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ABEX CORPORATION
INDUSTRIAL HYGIENE SURVEY
FRICTION PRODUCTS GROUP
LINDSAY, ONTARIO
FEBRUARY 10-14, 1975

PURPOSE

This Industrial Hygiene survey was conducted to determine the presence and extent of occupational disease exposures throughout the plant and to make recommendations for controlling or eliminating the hazards encountered.

SUMMARY

A total of 30 airborne dust samples were collected at various operations throughout the plant for lead and asbestos. As indicated in Appendix No. 1, sixteen of the asbestos samples exceeded the permissible limit of 2 fibers/ml. The areas involved included the Finish Department, Blok Press Department, Blok Preform, Upper Compounding, and Blok Inspection at the rear of the new finish area. Highest levels were obtained from Blok Preform during the collection of short term samples (15-30 minutes). Reducing the sampling time was required because of excessive dust loading on the filters which prevents accurate fiber counts.

Analyses of collected samples revealed nine locations where airborne lead concentrations were excessive. These locations included Blok Preform, the Finish Department, Blok Press, Reclaim de-riveting, and the sorting station in Reclaim Reception. Coincident with the asbestos counts, the highest lead levels were observed in Blok Preform where generation of airborne dust was clearly excessive.

The numbers of noisy locations and the extent of noise generated, paralleled the measurements taken during our previous survey of January 7-11, 1974. Although some employees were wearing hearing protective devices, their use is not mandatory, and several employees, especially in the finishing areas remain unprotected. In addition, audiometric testing is still not conducted for new and/or noise exposed personnel to identify those at risk with significant hearing loss.

INDUSTRIAL HYGIENE CORRECTIONS REQUIRED

75-1 Exhausted enclosures or hoods should be provided at the blok preform units which fully enclose all but the loading ports. Point source pickup by the laterally positioned exhaust hoods is not affording effective control during the pressing cycle.

75-2 Provide exhausted enclosure with rear take-off for the weigh scales and mix bins to reduce asbestos exposures during scooping and measuring. The most strategic point where control is needed is at the mix buggies where manual scooping and transfer of the mix result in high exposures.

75-3 The loose product mix adhering to the surface of freshly preformed truck bloks should be removed prior to handling by the blok press operators. A vacuum or blow-off enclosure should be installed to reduce or eliminate this source of asbestos fiber and lead exposure.

75-4 The blok press operators are exposed to asbestos and graphite-surfactant aerosols on the platforms while loading the presses. High velocity slot exhausts should be considered for installation on the opposite side of the loading platforms to remove these air contaminants.

75-5 Truck blok edge grinder No. 6-411 utilized by the blok press operator to trim the freshly pressed bloks should be provided with increased enclosure, and exhaust capacity should be upgraded.

75-6 Exhaust hoods should be installed on abrasive saws numbered L-26 and L-27 to provide more enclosure of the saw blades.

75-7 The brushing machine and automatic drill press No. W-581 in the new section of the Finish Department should be provided with improved exhaust enclosure. These machines are generating fine airborne fibers which are not readily apparent on visual observation of the operations.

75-8 Asbestos fiber levels above the 2 fiber limit were found at the radius roll machine adjacent to the aisle in Strip Finishing. Either the strips should be thoroughly cleaned before processing through the unit, or an exhaust hood should be provided to collect generated fibers.

75-9 Exhaust hoods in upper compounding, especially at powder and asbestos weigh scales should be replaced or redesigned, and exhaust velocities should be increased.

75-10 Excessive airborne asbestos levels at automatic drill press No. W-581 should be reduced through the provision of exhaust ventilation, preferably in the form of an exhausted enclosure surrounding the drill bits.

75-11 Exhaust ventilation at automatic drill No. 3, (Ser. No. L-19) should be upgraded to provide for capture of all particulate wastes. At present, this material builds up on the bench behind the drill press.

75-12 Airborne asbestos levels at the Blok Inspection table at the rear of the new finish area were excessive, and should be controlled through the provision of exhaust ventilation or thorough cleaning of the bloks prior to inspection.

75-13 Elevated airborne lead exposures observed at the de-riveting operation in Brakeshoe Reclaim and at the sorting station in Reclaim Reception should be controlled until 8 hour time weighted average levels can be determined. This can be accomplished by using approved toxic particulate respirators at the above locations.

75-14 Operators at all work locations in Appendices 1 and 2, which are denoted with asterisks, should be provided with approved respiratory protection. Respirators should be used only as interim protection until appropriate engineering controls can be implemented.

75-15 All ventilation ducts should be provided with pitot openings for measurement of duct velocities. Openings should be clearly marked and numbered.

75-16 Face velocity within the canopy hood at the rubber mill in lower compounding should be increased.

75-17 Exhaust hoods or enclosed take-offs should be provided at all machines in the Finish Department where ducts terminate in inefficient open-ended trunks.

75-18 When the make up air unit planned for the south side of the plant is to be purchased, the following points should be considered:

a. The fresh air intake should be located remote from any contaminating sources such as exhaust stacks or furnace exhausts. It is advisable to filter the fresh air to protect equipment and provide maximum heat exchange efficiency.

b. Make up air sources should be located to provide cross ventilation. However, the system should be engineered to prevent crossdrafts.

c. Make up air should be introduced into the plant below the 8 ft. to 10 ft. level. In this manner, the air is used first by people, and best results of general ventilation are obtained.

d. Maintain make up air temperatures at approximately the same as the desired room temperature.

(Installation of the above unit should eliminate smoke and fumes from the reclaim backing removal oven, a condition caused by make up air starvation.)

75-19 The filters inside the paint spray hood in the Reclaim Department should be cleaned regularly to maintain adequate face velocity.

75-20 Before entering the locker room to change, asbestos handlers should remove asbestos fibers and loose product mix from their clothing with a suction hose connected to a suitable collector. A defined location should be established for this purpose to encourage routine usage.

75-21 Floors and appurtenances throughout the plant, but especially in Blok Preform, Blok Press, and Compounding, should be maintained free of accumulated asbestos fibers and product mixes. Vacuum equipment should be used for this purpose. Manual sweeping should be confined to general work and office areas which are free of scattered or accumulated asbestos materials.

75-22 Torn or perforated plastic bags containing asbestos fibers should be patched or double bagged. Periodic inspection should be made of the bag storage areas to detect damaged bags, and warehouse personnel should be cautioned against perforating the bags.

75-23 Improvement in general housekeeping is essential in Blok Preform, Blok Press, and Compounding. Lead compounds and asbestos materials are accumulating on floors, equipment, and structural members.

75-24 As absorption of lead into the system through inhalation and ingestion is enhanced by smoking; the practice should be prohibited in all production areas.

