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STATE OF NEW YORK
 SUPREME COURT : COUNTY OF NIAGARA : PART III
 ----- x
 TERRY L. ADAMEC, SR. and : Index No. 105901
 DONNA J. ADAMEC, his Spouse,

Plaintiffs,

-vs-

INSULATION DISTRIBUTORS, INC. and :
 NIAGARA INSULATION, INC., :
 : Jury Trial
 Defendants.

----- x
 (TESTIMONY OF JAMES M. HAWLEY)
 775 Third Street
 Niagara Falls, New York 14302
 May 28, 2002

B e f o r e :
 HONORABLE JAMES B. KANE,
 Supreme Court Justice,
 and a Jury.

A p p e a r a n c e s :
 LIPSITZ & PONTERIO
 BY: MICHAEL A. PONTERIO, ESQ. and
 JOHN P. COMERFORD, ESQ.
 135 Delaware Avenue, Suite 506
 Buffalo, New York 14202-2410
 Appearing on behalf of the Plaintiffs.

RENALDO, MYERS & PALUMBO, P.C.
 BY: JAMES I. MYERS, ESQ.
 350 Essjay Road, Suite 200
 Williamsville, New York 14221
 Appearing on behalf of
 Insulation Distributors, Inc.

At

COLUCCI & GALLAHER, ESQ.
 BY: D. PATRICK GALLAHER, ESQ. and
 TODD C. BUSHWAY, ESQ.
 2000 Liberty Building
 424 Main Street
 Buffalo, New York 14202-3695
 Appearing on behalf of
 Niagara Insulation, Inc.,

Christine E. Myers, CSR
 Official Supreme Court Reporter

TESTIMONY OF JAMES HAWLEY. - WORKED w/ MACCLASHUN - Union guy. Business type
 (WE NEED TO GET HIM ONBOARD)
 UNBODILY STRONG. see p 40 of transcript.

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INDEX TO WITNESSES

PLAINTIFF'S:	Direct Ponterio	Cross Myers	Cross Bushway
JAMES M. HAWLEY	11 34 99	32 (Voir Dire) 58 103	87 -

INDEX TO EXHIBITS

PLAINTIFF'S:	For Id.	In Evd.
24-Stipulation	-	2
25-Stipulation	-	2
26-Letter 4/29/60 Lovell-Braun	2	-
26-A-Page 2 of Exhibit 26	2	-
27-Letter 5/4/60 Braund-JM Sales	2	-
27-A-Page 2	2	-
28(Marked by attorney)		
29-1/3/69 Local 4 Minutes	30	34
30-Article Asbestos Exp....	40	-
31-Asbestos Worker article	40	-
32-Asbestos Worker article	42	-
DEFENDANT'S:		
E-Certificate of Incorporation	60	-
COURT'S:		
1-Plaintiff's Pretrial Statement		52

Stipulations

(Proceedings of May 28, 2002.)

(Whereupon, Plaintiff's Exhibits 24 and 25 were then received and marked in evidence by stipulation of the attorneys.)

(Whereupon, Plaintiff's Exhibits 26, 26-A, 27 and 27-A were then marked for identification.)

(9:42 a.m., jury, all counsel present.)

THE CLERK: Good morning, ladies and gentlemen. I'm going to call the roll. Please respond.

(Jurors polled.)

THE CLERK: Let the record reflect the jury is properly seated, all counsel and parties are present.

THE COURT: Good morning, jurors. Are we ready?

MR. PONTERIO: Yes, your Honor.

THE COURT: Let's proceed.

MR. COMERFORD: At this time, your Honor, we'll read a stipulation entered between the plaintiff and Niagara Insulations in this matter. It's been marked Plaintiff's 24 and is in evidence. May I approach the jury, your Honor, and read this?

THE COURT: Okay.

Stipulations

MR. COMERFORD: Defendant, Niagara Insulations, former president of the company, Ray Braun, was aware from April 29th, 1960 that one of his employees, James Cavanagh, died August 8th, 1959 and the cause of the death was found to be asbestosis by the New York State Worker's Compensation Board. James Cavanagh died at age 57. James Cavanagh was employed by Niagara Insulations as an asbestos pipe coverer insulator. This stipulation is dated May 20th, 2002.

The second stipulation, which is in evidence as Plaintiff's 25, states: It is hereby stipulated that the following redacted letters dated April 29th, 1960 and May 4th, 1960 are deemed admissible for the Adamec trial only. The redacted letters are annexed hereto.

At this time I'd like to publish these letters to the jury, your Honor. The first letter's dated April 29th, 1960. It's to Mr. Ray Braun, Niagara Asbestos, Inc., Buffalo, New York. Dear Ray: As returning the notice of decision in the Cavanagh case and as enclosing the report by Mr. Greenful -- Greenfield, who reviewed the facts at my request. Unfortunately, this is a very serious disease and it

Stipulations

1
2 is practically incurable. Particles of asbestos
3 dust once ingested continue their slow insidious
4 tissue destruction through the years, even though,
5 even though exposure may long have terminated. If
6 the exposure is slight, as in well-guarded plants
7 with excellent exhaust ventilation and use of
8 adequate mask protection, insufficient asbestos will
9 be absorbed to destroy a vital amount of lung.
10 According to medical experts, the average exposure
11 before the appearance of the disease is 13.5 years.
12 It is well -- it is very rarely found with less than
13 five years exposure, irreparably increases after
14 this duration and beyond the tenth year the
15 likelihood of asbestosis is exceedingly great. And
16 that is Plaintiff's 26.

17 Plaintiff's 26-A states, the last page: With
18 kind personal regards, Sincerely, Jack M. Lovell,
19 and again here indicated the Niagara Asbestos, Inc.

20 The next document that's stipulated is
21 Plaintiff's 27. This is in evidence. It's a
22 two-page letter. This is the first page. It's
23 dated May 6th, 1960 from the Niagara Asbestos
24 Company and it's to the Johns-Manville Sales Corp.
25 Gentlemen: You will recall we previously discussed

Stipulations

1
2 with you the problem of dust from J. M. Insulations
3 and the very serious effect it was having in our
4 meetings with asbestos workers. One of our former
5 men died August 8th, 1959 and the cause was found to
6 be asbestosis. Since we endeavor to keep informed,
7 we asked Safety Management Company to check this out
8 for us and attach hereto a complete copy of the
9 report for your perusal.

10 We recognize the hazards of our industry and do
11 provide safety equipment to, I can't read the word,
12 it. Here, however, is a problem much too large for
13 a company such as ours, yet the problem is likewise
14 yours and the problem of all other insulation
15 manufacturers.

16 The last is 27-A. We are specifically
17 interested in knowing if you have had this problem
18 elsewhere in the United States, what have you done,
19 second line, are doing in relation to asbestos dust
20 in your products and if somehow industrywide
21 something can be done to remedy the inequity of the
22 liability. Please give this your consideration and
23 early reply. Signed by Mr. Braun.

24 At this time, your Honor, we'll seek to read in
25 portions of the deposition of Mr. Braun, the

1 Deposition of Mr. Braun Read by Plaintiffs' Attorneys
2 President of Niagara Asbestos, that was taken in
3 1983. I've provided copies to everyone, but may I
4 provide a copy to your Honor?

5 THE COURT: Yes.

6 (The following questions were read by Mr.
7 Comerford and the answers by Mr. Ponterio.)

8 MR. COMERFORD: This has been marked as
9 Plaintiff's 28.

10 BY MR. COMERFORD:

11 Q. I'll start at page three. Raymond Braun, 34
12 Hendricks Boulevard, Eggertsville, New York, after being duly
13 called and sworn, testifies as follows: Question. And this
14 deposition again is dated April 26th, 1983. Question: For
15 whom are you employed?

16 A. Niagara Insulations, Incorporated.

17 Q. In what capacity?

18 A. President.

19 Q. Next page, page four. And how long have you been
20 president?

21 A. About eleven, twelve years.

22 Q. And how long have you been associated with Niagara
23 Insulation?

24 A. Since 1938.

25 Q. You've heard Mr. Ditmar testify earlier --

Deposition of Mr. Braun Read by Plaintiffs' Attorneys

A. Yes, sir.

Q. -- that Niagara utilized asbestos products in its operation -- operations over the years, is that correct?

A. Yes, sir.

Q. What type of products did it -- asbestos products did it use?

A. Basically all thermal insulation.

Q. Okay. And would that be block pipe coverings?

A. Block pipe coverings and boards.

Q. And do you have any knowledge, sir, with respect to the manufacturers of the various products purchased, asbestos products purchased by Niagara over the years?

A. Yes, I do.

Q. Page 37.

MR. BUSHWAY: Can you give me the lines, John, because my pages appear to be a little off.

MR. COMERFORD: Okay.

MR. MYERS: I don't have a page 37.

MR. PONTERIO: If you look, the transcript is actually --

MR. COMERFORD: It's page 20.

MR. PONTERIO: -- separately paged. This is a printout, which is page 20.

MR. MYERS: Page 20.

1 Deposition of Mr. Braun Read by Plaintiffs' Attorneys

2 MR. COMERFORD: Page 20.

3 BY MR. COMERFORD:

4 Q. And we'll start at the top, at the first line, one.
5 Question. Okay. All the insulation that you utilized, let's
6 say the 1960's on contract jobs up to the time you stopped
7 using asbestos-containing insulation, late 1960's, whatever,
8 whatever it was, what percentage of the total insulation you
9 would use on a contract job would be asbestos-containing?

10 A. Oh, you mean after the basic insulations were
11 asbestos free?

12 Q. No. Before that.

13 A. Before that?

14 Q. Oh, yes. In the 1960's.

15 A. In the 1960's, practically all.

16 Q. And of all the asbestos-containing insulation
17 products that you may have utilized during the 1960's and
18 fifties, tell me what, if it was different in that time frame
19 too, what percentage was purchased from Johns-Manville
20 Corporation?

21 A. Practically all.

22 Q. What's your best figure, percent?

23 A. 95.

24 Q. So it's clear, 95 percent of the asbestos-containing
25 insulation your company used was Johns-Manville?

1 Deposition of Mr. Braun Read by Plaintiffs' Attorneys

2 A. Yes.

3 Q. That's your best estimate, because you don't have
4 those records today?

5 A. No.

6 Q. The next page in the transcript to go to is page
7 32.

8 MR. MYERS: Which would be --

9 MR. PONTERIO: Top right-hand corner. If you
10 look at the page it'll say 32.

11 MR. MYERS: Is that it?

12 MR. PONTERIO: Yes.

13 BY MR. COMERFORD:

14 Q. In the 1960's, did you -- did you ever have or
15 anybody from your company ever have any conversations with
16 anyone from Johns-Manville about the asbestos being
17 hazardous?

18 A. Not that I recall, no.

19 MR. BUSHWAY: I hate to interrupt. What page
20 in the actual transcript as opposed to the -- I have
21 a full transcript.

22 MR. COMERFORD: I don't have that one. Read
23 that again, please, page 63.

24 BY MR. COMERFORD:

25 Q. In the 1960's, did you ever have or anyone from your

1 Deposition of Mr. Braun Read by Plaintiffs' Attorneys
2 company ever have any conversations with anyone from
3 Johns-Manville about the asbestos being hazardous?

4 A. Not that I recall, no.

5 Q. Did you ever have any conversations in the 1970's?

6 A. With Johns-Manville?

7 Q. With Johns-Manville people regarding asbestos being
8 hazardous?

9 A. Not that I can recall, no.

10 Q. So, do I understand, then, that your only knowledge
11 of asbestos being hazardous would be what information you
12 received from Johns-Manville regarding their own products?

13 A. No. I would read trade journals and get information
14 from other sources.

15 Q. What trade journals have you reviewed?

16 A. Back in those days?

17 Q. Those days.

18 A. Probably the Asbestos Worker is one that comes in.
19 Asbestos Magazine is another one. U.S. News and World
20 Report. I can't think of what others there may have been.

21 Q. The Asbestos Worker, is that the paper put out by
22 the union?

23 A. Yes.

24 Q. The next page, it's page 34 and for Mr. Bushway who
25 has -- page 67. Question. Now you've mentioned having these

1 James M. Hawley - Direct - Ponterio
2 files of worker's compensation claims filed against Niagara
3 Insulation. When those files were claimed, did you ever have
4 any conversation concerning those claims with Johns-Manville?

5 A. No, sir.

6 MR. COMERFORD: That's it. Thank you.

7 MR. PONTERIO: At this time, your Honor, we'd
8 like to call Mr. James Hawley to the stand.

9 THE COURT OFFICER: Good morning, Mr. Hawley.
10 Look towards the court clerk, please, raise your
11 right hand, put your left hand on the Bible.

12 J A M E S M. H A W L E Y, after being duly called and
13 sworn as a witness, testified as follows:

14 THE CLERK: Thank you. Mr. Hawley, will you
15 state your name and spell your last name for the
16 court record?

17 THE WITNESS: My name is James M. Hawley.

18 THE CLERK: Spell your last name for me.

19 THE WITNESS: H-A-W-L-E-Y.

20 THE CLERK: Your address, please?

21 THE WITNESS: I live in 21-B Embassy Square in
22 Tonawanda, New York.

23 THE CLERK: Thank you very much.

24 DIRECT EXAMINATION

25 BY MR. PONTERIO:.

James M. Hawley - Direct - Ponterio

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Q. Good morning, Mr. Hawley.

A. Good morning.

Q. Could you please tell us, how old are you?

A. I'm 71 years old.

Q. And are you currently employed?

A. No. I'm retired.

Q. I'd like to ask you some questions about your previous employment. What type of work were you employed in?

A. I was an Asbestos Worker from --

Q. And when did you first become employed as an Asbestos Worker?

A. I started working in 1947.

Q. And when did you formally retire from the work as an Asbestos Worker?

A. In 1986.

Q. Mr. Hawley, if I may, I'd like to take the time frame from 1947 to 1962 and ask you, what type of work were you engaged in as an asbestos worker from 1947 to 1962?

A. I was employed on various construction jobs, generally, applying insulation materials to all types of hot and cold surfaces.

Q. Can you briefly give us some background information on what your general duties as an asbestos pipe coverer consisted of during this 1947 to 1962 time frame?

James M. Hawley - Direct - Ponterio

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2 A. It generally involved the application of insulation
3 materials to pipes, vessels, boiler walls, all types of
4 equipment that needed some sort of insulation, either for heat
5 purposes or refrigeration.

6 Q. And, Mr. Hawley, what is asbestos?

7 A. Well it's -- it's a chalky material and the way we
8 used it, it came in various forms.

9 Q. What were the principal forms it came in?

10 A. Well, if you were applying it to pipes, it would
11 come in long cylindrical tubes, usually three, three foot long
12 that were shaped to fit around the pipe, formed to fit around
13 it.

14 Q. Did that have a name amongst the asbestos workers?
15 What was that type of material called generally?

16 A. You mean the shape?

17 Q. Pipe covering?

18 A. It was pipe covering, yes. It came as block
19 material usually three foot long, six inches wide and you'd
20 either put that on walls or anything, flat surfaces or you
21 would cut it and fabricate it to fit around curved or round
22 surfaces.

23 Q. Any other principal forms?

24 A. The other form was in the form of what we would call
25 asbestos insulation cements and these would come in bags and

James M. Hawley - Direct - Ponterio

we would mix it with water and it would be similar to concrete, you might say, that we would trowel it on to the surfaces, irregular surfaces generally or on, on elbows of pipes to give a smooth finished appearance.

Q. Let me just step back and ask you a little bit more general information about these three principal forms of asbestos that you used as a pipe coverer. What did the asbestos insulating cement look like in the dry state?

A. It was a coarse material similar to flour, but a little rougher. A lot of bits and pieces of things in it.

Q. Can you run us through what physical steps you as an asbestos worker took taking that asbestos insulating cement from the bag and what the stages were until you applied it on a hot surface?

A. As you mentioned, it comes in a bag and you'd open the bag and generally if it was a large job you would have a mud box or some sort of a box. You would empty it in there, tip these bags out and empty them into the mud box or mixer or whatever type of device you were mixing it in, and then you would add water to it and using a hoe or sometimes just your hand if it was a small amount, you'd mix this with water until it became pliable in a plastic form that you could apply.

Q. Let me ask you, Mr. Hawley, when you dumped the asbestos insulating cement out of the bag, what did the

James M. Hawley - Direct - Ponterio

atmosphere look like?

A. It became very dusty. This material just floated all around you.

Q. And did you personally during the 1947 to '62 time frame, we'll focus on that, did you personally do this type of work activity you just described with the asbestos insulating cement?

A. I did a great deal of it. Yes.

Q. Did the airborne asbestos burn at all when you applied it?

A. No. It didn't burn.

Q. Did it have any offensive qualities to you as an asbestos worker when you're working with this asbestos insulating cement?

A. It was a very irritating substance in that it hung all around you in the air. You, you couldn't avoid breathing it in as you were mixing it.

Q. What color was this asbestos insulating cement when it came out of the bag?

A. Basically a gray, gray, whitish material.

Q. And as an asbestos worker, what was your understanding, what was the ultimate purpose of applying this asbestos insulating cement to hot surfaces?

A. Well it was to help retain the heat in whatever you

James M. Hawley - Direct - Ponterio

1
2 were insulating so the heat wouldn't escape and be wasted.
3 For safety sometimes to keep the hot surface from being
4 touched by people and getting burnt.

5 Q. I'd like to briefly talk to you about the asbestos
6 pipe covering that you mentioned, and once again, during this
7 1947 to 1962 time frame, did you, yourself, sir, personally
8 apply asbestos pipe covering at various job sites?

9 A. Many times I did.

10 Q. And what did the -- the asbestos pipe covering look
11 like, if you can describe to us, what did it look like?

12 A. Well, as I said, it usually came in two half
13 cylinders that would fit around the size of the pipe you were
14 using. It would be formed, it would come formed to fit
15 whatever size pipe. It was a white, generally white, grayish
16 material. Looked very similar to chalk.

17 Q. And how would you as an asbestos pipe coverer apply
18 the asbestos pipe covering on to hot pipes?

19 A. Well just -- on straight runs of pipe you would just
20 start putting one half on each side of the pipe and adhering
21 together with wires or bands or whatever was required, and as
22 you came to an elbow or some sort of a curved surface, then
23 you would start, you would have to take these straight
24 cylinders and miter them, as we called it, mitering and just
25 so that they'd start fitting around the curved surface.

James M. Hawley - Direct - Ponterio

Q. What do you mean by mitering?

A. Well taking -- these things were just straight flat tubes and you would cut them larger on one side and smaller on the other so that they'd start stepping around an elbow or a large sweep of a pipe.

Q. When you cut or sawed asbestos pipe covering, what did the atmosphere look like?

A. It was always very dusty. This material just clung all around you as you worked.

Q. How did the asbestos pipe covering come packaged?

A. Pipe covering generally came in three foot long pieces and it would come in cardboard boxes and depending how big or how small it was, how many would be in a box.

Q. And, Mr. Hawley, once again, briefly I'd like to talk to you about this asbestos-containing block that you mentioned and then we'll move on. During the 1947 to 1962 time frame, did you -- did you, yourself, sir, have occasion to apply asbestos-containing block?

A. Yes, I did.

Q. And what did the asbestos block look like?

A. Well, generally it came in three foot long pieces, and they were flat, of course. They'd be whatever the required thickness you were using, maybe perhaps two inch or three inch in thickness, usually six foot wide -- or, six

James M. Hawley - Direct - Ponterio

1 inches wide. So you might say six inches wide by three foot
2 long.
3

4 Q. What was the consistancy, the feel of this asbestos
5 block?

6 A. It was a spongy material. It was soft. I mean, not
7 too soft, but it was soft enough you could, you could
8 manipulate it. Similar, as I say, to, if you can imagine
9 blocks of just chalk, you know, you'd have in the school room.

10 Q. How would you, sir, as an asbestos pipe coverer
11 apply the asbestos block?

12 A. Well, again, it would depend on what you were
13 applying it to, but often it was put up against a wall, 'cause
14 if it were a flat surface you'd have some sort of adherence
15 to, they'd weld nuts or something on the wall and you'd impale
16 it on the nuts with wires and then fasten it sometimes.

17 Q. Would you be called upon, sir, to ever cut or saw
18 this product?

19 A. Well usually you had to do that, yes.

20 Q. And can you tell us, what did the atmosphere look
21 like when you cut or sawed this asbestos block?

22 A. Well, it became very dusty and, you know, and as I
23 say, that cloud of dust hung around you like a cloud.

24 Q. Sir, as an asbestos pipe coverer, did you belong to
25 a specific union?

James M. Hawley - Direct - Ponterio

A. Yes, I did.

Q. And what was the name of that union, sir?

A. Locally it was called the Asbestos Workers Local Number 4.

Q. And during this 1947 to 1962 time frame, were there various asbestos insulation employers in the Western New York area?

A. Yes, there were.

Q. And what is meant, sir, by an asbestos insulation employer?

A. Well, to my way of thinking, these were people that in this area furnished insulation to people. They arranged for the installation of it on projects where it was needed.

Q. During the 1947 to 1962 time frame, who were some of the prominent asbestos insulation employers in the Buffalo area?

A. There was Niagara Asbestos, Frontier Insulation, Insulation Distributors. I think Buffalo Insulation Distributors is their name. There was Claxton Asbestos, Armstrong Cork, then there were a few smaller contractors.

Q. Now, sir, as an asbestos pipe coverer, can you tell us, how would you obtain employment with one of these asbestos insulation employers? What was the mechanism?

A. Well, I was a member of this Asbestos Workers Local

James M. Hawley - Direct - Ponterio

Union 4 and they had an agreement with these contractors to furnish labor to them when they needed it. They would call up the office of the union, request X number of men, and if it was your turn to go out, you would be sent out to that job for that employer for that job.

Q. Now, did there come a time, sir, when your status as an asbestos pipe coverer changed?

A. Yes. I -- I became the elected business manager or business representative for the union in 1962, I started.

Q. Were you referred to as the business agent?

A. Yeah. That's, like, business agent was the -- one term, yeah. Business manager had a little more class, you know.

Q. Sure. How long did you hold the position of business manager for Local number 4?

A. For ten years until 1972.

Q. So from 1962 to 1972?

A. Right.

Q. Could you please provide us with a general description of what your job duties as the business agent for Asbestos Workers Local Number 4 involved?

A. Well I was the only full-time representative, so that it was my job to more or less oversee the welfare of my members. Go on the jobs, check the jobs for safety. If there

James M. Hawley - Direct - Ponterio

1
2 were any problems on the job, I would go there. I would try
3 to mediate disputes between the employer and the member or the
4 worker. Just generally do anything that had to be done to
5 smooth the normal work day.

6 Q. Now, from 1962 to 1972 when you were business agent,
7 was there an employer's group?

8 A. Yes, there was.

9 Q. And, and what was the employer's group during that
10 time period and who were they?

11 A. Well they were called -- they called themselves the
12 Asbestos and Insulation Contractors and Distributors
13 Association and they were comprised of all of the insulation
14 contractors in this area.

15 Q. Niagara was one of them?

16 A. Niagara.

17 Q. IDI?

18 A. IDI.

19 Q. And as business agent for Asbestos Workers Local
20 Number 4, would part of your job require you to have
21 face-to-face meetings with management of these various
22 companies?

23 A. I often met with them, yes.

24 Q. Mr. Hawley, did there come a time when you, sir,
25 first became aware of the health hazards related to the

1 James M. Hawley - Direct - Ponterio
2 inhalation of asbestos dust?

3 A. Yes, there was.

4 Q. And can you tell this jury, when did you first
5 became aware that there were health hazards related to the
6 inhalation of asbestos dust?

7 A. In the first part of the 60's, 1961, '62 I became
8 aware that there was a definite problem.

9 Q. And can you tell us, sir, how did you become aware
10 of the health hazards related to the inhalation of asbestos
11 dust in 1961, 1962?

12 A. Well our, our general office, which is -- was
13 located in Washington, which oversees all of the individual
14 local unions, had start -- started some programs in New York
15 City and New York -- and New Jersey and discovered that there
16 was a definite health hazard to our members and as they
17 explored this problem they disseminated the information out to
18 all the individual unions.

19 Q. Did there come a time when you became aware that
20 asbestos dust could cause a fatal disease in, death in
21 workers?

