Contract

Construction supervision and management for the first phase of the Kuwait water-front development scheme is to be provided by the U.K.'s Brian Colquhoun & Partners. The contract is valued at KD1 million ($3.7 million).

PART 11. ASBESTOS HEALTH HAZARDS. PRECAUTIONS

90. Quebec Gives Boards Asbestos Assistance
The Globe and Mail Sept. 12, 1980

Quebec (CP) – The Education Department will give school boards about $1-million during the next few years to pay for repairs needed to eliminate danger from asbestos construction material in about 20 schools across the province. Georges Dahmen, an expert on asbestos for the Quebec Energy and Resources Department, said yesterday that there is no real danger from asbestos in Quebec schools and the measure is precautionary.

91. Old Asbestos Exposures Showing Up as Casualties
Alberta, Edmonton. The Moncton Transcript, July 25, 1980

Edmonton (CP) – Workers in Alberta heavily exposed to asbestos 10 or 20 years ago are showing up in government files as casualties.

Officials said recently there have been 42 asbestosis claims in the last eight years, 29 between 1976 and 1979.

Tighter standards and reduced use of asbestos have lowered the hazard but officials still estimate between 2,000 and 3,000 workers in Alberta face asbestos exposure.

They include demolition workers knocking down buildings sprayed years ago with asbestos insulation, plasterers and drywallers who work with asbestos products, industrial insulators who replace older asbestos insulation, mechanics who grind asbestos-lined brake shoes and other tradesmen encountering asbestos in older buildings.

Alberta imported more than 3,000 tons of asbestos in 1978, most of it for asphalt road surfacing. There are no over-all figures for use of finished asbestos products.

Officials believe current uses of asbestos will not result in the health problems that have emerged among workers exposed several years ago.

"The great problem is in the past," Dave Gibson, director of occupational hygiene for the province, said in an interview.

He said an exposure limit of two fibres of asbestos per cubic centimetre, safer work practices and protective clothing protect workers from asbestosis (lung fibrosis) and lung cancer.

But, he said, there is uncertainty about how much exposure will result in mesothelioma, a rare cancer with a long latency period. At least two of 21 identified cases of mesothelioma in Alberta between 1970 and 1977 involved asbestos workers.

Alberta has no asbestos mines but many workers may have had heavy exposure in mines in other provinces. There is also a high turnover among workers in the construction trades which makes it difficult to assess exposure.

Gibson said Alberta can expect the discovery of several cases of asbestos-related disease each year.

Dr. Elizabeth Kaegi, who did a study of asbestos for the government in 1979, said claims can be expected to increase because of a greater awareness of asbestos-related diseases among workers.

Her report said up to 50 per cent of workers with significant asbestos exposure may die of cancer. Deaths from cancer in the general population are about 25 per cent.

Alberta workers' compensation board figures show 17 workers are getting pensions because of asbestosis and another nine have died. Board records also list 11 workers with asbestosis who are not disabled.

Based mainly on her report, the provincial government is preparing an intensive testing program designed to detect more cases of asbestos-related disease among workers and detect them sooner, improving chances for treatment.

The program will require medical tests on a regular basis for workers who deal with asbestos or have in the past. The tests will be accelerated for older workers.

The government is also preparing regulations for the use, labelling and storage of asbestos and is continuing a program of reducing asbestos use in Alberta, largely by attempting to persuade industry to find alternatives.

It is considering providing alternate jobs without loss in pay for workers who have asbestosis and are not disabled.

Unions, mainly the Insulators and Asbestos Workers, also want an automatic assumption provision, which would give automatic benefits to workers who show symptoms of asbestos-related disease and have a history of exposure.

92. Toxicology of Fibres
P. Gross & D. C. Braun
(Industrial Health Foundation Inc.)
Chemtech. 10, 436–437, July 1980

This article discusses the toxicity of asbestos, fibreglass, and natural and synthetic organic fibres. (9 refs.).

93. New Asbestos Fibre Counter

A Rapid Fibre Counter specifically developed to accurately measure the level of asbestos dust in industrial environments is now available from Vickers Instruments of Haxley Road, York, YO3 75D, and it will enable industry to comply with Health and Safety regulations covering the use of asbestos in working areas. Asbestos fibres are automatically counted and results are expressed on a four digit read out in fibres per square mm of filter surface or fibres per ml of sampled air. The Vickers M88 enables a single operator to accurately count up to 100 membrane filter asbestos samples per day without eye strain and with minimum fatigue. The Counter has been demonstrated to operate in the range 0.05 to 10 fibres per ml of air, under typical sampling conditions.