75-25 Eating and drinking should be prohibited in production areas. At present, employees are carrying food and drink from the cafeteria for consumption at their work stations. This practice increases the potential for lead ingestion.

75-26 Provide ear plugs or other approved hearing protective devices for employees working in areas where permissible durations of exposure are exceeded. Refer to the attached Analyses of Noise Exposures and previous survey reports of 1973 and 1974 for specific locations. Personal hearing protectors should be considered interim protection until engineering and/or administrative controls can be implemented.

75-27 Medical surveillance in the form of an approved audiometric testing program should be provided for all new employees and annually for all employees whose occupational noise exposures exceed permissible limits.

75-28 Gardner-Beloit O.D. grinder No. L-23 should be enclosed with noise absorbing materials. Even partial shielding would aid in reducing background levels at adjacent work stations.

75-29 Noise control engineering should be considered for abrasive grinder No. L-26, abrasive grinder No. L-27, the paint spray booth, the Shepard-Thompson grinder, and the Arc King grinder. With selective booth enclosure which incorporates absorption and shielding into the construction, background levels can be significantly reduced, especially in the Finish Department.

DISCUSSION

Airborne asbestos levels were generally higher than those encountered during our previous survey of January 7-11, 1974.

Blok Press and Preform areas continue to display excessive fiber levels which are in definite need of control. Blok Preform revealed concentrations which exceed both permissible eight hour time weighted average limits and one time peak excursion limits. Improved exhaust ventilation is planned for the three blok preform units, and priority should be given to the installation of these systems. Full enclosure of the presses, weigh scales, and mix buggies is required as opposed to point source collection to insure capture of all airborne materials. The existing lateral slot hoods are of the point source capture type, and as such, are not providing adequate control at the preformers. Their deficient performance can be observed at the back and sides of the preformers where fibers are being released to the ambient air. The heavy accumulations of asbestos fibers on the floor surrounding the machines are also indicative of inadequate collection, in conjunction with careless work habits on the part of the operators.

At Blok Press, there are essentially two sources of exposure which require control. The preformed bloks which arrive at Blok Press on the tiered racks are coated with fine dust containing both asbestos fibers and lead compounds. Any amount of disturbance or handling, such as transfer to the press platform, results in airborne dispersion of the dust. A vacuum system or exhausted blow-off enclosure should be provided to clean the preformed bloks prior to transfer to Blok Press. If possible, such a blow-off or vacuum device should be incorporated into the blok preform enclosures to include protection of these operators. The second source of exposure at Blok Press occurs on the vertical lift when the operator applies the graphite lubricant with the spray gun. This not only disperses asbestos fibers into the operator's breathing zone, but graphite-surfactant aerosols as well. This latter material accounts for a majority of the undesirable, dirty aspects of this operation. To collect both contaminants, side slot hoods connected to modified, flexible travel-vents should be installed on the edge of the press platforms across from the operators' positions. The hoods should include tapered plenums and three rows of slots with velocity in excess of 2,000 fpm at the lowest slot. (Refer to Fig. 4-13 for suggested design.)

Other areas requiring improved or additional exhaust ventilation are listed in the "Recommendations" section of the report. Several locations include stand grinders, saws, and drills in

the Finish Department where branch ducts terminate in open ended exhaust trunks which are either pushed out of the way and not used or placed in the vicinity of the point of dust generation. Either way, dust capture is minimal, and air volumes and energy are being wasted. The trunks should be connected to hoods or enclosures which surround the sources of dust release. Where trunks are unused or serve no purpose, they should be disconnected at their point of entry into the main duct and the opening sealed in a manner to prevent additional friction loss. Although mains and branches are basically well designed and amenable to systems balancing, ductwork should be thoroughly checked to insure that principles of good duct design are consistent throughout. Where elbow radii, aspect ratios, duct sizes, branch entries, duct enlargements, and duct contractions do not correspond to the appropriate examples in Figures 6-19, 6-20, and 6-22, redesign should be considered prior to systems balance.

Exhaust hood design at both weigh scales in upper compounding is not adequate either because of poor enclosure or excessive handling requirements by the operator. Redesign is planned for the powder weighing exhaust hood which should reduce handling and improve collection efficiency. The asbestos weigh scale should also undergo redesign to provide better enclosure and increased capture velocity at the face of the hood. The existing hood is open on two sides, reducing face velocity and resultant fiber capture. In addition, the exhaust duct opens directly into the hood with no plenum transition. This condition also interferes with entrainment of airborne fibers.

When exhaust systems have been improved in the areas discussed above, and/or as outlined in the "Recommendations", airborne control of both asbestos and lead exposures will ensue. However, lead absorption by ingestion must also be considered, and the plant should make extended efforts to reduce this source of exposure. Extensive clean-up and continued maintenance is required in all lead handling areas, but particularly in Compounding where spilled powders, settled fine dust deposits, and caked raw materials on floors in traffic areas were observed. These conditions enhance the possibilities of inadvertent lead ingestion, especially as the personal hygiene of operators also tends to deteriorate under these conditions. As indicated in the "Recommendations", smoking, and consumption of food and beverages should be strictly prohibited, not only in Compounding but in all production areas. Although other

considerations such as the establishment of rest breaks and personnel complaints will arise, the need for this restriction is supported by numerous lead studies, and should be seriously considered by the plant.

At the time of the survey, the majority of employees in noise hazardous areas were without hearing protective devices, primarily because the program is still voluntary, an. earplugs and/or ear muffs are supplied only upon request by the employees. In addition, audiometric testing is not conducted at the plant, precluding the advantages to be gained from pre-employment screening or detection of threshold shifts within exposed populations. Because of limited floor space, full enclosure or isolation of noisy machines in the Finishing Department is not practicable. However, there are some excessively noisy units such as abrasive saws, O.D. grinders and drill presses for which smaller sound absorbing exhaust enclosures could be designed. As a final note, the intermittent nuisance noise from metal to metal contact at the backing removal hopper and adjacent conveyor is still in evidence. The chute and conveyor should be lined with impact absorbing materials to eliminate this contributory noise source.

I would like to thank Pete Milner and Clare Netherton for their cooperation and assistance during the course of the survey.

SURVEYED BY: M. David Gidley

M. David Gidley, Certified Industrial Hygienist

4/1/75

INDUSTRIAL HYGIENE SURVEY
ABEX CORPORATION

GLOSSARY

cfm	-	Cubic feet per minute
dBA	-	Decibels-symbol denoting the relative intensity of sound pressure levels (re: 0.0002 dyne/square centimeter)
fpm	-	Feet per minute
GRA	-	General room atmosphere
mg/M^3	-	Milligrams per cubic meter of air
mppcf	-	Million particles per cubic foot of air
NIOSH - approved-		Approved by the National Institute for Occupational Safety and Health
OBZ	-	Operator's breathing zone
ppm	-	Parts per million by volume
PS	-	Personal sample
TLV	-	Threshold limit value for an 8-hour daily exposure
Ventilation	-	The terms ventilated, ventilating, or exhaust imply the use of mechanical means such as a fan for air movement, unless otherwise noted.
M.S.#	-	Medical Study No.