22 A. Yes.

23 Q. When did you first gain that knowledge that asbestos
24 dust could cause death in workers?

25 A. I would say the early sixties, again, '60, '61.

James M. Hawley - Direct - Ponterio

Q. And how did you become aware in the early 1960's that asbestos dust could cause death in workers?

A. Well, as I say, there was a survey being done in New York City and New Jersey and I learned a lot from that. I had firsthand experience with our own members who were becoming sick, were dying..

Q. Members of your union?

A. That's right. They were becoming sick and dying and it was obvious that they were suffering from some problem with their work materials.

Q. Sir, did there come a time when you as business agent for the Asbestos Workers Local 4 began to have discussions with the local insulation contractors about the health hazards of asbestos dust?

A. As soon as I took the job in 1962, I -- that was one of my goals, to improve the safety conditions and I, I did it then.

Q. And, sir, which local insulation contractors did you have discussions with about the health hazards of asbestos dust when you first became business agent?

A. Well with all of the members of the association as a group and individually and again these were Frontier Insulation, Niagara Asbestos, Buffalo Insulation Distributors and smaller ones.

James M. Hawley - Direct - Ponterio

1
2 Q. And in the early 1960's, did you tell these local
3 insulation contractors what you had learned about the harmful
4 effects of asbestos dust to workers?

5 A. Yes. We were passing all the information on to
6 them.

7 Q. Mr. Hawley, when you were business agent of Local 4,
8 to your knowledge, did these local insulation contractors ever
9 take steps to spread an awareness of the hazards of asbestos
10 dust beyond the workers in your local?

11 MR. MYERS: Objection.

12 MR. BUSHWAY: Objection.

13 MR. GALLAHER: Objection.

14 THE COURT: Sustained.

15 BY MR. PONTERIO:

16 Q. Sir, when you first informed the insulation
17 contractors, Niagara and IDI, in the early sixties about the
18 harmful effects of asbestos, what was their reaction?

19 A. They contended there was no health problem, that it
20 was a noxious material irritating to work with, but it was not
21 harmful to your health.

22 Q. Mr. Hawley, did there come a time when you became
23 aware that workers in your local union were becoming sick from
24 breathing asbestos dust?

25 A. Yes.

James M. Hawley - Direct - Ponterio

Q. And did there come a time when you became aware that workers in your local union had died from inhalation of asbestos dust?

A. Yes, there was.

Q. Did you personally know these asbestos workers?

A. I knew all of them.

Q. Did you sometimes work with some of these workers?

A. I worked with many of them.

Q. What types of asbestos products did they work with?

A. Well, again, you mean such as block and --

Q. That's correct.

A. -- insulation, pipe insulation with the various cements.

Q. When did you first become aware that workers in your local union were dying from inhalation of asbestos dust?

A. Well in the early sixties, again, I had firsthand experience then with them.

Q. Now, sir, in your capacity as business agent, were you required, were you called upon to attend worker's compensation hearings on behalf of your members who were sick?

A. I was.

Q. Is that one of your job duties as a business agent?

A. That's right.

Q. Before we get into any specifics, in general when

James M. Hawley - Direct - Ponterio

you were business agent, starting in 1962, who would be in attendance at these worker's compensation hearings?

A. Well generally the worker himself would be there if he was still alive. If he weren't, his, perhaps, widow or members of his family. The hearing examiner would be there. The other contractors involved who were involved in the hearing would have the right to be there and any of -- any witnesses that might, such as co-workers and that -- who could add some information would be there.

Q. Did you know a gentleman by the name of Joseph McLaughlin?

A. I did.

Q. Were you personally acquainted with Joseph McLaughlin?

A. Yes.

Q. Would you recognize him by sight, sir?

A. Yes, I would.

Q. And what was Joseph McLaughlin's occupation?

A. He was an asbestos worker journeyman.

Q. And, Mr. Hawley, in your capacity as business agent for Asbestos Workers Local 4, were you present at any worker's compensation hearings regarding Joseph McLaughlin?

A. Yes, I was.

Q. When was that worker's compensation hearing for

1 James M. Hawley - Direct - Ponterio

2 Joseph McLaughlin that you personally appeared at?

3 A. I went to one in 1964.

4 Q. Were you physically present at this hearing, sir?

5 A. I was.

6 Q. Was Mr. McLaughlin there?

7 A. Yes.

8 Q. Was Mr. McLaughlin's employer at the hearing in
9 1964?

10 A. Yes.

11 Q. Which employer was that, sir?

12 A. That was Buffalo Insulation Distributors. They had
13 their representative there.

14 Q. And as business agent, were you required as part of
15 your duties to become familiar with what the worker's
16 compensation claim was about?

17 A. I tried to become familiar. There are very, very
18 involved rules, but I tried.

19 Q. Why was that?

20 A. Well they have a --

21 Q. My question is, why, why as business agent were you
22 required to learn about the nature of the claim?

23 A. Well, so I could better help the person or worker if
24 he, you know, requested my help. It's confusing and to a
25 layman going up there it's, it's like a jungle, you know. So

1 James M. Hawley - Direct - Ponterio
2 they needed help and I tried to give what help I could give.

3 Q. In 1964, sir, when you were present, what was the
4 nature of Joseph McLaughlin's claim?

5 MR. MYERS: I'm going to object, your Honor.
6 There's no record of any worker comp claim in 1964.
7 There's been no documentation and for him to testify
8 concerning a hearing for something in which even the
9 Worker Compensation Board doesn't have any record
10 of, I object to it.

11 MR. PONTERIO: He was there, judge.

12 THE COURT: He was there. He can testify. You
13 can cross-examine.

14 BY MR. PONTERIO:

15 Q. My question to you, sir, in 1964, what was the
16 nature of Joseph McLaughlin's claim?

17 A. Well Mr. McLaughlin felt that the materials that he
18 had been working with over the years were causing him a
19 problem and he had filed a claim that -- for some
20 reimbursement for that, compensation for his --

21 Q. And was that asbestos materials?

22 A. Yes, it was.

23 Q. At the hearing in 1964 at the Worker's Compensation
24 Board, was there some resolution with this claim?

25 A. Yes, there was.

James M. Hawley - Direct - Ponterio

Q. You were present, sir?

A. Yes.

Q. What employer was present?

A. It was Buffalo Insulation Distributors. It was a Mr. Herbert McLaughlin, who happened to be Joseph McLaughlin's son, was there.

Q. And what was this resolution, sir, in 1964?

A. The resolution, as I recall it, was that Buffalo Insulation Distributors agreed to make the payments to Mr. McLaughlin for his claim with the understanding that they wouldn't be saddled with the ultimate responsibility for it. In other words, they were not taking any blame for it, but they would pay it and this was satisfactory to the hearing examiner and all the parties.

Q. As the business agent for your Local Number 4, did you become aware of deaths of members of your local when they occurred?

A. Well most instantly I did, yes.

Q. Do you recall becoming aware of the death of Joseph McLaughlin?

A. Yes.

Q. To the best of your knowledge, did you learn of Mr. McLaughlin's death on or about the day that he died?

A. Yes.

James M. Hawley - Direct - Ponterio

1
2 Q. In your capacity as business agent, did you attend a
3 worker's compensation hearing on behalf of the widow of Joseph
4 McLaughlin?

5 A. I did.

6 Q. And, sir, when did you physically attend a hearing
7 on behalf of the widow of Joseph McLaughlin?

8 A. I believe that was in 1969. I -- Mr. McLaughlin, I
9 believe, died in '68. This was about a year later.

10 Q. Did the asbestos workers union, sir, have a monthly
11 meeting?

12 A. We did.

13 Q. And as business agent for Local 4, did you have any
14 special duties with respect to the union meetings?

15 A. I was required to give a report, the business
16 agent's report of his activities for the previous month at
17 each meeting.

18 Q. And, sir, I'm going to show you what's been
19 marked --

20 MR. PONTERIO: If we could -- what's the next
21 exhibit, please?

22 (Whereupon, Plaintiff's Exhibit 29 was then
23 marked for identification.)

24 BY MR. PONTERIO:

25 Q. Sir, I'm going to show you what's been marked

1 James M. Hawley - Direct - Ponterio
2 Plaintiff's Exhibit 29 for identification and first I'll ask
3 if you could please identify what this document is for us?

4 A. This particular three-page document is a copy of the
5 minutes for a meeting that was held on Friday, January 3rd,
6 1969.

7 Q. And, sir, let me ask you, if you could turn to page
8 two of that document, could you identify what that is?

9 A. Page two? There's -- page two it just refers to the
10 financial -- oh.

11 Q. Excuse me, sir. It's --

12 A. Oh, I see. There's two page twos, yes. The page
13 two you're referring to is entitled the Business Agent's
14 Report for the January 3rd, 1969 meeting. This is --

15 Q. And who was the business agent in 1969?

16 A. I was.

17 Q. Was that your report, sir?

18 A. That's right. This was my report.

19 Q. And was that report prepared by you as part of your
20 duties as a business agent for Local 4?

21 A. It was.

22 Q. And was that report prepared by you at or near the
23 time of January 3rd, 1969?

24 A. It was probably prepared that afternoon.

25 Q. Is that your report, sir?

1 James M. Hawley - Voir Dire - Myers

2 A. That's right.

3 Q. And can you tell us, in the first paragraph, what
4 did you report on January 3rd, 1969?

5 MR. MYERS: Objection. It's not in evidence.

6 MR. PONTERIO: I'll be glad to move it in
7 evidence, your Honor.

8 MR. MYERS: May I have a voir dire?

9 THE COURT: Yes.

10 VOIR DIRE EXAMINATION

11 BY MR. MYERS:

12 Q. Mr. Hawley, Plaintiff's Exhibit number 29, the
13 Business Agent Report, this is typed up. Is this your typing?

14 A. No, it's not. It was apparently retyped again by
15 the recording secretary for that meeting.

16 Q. Do you have your original -- strike that. Did you
17 initially type it or did you do it in longhand?

18 A. I typed it.

19 Q. Okay. Do you have your typewritten report?

20 A. No, I don't.

21 Q. Do you know what happened to your typewritten
22 report?

23 A. Well I had no need for them once I gave it to the
24 recording secretary and he made it a part of the minutes.

25 Q. Do you know if the recording secretary changed that,

James M. Hawley - Voir Dire - Myers

your report?

A. No. He never changed it.

Q. Did you compare it word-by-word?

A. Yes.

Q. Do you know why he retyped it?

A. Well sometimes it was just for a matter of appearance if he had enough time. If he didn't have enough time, there were times when he took my report just as I typed it and inserted it in the minutes. I don't know why he did it differently.

Q. And, sir, just so that I understand it, whenever you made an appearance to the Worker Compensation Board, would you then report it back in terms of the Business Agent Report?

A. Not every time, no. I, I typed a report that I thought was of interest to the members that would help them in their day-to-day activities. If it helped them, I did. If it perhaps wasn't important to anybody, I didn't.

Q. And I notice there are two different page twos here. Do you know whether or not there was a page one that -- in terms of your report?

A. No. My -- I don't know that. No. There was no page one. That was my report. I only had that one page.

Q. And by the way, where, where were these minutes maintained?

1 James M. Hawley - Direct - Ponterio

2 A. Well the office of the recording secretary, if he
3 had one, was where they would be. They had a large book, a
4 ledger they used to put them in each month as they were read
5 and approved.

6 MR. MYERS: Okay. Your Honor, I have no
7 objection.

8 THE COURT: Mark it in evidence.

9 (Whereupon, Plaintiff's Exhibit 29 was then
10 received and marked in evidence.)

11 DIRECT EXAMINATION RESUMED

12 BY MR. PONTERIO:

13 Q. Mr. Hawley, I'm going to ask you to please read the
14 first paragraph of your report that you issued on January 3rd,
15 1969 for us.

16 A. It reads: Noted that Brothers Andy Jenkins, Oliver
17 Graham, John Clark and George Coulter appeared and testified
18 at the recent Workmen's Compensation Board hearing on behalf
19 of Brother Joseph McLaughlin's widow. Due in large part to
20 their testimony that Brother McLaughlin was exposed to
21 hazardous dust during his employment with B.I.D.I. and E. J.
22 Eddy, the board's hearing commissioner authorized a partial
23 award to his widow. This case is continuing.

24 Q. And B.I.D.I., who is that?

25 A. That's Buffalo Insulation Distributors.

1 James M. Hawley - Direct - Ponterio

2 Q. And, Mr. Hawley, were you physically present at the
3 worker's compensation hearing concerning the death of Joseph
4 McLaughlin?

5 A. I was.

6 Q. And which employer was present at that hearing?

7 A. A representative of Buffalo Insulation Distributors
8 was there, Mr. McLaughlin again.

9 Q. Did you also testify at that worker's compensation
10 hearing?

11 A. Yes.

12 Q. On behalf of the widow of Joseph McLaughlin?

13 A. I did.

14 Q. And was an award made back then?

15 A. Yes.

16 Q. And to your knowledge, who was the award made
17 against?

18 A. To his -- oh, it was against Buffalo Insulation
19 Distributors.

20 Q. Sir, did there come a time you became aware of the
21 disease asbestosis?

22 A. Yes.

23 Q. When was that, sir?

24 A. Well, again, as soon as I assumed this job it became
25 very obvious it was a problem with the --

James M. Hawley - Direct - Ponterio

Q. And did you communicate your knowledge of the disease asbestosis to the insulation contractors who were part of the employer's association?

A. I did.

Q. And that would include Niagara?

A. All of them.

Q. IDI?

A. Yes.

Q. Starting in the 1960's?

A. Yes.

Q. Sir, did you know a gentleman by the name of James Cavanagh?

A. I did.

Q. Did you know Mr. Cavanagh personally?

A. I did. I worked with him many times when I was still working with the tools.

Q. What was Mr. Cavanagh's occupation?

A. He was an asbestos worker journeyman.

Q. Did Mr. Cavanagh have any long-standing insulation contractor he worked for?

A. He almost exclusively worked for Niagara Asbestos.

Q. Is Mr. Cavanagh alive?

A. No. He's dead.

Q. When did he die, sir?

James M. Hawley - Direct - Ponterio

A. I believe he died in approximately 1958. I --

Q. Do you know what he died of?

A. He died of asbestos-related materials, exposure.

Q. Mr. Hawley, in addition to the employer's association meetings, can you tell this jury, what was the trade board?

A. Well the trade board was a combination of the Asbestos and Contractors, Employer's Association and the union. It was -- the union's people were generally there, officers, presidents, myself, vice president. Their executive board and the employers were made up of all the various local employers at that time.

Q. When you say employers, what type of employers?

A. Well the asbestos contractors and insulation people that distributed it..

Q. Did that include Niagara?

A. Yes.

Q. And Insulation Distributors?

A. Yes.

Q. And as business agent, starting in 1962, were you required to participate in trade board meetings on behalf of your union?

A. I was.

Q. And was it part of the regular course of your

1 James M. Hawley - Direct - Ponterio

2 business to attend meetings of the trade board on behalf of
3 your union?

4 A. Yes.

5 Q. How often did the trade board meetings take place?

6 A. Well they scheduled four meetings quarterly a year,
7 but we often met for other purposes if there was a
8 disagreement or some kind of a dispute or something that would
9 benefit the industry or we also met for negotiating our
10 contract periodically.

11 Q. Sir, when you were business agent from 1962 to 1971,
12 were the local insulation contractors, Niagara and Buffalo
13 Insulation, part of the trade board?

14 A. They were.

15 Q. And, sir, when to your personal knowledge did
16 discussions upon the health hazards of asbestos dust first
17 take place at trade board meetings?

18 A. Well, when I assumed the job in 1962, as I said, I
19 made this sort of a goal to move this along and I, I know that
20 it started then as far as I was concerned.

21 Q. Sir, who was Dr. Irving Selikoff?

22 A. Well he was a -- a well-known doctor. He was
23 associated with the, I believe Mt. Sinai Hospital in New York
24 City, and --

25 Q. And --

James M. Hawley - Direct - Ponterio

A. Go ahead.

Q. And did you meet, personally meet Dr. Selikoff?

A. Yes. ~~WOW~~.

Q. When did you first become aware of Dr. Selikoff?

A. Well, as I mentioned earlier, our international association gave him some sort of a grant to make a study in the New York City and New Jersey area of the unions there and they discovered that there was a serious problem facing our people.

Q. And, sir, when did you first become aware of those findings by Dr. Selikoff?

A. Well our international association started sending out communications to all the individual unions in the country and we have a journal that comes out, I think that comes out quarterly, they would send these things out.

Q. What time frame?

A. Well it was four times a year in January and -- I can't break them down, but four times a year.

Q. But my specific -- what time frame did you first become aware of Selikoff's findings?

A. Oh. This was in 1961/62.

Q. And did you communicate yourself personally, sir, the findings of Dr. Selikoff to Niagara and Buffalo Insulation management?

James M. Hawley - Direct - Ponterio

A. I did. ~~HOLY CRAP~~

Q. Sir, I'm going to show you what's been marked --

MR. PONTERIO: Let's mark this, please.

(Whereupon, Plaintiff's Exhibit 30 was then marked for identification.)

BY MR. PONTERIO:

Q. Sir, I'm going to show you Plaintiff's 30, an article entitled Asbestos Exposure and Neoplasia by Dr. Selikoff dated April 6, 1964 and ask, have you seen that document before?

A. Yes, I have.

Q. Can you tell this jury, when was the first time you saw that document by Dr. Selikoff on asbestos and cancer?

A. Well, it, it appeared in our, our journals I mentioned circulated throughout all the unions in the country.

Q. When was that?

A. Well, again, in 1964 and leading up to it even, because he was developing, you know, this then.

Q. Sir, I'm going to --

MR. PONTERIO: Let's mark this, please.

(Whereupon, Plaintiff's Exhibit 31 was then marked for identification.)

MR. MYERS: Is that another article by Selikoff?

1 James M. Hawley - Direct - Ponterio

2 MR. PONTERIO: Yes.

3 BY MR. PONTERIO:

4 Q. Sir, I'm going to show you what's been marked
5 Plaintiff's Exhibit 31 and ask if you could identify what this
6 is for us and the date, sir?

7 A. Well this is a photocopy of the journal I referred
8 to that goes out quarterly to all of the local unions, in
9 fact, actually to every member they get one, and it's more or
10 less --

11 Q. What's the date of that journal?

12 A. It's November of 1964.

13 Q. And what article is included in that?

14 A. Well, again, they've got this article by Dr.
15 Selikoff that he had given at, I guess, our general
16 convention.

17 Q. On asbestos and cancer?

18 A. That's right.

19 Q. And, sir, did you communicate Dr. Selikoff's article
20 on asbestos and cancer to Niagara and Insulation Distributers,
21 Inc. management at the time in 1964 when you received it?

22 A. Yes.

23 Q. In addition to yourself and your members, sir, did
24 the insulation contractors, Niagara and Insulation
25 Distributers, Inc., also receive the Asbestos Worker magazine?

1 James M. Hawley - Direct - Ponterio

2 A. They received everything that was sent out to our
3 members and to myself, even some things that I didn't know
4 they were receiving.

5 Q. Sir, did there come a time when Dr. Selikoff's group
6 actually came to your union, the Local 4 workers in Buffalo
7 and conducted examinations regarding their health?

8 A. Well not Dr. Selikoff. We were contacted by a Dr.
9 Albert Rosso. He was an assistant director, I believe, of the
10 New York State Department of Industrial Hygiene and he said
11 they had become concerned based on Dr. Selikoff's work and
12 they wanted to conduct a study here of our people in Buffalo
13 to see how it stacked up against the other reports they were
14 getting.

15 Q. What year was this?

16 A. I believe this would have to be in 1964/65 into --

17 MR. PONTERIO: Sir, I'm going to mark this,
18 please.

19 (Whereupon, Plaintiff's Exhibit 32 was then
20 marked for identification.)

21 BY MR. PONTERIO:

22 Q. Sir, I'm going to show you what's been marked
23 Plaintiff's Exhibit 32 and ask if you could identify that for
24 us, please?

25 A. Again, this is a copy of, a photocopy of the journal

*Good witness
(great)*

1 James M. Hawley - Direct - Ponterio

2 that was sent out to the workers and employers and people
3 interested in the trade.

4 Q. These are insulation employers?

5 A. Yes.

6 Q. And what's the date of that journal?

7 A. November, 1965.

8 Q. And what -- who worked -- which workers were being
9 examined in 1965?

10 A. Dr. Rosso was conducting this examination of our
11 members from Local 4, here in Buffalo.

12 Q. And was Niagara and IDI aware of those studies?

13 A. They were.

14 Q. They received that journal --

15 A. Yes.

16 Q. -- in 1965? And were any of your members of your
17 specific local becoming very sick due to asbestos?

18 A. They were.

19 Q. Mr. Hawley, I'd like you to assume we heard in
20 opening statements from Niagara Insulation and IDI's attorneys
21 that there just aren't people around anymore with knowledge of
22 what was going on in the 1960's. Sir, let me ask you, have
23 you ever received any telephone calls from Niagara
24 Insulation's President, John McKendry, about coming in and
25 testifying in court?

Colloquy

MR. MYERS: Objection.

MR. BUSHWAY: Objection.

THE COURT: He can answer.

MR. MYERS: No. The foundation was in terms of asking him to assume.

THE COURT: All right.

MR. PONTERIO: Let me just ask a separate question.

THE COURT: All right. Sustain the objection.

MR. PONTERIO: Sir, let me ask you, have you ever received any telephone calls from Niagara Insulation, Inc.'s President, John McKendry, about coming into court and testifying?

MR. BUSHWAY: Objection.

THE WITNESS: I did.

MR. PONTERIO: What did Mr. McKendry tell you?

THE WITNESS: He expressed his displeasure against my appearing.

MR. BUSHWAY: Objection, your Honor. May we approach?

THE COURT: Yes.

(Bench conference off the record.)

THE COURT: Jurors, take a short recess, ten minutes while we put something on the record.

Legal Argument

(10:40 a.m., jury exited the courtroom.)

MR. PONTERIO: Mr. Hawley, do you want to step down, step out in the hallway for legal argument?

THE COURT: All right. Let's go on the record.

MR. BUSHWAY: Your Honor, Todd Bushway for Niagara. My objection to the question and the line of questioning at this point is that plaintiffs are attempting to elicit testimony made by -- made by the President of Niagara, John McKendry. There's been no disclosure in this case as to those statements regarding whatever Mr. McKendry may have said and you have their pretrial disclosure in front of you for use in this case. It's my understanding plaintiff's response is, well, it's generally known within the asbestos litigation. We're entitled to their disclosure specifying what they're going to use in this particular case. That's not contained as part of their disclosure and the witness -- I would also point out that plaintiffs' counsel had told us they had -- we had conversations regarding subpoenaing employees. We agreed to accept the subpoena on behalf of Mr. McKendry and make him available should plaintiffs choose to call him. We

Legal Argument

were told by Mr. Comerford on Friday that they no longer wished to call Mr. McKendry. He was released from the subpoena.

MR. COMERFORD: We never subpoenaed him, though.

MR. BUSHWAY: We had an agreement, John, we would produce him. You called and asked me if I would accept. You told me on Friday you were releasing him.

MR. COMERFORD: Your Honor, Mr. Hawley's here to be cross-examined. If the court deems it appropriate, Mr. Bushway can, of course, outside the presence of the jury, he can even ask Mr. Hawley what the full message was, the threatening phone message was that was left by Mr. McKendry, but more specifically, I don't know that's necessary because the statement has been in the possession of Niagara Insulation and their attorneys for at least two years, if not three, and this is no surprise. They've known about the tape and if there is prejudice, well, they can question Mr. Hawley about it. He's here to be cross-examined.

MR. BUSHWAY: Cross-examination, your Honor, does not excuse their failure to disclose statements

Legal Argument

in this case.

MR. COMERFORD: Well I would argue that maybe it wasn't specifically disclosed in this case, but I will argue that the door was opened in this case by the defendants during opening statements and there's no prejudice here. We have Mr. Hawley here. Any questions that you have, he's here to answer.

MR. BUSHWAY: There has been no door opened, your Honor, through any evidence taken from the stand and there certainly is a disclosure obligation, both in the asbestos case management order that requires a pretrial statement to be served by the parties and generally by the CPLR regarding statements of an opposing party. They have not been disclosed in this case.

