UNITED STATES DISTRICT COURT
FOR THE
DISTRICT OF COLUMBIA

FRIENDS FOR ALL CHILDREN, INC., as legal guardian and next friend of the named 150 infant individuals, et al, Plaintiffs,	:	Civil Action No. 76-0544
-vs-	:	
LOCKHEED AIRCRAFT CORPORATION, Defendant and Third-Party Plaintiff,	:	
-vs-	:	
THE UNITED STATES OF AMERICA, Third-Party Defendant.	:	

Arlington, Virginia

Thursday, October 8, 1981

Deposition of JAMES W. TURNBOW, a witness herein, called for examination by counsel for the Plaintiffs in the above-entitled action, pursuant to notice, the witness being duly sworn by Claireen M. Holmes, a Notary Public in and for the Commonwealth of Virginia at Large, at the offices of Lewis, Wilson, Lewis & Jones, Ltd., 2054 North Fourteenth Street, Suite 300, Arlington, Virginia, commencing at

1:05 o'clock p.m., the proceedings being taken down by stenotype by Claireen M. Holmes and transcribed under her direction.

APPEARANCES:

On behalf of the Plaintiffs:

OREN R. LEWIS, JR., ESQUIRE
ROBERT W. LEWIS, ESQUIRE
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On behalf of the Defendant:

CARROLL E. DUBUC, ESQUIRE
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1819 H Street, N.W.
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C O N T E N T S

EXHIBITS

P R O C E E D I N G S

Whereupon,

JAMES W. TURNBOW,

a witness herein, was called for examination by counsel for the Plaintiffs, and, having been first duly sworn, was examined and testified as follows:

EXAMINATION BY COUNSEL FOR PLAINTIFFS

BY MR. OREN LEWIS:

Q. Would you state your full name, please?

A. James W. Turnbow.

MR. DUBUC: You should know, before you start, that in that description what he is going to testify to, he is not testifying on pressure differentials in the airplane. His field is the G force area. He is not going to be offered on the hypoxic decompression at this point.

MR. OREN LEWIS: Okay.

BY MR. OREN LEWIS:

Q. Now, sir, I have a report that you gave the Defendant, Lockheed, which is Exhibit D1303. Was that prepared by you, sir?

A. Yes, sir.

Q. And I may have missed it, but I don't know that I know the date of it. What is the date of it, can you

tell me?

A. It was very close to September the 8th. I may be one day, I guess, off.

Q. Well, if I were under oath and I had to say when I completed it, what date would I put?

A. September the 8th, 1981.

Q. 1981. All right. When were you asked to prepare this report, sir?

A. It would have been sometime after July the 27th -- 29th.

Q. 1981?

A. 1981.

Q. Okay. And who were you first contacted by?

A. In conjunction with this case?

Q. Yes, sir.

A. I believe that that would have been Mr. Piper.

Q. And that was on or about the 27th of July?

A. No. That would be a little earlier than that.

Q. Can you tell me when that was?

A. Probably June of '81.

Q. May or June of 1981?

A. May or June of 1981.

Q. Now, have you ever worked for the United States

as a consultant, sir?

A. Yes, sir, I have.

Q. How many times?

A. Well, I wouldn't be able to give you an exact number, I am sure, but I have done some work for the U.S. Army. I have been involved in at least one official meeting with the U.S. Air Force. Let's see. I have done some work for the F.A.A. in conjunction with one or two aircraft accidents.

Q. Anything else?

A. That is about it, I think.

Q. Did you ever work for the Lockheed Aircraft Corporation or any of its subsidiaries?

A. Not to my knowledge, prior to this time.

Q. All right, sir. And you are consultant in this case to the Lockheed Aircraft Corporation?

A. Yes, sir.

Q. Your profession at this time, sir, is as a consultant, sir? An engineering consultant?

A. That is correct.

Q. And you have been doing that since 1972?

A. Well, actually I have been doing that since about 1960, and there have been a few occasions prior to

1960 in which I have.

Q. Well, Doctor, I wasn't suggesting that you didn't have experience prior to 1972.

A. I understand.

Q. It is just that I am having difficulty understanding your C.V. and it is no doubt to me, but it says consulting experience, and it seems to suggest that you worked at various places up to '69, and then in '72 you were consultant to Sikorsky, and then after '72, it says aviation and automotive accident investigation for various legal firms.

A. Well, that would be correct as far as the legal firms.

Q. So that is why I framed the question as I did, sir.

A. However, I would point out to you that I furnished you, I believe, a copy of my vita in conjunction with this report, and that will give you a little better understanding of what all I have done.

Q. Well, sir, on the second page of your report, which is Exhibit 1303, it says -- that is a document with your picture, is that your personal brief history, sir?

MR. DUBUC: On the second page?

THE WITNESS: On the second page?

MR. OREN LEWIS: Yes. The one with your picture.

MR. DUBUC: That is at the end, I guess.

THE WITNESS: It should be in the last page.

BY MR. OREN LEWIS:

Q Well, in the copy that I have, it happens to be the second page. I don't know how it became that way.

MR. DUBUC: The exhibit that is marked has it at the end, so --

MR. OREN LEWIS: Well, whichever is the one with your picture on it, is that your personal brief history?

THE WITNESS: Yes, sir.

BY MR. OREN LEWIS:

Q And you are not speaking of anything else?

A No, sir.

Q All right. What are you doing in -- let's say in 1980. Were you doing essentially consulting work?

A That is correct.

Q For various clients?

A That's correct.

Q And has that been the case since 1972?

A Yes, and also prior to that time.

Q. I appreciate you did consulting prior to that time, but it seems that you were working in a more concentrated -- I don't know that this is true, but it seems to suggest that you were more concentrated prior to '72, the way you put it out. In other words, for example, you say in 1954 to 1959, Bellconi's Research Center (phonetic), University of Texas. Now, was that, in effect, a full-time position, sir?

A. It was full time at the University of Texas, yes, sir. That is correct.

Q. All right. And then after that, from '60 to '69, it says consultant for the Flight Safety Foundation?

A. Yes, sir.

Q. Was that a full-time position there?

A. No, sir, it was not.

Q. All right. So then that was a -- but you did act as a consultant for the Flight Safety Foundation during that period, but you did other consulting work; is that correct, sir?

A. Yes, sir. That would be correct, although 99.9 percent of it, in a period from 1960 to '69 would have been with the Flight Safety Foundation.

Q. Well, that is what I thought. It seems, the way

that this is structured, that you were primarily occupied with the companies that were described here?

A. Have I cleared it up for you?

Q. Yes, some.

Now, then it says in 1972 -- 1972, were you with Sikorsky Aircraft at that time?

A. I did some work for Sikorsky, yes, sir. That is correct. As a consultant.

Q. Now, was that full time, sir?

A. No, sir, it was not.

Q. That was as you are now?

A. That is correct.

Q. But among the clients that you had, was Sikorsky?

A. Sikorsky would have been one of my clients, that is correct.

Q. So in effect, then, from January of 1972 on, your experience as it is now, that you are a general consultant for various clients?

A. That would be correct.

Q. Yes, sir. Now, it reads aviation and automotive accident investigation for various legal firms, and that is where we see 1972 on. Which law firms?

A. I have worked for Mr. Franklin Houser in

San Antonio; I have worked for Mr. Gerald Sterns in San Francisco; I have worked for Mr. Cathcart, McGania and Cathcart (phonetic) in Los Angeles; and a number of others.

Q Now, since 1972, are your clients essentially law firms?

A Essentially, that would be correct. However, I have done some work for ~~Peter~~ Hughes's Helicopter and some work for Bell Helicopter and Sikorsky, as indicated here.

Q All right, sir.

A Let's see. I can't think of any other category that you wouldn't include under the title "law firms".

Q And is it essentially in connection with litigation, since 1972?

A Essentially, that would be correct, sir. Yes, more than 50 percent.

Q Well, what percentage is not connected with litigation since 1972?

A A very few percent.

Q So, it is well over 95 percent?

A I would say probably so, yes.

Q All right. On the basis of fees received, is the bulk of it for plaintiffs or for defendants?

A. I have worked for both. I would say the bulk would probably be plaintiff.

Q. That is in dollars?

A. In dollars?

Q. Yes, sir.

A. Yes, sir.

Q. I'm talking about in revenues.

A. Did you ask me a question?

Q. Yes, sir. I'm trying to find out, and I probably wasn't too clear as to what percentage of your consulting work, from a dollar standpoint, was received from plaintiffs and from defendants.

A. Well, again, it would be more than 50 percent, I believe, for plaintiffs.

Q. Do you know?

A. Probably -- I don't have the faintest idea. Maybe 70-30, something like that. Seventy percent for the plaintiffs, 30 percent for manufacturer, whatever.

Q. All right. But since 1972, your engineering work has been almost exclusively for litigation; is that a fair statement?

A. That would be correct, yes, sir.

Q. These involve matters that are either in court

or contemplated in going to court; is that correct?

A. That is correct. Yes, sir.

Q. How many times have you testified, sir?

A. I haven't the faintest idea.

Q. Can you give me some estimates?

A. By testifying, you mean in court?

Q. Well, I am going to break it down any way that is clear. How many times in court since 1972?

A. Well, I'd say -- this is a very crude estimate, maybe 15 times, something like that.

Q. Okay. How many times have you given your deposition?

A. Well, at least that many times, I would say.

Q. All right. So you have been in court 15 times; you have given your deposition --

A. Fifteen or 20 times, probably.

Q. -- 15 times?

A. Maybe more than that.

Q. I would like your best judgment.

MR. DUBUC: He is giving it to you.

THE WITNESS: I am giving you, you know, the best I can, and that is very crude, I want you to understand that.

BY MR. OREN LEWIS:

Q. I understand that, sir. And you have records on this, do you not?

A. Not really, no.

Q. You don't have records on how many cases or matters that you have handled?

MR. DUBUC: Asked and answered.

THE WITNESS: No, sir. I haven't maintained such records.

BY MR. OREN LEWIS:

Q. Well, you don't maintain --

MR. DUBUC: Asked and answered. He has told you.

BY MR. OREN LEWIS:

Q. What kind of records do you maintain, Dr. Turnbow?

A. Well, I have some of the depositions of which I have given, for example.

Q. Do you keep those?

A. I keep those.

Q. All of them?

A. No.

Q. Why not?

A. Well, some of them I never wound up with to begin

with.

Q. All right. Do you have records of the people that you worked for, the law firms and such, in the cases that they asked you to handle?

A. Some of them I do have, yes. Some of them I don't.

Q. What is your -- and it is no doubt on here, sir, and I -- your bachelor's degree in engineering, sir, what area is that in?

A. It is mechanical engineering.

Q. And that is machines or devices that move, in a sense?

A. That is correct, among other things.

Q. And then your master's degree is -- what is that in, sir?

A. Engineering mechanics.

Q. A refinement of the same subject, sir?

A. Yes, but -- that is a good way to put it, I guess. Sure.

Q. If it isn't -- what is your thesis in?

A. The response of a beam to an impact load. I presume you meant thesis and not dissertation.

Q. Well, I understood that a thesis was the master's

degree.

A. That is correct.

Q. And the dissertation was the doctoral.

A. That is the reason I asked the question.

Q. Okay. Response of a beam to a load?

A. Impact load.

Q. Impact load, I am sorry.

Now, what was your Ph.D. in, sir? What branch?

A. It was also in engineering mechanics.

Q. And what was your dissertation?

A. Properties of materials. Specifically, aluminum, copper at high rates of strain.

Q. Now, in your analysis of the crash here, you have on a page that is unnumbered, under the heading of analysis of G levels associated with the C5A accident near Saigon, April 4, 1975, and it says referenced used: and you have 13 items; is that correct, sir?

A. Yes, sir.

Q. Does that describe all of the information that you had at the time that you did the report?

A. Well, I am not sure that it does. In all probability, it does not.

Q. Would you tell me what else that you had that --

A. I have two base board boxes I would say probably somewhere between 30 and 40 pounds each, both full.

Q. Well, that doesn't help me much, Doctor. I'm going to want to know precisely what it is that you used and relied on in reaching your conclusions.

A. Well, precisely, that is what I used.

Q. Precisely --

A. But most specifically, the 13 items which I have listed here.

Q. Would you describe the contents of the boxes?

A. Yes, sir.

Q. In addition to these items.

A. I can't tell you.

Q. You don't have any idea?

A. I don't have any idea.

Q. Why didn't you describe it here?

A. Because these were the things that I used in the report.

Q. Well, what I am trying to find out, sir, and if I am not clear, I want you to be sure and tell me. What I am trying to find out is the data that you used, the information that you used, the facts or assumptions that you made in arriving at the conclusions that you arrived at.

So, that is where I would like to start, and I gather that you have done the same thing in effect by setting out these 13 items?

A. Yes, sir.

Q. And a casual reader would assume that these are the things that you would rely on. This is the factual basis for your report, and if it is not, I want to find out what other factual basis, if any, there is. And so when you talk about two boxes of materials, that does not help me at all.

A. I understand that, but I can't tell you what is in those two boxes with great detail today.

Q. Can you tell me with any detail?

A. If I would, I could -- if I could, I would. Let me see if I can think of anything that I have not listed here.

I don't think of anything at the moment that I have that I would have used certain extensively, other than what I have listed in these 13 items. Most of these boxes involve depositions and trial testimony --

Q. I understand that.

A. -- from previous trials and that is listed in item number six.

Q. Okay. Now, can you tell me, sir, where was Regina Aune located in the troop compartment?

A. Yes, sir. I think so. She was seated on the floor in the aisle about midway, lengthwise in the aisle, in much an Indian style. I believe there is one term that is used. Maybe not by Regina Aune, but one of the people describing how they were sitting.

Q. Where was Barbara Adams located?

A. She was between rows two and three on the right-hand side of the aircraft in the front of the troop section.

Q. She was between the seats?

A. She was between the seats, that is correct.

Q. All right. Who was holding Barbara Adams' hand?

A. That would have been her daughter.

Q. What is her name?

A. It is a short name, about four letters.

Q. Linda?

A. Linda, uh-huh.

Q. All right.

A. Five letters, I guess.

Q. Where was Thelma Thompson?

A. I don't know about Thelma Thompson at this point.

Q. Where was Peter Daughty, D-A-U-G-H-T-Y?

A. I don't know about Daughty.

Q. You don't have any idea where he was?

A. I just don't recall at the moment.

Q. Where was William Parker?

A. Parker would have been in the aisle, probably to the rear of a midpoint in the aisle.

Q. Where was Linda Adams located?

A. I have told you where Linda Adams was located.

Q. She was on the same side of the main aisle as her mother and next to her; is that correct?

A. That is correct. Both her mother and she were between rows two and three, Linda says, on the right-hand side.

Q. All right. Now, there is a main aisle that runs from forward to aft in this troop compartment; is that correct?

A. That is what I understand.

Q. And how many seats on each side?

A. Three. Well, that is not quite correct. There is two sets of seats up in the front, in which there are only two seats on the left-hand side of the airplane, across from the latrine.

Q. All right, sir. Now, other than that, is there any other main aisle in the forward and aft?

A. Not to my knowledge, other than the fact that in the extreme rear of the aircraft. That would not perhaps completely describe the arrangement.

Q. All right. But there is no side aisle on either side of the aircraft; is that correct, going forward and aft?

A. As far as I know, there is not.

Q. So the seats, then, are, for the main, arranged on either side of the aisle in rows of three?

A. That is correct.

Q. And then, of course, there would be an aisle or space, in any event, between the rows of seats?

A. Yes, sir.

Q. That's correct. So, when you say, for example, that Barbara Adams, she was located in the space betweem rows of seats two and rows of seats three; is that correct?

A. That is what she says, at any rate.

Q. Well, I am just trying to understand where you undertook to place her in your analysis of this.

A. I didn't undertake to place her in any place. I simply take her statement --

Q All right. Well, I want to know, did you assume that she was in that location? That Barbara Adams was in that location?

A I have assumed that, I suppose.

Q You see, I need to know what factual assumptions you made. If you didn't do that, I want to know where you placed her?

A I am happy with that.

Q All right. And you assumed that her daughter, Linda Adams, was located next to her on that same side of the main aisle in the rows -- between rows two and three; is that correct?

A That is correct.

Q All right. Now, where was Christie Lievermann located?

A She was between probably the -- well, the last rown and the next to the last row, or in about that location. It might have been between two and three or one and two, near the back of the airplane, and I believe on the left-hand side. Although, at the moment, I can't say that I recall whether it was left or right.

Q Now, you have called out row numbers. How are you counting?

A. In the first case, rows two and three were measured from the front of the plane.

Q. All right.

A. But are you talking about the Adams girls?

Q. I am speaking of Barbara Adams.

A. Uh-huh. In the second case, I used the same terminology that Lievermann used. She said rows two and three, I think, but she is referring to the back of the aircraft, at least as far as I can ascertain.

Q. All right. But let's just talk about one nomenclature, just so that we can understand, you know, when somebody does their thesis, can understand what we are talking about. And it doesn't make any difference to me whether you choose to count from the front or the back, sir, but whatever you think is reasonable. Do you want to start from the front?

A. I am happy with that, if you are.

Q. All right. I am, too.

So then the Adams women were located between rows two and three, counting from the front; is that correct, of the troop compartment?

A. That is what they say, yes.

Q. All right. And that is what you have assumed?

A. Yes.

Q. And on which side of the aisle, right or left?

A. On the right-hand side.

Q. On the right side, all right. Now, and then what row would Christie Lievermann be in, then?

A. Do we have a layout of the --

Q. Do you know the number?

A. I don't know how many rows there are at the moment, so we will have to do some counting for you here.

MR. OREN LEWIS: Would you let the record show that counsel and the witness are consulting.

MR. DUBUC: Yes. We are counting the rows.

MR. OREN LEWIS: Well, I don't know whether that requires a conference off the record.

MR. DUBUC: Okay. Let the record reflect that we have counted the rows. Do you want me to count them on the record? We can do that, too.

MR. OREN LEWIS: Well, let's do this.

Dr. Turnbow, I have a --

MR. DUBUC: Just so you know what we are counting from, we are looking Exhibit D1210.

MR. OREN LEWIS: Well, I happen to have one of those, too.

MR. DUBUC: Okay.

BY MR. OREN LEWIS:

Q. Would you do this for me, sir, take that diagram and write -- put bow or front -- is bow a better word or front for an airplane?

A. Forward.

Q. Forward? All right. Put forward for the forward portion of the airplane, would you, so that we would be able to see? Then, would you, along whichever side makes sense, let's say the closest to you, start with one, two, three, four, five, and then let's go down so that we can --

A. You want me to number them?

Q. Yes, sir. Just put numbers on those rows. May I come over there and just see how you have numbered that, sir?

So there are 14 rows; is that correct, sir?

A. That is what this diagram would indicate.

Q. All right. Now, would you then locate Christie Lievermann where you assume she was for purposes of your analysis on this diagram?

A. Well, I will give you two possible locations.

Q. Okay.

A. All right. My difficulty here is that I don't

know what she means by two or three rows from the rear. This could be a couple of places.

Q. All right. Well, just tell me where you placed her for purposes of your analysis?

A. Okay. I have given you two locations.

Q. All right. Would you describe them? Between what rows?

A. Well, they would actually come between rows 10 and 11, or 12 and 13.

Q. All right. And on the left side of the aisle, which would, in this case, be the row closest to the one who is looking at this diagram; is that correct?

A. That would be correct. Yes, sir.

Q. All right, sir. Or in other words, it would be port -- on the port side?

A. That is correct.

Q. All right. Would you put CL in those rows?

MR. DUBUC: He has already written Christie Lievermann.

BY MR. OREN LEWIS:

Q. All right. That is fine.

Between 10 and 11, or 11 and 12, and we understand for the record that it was one of those locations.

A. (Nodding head, indicating in the affirmative.)

Q. Would you put Barbara Adams in her location, since we have these numbered now? Just put BA, if you will.

MR. DUBUC: BA, okay.

BY MR. OREN LEWIS:

Q. And then you have put an LA for Linda Adams, all right.

A. Right.

Q. Now, would you put Harriet Goffinet Neill on this diagram?

A. Yes. She would have been directly across the aisle.

Q. Across which aisle, sir?

MR. DUBUC: You have established that there is only one aisle.

MR. OREN LEWIS: Oh, he means the main aisle. All right.

And between what rows of seats, sir?