PERMISSIBLE NOISE EXPOSURES

Duration per day, hours	Sound level dBA
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼ or less	115

FPG - LINDSAY
APPENDIX NO. 1
ANALYSES OF AIR SAMPLES
FOR ASBESTOS

ETHOD OF COLLECTION: Membrane
ilter with personal sampling pump at 2 LPM.
ETHOD OF ANALYSIS: Phase Contrast
icroscopy

DATE ANALYZED: 3/10-14/75
ANALYST: M. Desouky
TLV: 2 fibers/ml >5μ in length

ample No. ield	Lab.	Date	Time	Total(M3) Air Vol.	Location	Fibers/ml Conc.	Remarks
1		2/11/75	9:16am 11:15am	.219	Blok Press No. 4	3.84*	OBZ - MS# 2C-657
2		"	9:20am 10:43am	.164	Blok Presses Nos. 1 & 2, & truck blok edge grinder #L-411	5.78*	OBZ - Doug Lawson
3		"	9:54am 11:41am	.182	Finish Dept.O.D. grinder(new unit adj. to column E-7)	1.51	OBZ - MS# 2C-85
4		"	9:29am 10:55am	.172	Finish Dept.- abrasive saw #L-26	1.60	OBZ - MS# 2C-651
5		"	9:50am 11:38am	.178	Debonder (Reclaim hopper)	0.23	OBZ - MS# 2C-173
6		"	-	-	Finish Dept.- Do-All Zephyr	Damaged Filter	-
7		"	9:33am 10:58am	.167	Finish Dept.- Abrasive saw L-27	1.28	OBZ - John Martin
8		"	-	-	Blok Press area	Blank	-
9		"	10:05am 11:48am	.195	Finish Dept. Brushing machine	2.19*	OBZ - MS# 2C-582
10		"	10:55am 11:42am	.078	Finish Dept.-Abrasive saw L-26(short term sample)	3.34*	OBZ - MS# 2C-651

(*) Concentration in excess of TLV.

FPG - LINDSAY
APPENDIX NO. 1
ANALYSES OF AIR SAMPLES
FOR ASBESTOS

:THOD OF COLLECTION: Membrane
lter with personal sampling pump at 2 LPM.
:THOD OF ANALYSIS: Phase Contrast
croscopy

DATE ANALYZED: 3/10-14/75
ANALYST: M. Desouky
TLV: 2 fibers/ml >5μ in length

Sample No. Field	Lab.	Date	Time	Total(M3) Air Vol.	Location	Fibers/ml Conc.	Remarks
11		2/11/75	10:58am 11:47am	.095	Finish Dept.-Abrasive saw L-27(short term sample)	3.38*	OBZ - JOHN MARTIN
12		"	-	-	Blok Press Dept.	Damaged Filter	-
13		"	2:30pm 4:04pm	.181	Radius roll mach. adj. to aisle	3.35*	OBZ - MS# 2C-503
14		"	2:18pm 4:00pm	.197	Upper Compounding weigh operator	5.74*	OBZ - MS# 2C-675
15		"	2:14pm 4:01pm	.214	Lower Compounding rubber mill oper.	1.71	OBZ -MS# 2C-564
16		"	2:11pm 3:37pm	.172	Finish Dept.-Hand roll mach. #73 (Strip forming)	1.33	OBZ - MS# 2C-27
17		"	9:36am 11:47am	.269	Finish Dept.-Automatic drill Press #W-581	3.45*	OBZ - MS# 2C-626
18		"	2:08pm 4:02pm	.228	Hand roll mach. adj. to aisle(strip forming)	0.91	OBZ - MS# 2C-743
19		2/12/75	9:20am 11:40am	.291	Blok Preform #2 (Mix No. 551C)	1.94	OBZ - MS# 2C-229
20		"	9:27am 11:45am	.270	Upper Compounding-80 mix operator	1.24	OBZ - MS# 2C-74

(*) Concentration in excess of TLV.

SPNY 001298

FPG - LINDSAY
APPENDIX NO. 1
ANALYSES OF AIR SAMPLES
FOR ASBESTOS

THOD OF COLLECTION: Membrane
lter with personal sampling pump at 2 LPM.
THOD OF ANALYSIS: Phase Contrast
croscopy

DATE ANALYZED: 3/10-14/75
ANALYST: M. Desouky
TLV: 2 fibers/ml >5μ in length

mple No. eld	Lab.	Date	Time	Total(M^3) Air Vol.	Location	Fibers/ml Conc.	Remarks
21		2/12/75	9:14am 11:50am	.306	Strip Finish-Grinder #1(Ser. No L-227)	1.0	OBZ - MS# 2C-642
22		"	10:00am 11:55am	.201	Final inspection lin adj. to paint spray booth	0.68	OBZ - MS# 2C-21
23		"	9:49am 11:54am	.232	Arc King grinder adj. to paint spray booth	0.45	OBZ - MS# 2C-284
24		"	9:59am 11:52am	.186	Strip Finish-Disc brake riveter #5	1.7	OBZ - MS# 2C-653
25		"	1:51pm 4:04pm	.238	Brake Shoe Reclaim de-riveter operator	0.54	OBZ - MS# 2C-622
26		"	11:40am 11:59am	.045	Blok preform #2 (short term sample	6.12*	OBZ - MS# 2C-229
27		2/13/75	9:10am 10:53am	.206	Automatic drill #3 (Ser. No. L-19)	2.67*	OBZ - MS# 2C-187
28		2/12/75	1:59pm 4:08pm	.253	Reclaim Reception in process inspection	0.4	OBZ - MS# 2C-566
29		2/12/75	2:20pm 4:16pm	.224	Finish Dept. - Jig drill #6(Ser.#L-7)	0.56	OBZ - MS# 2C-623
30		"	3:10pm 3:55pm	.089	Blok Press #3 & 4 (shortterm sample)	3.43*	OBZ - MS# 2C-657

(*) Concentration in excess of TLV.