The answer that it's generally known in asbestos litigation I don't believe holds any weight, your Honor. There are hundreds, literally thousands of asbestos cases and if we're now going to say, well, it's generally known among us, among counsel, it's fair game, I don't buy that. These are specific cases about specific people and specific locations. The disclosure was not made.

MR. COMERFORD: Your Honor, my pretrial is so

Legal Argument

1 voluminous, if I was remiss in not putting in this
2 tape and that it'd be testified to, I guess that's
3 my fault, but as soon as this message was left on
4 Mr. Hawley's answering machine I think I went far
5 and above the call of duty here. I got a copy of
6 the tape. I called Mr. Gellman. I said Gellman,
7 Attorney Gellman, here's a tape. Here's a copy for
8 you. You should know that your client is calling
9 lay witnesses and I turned it over and the witness
10 is here today. This tape is well-known in the
11 litigation. And again, Mr. Hawley is here. He can
12 be cross-examined about it. And, your Honor, I know
13 it's not, the specific tape is not in my pretrial.
14 I was remiss in not putting it in.

15
16 MR. BUSHWAY: There's no specific mention of
17 any statements made by my client other than the ones
18 we've stipulated to and I don't know if they're
19 mentioned, but I know that we stipulated to them.

20 THE COURT: Well you're telling me that Mr. --
21 Attorney Ryan Gellman?

22 MR. COMERFORD: Yes.

23 THE COURT: That he had the tape?

24 MR. COMERFORD: Oh, he absolutely has the
25 tape. I don't think there's any doubt of that.

Legal Argument

1
2 MR. BUSHWAY: Your Honor, I would also point
3 out that Mr. Hawley was produced as a witness in
4 this litigation at the pretrial deposition as a
5 nonparty. We were informed by plaintiffs' counsel's
6 office that the purpose of producing Mr. Hawley for
7 pretrial discovery was -- had to do with the
8 McLaughlin worker's compensation issue and that's
9 basically what his transcript focuses on. So in
10 terms of any indication that this was going to
11 become an issue in this case, we have not been
12 notified.

13 MR. COMERFORD: Mr. Hawley was deposed in this
14 case, your Honor, by videotape deposition beforehand
15 and numerous issues were brought up and raised,
16 including the Cavanagh documents, the McLaughlin
17 claim --

18 MR. BUSH: There's no reference to the Cavanagh
19 documents.

20 MR. COMERFORD: In the deposition.

21 MR. BUSHWAY: In the deposition.

22 MR. COMERFORD: But our pretrial disclosure
23 mentions it, Mr. Bushway.

24 MR. BUSHWAY: My point is, your Honor, if the
25 asbestos -- if Mr. Comerford wants to use the

Legal Argument

asbestos litigation as a whole, if he calls our office up and says this nonparty witness is going to come in and testify at a deposition to cover generally these topics, if he's saying now we -- if he's saying -- if he is saying now that we can't rely on his office's representations of what topics those are going to cover, we're going to start to question every witness about every possible thing.

MR. PONTERIO: I've got the pretrial disclosure here, judge.

MR. MYERS: I would just like -- I myself have never heard the tape, your Honor, and I would just like to know if there's any inference in regards to IDI in regards to it.

MR. PONTERIO: Nothing. Nothing --

THE COURT: Nothing.

MR. PONTERIO: -- in reference to IDI.

THE COURT: All right.

MR. MYERS: Okay. I just --

MR. PONTERIO: It talks about Niagara Insulation's --

MR. COMERFORD: I mean, the heart of Mr. Hawley's testimony, and it's referenced at page four of our pretrial, the second to the last

Legal Argument

1 sentence says: As a business agent for Local 4,
2 Mr. Hawley will testify that he advised the officers
3 of Niagara Insulations, Inc. and Buffalo Insulation
4 Distributors, Inc. of the hazards of asbestos by the
5 early to mid-sixties. That's the thrust of his
6 testimony and that's why we produced him this
7 morning on that, your Honor.
8

9 MR. BUSHWAY: Your Honor, I haven't been able
10 to find that reference, but I'll rely on
11 Mr. Comerford's reading ability.

12 MR. COMERFORD: Page four, pretrial --

13 MR. BUSHWAY: But I would point out that that's
14 not the issue we're talking about right now.

15 MR. COMERFORD: Well, your Honor --

16 THE COURT: You don't mention McKendry in this
17 disclosure.

18 MR. BUSHWAY: And you will note we haven't
19 objected to his testimony regarding that.

20 MR. COMERFORD: Well, your Honor, I was remiss
21 in not sending him a follow-up letter, but I'll rest
22 on the record that they do have a copy of the tape
23 and it's no surprise.

24 MR. BUSHWAY: Well I would object to the
25 characterization of it is an oversight.

1 James M. Hawley - Direct - Ponterio

2 THE COURT: Are you familiar with the tape?

3 MR. BUSHWAY: Not personally. I have no doubt
4 that -- I'm not disputing his discussions with
5 Mr. Gellman at my office, but I think it's more than
6 just remiss. They clearly brought this witness in
7 to testify about this.

8 THE COURT: All right. We'll hear him on the
9 basis that there was prior knowledge and it
10 shouldn't be any surprise.

11 MR. BUSHWAY: Note my objection for the record.

12 THE COURT: Yes.

13 (Whereupon, Court's Exhibit 1 was then received
14 and marked in evidence.)

15 MR. BUSHWAY: Your Honor, just a bit of
16 housekeeping. We marked this as Court's Exhibit 1.

17 THE COURT: Okay. Fine.

18 (11:00 a.m., jury, all counsel present.)

19 THE CLERK: Let the record reflect the presence
20 of the jury, all counsel and the parties.

21 Mr. Hawley, you're still under oath.

22 THE WITNESS: Yes.

23 DIRECT EXAMINATION RESUMED

24 BY MR. PONTERIO:

25 Q. Mr. Hawley, before we left off, my last question to

1 James M. Hawley - Direct - Ponterio

2 you was, have you ever received any telephone calls from
3 Niagara Insulation's President, John McKendry, about you
4 coming into court and testifying?

5 A. Yes, I did.

6 Q. What did Mr. McKendry tell you?

7 MR. BUSHWAY: Objection.

8 THE COURT: Overruled.

9 THE WITNESS: He was very angry. Myself and
10 two other members of our union were going to testify
11 in a case that was against his company and he
12 thought the fact that we were testifying was, oh, I
13 don't know, it was biting the hand that fed us is
14 his term. He was very abusive. He used some
15 profanity. He used the F word to me for agreeing to
16 testify. He told me that he was going to be around
17 if I wanted to talk to him any further about it and
18 then he hung up.

19 MR. PONTERIO: Sir, how do we know --

20 THE COURT: Before you go any further, what was
21 the date of this?

22 MR. PONTERIO: What was the date of your
23 conversation -- of the conversation?

24 THE WITNESS: I believe it was in December of
25 1997, I believe. I was serving --

James M. Hawley - Direct - Ponterio

THE COURT: That's all. I just wanted the date.

BY MR. PONTERIO:

*HAHA.
SCHEIDT
SMART*

Q. Sir, how do we know you're not making this up?

A. Well, at that time I was acting as the administrator for our benefit funds for the union. The previous fellow became very ill and I was taking over. In the office all our phones had answering machines on them. I wasn't in at the time Mr. McKendry called. When I came in I seen I had a message. I played the message and I was astounded by the message and I kept it.

Q. Do you have that tape with you today?

A. I do.

Q. Sir, when you first became business agent in 1962, did you, yourself, have any, any goals you were trying to accomplish for your workers?

A. Well, as I mentioned earlier, this health problem was becoming obviously very serious and I thought this was something we should zero in on and do as much as we can to protect our people..

Q. Did you have any conversations with Niagara Insulation management about this problem?

A. Yes, I did.

Q. What did you try to get them to do?

James M. Hawley - Direct - Ponterio

A. Our original effort was to have them provide small respirators that would filter the dust and smoke that the workers were exposed to.

Q. And can you tell us in the early 1960's, what reaction did you receive from Niagara Insulation Distributors, Inc. management about this proposal?

A. It was a negative response. They were against furnishing these and they didn't think they were effective. They didn't think the workers would wear them. They didn't agree that there was any problem out there yet. They said it's a noxious substance, but it didn't really hurt your health, but basically and in my own opinion and from things I seen as we went along, the primary obstacle was cost. They did not want to furnish these to the workers because they cost too much money.

Q. Sir, was Carbon Graphite ever part of the local insulation contractors?

A. No.

Q. Was Carbon Graphite ever part of the employer's association you referred to, Niagara and IDI?

A. No, they weren't.

Q. Was Carbon Graphite ever a member of the trade board?

A. No.

James M. Hawley - Direct - Ponterio

Q. During the 1960's as part of your job duties, were you familiar with the types of asbestos products your members were using?

A. I was familiar with all of them.

Q. Have you ever heard of a product called Eagle Picher 66 cement?

A. Yes.

Q. How did you gain a familiarity with Eagle Picher 66 cement?

A. Well it was there when I first started working and I had a lot of experience myself applying it.

Q. During the 1960's, did you ever see any warning labels on Eagle Picher 66 cement?

A. There were no labels.

Q. During your career as an asbestos pipe coverer, did you actually work for Buffalo Insulation?

A. Yes, I did, quite a few times.

Q. Did Buffalo Insulation sell asbestos insulation in the 1960's?

A. They did.

Q. They also do insulation contract work in the 1960's?

A. Yes. They were both in -- a distributor and a supplier of materials and a contractor.

Q. Can you tell the jury in the 1960's and early 70's

1 James M. Hawley - Direct - Ponterio

2 what geographic areas Buffalo Insulation business encompassed?

3 A. Of course. The Western New York area and they went,
4 I believe, as far as Rochester, even Syracuse at times, down
5 to Erie.

6 Q. Pennsylvania?

7 A. Pennsylvania, yes.

8 Q. Was Buffalo Insulation a prominent insulation
9 contractor in the 1960's, early 1970's?

10 A. Yes, they were.

11 Q. Did you also have occasion to work for Niagara
12 Insulations?

13 A. Yes, I did.

14 Q. In the 1960's, early 1970's, what presence did
15 Niagara Insulations have in the Western New York area?

16 A. They were a very large contractor and supplier.

17 Q. They also sold insulation products?

18 A. They did.

19 Q. During this time frame?

20 A. Yes, they did.

21 Q. Mr. Hawley, are you being paid by any party at this
22 trial to come into court today?

23 A. No, I'm not.

24 MR. PONTERIO: No further questions.

25 THE COURT: Proceed.

James M. Hawley - Cross - Myers

MR. MYERS: May I proceed?

THE COURT: Proceed.

CROSS-EXAMINATION

BY MR. MYERS:

Q. Good morning, Mr. Hawley.

A. Good morning.

Q. Mr. Hawley, have you ever provided testimony before in any asbestos litigation?

A. Yes, I have.

Q. And how many times have you provided such testimony?

A. Just a guess, I, probably in a trial setting, I'd say four times. I've given many depositions before trials.

Q. And depositions would be testimony before. Now approximately how many depositions did you -- have you provided?

A. Perhaps seven, eight.

Q. And you've already testified because -- in regards to the injured worker, am I correct?

A. That's right.

Q. Now, let me -- I'm going to ask you questions in a number of different areas, but you had testified in terms of Joseph McLaughlin, I believe, and Joseph is somebody you knew for how long?

A. Well, as soon as I, I entered the business he was

1 James M. Hawley - Cross - Myers

2 already there. He, in fact, he was a charter member of our,
3 our organization, which started back in 1912. He's one of the
4 older fellows.

5 Q. He was a charter member back in 1912?

6 A. Yes.

7 Q. So he started working in the asbestos field in 1912?

8 A. I don't know whether he started working. He was a
9 charter member. He's on our charter. His name is there.
10 That's how I know that.

11 Q. And when you first started to work in the asbestos
12 field, do you know what company he worked with?

13 A. When he started?

14 Q. No. When you started.

15 A. Well he generally, at the time, if I recall
16 correctly, he worked, the first experience I had with him is
17 he was working for E. J. Eddy. He was working at the
18 Chevrolet General Motors plant that was being put up on the
19 River Road in Tonawanda, a very large project.

20 Q. And did -- and did you ever have occasion to work
21 with him?

22 A. I did, on various jobs.

23 Q. On what jobs did you work with him?

24 A. I don't recall now. I mean, our kind of work moved.
25 you around quite a bit as you were needed. So it might have

1 James M. Hawley - Cross - Myers
2 been only a matter of a few days. Nothing significant I can
3 remember.

4 Q. Okay. Now, you, you are aware that Buffalo
5 Insulation, IDI, wasn't around in the 1930's or '40's, am I
6 correct? They didn't exist?

7 A. I don't know when they started in business. I
8 worked for a company called H. S. Chaffee Company when I
9 started working in 1947 and that became Buffalo Insulation.

10 MR. MYERS: Well, would you please mark this?

11 (Whereupon, Defendant's Exhibit E was then
12 marked for identification.)

13 MR. MYERS: Thank you.

14 BY MR. MYERS:

15 Q. Now, Mr. Hawley, I show you what has been marked as
16 Defendant's Exhibit E for identification, and you know, as a
17 business agent, you are familiar with business documents such
18 as certificate of incorporations?

19 A. Not particularly, no.

20 Q. Okay. Well I show you Defendant's Exhibit E and it
21 shows that IDI was wasn't formed until April 13th, 1955. Now,
22 does that refresh your recollection, sir, as to when IDI was
23 formed?

24 A. No, it doesn't. No. I -- I don't agree with that.
25 They were, to my knowledge --

James M. Hawley - Cross - Myers

1
2 Q. Now you don't agree that in 19 -- that they were
3 created in 1955?

4 A. Oh, they probably were. You have the document. I
5 don't recognize that. I believe they were in existence before
6 then, maybe under another name, as I explained. I worked for
7 H. S. Chaffee in 1947.

8 Q. Are you an expert in terms of different names of
9 companies? I mean, is this something that you researched?

10 A. No. I worked for a company and knew their name and
11 suddenly they were no longer that company, they were calling
12 themselves another name. That's what I know.

13 Q. Now, do you have any evidence that Insulation
14 Distributors, I-N-C is the same thing as H. S. Chaffee?

15 A. Only my own knowledge. It was my understanding they
16 were the same company. They changed their name and their
17 structure, but --

18 Q. But you don't know that?

19 A. I know the companies I worked for.

20 Q. Well, but did you work for IDI prior to 1955?

21 A. Yes. I believe I did.

22 Q. Do you have any proof, any evidence that you worked
23 for them prior to 1955?

24 A. No.

25 Q. Now, in regards to Mr. McLaughlin, do you know how

James M. Hawley - Cross - Myers

1 long Mr. McLaughlin worked for IDI?

2 A. No, I don't.

3 Q. Do you know if he worked for IDI for a week, a year?

4 A. I have no particular knowledge of how long he worked
5 for them.

6 Q. Isn't it true that almost his entire working life
7 Mr. McLaughlin never worked for IDI; that he spent his entire
8 working career working for other companies such as E. J. Eddy?

9 A. In our work you worked for anybody that had the
10 work. You moved around quite a bit. Some people were
11 fortunate to stay with one contractor for various reasons.
12 Others constantly moved around. I don't know who he worked
13 for or how often he moved around.

14 Q. Well, sir, do you know when he retired?

15 A. 1958.

16 Q. So he retired in 1958. What was his health
17 condition in 1958 when he retired?

18 A. I can't speak with any great knowledge. I
19 understand he was probably not too well if he retired. I
20 mean, nobody at that point retired if they could avoid it.

21 Q. Do you know how old he was in 1958?

22 A. No, I don't, offhand. No.

23 MR. MYERS: Are these all the exhibits?

24 THE WITNESS: He was born in 18 --
25

James M. Hawley - Cross - Myers

THE COURT: Just wait.

BY MR. MYERS:

Q. Oh. Okay. When was he born?

A. You want me to tell you?

Q. Yeah, sure.

A. I believe he was born in 1888.

Q. 1888. So in 1888, if he retired in 1958, he would have been 70 years old?

A. Possibly. I -- I'll accept that.

Q. Okay.

A. It's your figures.

Q. All right. So he was 70 years old when he retired, and are you telling me that he was not in good condition when he retired?

A. I can't say what condition he was in.

Q. But -- but you said he wouldn't have retired unless he was -- unless he wasn't healthy. I don't want to misstate what you testified to.

A. Well at that age he probably couldn't get regular employment to begin with, that was his first problem, and I'm sure that old age in general made it difficult for him to do a lot of the work involved in our trade.

Q. So, so as far as you know, at the age of 70, you -- he was in good health, as far as you know? You don't --

1 James M. Hawley - Cross - Myers

2 A. I don't know what his health was.

3 Q. You don't know what his health was. Now, sir, I
4 want you to assume that the testimony in this case is that all
5 of Mr. McLaughlin's worker compensation files were subpoenaed
6 and that the testimony of the district manager of the Worker
7 Compensation Board was that there was only one file on
8 Mr. McLaughlin and that was opened up in 1967. Do you have
9 any written documentation in any of your union records, in any
10 of your union minutes that Mr. McLaughlin filed a worker
11 compensation claim in 1964 or before?

12 A. No, I don't.

13 Q. Did you or did the -- or, have you been informed by
14 Lipsitz and Ponterio that they've searched all of the union
15 minutes and that there's no record of any worker compensation
16 hearing for Mr. McLaughlin in 1964?

17 MR. PONTERIO: Note my objection on that.

18 THE COURT: Yes. Noted.

19 THE WITNESS: Would I be surprised to find that
20 out? I mean, I -- could you ask me again that
21 question?

22 MR. MYERS: Would you please read the question
23 back.

24 (Record read.)

25 MR. PONTERIO: Once again, note my objection.

James M. Hawley - Cross - Myers

We don't have all the union minutes. What we have, we looked at.

THE WITNESS: I would be surprised to find that out, yes.

BY MR. MYERS:

Q. That there is no record?

A. I don't know that. I mean, I know what people tell me, that there's no record. I'm amazed that there's no record.

Q. Did you, yourself, look through any of the union minutes?

A. No.

Q. Now, you, you mentioned that there was a representative of IDI back in 1964 at this worker comp hearing and the representative was Joseph McLaughlin's son, is that correct?

A. That's correct.

Q. Herb McLaughlin, and was Herb McLaughlin there representing IDI or was he there as a son trying to help his father or both?

A. I would hope he was there for both, but he was there as a representative of his company.

Q. In other words, he was somebody that IDI had that -- he was an IDI employee?

James M. Hawley - Cross - Myers

1

2

A. Yes.

3

4

Q. And he was somebody that was concerned about his dad, am I correct?

5

A. I would assume so.

6

7

Q. And just like, was he present in 1969 at the hearing that you were talking about in 1969?

8

A. I believe he was.

9

10

Q. And he was a representative and he is concerned about his mom?

11

A. I would hope so.

12

13

14

Q. And he was trying to do everything he could in order to get worker compensation benefits for his father and his mother; is that a fair statement?

15

16

17

18

19

A. Well I don't know what he was doing as a representative of the company. I would assume he wasn't interested in getting these benefits. As a father, as a son, I would assume he probably was interested. He wore two hats that day.

20

21

Q. Well, but the hat he really wore is he really wanted to help out his mom, am I correct?

22

A. I don't know.

23

24

25

Q. Now, do you have the -- -- yeah. Now, sir, when you do a business agent report, you try to be as accurate as possible, am I correct?

1 James M. Hawley - Cross - Myers

2 A. I try to give as much information as I think will
3 help our membership.

4 Q. Sure.

5 A. I don't give them everything that happened. I give
6 them the things that I think are going to make it more
7 informative for them.

8 Q. Right. And, by the way, did you, yourself, testify
9 at the worker comp hearing?

10 A. I did.

11 Q. You did. So, and the one thing that you would want
12 to do when you tell your members is you would like to tell
13 your members and in your business agent report really what
14 you, yourself, have done?

15 A. Well I do -- I tell them the things that I think
16 that they're most interested in.

17 Q. Okay.

18 A. I mean, if I told everything I did in a month, I'd
19 -- we'd be there three hours a night.

20 Q. Now, in regards to this business agent report, and
21 tell me if I'm reading this correctly, it says: Noted the
22 Brothers Andy Jenkins, Oliver Graham, John Clark and George
23 Coulter appeared and testified at the workers -- at the recent
24 Worker Compensation Board hearing on behalf of Brother Joseph
25 McLaughlin's widow, right?

James M. Hawley - Cross - Myers

1

2

A. Yes.

3

4

5

6

Q. Okay. Now, it doesn't say that you appeared and testified, does it? First of all, let me ask both questions. Does it say here that you appeared? That you were even there?

7

A. No, it doesn't.

8

Q. Does it say that you even testified?

9

A. No.

10

Q. Now --

11

A. Sir, how could I write it down if I wasn't there?

12

13

14

Q. Well, maybe Brother Andy Jenkins told you. Maybe somebody called you up and said that these people were there. There's -- you --

15

A. I was at that meeting or hearing.

16

Q. But it doesn't say that you were at the meeting.

17

18

19

A. Well I should have included myself. I assume that it was in my report and any logical person would assume I was there.

20

21

Q. Well, if you were going to testify, wouldn't you want to tell the members that you testified?

22

23

24

A. I probably did when I gave a verbal report that evening. I probably went in a little more detail on those, those written reports.

25

Q. Okay. Now in regards to the -- his health

James M. Hawley - Cross - Myers

1 condition, in terms of his medical condition, you don't know.
2 what Mr. McLaughlin's medical condition was, do you?

3 A. No.

4 Q. And now let me ask you this. You mentioned that at
5 some time you worked for IDI and was that before or after you
6 became a business agent?

7 A. They were the first company I worked for.

8 Q. Well, H. S. Chaffee -- can we agree that you didn't
9 work for IDI? You want to call them Chaffee, but nobody else
10 is calling them Chaffee, okay?

11 A. Okay.

12 Q. All right?

13 A. I worked for IDI.

14 Q. When?

15 A. Numerous times in my -- the years between '47 and
16 '62.

17 Q. Would you just assume, sir, that my questions are
18 only directed after April of 1955. Did you work for IDI after
19 April of 1955?

20 A. I'm sure I did. I worked for many contractors.

21 Q. And your -- and who else did you work for between
22 1955 and 1962?

23 A. Well, again, I tried to explain earlier that I work
24 as --
25

James M. Hawley - Cross - Myers

1
2 Q. Just tell me the names of the other companies you
3 worked for.

4 A. Niagara Asbestos, I worked for Frontier Insulation,
5 Armstrong Cork, Armstrong Contracts and Supply. I worked for
6 Claxton. Out-of-town contractors come in, I would work for
7 them.

8 Q. Did you work for Niagara?

9 A. Yes.

10 Q. Now, when you became the business agent, sir, did
11 you work for any companies?

12 A. While I was business agent?

13 Q. Yeah. While you were business agent?

14 A. No. No. I was a full-time employee of the union.

15 Q. And as a full-time, as a full-time employee, did you
16 go from time to time to check on jobs that your workers
17 performed, your union members performed?

18 A. It was a large part of my job.

19 Q. And what, what proportion of the job was it in terms
20 of, in terms of visiting plants?

21 A. If I took an eight-hour day, I would say six hours
22 of it are spent in visiting job sites, two hours perhaps in
23 paper work in my office.

24 Q. And from 1966 to 1972, did you ever visit the Carbon
25 Graphite site?

James M. Hawley - Cross - Myers

1

2

A. Yes.

3

Q. And how frequently did you visit it?

4

A. I don't -- I didn't have any regular schedule. I
5 went when there was, perhaps, people working there or if there
6 were a problem.

7

Q. Well in any given year, did you go there every year?

8

A. Oh, yes.

9

Q. How many times per year on the average?

10

A. I might go there eight or ten times a year.

11

Q. And was there -- what company or companies were
12 working at Carbon Graphite?

13

A. I almost exclusively remember Niagara Asbestos being
14 there. They had some sort of a retainer arrangement with the
15 company and they did most of their insulation work.

16

Q. Do you remember any other contractors being there
17 besides Niagara Asbestos?

18

A. No. Not particularly, no.

19

Q. Okay. So the only one you remember is Niagara
20 Asbestos, am I correct?

21

A. That's right.

22

Q. And when you went there, did you observe them in any
23 particular part of the plant?

24

A. At times I went there, they all worked, I don't know
25 the exact name of the building, but it was back at the end of

James M. Hawley - Cross - Myers

1
2 the plant and they had an installation there that required a
3 great deal of insulation work and that's where they always
4 worked that I recall.

