

JEFFREY L. STEIN, PhD

UNITED STATES PATENT AND TRADEMARK OFFICE

ZF NORTH AMERICA, INC., et al.,

Petitioners,

- vs - Review No. IPR2023-00273
 Patent No. 7,021,415 B2

STONERIDGE CONTROL DEVICES, INC.,

Patent Owner.

Examination before trial of JEFFREY L.
STEIN, PhD, taken pursuant to notice and agreement
of counsel, at REGUS Conference Center, Genesee
Conference Room, 510 Clinton Square, Rochester, New
York, on October 26, 2023, commencing at 8:51 a.m.,
before ANDREA J. HOBBS, Notary Public.

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**JEFFREY L. STEIN,
PHD**

BY MR. HUTCHINS

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1 THE REPORTER: How is the billing going to
2 work for the deposition?

3 MR. HUTCHINS: How is the billing?

4 THE REPORTER: Yeah. Like, do you each buy
5 your own or --

6 MR. HUTCHINS: Oh, yeah.

7 THE REPORTER: Is that how it's going to
8 work?

9 MR. HUTCHINS: Yes. So we'll -- Carlos, I
10 think, put in an order.

11 THE REPORTER: I just need to have it on the
12 record. Do you know what it was?

13 MR. HUTCHINS: No, but if you -- he'll
14 e-mail you what our order is at the end of the day.
15 I assume -- yeah. And I don't -- as far as rushing
16 or not, what's your normal turnaround?

17 THE REPORTER: 10 business days. I think it
18 said that this was going to be a 7-day expedite.

19 MR. HUTCHINS: Yeah, one week is fine.

20 THE REPORTER: Okay. And then is there any
21 stipulations?

22 MR. HUTCHINS: No.

23 MR. MURPHY: Do I need to separately order a
24 copy?

25 THE REPORTER: Are you ordering a copy?

1 MR. HUTCHINS: If you want a copy, you will.

2 MR. MURPHY: Yeah.

3 THE REPORTER: Okay. So you'll be buying
4 your own copy?

5 MR. MURPHY: Correct. And standard's fine,
6 thanks.

7 THE REPORTER: And you said no stipulations?

8 MR. HUTCHINS: No.

9

10 JEFFREY L. STEIN, PhD, 65 Barrington Street,
11 Rochester, New York 14607, after being duly called
12 and sworn, whose identity was confirmed by
13 government-issued documentation, testified as
14 follows:

15 EXAMINATION

16 BY MR. HUTCHINS:

17 Q. Is it -- my name is John Hutchins; I
18 represent the petitioners. And is it all right if
19 I call you Dr. Stein?

20 A. That's -- whatever your pleasure.

21 Q. Okay. Dr. Stein, have you ever been
22 deposed before?

23 A. Yes.

24 Q. And how many times?

25 A. I don't know off the top of my head.

1 Q. Are we talking more than a dozen?

2 A. Yes.

3 Q. Okay. So you likely know how this
4 works in general. If I say anything that's unclear
5 to you or that confuses you, just let me know.
6 Okay?

7 A. Of course.

8 Q. And please provide your answers
9 verbally so the court reporter can take them down
10 rather than shaking your head or nodding your head;
11 is that okay?

12 A. Yes.

13 Q. I plan to take a break roughly once an
14 hour for everybody's comfort, but if you feel you
15 need a break before that, please just let me
16 know --

17 A. Sure.

18 Q. -- and I'll try to accommodate that.

19 A. Thank you.

20 Q. And are you aware of anything that
21 would prevent you from providing truthful and
22 accurate testimony here today?

23 A. No, there's nothing that I'm aware of.

24 Q. Okay. And what did you do to prepare
25 for the deposition today?

1 A. I reviewed my declaration and the, you
2 know, materials that are cited in the declaration
3 and I had a meeting with Mr. Murphy, and that would
4 be sum total of my preparations.

5 **Q. And about how long did that take?**

6 A. I -- I just would -- I guess I would
7 have to guess, check my records that I keep. So I
8 don't know the number of hours that I spent.