FPG - LINDSAY
APPENDIX NO. 1
ANALYSES OF AIR SAMPLES
FOR ASBESTOS

:THOD OF COLLECTION: Membrane
.lter with personal sampling pump at 2 LPM.
:THOD OF ANALYSIS: Phase Contrast
croscopy

DATE ANALYZED: 3/10-14/75
ANALYST: M. Desouky
TLV: 2 fibers/ml >5μ in length

mple No. eld	Lab.	Date	Time	Total(M3) Air Vol.	Location	Fibers/ml Conc.	Remarks
31		2/12/75	2:01pm 4:11pm	.257	Reclaim Reception-sorting station	0.32	OBZ - MS# 2C-598
32		2/13/75	9:08am 10:46am	.192	Finish area-Blok inspection	5.41*	OBZ - MS# 2C-633
33		"	-	-	Finish Dept.	Blank	-
34		"	9:21am 11:46am	.270	Warehouse-packer-export coils	0.39	OBZ - MS# 2C-79
35		"	10:02am 10:42am	.076	Reclaim Reception sorting station	0.52	OBZ - MS# 2 C-598
36		"	9:33am 3:11 pm	.652	Warehouse packaging area-General Room air	0.14	GRA -
37		"	10:00am 10:37am	.073	Brake Shoe Reclaim-de-riveter oper. (short term sample)	0.50	OBZ - MS# 2C-622
38		"	10:16am 10:48am	.059	Automatic drill #3 (Ser.#L-19) short term sample	6.92*	OBZ - MS# 2C-187
39		"	10:38am 10:52am	.036	Brake Shoe Reclaim-de-riveter oper. (short term sample)	1.82	OBZ - MS# 2C-622
40		"	10:42am 10:54am	.025	Reclaim Reception-sorting station	1.71	OBZ - MS# 2C -598

(*) Concentration in excess of TLV.

SPNY 001300

FPG - LINDSAY
APPENDIX NO. 1
ANALYSES OF AIR SAMPLES
FOR ASBESTOS

THOD OF COLLECTION: Membrane
lter with personal sampling pump at 2 LPM.
THOD OF ANALYSIS: Phase Contrast
croscopy

DATE ANALYZED: 3/10-14/75
ANALYST: M. Desouky
TLV: 2 fibers/ml >5μ in length

mple No. eld	Lab.	Date	Time	Total(M^3) Air Vol.	Location	Fibers/ml Conc.	Remarks
31A		2/13/75	2:25pm 2:41pm	.031	Blok Preform #1 (short term sample)	27.98*	OBZ - MS# 2C-369
32A		"	2:41pm 3:02pm	.035	Blok Preform #1 (short term sample)	17.31*	OBZ - MS# 2C-369
35A		"	3:02pm 3:28pm	.031	Blok Preform #1 (short term sample)	27.49*	OBZ - MS# 2C-369
36A		"	-	-	Blok Preform	Blank	-

(*) Concentration in excess of TLV.

SPNY 001301

FPG - LINDSAY
APPENDIX NO. 2
ANALYSES OF AIR SAMPLES
FOR LEAD

METHOD OF COLLECTION: Membrane filter with personal sampling pump at 2 LPM
METHOD OF ANALYSIS: Atomic Absorption

DATE ANALYZED: 3/10/75
ANALYST: M. Desouky
TLV: 0.15 mg/M^3

Sample No. Field	Lab.	Date	Time	Total (M^3) Air Vol.	Location	mg/M^3 Conc.	Remarks
1		2/11/75	9:16am 11:15am	.219	Blok Press #4	Trace	OBZ - MS# 2C-657
2		"	9:20am 10:43am	.164	Blok Presses Nos. 1 & 2, & truck blok edge grinder No. L-411	Trace	OBZ - Doug Lawson
3		"	9:54am 11:41am	.182	Finish Dept. O.D. grinder (new unit adj. to Col.E-7)	Trace	OBZ - MS# 2C-85
4		"	9:29am 10:55am	.172	Finish Dept.-Abrasive saw #L-26	Trace	OBZ - MS# 2C-651
5		"	9:50am 11:38am	.178	Debonder (Reclaim hopper)	Trace	OBZ - MS# 2C-173
6		"	-	-	Finish Dept.-Do-All Zephyr	Damaged Filter	-
7		"	9:33am 10:58am	.167	Finish Dept.-Abrasive saw #L-27	Trace	OBZ - John Martin
8		"	-	-	Blok Press area	Blank	-
9		"	10:05am 11:48am	.195	Finish Dept.-brushing machine	Trace	OBZ - MS# 2C-582
10		"	10:55am 11:43am	.078	Finish Dept.-Abrasive saw #L-26 (short term sample)	Trace	OBZ - MS# 2C-651

(*) Concentration in excess of TLV.

FPG - LINDSAY

APPENDIX NO. 2

ANALYSES OF AIR SAMPLES

FOR LEAD

METHOD OF COLLECTION: Mambrane filter with personal sampling pump at 2 LPM

METHOD OF ANALYSIS: Atomic Absorption

DATE ANALYZED: 3/10/75

ANALYST: M. Desouky

TLV: 0.15 mg/M^3

Sample No. Field	Lab.	Date	Time	Total (M^3) Air Vol.	Location	mg/M^3 Conc.	Remarks
11		2/11/75	10:58am 11:47am	.095	Finish Dept.-Abrasive saw #L-27 (short term sample)	Trace	OBZ - John Martin
12		"	-	-	Blok Press Dept.	Damaged Filter	-
13		"	2:30pm 4:04pm	.181	Radius roll mach. adj. to aisle	Trace	OBZ - MS# 2C-503
14		"	2:18pm 4:00pm	.197	Upper Compounding weigh operator	Trace	OBZ - MS# 2C-675
15		"	2:14pm 4:01pm	.214	Lower Compounding rubber mill oper.	Trace	OBZ - MS# 2C-564
16		"	2:11pm 3:37pm	.172	Finish Dept.-Hand roll mach.#73 (strip forming)	Trace	OBZ - MS# 2C-27
17		"	9:36am 11:47am	.269	Finish Dept.-Automatic drill press #W-581	Trace	OBZ - MS# 2C-626
18		"	2:08pm 4:02pm	.228	Hand roll mach. adj. to aisle (strip forming)	Trace	OBZ - MS# 2C-743
19		2/12/75	9:20am 11:40am	.291	Blok Preform #2 (mix no. 551C)	Trace	OBZ - MS# 2C-229
20		"	9:27am 11:45am	.270	Upper Compounding 80 mix operator	Trace	OBZ - MS# 2C-74

(*) **Concentration in excess of TLV.**

SPNY 001303

FPG - LINDSAY
APPENDIX NO. 2
ANALYSES OF AIR SAMPLES
FOR LEAD

ETHOD OF COLLECTION: Membrane filter with personal sampling pump at 2 LPM
ETHOD OF ANALYSIS: Atomic Absorption