THE WITNESS: Well, that would be between four and five. However, I would point out to you, you know, that while they have said rows two and three, that rows two and three measured from the end of the latrine or measured from the bulk end, and I don't know the answer to that.

BY MR. OREN LEWIS:

Q. All right.

A. But in view of the fact that Barbara Adams was on the right-hand side -- Linda Adams was on the right-hand side, if she was looking into rows, then she was looking at the end of the latrine.

Q. All right.

A. So that is the reason I come up with them located between rows four and five.

Q. All right, sir. Now, then --

A. But see, now, we are --

Q. And Harriet Neill then is between four and five on the left-hand or port side of the airplane; is that correct, sir?

A. That is correct. I will write Neill --

Q. Would you mark that HN or whatever you think is fair for that?

MR. DUBUC: Neill. He came up with Neill. That is close.

MR. OREN LEWIS: Neill, all right.

BY MR. OREN LEWIS:

Q. Now, would you locate Marcia Tate?

A. At the moment, I don't recall where she is

located.

Q. You don't know where she was; is that correct?

A. At the moment, I don't recall.

Q. All right. And would you locate Regina Aune for me?

A. Aune?

Q. Yes.

A. I can do so only approximately.

Q. All right.

A. Okay.

Q. And where did you put her, sir? May I see the document?

A. Well, I have her between rows eight and nine. That could be between nine and ten or ten and eleven.

Q. All right. But she was in the main aisle; is that correct?

A. That is my understanding, yes, sir.

MR. DUBUC: You said or between 10 or 11? Why don't you makr that to indicate --

THE WITNESS: Okay.

BY MR. OREN LEWIS:

Q. Now, where was Gregory Gmerek, spelled G-M-E-R-E-K?

A. My recollection is that Gmerek would have been somewhere in the vicinity of Aune.

Q. Well, where was he from your review of the data? Where was he located?

A. I have told you everything I can, at the moment.

Q. You don't know whether he was between the seats or in the aisle or any place, do you?

A. I believe that he was in the main aisle.

Q. All right.

A. That is the impression that I have gotten.

Q. Well, I want you to give us as accurately as you can. I want you to be as precise as you can. If you don't know --

A. This is as precise as I can, at the moment. Although, I will tell you that I am not absolutely positive.

Q. All right. Who else was in the --

A. I am not sure that they know exactly where they were, as a matter of fact.

Q. So Aune could be mistaken as to where she was?

A. She seems to be pretty clear about her location and the fact that she was sitting on the floor in about the middle of the airplane.

Q. Well, when you said "they", I presume you meant

all of them. Or do you just feel that this particular airman doesn't know where he was?

A. That is what I have referred to. Yes, sir.

Q. Well, you said "they". Who else did you have in mind when you said "they"? They means more than one to me.

A. Well, for example, Parker.

Q. Where was he? Do you know where he was?

A. To the best of my knowledge, he would have been at some point to the rear of the aircraft, relative to Aune.

Q. But you don't know whether he was in the aisle or between the seats, do you?

A. I am reasonably certain that he was in the aisle.

Q. How do you know?

A. Because he went down the aisle.

Q. He could have been thrown into the aisle.

A. Say again?

Q. He could have been thrown into the aisle, he could have walked into the aisle. I want to know how you know, if you know, sir?

A. He had gotten up in the process of attempting to move to a slide, which had begun to expand as a result of the first impact, with the intent, I believe, of deflating that slide.

Q. Who reported that? Which witness stated that?

A. I don't know which witness stated that.

Q. Where was Susan Dirge located?

A. I don't recall at the moment.

Q. Can you tell me where Dr. Merritt Stark was located? You put him on the diagram.

A. I can only give you an approximation of his location.

Q. Well, where was that?

A. It would be on the right-hand side of the aircraft, between rows of seats. He was not in the aisle. He was between rows of seats, and he would have been near the rear of the aircraft, not in the front of the aircraft.

Q. All right. And have you located Harriet Neill? I guess you have.

MR. DUBUC: Yes.

BY MR. OREN LEWIS:

Q. May I see your diagram now? So, we have located everybody that you know their location of, Doctor? Can you place anybody else on this diagram?

A. There were two of the sergeants. They were very near Aune, but at the moment, I don't think I can tell you what those sergeants' names were.

Q. How about Thelma Thompson? Where was she?

A. I don't know where Thelma Thompson was.

Q. She was between the seats, wasn't she?

A. I don't know.

Q. Well, who else -- what other adults were in the troop compartment that you know of, in addition to those we have named? You mentioned -- what are the sergeants' names?

A. There were two sergeants that we haven't talked about.

Q. Do you know what their names were?

A. At the moment, I don't recall them.

Q. And you don't know where they were?

A. They were very near Aune.

Q. But you don't know whether they were between the seats or in the aisle; is that correct?

A. They were in the aisle, is my understanding.

Q. Are you sure about that?

A. Well, that is what --

Q. I am not debating it with you, Doctor. I am just asking you if you are sure about that.

A. Well, I guess I would have to say that I am as sure about that as I am about the other locations that were

given. That is what is stated in either the court's testimony or their statements.

Q. Now, what injuries did Linda Adams have?

A. She had knee injuries and those being the major injuries that she had.

Q. What did --

A. Maybe cut, bruise, that sort of thing.

Q. What injuries did Barbara Adams sustain?

A. I believe that she was one of the fatalities in the aircraft.

Q. What injury did Harriet Neill suffer?

A. I believe she had a broken collar bone and that would have been her primary injury.

Q. What would have been her primary injury?

A. The collar bone.

Q. What injuries did Christie Lievermann suffer?

A. Bruise. That is about it.

Q. And the injuries to Susan Dirge?

A. To who?

Q. Susan Dirge.

A. I can't give you any information on that at the moment.

Q. And what injuries did you say Linda Adams had?

A. Knee injury.

Q. What kind of knee injury?

A. The cartilage in the knee.

Q. Which knee?

A. Probably both. At least that is what she says. Knees, I believe.

Q. Is that the extent of her injuries?

A. Say again?

Q. Did she have any other injuries?

A. If there were other injuries, they apparently were minor.

Q. Did she sustain any cuts?

A. Possibly.

Q. Well, did she or didn't she?

A. If you want to know, we can get out her statement.

Q. I know, sir. I'm just trying to understand what it is that you used in coming to your conclusions, and I am just trying to get that.

MR. DUBUC: He is telling you.

MR. OREN LEWIS: Okay.

MR. DUBUC: He can get out the statement, if you want to look at it.

BY MR. OREN LEWIS:

Q Now, what injuries did Peter Daughty, D-A-U-G-H-T-Y, have?

A None -- say again? Say the name, I'm sorry.

Q Peter Daughty, D-A-U-G-H-T-Y.

A No. I was thinking of Boutwell, and he is one of the chaps whose name I had forgotten. Daughty, I don't recall.

Q You say Boutwell had no injuries at all?

A I don't think so.

Q All right. How about Peter Daughty, D-A-U-G-H-T-Y.

A I don't recall about Daughty. It must have been very minor.

Q And William Parker?

A I believe he was the military fatality in the troop compartment.

Q What did he die of?

A I don't have an answer.

Q Do you have any idea of the injuries he sustained?

A He was observed to have a head injury.

Q Any others?

A Well, let's see. Gmerek. If you will permit me

to ask a question here --

Q. Certainly. I am speaking of William Parker, now.

A. Say again?

Q. My question is with respect to William Parker.

MR. DUBUC: Well, you said any others, and he --

MR. OREN LEWIS: Well, I am talking about any other injuries to William Parker.

MR. DUBUC: Oh.

MR. OREN LEWIS: I am sorry if I wasn't clear, Doctor.

THE WITNESS: I don't have any further information on Parker.

BY MR. OREN LEWIS:

Q. What fractures did he sustain.

MR. DUBUC: Who?

BY MR. OREN LEWIS:

Q. William Parker.

A. What? Say again?

Q. What fractures, if any, did William Parker have?

A. I have no knowledge of his fractures.

Q. Can you describe what bones were broken, if any?

A. I cannot.

Q. Can you describe in any detail, with any precision,

the type of injuries that William Parker sustained?

A. He was observed to have a head wound, I believe.

Q. How long post-accident did he die?

A. I don't have the answer to that.

Q. Did you read his medical reports?

A. I did not.

Q. Did you see any data about his injuries?

A. I did not.

Q. Can you describe what injuries Thelma Thompson sustained?

A. I have no information on Thelma Thompson.

Q. So, you don't know? You couldn't describe that to any degree; is that correct?

A. That is correct.

Q. And you can't describe with any precision the injuries to Barbara Adams; is that right?

A. Statements were made by -- I believe it would have been Harriet Neill, but I could be mistaken on that point. But, one of the nurses, that she appeared to have a broken back.

Q. All right. When you say a broken back, the back has a number of bones and things attached to it. Are you speaking of a broken spinal column --

A. Spinal column.

Q. -- or fractured bones? What are you speaking of?

A. Spinal column.

Q. Did you make any attempt to try to analyze the type of wounds to the body that Barbara Adams sustained?

A. Well, she reports that she had the knee injuries. However, she helped evacuate the aircraft, take the children out of the aircraft, and she was ambulatory.

Q. Now, sir --

MR. DUBUC: Was your question with regard to Barbara or Linda?

MR. OREN LEWIS: I am content.

THE WITNESS: Oh, I am sorry. I am thinking of Linda Adams.

MR. OREN LEWIS: Note for the record that Mr. Dubuc reminded the witness.

MR. DUBUC: Well, note for the record that Dr. Turnbow has some hearing problems and I know you have dropped your voice once in a while, Mr. Lewis. So, if you would keep your voice up, as you ask him to, maybe he will catch all of your --

MR. OREN LEWIS: I will. And if you don't understand me or if I am not loud enough, Doctor, you tell me. I

usually haven't had the problem of being heard, but if you do have a problem --

THE WITNESS: Well, I am sure I heard you, but for some reason I was thinking of Linda Adams rather than Barbara Adams. And, I think I made the same mistake the first time you asked me about one of the Adams girls.

BY MR. OREN LEWIS:

Q. I am interested in as much accuracy as you can give me, Dr. Turnbow. I mean, it is important to me.

A. I understand that.

Q. Now, what --

MR. DUBUC: I am sure you are not trying to have him say that Barbara Adams was ambulatory and working on the airplane. I know you are not intending to do that. So, I thought I would point it out, his having already testified that she was one of the fatalities.

BY MR. OREN LEWIS:

Q. Would you tell me, sir, what wounds the body of Barbara Adams sustained?

A. I have already done that.

Q. Would you tell me?

A. Again?

Q. Yes.

A. I believe that it was -- Harriet Neill was not her name at the time, is my understanding, at any rate, observed that she was in the front of the aircraft and was in a position that would suggest to Harriet Neill that she would have had a broken spinal column.

Q. Did you look at any documents such as medical reports or body identification reports or autopsies which described with any precision the location of wounds, bruises, and fractures on the body of Barbara Adams?

A. No, I did not.

Q. Did you look at any type of reports by either a physician or a body identification person or any other person that had the responsibility to locate and point out wounds and accident marks on the persons of anybody in the troop compartment?

A. No, sir, I have not.

Q. Now, have you reviewed -- and I want to make sure that I am not confusing you. Have you reviewed any medical reports or medical data on any of the children in the troop compartment?

A. I have not.

Q. Now, for the purpose of your report, you have assumed that all of the children were in seats; is that

correct?

A. That is correct.

Q. And that they -- there were two in a seat; is that correct?

A. No, that is not correct.

Q. What have you assumed?

A. That there were one or two to a seat.

Q. All right. Well, let's find that out, then. They were all in seats, is that the assumption that you have made? Is that the basis that you have been working on?

A. That is correct. Yes, sir.

Q. All right. Now, how many were one to a seat?

A. I don't know.

Q. Do you know how many were two to a seat?

A. I don't know.

Q. Do you know how many there were in the troop compartment?

A. One hundred and forty-three.

Q. How many died in the troop compartment? I am speaking of children.

A. Maybe 144.

Well, certainly one died.

Q. Is there any report that said more than one died?

A. There was some indication that there could have been two.

Q. The collateral report said two died, didn't it?

A. I don't know whether I got that statement from the collateral report or not, but -- so, I don't remember whether the answer to your question is yes or no.

Q. All right. I see the first item that you reviewed, under references used, was U.S.A. Collateral Report, Volumes One, Two, and Three.

A. Yes, sir.

Q. So, you had the collateral material?

A. I had that material, yes, sir.

Q. All right. Now, for purposes of this report, how many children did you assume died in their seat?

A. One or two.

Q. One or two. And did you ask for any information about injuries to the children that were in the seats of the troop compartment?

A. No, sir. I have not done that.

Q. Did you ask for the medical reports and/or the death certificates or whatever documents may exist as to the adults in the troop compartment?

A. No, sir, I have not.

Q. And you didn't look at the medical reports of the surviving children or ask for any of this information?

A. No, sir.

Q. Now, do you have a wreckage distribution diagram as part of your report, sir?

A. Yes, sir, I believe so.

Q. Before we do that, let me ask the court reporter to mark this as Turnbow's Exhibit Number One. This is Defendant's Exhibit 1210, as drawn on by the witness.

(The document, Diagram of Troop Compartment, was marked as Turnbow Deposition Exhibit No. 1 for identification.)

BY MR. OREN LEWIS:

Q. Now, do you have a wreckage distribution diagram, sir?

A. I do have, yes, sir.

Q. And now if you will refer to the wreckage distribution diagram that is attached to your report, sir.

A. Yes, sir.

Q. I want to ask you some questions about this. Firstly, what photographs did you see at the time you wrote

your report?

A. Well, I had seen photographs of the initial touchdown location.

Q. Is that an aerial photograph or is it a ground level photograph?

A. Well, if it was an aerial photograph, it was taken from only a few feet from the ground. Well, correction. I believe that there were also some aerial photographs. A fairly large number of photographs.

Q. Well, you mention in item two of your references, photographs of the aircraft prior to and following the accident.

A. Yes, sir.

Q. Do you see that? Did they give you copies and did you keep copies of these photographs?

A. I have copies of some of the photographs, not all of them, that I looked at prior to writing this report.

Q. In the two boxes?

A. That is correct. Yes, sir.

Q. Firstly, how many photographs did you see?

A. Well, I can't give you an exact number, but probably -- I just don't remember.

Q. Can you give me an order of numbers? Is it more

than 100? Less than 100?

A. Maybe 50.

Q. Fifty. And I understand that that is not exact, but approximately 50; is that correct, sir?

A. That might be 25 and that might be 125.

Q. Well, that is a pretty wide range.

A. Yes, sir. I understand that is, but that is the best I can do for you right now.

Q. But in any event, you have them in the boxes?

A. No, sir. I don't have all of those. I would guess offhand that I might have 20, 25 photographs.

MR. OREN LEWIS: Mr. Dubuc, can you tell me what photographs he was furnished with?

MR. DUBUC: Yes. He was furnished with photographs used in the first trial, both color and black and white, that were marked as exhibits, and some that weren't marked as exhibits, but were in the series of, I think, series three and ten and two, if I am not mistaken.

MR. OREN LEWIS: But no photographs other than those that were marked, whether they were exhibits or --

MR. DUBUC: Well, some were not marked as exhibits.

MR. OREN LEWIS: I understand that, but all but the exhibits three, ten, and two. There were no others?

MR. DUBUC: I think that is right. Three, ten, and two series. That was before he wrote his report.

MR. OREN LEWIS: Pardon?

MR. DUBUC: That was before he wrote his report.

MR. OREN LEWIS: I understand that.

MR. DUBUC: He has seen a bunch of pictures yesterday -- last night.

MR. OREN LEWIS: You understand, Mr. Dubuc, why I am interested --

MR. DUBUC: Oh, yes.

MR. OREN LEWIS: -- in trying to see what he has seen, and I don't really want to get into any difficulty over that. I would just like to make as clear a record as we can of what he saw before he wrote his report.

MR. DUBUC: He saw those series that we had at those previous trials that were available.

MR. OREN LEWIS: Well, when did --

MR. DUBUC: I suspect he has probably seen some -- I am not sure. He may have seen some of the AAR photographs.

MR. OREN LEWIS: What do you mean by "AAR"?

MR. DUBUC: The sanitized portion was released in 1976, and was marked in the liabilities stage. I don't remember if he saw any of those part photographs or not.

They were marked in our exhibits -- depositions, but I guess they weren't used at the trial, because they weren't talking about those issues.

BY MR. OREN LEWIS:

Q. Well, sir, when was the first occasion that you saw photographs of the crash, site and the parts? I am speaking of the wreckage parts as opposed to the mechanical.

A. Well, I believe the first photographs I would have seen would have been in late July of this year. That is not correct. I have -- I have seen photographs and slides, and I believe also some motion pictures of this accident over the last couple of years, much prior to the time that I was contacted --

Q. All right.

A. -- by Mr. Dubuc here in conjunction with this case.

Q. What were the motion pictures of? The accident scene or the aerial pictures?

A. The photographs that I am thinking about --

Q. I am speaking of motion pictures.

A. I am not absolutely certain that these were motion pictures, but they were aerial scenes predominantly, that's correct.

Q And slides, you mentioned slides?

A Slides, and these would have been aerial scenes.

Q And ground level shots?

A There may have even been some ground level shots.

Q All right. And who showed those to you?

A These, I believe, would have been shown by Air Force personnel.

Q All right. And what was the occasion?

A Well, I am director of a short course, at least previously I was director of a short course at Arizona State University, in which we trained Air Force, Army, and other personnel in accident investigation, and these photographs were shown in conjunction with the short course.

Q I understand, sir. Now, just so that I can identify the short course a little better, were you the teacher in that course, sir?

A Yes. There were other teachers that I had.

Q But you were one of the principal teachers?

A That is correct. Yes, sir.

Q All right. Who brought the films to the --

A This would have had to have been U.S. Air Force people, I believe.

Q. I understand. And that would have been some of the -- but were they students or teachers, sir?

A. Say again?

Q. Would the --

A. It would have been a student.

Q. A student?

A. I believe. However, we called upon our students to make presentations --

Q. I understand.

A. -- about current events.

Q. I understand. But were there any Air Force teachers, sir?

A. Were there any Air Force teachers?

Q. Yes, sir.

A. In this class?

Q. Yes, sir.

A. There could have been, yes.

Q. I am just trying to pin down who it was.

A. Some of the teachers varied from time to time. These are elective --

Q. I understand. And when was this course given?

A. Well, it has been given since about 1958, I guess.

Q. I understand.

A. Three or four times a year.

Q. And can you give us an approximation as to when you first saw these motion pictures and still pictures involving the crash?

A. I first saw them, I think it was very shortly following the accident.

Q. Would it have been in -- we are speaking of '75 or '76, sir?

A. Yes, sir. That would probably be abour the right order of magnitude in any event.

Q. And did you say that this was at Arizona State University, sir?

A. Yes, sir.

Q. And who were the students in the class? In other words, was this for Air Force people?

A. Anybody interested in aviation safety, but Air Force, Marines, Army, Department of Transportation --

Q. I understand.

A. -- Canadian Department of Transportation, lawyers, manufacturers.

Q. I understand, sir. And approximately what was the duration of the course? Was it a semester course?

A. No. It is a two-week, seven hours a day.

Q So it was an intensive kind of a program?

A That is correct, sir.

Q With a number of lectures, including yourself?

A That is correct.

Q Who would cover various phases of aircraft accident investigation among other things; is that correct, sir?

A Yes, sir.

Q And these motion and still pictures were shown as one of the presentations in that course in which you were present?

A Yes, sir.

Q And by an Air Force officer, either a student or one of the teachers?

A Yes, sir. That is correct. And that has been done on more than one occasion.

Q Can you give me some idea of how many times that would be?

A I would say two or three times.

Q And this was -- the slides were color slides of the wreckage and that sort of thing?

A Yes, sir. I am sure there were color slides. I remember color, I think. Yes.

Q Let me show you some of the color slides, Doctor, and ask you if these are the type of pictures that --

MR. ROBERT LEWIS: Prints.

MR. OREN LEWIS: These are prints, of course, but if you could just look at those. Take your time.

THE WITNESS: Well, they are the sorts of things that I am referring to. Some of the ones that impressed me at the time, and this I remember quite specifically, were the aerial shots. It shcwed the river and the distribution of the wreckage and where the aircraft touched down.