9 **Q. On the order of half the day?**

10 A. No, it's more than a half a day.

11 **Q. Okay. But maybe two days?**

12 A. So I don't remember exactly, but on the
13 order of -- of -- on the order of days of
14 preparations.

15 **Q. Okay. Other than meeting with your**
16 **counsel -- when you refer to Mr. Murphy, you were**
17 **referring to counsel; is that correct?**

18 A. Yes.

19 **Q. Other than meeting with counsel, did**
20 **you meet with anyone else to provide you**
21 **information to prepare for your deposition?**

22 A. No.

23 **Q. Now, let me hand you what's been marked**
24 **as Exhibit 2005 and take a look through that and**
25 **tell me if you recognize it.**

1 A. This appears to be my declaration that
2 I authored this summer on -- signed on the 24th of
3 August.

4 **Q. And is it your general understanding**
5 **that one of the reasons we're here today is so that**
6 **I can ask you questions about this declaration?**

7 A. It is my understanding that this is
8 the -- the reason for asking me to be here is to
9 respond to opinions that I've authored in this
10 declaration.

11 **Q. And is it your signature at the end of**
12 **the declaration on page 71; is that correct?**

13 A. Yes, it is.

14 **Q. And if during the course of the day**
15 **today I refer to declaration, is it okay if we have**
16 **common understanding that I'm referring to**
17 **Exhibit 2005?**

18 A. I guess that there are other
19 declarations in this matter and we should be clear
20 as to which declaration we're speaking about. If
21 it is clear from the context then that's fine,
22 but --

23 **Q. Is there another -- would you prefer me**
24 **to use Exhibit 2005 then to refer to your**
25 **declaration rather than calling it the declaration,**

1 or is there some other name you'd prefer me to use?

2 A. Your declaration.

3 Q. Your declaration? Okay. And let me
4 ask you what's been previously marked as
5 Exhibit 2006. I'm going to hand you what's been
6 marked as Exhibit 2006 and ask if you recognize
7 that.

8 A. Yes. This is a copy of my -- of my
9 curriculum vitae.

10 Q. And is it a current copy of your CV?

11 A. It is not the most recent copy, but it
12 is fairly recent.

13 Q. Is there anything of import that you
14 would have added to this Exhibit 2006 if you were
15 submitting it today as opposed to at the time you
16 submitted your declaration?

17 A. I don't believe so.

18 Q. Before you submitted Exhibit 2006 to be
19 used in this proceeding, did you make any
20 particular changes or alterations to it?

21 A. I don't recall specifically when I --
22 well, I -- it says that this particular copy of my
23 CV was updated February 6th.

24 And I would have to check my records, but I
25 don't believe that I had done any work on the case

1 before that date.

2 Q. Okay. So as far as your recollection,
3 this CV was not, I'll say, individualized for this
4 particular case?

5 A. That's correct.

6 Q. Okay. Let me hand you what's been
7 marked as Exhibit 1001. And do you recognize this
8 to be the patent that's the subject of the
9 proceedings that we're -- that are the subject of
10 the IPR between ZF and Stoneridge?

11 A. Yes.

12 Q. And is it all right with you if during
13 the course of the proceedings today, I refer to
14 Exhibit 1001 as the 415 Patent?

15 A. That's fine.

16 Q. Have -- going back to your CV, have --
17 have you ever designed any electromechanical
18 actuators?

19 A. Yes.

20 Q. And can you describe for me which those
21 were?

22 A. Much of my research work and my --
23 my -- roughly speaking -- in the 1980s and '90s had
24 to do with electromechanical drive systems and a
25 number of research papers that I have listed in my

1 CV relate to the design of electromechanical
2 systems.

3 Also, my teaching at University of Michigan,
4 both undergraduate and graduate, focused on,
5 amongst other things, electromechanical drive
6 systems.

7 Q. And when you mentioned a number of your
8 research papers involved electromechanical systems,
9 would you consider those then to be actuators?

10 A. Actuators are part of those systems,
11 yes.

12 Q. Now, have you ever worked on any
13 electromechanical actuators for automobiles?

14 A. So in the broad context of
15 drive-by-wire systems, looked at steering systems
16 which were drive-by-wire, so electromechanical
17 steering, electrical brake actuation, transmission
18 control with electromechanical actuation. Those
19 are the first things that come to my mind.

20 Q. And can you describe for me your work
21 then with respect to electrical brake actuation in
22 automobiles?

23 A. I've done work with respect to antilock
24 brake systems.

25 Q. And what work was that?

1 A. Some of that work has been in the
2 context of research work where we're -- I was an
3 associate director of the University of Michigan
4 Automotive Research Center, better known as ARC,
5 and in that context we looked at a lot of parts of
6 the vehicle and -- meaning automobiles and trucks
7 that we -- including the braking systems, antilock
8 braking systems, that we worked on in the -- in the
9 center, and that was under my -- some of my
10 supervision.