DATE ANALYZED: 3/10/75
ANALYST: M. Desouky
TLV: 0.15 mg/M^3

ample No. ield	Lab.	Date	Time	Total (M^3) Air Vol.	Location	mg/M^3 Conc.	Remarks
21		2/12/75	9:14am 11:50am	.306	Strip Finish-grinder #1 (ser. No. L-227)	Trace	OBZ - MS# 2C-642
22		"	10:00am 11:55am	.201	Final inspection line adj. to paint spray booth	Trace	OBZ - MS# 2C-21
23		"	9:49am 11:54am	.232	Arc King grinder adj. to paint spray booth	Trace	OBZ - MS# 2C-284
24		"	9:59am 11:52am	.186	Strip Finish-Disc brake riveter #5	.04	OBZ - MS# 2C-653
25		"	1:51pm 4:04pm	.238	Brake Shoe Reclaim de-riveter oper.	.05	OBZ - MS# 2C-622
26		"	11:40am 11:59am	.045	Blok Preform #2 (short term sample)	.35*	OBZ - MS# 2C-229
27		2/13/75	9:10am 10:53am	.206	Automatic drill #3 (Ser. No. L-19)	.21*	OBZ - MS# 2C-187
28		2/12/75	1:59pm 4:08pm	.253	Reclaim Reception in process inspection	.09	OBZ - MS# 2C-566
29		"	2:20pm 4:16pm	.224	Finish Dept.-jig drill #6 (Ser. No. L-7)	.04	OBZ - MS# 2C-623

(*) Concentration in excess of TLV.

FPG - LINDSAY
APPENDIX NO. 2
ANALYSES OF AIR SAMPLES
FOR LEAD

METHOD OF COLLECTION: Membrane filter with personal sampling pump at 2 LPM
METHOD OF ANALYSIS: Atomic Absorption

DATE ANALYZED: 3/10/75
ANALYST: M. Desouky
TLV: 0.15 mg/M^3

Sample No. Field	Lab.	Date	Time	Total (M^3) Air Vol.	Location	mg/M^3 Conc.	Remarks
30		2/12/75	3:10pm 3:55pm	.089	Blok press #3 & 4 (short term sample)	.27*	OBZ - MS# 2C-657
31		"	2:01pm 4:11pm	.257	Reclaim Reception sorting station	.11	OBZ - MS# 2C-598
32		2/13/75	9:08am 10:46am	.192	Finish area-Blok inspection	.10	OBZ - MS# 2C-633
33		"	-	-	Finish Dept.	Blank	-
34		"	9:21am 11:46am	.270	Warehouse-packager export coils	Trace	OBZ - MS# 2C-79
35		"	10:02am 10:42am	.076	Reclaim Reception sorting station	Trace	OBZ - MS# 2C-598
36		"	9:33am 3:11pm	.652	Warehouse packaging area-General Room Air	.06	GRA -
37		"	10:00am 10:37am	.073	Brake Shoe reclaim de-riveter oper. (short term sample)	.14	OBZ - MS# 2C-622
38		"	10:16am 10:48am	.059	Automatic drill #3 (Ser. #L-19) short term sample	.51*	OBZ - MS# 2C-187
39		"	10:38am 10:52am	.036	Brake Shoe Reclaim de-riveter oper. (short term sample	.32*	OBZ - MS# 2C-622

(*) Concentration in excess of TLV.

SPNY 001305

FPG - LINDSAY
APPENDIX NO. 2
ANALYSES OF AIR SAMPLES
FOR LEAD

METHOD OF COLLECTION: Membrane filter with personal sampling pump at 2 LPM
METHOD OF ANALYSIS: Atomic Absorption

DATE ANALYZED: 3/10/75
ANALYST: M. Desouky
TLV: 0.15 mg/M^3

Sample No. Field	Lab.	Date	Time	Total (M^3) Air Vol.	Location	mg/M^3 Conc.	Remarks
40		2/13/75	10:42am 10:54am	.025	Reclaim Reception sorting station	.31*	OBZ - MS# 2C-598
31A		2/13/75	2:25pm 2:41pm	.031	Blok Preform #1 (short term sample)	.51*	OBZ MS# 2C-369
32A		"	2:41pm 3:02pm	.035	Blok preform #1 (short term sample)	.31*	OBZ - MS# 2C-369
35A		"	3:02pm 3:28pm	.031	Blok preform #1 (short term sample)	.71*	OBZ - MS# 2C-369
36A		"	-	-	Blok Preform	Blank	-

(*) Concentration in excess of TLV.

SPNY 001306

FPG - LINDSAY
APPENDIX NO. 3
ANALYSES OF NOISE EXPOSURES

METER: General Radio Sound Level Meter
WEIGHTING: "A" Weighting Network
MICROPHONE: GRC 1560-2131
DATE: 2/11-13/75
ANALYST: M. D. Gidley
SOUND LEVEL CALIBRATOR: GR 1562-A-154

LOCATION	dBA	Exposure Time in Hours	Perm.Exp. Time in Hours	Daily* Noise Dose	Ear Protection Required
1. Gardner Beloit O.D. grinder					
a. operating	98	4.5	2.66	-	Yes
b. idling	84	3.5	8+		
2. Abrasive grinder #L-26					
a. grinding	98	4.5	2.66	-	Yes
b. idling	88	3.5	8+		
3. Multiple drill #F-581					
a. drilling	92	6.94	6	1.38	Yes
b. air release	94	1.06	4.5		
4. Drill #L-19					
a. operating	98	3.76	2.66	-	Yes
b. background	86	4.24	8+		
5. Drill press #L-17	86	-	8+	No	
6. Blok O.D. grinder adj. to Column E-7					
a. operating	96	2.246	3.5	-	No
b. background	84	5.75	8+		
7. Riveting machine (Ser. No. 6784)					
a. operating	92	4	6	-	No
b. background	85	4	8+		
8. Riveter #5	86	6	8+	-	No
9. Paint spray booth	98	6.5	2.66	-	Yes
10. Inspection & Packaging adj. to paint spray booth	89	6.5	8+	-	No
11. Shepard Thompson grinder adj. to paint spray booth					
a. grinding & paint spray	97	6.5	3	2.44	Yes
b. grinding	96	1.0	3.5		
c. background	89	0.5	8+		
12. Arc King grinder					
a. grinding	96	4.6	3.5	.17	Yes
b. idling	90	3.4	8		

FPG - LINDSAY
APPENDIX NO. 3
ANALYSES OF NOISE EXPOSURES

METER: General Radio Sound Level Meter
WEIGHTING: "A" Weighting Network
MICROPHONE: GRC 1560-2131
DATE: 2/11-13/75
ANALYST: M. D. Gidley
SOUND LEVEL CALIBRATOR: GR 1562-A-154

