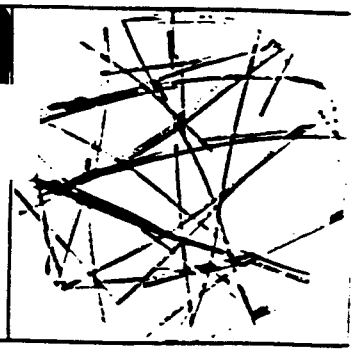
ASBESTOS

INFORMATION

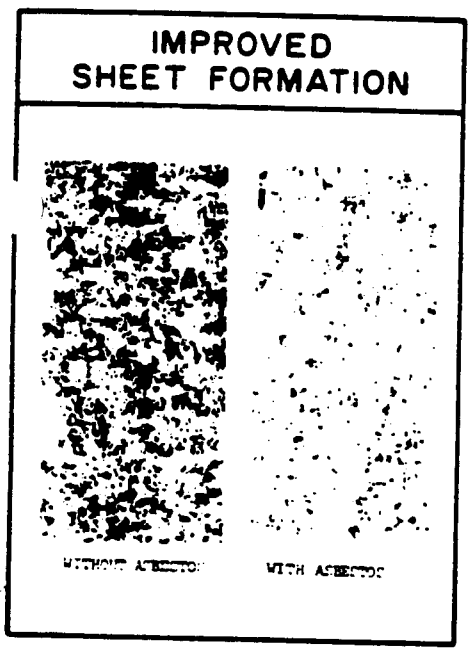
PLAINTIFF'S EXHIBIT
Union Carbide 16



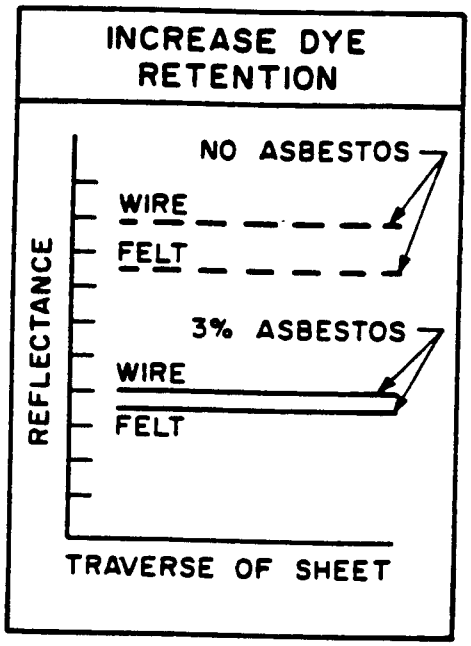
UNION CARBIDE HIGH-PURITY ASBESTOS

A NEW WHITE FIBROUS FILLER AND RETENTION AID FOR PRINTING PAPERS

IT PROVIDES:







PLUS

Opacity	Cellulose Fines Retention
Brightness	Printability Improvements
Reduced Show-Through	Reduced Static Electricity Buildup

A17063

SEE ATTACHED MILL TRIAL DATA

RETENTION OF TITANIUM DIOXIDE IN BOND PAPER

Purpose of Trial: Improve Titanium Dioxide Retention to effect either material cost savings or improve the opacity of 37 lb. Bond produced by this paper company.

Type of Paper Machine: Open Fourdrinier — 126" Trim — machine speed 700 ft./min.

Production rate: 70 tons per day.

Furnish (in use):	Furnish Change During Trial:
18% Hardwood-Sulfite	no change
26% Softwood-Sulfite	no change
56% Softwood-Kraft	no change
Additives*	2.4% Asbestos
1.6% Talc	no change
13.0% Clay	to 10.6% Clay
0.4% Emulsified Wax	no change
3.0% Titanium Dioxide	to 2.4% (Post trial retention data indicated that 1% TiO_2 could have been removed without a loss in opacity).

Savings Resulting From Improved TiO_2 Retention:

Reduction of TiO_2: 1% of 70 tons of paper per day = $350/day savings.

Cost of 2.4% asbestos (3¢/lb. due to 2¢/lb. clay reduction) $100/day

Net savings per day due to asbestos retention of TiO_2 ..... $250 or $3.60/ton paper

Annual Savings $37,800

These savings are for this one grade being produced 150 days per year.
Actually this company has other grades where the same results may be obtained.