5 Q. And again, your recollection's that the only outside
6 contractor at Carbon Graphite for asbestos was Niagara
7 Asbestos during the period of time that you went there from
8 1962 through 1972?

9 A. I'm sure there were others, but I can't recall.

10 Q. Well when you said that you were sure there were
11 others -- by the way, do you have any records as to when you
12 visited Carbon Graphite?

13 A. No, I don't.

14 Q. Okay. And when I asked you the question, you gave
15 sworn testimony, did you not, sir, on February 27th, 2002 of
16 this year?

17 A. Was this the videotaped testimony?

18 Q. Yes.

19 A. Yes.

20 Q. Okay. And when I asked you the question on page 77,
21 line 18, and this was in regards to whether or not there were
22 any other contractors being at Airco Speer, Carbon Graphite,
23 do you recall any other contractors being there? And we don't
24 want you to guess. Answer. Did you give this answer? No. I
25 mean, I would be guessing. No, I don't.

James M. Hawley - Cross - Myers

A. That's right.

Q. Is that correct?

MR. PONTERIO: Are you going to read the preceding question and answer, Mr. Myers, or leave that for redirect?

MR. MYERS: You can leave it for redirect.

MR. PONTERIO: Okay. I will.

BY MR. MYERS:

Q. And when we said, and when we call any other contractors, before you had identified Niagara Insulation as being the only outside contractor that you remembered being there?

A. That's right.

Q. Now, by the way, you were there probably on a fairly consistent basis this eight or ten times each year between '62 and '72, am I correct?

A. Yes.

Q. Now, during that period of time, did you ever see any of -- first of all, did you ever see any Niagara workers wearing respirators?

A. No.

Q. Did you ever see any Carbon Graphite workers wearing respirators?

A. No.

1 James M. Hawley - Cross - Myers

2 Q. Now, sir --

3 A. I said, if I might explain, it wasn't my point to
4 observe what they were wearing. I mean, that was no concern
5 of mine. I'd never seen any. I can't recall seeing any.

6 Q. There was no concern what Niagara Insulation union
7 workers were wearing to you?

8 A. I was concerned about what Niagara's workers were
9 wearing. I can't be concerned what the plant people were
10 wearing. It was none of my business.

11 Q. When you say that you can't be concerned what the
12 plant workers were wearing 'cause it's none of your business,
13 explain that to me.

14 A. That wasn't my job to go in and observe the plant
15 safety practices. I wouldn't be invited in there very often
16 if I started doing that. I was there to check my own people,
17 make sure that they were working under safe conditions.

18 Q. So, so your concern, your sole concern is your
19 people and if you saw unsafe conditions in regards to the
20 plant workers, that would be none of your business?

21 A. I might be concerned, but I -- my opinions wouldn't
22 have been appreciated.

23 Q. So, so that even if you saw an unsafe condition at
24 Carbon Graphite, you would not tell the management of Carbon
25 Graphite, because they would not like to hear that from you?

1 James M. Hawley - Cross - Myers

2 A. I would expect that they'd -- should have been
3 advised of that by people from the contractor. If there's an
4 unsafe condition, I would think they would tell the company.

5 Q. But you, yourself, as the union man would never tell
6 anybody in terms of Carbon Graphite that there were unsafe
7 conditions?

8 A. Not normally, no.

9 Q. And, in fact, you never did that at Carbon Graphite,
10 am I correct?

11 A. I never did it anywhere.

12 Q. And, and would it be true that the person who
13 controlled the working conditions at the plant was Carbon
14 Graphite, was Airco, the management there?

15 A. Not the insulation work.

16 Q. Not the insulation work, but the insulation work
17 that you saw was the insulation work by your workers?

18 A. Yes.

19 Q. Now, you testified that you were really concerned in
20 terms of the health of your workers, and, and let me ask you
21 this. Would a respirator be something that you would
22 recommend to your workers that they would wear?

23 A. Yes.

24 Q. And when did you first start to recommend to your
25 workers that they wear respirators?

James M. Hawley - Cross - Myers

A. In 1962.

Q. In 1962. So that from 1962 through 1972 you were recommending to your workers to wear respirators and every time you went to Carbon Graphite you never saw them wear respirators. What, if anything, did you do in terms of your workers at Carbon Graphite?

A. I can't recall that I never saw them wearing them. I mean, they at that time were well aware of the hazards and that and I'm sure they were probably wearing them, but I, I didn't see them walking around with them on.

Q. So, so now, now they are wearing them. Now you --

A. I assume they would have. I mean, they knew the hazards as well as I did.

Q. But you, yourself, never saw any of them ever wear it?

A. No. I generally didn't see them in the work area that -- we'd walk outside the building and talk and something of that sort.

Q. This wasn't a concern of yours?

A. Well of course it was.

Q. It was a big concern, wasn't it?

A. Yes.

Q. Your workers aren't wearing respirators?

A. Well I believe they were wearing respirators. I'm

James M. Hawley - Cross - Myers

1 saying when I seen them they weren't. We were outside,
2 perhaps, talking about the job and they weren't wearing them
3 outside.
4

5 Q. Now, where did I put the deposition? Well, sir, on
6 page 78, line 15, when I asked you a question, and when you
7 went up in terms of Niagara, when you went up there in terms
8 of Airco Speer, and Airco Speer is Carbon Graphite, am I
9 right, what part of the facilities did you inspect? Answer.
10 Well there was only the one area that seemed to have worked,
11 and it was some big large vessels that were not submerged but
12 they were sunken in the ground like pits and that's the work
13 that they were generally doing there. So isn't it true that
14 you did go to the plant, you saw what Niagara workers were
15 doing?

16 A. Well sure.

17 Q. And when you went there, you don't recall ever
18 seeing them wearing respirators?

19 A. I would be more apt to recall if they weren't
20 wearing them, yes. I don't recall if they weren't. I mean, I
21 would assume they were. If they hadn't been wearing them, I
22 would have been urging them to wear them.

23 Q. All right. Now, you -- you -- you mentioned that
24 the real problem in terms of getting respirators was with the
25 employers. Was that your testimony when Mr. Ponterio was

James M. Hawley - Cross - Myers

1
2 asking you questions?

3 A. Problem with the employer, is that what you're
4 asking me?

5 Q. Yes.

6 A. Yes. It definitely was with the employers.

7 Q. There wasn't any problems with your workers, were
8 there?

9 A. Our workers were going on their own to a Sears and
10 Robucks auto supply store and getting a little foam rubber
11 dust mask for a dollar 59 because their employer wouldn't buy
12 them for them. They were concerned.

13 Q. Now, sir, by the way, does the law firm of Lipsitz
14 and Ponterio represent you?

15 A. You mean, in what way?

16 Q. In any way?

17 A. One of their people helped me sell my house a few
18 years back. That was the only thing. Other than that, no.

19 Q. Now, Plaintiff's Exhibit number 32, which has been
20 marked for identification, is the article in the Asbestos
21 Worker, am I correct?

22 A. Yes.

23 Q. And this is the one in which -- and you are familiar
24 with this article, aren't you?

25 A. Yes. I'm sort of responsible for it.

James M. Hawley - Cross - Myers

1
2 Q. You're responsible for this article and for the
3 printing of this article?

4 A. Well not the printing.

5 Q. But you're responsible for the article?

6 A. I initiated it.

7 Q. You initiated it. Now, sir, again, I want to read,
8 and tell me if I'm reading this correctly, and I'm reading now
9 on page, what's labeled page 7, and I'm reading the last
10 column in the middle. I'm going to start in the middle of the
11 paragraph, 'cause -- first of all, it refers to Dr. Rosso?

12 A. Rosso.

13 Q. Rosso, and it starts here. It says: From his
14 investigations it soon became clear that the most effective
15 way that the worker could protect himself was through the
16 faithful and constant use of a good respirator mask; do you
17 see that?

18 A. Yes.

19 Q. And then it says: Acting on this information,
20 President Walters and Business Agent Hawley, that's you, isn't
21 it?

22 A. Yes.

23 Q. Met with local employers' group, the Asbestos and
24 Insulation Contractors and Distributors Association. It was
25 mutually agreed to initiate a program to educate each asbestos

James M. Hawley - Cross - Myers

worker on the importance of using a respirator for his own personal protection. Is that correct?

A. Right.

Q. And did that happen?

A. In 1964, I believe this is when this occurred, right?

Q. '64 or the article, I believe, may have been in '65. I'm not --

A. We had been trying to do this since 1962.

Q. Well, okay. Then it says: The employer association agreed to standardize on and to provide what was felt to be the best obtainable type of mask. Surprisingly enough, getting the individual workmen to wear the respirators faithfully has thus far proven to be the biggest challenge to the entire program. So isn't it true that at least in terms of this article in this magazine, when you sent it out to the Asbestos Worker you weren't saying that you were having any problems with organizations like Niagara or IDI or Frontier, but your biggest problem was with your own workers?

A. I'm saying there that they were -- the employers were just starting to furnish them in 1964 and from '62 to '64 we had been fighting to get them. Once we got them distributed out to the members, we found a problem getting people to wear them. I mean, that's obvious. It's like

1 James M. Hawley - Cross - Myers

2 anything else. Like cigarette smoking, how do you get people
3 to stop smoking cigarettes when they know they're harmful?
4 How do we get people to wear a respirator when they know what
5 they're working with is harmful? It's human nature.

6 Q. Well you mentioned cigarette smoking, how do you get
7 them to stop smoking. Did you have any concerns at all,
8 Mr. Hawley, about your workers smoking?

9 A. We encouraged them not to smoke. We knew that that
10 was an added hazard.

11 Q. And when you say that you knew it was an added
12 hazard, when did you become aware that cigarette smoking was
13 an additional hazard to your workers?

14 A. Dr. Selikoff's reports started to point this out.

15 Q. That would be in the early 1960's?

16 A. Yes.

17 Q. So, from that point on you knew that if the workers
18 worked with asbestos and smoked, that that was real bad?

19 A. Correct.

20 Q. And what actions did the union take to encourage its
21 members to stop smoking?

22 A. Well, again, communications and meetings. We
23 discussed this with them and explained that they were
24 increasing their chances of having health problems by
25 smoking. We encouraged them not to smoke. Not much more we

James M. Hawley - Cross - Myers

1
2 could do.

3 Q. Now, sir, you -- let me ask you some questions in
4 terms of warnings on asbestos products. Was there ever any
5 warnings placed on any asbestos products prior to 1972 that
6 you saw?

7 A. No.

8 Q. And if there was any warnings, would that be
9 something that you would be aware of?

10 A. If I saw them, I would be aware of them. I don't
11 recall seeing any.

12 Q. Now you, yourself, as I understand it, no longer
13 worked as an asbestos worker from 1962 to 1972?

14 A. Oh, no. I went back to work after 1972 when I was
15 defeated as a business agent's position and I returned to work
16 with the tools.

17 Q. Right. But that's after '72, but between '62 and
18 '72 you never worked as an asbestos worker?

19 A. No. Not at that time. No.

20 Q. And you never worked with any asbestos products
21 during that period of time?

22 A. No.

23 Q. So, you, yourself, never worked, for example, with
24 Eagle Picher Super 66 from 1962 through 1972?

25 A. No.

James M. Hawley - Cross - Myers

1
2 Q. So you, you, yourself, never saw what was on an
3 Eagle Picher bag during that period of time?

4 A. When I was on the job sites, if I had seen that
5 warning on a bag I would remember it.

6 Q. Okay.

7 A. I don't remember it.

8 Q. Well, sir, did you ever see this warning on any
9 asbestos product prior to 1972? Caution. This product
10 contains asbestos fiber. Inhalation of asbestos in excessive
11 quantities over long periods of time may be harmful. If dust
12 is created when this product is handled, avoid breathing the
13 dust. If adequate ventilation control is not possible, wear
14 respirators approved by the U.S. Bureau of Mines for
15 pneumococcus producing dust.

16 A. The boxes and the bags that I seen didn't have that
17 on there. It may. I might have been looking at the wrong
18 ones, but I never seen it.

19 Q. You never saw it, but is it your testimony that this
20 -- that this caution did not appear on Eagle Picher Super 66
21 cement bags?

22 A. I don't know if it did or not. I never seen it.

23 Q. You don't recall whether you -- okay. You never saw
24 it. Now in regards to how a product was used by the workers
25 at Carbon Graphite, not Niagara workers, but Carbon Graphite.

1 James M. Hawley - Cross - Myers

2 workers, who had control how the products were used? For
3 example, assume that cement products were used at Carbon
4 Graphite. Who dictated the working conditions for the Carbon
5 Graphite employees?

6 A. I would assume that the company themself would
7 oversee their own employees' safety.

8 Q. And by the way, this -- this, this knowledge --
9 strike that. Did you make any determination when you went in
10 the Carbon Graphite plant as to whether or not -- how would
11 you describe the atmosphere, I mean, the air, was it clear,
12 dusty?

13 A. Most of the chemical plants down here in the Falls
14 were dusty and the air was bad. I don't think that was any
15 exception.

16 Q. And do you remember whether or not that plant used
17 carbon or --

18 A. I don't know much about their operation.

19 Q. Do you remember what contaminants were in the air at
20 Carbon Graphite?

21 A. I wouldn't be familiar with those, no.

22 Q. But your recollection is it was a fairly dusty
23 place?

24 A. It was a dirty place to be in. You didn't want to
25 be there if you could avoid it.

James M. Hawley - Cross - Myers

1
2 Q. And was the air quality anything that you -- that
3 your union tried to address with Carbon Graphite?

4 A. No.

5 Q. And if there was, during this time period, if there
6 was anything that was unsafe, for example, did you have the
7 right to complain to the New York State Department of Labor?

8 A. No. I don't recall doing that, no.

9 Q. Okay. But did the New York State Department of
10 Labor, did they investigate plants?

11 A. They did. What, what happened, if I found a place
12 where I thought it was particularly hazardous for whatever
13 reason I could call them and we did that often and they had
14 field investigators and they would go out and check your
15 complaint. Sometimes they'd fix it, sometimes they wouldn't,
16 but --

17 Q. Okay. And when you say I would call them, you're
18 saying if you went into a plant and you saw something that was
19 really hazardous, you would call the New York State Department
20 of Labor, am I correct?

21 A. If it was something that was affecting my people,
22 yes.

23 Q. If it was something affecting your people, 'cause
24 you would want that condition corrected?

25 A. Right.

James M. Hawley - Cross - Myers

Q. And the New York State Department of Labor would then have investigators that would go into the plant?

A. Often they would do that. Sometimes they wouldn't.

Q. Yeah. But sometimes they would go in unannounced, am I correct?

A. I would hope so, yes.

Q. And you had a good working relationship with the New York State Department of Labor when you were the business agent?

A. Yes.

Q. And the New York State Department of Labor had the power to go into a plant, look at a condition, and if a condition was unsafe, to make sure it's corrected?

A. Yes.

Q. And you took advantage of that?

A. Every time I could.

Q. Every time you could. And did you at any time, when you went to Carbon Graphite during this ten-year period, ever contact the New York State Department of Labor concerning the working conditions at Carbon Graphite?

A. I don't believe so.

MR. MYERS: If the court would just give me one moment.

THE COURT: Sure.

James M. Hawley - Cross - Bushway

BY MR. MYERS:

Q. I assume you didn't bring any documents or papers into court with you today, did you, Mr. Hawley?

A. Just the tape. That's all.

Q. Carbon Graphite, do you know if they had a safety department?

A. Not particularly. I'm not aware of it. I assume they did, but I don't know.

Q. You don't know. Would you assume that they had engineers? Was that a fairly -- how would you describe that operation, Carbon Graphite?

A. Well it was a big company, I knew that, and we were in there often and I was interested in that. I assume they were moderately successful.

Q. Good size company?

A. Oh, yes.

Q. They would be aware of safety hazards, health hazards in the plant?

MR. PONTERIO: Note my objection. Calls for speculation unless he has personal knowledge.

MR. MYERS: Okay. I don't have anything further.

CROSS-EXAMINATION

BY MR. BUSHWAY:

1 James M. Hawley - Cross - Bushway

2 Q. Good morning, Mr. Hawley.

3 A. Good morning.

4 Q. Let me just take a quick look at -- Mr. Hawley, my
5 name is Todd Bushway. I'm showing you exhibit 32, which is
6 the, the -- this article from the Asbestos Worker in 1964.

7 A. Yes.

8 Q. And I believe this is the one that you said you were
9 -- I don't think you said you were the author, but you were
10 instrumental in?

11 A. Getting it published, yes.

12 Q. Getting it published. In the study and on what is
13 the third page of this exhibit it says: Acting on this
14 information, President Walters and Business Agent Hawley met
15 with their local employer's group, the Asbestos and Insulation
16 Contractors and Distributors Association. It was mutually
17 agreed to initiate a program to educate asbestos workers on
18 the importance of using a respirator for their own personal
19 protection, correct?

20 A. Yes.

21 Q. Now, that means the employers' group was working
22 with you?

23 A. In 1964 when they were starting to find out the
24 problems --

25 Q. Meaning --

James M. Hawley - Cross - Bushway

A. -- and recognizing them.

Q. -- the union went to the employer's group. The board that you talked about served as the interaction and said, hey, we want to do this study concerning the health of our employees and they worked with you, correct?

A. They worked with us. We didn't need their permission to do the study. We did it without -- we would have done it without them, but they agreed to cooperate.

Q. Okay. So they were concerned about the safety of the workers as well?

A. In 1964.

Q. Okay. Now, that article was published in '64, so the events described took place prior to the publication, fair enough?

A. Yes.

Q. Okay. And that's a quarterly magazine?

A. Yes.

Q. Now, just briefly, you indicated that you received a phone call five years ago from Mr. McKendry?

A. 1997, yes.

Q. Nothing to do with this case, right?

A. No. It was another case I was going to give a deposition in or testify.

Q. Didn't affect what you did or didn't do, did it?

1 James M. Hawley - Cross - Bushway

2 A. Oh, no, definitely. It irritated me.

3 Q. Fair enough. Mr. McKendry can be an irritating guy
4 at times, can't he? .

5 A. We agree on that.

6 Q. Shall we say a colorful personality?

7 A. Colorful.

8 Q. Now as business agent for the union, did you view
9 the safety of your workers as your primary responsibility? .

10 A. It was one of my primary responsibilities, yes.

11 Q. Okay. And would it be a fair statement that you
12 viewed any problems that asbestos workers in your local had in
13 terms of health hazards and safety equipment as being a
14 problem brought about by the contractors?

15 A. Not exclusively. I mean, our members, you know, had
16 a responsibility to do the work safely themselves. I mean, it
17 was a two-way street. We had to educate our members and our
18 employers.

19 Q. Do you feel the union did all it could to ensure the
20 safety of its workers?

21 A. Now I can look back and say no, but I was doing all
22 I knew how to do. I didn't have a background or an education
23 to do what probably I should have done at that time.

24 Q. Fair enough. Now we've heard some discussion about
25 the use of respirators by asbestos workers, correct --

James M. Hawley - Cross - Bushway

A. Yes.

Q. -- in the 1960's time period. Now you indicated, if I understood your testimony correctly, that that was one of the items you would bring to the employer's group for discussion, correct?

A. We thought that was the most obvious first step to take and that's why we always went with that.

Q. And did you personally look into what types of respirators would be appropriate?

A. Yes.

Q. Did you ever make a list of those and give them to your workers and say, hey, this is the equipment you ought to use?

A. Well you're speaking of a time they wouldn't get their hands on a respirator unless they bought it themselves.

Q. My question -- my question to you is, you as the business agent, Local 4, the asbestos workers, did you make a list of safety equipment and give it to your union members and say, this is what the union thinks you ought to wear?

A. Not in so many words. I investigated various respirators and tried to determine which were the best ones in the hope that we could get the employers to start furnishing them, but I had that information available if somebody wanted to go out and buy their own, but that, you know, wasn't a

James M. Hawley - Cross - Bushway

common thing to do.

Q. My question is, did you give your members a list of proposed --

A. I didn't distribute a list, no.

Q. Now, part of your job as the business agent would be involved with negotiating contracts with the employer's group, correct?

A. Yes.

Q. And am I correct in understanding that the, the way this worked is the local would have a contract which would cover their working relationship with all the contractors that were on the contractors' side of that, correct?

A. Yes.

Q. And depending on which contractors you worked for, you would still have the same contract?

A. That's right.

Q. In the 1960's, did the union ever make the use of respirators or other safety equipment an issue in those contracts?

A. Every contract negotiation I was involved in from the time I started, that was the prime goal, to put safety equipment in and particularly respirators and have them furnished by the employer.

Q. And when did they actually become furnished by the

James M. Hawley - Cross - Bushway

employers?

A. Around '64, '65 they started grudgingly making them available. We -- we had it put in our contract. Up until the time we put it in our contract in the language, we were unsuccessful.

Q. And you as the union had to decide which terms you wanted in the contract and which ones you wouldn't put in the contract, correct?

A. Well, no. I mean, I only tried, that's all. It was a mutual thing that we put in the contract.

Q. But -- fair enough. The union never made it a breakdown issue for the contract discussions, fair? Correct?

A. Well it was a serious issue, I mean, every time.

Q. But you negotiated it away?

A. We didn't negotiate it away. I mean, you try and re -- get to something that you can both mutually agree on. That's what it's all about, compromising. You don't -- if you're asking did we go out on strike because they wouldn't furnish us with respirators, no, we didn't do that.

Q. Now you indicated the conditions in the plants were not your concern?

A. Well, it really -- I was concerned, but again, it's not any of my business. I mean, if I go in the plant, I'm a visitor in that plant. I'm in there under their good graces,

1 James M. Hawley - Cross - Bushway

2 and if I start going around and pointing out problems that
3 they're having with their own operations and their own people,
4 I'm not going to be in there anymore.

5 Q. Fair to say the contractors such as Niagara are
6 guests in the plant as well?

7 A. I don't know. I would think they would be more in a
8 better position to point it out to a company if there's a
9 problem than me.

10 Q. Wouldn't the plant conditions be a concern of yours,
11 the business agent for the insulators, in the sense that you'd
12 want to know what was in that plant and what your people might
13 be exposed to, other than the materials they, themselves, were
14 using?

15 A. In a perfect world that would be nice, but, you
16 know, when you walk in a plant, you don't know what's in
17 there.

18 Q. And you wouldn't take any steps to find out either,
19 would you?

20 A. Well I didn't have the time or the knowledge or the
21 background to do that.

22 Q. Now, you indicated that you would continuously
23 present equipment to the contractor, present information to
24 the contractor's association about health hazards or other
25 things that you might learn, correct?

James M. Hawley - Cross - Bushway

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A. Yes.

Q. Did you ever go to the plants where your people were working and convey that information as well?

A. No.

Q. Ever send them a letter?

A. No.

Q. Now, you indicated you didn't give your people a list of equipment that would be recommended, safety equipment, correct?

A. I had a list. I didn't make it generally available, no.

Q. Now, and you didn't supply respirators to your people?

A. Our members bought their own.

Q. Did your union have a code of conduct or certain rules that its members had to abide by?

A. Yes.

Q. And some of those related to conduct on work sites?

A. That's true.

Q. Ever require safety equipment as part of those rules?

A. We require in the contract that they provide safety equipment. We never specifically mentioned respirators.

Q. I'm not asking you about the contract with the

1 James M. Hawley - Cross - Bushway
2 employer. I'm talking about your internal union codes.

3 A. Yes. We have a code of workmanship.

4 Q. And that in the 1960's didn't require respirators or
5 other breathing equipment, did it?

6 A. No. We didn't make up the code of workmanship.
7 This was distributed from our international association to the
8 members. When you became a member they gave you this little
9 book and it had a code of workmanship and we didn't write the
10 code of workmanship.

11 Q. Could you as a local have added rules or conditions
12 as part of being a member of the local?

13 A. No.

14 Q. Now, would it be a fair statement that the
15 international association probably knew more about this issue
16 than you did?

17 A. I'm sure they did.

18 Q. Now, you would often work with contractors in the
19 area to find work for your members, correct?

20 A. Yes.

21 Q. Fair statement part of your job as a business agent
22 was to keep your eyes and ears open for nonunion workers in
23 the area or potential projects that would require insulation
24 work?