LOCATION	dBA	Exposure Time in Hours	Perm.Exp. Time in Hours	Daily* Noise Dose	Ear Protection Required
13. Hammond belt grinder					
a. operating	93	5	5.25	-	No
b. background	88	3	8+		
14. Ross oven - on floor in adj. work area	88	8	8+	-	No
15. Blok Preform area	85	8	8+	-	No
16. Blok Press area	86	8	8+	-	No
17. Backing removal-Reclaim oven					
a. impact	98	2	2.66	-	No
b. background	85	5.5	8+		

(*) Daily Noise Dose is the numerical expression of the comined effect of 2 or more periods of noise exposure at different levels. When the sum of the fractions,

$$\frac{C_1}{T_1} + \frac{C_2}{T_2} + \frac{C_n}{T_n} \cdots\cdots$$

where: C= Actual time of exposure at a specific noise level
T = Permissible exposure time

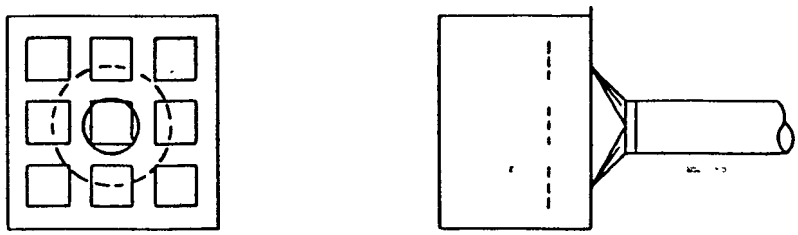
exceeds unity, the mixed exposure is considered to be in excess of the Threshold Limit Value.

PPG - LINDSAY
APPENDIX NO. 4
HOOD AND DUCT VELOCITIES
FEBRUARY 12, 1975

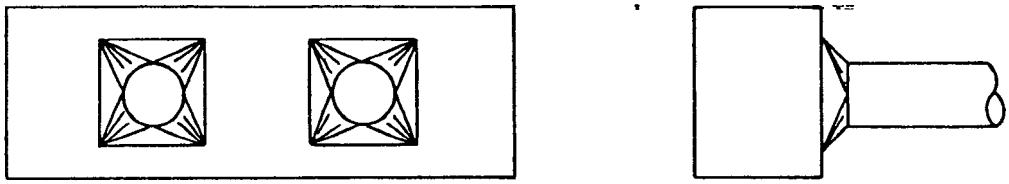
LOCATION	VELOCITY (FPM)	COMMENTS
1. Paint spray booth (hood face)	460	
2. Blok Preform No. 1 (hood face)	2500	
3. Blok Preform No. 2 (hood face)	2500	
4. Paint spray hood in Reclaim Dept. (hood face)	170	Clean filters regularly.
5. Arc King grinder	No pitot openings	Provide circled & numbered orifices
6. Shepard-Thompson grinder adj. to paint spray booth (duct)	6000	
7. Strip finish - grinder #1	No pitot opening	Provide circled & numbered orifice
8. Strip Finish - grinder #2	No pitot opening	Provide circled & numbered orifice
9. O.D. grinder - strip finish	No pitot openings	Provide circled & numbered orifices
10. Drill press #2 (duct)	>6000	
11. Gardner 123 drill press #3 (duct)	>6000	
12. Brushing machine (duct)	2100	
13. Drill press #L-6 (duct)	>6000	Damper partially closed.
14. Multiple drill #W-581	No pitot opening	Provide circled & numbered orifice
15. Drill press #L-5 (duct)	>6000	
16. Chamfer L-22 (hood face)	>2500	
17. Abrasive saw #L-26 (open trunk)	<200 at 6" from trunk face	Provide exhaust hood
18. Abrasive saw #L-27	1100 at 6" from open hood face	Provide exhaust hood enclosure
19. Drill press [redacted]	2400	
20. Drill press [redacted]	1500	Provide exhaust hood replace open ends
21. Drill press [redacted]	>6000	Provide exhaust hood replace open trunk
22. Drill press L-7	6000	Provide exhaust hood
23. Multiple drill (rear take-off)	>6000	replace open trunk

FPG - LINDSAY
APPENDIX NO. 4
HOOD AND DUCT VELOCITIES
FEBRUARY 13, 1975

LOCATION	VELOCITY (FPM)	COMMENTS
24. Do-All Zephyr	No pitot opening	Provide circled & number orifice
25. Hammond belt grinder	No pitot openings	Provide circled & number orifices
26. Upper Compounding weigh scale (powders)		
a. at hood face	500	Inadaquate pickup
b. at pitot opening #40	2400	Low flowrate
27. Upper compounding-asbestos weigh scale hood (hood face)	700	Redesign hood & [redacted] hood enclosure
28. Lower compounding-rubber mill canopy hood		
a. hood face	100	Increase [redacted] velocities
b. pitot opening in duct	500	

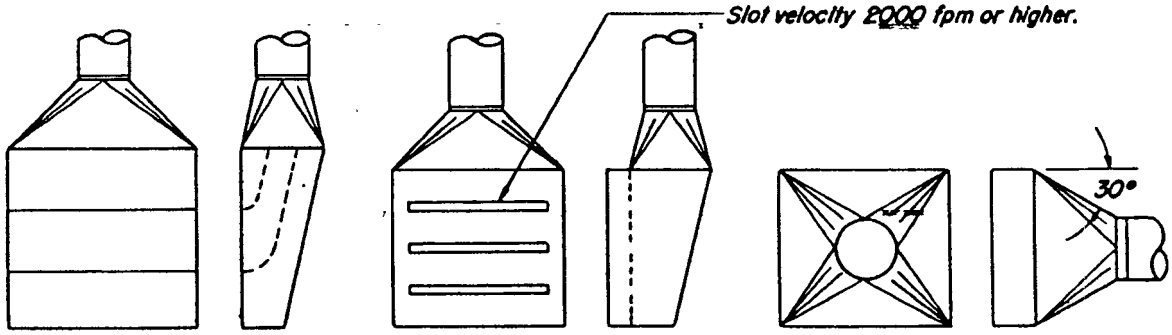


DISTRIBUTION BY BAFFLES
See Fig. 4-16



LONG BOOTHS - DISTRIBUTION BY MULTIPLE TAKE-OFFS and TAPERS

BOOTH-TYPE HOODS
(Same principle apply to canopy type)



DISTRIBUTION BY SPLITTER VANES

DISTRIBUTION BY SLOT (or baffles)