BY MR. OREN LEWIS:

Q I understand.

A And that sort of thing.

Q But there were ground level shots of the wreckage as well?

A I am not sure about that aprticular detail. It seems to me that I remember ground level shots, as well as the aerial shots, But I could be mistaken on that point.

Q All right.

A After you've looked at several hundreds of these photographs in the case --

Q I understand.

A. It is kind of hard to tell when you saw what.

Q. Now, would there be any way to locate that material, sir?

A. I don't know of any way to do that. No, sir.

Q. The Air Force people took it back with them?

A. Yes, sir.

Q. It didn't remain part of the curriculum?

A. No, sir.

Q. Was there a program of some kind that one could look back and identify who it was that produced that?

A. No, sir. It would be possible to. There is more than one of these impromptu things, that people were discussing this particular accident, and somebody had the slides, so we put them on.

Q. I understand. Now, calling your attention to the wreckage diagram --

MR. DUBUC: That is Exhibit D9, by the way.

MR. OREN LEWIS: Thank you. Exhibit D-9? D as in "dog"? Nine?

MR. DUBUC: Yes.

BY MR. OREN LEWIS:

Q. What damage -- strike that.

Describe, if you will, the condition of the ground

in the area of the first impact. I mean, from that point to the river. You see the diagram here, sir?

A. All right. Yes, sir, I am clear on what you are asking me, but I am sot sure whether you are asking me about the nature of the terrain or --

Q. Everything.

A. What it looked like, the airplane touchdown?

Q. Everything that you are relying on as a fact on which you base your conclusions, Doctor.

A. All right. It is level terrain or essentially level terrain. In fact, I guess probably rice footage. There are some relatively small ditches, boons, that sort of thing. Various edges of some of the fields. There were some palm trees, which were shown on the diagram and there were, I think, four of these palms. The diagram shows three. It seems to me I recall that the aircraft, right-hand wing, passed through four of them. There are photographs which show the marks make by the landing gear on the aircraft as it touched down in this area.

Q. Would you put those on this diagram, where this airplane first hit the ground?

A. It would be where it says initial touchdown. It is already laid out there.

Q. And how long are the gouge marks?

A. I will have to estimate that for you. I don't know that anyone has given a specific measurement.

Q. Well, I want whatever you have concluded, that is the basis of your analysis of these facts, Doctor.

A. Well, I have not made any conclusions one way or the other as far as my knowledge is concerned of the length of those marks.

Q. Well, how deep are they?

A. Again, I would have to estimate that.

Q. Well, give me your best estimate.

A. Well, I would say that while the tires were on the ground, the depth -- if you want specific numbers here -- now, you are just trying to find out what I know about this?

Q. Yes, I am.

A. Or do you want to know what the answers are?

Q. Well, I want to find out what you know about it.

A. Well, you know, there are an awful lot of thing about this accident -- Mr. Lewis, is it?

Q. Yes, sir.

A. That pretty obviously that I don't know and an awful lot of things about this accident that nobody knows anything about, and there are an awful lot of things about

this accident that nobody is ever going to know anything about. One can spend a lifetime in looking at details of this accident and I will say, "never have scratched the surface."

You are asking me about things that are insignificant as far as I am concerned.

Q. I understand that, Doctor. You will have to forgive me --

A. I will try to find out what you want to know, and I will do my best to tell you, sir.

Q. I understand, sir, but there were a number of very small children that were hurt in this crash, and it is important that we get what the situation is, sir. And, I believe that it is a very reasonable thing for me to try to find out the depth of your knowledge.

Now, I am sorry if you feel that is unreasonable, because I really don't intend it to be.

A. No, I don't feel that it is unreasonable at all. That is the reason that I am asking you here, because if you are interested in some particular detail, I don't want to give you a wrong number.

Q. Sir, you see, this is your field, the engineering, and not mine. Now, I am a trial lawyer and I am just

interested in your knowledge of the facts, and I would like you to tell me, if you can, what your estimate of the length of the gouge marks at the point that the airplane first came to the ground, and I am speaking of that side of the river. I don't know whether that would be -- we can speak of left bank and right bank or any other reasonable way that you think would be a reasonable way to describe it. But since north is in the upper part of the diagram, I guess --

A. East bank and west bank.

Q. -- this would be east bank and west bank.

A. That is very good.

Q. Well, let's speak of east bank and west bank. On the east bank, could you tell me how long the gouge marks are in the ground, to your best estimate?

A. Could you let me take a look at your photographs that show those gouge marks?

Q. If you can't do it without looking at the photographs, I will accept that. But, I am anxious to see what you know.

MR. DUBUC: He indicated --

THE WITNESS: I can give you some crude approximations, but you will have to understand that they will

be crude.

BY MR. OREN LEWIS:

Q. You never undertook to try to analyze that; is that correct?

A. That is correct, because I don't feel that it is significant.

Q. I understand that, but if you would just give me your best estimate, how long they are.

A. If you look at the photographs, you are going to discover that the left-hand gear, and this would be the rear main gear on the aircraft, touched down first. There will be wheel marks for a distance of some 10 or 15 feet. And about the point in which those wheel marks begin to play out, you will discover that there will be wheel marks due to the right-hand rear gear.

Q. The first was to the left; is that correct?

A. That is correct.

Q. Ten to 15 feet of field marks to the left gear, and then the right gear touches down; is that right?

A. If we understand now that by 15, that is a very crude approximation.

Q. All right.

A. On the right-hand side, I would say that the

length of the wheel marks are probably less long. Again, this would be clearly shown if you look at the photographs, but the length of the marks would be somewhere, again, in the vicinity of 10 to 15 feet.

Q. On the right side?

A. On the right side, that is correct.

Q. All right. When you say right side, you are speaking of the right side or starboard side of the aircraft?

A. That is correct. Then returning to the left-hand side, both of the rear main gears broke off in this first touchdown, and the break occurred at a point -- well, it occurred in the moveable part of the oleo strut and just above, once referred to as a bogey. And if you look at the photograph, you will find that as soon as the load was removed from that left-hand moveable part of the oleo, it extended and started making a mark in the soil, and the depth of the mark is -- might be a foot deep.

Q. Not deeper than that?

A. Maybe two foot deep. Probably about a foot deep would be my guess, looking at the --

Q. Your best estimate.

A. About a foot deep, and the length of this mark will probably be of the order of maybe 20, 30, it could be

40 feet. That order of magnitude.

Q Twenty to 40 feet?

A Something like that, yes.

Q And this is the mark made by the left landing gear after the wheels broke off?

A At least a portion of the left landing gear, that is correct. In the inside of that, there will be a parallel mark, and that will be roughly the same length, should be about the same length. And that mark is most probably made by the rear inboard wheel door, landing gear wheel door. On the right-hand side of the airplane, there will be a couple of -- I say a couple, now that could be four, six, or two. Photographs will clearly show what the situation is there, but these are a couple of indentations in the soil and these are also probably made by the broken right-hand gear.

Okay. I think I have answered your question.

Q All right. Let me make sure that I understand. How many landing gear -- how many main landing gear does this aircraft have?

A Four.

Q Four. And how are they arranged on the aircraft?

A They are in tandem pairs.

Q. So there are two pairs -- excuse me, there is one pair of two on each side?

A. That is correct. Yes, sir.

Q. And are they side by side or one behind each other?

A. They are tandem. One in front of the other.

Q. All right. The reason I am asking you this, sir, is somebody -- you clearly understand it, but somebody without the background may not understand precisely what that means, so that is why I am asking that question that way.

A. Okay.

Q. So then the -- how many of the tandem gears on the left side broke off?

A. One.

Q. So then there was one set of wheels left, right?

A. That is correct.

Q. And one set of -- excuse me. And one shaft with no wheel?

A. That is correct.

Q. And which broke off, the front or the back on the left side?

A. The back.

Q. The back. So, there were wheels on the front and no wheels on the back shaft?

A. That is correct.

Q. That is with the left side. Now, how about the right side, sir?

A. The same situation.

Q. So the front gear you say were left on?

A. The two front main gears were left on.

Q. On both those sides?

A. On both sides.

Q. And they were just shafts?

A. No. No. The complete gear with all -- let's see. There would be a two, three, four, five, six, a total of 12 wheels.

Q. No, I am speaking of in the part of the landing gear where the wheels broke off, therewas just a shaft; is that correct? There weren't wheels at that part?

A. That is correct.

Q. So --

A. Apparently I didn't understand your question.

Q. I understand that. I just want to be clear. Now, the wheels were located under the wings or were they in the - I am speaking of the main landing gear, sir, or were they in

the fuselage?

A. They were in the fuselage. They attach structurally to the fuselage structure.

Q. All right, sir. Now, how long was the mark on the -- I believe you said on the left side, and I may be mistaken. There was a 10 or 15 foot wheel mark, and then there was a shaft mark, if that is a fair way to put it, which was 20 to 40 feet?

A. That is on the left-hand side.

Q. That is correct. Now, what is the shaft mark on the right-hand side? You may have said, I just want to make sure.

A. There were just two or three nicks on the ground.

Q. Just nicks on the ground. So there is no long shaft mark; is that correct?

A. That is true.

Q. And they arrange from two to six; is that correct, sir?

A. That is the way I recall it, yes.

Q. Over what distance?

A. Well, it would be about the same distance as on the left-hand side.

Q. Twenty to 40 feet?

A. Yeah, somewhere in that range.

Q. Okay. Now, did the front wheels make marks?

A. No, sir. I find no evidence of that.

Q. Did any other portion of the airplane touch the ground other than the wheels that you have described and/or the shaft?

A. The landing gear.

Q. Yes, sir.

A. The left-hand landing gear door.

Q. The left-hand landing gear door. Anything else?

A. Well, are you talking about in that particular location?

Q. Any place on the east bank.

A. Yes, I believe that there were some other pieces of the aircraft which were shed on the west bank, at least there is a possibility that that could be true.

Q. All right. What parts were shed on the east bank, sir?

A. Well, they probably would be parts associated with the landing gear doors or skin in that general vicinity of the fuselage.

Q. Well, I would like you to tell me with as much precision as you can what parts were found on the east bank.

A. I have no knowledge of what specific parts were found.

Q. Do you know how many wheels were found on the east bank?

A. No, I don't know how many wheels were found. I have seen quite a few of them, let's see, I think about at least eight or ten, I would say, just looking at the photographs.

Q. Well, there are four main landing gear, I believe, we have already established.

A. Yes, sir.

Q. Now, how many wheels does each one have?

A. Each landing gear has six wheels.

Q. So, there were 24 wheels in total in the main landing gear; is that correct, sir?

A. Yes, sir.

Q. Plus whatever is in the nose?

A. Yes.

Q. And how many are there in the nose?

A. There are four in the nose.

Q. All right, sir. Now, so you don't know how many wheels were found?

A. I don't know how many, but I have already given

you a wrong answer, and I am counting here in my mind wheels that I have seen in the photographs, and I have seen more than ten.

Q. So, you have seen --

A. I wouldn't be surprised if all 24 of the -- correction. All 12 -- well, if I see more than 10, that would be 12 in the rear gears, and I have seen four and four and some more. So, I have seen -- well, at least 10, I guess. That is about as close as I can be. But, I started to say, I wouldn't be surprised if all 12 wheels were on the east side of the river.

Q. Well, did you undertake to find that out? That is one of the things --

A. I didn't. I know that all 12 broke off on the east side of the river, and that is as far as I need to go.

Q. How do you know that?

A. Say again?

Q. How do you know that?

A. Well, I don't really care where the wheels went.

Q. I know. How do you know that they all broke off on the east side?

A. Because they took the bogeys off.

Q. And what is a bogey?

A. The bogey is the thing that the wheel is attached to, and so when the bogey goes, the wheels go with it.

Q. And were all the bogeys found for the rear wheels on the east bank?

A. Well, the left-hand bogey probably broke into several parts, at least I think that it broke into several parts. So, I can't tell you that it couldn't have been a part on the west side of the river.

Q. I just want to know if you know or not.

A. Well, haven't I told you?

Q. No.

A. I haven't told you?

Q. Was there any --

A. Then the answer is I don't know, I guess.

Q. Well, the court reporter isn't going to be able to guess, Mr. Turnbow, and I don't want to, either. She writes down as accurately as she can, which is quite accurately, everything that you or I say. And so, deductions are, I guess, for later, but I just want to try to get the data that you have and the analysis that you made.

A. Very good.

Q. Now, were there any other marks on the east bank other than those you have described from the aircraft?

A. Yes, sir.

Q. What were they?

A. Well, there were marks made by various wheels as they went forward from the initial touchdown site.

Q. Okay. And where are they located?

A. Out in front of this shaded area, it appears -- well, perhaps within the shaded area that appears in the wreckage diagram.

MR. DUBUC: Exhibit D9.

THE WITNESS: Exhibit D9?

MR. DUBUC: Yes.

THE WITNESS: I think I have answered your question.

BY MR. OREN LEWIS:

Q. Well, I am trying to find as clearly as I can, sir, what marks in the ground were on the east bank. Now, you have described -- I don't know whether you have described them all, but I want all of them.

A. No, I haven't described them all.

Q. Well, I may not have been clear, but I do want them all.

A. All right. There were also two marks that were made by the -- by the air flow into the two left-hand

engines of the aircraft, and then there is a -- there is an area that extends generally within this shaded area in Exhibit D9, and perhaps extended a little bit further than that, in which these wheels are continuing to roll or to move along the surface. There is probably also some air blast from the aircraft that has disturbed the natural straw and dust, and that sort of thing, which disappears.

Q What was the state of the field? Would you say it was a rice field? That was on the east bank?

A Well, I am presuming that it would be a rice field.

Q Was rice growing in the field at the time?

A Basically, I don't think so. No.

Q What was the condition of the ground?

A I believe it would have been dry or nearly dry as compared to what you would expect to find in a currently growing green rice field.

Q It was like a field in the United States?

A It would be like a wheat field in the United States in the wintertime.

Q Okay. Now, on the left bank -- excuse me, on the west bank, what is the dike made of?

A Say again? On the west bank?

Q. Yes, sir. What was the dike constructed of?

A. I believe it to be constructed of soil.

Q. Was it compacted?

A. I can't answer that -- well, let me ask you this. What do you mean by "compacted"?

Q. Well, I'd rather just ask you to tell me --

MR. DUBUC: Well, he is using your word. That is a pretty valid question.

MR. OREN LEWIS: I understand that, but --

MR. DUBUC: I should have asked you that three days ago.

MR. OREN LEWIS: I know you think this is amusing, Mr. Dubuc, but I don't really think that it is.

MR. DUBUC: No, I don't think it is amusing. I think it is a good question.

BY MR. OREN LEWIS:

Q. Well, let me ask you this, sir. Soil comes in varying states of compaction, does it not, depending upon where it is, what has been done to it?

A. Yes, sir, I would agree with that.

Q. Now, that may not be an engineering term, and I am only a lawyer, and if there is another word that makes more sense, I will be glad to use it. I am just trying to

understand what you understood the construction of the dike to be like.

MR. DUBUC: Can we go off the record?

MR. OREN LEWIS: Sure.

(Discussion off the record.)

(Brief recess.)

BY MR. OREN LEWIS:

Q. Sir, what was the state of the soil in the dike on the west bank of the Saigon River?

A. Well, I can give you my best guesstimate as to what it would have been.

Q. Well, did you make any -- did you make any attempt to come to any conclusion on what it was like? In other words, did you --

A. Well, I think the answer is yes, I have.

Q. All right. What is that?

A. At least as it affects this accident.

Q. That is what I mean. Would you tell me what you did?

A. Well, I have talked with Mr. John Edwards and I have looked at the photographs of the dike, and I believe it to be just an ordinary dirt dike. You asked me if it was compacted, and I am extremely doubtful that it was done with

sheet roller, that sort of thing. I have no scientific reason for giving you that answer, I guess, but it would be kind of doubtful that that was done. It undoubtedly has been compacted by people walking up and down the dike, because when dikes are built, and people walk on them, --

Q. Well, I just want to know --

MR. DUBUC: Well, wait a minute.

MR. OREN LEWIS: I'm sorry. Did you finish?

THE WITNESS: Just an ordinary dirt dike along a canal.

BY MR. OREN LEWIS:

Q. Well, I am trying to get you -- if you feel that it has any type of strength, I'd like you to tell me what you think it has and if you made any attempt, did you make any inquiry about the quality of the soil? What type of soil it was or any of that kind of stuff? Did you make any assumptions?

A. I assumed that it is soil that, you know, would grow crops and rice or --

Q. Well, soil varies widely and its quality, does it not, as far as its capacity to be compacted and how hard it gets when it is compacted?

A. Well, since there is a ditch adjacent to the field,

I would presume that the soil has been pulled out of that ditch and piled up as a dike, as contrasted as, say, going out here with a truck and hauling quarrel or calechi -- or what do you people use in this country? Oyster shell or whatever. In other words, it was dirt that was a characteristic of this field area that we're talking about.

Q Well, I just want to know, did you -- so, you have made no assumptions as to --

MR. DUBUC: He has told you what he did. He just gave you several assumptions from pictures.

MR. OREN LEWIS: Well, I don't believe that I ever suggested that it was quarrel or oyster shell or calechi.

MR. DUBUC: No. No. He says it is not that, he says it is dirt. He just said that.

BY MR. OREN LEWIS:

Q Well, can you tell me, sir, do different types of soil have different qualities as far as their capacity to be compacted and their resistance to impact when compacted?

A Yes, sir.

Q Did you make any attempt to get any understanding of what those qualities might be in the case of this

particular dike?

A. Not beyond what I have told you.

Q. All right. What did Edward tell you?

A. He indicated that it was just a dirt dike.

Q. He didn't tell you what kind of dirt, how hard it was, or anything like that?

A. No.

Q. Do you know how old it is?

A. No, I don't.

Q. All right, sir. Now, where did the airplane first hit the ground, or any part of it, on the west bank?

A. You said any part of it, didn't you?

Q. Yes, sir.

A. Well, I believe that some part of the main gear on the airplane may well have conducted -- compacted this dike, the top of the dike. I say the top of the dike, change that to read the dike.

Q. When you say some part of the main gear, which part of the main gear?

A. Well, it would be the wheels of the main gear, because those are the things that extend down the farthest fenders, and the fenders forward in that particular aircraft.

Q. So, we are talking about the front pair of landing

gear, the ones that you say still have wheels?

A. Yes, sir. That is correct. I will also tell you that there is some possibility that the nose gear also contacted this dike.

Q. All right, sir. And how do you see that, sir?

A. How do I see that?

Q. Yes. Well, how would one conclude that, or what evidence is there?

A. Well, I don't know whether -- I haven't come to a final conclusion on that.

Q. I understand.

A. And in part because of these additional photographs that have shown up.

Q. Well, there is some evidence, though, that the front landing gear struck the dike; is that not correct, sir, from the marks on the dike?

A. From the marks on the dike?

Q. Yes.

A. The front landing gear contacted the dike?

Q. Yes.

A. You said crossed it. There is no doubt in my mind that it went across it.

Q. No. I am speaking of struck the dike. I mean the

front landing gear.

A. Okay. I think we better start over on this one, Mr. Lewis.

Q. All right. I understood you to say --

MR. DUBUC: He is having trouble with front landing gear, I think. Are you talking about front mains or nose gear?

MR. OREN LEWIS: I guess I am not being precise and I apologize to you.

The front, you have told me, that the front main landing gear you felt struck the dike, and I believe you told me, and I may be mistaken, that there is some possibility that the forward landing gear --

MR. DUBUC: Nose gear.

THE WITNESS: Nose gear.

BY MR. OREN LEWIS:

Q. Nose gear, if you prefer, struck the dike; is that correct?

A. Yes, sir. That is correct.

Q. All right. And is that because of marks on the dike, sir?

A. In part, yes. That is correct.

Q. Well, what else suggests that the nose gear struck

the dike? What other evidence in addition to the marks on the dike suggests that the nose gear struck the dike?

A. Well, at the moment, I really can't think of any other evidence.

Q. The only reason I ask the question, sir, is because you said "in part" and I --

A. I understand, but what other evidence do I have that the nose gear might or might not have struck the dike other than --

Q. I thought you said the most recent photographs that you saw.

A. Well, that is correct. These recent photographs show the dike to a little bit better detail than we have ever seen them before.