25 A. Yes.

James M. Hawley - Cross - Bushway

1
2 Q. And if you could get that steered to a union
3 contractor, your members would work?

4 A. That's correct.

5 Q. So in that sense you would work with the
6 contractors, correct?

7 A. Often.

8 Q. Now, fair statement that the members of Local 4 are
9 experts in the insulation trade?

10 A. I believe so.

11 Q. It's part of the reason for having a union?

12 A. That's right.

13 Q. As part of that, would the union members go through
14 some training as to the proper means of installing the various
15 materials used in your trade?

16 A. Yes.

17 Q. Do you believe that the union members working in the
18 1960's to early 1970's applied materials properly in
19 accordance with manufacturers' directions for their use?

20 A. Well they were required to do that, yes.

21 Q. Required by whom?

22 A. By their employer. Their employer would tell them
23 how they wanted something done on the job and they would do it
24 the way they were told or they wouldn't be there much.

25 Q. Now these materials that we've been talking about

1 James M. Hawley - Cross - Bushway
2 were perfectly legal in the 1960's and early 1970's, correct?

3 MR. PONTERIO: Note my objection, judge, in
4 that this is not a criminal proceeding. Whether
5 it's legal or illegal, this is a civil proceeding.
6 We're making no claim they were violating the
7 criminal law.

8 BY MR. BUSHWAY:

9 Q. There was no prohibition about these contractors
10 using these materials at the time, correct?

11 A. Not that I know of.

12 Q. In fact, they were widely used in the industry that
13 you worked in, correct?

14 A. Just like cigarette smoking is widely smoked.
15 That's not illegal either.

16 Q. Well, your union -- the contractors, plants like
17 Carbon Graphite were all installing, buying, selling, using
18 materials at that time that had common industrial
19 applications, correct?

20 A. Yes.

21 MR. PONTERIO: Note my objection.

22 BY MR. BUSHWAY:

23 Q. Now, if a plant such as Carbon Graphite was buying
24 materials for installation by its own people, in other words,
25 plant employees, that would not be any jurisdiction of the

James M. Hawley - Redirect - Ponterio

Local 4 union, would it?

A. No.

Q. You would like to convince them to use Local 4 workers, correct?

A. I tried to do this. This was my job.

Q. But if the plant was using other asbestos materials for installation by its own people, you'd have no knowledge of that?

A. Oh, I know they were doing that. I mean, this was a common practice. These very contractors we're talking about here that we mentioned their names earlier, they all sold materials to all of these plants and these plants used their own people often for installation work. Maintenance people, different tradesmen on the jobs to the detriment of my people and my job was to try and get this work for my people who could do, who I thought could do it better and cheaper and quicker.

MR. BUSHWAY: Fair enough. No further questions. Thank you.

REDIRECT EXAMINATION

BY MR. PONTERIO:

Q. I have just a -- I'll be very brief, Mr. Hawley. Does anything that Mr. Myers examined you on today change the fact that you were present at the worker's compensation

1 James M. Hawley - Redirect - Ponterio
2 hearing of Joseph McLaughlin when he was alive?

3 A. No. I was there.

4 Q. And when his widow was there when Mr. McLaughlin had
5 died?

6 A. I was there, too.

7 Q. You -- Mr. Myers had mentioned about the McLaughlin,
8 the son that was present for Insulation Distributors, Inc. at
9 the time his dad had died. Were you present when the
10 Insulation Distributors, Inc. management dealt with
11 nonrelatives of injured workers who were making claims?

12 MR. MYERS: Objection.

13 THE COURT: Sustained.

14 BY MR. PONTERIO:

15 Q. Did you deal with --

16 A. I was to other hearings.

17 THE COURT: Wait, please.

18 MR. PONTERIO: Did you go to other hearings in
19 which a worker made a claim against IDI back in the
20 early sixties about asbestos?

21 MR. MYERS: Objection.

22 THE WITNESS: Yes.

23 THE COURT: Overruled.

24 THE WITNESS: Yes.

25 BY MR. PONTERIO:

James M. Hawley - Redirect - Ponterio

1
2 Q. And what were your face-to-face confrontations with
3 IDI in those cases?

4 A. Well they were never argumentative. I mean, we were
5 all there pretty much for the same thing, to help the workers.

6 Q. How about IDI?

7 A. IDI was always in the same position. They were
8 going to help the worker if it didn't hurt them too much, I
9 suppose, financially.

10 Q. But they were aware of the hazards that you talked
11 about?

12 A. Oh, sure, surely.

13 Q. Mr. Myers asked you about a, a label, and he didn't
14 show you this, but I will show it to you, exhibit D in
15 evidence. Does this refresh your recollection what the Eagle
16 Picher Super 66 insulating cement looked like?

17 A. It wasn't like that when I was using Eagle Picher,
18 but in later years I've seen pictures like that with these
19 warnings on. When I was using it and when I was working as a
20 business agent, that warning wasn't on the things I seen.

21 Q. Do you see a warning on this?

22 A. There's something here in very small print here,
23 which I'm not sure my glasses are up to, but it's tiny like a
24 warning on a cigarette pack. You've got to squint to see it.

25 Q. When you opened the bag, would you open it from the

James M. Hawley - Redirect - Ponterio

1
2 top?

3 A. That's right.

4 Q. Anything on the labeling on the top?

5 A. No.

6 Q. Do you see anything here about asbestos causing
7 cancer?

8 A. No.

9 Q. And by --

10 A. I haven't read it. I mean, do you want me to take
11 it and read it? But I don't believe there was anything on
12 there.

13 Q. Well take your time and read, see what you can see.
14 Fine.

15 A. No. I see nothing about it causing cancer, no.

16 Q. And by 1965 you shared Selikoff -- these companies
17 received the Asbestos Worker magazine on the Selikoff article
18 and asbestos and cancer as you did?

19 A. They received everything that I and the members
20 received.

21 Q. Was Carbon Graphite ever a member of the insulation
22 contractors/employer' group?

23 A. No, they weren't.

24 Q. And was the Asbestos Workers Local 4 a different
25 union from the Carbide Graphite union?

James M. Hawley - Recross - Myers

A. We certainly were, yes.

MR. PONTERIO: No further questions. Thank
you.

RECROSS-EXAMINATION

BY MR. MYERS:

Q. Now your union belonged to what labor grouping, and
by this I mean, was it the AFL? Was it the AFL/CIO? They
weren't combined then, were they?

A. Yes, they were.

Q. They were combined back then?

A. Yes.

Q. Did the union at Carbon Graphite also belong to the
AFL/CIO?

A. I don't even know anything about their union.

Q. It's the Atomic Chemical Union; you don't know
anything about them at all?

A. I wasn't familiar with them, no.

Q. Okay. Sir, do you have any records, whether it's in
minutes, notes, business agent reports, written records of
attending any other worker comp hearings relating to IDI?

A. I have nothing in record form, no.

Q. But your recollection is whenever you attended
there, whatever representative of IDI was there, they were
also very concerned about the worker and they tried to do the

James M. Hawley - Recross - Myers

right thing?

A. To a point.

Q. Okay. And when we -- when you gave the deposition back in February, I believe, you never mentioned at that deposition that you attended any other worker compensation hearing besides Mr. McLaughlin involving IDI, did you?

A. I don't believe so. I don't know if I was asked, but I don't believe I mentioned any, no.

Q. Okay. But Mr. Lipsitz asked you a whole series of questions?

A. Yes.

MR. MYERS: I don't have anything further, your Honor.

MR. BUSHWAY: No questions, your Honor.

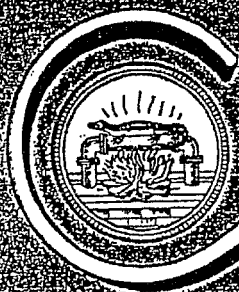
MR. PONTERIO: No further questions.

THE COURT: You're excused.

THE WITNESS: Thank you.

* * * * *

EXHIBIT "L"



THE

Asbestos

WORKER

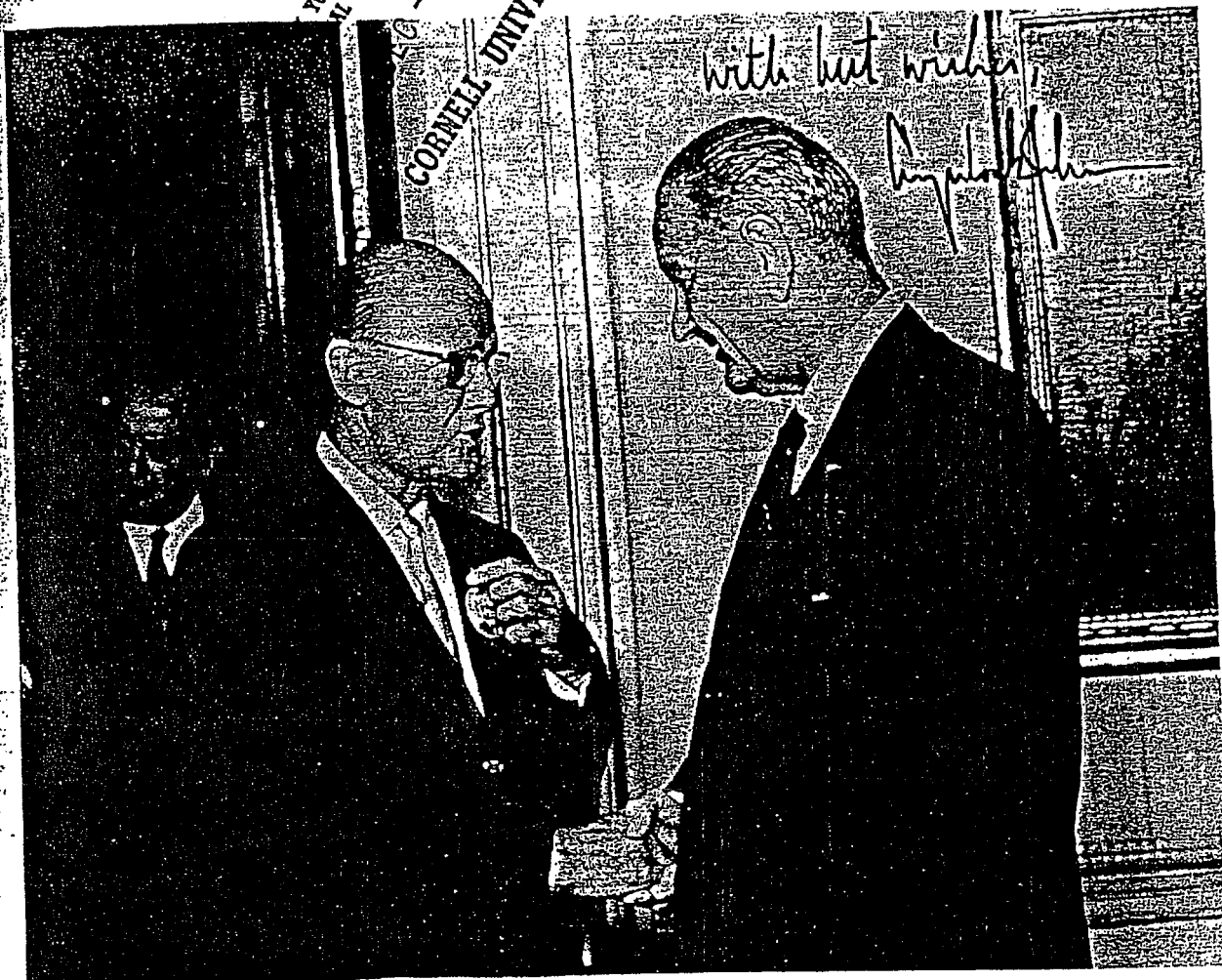
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ENDORSED BY AFL-CIO EXECUTIVE COUNCIL



President Sickles attended the meeting at the White House with other International Union Officials when AFL-CIO President George Meany presented the Executive Council Resolution which set forth the endorsement of Lyndon B. Johnson and Hubert H. Humphrey.

Airborne Asbestos Concentrations Associated with Heavy Equipment Brake Removal

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Asbestos-containing brake linings were used in heavy-duty construction equipments such as tractors, backhoes, and bulldozers prior to the 1980s. While several published studies have evaluated exposures to mechanics during brake repair work, most have focused on automobiles and light trucks, not on heavy agricultural or construction vehicles. The purpose of this study is to characterize the airborne concentration of asbestos to workers and bystanders from brake wear debris during brake removal from 12 loader/backhoes and tractors manufactured between 1960 and 1980. Asbestos content in brake lining (average 20% chrysotile by polarized light microscopy) and brake wear debris [average 0.49% chrysotile by transmission electron microscopy (TEM)] was also quantified. Breathing zone samples on the lapel of mechanics ($n = 44$) and area samples at bystander ($n = 34$), remote ($n = 22$), and ambient ($n = 12$) locations were collected during 12 brake changes and analyzed using phase contrast microscopy (PCM) [National Institute for Occupational Safety and Health (NIOSH) 7400] and TEM (NIOSH 7402). In addition, the fiber distribution by size and morphology were evaluated according to the International Organization for Standardization method for asbestos. Applying the ratio of asbestos fibers:total fibers (including non-asbestos) as determined by TEM to the PCM results, the average airborne chrysotile concentrations (PCM equivalent) were 0.024 f/cc for the mechanic and 0.009 f/cc for persons standing 1.2–3.1 m from the activity during the period of exposure (~0.5 to 1 h). Considering the time involved in the activity, and assuming three brake jobs per shift, these results would convert to an average 8-h time-weighted average of 0.009 f/cc for a mechanic and 0.006 f/cc for a bystander. The results indicate that (i) the airborne concentrations for worker and bystander samples were significantly less than the current occupational exposure limit of 0.1 f/cc; (ii) ~2% of respirable fibers were >20 µm in length; and (iii) ~95% of chrysotile in the brake linings degraded in the friction process. The industrial hygiene data presented here should be useful for conducting retrospective and current exposure assessments of individuals, as well as hazard assessments of work activities that involve repairing and replacing asbestos-containing brakes in heavy construction equipment.

Keywords: asbestos; brakes; heavy equipment; industrial hygiene

INTRODUCTION

Once thought to be a 'miracle' mineral, asbestos gained widespread use beginning in the early 1900s, and has been reportedly incorporated in some 3000 different products because of its low cost and desirable qualities, such as heat and fire resistance, wear and friction characteristics, tensile strength, heat, electrical and sound insulation, adsorption capacity, and resistance to chemical and biological at-

tack [Agency for Toxic Substances and Disease Registry (ATSDR), 2001]. For these reasons, asbestos, specifically chrysotile, was used for many decades by the automobile, heavy equipment, crane, railroad, and airline industries as a component of brakes. Chrysotile's frictional characteristics, such as good tensile strength, durability, flexibility, and heat resistance, provided the auto industry with a friction material that could withstand extreme temperatures, pressure, and stress (Skinner *et al.*, 1988; Paustenbach *et al.*, 2004; Maines, 2005). These characteristics were particularly necessary for safety, as automobiles throughout the 20th century became larger, heavier, and faster (Harper, 1998).

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Because of regulatory and societal concerns about the health effects caused by exposure, asbestos use in the USA has precipitously declined since the mid-1970s (ATSDR, 2001; Maines, 2005; dos Santos Antao *et al.*, 2009; Kelly and Matos, 2009). Over the last 30 years, significant attention has been paid to evaluating asbestos exposures and the potential risk of asbestos-related diseases among automobile garage mechanics (Paustenbach *et al.*, 2004). Chrysotile asbestos was also used as a friction material in heavy construction equipment, but potential asbestos exposures to mechanics repairing brakes on such equipment has been less well studied and understood (Boelter *et al.*, 2007).

Although the asbestos content in automobile brakes is generally between 30 and 50% (Lynch, 1968; Anderson *et al.*, 1973; Madl *et al.*, 2008), heat and pressure, such as that exerted during vehicle braking, can cause chrysotile asbestos to degrade to non-fibrous amorphous decomposition products, as well as form other non-fibrous minerals, such as forsterite and olivine (Jacko *et al.*, 1973; Candela *et al.*, 2007). The dehydration or retention of water, in chrysotile decomposition products has been shown to influence the extent to which forsterite is formed under heat and pressure (Candela *et al.*, 2007). It has been suggested, however, that friction during mechanical braking disaggregates mineral bundles in the brake lining, which liberates water and results primarily in amorphous, non-fibrous, magnesium silicate degradation products (Candela *et al.*, 2007). Because the elemental ratios and X-ray diffraction (XRD) patterns of chrysotile and these degradation products are similar, transmission electron microscopy (TEM) is often necessary to identify fibrous structures of chrysotile at low bulk concentrations. Using microscopy, historical studies have shown that brake wear debris collected from an automobile dynamometer or drum brakes contains on average between 0.02 and 4.5% asbestos, with the majority of wear debris samples containing <1% chrysotile (Hickish and Knight, 1970; Luxon, 1970; Anderson *et al.*, 1973; Jacko *et al.*, 1973; Rohl *et al.*, 1977; Rowson, 1978; Williams and Muhlbaier, 1982; Cha *et al.*, 1983; Sheehy *et al.*, 1989). While these studies do not directly measure forsterite or other degradation products in brake wear debris, the breakdown of chrysotile is inferred by comparing asbestos content in the lining to that in brake emissions or accumulated dust in the brake assembly.

Although it has been assumed that the forces that convert chrysotile in automotive brakes are at work during the use of heavy equipment (e.g. dozers, backhoes, and graders), little work has been conducted that confirms the degradation of chrysotile to forsterite or an amorphous form. This matter is of particular interest since it is not well understood how the different speeds or weights of heavy construction equipment, compared to passenger automobiles, can

influence the frictional mechanisms, and thus, by extension the conversion to forsterite or other non-asbestos amorphous materials. Understanding this matter will inform hygienists whether workers conducting brake repairs on heavy construction equipment, during the period between the 1950s and the 1980s or in modern times, were exposed to appreciable concentrations of asbestos.

Only one published study has evaluated potential asbestos exposures to mechanics repairing heavy construction equipment brakes (Boelter *et al.*, 2007). In this paper, personal short-term (30 min) and long-term [8-h time-weighted average (TWA)] samples for airborne asbestos were collected during repair activities involving the replacement of asbestos-containing products (i.e. engine gaskets, brake, and clutch linings) in a dozer, grader, and two loaders. Area samples were also analyzed to characterize potential exposures to a bystander nearby these activities. The asbestos-containing products removed from the construction equipment, as well as brake wear debris were analyzed for asbestos content. While this study filled an important data gap, it did not address directly whether chrysotile asbestos was degraded to a similar extent as that observed with passenger automobiles, and it only characterized a limited number of equipment representing a wide array of types and brake assembly configurations (e.g. disc, drum, and band). Complete enclosure of a brake system, size of asbestos-containing friction lining, location, and access configuration in relation to the mechanic's breathing zone, as well as method of maintenance work are all likely to influence occupational exposures to airborne asbestos during brake repair activities. With these factors in mind and without additional information, it was uncertain how the information presented in the Boelter *et al.* (2007) might compare to results from other types of heavy construction.

The handling and cleaning of contaminated work clothing worn in some occupational environments have been suggested as a possible source of para-occupational or 'take-home' chemical exposure. Studies that have reported exposure through this possible secondary exposure pathway include industries where beryllium, lead, or even asbestos (e.g. insulation workers) exposures in the workplace were excessive. For example, Eisenbud *et al.* (1949) found mean air concentrations of 500 μg beryllium m^{-3} when the clothing of beryllium manufacturing workers was shaken out. Piacitelli *et al.* (1997) found elevated lead concentrations in the vehicles and homes of lead-exposed construction workers. Some persons, who live in the homes of workers exposed to free asbestos fibers, developed asbestos-related disease (Lieben and Pistawka, 1967; Anderson *et al.*, 1976, 1979; Li *et al.*, 1978; Epler *et al.*, 1980; McDonald and McDonald, 1980; Joubert *et al.*, 1991; Magnani *et al.*, 1993).

Generally, workers in asbestos manufacturing, mining, and shipyard industries are exposed to very high airborne concentrations of asbestos and come in direct contact with large amounts of bulk asbestos and, in the majority of cases, amphibole asbestos. The take-home exposure of other household members (so-called secondary exposure or para-occupational exposure) is thought to occur as a result of bringing very dusty work clothing into the home, which was usually contaminated due to daily contact with bulk or raw asbestos. Although exposures associated with handling work clothes worn during brake repair work were expected to be extremely low, it was felt that this issue deserved greater characterization as it has implications for both historical and current asbestos exposures of a group of individuals not previously studied.

Since a broader range of data would increase the confidence in the preliminary study, we evaluated a number of vehicles for the purpose of understanding the extent of potential conversion of chrysotile asbestos in brake linings to forsterite and amorphous materials. We also characterized worker and bystander exposures to airborne asbestos during brake removal in various types of heavy construction equipment and assessed the potential of take-home exposures from clothing worn during the brake removal activities. In this study, worker and environmental exposures were evaluated during the maintenance of 12 pieces of heavy construction equipment with similar brake assembly configurations. Because of the relatively large number of pieces of equipment tested with similar brake assemblies, the influence of the extent of equipment use (e.g. hours of operation), methods of brake removal used by different mechanics, oily versus dry brake assemblies, and type of equipment (loader backhoe and tractor) on the variability of the airborne asbestos measurements could be assessed. In addition, short-term samples were collected and 8-h TWA exposures were calculated for comparison to historical and current occupational exposure limits for asbestos. The fiber size and morphology distributions were also measured to characterize the proportion of respirable airborne fibers, free or associated with a matrix, released during brake removal activities. It is anticipated that this information will not only provide useful information regarding potential historical exposures experienced by mechanics conducting brake repair work on heavy construction equipment but will also provide a basis for correlating this information to the exposures and health experience of automobile mechanics.

METHODS

Description of backhoe/tractor brake assemblies

Table 1 provides a summary of the type of vehicles evaluated in the study, as well as the years during

which the equipment was manufactured, total hours of operation, and the facility in which the brake repair work was performed. Each of these vehicles contained a left and right dry drum and disc brake assembly (Fig. 1), each of which possessed an inner and outer drum lining and two band linings comprised friction material. Equipment that potentially had asbestos-containing linings was selected for the study based on the age of the equipment and repair maintenance records provided by the equipment owners. A total of 12 pieces of equipment (two tractors and 10 loader backhoes) manufactured between 1960 and 1980 and operated between 943 and 6741 h were included in this study. It should be noted that the hours of operation for each piece of equipment may not necessarily reflect the total number of hours on the brakes; however, measurements of lining thickness for each brake assembly showed significant brake wear. It was not determined until after the testing through bulk sample analysis whether the equipment contained asbestos brake linings. In fact, all vehicles tested did have asbestos in the friction materials.

Description of test site and study conditions

Brake repairs were performed at two heavy-duty equipment service centers on six different days over a period of 17 months (April 2005 to September 2006); 5 days were spent at one center located in Stockton, CA, and the other day at a center in Big Rock, IL (Table 1). These service centers were selected because they were (and continue to be) active repair facilities for heavy-duty construction equipment, including tractors and backhoe loaders. The weather conditions in Stockton were generally sunny and clear, with temperatures ranging from 21 to 27°C during the 5 days of testing. The Big Rock testing took place during cloudy conditions, with temperatures ~15.6°C.

All work was performed by two currently employed mechanics (one in Stockton and one in Big Rock), who had between 15 and 30 years of professional experience repairing heavy-duty construction and agricultural equipment. The mechanics performed the brake removal in the same manner they had reportedly used throughout their careers. The service shop in Stockton, CA, was relatively large, with four service bay doors and approximate dimensions of 30 m wide by 14.9 m deep, with a ceiling height of 6.1 m (Fig. 2). The facility in Big Rock, IL, was less than half the size of the service center in Stockton, CA, with only one service bay door and approximate dimensions of 14.3 m wide by 11.9 m deep with a 6.1-m ceiling (Fig. 3). All service bay and entry doors were closed while the brake removal was being conducted. In addition, both repair shops were not equipped with any active heating, air conditioning, or ventilation systems.