11 **Q. Now, setting aside work that you may**
12 **have supervised, what did you actually do, if**
13 **anything, with respect to brake actuators for**
14 **automobiles?**

15 A. I'm not sure that I understand your
16 question. Could you repeat it?

17 **Q. Sure. Can you describe for me the sum**
18 **total of work that you personally have done with**
19 **respect to the design or implementation of**
20 **actuators for brake systems in cars?**

21 A. So I'm having trouble with the idea
22 that I've done personally as opposed to work that
23 I've done in the context of -- well, let's say
24 other context besides what you're calling personal.
25 I don't know what you mean by personal.

1 Q. Okay. Well, let's -- let's break it
2 down. Have you, at some point in time, had people
3 working for you who designed actuators for brake
4 systems in automobiles?

5 A. So I would say that generally the
6 answer to that question is -- is yes.

7 Q. And who are you thinking of?

8 A. You want their specific names or --

9 Q. Sure. I -- can you elaborate upon who
10 it is that you think was working for you that
11 designed actuators for -- for brake systems in
12 cars?

13 A. So I had in my -- in my laboratory what
14 we call research scientists that are paid to help
15 out with research work that's being done in the
16 lab, and I also had doctoral students and master's
17 level students and occasionally undergraduate
18 students, but I'm not sure that they were ever
19 paid.

20 Q. And you believe at some point in time,
21 one or more of those people were designing
22 actuators for brake systems in cars; is that
23 correct?

24 A. Cars and trucks.

25 Q. Now, did you -- and this is where the

1 personally comes in. Did you, personally, ever
2 design an actuator for a brake system in an
3 automobile?

4 A. So that's when I don't understand what
5 you mean by personally. Every one of these people
6 that were working for me would be meeting with me
7 on a continuing basis and we would go over all of
8 the details of the particular project that they
9 were involved in.

10 Q. Okay.

11 A. So I very much felt like I was, you
12 know, involved personally on all these projects.

13 Q. Okay. Do you -- did you consider their
14 work to be your work?

15 A. I did --

16 Q. Okay.

17 A. -- consider that to be the case, yes.

18 Q. Now I understand. Okay. So now with
19 that understanding then, what were the -- what
20 were -- what was the nature of the work that was
21 being done on the actuators for parking brakes for
22 automobiles that these research scientists or
23 doctoral or master's researchers were doing?

24 A. Now, you added parking brake in -- in
25 your question and that wasn't something you had

1 before in your question.

2 Q. Fair enough. Let's -- let me break it
3 down into those two since I was asking previously
4 about brakes in general.

5 Have you or your teams ever been involved
6 with designing parking brakes for automobiles?

7 A. Not that I can specifically recall.

8 Q. Okay. So then let me broaden the
9 question since I accidentally added parking brakes,
10 as you -- as you mentioned.

11 Can you describe for me the nature of the
12 work that was being done by the research scientists
13 and doctoral and master's researchers that were
14 working for you with respect to brakes and their
15 actuators in automobiles?

16 A. So broadly speaking, we were trying to
17 look at design issues as they interfaced with their
18 performance of vehicles, vehicle performance, and
19 braking of course is -- is part of that.

20 And so we were involved in looking at
21 implementing the characteristics of the braking
22 system into our -- as well as other parts of the
23 vehicle -- into simulation environments that would
24 allow us to study how the components affected the
25 behavior of the vehicle doing certain maneuvers for

1 example.

2 Q. Do you recollect any projects focused
3 particularly or specifically on braking systems of
4 automobiles?

5 A. I don't think I understand your
6 question. Could you mean -- explain what you mean
7 by particularly focused on?

8 Q. Sure. Well, you mentioned in your last
9 answer, and this is why I asked the question, that
10 you were looking at creating a simulation or a
11 model of some sort for vehicle performance that
12 included, among various other aspects of the car,
13 the braking system.

14 And I was asking you if you were aware of
15 any projects where the main focus of the project
16 was the braking system specifically.

17 And if that, by the way, includes the
18 project you were just talking about, please feel
19 free to say so.

20 A. I'm not sure really how to answer that
21 question. I can tell you that we included braking
22 systems in our analysis of the vehicle because it's
23 important to mobility of the vehicle, the
24 performance of the vehicle. So that's how I would
25 answer your question.