94. Respiratory Morbidity in Workers Exposed to Dust containing Phenolic Resin
P. J. Sparks & J. Peters
(Occupational Health Program, Harvard School of Public Health, 665 Huntington Avenue, Boston, M.A. 02115, U.S.A.)
Occupational & Environmental Health, Vol. 45, No. 3, 1980, pp. 221–229

The study suggests that exposure to dust containing phenolic resin had both acute and chronic effects on pulmonary function.

95. Recovery of Ingested Asbestos Fibres from Gastrointestinal Lymph in Rats
P. Sebastian, R. Masse & J. Bignon
Environmental Research 22, 201–216, 1980

96. Clearance of Anthophyllite Fibres from Rat Lung and the Formation of Asbestos Bodies
A. Holmes & A. Morgan
Environmental Research 22, 13–21, 1980

97. Comparative Toxicities of Different Forms of Asbestos in a Cell Culture Assay
Betti Reiss et al.
Environmental Research 22, 109–129, 1980

98. Pulmonary Function of Control and Industrially Exposed Nigerians in Asbestos-cement, Textile and Toluene Diisocyanate-foam Factories
U. G. Oleru
Environmental Research 23, 137–148, 1980

99. Pleural Thickening
Respiratory function changes after asbestos pleurisy
Wright, P. H., Hanson, A., Kreel, L. & Capel, L. H.
Cardiothorac. Inst., London Chest Hosp., London GBR
Thorax 1980 35/1 (31–36)

Six patients with radiographic evidence of diffuse pleural thickening after industrial asbestos exposure are described. Five had computed tomography of the thorax. All the scans showed marked circumferential pleural thickening often with calcification, and four showed no significant evidence of intrapulmonary fibrosis (asbestosis). Lung function testing showed reduction of the inspiratory capacity and the single-breath carbon monoxide transfer factor (TLCO). The transfer coefficient, calculated as the TLCO divided by the alveolar volume determined by helium dilution during the measurement of TLCO, was increased. Pseudo-static compliance curves showed markedly more negative intrapleural pressures at all lung volumes than found in normal lung expansion despite abnormally great distending pressures. The pattern of lung function tests is sufficiently distinctive for it to be recognised in clinical practice, and suggests that the lungs are held rigidly within an abnormal pleura. The pleural thickening in our patients may have been related to the condition described as "benign asbestos pleurisy" rather than the interstitial fibrosis of asbestosis.

100. Alterations in the Surface-related Phenomena of Alveolar Macrophages Following Inhalation of Crocidolite Asbestos and Quartz Dusts: An Overview
Miller, K.
Dept. Immunol., Nat. Res. Inst. Occupat. Dis., South African Med. Res. Counc., Johannesburg SAF
Environ. Res. 1979 20/1 (162–182)

101. Procedure for the Detection and Identification of Asbestos and Other Fibers in Fibrous Inorganic Materials
Monkman, L. J.
Turner & Newall Ltd., Asbestos Fiber Lab., Trafford Park, Manchester M17 1RU GBR
Ann. Occup. Hyg. 1979 22/2 (127–139)

A systematic procedure for the detection and identification of asbestos and other fibres in insulation and other fibrous materials is described. The need for adequate sampling and acid pre-treatment to remove the bulk of the non-fibrous matrix of such samples is stressed. The method requires an initial low-power stereo-microscopic examination followed by petrological polarization microscopic identification of the

fibres. The optical characteristics required for the unambiguous identification of the common asbestos minerals are given.

102. Further Observations on the Short-term Retention and Clearance of Asbestos by Rats, using UICC Reference Samples
Middleton, A. P., Beckett, S. T. & Davis, J. M. G.
Inst. Occup. Med., Edinburgh GBR
Ann. Occup. Hyg. 1979 22/2 (141–152)

Rats exposed to UICC chrysotile 'A', amosite and crocidolite at concentrations close to 1, 5 and 10 mg/m^3 of respirable fibre for a total of 210 h over a 6-week period were killed in five groups at approximately monthly intervals. The asbestos retained in the lungs was estimated by infra-red spectrophotometry after ashing. The results indicated different initial fractional retentions but that the rate of clearance was independent of the type of asbestos and of the concentration during exposure deposition and clearance could be described.