Prior to conducting the study, permission from a medical institutional review board (IRB) was

Table 1. Summary of equipment tested and bulk sample asbestos concentrations of brake linings and wear debris

Equipment	Date	Equipment type	Hours	Model type	Site	Air exchange (ACH)	Average thickness (mm) by assembly	Brake linings						Brake wear debris											
								XRD (% weight chrysotile)			PLM (% area chrysotile)			TEM (% weight chrysotile)			Decomposition								
								Left	Right	n	Average	SD	Range	n	Average	SD	Range	n	Average	SD	Range	%			
Eq1	13 April 2005	580C	4360	Backhoe	Stockton	—	4.33	4.31	8	0	32	4	25–37	8	0	40	8	24–54	2	0	0.150	0.071	0.1–0.2	99.5	
Eq2	14 September 2005	580C	1232	Backhoe	Stockton	0.6	4.46	4.26	8	0	19	3	15–22	8	0	26	8	20–35	2	0	0.009	0.001	0.008–0.009	100.0	
Eq3	16 September 2005	580	1562	Tractor	Big Rock	0.6	4.76	4.73	8	0	23	3	19–28	8	0	28	5	20–35	2	0	0.075	0.021	0.06–0.09	99.7	
Eq4	16 September 2005	430	943	Tractor	Big Rock	0.6	4.11	4.42	8	0	29	4	24–36	8	0	33	10	15–40	2	0	0.450	0.354	0.2–0.7	98.5	
Eq5 ^a	14 November 2005	580C	6230	Backhoe	Stockton	0.66	2.57	3.15	8	1	14	6	1–19	8	1	15	8	0.5–25	2	2	0.050	0.000	0.05–0.05	99.6	
Eq6 ^a	14 November 2005	580C	3600	Backhoe	Stockton	0.66	4.09	4.42	8	4	8	9	1–25	8	5	8	12	0.05–30	2	2	0.050	0.000	0.05–0.05	99.4	
Eq7	14 November 2005	580C	6741	Backhoe	Stockton	0.66	3.41	4.36	8	0	17	3	14–22	8	0	19	2	15–20	2	1	0.825	1.096	0.05–1.6	95.1	
Eq8 ^b	14 June 2006	580C	3264	Backhoe	Stockton	1.55	4.04	4.13	8	0	27	7	18–39	8	0	17	6	10–27	2	0	0.700	0.141	0.6–0.8	97.4	
Eq9 ^b	14 June 2006	580CK	2744	Backhoe	Stockton	1.55	4.43	4.56	6	2	15	12	1–29	6	0	15	12	0.5–28	2	0	3.015	4.221	0.03–6	79.2	
Eq10	20 September 2006	580C	2743	Backhoe	Stockton	1.28	4.62	3.76	8	2	20	13	1–36	8	2	25	25	0.5–70	2	0	0.085	0.021	0.07–0.1	99.6	
Eq11	20 September 2006	580B	4188	Backhoe	Stockton	1.28	4.46	4.36	8	0	19	4	12–25	8	0	16	6	6–25	2	0	0.035	0.021	0.02–0.05	99.8	
Eq12	20 September 2006	580C	5320	Backhoe	Stockton	1.28	4.31	2.18	8	5	1	0	1–2	8	4	1	1	0.5–3	4	0	0.435	0.422	0.04–0.8	65.2	
Eq1–Eq12													12	19	3.8	1–39	12	20	6.1	0.05–70	12	0.49	1.20	0.008–6	94.4

ND, non-detectable.

^aAsbestos was not detected in both band and drum lining on right assembly.^bNo right drum lining was present. Non-detectable samples entered as one-half the limit of detection or sensitivity limit.

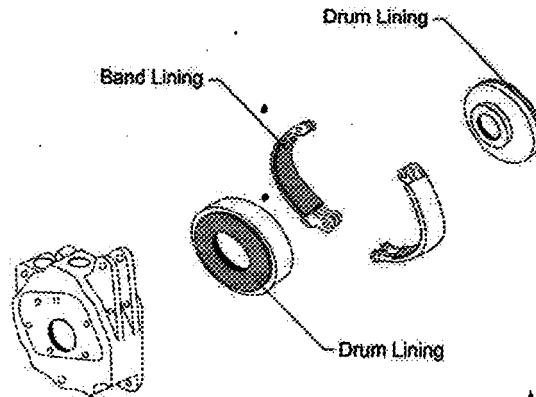


Fig. 1. Heavy equipment dry brake systems diagram.

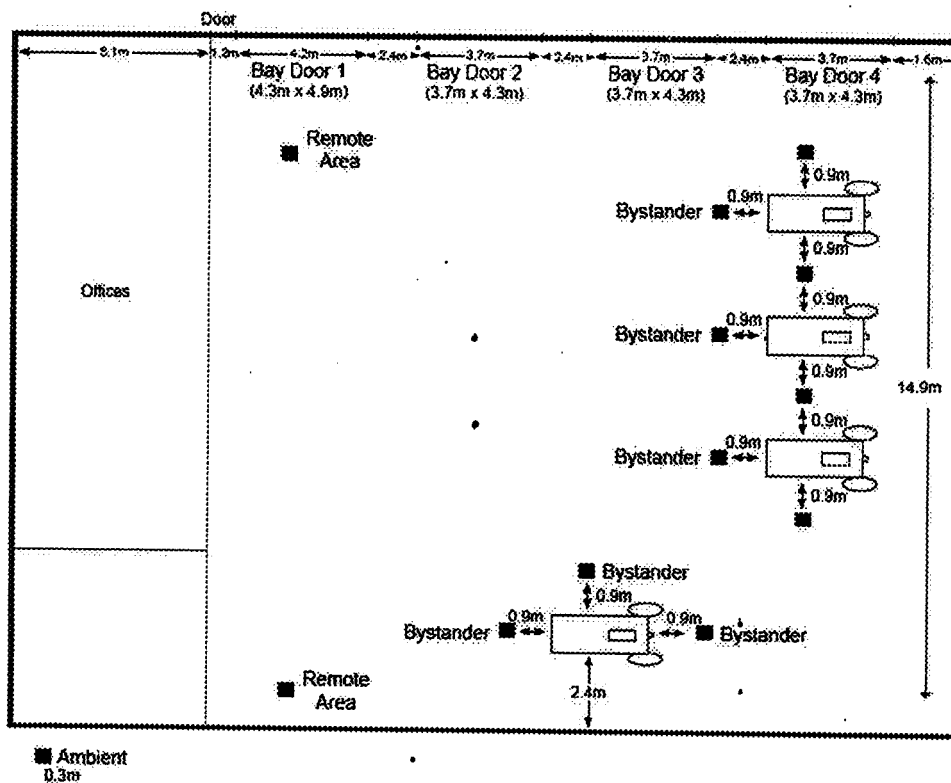


Fig. 2. Diagram of equipment repair facility (Stockton, CA) and locations of area sampling stations.

requested and obtained (Essex Institutional Review Board, Inc., Lebanon, NJ, USA). This IRB complies with the federal regulations of the National Institute of Health, the Office of Human Research Protection (45 CFR 46), and the Food and Drug Administration (21 CFR 50, 56). It is also accredited by the National Committee for Quality Assurance, formerly The Partnership for Human Research Protection.

Description of exposure scenarios

Airborne asbestos concentrations were measured during brake removal and disassembly activities

related to all 12 pieces of equipment. Clothes handling tasks, such as shaking and folding of coveralls worn during maintenance of 11 pieces of equipment, were also studied. Before any brake work was performed, mechanics were fitted with new coveralls. These coveralls were collected after the mechanic completed work on each piece of equipment and were later tested to evaluate the exposure of persons during the handling of these potentially contaminated work clothes. Each coverall ($n = 11$) was stored in separate plastic-lined bags until the last day of testing, when the clothes handling task was conducted.

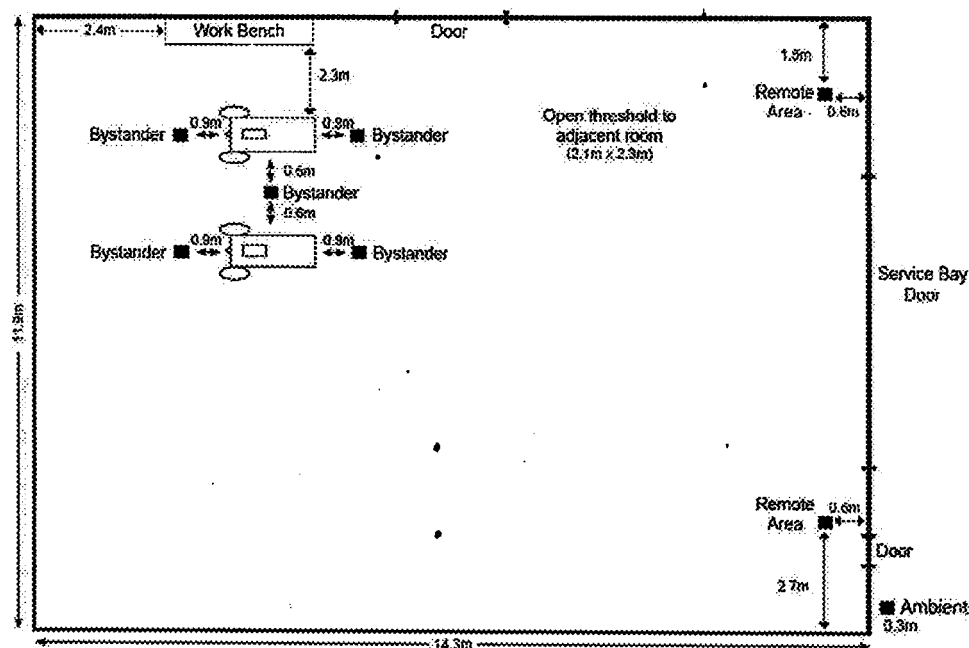


Fig. 3. Diagram of equipment repair facility (Big Rock, IL) and locations of area sampling stations.

The simulated clothes handling task involved repeatedly shaking, folding, and turning clothes inside out for ~1 to 2 min for each pair of overalls by a volunteer to simulate the handling and laundering. Although no fibers or debris were visible on the coveralls, some particles were observed in the air during the clothes handling task. TEM analysis of air samples was used to evaluate the proportion of asbestos versus non-asbestos airborne particles released during shaking.

The brake removal process was similar for all pieces of equipment, with slight differences only in the work practices exhibited by each mechanic. The mechanics worked on each piece of equipment one at a time. To remove and disassemble the brakes, the external brake housing was first removed from the tractor or loader backhoe using a manual, or power wrench to loosen bolts that held the housing in place. On four occasions (Eq1, Eq9, Eq10, and Eq12), a blowtorch had to be applied to facilitate loosening of the external housing bolts. Once the external housing was removed, the entire brake assembly was removed from the vehicle. At this point, the mechanic at the Stockton facility would blow out the assembly and work area with compressed air and then repeat the entire process for the second brake housing. Once both complete assemblies were removed, he performed bench work, which entailed disassembling the drum linings from both brake assemblies. Using a slightly different order than the Stockton mechanic, the mechanic in Big Rock, IL, completed the entire brake removal process on the first assembly before beginning the process on the

second one. More specifically, once the brake assembly was removed from the external housing, the brake assembly was moved to a workbench, and the drum linings were removed from the face plates in preparation of shipment to a specialized shop for refacing. After one complete brake assembly was disassembled and the linings removed, the mechanic from Big Rock would repeat the same process for the second housing and then blow out both brake housings at the end of the brake removal job.

While performing the bench work, the Stockton and Big Rock mechanics used different methods to remove the friction linings from the drum facings. Specifically, the Stockton mechanic used a hammer and punch to remove the rivets that attached the lining to the drum face, whereas the Big Rock mechanic used a power drill. It is noteworthy that four of the 12 pieces of equipment tested contained at least one brake assembly that was saturated in oil that had leaked from an adjacent reservoir. In these circumstances, these assemblies were wiped clean before the linings were removed. In general, the Stockton mechanic took ~30 min to remove and disassemble the linings from two brake housings from one piece of equipment, whereas the Big Rock mechanic took ~45 to 60 min to perform the same job.

Sampling and analytical methods

All airborne samples for asbestos were collected in accordance with federally established criteria. Airborne asbestos and other particulates were collected onto mixed cellulose ester membranes (25 mm, 0.45 μ m pore size; Zefon International, St Petersburg,

FL, USA), with either portable SKC Universal (SKC-West, Inc., Fullerton, CA, USA) or high-volume Dawson 1300 sampling pumps (Ashtead Technology Rentals, Hayward, CA, USA). The sampling pumps were calibrated with a Bios DryCal DCLite primary flow calibrator (Bios International Corporation, Butler, NJ, USA) before and after each sampling event. The temperature inside the garage was noted (Springfield PreciseTemp, Wind and Weather Instruments, Fort Bragg, CA, USA) during the collection of each air sample. Asbestos sample collection equipment, materials, and procedures were consistent with National Institute for Occupational Safety and Health (NIOSH) Methods 7400 and 7402.

Before any brake removal activities began, background samples for airborne asbestos were collected in three different locations in the service centers. Personal samples from workers' lapels, bystander area samples within 1.2–3.1 m of the work activities, remote area samples at more distant locations (9–15 m) from the work activities, and ambient samples for airborne asbestos were collected during tractor brake or backhoe brake removal and disassembly. Figures 2 and 3 illustrate the location of the bystander, remote area, and ambient airborne asbestos samples collected in relation to the work activities, at both the Stockton and the Big Rock facilities. Consecutive 30-min samples were collected at an airflow rate ranging from 1 to 10 l min⁻¹ on the right and left lapel of the worker during the brake removal activities. To characterize potential bystander exposures to asbestos, air samples were collected at breathing zone height (1.5 m) at three different locations ~1.2 to 3.1 m from the vehicle. Bystander samples were collected at an airflow rate of 5–11 l min⁻¹ during brake removal activities on each vehicle (30–60 min). Background samples of ambient air (outside the shop, 90–180 min) and remote area (inside the shop, 30–60 min) were also collected for airborne asbestos at an airflow rate of ~10 l min⁻¹ during the brake removal activities. At least two field blanks were collected during each day of the above-described testing.

All airborne asbestos samples, including personal, area, background, and ambient samples, were sent to an accredited laboratory (EMS Laboratories, Pasadena, CA, USA) for asbestos analysis by phase contrast microscopy (PCM, NIOSH Method 7400) and TEM (NIOSH Method 7402) (NIOSH, 1994a,c). EMS Laboratories is an asbestos analysis laboratory, accredited by the American Industrial Hygiene Association and the National Voluntary Laboratory Accreditation Program (US Department of Commerce, National Institute for Standards and Technology, Gaithersburg, MD, USA) and utilizes analysts trained according to NIOSH 582 who adhere to the quality assurance and quality control requirements set forth by OSHA (OSHA, 1994) and the most cur-

rent version of the NIOSH 7400 Method. For the analysis of air samples by TEM, selected area electron diffraction and energy-dispersive X-ray were used to assess the fiber type via the diffraction pattern and elemental profile of the asbestos fibers, respectively (NIOSH, 1994c). Fibers were counted according to the NIOSH Methods 7400 and 7402, which define fibers as being >5 µm in length and 0.25 µm in diameter and having at least a 3:1 aspect ratio (NIOSH, 1994a,c). Air samples were also analyzed according to the International Organization for Standardization (ISO) method for characterization of fiber type, size, and morphology of fibers >5 µm in length (ISO, 1995).

Fiber size and morphology analysis

Because OSHA specifies PCM analysis (with or without TEM analysis) for evaluating occupational exposures to airborne asbestos, most studies utilize NIOSH Method 7400. However, PCM analysis under NIOSH Method 7400 does not differentiate asbestos fibers from other structurally similar non-asbestos fibers, so OSHA has indicated that TEM analysis (NIOSH Method 7402) can be used to quantify the ratio of asbestos fibers to total fibers (OSHA, 1994). While NIOSH Methods 7400 and 7402 are still used today to determine workplace compliance with the OSHA PEL for asbestos, these methods are limited in their ability to account for fiber morphology (e.g. presence of a resin) that might influence the respirability or the health hazard of airborne fibers.

While not widely used, the ISO Standard method allows for characterization of both fiber size and type, as well as determination of the fiber size distribution of airborne asbestos and differentiation of free fibers from fibers associated with a non-respirable matrix (ISO, 1995). This method (in addition to the NIOSH methods) was used in this study because the data can then be employed in future dose-response and risk assessment models (while the NIOSH methods are most appropriate for comparing to the OSHA PEL) (OSHA, 1994).

Using the ISO methodology, asbestos fibers were classified according to fiber size and morphology. Asbestos fiber morphology was quantified by categorizing asbestos fibers that were >5 µm in length as free fibers, free fiber bundles, fiber clusters, or matrix fibers (including matrix fibers, bundles, and dispersed arrangements). In those instances where asbestos fibers were associated with a cluster or matrix, the dimensions of the cluster or matrix structure, as well as those of the individual fibers comprised within the cluster or matrix, were recorded. Asbestos fibers were characterized by their morphology and size to evaluate the proportion of airborne fibers that were potentially respirable. While fibers up to 3.5 µm in diameter have been detected in the lungs of workers,

and while fibers of this dimension may represent the very upper bound limit of respirability (Gross *et al.*, 1971; Morgan and Holmes, 1980; Timbrell, 1980, 1982), a number studies have shown that most fibers that are deposited in the pulmonary region of the lung are thinner than 0.7 μm , and almost all are thinner than 1 μm (Harris and Timbrell, 1975; Sussman *et al.*, 1991a,b; Strom and Yu, 1994; Yu *et al.*, 1995). Respirable fibers (free and bundles) were therefore designated as those with diameters of $\leq 0.7 \mu\text{m}$. The deposition of fibers contained within clusters or matrices was assumed to be based on the dimensions of the overall cluster or matrix structure. Depending on the size and shape of these structures, the fiber cluster or matrix may act aerodynamically more like a particle than as a fiber. Nonetheless, respirability of fiber clusters or matrices was evaluated in two ways, as a respirable fiber of diameter $\leq 0.7 \mu\text{m}$ or a respirable particle with diameter $\leq 10 \mu\text{m}$.

In addition, fibers $> 20 \mu\text{m}$ in length were considered in the size distribution analysis. There is a basis of data to suggest that asbestos fibers of this length or greater pose the greatest risk, whereas those $< 5 \mu\text{m}$ do not. Stanton *et al.* conducted a series of animal exposure experiments with asbestos and non-asbestos fibers and ultimately concluded that fibers $\leq 8 \mu\text{m}$ in length have little or no mesotheliogenic potential (Stanton, 1973; Stanton *et al.*, 1977, 1981). Berman *et al.* (1995) evaluated data from 13 rat inhalation bioassays in which the animals were exposed to nine different types of asbestos dusts and concluded in this analysis that structures contributing to lung tumor risk appeared to be long ($\geq 5 \mu\text{m}$) and thin (0.4 μm) fibers (Berman *et al.*, 1995). Berman further noted that potency appeared to increase with increasing length, with structures longer than 40 μm being ~ 500 times more potent than those between 5 and 40 μm in length. These researchers suggested that structures $< 5 \mu\text{m}$ in length did not contribute to lung tumor risk. Modeling results reported by Miller *et al.* (1999) indicated that the concentration of fibers longer than 20 μm and thinner than 1 μm in diameter is most influential in determining the tumorigenic potential of fibers (Miller *et al.*, 1999). In addition, the US Environmental Protection Agency (US EPA) contracted the preparation of a technical support document for a protocol to assess asbestos-related risk (Berman and Crump, 2003). Based on the modeling results presented in the technical support document, the authors concluded that the best estimate of risk for both lung cancer and mesothelioma for fibers between 5 and 10 μm in length is one-three-hundredth of the risk assigned to fibers longer than 10 μm . Further, the best estimate of the potency of fibers shorter than 5 μm was zero for mesothelioma and lung cancer. The authors also explained that 'results from [their] review of the supporting literature suggest that the optimum cutoff

for increased potency occurs at a length that is closer to 20 μm than 10 μm '.

Collection and analysis of bulk asbestos samples

For each piece of equipment, filings of the brake material from each assembly (two drum linings and two band linings) and samples of brake wear debris (one from each assembly) were collected for bulk sample asbestos analysis. Both types of bulk material were analyzed by EMS Laboratories, using polarized light microscopy (PLM) according to NIOSH Method 9002 (NIOSH, 1994b) and XRD according to NIOSH Method 9000 (NIOSH, 1994d). Because the asbestos concentration in brake wear debris was anticipated to be below the detection limit for PLM or XRD ($\sim 1\%$), a modified approach based on the US EPA methods for detecting asbestos in bulk samples and drinking water was utilized (Chatfield and Dillon, 1983; Perkins and Harvey, 1993). More specifically, this approach involved ashing the sample to remove organic material using muffle furnace, suspending the ashed sample in water, filtering an aliquot of the water suspension, transferring the filtered sample onto a TEM grid, and characterizing dimensions of fibers according to those measured under NIOSH 7400/7402.

Air exchange measurements using tracer gas

Sulfur hexafluoride (SF_6) was used as a tracer gas to estimate the air exchange rate within the service centers. Briefly, measurements of the gas were taken according to American Society for Testing and Materials (ASTM) Method E741-00 (ASTM, 2001), and air exchange measurements using this method were collected during each day of testing. A steady state concentration of 1 p.p.m. for SF_6 (Sigma-Aldrich, St Louis, MO) was targeted as the initial room concentration for the tracer gas analysis. Tedlar bags (Fisher Scientific, Hampton, NH, USA) filled with SF_6 were then released in the garage with all doors closed. Fans on either end of the garage were used to facilitate the gas dispersion. After steady state was reached, fans were turned off, and SF_6 measurements were taken in 30-s intervals with a MIRAN SapphiRe-XL Analyzer (Thermo-Electron Corporation, Waltham, MA, USA; Ashtead Technology Rentals) for $\sim 1 \text{ h}$. The air exchange in the garage was calculated using the concentration decay (optional regression) test method by plotting the natural logarithm of SF_6 concentration over time (ASTM, 2001).

Data and statistical analysis

For the purposes of statistical analyses, results below the analytical sensitivity limit were imputed using a value equal to one-half the sensitivity limit. Analytical sensitivity limits were estimated based on the presumption that one fiber could be counted

within 100 microscopic fields and divided by the volume of air sampled. PCM measurements were adjusted for asbestos fiber content according to the method outlined in NIOSH Method 7402, which specifies multiplying the ratio of asbestos fibers to total fibers observed in the TEM analysis by the PCM fiber concentration (NIOSH, 1994c). The ratios of asbestos to total fibers (asbestos and non-asbestos fibers) were based on TEM fiber counts for the same filters, from which the PCM fiber counts were obtained. The PCM measurements adjusted by the ratio of asbestos versus total fibers are referred to as 'PCM-equivalent' (PCME) airborne asbestos concentrations. In circumstances where PCM measurements were above the sensitivity limit, but asbestos fibers were not detectable by TEM, a PCME asbestos concentration was not calculated.

Descriptive statistics were performed on PCM, TEM, and PCME measurements of airborne fiber concentrations collected during the removal of asbestos-containing brake assemblies from tractors and loader backhoes, and also during the clothes handling activities. Results were analyzed by sample location (worker, bystander, remote area, and background), by testing location (Stockton and Big Rock), and by assembly oiliness, when applicable. Eight-hour TWA asbestos exposures during brake removal were also calculated based on the PCME measurements for both the worker and the bystander, based on the assumption that three brake jobs could be conducted in a single workday and the remaining time the worker would be exposed to background concentrations. For example, 90 min of brake removal activities (representing work on three pieces of equipment) at a concentration of 0.024 f/cc and a 390-min exposure to background at a concentration of 0.005 f/cc would result in an 8-h TWA of 0.009 f/cc.

Air concentration data were determined to be log-normally distributed based on probability plots. One-way analysis of variance and pairwise comparisons based on the Tukey's test for each group were conducted for natural log-transformed air concentration data of worker, bystander, and remote area samples. Two-sample *t*-test of the log-transformed worker data was conducted with respect to dry versus oily brake assemblies based on unequal variances. Power calculations of the above comparisons were estimated to be 100%. A Pearson and Spearman (non-parametric) analysis was performed to evaluate whether airborne chrysotile concentrations for the worker (untransformed and natural log transformed) were influenced or correlated with the asbestos content in the brake lining or brake wear debris and whether the asbestos content in the brake wear debris was influenced by the extent of wear (e.g. lining thickness) or the original asbestos content in the brake lining.