Other Gains associated with this mill evaluation:

1. Saveall Effluent was improved in clarity. This unit was handling an estimated one million gallons of excess white water per day and the use of 2.4% asbestos allowed a 35% reduction of solids passing to the sewer. This amounts to reduced stream polution and more tons of paper per 100 tons of stock.
2. Closure or more uniform formation was indicated by porosity readings.
3. Opacity values increased during the use of asbestos even though clay and TiO_2 quantities were reduced as shown above.
4. Smoothness values were improved.

Physical Characteristics of the Bond Paper produced:

Percentage Asbestos:	0%	1%	2.4%
Basis Weight (lbs./300 Ft²)	38.3	37.0	38.0
Machine Direction Tensile	12.6	13.0	13.8
Cross Direction Tensile	8.3	8.0	6.5
Mullen	20.6	20.8	22.0
Tear	32/33	30/33	34/36
Smoothness (Gain)	53	32	31
Opacity (Gain)	82.5	83	84-84.5
Brightness	83	82-83	82
Wax Pick	18/16	18/18	18/18
Caliper	3.23	3.09	3.10
% Ash in the Bond Paper (gain)	10.2	11.3	12.4

*Based on 5050 lb. batch of cellulose fiber

A17064

APPLICATION

RETENTION AID IN PAPER MILL SAVEALL OPERATION

OBJECT: REDUCE SOLIDS LOSSES AND REDUCE RIVER POLLUTION

TYPE OF SAVEALL: OLIVER DRUM TYPE FILTER WITH STAINLESS 60/40 MESH WIRE USING FRESH CELLULOSE PULP AS A FILTER AID.

MATERIAL TO BE RECLAIMED FROM EXCESS WHITE WATER RETURNED FROM THE PAPER MACHINE

1. Titanium Dioxide
2. Clay
3. Cellulose fines
4. Starch
5. Dye particles

Data for the operation:

Production rate of Paper Machine: 60 tons/day

Machine Speed: 800 fpm Wire mesh — 75x58

Total Filler Content: 6.25% (1.25% TiO_2; 2.5% clay; 2.5% starch)

Furnish: 50% Magnifite Hardwood
30% Softwood Draft-Spruce
20% Broke

pH 5.0 with Alum

REDUCTION OF SOLIDS LOSSES USING HIGH PURITY ASBESTOS:

% Asbestos	0	2½
Flow Rate (GPH)	1,000,000	1,000,000
Average Solids in lbs./1000 gals.	3.25	0.55
Number of days/year for this particular condition	200	200
Value of Material $/ton	100	100

ANNUAL SAVINGS RESULTING FROM THE USE OF ASBESTOS: $27,000

A17065

APPLICATION—RETENTION OF FILLERS

Novel Paper No. 22 for Color Books

Purpose: Improving Retention of Fillers for Improved Opacity, and for Material Savings.

Type Paper Machine: Open-Fourdrinier
Production Rate: 150 tons per day
Systems pH: 4.5 - 5.0
Basis Weight: 32 lb./1000 ft.²

} Machine Trim: 132"
Machine Speed: 804 F.P.M.

Furnish:

Prior to use of Asbestos	with 2% Asbestos
80% Groundwood	80%
20% Unbleached sulfite	20%
5% Georgia clay	5%
0.3% Tetrasodium Polyphosphate	0.3%
0.4% Zinc Hydrosulfite	0.4%
0.3% Alum	0.3%
2.8% Zeolex	0%
0% Asbestos	2.2% — added

Other additives to the headbox: Kymene 557 — 1.7%.

Retention Results:

	0	2.2%	
% Asbestos			
% Clay	24	39	
% Total ash	30	43	
% Increase due to asbestos (clay retention)		62%	} 52.5% ave.
% Increase due to asbestos (total ash)		43	

Paper Tests with and without Asbestos:

	0% Asbestos	2.2% Asbestos
Basis Weight (lbs./3000 ft.²)	32	32
% Ash	4.4	6.5
% Opacity	92.9	93.6
Two-sidedness	1 pt.	0 - 0.5 pts.

Economic Gain and Quality Improvements:

1. High Purity Asbestos (2.2%) replaced 2.8% Zeolex with an immediate cost advantage. With a production rate of 140 ton/day, Zeolex was being used at a cost of $548/day while its replacement, High-Purity Asbestos, cost $308/day, yielding a savings of $240/day. The asbestos also caused an increase in clay retention; a 0.7 pt. opacity gain was achieved allowing either improved quality, or an additional estimated savings of $390/day if normal specifications are held. Final result was a total daily savings of $680/day.

2. Reduced two-sidedness during the use of High-Purity Asbestos also gave an improved paper product.

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