1 **Q. Okay. And did you or any of your teams**
2 **ever design any components for a braking system in**
3 **an automobile?**

4 A. Well, as I mentioned, we were looking
5 at how the braking systems, amongst the other
6 systems as well, affected the performance of the
7 vehicle and looking at how the design affected the
8 performance, and in some cases optimizing the
9 design to try to get better performance.

10 **Q. And sitting here today, can you think**
11 **of any improvements you or your teams made to the**
12 **design of a braking system in an automobile?**

13 A. Well, it's a matter I guess of -- of
14 exactly how you define improvements. That was the
15 goal of our work was to understand the relationship
16 between the design of different components within
17 the vehicle and the performance of the vehicle with
18 the idea of improving the performance of the
19 vehicle.

20 **Q. And is there any particular design**
21 **change that you or your team developed with respect**
22 **to a braking system of an automobile that you can**
23 **think of sitting here today?**

24 A. I think in a broad sense, that we
25 looked at improvements. We were able to see

1 improvements in -- that is we were able to see what
2 the most important components were in governing the
3 behavior of the vehicle. So in that sense, yes.

4 Q. And what was the design change that
5 resulted from the analysis you just described?

6 A. I guess I just -- as I'm sitting here
7 today, I can't remember enough of the fine detail
8 to be able to answer your question.

9 Q. Okay. Did -- have you ever designed a
10 component for a mass-produced commercial
11 automobile?

12 A. I guess it depends on what you mean by
13 designed in that context.

14 Q. Sure. Do you have an understanding of
15 what it means to -- if -- let's step back even
16 further.

17 Let's take an example of a commercial
18 automobile, say a 2005 Honda Accord or the like,
19 but we'll say a 2005 Honda Accord.

20 There are many, many parts in a 2005 Honda
21 Accord, each of whom -- each of which were designed
22 by someone. Can we agree upon that or a team of
23 somebodies?

24 A. Team of somebodies, yes.

25 Q. Okay. And what, if anything, do you

1 understand to be involved at a car company with
2 respect to the design of a particular component?
3 In other words, creating a specification, if you
4 will, for what the component is going to be.

5 A. Your question is extremely broad and
6 makes it difficult to -- to answer. I certainly
7 have been involved with the automobile companies
8 and some of the design engineers and teams.

9 And there's a lot of cross-functional
10 information that is provided to the teams from
11 other teams and from higher up engineering and from
12 research and development.

13 And the idea that there's just one little
14 team that's off in a corner that produces part A
15 and another group of people of a different corner
16 producing part B is just not the way engineering's
17 done.

18 Q. Have you ever created or worked on, in
19 particular, a specification for a particular
20 component in a mass-produced automobile?

21 A. I have been involved in helping the
22 automobile companies come up with specifications
23 for different parts of the vehicle.

24 Q. And which parts are you thinking of and
25 which vehicles are you thinking of?

1 A. Talking about -- so, for example, I was
2 involved with Chrysler -- well, what was called
3 Chrysler at the time, and we were looking at their
4 development of electrical systems within their cars
5 to, you know, be smart products.

6 And I was involved with them in trying to
7 come up with the ability to get a good estimate of
8 the mass of the vehicle as part of the ability of
9 the system to, for example, control different loads
10 that the vehicle might be carrying, different
11 payloads in the vehicle itself whether a trailering
12 a vehicle -- you know, a trailer behind the vehicle
13 and concerned about how to change the -- you know,
14 the behavior of the vehicle automatically by
15 sensing the mass of the vehicle.

16 **Q. So you were helping them to understand**
17 **the mass of the vehicle as a whole?**

18 A. Not to understand the mass of the
19 vehicle, to be able to estimate what the
20 instantaneous mass of the vehicle would be while
21 the vehicle is being used.

22 You hook up a trailer, you load up the
23 vehicle, the mass of the vehicle changes. It
24 changes the braking requirements, for example.

25 **Q. And as part of that, did you help**

1 anyone at Chrysler design any particular component
2 of a mass-produced Chrysler?

3 A. Well, I would say that we helped them
4 be able to design their braking systems and their
5 other systems that are important to vehicle
6 performance as a function of having a good
7 representation of vehicle mass.

8 Q. And as part of that work, did you or
9 anyone of your team actually sit down and attempt
10 to design any particular component of a braking
11 system?