Q. Have you ever seen the movie?

A. I have seen the movie, yes, today for the first time, but --

Q. Well --

A. Standby. The movie that I think you are referring to I have seen today for the first time.

Q. Well, I am speaking of the one that I most recently obtained a copy of, and there were, for your information, two of them. One of them is a shorter one.

MR. DUBUC: That is the one he saw.

BY MR. OREN LEWIS:

Q. The shorter one is one showing apparently an attempt to fly over the crash scene directly; it is the smaller one. Then there is a larger one, which has a number of other scenes, apparently including that one scene in it.

A. Well --

Q. What did you see?

A. Let me clear up one point, if I may.

Q. Yes, sir.

A. I told you previously that I think that I could have seen some movies of this accident site.

Q. Yes, sir.

A. And it is possible that the movie that I saw may have been one of these movies taken from a helicopter in which they flew the flight path.

Q. And so they looked the same?

A. Well, I just don't remember that much detail about --

Q. I understand.

A. -- what I looked at previously. So, I can't tell you whether it looked the same or not.

Q. Well, it is the same sort of movie; is that

correct, sir?

A. Yes. The sort of thing that I remember is yes, it would have been the same kind of movie.

Q. Okay. So, it was from the movies and the most recent pictures that you saw which were the ones that you saw either last night or this morning; is that correct, sir?

A. That is correct. This morning.

Q. That suggest evidence that the nose gear may have struck the dike; is that correct?

A. Well, it really doesnt suggest evidence that the nose gear struck the dike. It appears to be some disturbance in the top six inches of the dike, I will say, that would suggest that maybe something struck the dike.

Q. All right, sir.

A. And in view of the fact that this wreckage diagram, they bring the impact -- when I say they bring the impact area, let me see what it says. It says debris area. That is all it says. Debris area right up to the dike, and that would suggest to me that maybe somebody thought that the dike was involved.

Q. All right. What was the terrain on the west bank?

Was it like a wheat field in the winter?

A. No, sir. It would have been more like a rice field with water in the field, and that might not be true of all areas of that field over there. See, this airplane went something like a third of a mile or better, but generally speaking, at the time of the accident, I believe there would have been a great deal of water in that field.

Q. All right. All the way up to the dike?

A. Yes, sir.

Q. Including all that shaded area? That is what's called the debris area; is that correct?

A. Yes, sir, generally --

MR. DUBUC: Are we referring to Exhibit D9 now?

MR. OREN LEWIS: Yes, sir. And I am speaking of the west bank now.

So the terrain, for all practical purposes, was the same through the debris areas; is that your understanding?

THE WITNESS: More or less. There was different amounts of vegetation in some fields than in others.

BY MR. OREN LEWIS:

Q. Was there rice under cultivation?

A. I am not sure about that. I am not an expert on

rice farming.

Q. Well, was there any kind of a crop that looked like grain growing in a field?

A. Well, I have seen some of the photographs, and it would suggest to me that yes, there was something growing there, but I am not sure. I am not sure when those photographs were taken.

Q. Well, you used the expression rice field earlier. I was just curious --

A. Well, it wasn't corn or maize or cotton, at least -

Q. Well, were they rice fields or not, sir, in your judgment?

A. Say again?

Q. Did you conclude that those were rice fields or not?

A. I considered that they were rice fields. Sure.

Q. All right, sir. Now, I would like you to describe your understanding of the -- is gouge mark a fair way to put what the type of mark that the wreckage makes when it travels across the ground?

A. Yes, sir. That is descriptive.

Q. If there is another word, I am willing to use that. I just want to make sure we are on the same wave

length, sir.

A. That is quite a description.

Q. All right. Now, I'd like you to describe the gouge marks and you notice there is a diagram -- this is the Air Force diagram; is that correct, sir?

MR. DUBUC: It is Exhibit D9.

THE WITNESS: Yes.

BY MR. OREN LEWIS:

Q. Exhibit D9. And you see where it says impact?

A. Yes, sir.

Q. And it points towards the dike; is that correct, sir?

A. Yes, sir. That is correct.

Q. And then --

A. Although observe that the arrow is going to the west side of the dike.

Q. Well, it looks to me like it's pointing to the dike.

A. Well, it curves up and points directly towards the west side of the dike.

Q. All right. You disagree with that?

MR. DUBUC: Well, he has stated what it is.

MR. OREN LEWIS: Well, I just want to know --

MR. DUBUC: Does he disagree with what?

MR. OREN LEWIS: That the second impact was pointed out by this arrow.

THE WITNESS: I don't disagree with it, no.

BY MR. OREN LEWIS:

Q All right. Now, from the point there on the dike, how far was the -- did the gouge mark go?

A Well, it depends.

Q From the dike.

A Well, it depends upon, of course, what piece of the aircraft you are talking about.

Q Well, going from east to west on the west bank, was there more than one set of gouge marks?

A Yes, sir.

Q All right. How many gouge marks were there?

A I don't recall by sets, and I assume you mean parallel rows?

Q Yes, sir.

A Well, that would be rather difficult to answer that question.

Q Well, would you do the best that you can?

A Well, we can start with one, and there is one path at least within which there appears to be more than one

individual mark.

Q. All right. How far does that path extend?

MR. DUBUC: Were you finished?

THE WITNESS: (Nodding head, indicating in the affirmative.)

MR. DUBUC: Okay.

BY MR. OREN LEWIS:

Q. How far does that one path extend from the dike going west?

A. Well, if you go with the troop compartment, then the distance is something like around 650 yards, or about -- I get 1,950 feet, just scaling the diagram. Other people have gotten, I think, a little higher.

Q. All right. Is there an unbroken path of gouge marks from the dike to where the troop compartment ended up?

A. Well, I don't think the path is unbroken. It is somewhat variable, of course.

Q. Well, how much are there tracks, gouge marks, that lead from the initial impact point to where the troop compartment ended up, unbroken?

MR. DUBUC: Unbroken?

MR. OREN LEWIS: Yes.

THE WITNESS: Well, I think any individual gouge marks would necessarily have to be broken, because of the way the aircraft separated.

BY MR. OREN LEWIS:

Q. All right. Well, how did the aircraft separate?

A. Well, into several major components, and then, of course, to a relatively large number of smaller components.

Q. All right. Well, where did the airplane separate?

A. Well, it separated after the cockpit section.

Q. Well, no, I am speaking -- I am sorry. Would you show me --

MR. DUBUC: In other words, you're asking him where it separated in terms of a point from the dike? Is that what you're asking him?

MR. OREN LEWIS: Where on the ground.

MR. DUBUC: Where on the ground.

THE WITNESS: Where on the ground. Yes, sir.

MR. DUBUC: He has got it.

BY MR. OREN LEWIS:

Q. Well, would you take that diagram that you have in front of you, sir, and put an "X" at the point where the airplane broke apart?

MR. DUBUC: Well, this is his. If you are going to mark this, this is his. Do you want to mark a copy of the diagram rather than -- this is on his report.

MR. OREN LEWIS: We can use this one.

THE WITNESS: First, that cannot be done with one X mark.

BY MR. OREN LEWIS:

Q. Here, Let me pass this to you, sir, and --

A. I can show you where the separation started.

Q. All right. Put an X-1 where the separation started.

A. Okay. I have done so.

Q. May I look over your shoulder just so that I can coordinate with you, sir?

A. Yes, sir.

Q. And you have put an X at the dike; is that correct?

A. That is correct.

Q. Would you put a 1 --

A. I put an x sub-one.

Q. X-1, okay. And then what happened after that?

A. I am not sure that I understand the specific question.

Q. Well, we were talking about gouge marks, and you --

A. Yes, sir.

Q. -- said that the plane began to separate or break apart, I guess, is what you mean.

MR. DUBUC: No, that is not it.

THE WITNESS: No, that is not quite descriptive.

BY MR. OREN LEWIS:

Q. Well, at what point on this diagram, going from east to west, did the tail break off?

A. I can only give you a range of values.

Q. What is the range?

A. Well, the range of values, of course, are between the dike and the point at which the tail came to rest.

Q. But you can't come any closer than that; is that correct?

A. Well, I can tell you that it wasn't at the dike, I think. Extremely unlikely. And that it wasn't at the point in which the tail came to rest.

Q. But you cannot do any better than that; is that correct.

MR. DUBUC: You are asking for his best estimate?

MR. OREN LEWIS: I am asking if he has made a calculation of where that happened.

THE WITNESS: I have not made any further estimate than that.

BY MR. OREN LEVIS:

Q All right. At what point, going from east to west, did the flight deck break off a hull?

A Well, if this diagram is correct --

Q I am not representing that it is. I am only representing that it is the Air Force's diagram.

A I understand, but we have to start with fomrthing. If this diagram is correct --

Q Have you assumed that it was correct?

A I have assumed that it is generally correct, but it may not be correct in all details.

Q Well, let's correct it, then, by your judgment first. And where is the diagram incorrect, in your opinion?

A I don't know that.

Q So, you didn't make any attempt to verify and see whether this diagram was correct; is that right, sir?

A I don't know any way that I could verify that.

Q Well, I am not --

A No.

Q -- I am just saying that you never took the photographs or made any calculations or tried to measure the

location of the parts or gouge marks or anything like that?

A. No, sir. I have not done that.

Q. All right.

A. Generally that these records of distribution patterns are generally pretty good, at least -- as done by the Air Force, they are generally pretty accurate with regard to those components that cannot be easily picked up and moved by someone.

Q. Well --

A. I haven't answered your question, I guess.

Q. No, you really haven't. Would you tell me -- I believe you told me, sir, that you felt it was generally correct, but it may not be correct in all details; and I was just asking you what details might not be correct.

A. Well, I am just assuming that, you know, if I say that it is correct, then you are going to call me on the carpet on the witness stand and --

Q. If it isn't --

A. -- describe that that means every last detail, and I would be -- I am not a betting man, but if I were, I would maybe bet that --

Q. That it isn't correct?

A. Someone could find a little detail here that might

not be quite right.

Q. Well, are there major details in which it is not correct, or is it correct in all material details?

A. Is it correct?

Q. In all material details.

A. I have assumed that --

Q. That it is?

A. In -- the major part is correct, yes, sir.

Q. Major isn't a very scientific word, and we lawyers may use it, but you engineers don't ordinarily, and I am trying to say when you say "major", is it --

A. Well, yes, I find a discrepancy here, I think.

Q. All right. Where is that?

A. This diagram shows -- the way I would interpret it, three broken trees. That is what the arrow says --

Q. All right.

A. -- and I think the photographs show four. Now, I could be in error about that, but if you want to find out, we can look at the photographs right quick and straighten that out.

Q. All right. So, there are four broken trees?

A. Yes.

Q. Anything else?

A. I don't think I have observed anything else.

Q. And are the four broken trees in a row?

A. Yes, sir. They are in a row.

Q. And there are four and it is in unbroken sequence? In other words, there are four broken trees in a row?

A. I believe that that is correct, yes, sir. That is my recollection.

Q. All right. And then any other discrepancies that you have observed?

A. As I have stated before --

Q. In Exhibit D9?

A. -- I have not observed any, and I have not checked for any.

Q. All right. Do you see the flight deck, for example, the tracks leading up to it are shown in an arc?

A. Yes, sir.

Q. What is that arc?

A. What is that arc?

Q. Yes.

A. It is just the path followed by the flight deck.

Q. Well, did you measure the degree of arc?

A. No, sir, I have not measured the degree of arc.

Q. Now, when the airplane struck the dike, would you

draw an arrow for me in the river side of the dike as to the direction of flight of the aircraft?

MR. DUBUC: The question, I object to the form. It is suggesting the airplane rather than the wheels. You mean the wheels struck the dike? That is what he's testified to.

MR. OREN LEWIS: Mr. Dubuc, I have always thought that the wheels were a necessary component of airplanes.

MR. DUBUC: All right.

MR. OREN LEWIS: Particularly this one.

MR. DUBUC: Why don't I go ahead and assume later that it was the airplane and not the wheels? You mean any part of the airplane?

MR. OREN LEWIS: Yes, but I am interested in -- the question is on the flight path, the direction of travel of the aircraft, and just prior to the time that it impacted with the dike or any part of it impacted with the dike.

THE WITNESS: I am going to ask you to ask that question again.

BY MR. OREN LEWIS:

Q I would be happy to.

A You are talking about the whole aircraft, at least --

Q. Well, if I took a piece of paper, sir, and I drew a little airplane on it --

A. Yes, sir.

Q. -- and I used my heavier line for the direction of travel, I am going to put a little arrow in the front of the airplane; can you show me, sir, which direction the airplane was going when it struck the dike or any part of it struck the dike?

A. Yes, sir.

Q. All right. Would you --

A. Do you want me to draw this on the diagram?

A. Yes, I would.

All right, sir. Now, would you draw a dotted line leading up to the point that any part of the aircraft struck the dike?

A. All right. I have done that.

Q. Now, have you done that as precisely as you can?

A. There could be nothing considered to be precise about what I have done here.

Q. All right. I am just trying to get the line of travel just as good as I can.

A. This is generally from east to west.

Q. All right. Assuming that the arrow here is due

north, was the airplane flying due west?

A. Very nearly.

Q. Well, what degree west was it going?

A. What degree from due west?

Q. Yes.

A. Do you mean --

Q. Well, I mean it was heading west and if north is zero and south is 180 degrees --

MR. DUBUC: He is drawing it based on the arrow being north.

THE WITNESS: 270 degrees, and that could be 275 degrees or --

BY MR. OREN LEWIS:

Q. From 270 to 275?

A. 270 plus or minus 10 degrees I would say would probably do it.

Q. That is 20 degrees. You can't tell me within the 20; is that right, sir?

A. Well --

Q. You can't make it finer than 20 degrees?

A. 270 plus or minus one, but I don't know how accurate that it.

Q. Well, I want you to be as accurate as you can, sir.

MR. DUBUC: Well, Mr. Lewis, you are asking him to draw it based upon an arrow on the diagram, and that is what he has given you the estimate on. He is not able to give you the exact degrees unless you want to have a compass at the place and check whether north is north. But he has given you a reference as you asked him to from the indicated direction of north.

MR. OREN LEWIS: I understand that, and I am assuming that north is as precisely indicated on this chart here, because the grid lines are oriented --

MR. DUBUC: Right.

MR. OREN LEWIS: -- north and south, east and west; is that correct, sir?

THE WITNESS: The grid lines are oriented -- that is what this diagram would indicate, yes.

BY MR. OREN LEWIS:

Q So I want you to assume then that the grid lines are accurate, that north is where it is and east is in the direction to the right, and west is the direction to the left. And so assuming that that is correct, then, I'd like you to tell me as closely as you can, from your understanding of the data that you have reviewed, the direction of the airplane just immediately prior to its

touching the dike.

MR. DUBUC: As indicated on this diagram?

BY MR. OREN LEWIS:

Q. Yes, sir. Or your analysis, if you think it is wrong or anything like that, you can correct that, too. I am just trying to get the direction of travel.

MR. DUBUC: You have asked him twice, and he has answered it, and he has also drawn a line.

MR. OREN LEWIS: He has a 20 degree spread --

MR. DUBUC: That's right.

MR. OREN LEWIS: -- and I am just asking him if he can close it any. If he can't, I understand that. I am not going to argue with the witness.

THE WITNESS: Well, I have not done any analysis on this, other than what we have done here in a couple of minutes today. And you know, it is ridiculous to think that I could be more than maybe plus or minus ten degrees.

BY MR. OREN LEWIS:

Q. All right. Then that hasn't been part of your calculations, sir?

A. No, sir.

Q. All right. You just have to excuse me. I didn't, you know, I thought that you would try to calculate

how the parts ended up by the direction of travel. And that didn't have anything to do with it?

A. No, sir. It does not.

Q. All right. Now, how long is the gouge mark or path of wreckage leading from the dike in an unbroken sequence?

A. In an unbroken?

Q. Yes, sir.

MR. DUBUC: You have asked him that before. he said there isn't one, there are several marks.

MR. OREN LEWIS: I thought he said there was a path made up of several marks.

MR. DUBUC: He said there were several paths and he gave you an example of one. Now, you have asked him and he's answered it.

MR. OREN LEWIS: Well, I misunderstood the witness and I am sorry, Doctor, but are there several paths leading from the dike?

THE WITNESS: Well, there is one, of course, general major path.

BY MR. OREN LEWIS:

Q. That is what I thought you said.

A. And within that path, there are numerous marks.

If you try to follow one mark in an aircraft accident -- generally, this is going to run out, but something will pick up over here and continue for a while, and something else will pick up and continue for a while.

Q. I understand.

A. So, I really don't understand quite what you are asking me. And --

Q. I just want to know --

A. -- I don't think it is important.

Q. The path that you have through here, on this chart, D9, which is Defendant Lockheed's exhibit --

MR. DUBUC: That he has.

MR. OREN LEWIS: Well, he has attached it to his report.

MR. DUBUC: He didn't refer to the chart.

MR. OREN LEWIS: No, we know the Air Force did it.

MR. DUBUC: Okay.

MR. OREN LEWIS: But you did attach it to his report, and I have assumed that he has relied on it. We will never finish the deposition at that rate.

I just want you to tell me, sir, do you see the line that goes from the dike out away from the dike?

THE WITNESS: Yes, sir. I see that.

BY MR. OREN LEWIS:

Q. And you see there is a break past that?

A. Yes, sir. I do.

Q. All right. I want you to tell me, if you can, how long that path is as shown here?

A. All right. I am going from the point that I have marked X-1 --

Q. Yes, sir.

A. -- out, roughly 273 degrees to the end of a mark that appears in the diagram, which may or may not be a "path" but it ends about midway between 1225 and 1400 yards --

Q. Have you --

MR. DUBUC: Wait a minute, he is not finished.

MR. OREN LEWIS: I understand he is going to calculate the measurement.

You didn't do that before; is that right?

THE WITNESS: No, sir. Do you want a number?

BY MR. OREN LEWIS:

Q. Yes.

A. All right. And it goes a little further than midway, and I would say it goes about 55 percent of midway.

Do you want this in yards, feet, miles?

Q. Feet. Feet.

A. Well, I came up -- I come up with 663 and three-quarters feet.

Q. All right. Would you write 663 feet on the diagram that you have in front of you to indicate the area and also write the 273 degrees?

Now, would you write an X-2 at the end of that line there? In other words, the western end of it?

A. Well, I've got the X-2 and you asked me to do something else?

Q. Put the degrees --

A. 200 and -- what did I say?

Q. 273.

A. All right. I have done that.

Q. All right. And you put the 663 feet, right?

MR. DUBUC: And three-quarters.

THE WITNESS: And three-quarters.

BY MR. OREN LEWIS:

Q. All right. Now, from the point X-2, sir, -- let me make sure we are speaking of the same thing. Would you put an arrow or something? I just want to be clear.

All right. From point X-2 to the troop compartment, is there any gap in the gouges?

A. Do you mean in the diagram?

Q. Or on the ground?

A. Or on the ground.

Q. On the ground.

A. In the diagram, there would be a gap.

Q. And how big is the gap on the diagram?

MR. DUBUC: Wait a minute, He is not finished.

THE WITNESS: On the ground, there will be no gap.

BY MR. OREN LEWIS:

Q. All right. On the diagram, how much is the gap that is shown on the diagram? In other words, how many feet?

A. I get 236 and a quarter feet.

Q. 236 -- pardon, sir?

A. And a quarter feet.

Q. All right. And would you show -- put an X-3 at the beginning of the mark shown that leads to the troop compartment, would you do that?

A. Okay. Well, I am not being terribly accurate here. It is going to be really a little less than that number that I have given you, so I will correct it.

Q. What is the distance?

A. Standby. (Pause) It is about 233 feet.

Q. All right. And would you write on there showing the gap shown here of 233 feet?

MR. DUBUC: This is the gap based on the marks on D9.

BY MR. OREN LEWIS:

Q. Yes, sir, and then an X-3 at the point that they show that.

A. Standby. I think I have made an error here. (Pause) I think I have made an error. It is 210 feet.

Q. All right. You have an X-2 to X-3. I want an X-3.

A. You want an X-3 down here?

Q. No. Let's keep them all on the same side.

A. All right.

Q. And just draw an arrow to the point that that goes to.

A. Okay. Go ahead.

Q. I'm sorry, sir?

A. I said go ahead.

Q. All right. Now, what is the direction, compass direction, true direction, from X-2 to X-3?

A. Well, there is a compass direction from X-2 to X-3.

Q. Yes.

A. Just between these two points, that is all you want?

Q. Yes, sir.

MR. DUBUC: As shown on D9?