DISTRIBUTION BY TAPER

SIDE-DRAFT & SUSPENDED HOODS

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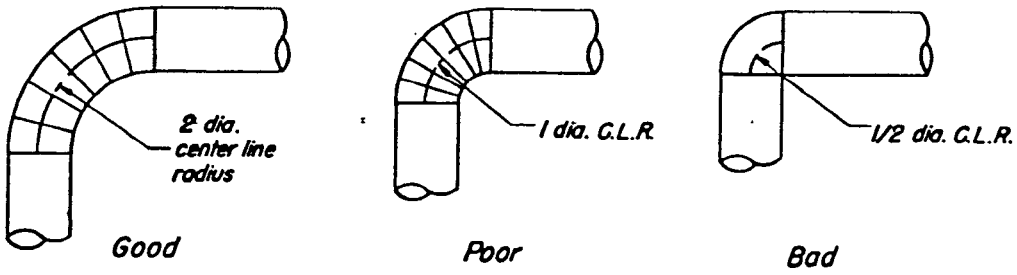
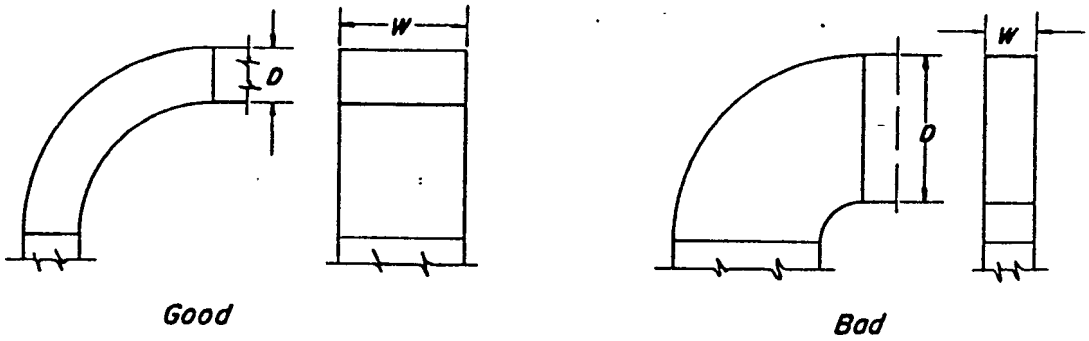
PRINCIPLES OF MANIFOLD DESIGN	
DATE 1-64	Fig. 4-13



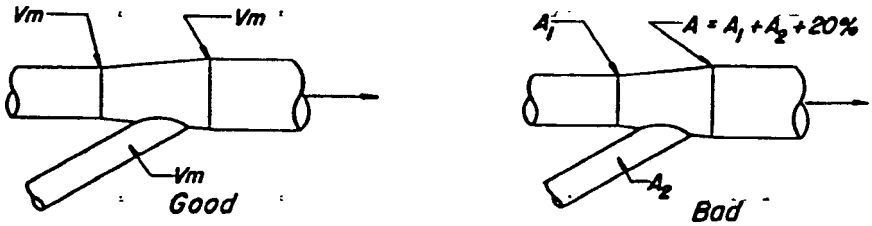
ELBOW RADIUS

Elbows should be 2 or 2 1/2 diameters centerline radius except where space does not permit.



ASPECT RATIO

Keep AR($\frac{W}{D}$) high in using rectangular duct



Vm = Minimum transport velocity.
A = Cross section area.

PROPER DUCT SIZE

Size the duct to hold the selected transport velocity or higher.

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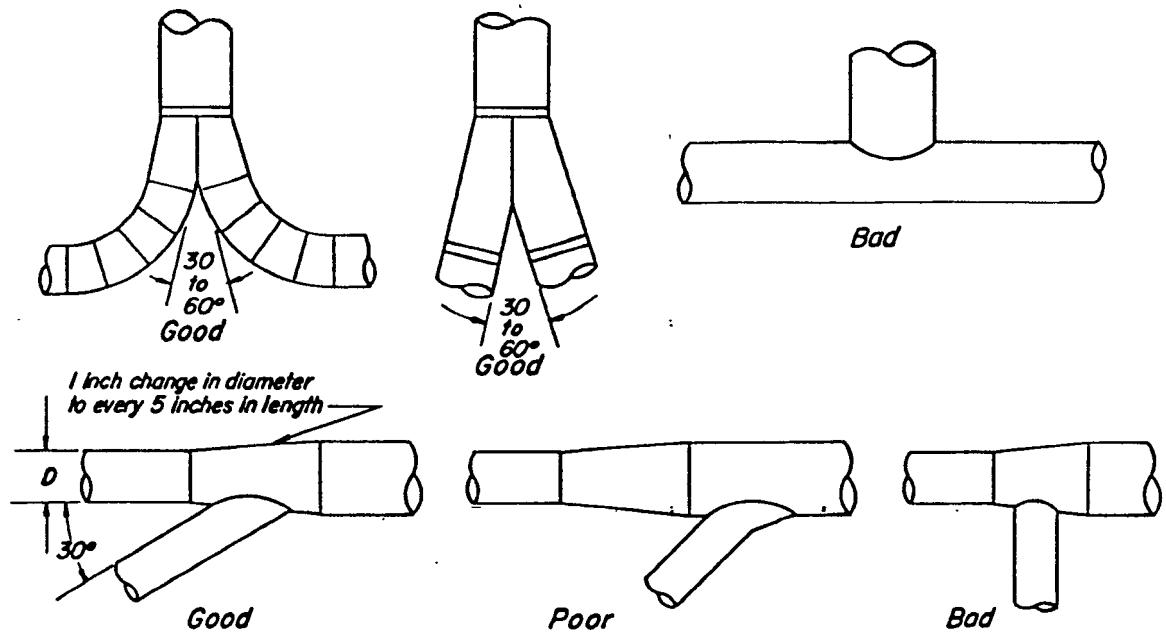
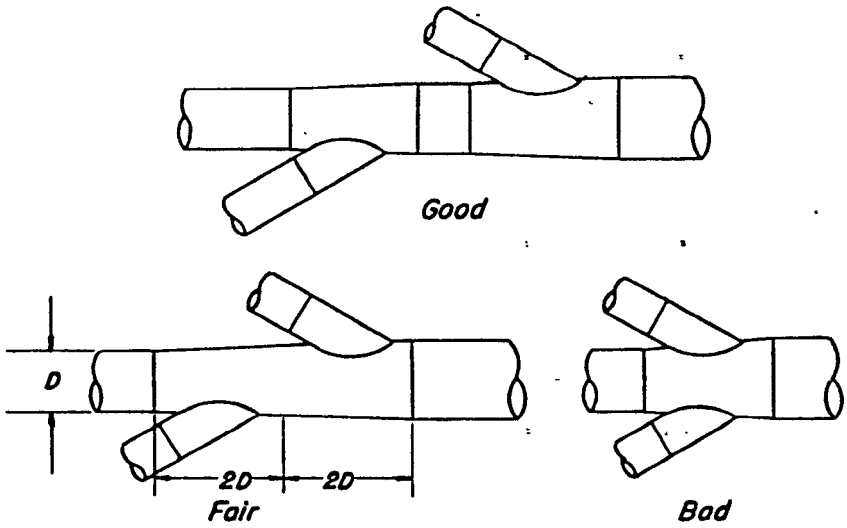
PRINCIPLES OF DUCT DESIGN

DATE 1-66 | Fig. 6-19



BRANCH ENTRY

Branches should enter at gradual expansions and at an angle of 30° or less (preferred) to 45° if necessary.