103. Pneumoconioses
Analysis of the cores of asbestos bodies from members of the general population: Patients with probable low-degree exposure to asbestos
Churg, A. & Warnock, M. L.
Dept. Pathol., Univ. Chicago, Chicago, Ill., USA
Am. Rev. Respir. Dis. 1979 120/4 (781–786)

Asbestos bodies were isolated from the lungs of 21 patients who had 300 to 9,000 of such bodies/g of lung tissue, a concentration frequently found in manual laborers in the general population who are not primary asbestos workers. All of the 123 bodies examined by electron diffraction produced diffraction patterns consistent with amphibole varieties of asbestos. Electron microprobe analysis (energy dispersive X-ray spectroscopy) of 46 bodies revealed that 38 of the cores were composed of the commercial amphiboles, amosite and crocidolite, where only 8 were composed of the non-commercial amphiboles, anthophyllite and tremolite. Review of the occupations of these patients revealed that all but one had blue-collar jobs. For many of these persons, putative sources of asbestos exposure such as construction work could be defined, but for some, the source could not be determined. One woman was apparently exposed to asbestos in the practice of her hobby of ceramics, in which she used anthophyllite-contaminated clay. We concluded that commercial amosite/crocidolite asbestos forms the cores of most asbestos bodies in manual laborers in the general population and that the source is usually occupational.

104. Chemical and Photoelectron Spectrometry Analysis of the Adsorption of Phospholipid Model Membranes and Red Blood Cell Membranes on to Chrysotile Fibres
M. C. Jaurand et al.
Brit. J. Ind. Med. 37: 169–174, May 1980.
24 refs.

105. An Epidemiological Survey of Immunological Abnormalities in Asbestos Workers. I. Nonorgan and Organ-specific Autoantibodies
A. Lange
Environ. Res. 22: 162–175, June 1980. 28 refs.

Antinuclear antibodies (ANA) in asbestos workers are significantly correlated with the symptoms of lung fibrosis. The incidence of ANA in asbestosis is not sex dependent. In nonasbestotic asbestos workers ANA are more frequently seen in females rather than in males. ANA, in asbestos workers, belong more frequently to the IgG class and these autoantibodies are found in higher titers in asbestos workers as opposed to the controls. On a group basis DNA antibodies are not significantly elevated in asbestosis. Rheumatoid factor (RF) was found with the highest frequency in male asbestotic cases. However, RF and/or smooth muscle antibody (SMA) positive cases are significantly clustered among workers with chronic sinusitis and chronic bronchitis. Non-organ-specific autoantibodies were found more frequently in those with a vital capacity impairment as opposed to asbestos workers normal in this respect. Organ-specific autoantibodies are rarely seen in asbestos workers. Moreover, except for sheep red blood cells (SRBC) antibodies in women, no correlation was found among some natural and influenza antibodies and non-organ-specific autoantibodies in asbestos workers.

106. Recovery of Ingested Asbestos Fibers from the Gastrointestinal Lymph in Rats
P. Sebastien et al.
Environ. Res. 22: 201–216, June 1980. 38 refs.

Using the transmission electron microscope, asbestos fibers have been assessed in lymph fluid collected from the thoracic lymph duct in five groups of rats previously exposed to asbestos fibers (by ingestion). Ten rats were gavaged a single dose weighing approximately 20 mg. Five were given pure UICC chrysotile A while another group of five had pure UICC crocidolite. All the rats of the chrysotile group were positive animals with recovery rate values ranging from 6.9×10^{-7} to 3×10^{-5} (90% of the fibers being recovered during the first 16 hr following the gavage). The crocidolite group had only three positive animals and lower recovery rate values of 5.7×10^{-8} to 5.6×10^{-7}. A third group was fed a synthetic diet containing 1%, by weight, chrysotile with a majority of short fibers (90% below 4 μm). Of the 15 rats comprising this group, 13 were positive with maximum daily recovery rates ranging from 2.1×10^{-7} to 2.1×10^{-6}. A group of eight rats fed.