MR. OREN LEWIS: As shown on D9.

MR. DUBUC: Well, you realize that he doesn't have a compass on his, so I think I will object to having him try to estimate without a compass.

BY MR. OREN LEWIS:

Q. Can you do that?

A. Well, I can estimate. It will be, you know, an estimate, but --

MR. DUBUC: I am going to object to having him do this without a compass.

MR. OREN LEWIS: He said he can do it.

MR. DUBUC: Without a compass?

THE WITNESS: Well, as long as you understand that it is without a compass.

MR. DUBUC: I want to confer with him.

MR. OREN LEWIS: Let the record show that counsel is conferring with the witness.

MR. DUBUC: I'm conferring with him as to whether

he can do it or not.

All right. If you can do it. Recognize that it is an estimate.

MR. OREN LEWIS: I understand that he has no compass.

Did you do the estimate of the --

MR. DUBUC: He is still doing it.

THE WITNESS: Okay. And you want me to write that down here?

BY MR. OREN LEWIS:

Q Yes, if you would.

Q Do you want me to draw that line in here?

Q No. No, just leave that, because the apparent gap may be obscured here, and I don't want to do that. If you can indicate that without -- or just write on the side you know, from X to X is so many degrees.

MR. DUBUC: He has got it in the corner.

MR. OREN LEWIS: That is fine.

So that is 2.96.56 degrees true; is that your estimate?

THE WITNESS: That's correct.

BY MR. OREN LEWIS:

Q All right. Now, what is the arc in the -- well,

would you put an X-4 at the eastern end of the troop compartment as shown there?

MR. DUBUC: On D9?

MR. OREN LEWIS: Yes, sir. On D9.

THE WITNESS: Yes, sir.

BY MR. OREN LEWIS:

Q. Now, X-3 and X-4 is shown as an arc on this diagram; is that correct?

A. At least there is an arc down between these two points, yes, sir.

Q. All right. Did you measure that arc?

A. By measuring the arc, do you mean --

Q. Showing the degree of arc?

A. Well, you will have to tell me what you mean by that. Do you mean the term the radius curvature of the arc?

Q. The radius, yes.

A. And define the angle?

Q. Yes, sir.

A. No, sir, I did not.

Q. Now, would you describe the wreckage of the troop compartment after it came to a rest?

A. Yes, sir.

Q. Would you start with the front?

A. Fron of the troop compartment?

Q. Yes, the forward end, exterior. What parts of the structural members, if any, of the aircraft were attached to the remains of the troop compartment?

A. Well, there is a truss like structure at the forward end of this piece of the airplane, which has been referred to as the troop compartment. That truss, I don't think, is in the troop compartment properly.

Q. Well, I am not suggesting that it is. But just so we can have common nomenclature to the Exhibit D9, has a structure identified as troop compartment. Do you see that, sir?

A. Yes, sir.

MR. DUBUC: That is what he is telling you.

BY MR. OREN LEWIS:

Q. I understand that. And so that piece of the airplane --

MR. DUBUC: That is what he is describing.

THE WITNESS: That is what I am talking about.

BY MR. OREN LEWIS:

Q. All right. Would you describe the truss that was attached to that portion of the airplane?

A. Yes, sir. It is a typical open truss.

Q. How many members does it have?

A. I wouldn't have the faintest idea without looking at the photographs.

Q. What was the function of that truss?

A. I am not sure.

Q. And when you say truss, you are speaking of something that looks like a series of --

A. Bridge truss.

Q. Like a bridge truss, sir?

A. Yes, sir.

Q. And was that on the same level as the troop compartment? I mean, was it on the same level as the passenger seats in the troop compartment?

A. Well, I can't answer that. If you are talking about, you know, plus or minus six, eight, twelve inches, and that sort of thing.

Q. Yes.

A. Generally, it is on the same level. Generally, it is on the same level.

Q. All right. I am speaking of generally, sir.

Now, were any of those truss members, and I am speaking of the individual beams, if that is a reasonable word to use, deformed?

A. I don't know.

Q. Did you undertake to find out?

A. I have looked at the photographs and I didn't see any apparent deformation, but I didn't look to see whether there were some that were deformed or not deformed. Just a casual observation.

Q. All right. That wasn't part of your study, then; is that correct?

A. That is correct.

Q. Did you see that photograph before you wrote your report?

A. I don't think so.

Q. Well, describe the photographs that you had available to you of the troop compartment at the time you did your analysis and wrote your report.

MR. DUBUC: We have already covered that. The series that he told you about.

MR. OREN LEWIS: I want him to tell me what pictures --

MR. DUBUC: Describe pictures?

MR. OREN LEWIS: Yes, what he saw of the troop compartment. That piece of the airplane.

Did it include any views of the truss section that you described?

THE WITNESS: I don't recall whether it did or not.

BY MR. OREN LEWIS:

Q. What hold the wings to the hull?

A. I don't know.

Q. Is there some kind of a structural member?

MR. DUBUC: He said he doesn't know. What is the next question? You have asked him and he has answered.

BY MR. OREN LEWIS:

Q. You have no idea of whether there was any kind of a structural member holding the wings?

A. Oh, yes. Yes, I have an idea about that.

Q. I feel sure you do, and Mr. Dubuc says you don't.

MR. DUBUC: Well, you asked him specifically what one does, and you said does any, and he says he hasn't an idea about any, but he does remember a specific one. I think that is what he is saying, but go ahead. Do you know the question? Do you understand the question?

THE WITNESS: No, I will have the question again, if I may.

BY MR. OREN LEWIS:

Q. All right, sir. I understand that --

MR. DUBUC: Let's have the question.

MR. OREN LEWIS: Mr. Dubuc, allow me to -- he wants an explanation.

MR. DUBUC: No, he just wants the question, not an explanation. What is the question?

THE WITNESS: What is the question?

BY MR. OREN LEWIS:

Q. All right. Is there any kind of a structural member shown in the photographs that you have seen which has as its primary function the attachments of either the wing to the airplane or that are part of the wing structure?

A. I don't know.

Q. Do you know whether the wings broke off at any time from the hull of this aircraft?

A. At least the wing and the spar, a portion of the fuselage immediately above and below, and the wing separated at some time.

Q. Do you know at what time it separated?

A. No, sir. I don't.

Q. And you wouldn't know in what point of travel between X-1 and X-4 the wing separated?

A. As to a specific point?

Q. Yes, sir.

A. No, sir, I don't.

MR. OREN LEWIS: Could we take a two-minute break?

(Brief recess.)

BY MR. OREN LEWIS:

Q. Sir, at the time the wings separated from the hull, how many engines were still in place?

A. I have not looked at that. I don't know the answer to that.

Q. Well, where, at what point, between X-1 and points west, going from X-1 west, did the first engine separate from the wing?

A. I have not looked at that detail.

Q. How strong is the connection between the engine and the wing? In other words --

MR. DUBUC: You mean what the strength of the material is?

MR. OREN LEWIS: Yes. In other words, what kind of force does it take to tear the engine off of the wing?

THE WITNESS: About the same force it would take to tear the engine out of a Cessna two-place 150. I could be wrong about that. I don't have an answer to that.

BY MR. OREN LEWIS:

Q. How much force does it take to tear the engine out

of a Cessna two-place 150?

A. I don't have an answer to that pretty accurately. You know, it is a six or seven G airplane at most, and I am just anticipating that this C5A is at least a six G airplane.

Q. All right. Was that one of the assumptions that you made in your preparing your report, sir?

A. No, sir. I doesn't have anything to do with my report at all.

Q. Well, do you know how many Gs the airplane would take before it would be expected to break up structurally?

MR. DUBUC: I object. He says it's got nothing to do with his report, so what is the relevance of it, Mr. Lewis?

MR. OREN LEWIS: If you will forgive me, I don't think I have to have everything relevant. It only needs to lead to relevant evidence, and I don't think I have to explain, Mr. Dubuc.

MR. DUBUC: Oh, yes. Yes, if I object to the form of the question and if I call for relevance or anything leading to relevant information. He has already said he didn't use the figure or the concept in reaching his figures. It doesn't have any relevance and he said that. So, all

this does is prolong the deposition. That is the point, and we know we have -- I have already told you, we have a 6:15 airplane, and certainly Dr. Turnbow wants to make that. And so we will go on until at least 5:15 or whatever.

MR. OREN LEWIS: I am going to suspend at 5:15 so that the gentleman can catch his airplane.

MR. DUBUC: Well, no, I am not willing to bring him back, because you spent the entire -- almost three hours now on many things that doesn't have anything to do with his field, and that is what he is here for.

MR. OREN LEWIS: Mr. Dubuc --

MR. DUBUC: This is not overall discovery, it is pretrial examination of an expert. This is not general pretrial discovery.

MR. OREN LEWIS: Mr. Dubuc, I think I have a right to find out what he considered and what he didn't and --

MR. DUBUC: Well, if you would --

MR. OREN LEWIS: Let me finish, Mr. Dubuc, please.

MR. DUBUC: That would shorten it.

MR. OREN LEWIS: You won't let me finish? Now, you just talk on and let me know when you are finished, and then I will start.

MR. DUBUC: Well, it certainly would shorten it if you want to ask him what he has considered and what he didn't consider. As you know, the rule on expert witnesses is not quite the same as Rule 30 and Rule 26. It isn't general discovery. It is defined and restricted to certain things as to what his opinion is and what he based his opinion on and what factors he considered, and the reasons for it. It is not general discovery.

MR. OREN LEWIS: Just tell me when you are finished.

MR. DUBUC: I am finished.

MR. OREN LEWIS: Mr. Dubuc, the gentleman said that he assumed that this was a six G airplane.

MR. DUBUC: And he also stated that it had nothing to do with his opinion. He is assuming for the purpose of your question, but not for his opinion. He has told you that already.

MR. OREN LEWIS: Mr. Dubuc, you and I can debate all the way to 5:15 and if you want to use the time that way --

MR. DUBUC: My statement on the record is saying what is your next question, Mr. Lewis?

BY MR. OREN LEWIS:

Q. My question is, sir, how do you come to the conclusion that this is a six G airplane? Did anyone tell you that?

A. No. No one has told me that.

Q. But that is your judgment; is that correct?

A. I anticipate that this airplane would generally meet F.A.A. requirements for transport type aircraft, and perhaps a little bit more so that possibly the airplane might be as strong as six Gs.

Q. But as an engineer, you would expect the airplane to be able to take six Gs before it began to destruct?

MR. DUBUC: I object. He has just told you he doesn't know that. You are directed not to answer that question.

What is the next question?

BY MR. OREN LEWIS:

Q. All right. How deep are the gouge marks from X-3 to X-4?

MR. DUBUC: The gouge marks of the airplane?

MR. OREN LEWIS: Yes. That is all there is between X-3 and X-4, I believe.

THE WITNESS: I don't have a definite measurement

for you. I am sure that they are probably variable.

BY MR. OREN LEWIS:

Q How wide are the gouge marks between X-3 and X-4?

A It depends on which gouge marks you are talking about, of course.

Q Well, I am speaking of the gouge marks that I understood -- well, maybe I am making an unfair assumption.

Were there gouge marks between X-3 and X-4 on the ground?

A That is what this shaded pattern would indicate.

Q The cross-marked area, sir?

A Cross X mark labelled debris area in the ledger.

Q Now, are there tracks that lead up from X-3 to the troop compartment?

A Yes, sir.

Q Now, how many tracks are there?

A On this diagram?

Q On the ground.

A There is probably an infinite number on the ground.

Q Now, are there primary gouge marks?

A I would say that there are two primary gouge marks, yes, sir.

Q All right. Can you tell us the length of both

gouge marks from X-3 to X-4?

A. X-3 to X-4, I can give you a reasonable proximation.

Q. All right.

A. I get about 1118 and a half feet, the way I have computed it on the diagram.

Q. Would you write that down?

A. On the diagram?

Q. I want to know that, certainly.

MR. DUBUC: Are you talking about what is on the diagram as opposed to what is on the ground?

MR. OREN LEWIS: Well, I'm going to go to that. Do you know what goes on the ground? Do you have any measurement of the gouge marks on the ground?

THE WITNESS: No, sir.

BY MR. OREN LEWIS:

Q. So if you don't use this diagram, you don't have any way of knowing that; is that correct?

A. That is correct.

Q. And you have no measurements or assets to measurements by anyone other than this diagram as to these distances; is that correct?

A. That is correct.

MR. DUBUC: Which distances?

MR. OREN LEWIS: The distances from one point to the other on the Defendant's Exhibit D9.

MR. DUBUC: You mean the gouge marks by the airplane?

MR. OREN LEWIS: Or anything else.

MR. DUBUC: Or anything else?

MR. OREN LEWIS: Anything at all.

Isn't that correct, Dr. Turnbow?

THE WITNESS: That is correct. Yes, sir.

BY MR. OREN LEWIS:

Q. I mean, if there is, then I don't mean to be tedious. I would like to know what they are.

A. I don't have access to other information.

Q. All right, sir. Now, I didn't write that down. Would you state the distance from X-3 to X-4?

MR. DUBUC: 1118 and a half.

MR. OREN LEWIS: Pardon?

MR. DUBUC: 1118 and a half.

BY MR. OREN LEWIS:

Q. This is in feet, right, sir?

A. That is correct. Yes, sir.

Q. Now, how widely separated are the two primary gouge marks?

A. In feet?

Q. Yes, sir.

A. I would not be able to tell you.

Q. All right.

A. But they will be equal to the width of the floor area plus maybe as much as two or three feet; and I should have said the floor area of the troop compartment.

Q. All right. What is the width of the floor area of the troop compartment?

A. I don't know.

Q. Do you know how much that structure weighs?

A. No, sir, I don't.

Q. I mean, the wreckage that is on the diagram.

A. No, sir, I don't.

Q. Did you compute the surface of the exterior of the troop compartment?

A. The surface of the exterior?

Q. Yes, sir.

A. That is the open end?

Q. No. Well, did you compute the surface of the open end?

A. No.

Q. Did you compute the surface of the other -- rest of

the area of the stern and the top or surrounding the top and walls, or whatever you would call the upper part of the hull?

A. I computed no surface areas.

Q. All right, sir. Did you -- and, you have already told us that you don't know how deep those gouge marks are from X -- the primary gouge marks, I am speaking of, from the point X-3 to X-4; is that correct?

A. That is correct.

Q. You don't know how deep they are or how wide they are; is that correct?

A. I have given you the width.

Q. Well, I am speaking of the width of each mark.

A. Oh, the width of each mark?

Q. Yes, sir.

A. No, sir. I don't believe I have a measurement on that.

Q. All right. Now, did you calculate how fast the troop compartment decelerated from the point X-3 to X-4?

A. Yes, sir, in a way.

Q. All right. How did you do that?

A. I computed an average deceleration from X-1 to X-4.

Q. All right. Well, are you suggesting that there are gouge marks of the same depth from X-1 to X-4?

MR. DUBUC: You are talking about --

MR. OREN LEWIS: I am talking about the primary gouge marks.

MR. DUBUC: The gouge marks of the airplane?

MR. OREN LEWIS: Yes.

THE WITNESS: No, I am not suggesting that.

BY MR. OREN LEWIS:

Q. All right. Now, did you calculate the coefficient of friction of any part of the wreckage?

A. Coefficient of the friction of any part of the wreckage?

Q. Yes.

A. Yes, sir. In a way, I have done that.

Q. All right. How did you do that?

A. Well, I calculated the average coefficient friction.

Q. The average coefficient of friction of what?

A. That is for the airplane.

Q. All right. Now, what is the formula for calculating the coefficient of friction that you used?

A. It is equal to the average of deceleration measured in Gs.

Q. All right. Now, would you tell me how you say that in mathematical terms? What is the formula?

A. I just stated that.

Q. I beg your pardon, sir?

A. The average coefficient of friction --

Q. Yes.

A. -- is equal to the average G level or average deceleration measured in Gs. That is the formula.

Q. So, is it your testimony, sir, that as an engineer, that I can pick any point along the line and you can tell me with any precision what the G force was at that point?

A. At that point? No, sir, you cannot do that.

Q. So when you take average, the average is like many averages, inaccurate, or may be inaccurate, for any particular point; is that correct?

A. For any particular point, well, it is not inaccurate in the sense that it's accurately what you have, the average.

Q. But it is an average?

A. It is an average, that is correct.

Q. All right. Now, what is the coefficient of friction of a body weighing whatever the troop compartment

weighed, passing through material? In other words, the soil, to the depth that it was passing through some point three to point four?

A. Well, you have asked a question here that is kind of a meaningless question, and I am not being --

Q. It is as good as I can do.

A. -- critical here, Mr. Lewis, but coefficient of friction is not really totally descriptive here. It is really coefficient of resistance.

Q. If you prefer.

A. Okay. And there is quite a difference.

Q. All right.

A. And what I have done is to give you the average coefficient of the resistance or the deceleration distance covered by the troop compartment.

Q. Well, would you tell me what the high point is?

A. What the high point is?

Q. In Gs.

A. In Gs?

Q. Yes.

A. My best estimate would be the order of three times the average value.

Q. And what is the average value?

A. We are talking about this accident, now?

Q. Yes.

A. Okay. The average G value I computed was 1.66.

Q. All right. And so what is 3.166?

A. It would be about five Gs, but I will get it for you exactly.

Q. All right.

A. It is about 4.98.

Q. All right. Is five close enough to talk about, or should we say 4.98?

A. No, five is fine.

Q. Five is reasonable to you?

A. Yes, sir.

Q. All right. Now, can you tell me at what point from X-1 to X-4 was the G force on the troop compartment five?

A. At what point?

MR. DUBUC: You are talking about on the airplane, right?

MR. OREN LEWIS: No. He said that it was five.

THE WITNESS: (Nodding head, indicating in the affirmative.)

BY MR. OREN LEWIS:

Q At what point was it five?

A Well, specifically, I can't answer that question. I don't think I should address myself to it.

Q Can you tell me how long it was five?

A Not very long.

Q Can you give me any idea how long it was five? Did you calculate that?

A I have looked at it from this standpoint. Let's just suppose there is five for the total distance.

Q Pardon?

A Let's just suppose it is five for the total distance.

Q From X-1 to --

A From X-1,

Q -- X-4.

A Uh-huh.

Q All right.

A And we can come up with some conclusions. Okay.

Q Well, you just tell me how you explain it.

MR. DUBUC: That is what he is going to do.

THE WITNESS: Well, that is what I am going to do. Now, I haven't done this, but I will do it on my computer

here and give you the answers.

BY MR. OREN LEWIS:

Q Well, I am really interested in what you did, Doctor.

MR. DUBUC: Well, let him finish. You asked him to do it, and he is going to do it.

MR. OREN LEWIS: Mr. Dubuc, I don't want you --

MR. DUBUC: Well, you keep changing your question as to whether or not he's going to be able to do it or not.

MR. OREN LEWIS: Well, he asked me. He said that he had not done it. And I am asking him --

MR. DUBUC: All right. You asked him to do it.

MR. OREN LEWIS: I am trying to get the basis, the factual basis of what he knows and what he doesn't know.

MR. DUBUC: But your question was would you do it.

MR. OREN LEWIS: And he said let's assume that it was five all the way, and then since that isn't the case --

MR. DUBUC: And then you said explain that.

MR. OREN LEWIS: I will withdraw that, Mr. Dubuc.

MR. DUBUC: All right.

MR. OREN LEWIS: You are going to keep this -- we are going to be three days instead of only one.

MR. DUBUC: No, we are only going to be today.

MR. OREN LEWIS: Oh, we will see, Mr. Dubuc.

MR. DUBUC: Yes, we will.

MR. OREN LEWIS: We will definitely see that.

MR. DUBUC: We will.

MR. OREN LEWIS: You deposed Mr. Timm for a rather long time.

MR. DUBUC: I haven't deposed Mr. Timm at all in this aspect of this case.

MR. OREN LEWIS: You asked him a great deal --

MR. DUBUC: Not on this aspect of the case.

MR. OREN LEWIS: On any aspect of the case. You took rather a long time.

MR. DUBUC: I haven't had a chance to depose Mr. Timm. I was supposed to do that this morning, and he was withdrawn.

MR. OREN LEWIS: Do you want to debate that right now, Mr. Dubuc?