BRANCH ENTRY

Branches should not enter directly opposite each other.

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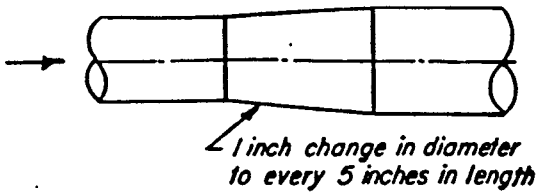
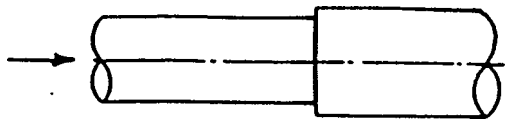
PRINCIPLES OF DUCT DESIGN

DATE 1-66 | Fig. 6-20

DUCT ENLARGEMENT

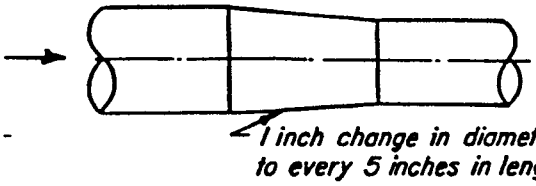


GOOD

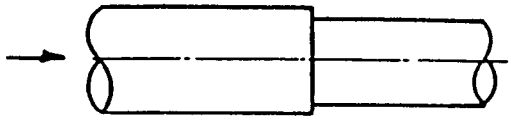


BAD

DUCT CONTRACTION

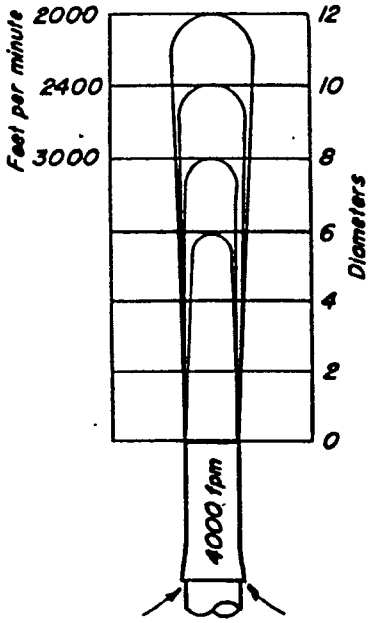


GOOD



BAD

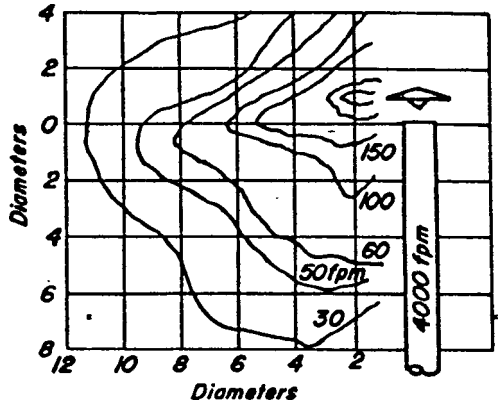
STACKHEAD



RIGHT

Vertical discharge cap throws upward where dilution will take place.

WEATHER CAP



WRONG

Deflecting weather cap discharges downward.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

PRINCIPLES OF DUCT DESIGN

DATE 9-66 | Fig. 6-22

July 16, 1975

Mr. P. C. Milner
Plant Manager
FPG - Lindsay

Subject: Industrial Hygiene Survey Report of 2/10-14/75
and Status Letter

Noting your general comment on the status letter of July 8, 1975, it is not unusual that significant variations in comparative airborne asbestos levels would occur from one year to the next, especially at inadequately ventilated machines where control is minimal. Comparing the 1974 and 1975 reports, major variations occurred only at the Blok Preform units during the collection of short term samples. The short term samples were collected at Blok Preform No. 1 one day later than the longer term samples collected at Blok Preform No. 2. During the sampling at Blok Preform No. 2, it was the only machine operating. The following day both Preform units were operating during the collection of the short term samples. This may account for some of the increase. Although speculative at this point, other factors could have included variations in ambient temperature, pressure, and/or relative humidity, temporary changes in make up air supply, hood flowrate fluctuations, condition and type of mix, work techniques, height of the operator (physical proximity to the source of contamination), machine adjustment, ad/or contributory fiber encroachment from adjacent operations i.e. Blok Press, Strip Finish, etc.

The short term samples were collects during a period of peak work activity to determine if asbestos concentrations exceeded the established Ceiling Limit of 10 fibers per milliliter greater than 5 microns in length. This limit is part of the Ontario standard which prohibits any excursions above the 10 fiber level. As indicated in the report, all three consecutive short term samples at 27.98 mg/M^3, 17.31 mg/M^3 and 27.49 mg/M^3 exceeded the Ceiling Limit. Considering the conditions existant at the time from a subjective viewpoint, it is likely that continued short term sampling throughout the day would have yielded a distributed average 8 hour exposure level of similar high

magnitude which would have produced a value for comparison to the 2 fiber limit. However, this was not done since nothing useful could be obtained from verification of obvious gross contamination.

Please let me know if you have any further questions.

M. David Gidley, Manager
Industrial Hygiene and
Environmental Control

MDG:EJ
CC: C. C. Blackwell, Jr., M.D.
A. A. Borin
E. H. Feierabend
C. W. Netherton
G. Nicholson
D. K. Rennie
G. L. Romine
R. Livingston

March 27, 1973.

E.H. Feierabend,
Winchester.

Ministry of Health

We had a visit yesterday from Mr. Charlie Mander of the above, to take air samples at various locations. This was a routine annual survey - he was here in March last year also.

Samples were taken with a Telemetic pump at the following locations:

Kneader	-	Loading
		Unloading
Lodige Mixer	-	Charging
		Dumping (Wet Mix)
Hand roll		
Preform		
Finishing	-	Block Drill
		Vee Drill
		Ripping Saw
		Strip I.D. Grinder
		General Background

No personal samples were taken.

Will advise further when report is received.

P.C. Milner

P.M:lw

c.c. Dr. Blackwell
D.K. Rennie
D. Gidley
G. Nicholson
R. Livingston