107. Exposures to Man-made Mineral Fibers in User Industries in Scandinavia
Schneider, T.
Nat. Inst. Working Environm., Hellerup DNK
Ann. Occup. Hyg. 1979 22/2 (153–162)

Results of man-made mineral fibres (MMMF) measurements in the Danish user industry are reported. Results of a published Swedish report which also mentions

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irritation effects are quoted. The Danish survey was carried out using the same sampling methods as used in the Joint European Medical Research Board (JEMRB) dust survey in the European manufacturing industry. Some other methods were added. Fibre levels during different work situations and not long-term exposure levels were determined. Fibre levels varied from less than 0.05 to over 3 f/cm^3. Fifty per cent of all fibres had diameters less than 1.0 μm. The greatest fibre levels were found during technical insulation and insulation in existing buildings. The concentration and fibre geometry of coarse fibres was determined. Work with MMMF manufactured distributions being comparable with the ones found for modern MMMF.

108. An Epidemiological Survey of Immunological Abnormalities in Asbestos Workers. II. Serum Immunoglobulin Levels
A. Lange
Environ. Res. 22: 176–183, June 1980. 20 refs.

A significant elevation of serum IgA and IgG was found in female asbestos workers below age 36. Higher values of serum IgA, IgG, and IgM were found in male asbestos workers over age 35, when compared to matched controls. Female asbestos workers, over age 35, statistically differ from their controls only with respect to IgG levels. Patients, with asbestosis and with an impairment of blood oxygen saturation, contribute greatly to the elevation of serum immunoglobulin levels in asbestos workers. The asbestosis process, but not chronic bronchitis, is responsible for high serum IgA and IgG levels.

109. Review of Lung Function Data in 195 Patients with Asbestosis of the Lung
Arzt, G. H., Pirtkien, R. & Rosenthal, H.
Lungenfunktionsabt., Allgem. Krankenh. Harburg, D-2100 Hamburg 90 GFR
Int. Arch. Occup. Environ. Health 1980 45/1 (63–79)

LARYNGEAL CANCER CAUSED BY ASBESTOS DUST

110. Problem of Laryngeal Cancer, as Occupation Injury Caused by Asbestos Dust (Hung)
Kup, W.
Klin. ORL, Med. Akad., Berlin-Buch DDR
Ful-Orr-Gege-Gyog. 1979 25/3 (150–152)
Summ. in English and German

As reported by the statistics of the German Democratic Republic, the frequency of laryngeal cancer is steadily increasing. It is not yet clear, whether the influence of the environment plays a role in this respect. This is also valid for the cancerogenic influences of various working places. Only a few publications and case reports are at our disposal. Two cases are reported by the author, in whom laryngeal cancer was probably due to the influence of asbestos dust.

111. Asbestos, Dental X-rays, Tobacco, and Alcohol in The Epidemiology of Laryngeal Cancer
Hinds, M. W., Thomas, D. B. & O'Reilly, H. P.
Occup. Hlth Sect., Washington State Dept. Soc. Hlth Serv., Olympia, Wash., U.S.A.
Cancer (Philadelphia) 1979 44/3

112. A Case of Laryngeal Cancer Due to Occupational Exposure to Asbestos (Germ.)
Ein Fall von Kehlkopfkrebs Durch Asbestexposition am Arbeitsplatz
Kup, W.
Obergutachtenkommission Berufskrankh., Zent. Inst. Arbeitsmed. DDR, Berlin, DDR
Dtsch. Gesundheitswes. 1979 34/35 (1698–1700)
Summ. in Russian and English

Considerably and sufficiently long exposure to a confirmed carcinogenic substance at the place of work, agreement between the place of exposure and the occurrence of the tumour and the fact that a workmate exposed in the same manner contracted the disease indicate that there is a high degree of probability that there is a causal relationship and that sufficient grounds exist for recognizing this illness as an occupational disease. The degree of disablement is calculated on the basis of the socially burdensome necessity of a permanent tracheostoma and of speech impairment. It is estimated to be 60%. The person concerned is unfit to continue working in occupations involving air pollutants.

113. Asbestos in Drinking Water and Cancer Incidence in the San Francisco Bay Area
M. S. Kanarek et al.
Am. J. Epidemiol. 112: 54–72, July 1980. 26 refs.