MR. DUBUC: That is a fact. I don't have to debate it.

MR. OREN LEWIS: Do you want to debate it? I will

tell you that we did not have the pictures. We have not had an opportunity to analyze the data, Mr. Dubuc.

MR. DUBUC: What is your next question, Mr. Lewis?

BY MR. OREN LEWIS:

Q. Sir, how long, in your calculations, was any occupant in the troop compartment subjected to five Gs?

A. Well, it couldn't have been very long, and more specifically, I have kind of done this for you in my report.

Q. All right. Would you direct me to that?

A. Yes, sir.

MR. DUBUC: Exhibit D1303, the report number.

THE WITNESS: Look at page six, if you would, please.

BY MR. OREN LEWIS:

Q. Is it numbered six, sir?

A. It is not numbered.

Q. It is not numbered?

A. No, sir.

MR. DUBUC: The last page has the words "the wreckage diagram" and at the bottom there is asterisk that says see Appendix One.

BY MR. OREN LEWIS:

Q All right. I am locking at that page.

A If you read the last couple sentences in the paragraph --

MR. DUBUC: Well, read it to him.

THE WITNESS: All right. The reader should observe carefully the fact that such peaks, that is five Gs, cannot physically be applied for any appreciable period of time otherwise the aircraft would have to stop and much less at 1950 feet. The value would be 646 feet at five Gs constant deceleration.

Now, we know it didn't stop at 646 feet, so we know that the G level was generally less than five Gs over the period in question.

BY MR. OREN LEWIS:

Q How long was it at five Gs? You used the expression couldn't be very long or very long. Those are not engineering terms, as I understand it. I would like to know if you have calculated how long?

MR. DUBUC: He has just read to you how to calculate it.

BY MR. OREN LEWIS:

Q How long?

A. Well --

MR. DUBUC: Go ahead.

THE WITNESS: I will give you an upper limit.

BY MR. OREN LEWIS:

Q. All right.

A. It couldn't be longer than about nine seconds. 8.8 seconds, I think it is on the --

Q. 8.8 seconds?

A. Yes, sir.

Q. All right. Subjected to five Gs, right?

A. That is correct. And it is much, much less than that number, and I can tell you why, if you would like me to tell you.

Q. I'll be interested in a minute, but I am anxious for the measurement first, and then I will --

MR. DUBUC: The measurements?

MR. OREN LEWIS: Well, he said that there was a --

MR. DUBUC: What is the question? You made a statement.

MR. OREN LEWIS: Mr. Dubuc, if you are going to continue to interrupt my deposition, I am going to suspend it and then just seek the Court's assistance. This man is

an engineer and --

MR. DUBUC: I am looking for questions rather than statements. So what you are interested in -- ask him a question and he will answer the question.

MR. OREN LEWIS: Are you finished?

MR. DUBUC: Yes. What is the question?

BY MR. OREN LEWIS:

Q The question is how did you arrive at 8.8 seconds as an upper limit?

A Well, I know that the initial velocity of the aircraft was about 450 feet per second. Looking at the troop compartment, we know the final velocity was zero. So, we know the average velocity was half of 450or 225 feet per second, and we know that the aircraft went -- my scale of measurement was 1950 feet. If we take the individual measurements that we have just come up with, we get about 1990 feet. About a 40 foot difference, which is insignificant, so I will just assume that it is 1950 feet and I come up with 8.67 seconds as the time to decelerate, and that time has to be very close to the true time to decelerate. So, we know that whatever deceleration took place between X-1 and X-2, it could not have occurred for a longer period of time than about 8.67 seconds.

Q. All right. So that is how you have your upper limit?

A. (Nodding head, indicating in the affirmative.)

Q. Now, can you tell me, were there peaks and valleys in the Gs that the occupants were subjected to?

A. Where?

Q. Were there peaks and valleys?

MR. DUBUC: Were there.

THE WITNESS: Were there peaks? Yes, sir, there were peaks and valleys.

BY MR. OREN LEWIS:

Q. All right. Now, have you calculated the peak Gs?

A. Yes, sir.

Q. And how did you do that?

A. I multiplied the average value, 1.66.

Q. By?

A. By a factor of three.

Q. And why did you use the factor of three?

A. Because of various factors.

Q. Which include?

A. Which include my some ten years of experience in crash testing aircraft and making deceleration measurements

within the aircraft, from observing the physical facts associated with this accident. More specifically, that as the troop compartment is concerned, the nature of this accident, the terrain over which it passed, the nature of the gouge marks, the lack of any initial deep penetration of the fuselage proper, the lack of impact with any major obstructions like extremely large trees, bridge abutments, huge boulders, and so forth and so on, clearly indicates that this is an accident in which the G level over the deceleration distance of 1950 feet to 1990 feet for the troop compartment is very nearly a constant level deceleration. Much more so than occurs in many accidents and at other circumstances, have occurred in this accident, much more so than could have occurred in this accident.

MR. DUBUC: For the record, we are trying to finish the deposition and this is the third time we have had something brought in to interrupt it.

MR. OREN LEWIS: And how long is your estimate, Mr. Dubuc, that Mr. Fricker's giving me this note took?

MR. DUBUC: I haven't computed it.

MR. OREN LEWIS: Well, do you want to make an estimate?

MR. DUBUC: No, I'd like to hear your next

question.

(Discussion off the record.)

BY MR. OREN LEWIS:

Q. Sir, I don't see where you get the factor of three. What gives you the three?

A. Well, should I give it to you again?

Q. Well, I heard the items that you mentioned, sir. I don't see the connection between those and the three. Is that some kind of a formula that you have evolved yourself, sir, or is it in common use in the engineering profession, or where does it come from? In other words, do we use a three times average Gs under some circumstances and another factor under other circumstances?

A. That would be correct.

Q. All right. Would you tell me where I would find the reference for that?

A. You would find yourself a good expert and talk to him.

Q. But that is not published.

A. Not to my knowledge.

Q. And you haven't published on it, and to your knowledge, no one else has?

A. Not to my knowledge.

Q. All right. Now, did you undertake to calculate how many Gs it would take to break off any part of this?

A. I have not made a calculation, but I can give you a pretty good close number.

Q. All right.

A. About a thousandth of a G.

Q. A thousandth of a G?

A. Yes, sir.

Q. To break off what part?

A. To break off a landing gear door.

Q. All right. Any other factors? How much would it take to break off an engine?

A. I don't have a specific number on that, but let me see if I can --

Q. All right.

A. Now, if you understand that these are ballpark numbers.

Q. I understand that that is your best judgment, sir.

A. Well, I don't think it would take more than a quarter of a G.

Q. To break off an engine on a C5A?

A. Yes, sir.

Q Well, what factors would you take into consideration? Gee --

MR. DUBUC: What kind of Gs are you asking him for?

MR. OREN LEWIS: Well, G is a --

MR. DUBUC: Are you asking him for X factors? YX is G? Or what are you asking him?

MR. OREN LEWIS: Well, is there a difference in what Gs it would take to break off the engine?

THE WITNESS: Yes, sir. It would depend upon the circumstances.

BY MR. OREN LEWIS:

Q Under these circumstances. Under the circumstances of this crash as you understand it. I want you to tell me how many Gs it would take to break an engine free from its supports on the wing.

A Well, again, if you understand that this is pretty crude. I might be off by 100 percent.

Q Well, what is the range, then?

A I'll say anywhere from zero to a half a G.

Q Half a G?

A Yeah. But a quarter of a G would probably do it pretty well.

Q And what force would it take to break the wing off, in Gs?

A Well, again, it depends upon the nature of the failure and I am not sure that we know in this particular case just exactly how the failures occurred, but it could be done as a very low load, like certainly below five Gs.

Q A load before five Gs?

A Even below a couple of Gs.

Q All right. Now, the wing is an outboard of the hull, a series of fuel tanks, is it not?

A I presume that that is the case, yes, sir. That is my understanding.

Q Are there any dry bays?

A Are there any dry bays?

Q Yes.

A I don't know whether there are or not.

Q Do you know how many gallons of fuel there were in the wing tanks, either separately or together, at the time of impact?

A No, sir, but there would have been quite a bit.

Q Do you have any idea how much?

A I'd say maybe a railroad tank car.

Q How many gallons in a railroad tank car?

A. Eight thousand gallons.

Q. So your judgment is that there were 8,000 gallons of fuel in each wing or together?

A. I don't know. I don't have the faintest idea. We are talking about thousands of gallons rather than gallons.

Q. There is many, many gallons, right?

A. Yeah.

Q. And it would weigh a great deal; is that correct?

A. It would weigh quite a bit, that is right.

Q. And how many pounds is a gallon of aviation fuel?

A. About six and a half pounds.

Q. Did you make any calculations as to how much the wing structure weighed, either individually or together?

A. The wing structure itself?

Q. Yes.

A. I have made no such calculations.

Q. Either with the engines or separated from the engine?

A. Either with the engine or separated -- I made no calculations, no, sir.

Q. But I am still trying to get why you used a factor of three, for example, instead of five or two or eight.

MR. DUBUC: He has told you that.

BY MR. OREN LEWIS:

Q That is just a judgment, is that right?

MR. DUBUC: It is based upon his experience. He explained it all in a long paragraph. Do you want to have her read that back or something?

MR. OREN LEWIS: I am trying to find out the basis for his opinion.

MR. DUBUC: But you asked him this before, and he's answered that.

MR. OREN LEWIS: I fully understand --

MR. DUBUC: And you are not permitted to ask questions three times.

MR. OREN LEWIS: I am permitted to ask questions --

MR. DUBUC: The same question.

MR. OREN LEWIS: -- Mr. Dubuc, to the point that I can understand it.

MR. DUBUC: No, you are not, Mr. Lewis.

MR. OREN LEWIS: We'll see. We'll see.

MR. DUBUC: You are permitted to ask questions if there is a common objection, I think, sustained universally by Courts as to asked and answered question. He has told you this already.

MR. OREN LEWIS: In a discovery situation of this kind?

MR. DUBUC: Yes, sir.

MR. OREN LEWIS: Well, I am willing to stop now and certify it to the Court. We have a hearing Tuesday, and we can take this up. This is an expert that has obviously looked at these facts --

MR. DUBUC: We will just note another objection.

MR. OREN LEWIS: -- and I think I have a right to try to understand how he arrived at the factor of three. He has already told me it is not public, and so there is no other source that I can get it from, other than this gentleman here.

MR. DUBUC: It is based on his experience. Do you want him to tell you about his experience?

MR. OREN LEWIS: I am going to ask him, sir, some of these details. Now, that is a preliminary question, but if you don't want him to answer any of that, why don't you instruct him not to answer any more questions along this line, and we will certify that to the Court.

MR. DUBUC: All right.

MR. OREN LEWIS: If that is your position. I am telling you I want to ask him how he arrived at the three. I

understand that he says it is from his experience and so forth. I want to know what percentage experience, what percentage terrain, what percentage of these other things. I want to understand how he arrived at the three.

MR. DUBUC: Percentage of terrain?

MR. OREN LEWIS: Yes. He gave me a number of factors. He said that he comes up with the three because of the physical facts of the accident, the terrain, the lack of impact with heavy objects, and all those different things, and I want to know what percentage of his thinking went into each element. Now, if you don't want me to inquire, I will just have to certify it to the Court.

MR. DUBUC: Tell him your percentage or estimate, if you can, as to the factors, and if you have got experience in accidents, how you evolve in formulating.

THE WITNESS: Well, again, I base it upon what I see taking place with respect to the aircraft structure and the ground. That is the nature of the gouge marks that appear in the ground.

BY MR. OREN LEWIS:

Q All right. Go on.

A They are much, much closer to being uniform gouge marks than one sees in, I would say, 90 percent of the

accidents which occur.

Q All right.

A This airplane basically landed at high speed. I base it in part on --

Q I want to stop you right there.

MR. DUBUC: No. No. Let him finish his answer.

MR. OREN LEWIS: I want to get each element. This is one element, and if you finish this answer on that element as to the nature --

MR. DUBUC: No. Please let him finish.

MR, OREN LEWIS: Oh, I am anxious to have him finish.

I'd like to take up each element at a time as we go on.

MR. DUBUC: But you've asked him the general question, so let him finish his answer, and then you can go back and pick at it.

THE WITNESS: I think I finished that answer.

BY MR. OREN LEWIS:

Q All right. Now, then, are you then saying that the gouge marks are, in your judgment, uniform from throughout the crash landing process; is that correct?

A Much more so than one finds in most accidents.

Q All right. Did you measure the depth of gouge marks or the width of the gouge marks?

A You don't have to measure them.

Q I'm not asking you do you have to. I am saying, did you measure any gouge marks or make any attempt to calculate how much dirt was misplaced, or what the resistance of the material through which parts of the airplane were passing?

A No, sir.

Q You did not; is that correct?

A That is correct.

Q All right. Now, what percentage of -- what weight did you give that particular aspect?

A What weight did I give it?

Q Yes.

A I didn't give it any particular weight.

Q In coming up with your formula three X?

A I have no formula.

Q I beg your pardon, sir? You mentioned three times the gravity, which was 1.6 something. I have a note on that here. I believe you said three times 1.66.

A Yes, sir.

Q All right. Now, if that is not a formula, then

I apologize to you. I just thought that it was.

So, you can't tell me how much weight you gave to the terrain itself?

A. I gave a very high weight to that fact. Now, percentage-wise, I have not attempted to address that problem.

Q. All right.

A. Whether that is 50 percent of the total or 75 percent of the total. I trust that is what you are asking me.

Q. Yes.

A. I haven't done that. I'll try to do that for you before the trial, if you so desire.

Q. Well, if you can't tell me now, I want to know -- if you have not done that, then you haven't done that.

MR. DUBUC: He is offering to do it for you.

BY MR. OREN LEWIS:

Q. Do you want to do it now?

A. No, I don't propose to do it now.

Q. All right. Now, tell me, you say you have crash tested aircraft?

A. Yes, sir.

Q. What is the largest aircraft that you have crash

tested?

A. Four engine transport.

Q. What is the name of this airplane?

A. DC-7. Well, that might not be right. 1649 Super Connie (phonetic) might conceivably weighed more than the DC-7.

Q. All right. Where did you crash test the 649? Is that the name of it, sir?

A. 1649.

Q. 1649 Super Constellation?

A. Yes, sir.

Q. When did you do that?

A. When did I do it?

Q. Yes.

A. About 1967.

Q. Who for?

A. For the F.A.A., NASA, U.S. Air Force, and the Navy, I think all participated.

Q. And also did you say a Douglas aircraft 7, sir?

A. Yes, sir.

Q. And who did you do that for?

A. Same program.

Q. In the same year?

A. About the same year.

Q. 1967?

A. Yes, sir, about.

Q. Okay. Where abouts did it crash?

A. In Phoenix, Arizona -- near Phoenix, Arizona.

Q. All right. And now were there any other crash tests that you considered comparable to the C5A crash?

A. Well --

Q. That you did?

A. Well, there are all comparable in a way, if you understand the difference between the characteristic decelerations that take place on a large aircraft and a snaller aircraft.

Q. Well, then tell me all of the crashes.

A. All of the crashes?

Q. Yes.

A. Well, I could best give it to you this way. I think there were about 34 full-scale crashes.

Q. All right. For whom?

A. The the U.S. Army, U.S. Air Force, the F.A.A., U.S. Navy.

Q. And this was all the same program, sir?

A. Flight Safety Foundation, yes, sir. Well, no,

there were more than one program involved.

Q. All right. Well, who paid for the airplanes, the start-up?

A. Who paid for the airplanes?

Q. Yes.

A. It depends on a particular test.

Q. Well, who paid for the Super Constellation?

A. I believe the F.A.A.

Q. It was destroyed as far as its usefulness, was it not?

A. Yes, sir. That is correct.

Q. And is that true in all of these cases?

A. Yes, sir.

Q. All right. The F.A.A., did they buy a new Super Constellation or was it a used one?

A. No. They were used airplanes.

Q. How many hours on it?

A. I don't recall. They were flyable. They were flown in to Phoenix.

Q. All right, sir. And under what circumstances was this Super Constellation crashed?

A. For the purposes of investigating a post-crash fire, the performance of transport forward-facing seats,

performance of cargo and litter tie downs, performance of air bags for use as decelerators for the occupants, and other experiments.

Q. Was there a test protocol?

A. Yes, sir. There would have been.

Q. Who was in charge of the test?

A. I was in charge of the scientific efforts.

Q. All right. And the government then has the records on this? Did you turn your records over to the government?

A. Yes, sir. There are records available. They would most likely be with the F.A.A.

Q. All right. Now, how fast was the airplane going when it struck the ground?

A. As I recall, the DC-7 was doing about 160 and I don't remember whether that was knots or miles per hour, knots probably. And the Super Connie was about 100 and -- about 135, 36 miles an hour.

Q. That is not knots, that is miles per hour?

A. That is miles per hour.

Q. Okay. Well, how many miles per hour is 160 knots?

A. 160 knots?

Q. Yes.

A. It would be 184 miles an hour, but the speed was probably 160 miles an hour and not knots.

Q. All right. 160 miles per hour. All right. Now, in the 1649 Super Constellation, where was this airplane crash?

A. Near Phoenix.

Q. Is it an air base or does it have a location?

A. It was an airport, yes, sir.

Q. An airport?

A. Yes, sir.

Q. Which airport?

A. Deer Valley.

Q. Deer Valley?

A. Yes, sir.

Q. Was it crashed on the runway?

A. On a specially built runway.

Q What kind of a specially built runway was it?

A Well, it consisted of a railroad track, as a monorail, to guide the nose gear and then two paved strips to provide support for the main gear.

Q So then this wasn't an airplane that was flown through the air and crashed into the ground?

A No, it was flown through the air for part of the time. Yes, sir.

Q Well, how much of the time?

A Well, how many feet?

Q Well, I am just trying to get some understanding of the test protocol, what was done.

A Well, we ran the airplane 3,000 feet down the track, at which time it reached the speed of 160 miles an hour. We knocked both of the main gears and the nose gear out from underneath the airplane simultaneously, took off basically all four engines and ran the airplane through two telephone poles, struck the left wing with a hill, struck the fuselage with an eight degree slope on hard compacted ground, nodded to impact on that slope and continue the impact of twenty degrees slope and then go over that hill and impact beyond the hill with basically a free-fall of about 60 feet for the fuselage.

Q And is it your statement that that is comparable to this crash?

A No, it isn't comparable in the sense that it is not a one to one situation. That was a fairly high G situation as far as large fixed-wing transports are concerned because of the steepness of the slope, the nature of the soil and the nature of the impact angle. Well, that is about it, I guess.

Q Were there any people in it?

A No, sir. We had one man that offered to ride it.

Q You declined?

A We declined. Yes, sir.

Q Do you have any of these crashes, these 34, that where the airplane was flying through the air at 310 miles an hour and struck the ground?

A Do I have what?

Q Are there any of these crashes where the airplane was a large structure, large transport type airplane and struck the ground at or around 310 miles an hour?

A I am not familiar with any test crash in which that has been done. There have been some crashes which have, of course -- real crashes that have occurred in that configuration, in addition to this one.

Q Which ones?

A Well, the L1011 that crashed in the Everglades would have -- have some of the characteristics of this crash.

Q All right.

A I am not sure of the exact speed of the L1011, but it would not have been, I think, under 200 miles an hour. I am familiar with one accident that occurred at 450 miles an hour in a B51 Mustang in which the occupants survived with basically only a spinal fracture.

Q How many people lived in the L1011 crash?

A I think about half of them or something like that. Maybe more than half.

Q That was a Lockheed Aircraft?

A That was a Lockheed Aircraft. Yes, sir, that is correct.

Q And was the speed in the vicinity of 310?

A I don't recall the exact speed, but I would say probably between 200 and 300.

Q All right. And were there a number of serious injuries in addition to --

A Sure.

Q -- the people that died?

A. Sure.

Q. What was the angle that the airplane struck the ground?

A. I don't have a number for you on that.

Q. Any other large aircraft crashes that you feel are -- I am talking about where there was a speed of comparable -- roughly comparable speed of the large transport aircraft?

A. Well, I can think of one other at least, and this was a DC6 or DC7 accident that occurred in Florida in probably the 1950's. I think the speed was around 205, but I could be in error on that. That was a long time ago.