RESULTS

All equipment contained at least one brake assembly with asbestos-containing linings. The thickness of the brake linings ranged from completely worn to the metal support to 5.94 mm, and their asbestos content is presented in Table 1. In summary, the asbestos content of the brake lining averaged 19% chrysotile by weight (range: 1–39%) as measured by XRD and 20% chrysotile by area (range: 0.5–70%) as measured by PLM (Table 2). Table 1 also presents the asbestos content measured in the brake wear debris. The average asbestos content found in these samples was 0.49% of chrysotile asbestos (range: 0.008–6%). All heavy equipment showed brake wear debris with <1% chrysotile asbestos, with the exception of Equipment 9, which had brake debris in one assembly containing 6% asbestos. It should be noted that this assembly was also missing both drum linings. These results indicate that nearly all (average of 94.4%, range 58–100%) the chrysotile in the brake linings degraded or was converted to an amorphous material. Specifically, for 10 of the 12 pieces of equipment, over 95% of the chrysotile in the brake linings was degraded to non-fibrous particles in the brake wear debris. Interestingly, there were no correlations found between the asbestos content in the brake lining and brake wear debris, suggesting that the asbestos content in the brake lining does not influence the amount of asbestos remaining in the brake wear debris after degradation processes.

Air sampling results are reported in Tables 2 and 3. Table 2 presents the short-term (30 min) and brake removal airborne asbestos concentrations measured by PCM, TEM, and PCME for the worker, bystander, remote, and background locations by facility. The average airborne chrysotile concentrations as measured by PCM, TEM, and PCME were 0.053, 0.087, and 0.024 f/cc, respectively, for the Stockton mechanic and 0.558, 0.012, and 0.010 f/cc measured by PCM, TEM, and PCME, respectively, for the Big Rock mechanic (Table 2). The overall worker average airborne asbestos concentrations by analytical method are presented and compared to the OSHA 30-min asbestos excursion limit in Fig. 4. No correlations were found between concentrations of airborne asbestos for the worker (PCME, 30 min) and the asbestos content in the brake lining or wear debris; this lack of correlation is likely attributed to the low asbestos concentrations in the air samples and in the brake wear debris.

The results of the clothes handling activity are also presented in Table 2. The average airborne asbestos concentrations measured on the volunteer (handling the clothes) were 0.231, 0.011, and 0.036 f/cc when measured by PCM, TEM, and PCME, respectively. Likewise, at the bystander location, average asbestos concentrations of 0.093, 0.012, and 0.010 f/cc were

Table 2. Continued

Sample type/activity/location		Equipment		Asbestos fiber concentrations (f/cc)																			
				PCM								TEM								PCME ^a			
		n	n (ND)	n (NR)	Avg	GM	SD	Range	n	n (ND)	n (NR)	Avg	GM	SD	Range	n	Avg	SD	Range				
Big Rock	Eq12	2	0	0	0.004	0.003	0.005	0.001-0.008	2	2	0	0.004	0.003	0.001	0.002-0.003	—	—	—	—				
	Eq1-Eq2, Eq3-Eq12	9	—	—	0.014	0.013	0.007	0.001-0.036	9	—	—	0.005	0.004	0.003	0.001-0.020	4	0.009	0.004	0.006-0.023				
	Eq3	5	0	0	0.015	0.014	0.007	0.007-0.026	5	5	0	0.003	0.002	0.001	0.002-0.004	—	—	—	—				
	Eq4	3	0	0	0.055	0.054	0.005	0.049-0.059	3	2	0	0.002	0.001	0.001	0.001-0.002	1	0.0024	—	0.002				
	Eq3-Eq4	2	—	—	0.035	0.034	0.006	0.007-0.059	2	—	—	0.002	0.002	0.001	0.001-0.004	1	0.002	—	0.002				
Clothes handling		2	0	0	0.093	0.080	0.066	0.046-0.140	2	0	0	0.012	0.008	0.012	0.003-0.020	2	0.010	0.011	0.003-0.018				
Remote area																							
Brake and bench work																							
Stockton																							
Big Rock	Eq1	0	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—	—	—				
	Eq2	2	0	0	0.004	0.004	0.001	0.004-0.005	2	2	0	0.002	0.002	0.000	0.002-0.002	—	—	—	—				
	Eq5	2	0	0	0.005	0.004	0.002	0.003-0.006	2	1	0	0.002	0.002	0.000	0.002-0.002	1	0.001	0.000	0.001				
	Eq6	2	0	0	0.004	0.004	0.000	0.004-0.004	2	2	0	0.002	0.002	0.000	0.002	—	—	—	—				
	Eq7	2	0	0	0.005	0.005	0.002	0.003-0.007	2	2	0	0.001	0.001	0.000	0.001	—	—	—	—				
	Eq8	2	0	0	0.009	0.009	0.003	0.007-0.011	2	2	0	0.002	0.002	0.000	0.002	—	—	—	—				
	Eq9	2	0	0	0.006	0.006	0.000	0.006-0.006	2	1	0	0.002	0.002	0.001	0.002-0.003	1	0.0016	0.000	0.002				
	Eq10	2	0	0	0.005	0.004	0.004	0.002-0.007	2	2	0	0.002	0.002	0.000	0.002	—	—	—	—				
	Eq11	2	0	0	0.008	0.008	0.002	0.007-0.010	2	2	0	0.002	0.002	0.000	0.002	—	—	—	—				
	Eq12	2	0	0	0.008	0.008	0.000	0.008	2	2	0	0.002	0.002	0.000	0.002	—	—	—	—				
	Eq1-Eq2, Eq5-Eq12	10	—	—	0.006	0.006	0.002	0.002-0.011	10	—	—	0.002	0.002	0.000	0.001-0.003	2	0.001	0.000	0.001-0.002				
	Clothes handling	Eq3	2	0	0	0.010	0.010	0.001	0.010-0.011	2	2	0	0.001	0.001	0.000	0.001	—	—	—	—			
Eq4		2	0	0	0.035	0.035	0.002	0.033-0.036	2	2	0	0.001	0.001	0.000	0.001	—	—	—	—				
Eq3-Eq4		2	—	—	0.022	0.022	0.001	0.010-0.036	2	—	—	0.001	0.001	0.000	0.001-0.001	—	—	—	—				
Background		2	0	0	0.040	0.037	0.021	0.025-0.055	2	2	0	0.001	0.001	0.000	0.001-0.002	0	—	—	—				
Brake and bench work																							
Stockton																							
Eq1	0	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—	—	—				
Eq2	2	0	0	0.023	0.023	0.006	0.019-0.027	2	1	0	0.003	0.002	0.002	0.001-0.004	1	0.005	0.000	0.005					

Table 2. Continued

Sample type/activity/location		Equipment		Asbestos fiber concentrations (f/cc)										TEM				PCME ^a			
PCM																					
	<i>n</i>	<i>n</i> (ND)	<i>n</i> (NR)	Avg	GM	SD	Range	<i>n</i>	<i>n</i> (ND)	<i>n</i> (NR)	Avg	GM	SD	Range	<i>n</i>	Avg	SD	Range			
Big Rock	Eq5	3	0	0	0.010	0.007	0.008	0.003–0.019	3	2	1	0.001	0.001	0.000	0.001	—	—	—			
	Eq6	3	0	0	0.007	0.006	0.002	0.004–0.008	3	3	0	0.002	0.002	0.001	0.002–0.003	—	—	—			
	Eq7	3	0	0	0.008	0.005	0.008	0.002–0.017	3	3	0	0.002	0.002	0.001	0.002–0.003	—	—	—			
	Eq8	3	0	0	0.006	0.005	0.002	0.003–0.007	3	3	0	0.002	0.002	0.000	0.002	—	—	—			
	Eq9	3	0	0	0.008	0.008	0.001	0.007–0.009	3	3	0	0.001	0.001	0.000	0.001–0.002	—	—	—			
	Eq10	3	0	0	0.007	0.006	0.005	0.002–0.012	3	3	0	0.002	0.002	0.000	0.015	—	—	—			
	Eq11	3	0	0	0.007	0.006	0.001	0.006–0.007	3	3	0	0.002	0.002	0.000	0.002	—	—	—			
	Eq12	3	0	0	0.008	0.008	0.001	0.006–0.009	3	3	0	0.002	0.002	0.000	0.002	—	—	—			
	Eq1–Eq2, Eq5–Eq12	10			0.009	0.008	0.004	0.002–0.027	10			0.002	0.002	0.000	0.001–0.004	1	0.005	—	0.005		
	Eq3	2	0	0	0.008	0.008	0.000	0.008	2	2	0	0.002	0.002	0.000	0.002	—	—	—			
	Eq4	2	0	0	0.021	0.021	0.019	0.007–0.035	2	2	0	0.002	0.002	0.000	0.002	—	—	—			
	Eq3–Eq4	2			0.015	0.015	0.010	0.007–0.035	2			0.002	0.002	0.000	0.002	—	—	—			
Ambient																					
Brake and bench work																					
Stockton																					
Eq1	0	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—	—	—			
Eq2	1	0	0	0.001	0.001	—	0.001	1	1	0	0.004	0.004	—	0.004	—	—	—	—			
Eq5–Eq7	3	0	0	0.002	0.002	0.002	0.001–0.005	3	3	0	0.004	0.004	0.001	0.004–0.005	—	—	—	—			
Eq8–Eq9	3	0	0	0.002	0.002	0.002	0.001–0.004	3	1	0	0.001	0.001	0.001	0.005–0.007	2	0.004	0.000	0.004			
Eq10–Eq12	3	0	0	0.003	0.003	0.001	0.003–0.004	3	1	0	0.001	0.001	0.001	0.008–0.010	2	0.002	0.000	0.001–0.002			
Eq1, Eq5–Eq12	4			0.002	0.002	0.001	0.001–0.005	4			0.001	0.001	0.000	0.004–0.010	2	0.003	—	0.001–0.004			
Big Rock																					
Eq3	1	0	0	0.001	0.001	—	0.001	1	1	0	0.003	0.003	—	0.003	—	—	—	—			
Eq4	1	0	0	0.001	0.001	—	0.001	1	1	0	0.005	0.005	—	0.005	—	—	—	—			
Eq3–Eq4	1			0.001	0.001	—	0.001	1			0.004	0.004	—	0.003–0.005	—	—	—	—			

PCMadj, PCM concentration multiplied by the ratio of asbestos fibers to total fibers measured by TEM; *n*, number of samples; NR, number of samples not readable; ND, number of samples in which asbestos was not detected; Avg, average; SD, standard deviation; —, not applicable.

^aBased on samples in which asbestos fibers were detected by TEM.

Table 3. Summary of fiber size and morphology of airborne asbestos fibers collected on the worker during brake removal

Fiber structure classification	n	Total fibers (%)	Percent fibers (%) classified as fiber or particle with dimensions of					
			Respirable fiber				Respirable particle*	
			<0.7 μm width		<3 μm width		<10 μm width	
			>5 μm length (%)	>20 μm length (%)	>5 μm length (%)	>20 μm length (%)	>5 μm length (%)	>20 μm length (%)
Total fibers	261	—	—	—	—	—	—	—
Free fiber/bundle	95	36	18	2	35	2	—	—
Fiber clusters	8	3	2	0	2	1	3	1
Matrix disperse	158	61	0	0	7	0	36	9

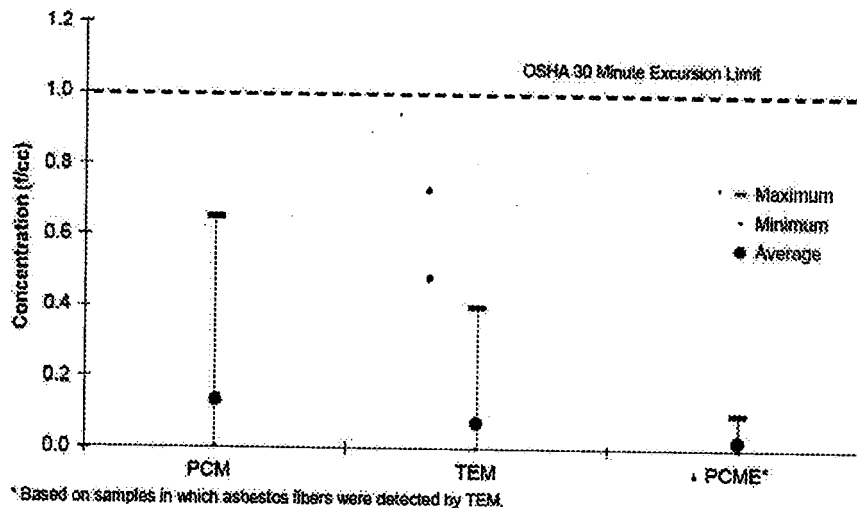


Fig. 4. Comparison of worker asbestos concentrations (f/cc, 30 min) by analytical methods (PCM, TEM, and PCME).

measured using PCM, TEM, and PCME, respectively (sampling times were 30 min in duration and collected during the anticipated peak times of exposure).

Figure 5 presents the average asbestos concentrations as measured by PCME for the worker, bystander, remote, and background locations, as compared to the current OSHA 30-min excursion limit for asbestos. Asbestos was not detected in more than half of the samples collected at the bystander locations (even though <1.2 m from the work activity) as determined by TEM, and average airborne asbestos concentrations at the bystander locations were generally less than half of those measured for the mechanic. Airborne concentrations were 0.014 f/cc (PCM), 0.005 f/cc (TEM), and 0.009 f/cc (PCME) at bystander locations at the Stockton facility and 0.035 f/cc (PCM), 0.002 f/cc (TEM), and 0.002 f/cc (PCME) at bystander locations at the Big Rock facility (Table 2). Airborne asbestos concentrations found at the remote and background locations samples were even lower than those found at the bystander locations. It is interesting to note, however, that actinolite (one fiber) was detected in two ambient air samples and one worker sample, although this

finding is not surprising since actinolite is commonly found in ambient air (Lee and Van Orden, 2008).

Because four pieces of equipment (Eq3, Eq4, Eq6, and Eq7) had at least one assembly saturated in oil, airborne asbestos concentrations found on the worker removing those brakes were compared to the concentrations found while removing dry brake assemblies. The resulting average asbestos concentration during oily brake removal (0.009 f/cc) was less than one-fourth the concentration of dry brake removal (0.043 f/cc), as measured by PCME. These findings were statistically significant ($P = 0.001$) by a two-sample t -test of the log-transformed worker data.

Estimated 8-h TWA asbestos exposures were calculated for the worker and the bystander. Considering the time involved in the brake removal activity, and assuming three brake removal jobs are conducted per shift, the resulting average 8-h TWA was estimated to be 0.009 f/cc for a mechanic and 0.006 f/cc for a bystander. Therefore, 8-h TWA asbestos exposures for mechanics performing brake removal on heavy equipment and those standing nearby this work are not likely to exceed the current OSHA PEL of 0.1 f/cc.

Table 3 presents a summary of fiber size and morphology of the airborne asbestos fibers collected on

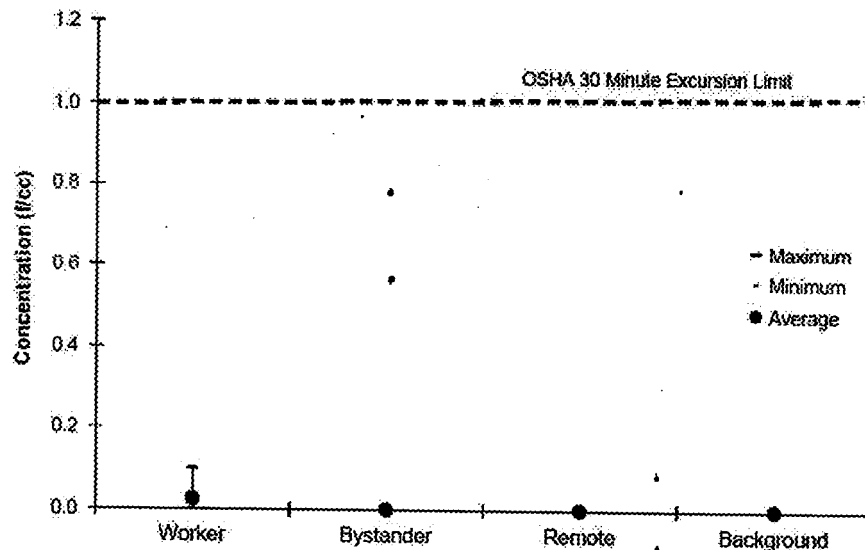


Fig. 5. Comparison of worker, bystander, remote area, and background airborne asbestos concentrations (f/cc, PCME, 30 min).

the worker. Within the worker samples, there were 261 total asbestos fibers counted using the ISO methodology. Of these, only 36% were free fibers or bundles, 18% were free fibers or bundles with diameter $<0.7 \mu\text{m}$ (length $>5 \mu\text{m}$) and only 2% were free fibers or bundles with diameter $<0.7 \mu\text{m}$ and length $>20 \mu\text{m}$. The remaining fibers were either in clusters (3%) or attached to a matrix (61%). Only 4% of the fibers, however, were part of a cluster that may be respirable ($<10 \mu\text{m}$ in width), and 44% of fibers were part of a matrix that may be respirable. Figure 6 is an image of fiber clusters collected in worker samples and exemplify fibers that are part of a much larger matrix.

DISCUSSION

This study was conducted to assess possible exposures to airborne asbestos during removal and disassembly of asbestos-containing brakes from heavy construction equipment manufactured during the 1950–1980 time frame. The data collected in this simulation study are believed to capture the plausible range of variables that might influence exposures during brake removal and disassembly from heavy construction equipment, as well as the potential exposure associated with handling work clothes. The work activities were conducted under low ventilation conditions (e.g. no active local or general ventilation and low building air exchange), by mechanics with varying years of experience and techniques at different maintenance service centers, and on different heavy construction equipment (tractors and backhoes) with similar brake assembly configurations, but representing a range of equipment use (e.g. hours and brake lining wear). The results collected from

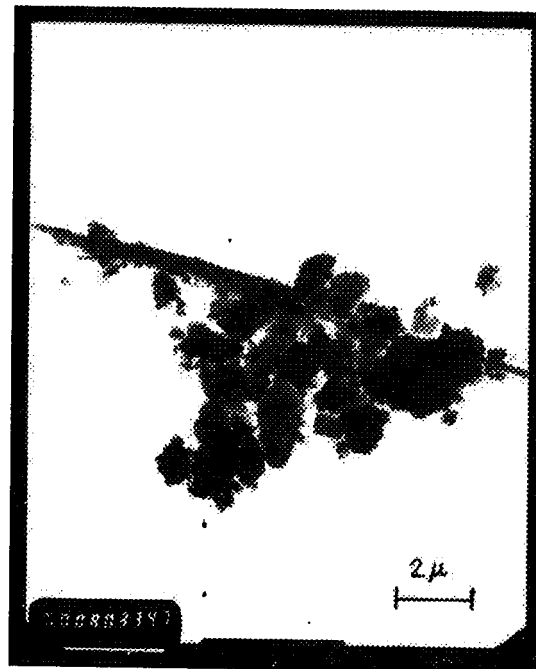


Fig. 6. TEM image of a fiber cluster collected during a short-term worker sample performing brake removal on Equipment 6, courtesy of EMS Laboratories.

this study provide information not only on airborne asbestos exposures experienced by mechanics removing asbestos-containing brakes from heavy construction equipment and by persons nearby these activities but also on the extent to which chrysotile asbestos degrades into non-fibrous particles during braking of heavy construction equipment, the influence that dry versus oily brake assemblies has on airborne asbestos exposures, and the size and

morphological distribution and potential respirability of airborne chrysotile fibers generated during the brake removal activities.

Although most of the brake removal work was conducted at the Stockton, CA, service center (10 backhoes) and not at the Big Rock, IL, facility (2 tractors), worker exposures resulting from brake removal and disassembly at these two facilities, mechanics, and types of equipment appeared to be similar. The most striking effect on airborne asbestos concentrations measured on the workers' lapel was the internal dryness of the brake housing (i.e. whether it was saturated with oil), with dry assemblies resulting in worker exposures of 0.043 f/cc (range: 0.01–0.13 f/cc) and oily assemblies resulting in worker exposures of 0.009 f/cc (range: 0.003–0.016 f/cc). No correlation was apparent using regression analyses for the amount of asbestos present in the brake wear debris when compared to the asbestos content in the drum and band linings or to the extent to which the linings were worn (e.g. lining thickness). It is possible that this lack of correlation reflects the already low chrysotile asbestos concentrations present in the brake wear debris (0.49%), inability of these fibers to become airborne during manipulation and compressed air blowout of the brake assembly, and/or similar surface area dynamics during the mechanical action of the braking process that is independent of the asbestos content.

The precision of airborne fiber concentrations is dependent on the fiber density and proportion of filter surface area (e.g. microscope fields) examined, with statistical uncertainties generally being inversely proportional to the fiber density (Johnston *et al.*, 1982; Ogden, 1982; Cherrie and Johnston, 1986; Lange *et al.*, 1996). It has been reported that the accuracy is not greatly improved for counts beyond 50 fibers and thus has been recommended that at least 50 fibers be counted and the number of fields be only limited where the airborne fiber concentrations are so low that the accuracy is no longer important (Ogden, 1982). These concepts have been incorporated into the current NIOSH method for asbestos (NIOSH, 1994a), where 100 fibers or 100 microscope fields, whichever criterion is met first, are counted. For the majority of the worker samples collected in this simulation study, >50 fibers were counted within the prescribed 100 microscope fields, whereas far fewer fibers (<10–20 fibers) were observed in samples collected in bystander or remote area locations. The confidence limits would, as a result, be expected to be narrower for worker compared to those for area airborne asbestos concentrations. Based on the data collected in this study, however, it was determined that the data represented a power of 100% at a 95% confidence level to detect a difference between worker, bystander, and remote area measurements, as well as worker exposures handling

dry versus oily brake assemblies. Based on standard *t*-tests comparisons, worker exposures were found to be significantly higher than those measured at bystander or remote area locations ($P < 0.0001$), and worker exposures while removing brakes from dry assemblies were statistically greater than those associated with oily assemblies ($P = 0.001$).

Although Boelter *et al.* (2007) evaluated airborne asbestos levels during repair of heavy construction machinery; they did not restrict their study to just brake work (Boelter *et al.*, 2007). Boelter *et al.* (2007) evaluated asbestos air concentrations during 'in-frame maintenance and repair activities, which included aggressive techniques that resulted in visible dust from work involving friction products and gaskets'. Further, the work performed during this study included dismantling, cleaning, and reassembling engines and clutches. Because a narrow range of work tasks were involved with brake removal, only a subset of asbestos measurements from the Boelter *et al.* (2007) study can be directly compared to our study. It was observed that airborne asbestos concentrations observed during brake removal and disassembly were equal to or less than those of comparable work activities reported in the Boelter *et al.* (2007). Work involving band brake removal, rivets and friction lining removal from brake band or brake shoe, and disc brake assembly removal resulted in average 30-min airborne asbestos concentrations ranging from 0.044 to 0.045 f/cc (PCME) in the Boelter *et al.* (2007) study. The average airborne asbestos concentration for similar activities in our study was 0.016 f/cc (range: 0.001–0.090 f/cc) (PCME). Boelter *et al.* collected and analyzed debris from the brake assembly of each piece of equipment and reported non-detectable or <1% asbestos levels for every sample. Because PLM was utilized as the method for bulk sample analysis of brake wear debris, and because concentrations below 1% are not detectable, this approach did not allow for precisely quantifying the extent to which chrysotile is degraded during braking. While we did not specifically measure forsterite concentrations in brake wear debris, indirectly we can determine how much chrysotile is degraded by measuring the chrysotile content in the friction lining and in the brake wear debris residing in the brake housing. With TEM analysis, we were able to quantify the amount of chrysotile in the brake wear debris (average 0.49%, range 0.008–6%) and determine that 95% of chrysotile in the brake lining is degraded to non-fibrous, non-asbestos particles in the friction process. These findings are comparable to those reported for passenger automobiles, with reported averages being between 0.02 and 4.5% asbestos, with the majority of wear debris samples containing <1% chrysotile (Hickish and Knight, 1970; Luxon, 1970; Anderson *et al.*, 1973; Jacko *et al.*, 1973; Rohl *et al.*, 1977; Rowson, 1978;

Williams and Muhlbaier, 1982; Cha *et al.*, 1983; Sheehy *et al.*, 1989). We acknowledge that the degraded chrysotile may not, in fact, be chemically equivalent to forsterite and that it may be some other non-asbestos amorphous material (Langer, 2003; Candela *et al.*, 2007). It is also acknowledged that the material that is called chrysotile in this analysis may not possess the biologic activity of chrysotile asbestos due to dehydroxylation and other stresses as has been suggested by Langer (2003).