Age-adjusted, sex- and race-specific 1969–1971 cancer incidence ratios for the 722 census tracts of the San Francisco–Oakland Standard Metropolitan Statistical Area were compared with measured chrysotile asbestos counts in tract drinking waters. The water supplies serving the area have varying contact with naturally occurring serpentine. The t test for multiple regression coefficients and the t test for correlation coefficients showed significant ($p < 0.01$) relationships between chrysotile asbestos content of tract drinking water and white male lung, white female gall bladder and pancreas, and peritoneal cancers in both sexes. Of weaker significance ($0.01 \leqslant 0.05$) were female esophagus, pleura and kidney, as well as stomach cancers in both sexes. These associations appeared to be independent of income, education, asbestos occupation, marital status, country of origin and mobility.

AC12 UNDERGROUND CANALISATION
Published by Verlag Kramer & Co., CH 8001 Zurich. Spiegelgasse 14.

Contents

114. Paphos Irrigation Project
Cyprus
Why Asbestos -cement Pipes were Used

In the Paphos irrigation area about 400 km of asbestos-cement pipes were laid, with nominal diameters from 900 mm down to 80 mm. Only the main canal was constructed as an open canal and 16 km of the Western conveyor was constructed of ductile pipes having diam. 900 to 600 mm. The distribution network, however, is constructed exclusively of asbestos-cement pipe.

The decision to use asbestos-cement pipes was made by the Water Development Department partly for economic reasons and partly because of the excellent previous experience with this material regarding its resistance, tightness and its lack of need for corrosion protections.

115. Planning of a Supra-Regional Water Supply System Styria, Austria

The materials shortlisted for the cases referred to in Styria for the construction of water transport and long-distance mains pipelines have included asbestos-cement, ductile cast iron and rigid PVC. Almost without exception, asbestos-cement pressure pipes, for working pressures of up to 10 and 16 bar at diameters of 200 to 900 mm respectively, proved to be most economical. For the first stage of construction by the South-east Borders Water Association, about 50 kmof asbestos-cement pressure piping (nominal diameters of 300 and 500 mm, for pressures of 10 and 16 bar) are being purchased in 1980 on the basis of public tenders advertised in October 1979. This represents a net value of about 38 million Austrian schillings.

116. Drinking Water Conduit
Cartagena, Columbia

The administrators of this Historically important town established a contract for the construction of a drinking water distribution network, for which asbestos-cement pipes of DN700 and Reka couplings, produced locally, were used. The project, which cost $6,000,000, was financed by the Institute for Urban Development.

117. The Principles of Thrust-Boring and Jacking Part 3.

The third and last instalment of this series of articles describes the thrust-boring process along a curved truck and demonstrates the difficulties involved in practice.

118. 1880–1980 Central Water Supply Centenary Darmstadt, Rhine Valley

The company operates 12 water works, of which two are large, and a distribution network with a total length of 1,416 km. Whilst the oldest conduits, particularly in the urban area of Darmstadt, are principally made from cast iron, asbestos-cement pipes were, with the exception of the house connections, exclusively used for the comprehensive extensions to the distribution which were carried out between 1949 and 1979.

119. Asbestos-cement Pipes for the World's Largest Solar-powered Pumping Station

The French pump manufacturers Pompes Guinard, who have a great deal of experience in water extraction and irrigation, have been busy on the development of pumping plant which is not only simple and sturdy in design, but can also be driven entirely automatically by available solar energy alone. The same criteria apply to the pipework coupled to the pumps – robustness, corrosion-proof materials, low weight and simplicity of installation: so, once again, the choice has fallen on asbestos-cement pipes.

120. 45 km of Supply Pipeline for Industry and Agriculture
Reggio Emilia, Italy

The entire pipeline will be built of asbestos-cement pressure pipes 1000–1600 mm in diameter. A first section has already been completed, and another is under construction.

121. Preventive Measures Against the Development of a Critical Level of Sulphides in Sewage Disposal Plants. Norbert Close.

CEMENT COMPOSITES.
Edited by Dr. R. N. Swamy.
The International Journal of Cement Composites.
November 1980

Contents:

122. Analysis of Fracture by Means of the Fictitious Crack Model, Particularly for Fibre Reinforced Concrete
Arne Hillerborg, p. 177.

123. Creep of Glass-fibre Reinforced Cement Composites in Tension
Howard G. Allen, p. 185.

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