Q. Well, I am interested in 300 category, which is, I believe, roughly a third more than 205.

A. I don't recall any others at the moment.

Q. But the closest would be the L1011 in the Everglades?

A. I don't know whether that is the closest or not.

Q. Is the closest one that you can think of?

A. The closest one that I can think of at the moment. Sure.

Q. Sir, did you look into the, when you were doing this investigation into the crash, whether or not the wing supports were weaker than designed?

A. Were weaker than designed?

Q. Yes, sir.

A. No, sir. I have not looked at that.

Q. Had any defects?

A. No, sir, I have not looked at that.

Q. Are you familiar with a program to reinstall or replace the wings on the C5A fleet.

A. I have heard of that program. Yes, sir.

Q. And that was because there were a number of fractures or faults found in the structural members of the wings, is that not correct?

A. I would presume that that would be perhaps the reason.

Q. And do you know whether that program is actually going forward at this time?

A. I do not know.

Q. But you didn't take that into consideration in your analysis?

A. No, sir. It has no significance.

Q. Can you tell me what the resistance of the -- in any measurement -- well, let me withdraw that.

When you are talking about resistance of moving through a material like soil, how is that measured, in foot

pound? How would you describe that?

A. Well, generally the term resistance implies a force and forces are measured in pounds.

Q. All right. So then in pounds, sir?

A. Yes, sir.

Q. So if we had a soil of the type that was in this west bank and we were able to take a test and propel a particular sized object through it to a certain depth and width, then the result would be -- you would come out and you would find out how many pounds that would take, is that right sir?

A. Are you talking about this dike over here?

Q. No. I'm speaking of soil --

A. You said soil, west bank.

Q. Well, when I say west bank, it is opposed to the east bank of the Saigon river. I am not speaking of the dike itself.

A. You are talking about the general level terrain?

Q. Yes, sir. The terrain there.

A. Well, I don't know what you have in mind with regard to what you're talking about here. There are all types of soil tests that could be conducted that would give one some feel for the resistance of the soil to compressive

loading and so forth and so on. Sure.

Q In other words, but the force would depend upon the weight of the objects and the size of the face that was presented to the soil would it not, and the speed that it was -- initially impacted the soil?

A Yes, sir, I think it would depend upon certainly the size of the object, talking about the force in pounds, it would depend upon -- what else did you say? The speed?

Q Yes.

A Yes, sir. I think -- probably depend certainly on the speed. The specific amount of plowing or moving, in other words, that was being done at the time of the question.

Q And then by doing that, you would come up with an analysis of how fast you could stop a given object moving through that material, to that depth?

A Well, some people have attempted to do this. I think in all probability -- I don't think it is a very good approach, but --

Q No, I just wanted to know if that -- in this case, you say?

A In any case.

Q No. No. I am saying did you say somebody has attempted to do that in this case?

A Well, I think people have attempted to do that, yes. I'm sure they have.

Q Who?

A I don't know, but, you know, you talk to various hundreds of people that are composing computer programs to try to do this and that. Where they take into account that it is all characteristic --

Q Who did you talk to that suggested that?

A I haven't the faintest idea.

Q Well, who have you talked to about this case?

A This case? I haven't talked to anybody about this case except this law firm.

Q When you say this law firm you mean --

A And the other experts that are involved. I have talked to one or two of those, I guess. One.

Q Who?

A John Edwards.

Q Anybody else?

A Well, let's see. I have talked very, very briefly with Doctor McMeekin.

Q Anybody else?

A Yes. I'm sure one or two other two other people who were present at the meeting and, of course, I heard their

input.

Q At what meeting?

A At the meeting.

Q Which meeting, sir.

A The meeting of Mr. Dubuc's experts in late July -- 27th, I think.

Q All right. Who was there?

A I don't know all of the people who were there, but --

Q Just tell me who you know.

A Doctor McMeekin, Mr. Edwards, and I would say probably -- maybe 10 or 15 other people, MD's, Psychologists --

Q Just --

A -- maybe even some other engineers. I don't know.

Q Can you tell me who you remember as being there, sir?

A I have told you who I remember. These are the only ones that I know.

Q Any others that you can tell me the name of?

A No, at the moment, I can't.

Q Can you tell me who was there, Mr. Dubuc, so I can ask the witness if he remembers X or Y?

MR. DUBUC: No, I am not going to tell you who was there.

BY MR. LEWIS:

Q Did you see any representatives of the Plaintiff there?

A Of what?

Q Did you see any representatives of the Plaintiff there at the meeting?

A I wouldn't have recognized that fact. Had there been, I don't know.

Q But nobody identified themselves to you?

A No, sir.

Q There were a number of lawyers there for the government and for the Lockheed Aircraft Corporation, sir?

A Yes, sir. There would have been.

Q Can you tell me who?

A Yes, sir. Maybe I can. I believe Mr. Piper may have been there. I could be in error about that. Let's see. One of the young -- couple of the young lawyers from Mr. Dubuc's office and Tom Almy.

Q Um-hmm. Okay.

A And John Connors.

Q Anybody else?

A That is all I recall at this moment, but there were others there.

Q How much time have you devoted to the study of this material, sir.

A In total days?

Q Well, hours or days or any other units you want to use.

A Um-hmm. Well, I would say probably around 170 hours.

Q And what was your Consultant Fee? Was it on an hourly basis?

A No, sir. It is on a daily basis.

Q And how much is that, sir?

A $750 a day for the Routine Engineering Work, $850 for Deposition and $1,000 for Court Testimony.

Q I presume you get your expenses?

A Yes, sir. I hope so, anyway.

Q I hope you do, too.

MR. OREN LEWIS: Mr. Dubuc, I have a great deal more to ask the witness. I'm willing to go on --

MR. DUBUC: Well, you have another 25 minutes.

MR. OREN LEWIS: I'm willing to take the 25 minutes and I'm also, if there's any advantage to the witnes

I am going to suspend now.

MR. DUBUC: No, it isn't any advantage to the witness unless you are done --

MR. OREN LEWIS: No, I am a long way from being done.

MR. DUBUC: -- that would be to his advantage.

MR. OREN LEWIS: I beg your pardon, sir?

MR. DUBUC: That would be to his advantage.

BY MR. OREN LEWIS:

Q Do you have any idea, sir, what force, either in pounds or otherwise, any other unit of measurement that it takes to break any human bone?

A That it takes to break?

Q Any human bone.

A Any human bone?

Q Yes, sir.

A Yes, sir.

Q How much does it take to break the humerus in a one year old child?

A Well, I don't have a number for that

Q How about the femur?

A No, sir.

Q Any other bones?

A. The skull.

Q. How much does it take to break the skull on a one year old child?

A. I am not talking about a young child, but an adult.

Q. How much force does it take to break the skull in adult?

A. Well, it takes about 140 G's to -- between that and about 400 G's, depending upon the length of time for which the load is applied. And at 140 G's, which would be the lower level, if you allow about 12 pounds for the head, that would be 680 pounds.

Q. And how do you come to -- then what you're saying is you can do it in G's?

A. Yes, sir.

Q. Or translate it into pounds?

A. You can translate that into pounds, yes, sir.

Q. So you gave me the G figure and then the pounds, is that right, sir?

A. Yes, sir.

Q. All right. Did you make any investigation of the seats in this crash?

A. Did I make any investigation in the seats?

Q. Yes. Yes.

A Well, I did to this extent. I have questioned Mr. Edwards, who was on the site and claims that he went back and forth through this section of the troop compartments and that there were two exceptions. All of the seats were in place and the two exceptions were two forward facing seats at the very rear of the aircraft and it was discovered that both seats were not properly installed and as a result of the rear legs not being properly attached in the seat tracks. They rotated forward. They stayed in place, but they just rotated forward.

Q What seat tracks were they?

A What seat tracks?

Q Oh, I understand. But they never completely displaced, turned over or anything of that kind?

A No. Just rotated forward.

Q So the occupants in those seats still would have been safe?

A Yes, sir. I believe that to be the case and there is considerable questions as far as I can ascertain as to whether there were any occupants at all.

Q So you have assumed that there were no occupants of those seats?

A I haven't considered it either way. It is not

important, I think, really.

Q All right. And you have assumed that all the children were in rearward facing seats, is that correct?

A I have. Yes, sir.

Q And it is your opinion to an absolute scientific certainty I gather that the children in those seats would have sustained no physical injury.

MR. DUBUC: The standard I think is a reasonable --

MR. OREN LEWIS: I understand that. I'm just reading -- well, I am not reading from his report, But I am saying what I understood his report to be.

MR. DUBUC: Well, I understand your question to be absolute scientific certainty.

MR. OREN LEWIS: That is what it says. It is the opinion of this author that it is a scientific certainty, that the deccelerations occurring in the April 4, 1975 C5A accident did not provide any direct hazard to the life or health of the children or adults located in the troop compartment of that aircraft.

MR. DUBUC: You are reading from Exhibit D --

MR. LEWIS: I am reading from his report, the third sentence of the Conclusion.

MR. DUBUC: Exhibit D-1303?

MR. OREN LEWIS: Yes, sir.

THE WITNESS: Yes, sir. That is my conclusion.

MR. OREN LEWIS: I don't see any modifier in there.

MR. DUBUC: But your question had a modifier.

MR. OREN LEWIS: I beg your pardon.

MR. DUBUC: Your question had a modifier in it.

BY MR. OREN LEWIS:

Q Was it your understanding and did you assume that there were no injuries to the children in those seats?

A No, there were injuries.

Q You do understand that there were injuries?

A Yes, sir.

Q The children that were sitting in the seats?

A One or two did not survive, at least one did not survive.

Q All right. How about beyond that? Any orthopedic injuries?

A I have no further information than that.

Q Would that be important to know?

A It would depend upon what is known about a situation.

Q All right. Did anyone tell you that one of the

children --

A Well, no. No. Standby. I don't think it is important.

Q Why not?

A Simply because of the fact that the deccelerations that occurred in this accident were so low compared with the tolerance of the human head to the solidity level, that brain injuries simply could not have occurred as a direct result of these deccelerations levels.

Q Do you know what a coup-counter-coup injury is?

A Yes, sir, I do.

Q What is it?

A It means a blow to one side of the head resulting in a tendency for the brain to separate from the skull cavity on the opposite side of the head producing a contusion or bruises. In other words, to the skull.

Q All right. How much force does it take to the outside of the head to cause the brain to move around inside the skull?

A Well, apparently the tolerance of the human head, to blows of this type are at least something in the order of 140 PG's.

Q So what you're saying is that any loading under

140 PG's wouldn't injure the brain in the skulls of any of these children seated as they were, is that correct?

A. Would not produce any permanent injury.

Q. Well, you mean you might get some kind of a temporary or nonpermanent --

A. Yes, you might be knocked out, for example. You might even have a hairline skull fracture, for example.

Q. I understand. So what you're saying is you could have a hairline skull fracture and not injure the brain?

A. I believe that to be correct, at least people do have skull fractures from time to time and don't discover the fact that they have had one. Now, whether the brain was injured in this process or not, that might be a little bit of a technical question. There might be a very minor injury to the brain.

Q. I understand.

A. But, you know, if you don't find out about it and you don't suffer any ill effects, that is what I'm talking about.

Q. I understand. So what was the thickness of the padding, if any, on the chairs here?

A. I don't have a number for you on that.

Q. Do you know to what it's resistance to compression

is?

A The resistance of the padding?

Q Yes.

A As contrasted to the chair itself?

Q Well, the chair -- yes, I am speaking, as opposed to the chair frame.

MR. DUBUC: The thickness of the cushion on the back of the chairs?

MR. OREN LEWIS: Yes. That is what I'm asking him.

Different padding has different compression rates, is that right?

THE WITNESS: Yes, sir. They do.

BY MR. OREN LEWIS:

Q And if you have a very quick compression rate, then that decreases the padding effect, does not?

A Well, not necessarily. In fact, it may actually increase the thickness. The effect of thickness.

Q How is that?

A It is very rapidly applied in very rapidly applied loads. Materials can appear to be stiffer, if you will, than they really are.

Q So, do you know what the padding -- you don't know

what the padding is, the material is?

A. No, sir. I don't.

Q. You don't know?

A. I have assumed it is consistent with the general aircraft seat.

Q. Alright. And what is that?

A. I would use the term foam rubber. Generally, it is not really rubber, but some type of plastic.

Q. Foam rubber or plastic?

A. Yes, sir.

Q. How thick is it?

A. A resilient and of the order of -- well, the order of a couple of inches.

Q. We're speaking two inches?

A. Um-hmm.

Q. And how fast will that compress under what circumstances?

A. I have no numbers for you on that today.

Q. Pardon?

A. I don't have any numbers on that for you today.

Q. At 310 miles an hour, can you tell me how many --

A. Well, that 310 miles an hour would have nothing to do with it really.

Q. But unless the G factor was over 140 then your testimony is that there would be any possibility of injury to

these babies' brains?

A. The possibility would be extremely rare.

Q. Alright. And it wouldn't make any difference how often the brain was moved from side to side or vibration as long as it was under 142?

MR. DUBUC: Side to side he is talking about.

MR. LEWIS: Yeah, that would be moving back and forth inside the skull.

MR. DUBUC: Forward and aft is one way.

MR. LEWIS: Forward and aft. Alright. Let's stick with forward and aft.

In any direction, would it make any difference?

THE WITNESS: Are you talking about this accident or hypothetical situations?

BY MR. LEWIS:

Q. This accident. This accident.

A. In this accident, no, I don't think that it would have made any difference.

Q. So side to side or forward to back wouldn't make any difference?

A. No, sir. I don't think so.

Q. Alright. Or up and down?

A. Or up and down even, no, sir.

Q. Alright. Did you calculate whether there was any up or down G's?

A. Yes, sir. I did that. At least I considered that.

Q. What did you calculate?

A. Well, the design people at Lockheed have calculated a vertical load as a result of, we will say, "a normal landing" -- that is perhaps not quite right. A hard landing at sink speeds of the order, I think they used eleven to sixteen feet per second. I'm sure you've got this information, and they concluded that the G load, not counting the static one G which we all have on us, was somewhere between, I think, about seven tenths and one point zero five or one point zero two.

Q. One point zero two to one point zero five?

A. Yes, sir.

Q. What would be the peak load?

A. That is the peak load that they computed.

Q. Who did this computation, do you know?

A. No. It would have been done by the structures department, I believe, with Lockheed.

Q. You didn't do it?

A. I did not compute that, no.

Q. And other than assuming that they know how to do

that, you wouldn't know if their computation was accurate, right?

A. I think their computation is realistic because the sink speeds at which this aircraft touched down was in the order of 500, 600 feet per minute. And that is about normal sink speed, and there is a normal landing that we are talking about. The vertical loads would have been insignificant.

Q. Now, what experience do you have in human tolerance to deceleration?

A. Well, I have quite a bit of experience in that area. I teach it from time to time. I have taught it from time to time.

Q. In what school, sir?

A. At Arizona State University and to --

Q. In what course?

A. Say again?

MR. DUBUC: He didn't finish his answer yet.

MR. LEWIS: I apologize.

MR. DUBUC: Arizona State University and?

THE WITNESS: And one of my senior dynamics courses. I have also taught it to the U. S. Army. U. S. Air Force people do cover certain aspects of it in conjunction with the

short course that I have been involved in for the past eleven or twelve years -- more than than. Twenty-one years. I have witnessed some human subject sled rides at Holoman Air Force Base. I have acted as a guinea pig myself with suddenly applied loads to the head. I have been involved in tests of animals, specifically bears in crash tests of aircrafts. Although they're not human, their anatomy is surprisingly quite similar to that of a human. That is about my experience.

BY MR. LEWIS:

Q. Okay. What training have you had in -- you call it human dynamics? I don't know, whatever you call it. Did you use the word --

A. I used the word dynamics.

Q. Dynamics.

A. It is a college senior level course in which this material that we are discussing, human tolerance to decelerating loading was covered.

Q. I just want to know what training you have had, sir.

A. What training have I had?

Q. Yes.

A. Well, about twenty years practical experience, I

guess.

Q. But you haven't had any educational background in any aspect of the human tolerance to deceleration, is that correct?

A. No, sir. That is not correct.

Q. Alright. What have you had?

A. I am a graduate engineer, Ph.D. and while that particular subject was not covered, I still consider that education to be most appropriate to this particular topic which has to do with really the engineering aspects of the human body.

Q. And then you feel that you are an expert in how the human body would react under various engineering circumstances, is that correct?

A. I am at least an expert with regard to certain areas in this field.

Q. Including the head?

A. Yes, sir. I have some knowledge having to do with the impact of the head.

Q. How about the knee?

A. Say again?

Q. The knee.

A. I have not looked into that.

Q. Do you know what force it takes to break any of the arm or leg bones in a child from say one to four?

A. Well, that information may be available, surprisingly, but --

Q. You don't know?

A. I don't have it, no, sir. I have not had occasion to make use of it.

Q. You say it couldn't have happened to any of the children in the seats?

A. That is correct. And from the fact that the deceleration levels were just so low compared with the tolerance of the overall human body to deceleration in a rearward situation.

Q. I understand that. So, there certainly wouldn't be enough Gs or force or whatever way you want to put it to to fracture any of the leg bones in these children, is that correct?

A. Not as long as they were seated.

Q. And you have assumed that they were seated. And that is part of the data that you got, isn't it?

A. That is correct.

Q. Now, do you know whether Barbara Adams just was crushed or not?

MR. DUBUC: We have already been through that.

MR. LEWIS: No.

MR. DUBUC: Yes, you asked him before whether he knew the injuries to Barbara Adams, and he answered he did not, no.

MR. LEWIS: Alright.

Then I am going to ask you to assume that she had a crushed chest.

THE WITNESS: Yes, sir.

MR. DUBUC: Are you reading from something?

MR. LEWIS: I just want him to assume that she had a crushed chest.

Do you know what force it takes to crush a human chest.

THE WITNESS: Well, that depends upon exactly how the load was applied. It could be a relatively low force if it were applied over a relatively small area. It could be at a relatively large force like the order -- well --

BY MR. LEWIS:

Q. What would be the range of force required to cross --

A. Well, it would depend entirely upon the distribution of the load over the chest.

Q. Well, now, you have told us that she was located between rows four and five.

A. Yes, sir.

Q. On the right side of the airplane?

A. Yes, sir.

Q. Alright. At that location --

A. Yes, sir.

Q. -- under these circumstances, how much force would it take to crush her chest?

A. It would depend upon the area in which the load was distributed, and I have no knowledge of what that area was.

Q. I believe you said in your report, doctor, that the accident did not provide hazard to the life or health of the children or adult located in the troop compartment.

A. No, sir. I didn't say that.

Q. Well, that is what I read.

A. Well, read it carefully.

Q. It is a scientific certainty that deceleration occurring in the April 4, 1975 Saigon C5A accident did not provide a direct hazard to the life or health of the children or adults located in the troop compartment of that aircraft.

A. Yes, sir. That is what I said.

Q. Alright. Now, how do you explain that she died?

A. The fact that she was standing adjacent to the isle and that she went forward down the isle and wound up at the bulkhead and in the process of doing that, she achieved appreciable velocity with mspect to the airplane. She did not participate in the G level associated with the airplane proper, that is the troop compartment proper and the rest of the children who were seated in the seats. She, in effect, had a fall, if you will, from between rows four and five to the bulkhead and a G level somewhere between we'll say one point six and five. And so, she hit the end of the bulkhead with appreciable speed.

Q. How fast was she going?

A. Well, If you'll let me approximate.

Q. Surely.

A. I would say the distance from her position at the front of the bulkhead might have been, I'd say 12 ft. Now, that could have been 15 ft. Let's see. This thing is 60 ft. long -- let's say about 12 ft., and she would have hit the bulkhead at about 44 ft. per second or about 30 miles an hour.

Q. And what was the G load on her?

A. I don't know what the G load would have been on

her at that particular point. It would have, depending upon --

Q. What factors?

A. What she hit, it would depend upon her --

Q. What did she hit?

A. I don't know what she hit. She hit something that was pofficient to cause her not to survive the accident.

Q. Did she hit a bulkhead?

A. She may have.

Q. Is your testimony that you have calculated from some of these reports that she was standing?

A. She was standing?

Q. Yes.

A. Did I calculate that? I didn't calculate that.

Q. Well, how do you come to the conclusion that she was standing?

A. Did I say she was standing?

Q. You just did.

A. I could well be in error, but she may have been standing.

Q. Well, was she standing?

A. Nobody knows the answer to that question.

Q. Well, there may be people that know. You mean you

don't know?