Few studies have characterized the size distribution and morphological characteristics of asbestos fibers associated with handling asbestos-containing friction materials (Atkinson *et al.*, 2004; Jiang *et al.*, 2008; Madl *et al.*, 2008), and other studies have evaluated the size and type of asbestos fibers retained within the lungs of mechanics (Churg and Wiggs, 1986; Dodson *et al.*, 1991; Roggli *et al.*, 2002). In the former set of studies, however, fiber characteristics were associated with directly handling replacement asbestos-containing automobile brakes, and in the latter group of studies, the source of the fibers retained within the lungs can only be qualitatively associated with employment history. To the best of our knowledge, no studies have evaluated the size distribution and morphological characteristics of asbestos fibers in brake wear debris released during the disassembly of brakes, and in particular in heavy equipment brakes. We found that 61% of the airborne asbestos fibers were associated with a matrix or resin that can significantly influence the potential respirability of these fibers; of the fibers associated with a matrix, only 9% were potentially respirable (using cutoff of particle diameter of 10 μm) and had fiber lengths $>20 \mu\text{m}$. Of the free fibers or bundles (not associated with a matrix), only 2% of airborne fibers were respirable (cutoff of fiber diameter of 3 μm). Thus, even with the low concentrations of airborne asbestos fibers released during heavy construction equipment brake removal and disassembly, only a small percentage of these fibers were likely to be respirable.

The exposure and epidemiologic literature for automobile mechanics can provide a useful benchmark for exposures measured in this study. In a recent assessment of all the published and unpublished industrial hygiene data collected during asbestos brake repair by vehicle mechanics, nearly 200 brake job and 8-h TWA airborne asbestos samples were analyzed (Paustenbach *et al.*, 2003). In this assessment, which encompassed measurements collected in seven different countries over the last 30 years, average 8-h TWA concentrations of 0.04 f/cc for airborne asbestos were found with individual measurements ranging from <0.002 to 0.68 f/cc reported for brake mechanics servicing light trucks and passenger vehicles (Paustenbach *et al.*, 2003). This value (0.04 f/cc) is identical to that identified by US EPA in the

survey that they conducted in 1984 (Weil *et al.*, 1985). The values are also not dissimilar from the analysis of >200 short-term samples recently reported by Richter *et al.* (2008).

In addition, since 1975, six epidemiologic case-control studies and two meta-analyses have evaluated the risk of asbestos-related disease among mechanics (McDonald and McDonald, 1980; Teta *et al.*, 1983; Spirtas *et al.*, 1985, 1994; Weitowitz and Rodelsperger, 1994; Teschke *et al.*, 1997; Agudo *et al.*, 2000; Wong, 2001; Hessel *et al.*, 2004). These studies have consistently found no increased risk of mesothelioma in brake mechanics. Studies that specifically evaluated mechanics involved in brake lining installation and repair also showed a relative risk consistently <1.0 (Spirtas *et al.*, 1985; Weitowitz and Rodelsperger, 1994; Teschke *et al.*, 1997; Hessel *et al.*, 2004). It has been noted that the risk of mesothelioma in brake mechanics is similar to that of other occupations that do not involve occupational exposure to asbestos, such as teachers, librarians, and accountants (Teschke *et al.*, 1997). Based on these findings, the available epidemiological data show that employment as a motor vehicle mechanic or, more specifically, a brake repair worker does not result in an increased risk of developing mesothelioma (Paustenbach *et al.*, 2004). Taking the epidemiologic and industrial hygiene findings together, we can conclude that auto mechanics who repair asbestos-containing brakes as a career are exposed on average to 0.04 f/cc (range <0.002 –0.68 f/cc) of asbestos and are therefore not at an increased risk of asbestos-related disease, including mesothelioma (Paustenbach *et al.*, 2003). The range of lifetime cumulative doses of chrysotile have been characterized by Finley *et al.* (2007) and were reported to range from 0.16 to 0.41 f/cc year⁻¹ for facilities with no dust-control procedures (1970s) and from 0.010 to 0.012 f/cc year⁻¹ for those employing engineering controls (1980s). Upper bound (95%) estimates for the 1970s and 1980s were 1.96–2.79 and 0.07–0.10 f/cc year⁻¹, respectively (Finley *et al.*, 2007). These data also suggest that mechanics conducting brake work on heavy construction equipment similar to that described in this simulation study are comparable to exposures of automobile mechanics (Fig. 7) and, as a result, would also not be expected to be at an increased risk of asbestos-related disease.

In summary, the short-term airborne asbestos concentrations measured for both a worker removing asbestos-containing brakes from heavy construction equipment as well as for a bystander working in the vicinity of such activity were below both the current OSHA excursion limit for asbestos and all the previous US occupational asbestos standards. Based on a collection of 44 samples, this study found that short-term exposures (30 min) of a mechanic to airborne asbestos during the removal and disassembly

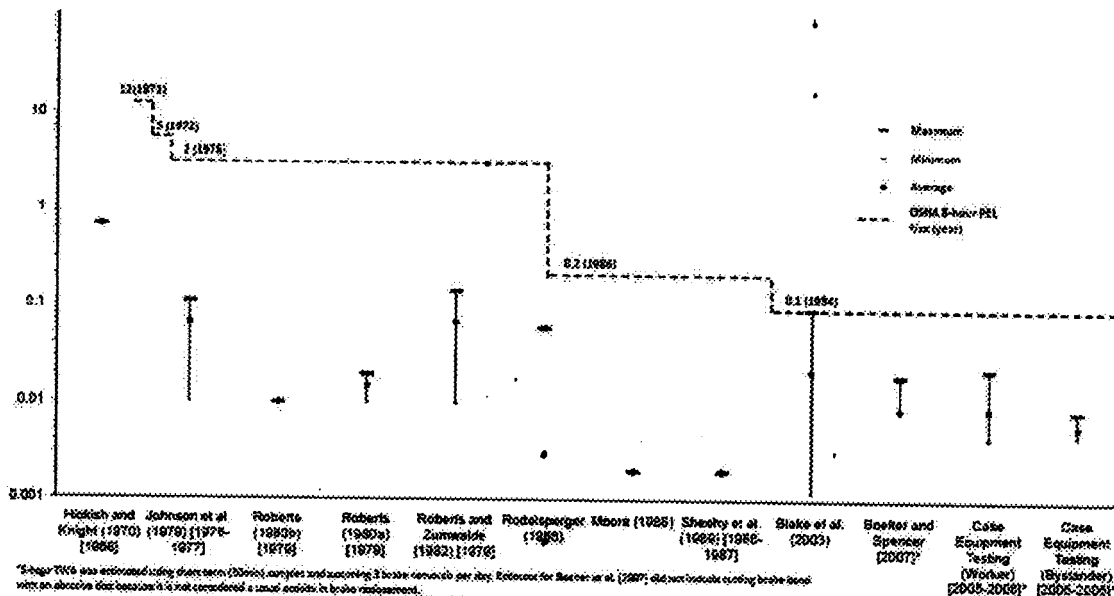


Fig. 7. Comparison of airborne asbestos exposures for automobile mechanics to those measured by mechanics handling asbestos-containing brakes on heavy construction equipment.

of asbestos-containing brakes from heavy construction equipment average 0.024 f/cc (range: 0.001–0.1 f/cc), whereas 8-h TWA exposures average 0.009 f/cc (range: 0.005–0.23 f/cc), based on the assumption that three brake assemblies could be removed within a workday. The industrial hygiene data presented here should therefore prove useful for retrospective and current exposure assessments of individuals and hazard assessments of work activities that involve repairing and replacing asbestos-containing brakes contained in heavy construction equipment (Hickish and Knight, 1970; Johnson *et al.*, 1979; Roberts, 1980a,b; Roberts and Zumwalde, 1982; Rodelsperger *et al.*, 1986; Moore, 1988; Sheehy *et al.*, 1989; Blake *et al.*, 2003; Boelter *et al.*, 2007).

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REFERENCES

Agudo A, González CA, Bleda MJ *et al.* (2000) Occupation and risk of malignant pleural mesothelioma: a case-control study in Spain. *Am J Ind Med*; 37: 157–68.

Anderson AE, Gealer RL, McCune RC *et al.* (1973) Asbestos emissions from brake dynamometer tests. New York, NY: Society of Automotive Engineers (SAE) Automobile Engineering Meeting, Detroit, MI, 14–18 May 1973. Paper No. 730549.

Anderson HA, Lilis R, Daum SM *et al.* (1976) Household-contact asbestos neoplastic risk. *Ann N Y Acad Sci*; 271: 311–23.

Anderson HA, Lilis R, Daum SM *et al.* (1979) Asbestosis among household contacts of asbestos factory workers. *Ann N Y Acad Sci*; 330: 387–99.

ASTM. (2001) Standard test method for determining air change in a single zone by means of a tracer gas dilution. West Conshohocken, PA: American Society for Testing and Materials (ASTM) E741-00.

Atkinson MA, O'Sullivan M, Zuber S *et al.* (2004) Evaluation of the size and type of free particulates collected from unused asbestos-containing brake components as related to potential for respirability. *Am J Ind Med*; 46: 545–53.

ATSDR. (2001) Toxicological profile for asbestos. Atlanta, GA: US Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR).

Berman DW, Crump KS. (2003) Final Draft. Technical support document for a protocol to assess asbestos-related risk. Washington, DC: Office of Solid Waste and Emergency Response, US Environmental Protection Agency (US EPA). EPA # 9345.4-06.

Berman DW, Crump KS, Chatfield EJ *et al.* (1995) The sizes, shapes, and mineralogy of asbestos structures that induce lung tumors or mesothelioma in AF/HAN rats following inhalation. *Risk Anal*; 15: 181–95.

Blake CL, Van Orden DR, Banasik M *et al.* (2003) Airborne asbestos concentration from brake changing does not exceed permissible exposure limit. *Regul Toxicol Pharmacol*; 38: 58–70.

Boelter FW, Spencer JW, Simmons CE. (2007) Heavy equipment maintenance exposure assessment: using a time-activity model to estimate surrogate values for replacement of missing data. *J Occup Environ Hyg*; 4: 525–37.

Candela PA, Crummett CD, Earnest DJ *et al.* (2007) Low-pressure decomposition of chrysotile as a function of time and temperature. *Am Mineral*; 92: 1704–13.

- Cha S, Carter P, Bradlow RL. (1983) Simulation of automobile brake wear dynamics and estimation of emissions. Warrendale, PA: Society of Automotive Engineers (SAE) Passenger Car Meeting Dearborn, Michigan 6–9 June 1983. Technical Paper Series No. 831036. pp. 1–21.
- Chatfield EJ, Dillon MJ. (1983) Analytical method for determination of asbestos fibers in water. Athens, GA: Environmental Research Laboratory, Office of Research and Development, US Environmental Protection Agency EPA-600/4-83-043.
- Cherrie J, Johnston AJA. (1986) The influence of fiber density on the assessment of fiber concentration using the membrane filter method. *Am Ind Hyg Assoc J*; 47: 465–74.
- Churg A, Wiggs B. (1986) Fiber size and number in workers exposed to processed chrysotile asbestos, chrysotile miners, and the general population. *Am J Ind Med*; 9: 143–52.
- Dodson RF, Garcia JG, O'Sullivan M *et al.* (1991) The usefulness of bronchoalveolar lavage in identifying past occupational exposure to asbestos: a light and electron microscopy study. *Am J Ind Med*; 19: 619–28.
- dos Santos Antao VC, Pinheiro GA, Wassell JT. (2009) Asbestosis mortality in the USA: facts and predictions. *Occup Environ Med*; 66: 335–8.
- Eisenbud M, Wanta RC, Dustan C. (1949) Non-occupational berylliosis. *J Ind Hyg Toxicol*; 31: 282–94.
- Epler GR, Fitz Gerald MX, Gaensler EA *et al.* (1980) Asbestos-related disease from household exposure. *Respiration*; 39: 229–40.
- Finley BL, Richter RO, Mowat FS *et al.* (2007) Cumulative asbestos exposure for US automobile mechanics involved in brake repair (circa 1950s–2000). *J Expo Sci Environ Epidemiol*; 17: 644–55.
- Gross P, Tuma J, DeTreville RTP. (1971) Lungs of workers exposed to fibreglass. *Arch Environ Health*; 23: 67–76.
- Harper GA. (1998) Brakes and friction materials: the history and development of the technologies. Bury St Edmunds, UK: Mechanical Engineering Publications, Ltd; pp. 1–79.
- Harris RL, Jr, Timbrell V. (1975) The influence of fibre shape in lung deposition-mathematical estimates. *Inhaled Part*; 4: 75–89.
- Hessel PA, Teta MJ, Goodman M *et al.* (2004) Mesothelioma among brake mechanics: an expanded analysis of a case-control study. *Risk Anal*; 24: 547–52.
- Hickish DE, Knight KL. (1970) Exposure to asbestos during brake maintenance. *Ann Occup Hyg*; 13: 17–21.
- ISO. (1995) Ambient air—determination of asbestos fibres—direct-transfer transmission electron microscopy method. Geneva, Switzerland: International Organization for Standardization (ISO) ISO10312:1995E.
- Jacko MG, DuCharme RT, Somers JH. (1973) Brake and clutch emissions generated during vehicle operation. New York, NY: Society of Automotive Engineers (SAE) Automobile Engineering Meeting, 14–18 May 1973. Paper No. 730548. pp. 1–20.
- Jiang GC, Madl AK, Ingmundson KJ *et al.* (2008) A study of airborne chrysotile concentrations associated with handling, unpacking, and repacking boxes of automobile clutch discs. *Regul Toxicol Pharmacol*; 51: 87–97.
- Johnson P, Zumwalde RD, Roberts D. (1979) Industrial hygiene assessment of seven brake servicing facilities—Asbestos. Cincinnati, OH: National Institute for Occupational Safety and Health.
- Johnston AM, Jones AD, Vincent JH. (1982) The influence of external aerodynamic factors on the measurement of the airborne concentration of asbestos fibres by the membrane filter method. *Ann Occup Hyg*; 25: 309–16.
- Joubert L, Seidman H, Selikoff IJ. (1991) Mortality experience of family contacts of asbestos factory workers. *Ann N Y Acad Sci*; 643: 416–8.
- Kelly TD, Matos GR. (2009) Historical statistics for mineral and material commodities in the United States. Reston, VA: US Department of Interior, US Geological Survey.
- Lange JH, Lange PR, Reinhard TK *et al.* (1996) A study of personal and area airborne asbestos concentrations during asbestos abatement: a statistical evaluation of fibre concentration data. *Ann Occup Hyg*; 40: 449–66.
- Langer A. (2003) Reduction of the biological potential of chrysotile asbestos arising from conditions of service on brake pads. *Regul Toxicol Pharmacol*; 38: 71–7.
- Lee RJ, Van Orden DR. (2008) Airborne asbestos in buildings. *Regul Toxicol Pharmacol*; 50: 218–25.
- Li FP, Lockich J, Lapey J *et al.* (1978) Familial mesothelioma after intense asbestos exposure at home. *JAMA*; 240: 467.
- Lieben J, Pistawka H. (1967) Mesothelioma and asbestos exposure. *Arch Environ Health*; 14: 559–63.
- Luxon S. (1970) Technical implementation of the new asbestos regulations. *Ann Occup Hyg*; 13: 23–4.
- Lynch JR. (1968) Brake lining decomposition products. *J Air Pollut Control Assoc*; 18: 824–6.
- Madl AK, Scott LL, Murbach DM *et al.* (2008) Exposure to chrysotile asbestos associated with unpacking and repacking boxes of automobile brake pads and shoes. *Ann Occup Hyg*; 52: 463–79.
- Magnani C, Terracini B, Ivaldi C *et al.* (1993) A cohort study on mortality among wives of workers in the asbestos cement industry in Casale Monferrato, Italy. *Br J Ind Med*; 50: 779–84.
- Maines R. (2005) Asbestos and fire: technological trade-offs and the body at risk. New Brunswick, NJ: Rutgers University Press; pp. 1–254.
- McDonald AD, McDonald JC. (1980) Malignant mesothelioma in North America. *Cancer*; 46: 1650–6.
- Miller BG, Jones AD, Searl A *et al.* (1999) Influence of characteristics of inhaled fibres on development of tumours in the rat lung. *Ann Occup Hyg*; 43: 167–79.
- Moore LL. (1988) Asbestos exposure associated with automotive brake repair in Pennsylvania. *Am Ind Hyg Assoc J*; 49: A12–3.
- Morgan A, Holmes A. (1980) Concentrations and dimensions of coated and uncoated asbestos fibres in the human lung. *Br J Ind Med*; 37: 25–32.
- NIOSH. (1994a) Asbestos and other fibers by phase contrast microscopy (PCM); Method 7400. NIOSH Manual of Analytical Methods. Washington, DC: National Institute for Occupational Safety and Health (NIOSH) DHHS Publication No. 94-113.
- NIOSH. (1994b) Asbestos bulk by polarized light microscopy (PLM); Method 9002. NIOSH Manual of Analytical Methods. Washington, DC: National Institute for Occupational Safety and Health (NIOSH) DHHS Publication No. 94-113.
- NIOSH. (1994c) Asbestos by transmission electron microscopy (TEM); Method 7402. NIOSH Manual of Analytical Methods. Washington, DC: National Institute for Occupational Safety and Health (NIOSH) DHHS Publication No. 94-113.
- NIOSH. (1994d) Chrysotile asbestos by X-ray diffraction (XRD); Method 9000. NIOSH Manual of Analytical Methods. Washington, DC: National Institute for Occupational Safety and Health (NIOSH) DHHS Publication No. 94-113.
- Ogden T. (1982) The reproducibility of asbestos counts. London: Health and Safety Executive (HSE) Laboratories; pp. 1–15 Research Paper 18.
- OSHA. (1994) Occupational exposure to asbestos; final rule. *Fed Regist*; 59: 40964–6.
- Paustenbach DJ, Finley BL, Lu ET *et al.* (2004) Environmental and occupational health hazards associated with the presence of asbestos in brake linings and pads (1900 to present): A “state-of-the-art” review. *J Toxicol Environ Health B Crit Rev*; 7: 25–80.
- Paustenbach DJ, Richter RO, Finley BL *et al.* (2003) An evaluation of the historical exposures of mechanics to asbestos in brake dust. *Appl Occup Environ Hyg*; 18: 786–804.
- Perkins RL, Harvey BW. (1993) Test method: Method for the determination of asbestos in bulk building materials. Research Triangle Park, NC: Atmospheric Research and

- Exposure Assessment Laboratory, US Environmental Protection Agency EPA/600/R-93/116.
- Piacitelli GM, Whelan EA, Sieber W *et al.* (1997) Elevated lead contamination in homes of construction workers. *Am Ind Hyg Assoc J*; 58.
- Richter RO, Finley BL, Paustenbach DJ *et al.* (2008) An evaluation of short-term exposures of brake mechanics to asbestos during automotive and truck brake cleaning and machining activities. *J Expo Sci Environ Epidemiol*.
- Roberts DR. (1980a) Industrial hygiene report: asbestos at allied brake shop. Cincinnati, OH: Industrial Health Section, Division of Surveillance, Hazard Occupations and Field Studies, National Institute for Occupational Safety and Health (NIOSH).
- Roberts DR. (1980b) Industrial hygiene report: asbestos: reading brake and alignment service. Reading, OH: Industrial Hygiene Section, Industry-wide Studies Branch, Division of Surveillance, Hazard Occupations and Field Studies, National Institute for Occupational Safety and Health (NIOSH).
- Roberts DR, Zumwalde RD. (1982) Industrial hygiene summary report of asbestos exposure assessment for brake mechanics. Industrial Hygiene Section, Industry-wide Studies Branch, Division of Surveillance, Hazard Occupations Field Studies, National Institute for Occupational Safety and Health (NIOSH) Report No. 32-4.
- Rodelsperger K, Jahn H, Bruckel B *et al.* (1986) Asbestos dust exposure during brake repair. *Am J Ind Med*; 10: 63-72.
- Roggli VL, Sharma A, Butnor KJ *et al.* (2002) Malignant mesothelioma and occupational exposure to asbestos: a clinicopathological correlation of 1445 cases. *Ultrastruct Pathol*; 26: 55-65.
- Rohl AN, Langer AM, Klimentidis R *et al.* (1977) Asbestos content of dust encountered in brake maintenance and repair. *Proc R Soc Med*; 70: 32-7.
- Rowson DM. (1978) The chrysotile content of the wear debris of brake linings. *Wear*; 47: 315-21.
- Sheehy JW, Cooper TC, O'Brien DM *et al.* (1989) Control of asbestos exposure during brake drum service: National Institute for Occupational Safety and Health DHHS (NIOSH) Publication No. 89-121.
- Skinner HC, Ross M, Frondel C. (1988) Asbestos and other fibrous materials—minerology, crystal chemistry and health effects. New York, NY: Oxford University Press; pp. 1-149.
- Spirtas R, Heineman EF, Bernstein L *et al.* (1994) Malignant mesothelioma: attributable risk of asbestos exposure. *Occup Environ Med*; 51: 804-11.
- Spirtas R, Keehn R, Wright W *et al.* (1985) Mesothelioma risk related to occupational or other asbestos exposure: preliminary results from a case-control study. *Am J Epidemiol*; 122: 518.
- Stanton MF. (1973) Some etiological considerations of fiber carcinogenesis. Biological effects of asbestos: proceedings of a working conference. Lyon, France: International Agency for Research on Cancer (IARC).
- Stanton MF, Layard M, Tegeris A *et al.* (1981) Relation of particle dimension to carcinogenicity in amphibole asbestos and other fibrous minerals. *J Natl Cancer Inst*; 67: 965-75.
- Stanton MF, Laynard M, Tegeris A *et al.* (1977) Carcinogenicity of fibrous glass: pleural response in the rat in relation to fiber dimension. *J Natl Cancer Inst*; 58: 587-603.
- Strom KA, Yu CP. (1994) Mathematical modeling of silicon-carbide whisker deposition in the lung—comparison between rats and humans. *Aerosol Sci Technol*; 24: 193-209.
- Sussman R, Cohen B, Lippman M. (1991a) Asbestos fiber deposition in a human tracheobronchial cast. I. Experimental. *Inhal Toxicol*; 3: 145-60.
- Sussman RG, Cohen BS, Lippmann M. (1991b) Asbestos fiber deposition in a human tracheobronchial cast. II. Empirical model. *Inhal Toxicol*; 3: 161-79.
- Teschke K, Morgan MS, Checkoway H *et al.* (1997) Mesothelioma surveillance to locate sources of exposure to asbestos. *Can J Public Health*; 88: 163-8.
- Teta MJ, Lewinshon HC, Meigs JW *et al.* (1983) Mesothelioma in Connecticut, 1957-1977. Occupational and geographic associations. *J Occup Med*; 25: 749-56.
- Timbrell V. (1980) Measurement of fibers in human lung tissue. In: Wagner JC, editor. Biological effects of mineral fibers. Lyon, France: International Agency for Research on Cancer (IARC).
- Timbrell V. (1982) Deposition and retention of fibers in the human lung. *Ann Occup Hyg*; 26: 347-69.
- Weil S, Delpire A. (1985) US EPA. (1985) Internal memorandum to A Moll, regarding asbestos exposure—brakes and ambient. Washington, DC: US Environmental Protection Agency (US EPA), Office of Policy, Planning, and Evaluation.
- Williams RL, Muhlbaier JL. (1982) Asbestos brake emissions. *Environ Res*; 29: 70-82.
- Woitowitz HJ, Rodelsperger K. (1994) Mesothelioma among car mechanics? *Ann Occup Hyg*; 38: 635-8.
- Wong O. (2001) Malignant mesothelioma and asbestos exposure among auto mechanics: appraisal of scientific evidence. *Regul Toxicol Pharmacol*; 34: 170-7.
- Yu CP, Zhang L, Oberdorster G *et al.* (1995) Deposition of refractory ceramic fibers (RCF) from the rat lung—development of a model. *Environ Res*; 65: 243-53.