A. Well, I don't know, and Neil doesn't know, and Neil was standing in the isle adjacent to her.

Q. Looking at her?

A. Say again?

Q. Looking at her?

A. Oh, I don't know whether she was looking at her or not, but she doesn't know.--

Q. Was Neil communicating with her, do you know?

A. -- that is what I get from Neil's statement.

Q. Do you know whether Neil was communicating with her or not?

A. I don't know.

Q. Do you know whether anybody was talking with her? Do you know whether any of the people in the troop compartment were talking with her or not?

A. No.

Q. And so you don't know whether she was braced behind those seats or how she was, do you?

A. I know she wasn't braced enough to prevent her from going down the isle.

Q. How do you know she didn't go over the top of the seats?

A. You mean if she stood up?

Q. No, wonder if she was thrown up? Why couldn't she have been thrown up over the top of the seats and flung down against the bulkhead?

A. Well, that is a good question. Well, had that been the case, she would have wound up against the lavatory.

Q. Do you know that she didn't? Where did she end up?

A. My understanding is that she wound up down near the bulkhead.

Q. Which bulkhead?

A. Just about station or just in front of chairs in row one.

Q. Was there a bulkhead there?

A. I guess there must have been.

Q. Well, do you know whether there was a bulkhead there or not, sir?

A. No, I don't know whether there was one there or not, but she must have hit something in that area.

Q. And your testimony is that she then went to the left around the lavatory and struck a bulkhead which was just ahead of station one; is that your testimony?

A. That would be the implication of what I get,

from what I'm able to read in the various depositions and statements.

Q. Have you looked at the pictures of the troop compartment?

A. Have I looked at the pictures of the troop compartment?

Q. Um-hmm.

A. Yes, sir. I have looked at some.

Q. And are you telling me whether there was a bulkhead there, just prior to seat one?

A. No, I am not telling you that. I'm telling you that in the various statements that several of these people used, they refer to the bulkhead at the end -- forward end of the troop compartment. So, I presume, you know, that there was one there. Maybe I am wrong.

Q. Well, the partition at the lavatory would be a bulkhead, at least by my standard, would it not?

A. Sure.

Q. I mean, that partition, wall is another word for bulkhead, isn't it?

A. Something across there, yes.

Q. That's right. And so the lavatory has a bulkhead in its rearward orientation?

A. Yes, sir. It does have.

Q. So, if she left,-- you have her daughter to the right of her, is that right? The way I see this diagram here --

A. Yes, sir. That is correct.

Q. You have Barbara next to her daughter there?

A. That is correct. That is correct.

Q. Now, you don't know that she wasn't flung up over those seats, do you?

A. No, I don't know that.

Q. And if she was flung up over those seats from a braced position between the seats striking anything forward there, meaning several rows of seats forward, that would suggest that your calculations are off, wouldn't it?

A. No, not at all.

Q. How many Gs --

A. Oh, you mean with regard to the speed at which she hit the bulkhead?

Q. Or the G bars or anything else.

A. I have not computed the G bars. I have calculated the speed based upon an estimated distance.

Q. What kind of force would it take to propel her out of that position and up over the seat and down the isle

to strike anything at thirty miles an hour?

A. Might not take virtually any force at all. It depends on what she does. Does she turn loose? Does she stand up? Does she move out in the isle to try to do whatever she has decided she's going to do? Does she think the first impact is it and it is all over, and she steps out into the isle and at the second impact and wham, down the isle she goes?

Q. Do you know whether she was killed at the first or second impact?

A. She was not killed at the first impact. That is an absolute certainty.

Q. How do you know that?

A. Because the change of velocity in the first impact was less than one foot per second, and so if she went down the isle, she did so at less than crawling speed.

Q. Tell me this --

A. She would not have been killed as a result of such action.

Q. How did the two babies die?

A. I am not sure that two did, first.

Q. Do you have any explanation?

A. The one that died --

Q. Right.

A. -- to my knowledge --

Q. Alright.

A. -- died because of strangulation.

Q. And how did that happen?

A. Because of some cord that got wrapped around the child's neck, having to do with a satchel or something that was placed around it's neck.

Q. How would that happen?

A. I don't know.

Q. No, I am talking about how would it happen mechanically that that child would die by the cord being around its neck?

A. If you got strangled?

Q. Yes.

A. Just by getting strangled.

Q. But where would the cord have to be? The pressure would have to be on the front of the neck not the back of it, is that right?

A. It would have to be on the front of the neck?

Q. Yes.

A. It would have to be all the -- well, it would have to close off the air passage.

Q. Alright. Now, how would that cord then strangle the child?

A. Well, let's just -- do we know where the child was seated?

Q. I don't know if she was -- somebody and that child was in the troop compartment in a rearward facing seat. You have assumed all of them were. Did you assume that one was different?

A. You understand that I don't know, and I don't think you know, and I don't think anybody knows how this happened. We can only surmise at how it might have happened; and I'm willing to do that --

Q. Well, let me make sure that I understand this, Doctor Turnbow. Essentially much of what you have said about this crash is surmised, isn't that true?

A. Much of what I said? Much means more than 50%?

Q. Yes.

A. Well, you know, Mr. Lewis, this is not the first one of these that I have been through; but I think that this case is so straight forward with regard to the G levels associated with this troop compartment that, like I said in my statement, I think it is beyond any possibility that the deceleration were high enough to provide any direct hazard

to those children certainly who were seated and the adults who remained in position --

Q. Between the seats?

A. -- in the aircraft, wherever they were. Some of them remained in position in the isle.

Q. Well, let me ask you this --

A. Or even who restricted the motion to the point to where they didn't develop a relatively large velocity with respect to the aircraft and hit down here at the "the bulkhead" and whatever that is. Maybe it isn't a bulkhead.

Q. You're speaking of forward end?

A. Forward end.

Q. Let me ask you this, then, sir. If G loadings of five Gs or less would damage a baby's brain, then you could be wrong, is that right? I'm not asking you to agree, doctor, but if that were true, then you could be wrong about the capacity to injure babies' brains, is that correct?

A. Yes, I guess that possibly would be correct because I can anticipate that peak accelerations in this accident could have been as high as five Gs.

Q. So if somebody who was very knowledgable in infants' brains, both as to their structure and what the anatomy is; and if both people concluded that five Gs could

injure babies' brains, then you would agree that there would be forces that could do so, otherwise not?

A. Yes, sir --

MR. DUBUC: Just a minute. Just a minute. I object to the form.

MR. LEWIS: Okay.

MR. DUBUC: Are you asking him to assume that or are you saying is that?

MR. LEWIS: I'm just asking him to assume that.

MR. DUBUC: Assume that. Without any disagreement, okay, even though somebody may disagree.

BY MR. LEWIS:

Q. Alright. But is that correct, sir? In other words, if five Gs could injure a baby's brain, and I'm not asking you to agree with their studies, but if that was established, then the capacity to injure baby's brains would be present, is that correct?

MR. DUBUC: Hold the question.

MR. LEWIS: I am happy to hold it. (Pause)

MR. LEWIS: Let me just get this one question, Carroll, and I know that the witness has to go.

Sir, I am just trying to establish this one thing. Assume, if you will, and I'm not asking you to agree that this

is the case, but assume, if you will, that loads of five Gs had the capacity to injure babies' brains. If that were true, then there would be the capacity -- then this airplane crash had the capacity to injure the children in the seats?

MR. DUBUC: When you say five Gs, you are talking about five Gs minus X, in rearward facing seats?

MR. LEWIS: I'm speaking as they were oriented here.

MR. DUBUC: Alright. You are assuming if, under those circumstances, minus X, five Gs had the capacity to injure children's brains, what?

MR. LEWIS: Then he would concede that this aircraft, there was enough force to injure their brains.

MR. DUBUC: Oh, the ones in there?

MR. LEWIS: Yes.

MR. DUBUC: I don't think you're asking him a positive question. These are individual people.

BY MR. LEWIS:

Q. But isn't that so, sir?

A. Well, that is not quite true because what I've told you here is that I don't think the G levels exceeded five Gs.

Q. I understand that.

A. The question is what were they really. One?

Q. I believe you said there was a peak of five Gs.

A. Okay. Now, the question is how long is that load applied. The peaks imply very very short duration, okay. So, for me to go along with your supposition here about the only outcome of this --

Q. Yes.

A. -- you know, you are going to have to talk about how long this load was applied. Five Gs is not the whole story.

Q. Alright. I think we just better quit here, Mr. Dubuc, in fairness to the witness.

MR. DUBUC: Alright.

MR. LEWIS: We will suspend and I will agree with the time with counsel to resume.

(A discussion was held off the record.)

MR. LEWIS: Thank you, doctor.

Whereupon, at 5:25 o'clock p.m., the taking of the instant deposition ceased.

CERTIFICATE OF NOTARY PUBLIC

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF FAIRFAX)

I, CLAIREEN M. HOLMES, the officer before whom the foregoing deposition was taken, do hereby certify that Dr. James Turnbow, whose testimony appears in the foregoing deposition, was duly sworn by me, a Notary Public in and for the Commonwealth of Virginia at Large; that the testimony of said witness was recorded by me by stenotype and thereafter reduced to typewritten form under my direction; that said deposition is a true record of the testimony given by said witness; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this deposition was taken; and, further, that I am not a relative of or employee of any attorney ro counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of the action.

Clareen M. Holmes
Notary Public in and for the
Commonwealth of Virginia

My Commission Expires:

February 8, 1985

NOTE

Upon reading the following deposition and before subscribing thereto, the deponent, _____, deposed on _____, indicated the following corrections:

Page 11 Line 8 Reads: Peters

Should Read: Hughes

Page 32 Line 13 Reads: IN

Should Read: NOT

Page 54 Line 11 Reads:

Should Read: would be

Page Line Reads: would not be

Should Read:

Page Line Reads:

Should Read:

_____

DEPONENT

NOTE

Upon reading the following deposition and before subscribing thereto, the deponent, _____, deposed on _____, indicated the following corrections:

Page Line Reads:

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DEPONENT

NOTE

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DEPONENT

I have read the foregoing 192 pages which contain a correct transcript of the answers given by me to the questions recorded therein.

_____

Signature of the Witness

- - -

SUBSCRIBED AND SWORN to before me this _____ day of _____, 1981.

_____

Notary Public

My Commission expires: _____.

JAMES M. ESTABROOK
EDWARD H. MAHLA
JOHN C. MOORE
MAC DONALD DEMING
GORDON W. PAULSEN
M. E. DE ORCHIS
DAVID P. H. WATSON
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*ADMITTED TO D.C. BAR

October 15, 1981

BY HAND

James Turnbow
5126 East Flower Street
Pheonix, AZ 85018

FFAC/Kurth/Marchetti v. Lockheed Aircraft Corporation
Our files 2041-1278-2S/6S/5C

Dear Mr. Turnbow:

Enclosed is a copy of your recently taken deposition and the original signature page. Please read your deposition and make any necessary corrections on the enclosed blank correction sheets, sign each sheet and forward them together with the signed and notarized original signature page to me.

I will transmit these immediately to the Court Reporter so that your original deposition can be filed with the Court hopefully before the Marchetti trial begins.

Please retain the copy of the deposition for your files.

Very truly yours,

HAIGHT, GARDNER, POOR & HAVENS

By: Anne Kundert

Anne Kundert
Paralegal Supervisor

Enclosures
/gvs

COPY

UNITED STATES DISTRICT COURT
FOR THE
DISTRICT OF COLUMBIA

STENOGRAPHIC TRANSCRIPT

FRIENDS FOR ALL CHILDREN, INC., as legal guardian and next friend of the named 150 infant individuals, et al,	:	
Plaintiffs,	:	
-vs-	:	Civil Action No. 76-0544
LOCKHEED AIRCRAFT CORPORATION,	:	
Defendant and Third-Party Plaintiff,	:	
-vs-	:	
THE UNITED STATES OF AMERICA,	:	
Third-Party Defendant.	:	

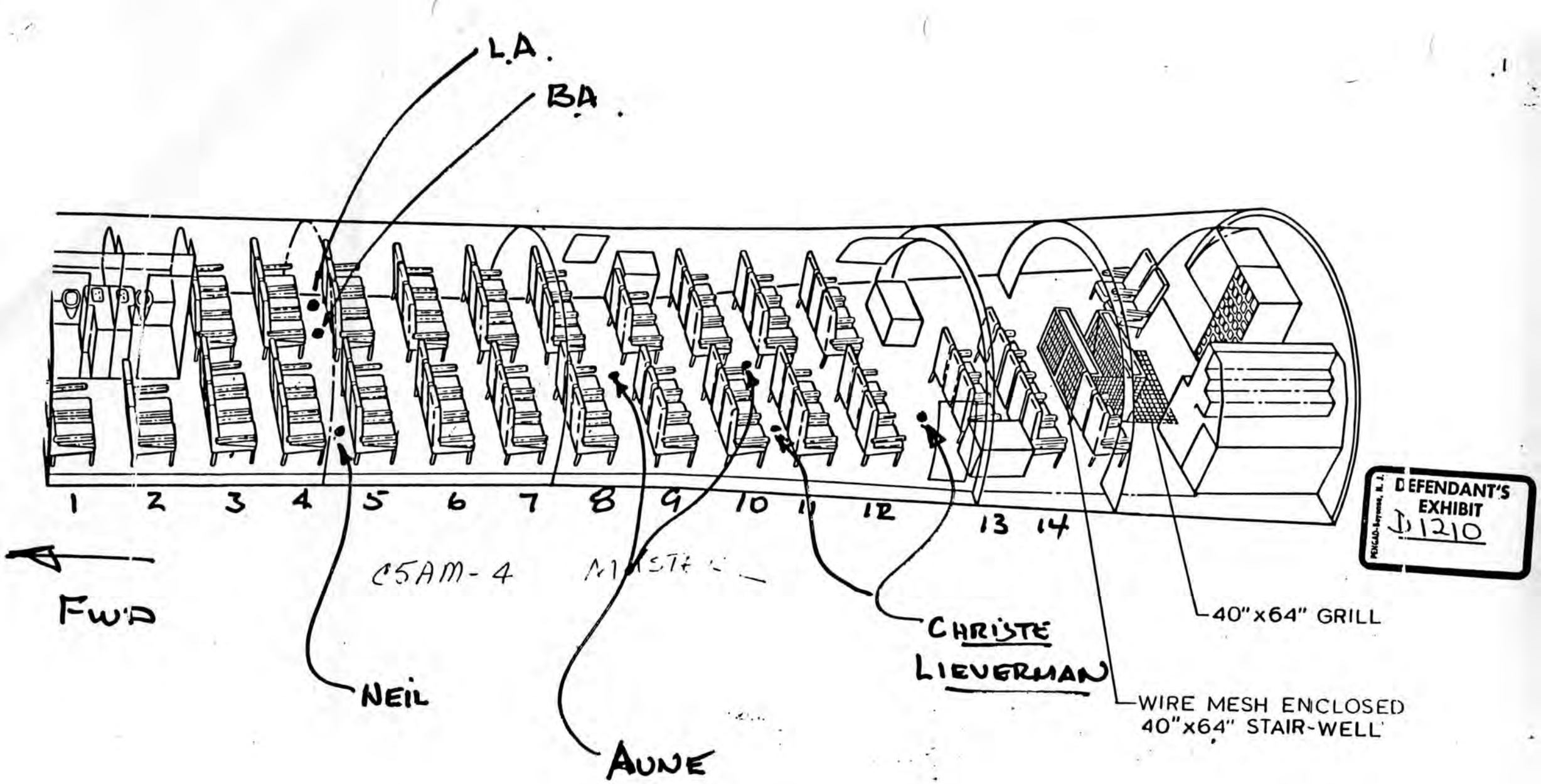
Arlington, Virginia

Thursday, October 8, 1981

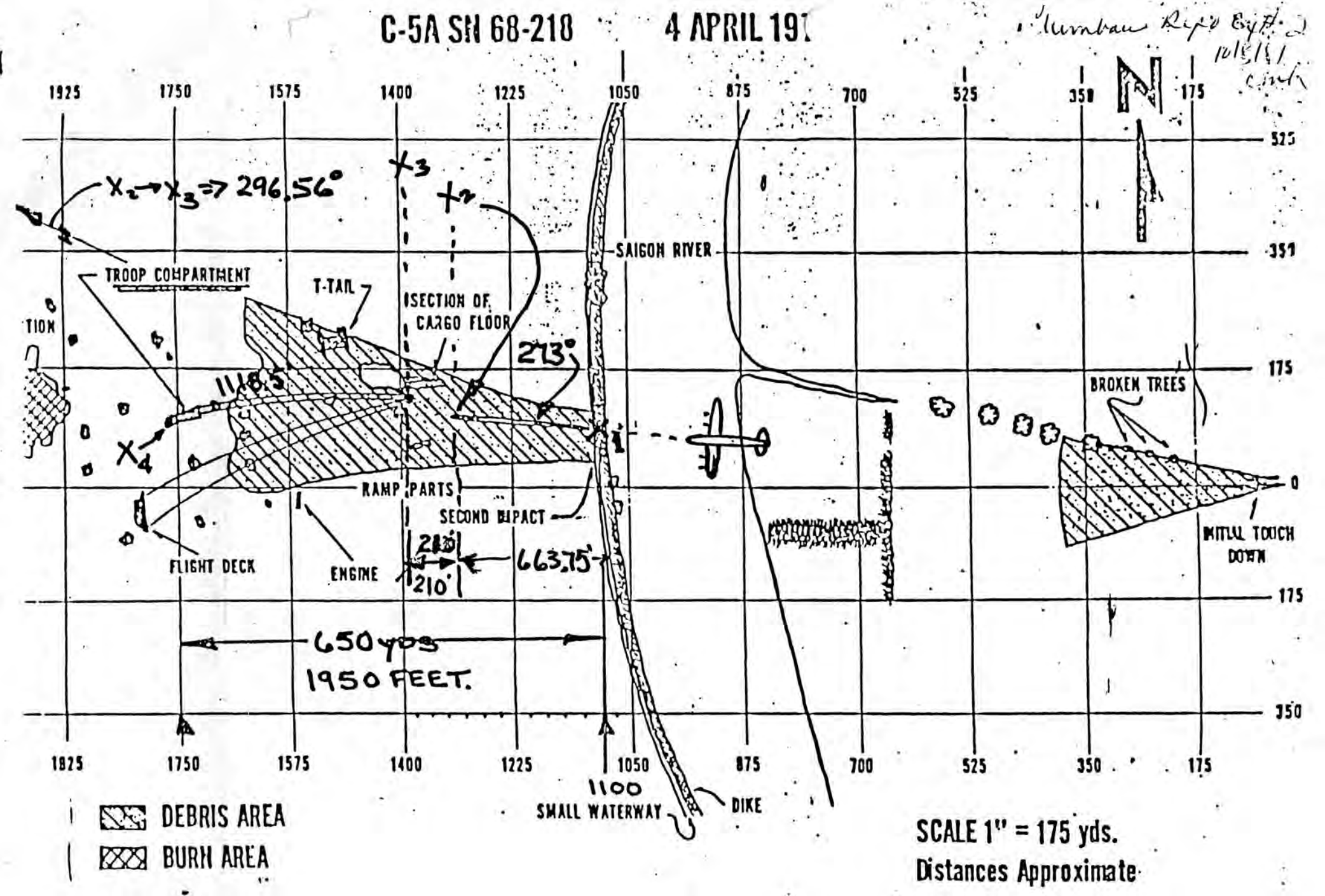
Deposition of

JAMES W. TURNBOW

Mattingly Reporting, Inc.
COURT REPORTERS
4339 Farm House Lane
Fairfax, Va. 22032



Turnbow Exh. 1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4 APRIL 197
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525
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175
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350
$X_2 \rightarrow X_3 \Rightarrow 296.56°$
X_3
X_2
X_4
TROOP COMPARTMENT
T-TAIL
SECTION OF CARGO FLOOR
213'
1116.5
SAIGON RIVER
BROKEN TREES
RAMP PARTS
SECOND IMPACT
FLIGHT DECK
ENGINE
210'
663.75'
INITIAL TOUCH DOWN
650 yds
1950 FEET.
1100
SMALL WATERWAY
DIKE
DEBRIS AREA
BURN AREA
SCALE 1" = 175 yds.
Distances Approximate