12 A. In that particular work, we were
13 providing them with the high-level data that was
14 coming in for -- about the mass of the vehicle.
15 The specific changes that they made to the
16 components for production, I was not involved in.

17 Q. Is there any instance where you can
18 remember that as part of your work, you or someone
19 who was working for you actually sat down and
20 attempted to design a particular component of a
21 particular mass-produced automobile?

22 A. Could you repeat the question, please?

23 Q. Sure. Is there any instance where you
24 can -- well, let me break it down.

25 Is there any instance where you can remember

1 that you actually sat down and attempted to design
2 a particular component of a particular
3 mass-produced automobile?

4 A. Could I ask you to -- to rephrase that
5 question, please?

6 Q. Sure. What about it's unclear?

7 A. Well, if I could tell you that, I
8 wouldn't have to ask you to rephrase. Just -- if
9 you could -- if you just simply want to repeat it,
10 that's fine, but --

11 Q. Sure. The question was, is there any
12 instance that you can remember that you actually
13 sat down and attempted to design a particular
14 component for a particular mass-produced
15 automobile?

16 A. I mean, I worked on mass-produced
17 vehicles, I worked with the car companies in trying
18 to improve those vehicles and attempted to help
19 with that process of coming up with improved
20 designs. So I guess in that general sense, yes.

21 Q. Okay. And sitting here today, is that
22 the -- the best answer you can provide me about
23 your work on the design of any particular component
24 for a particular mass-produced automobile?

25 A. Well, that's your characterization to

1 say, is that your best answer. What do you mean is
2 it my best answer? It is my answer --

3 Q. Fair enough.

4 A. -- I gave you to --

5 Q. Exactly. I have to take your answers
6 as they are. You're absolutely correct, sir.

7 If you could look at your CV, Exhibit 2006,
8 and there's -- there's a lot of publications here
9 listed in it.

10 Are there -- are there any of your
11 publications in your CV that are closely related in
12 your view to the subject matter of the 415 Patent?

13 A. I believe so.

14 Q. And can you identify the ones that you
15 believe are most closely related for me, please?

16 A. So, for example, one that might not pop
17 out at you, if we look on page 15 of my CV, C2 was
18 a paper that I authored with my doctoral thesis
19 advisor.

20 We were very interested in the relationship
21 between the design of electromechanical systems,
22 electrohydraulic systems, and the ability to get
23 good performance out of those systems.

24 And this was a conference in which some
25 specific work that I was doing for my doctoral work

1 at the time, which was on the design of the
2 prosthetic device that had an actuator in it, and
3 the design characteristics, how those were
4 considered given that in that -- in this particular
5 case we had some very specific requirements for the
6 prosthetic device in terms of how we wanted to
7 control it, how noisy it could be, and things of
8 that nature.

9 And so it was the intersection between the
10 design and control and noise characteristics that
11 we were trying to look at as a total picture.

12 Then the next one, C3, there are a number of
13 papers here. I did quite a bit of work on
14 actuation -- electromechanical actuation systems,
15 that's what C3 is; that's what C4 is; that's what
16 C5 is.

17 Those systems, I was interested in the
18 characteristics of those electromechanical systems,
19 how they were performing, and how the performance
20 could be characterized and how the design of those
21 systems could be best utilized for controlling the
22 process, in which -- in that case was -- these are
23 for machine tools, for metal cutting, not for
24 parking brakes, but it's the same kind of idea of
25 electromechanical actuation system, precision

1 actuation systems.

2 And I mean, I -- C14, several systems with a
3 backlash, a particular focus on the issues involved
4 with drive trains that have what we call backlash
5 or spacing in the gearing, which is difficult to
6 avoid completely, and the impact of this on the
7 performance of these precision motion systems.

8 C17 has to do with the issues of friction
9 that come up and how the friction care -- affects
10 the performance of these precision motion systems.

11 So as you say, there's a lot of publications
12 here so we could go through other -- let's see.
13 That -- that -- if I could ask you to repeat your
14 question so I could stay with my answer on track.

15 **Q. Sure. I was asking you to identify**
16 **the -- the publications that you thought were most**
17 **relevant to the subject matter of the 415 Patent.**

18 A. I see. Well, that's a pretty broad
19 question so I'm giving a pretty broad answer.

20 **Q. I -- I appreciate that. Again, any**
21 **guidance you can provide me as to which ones I**
22 **should focus on.**

23 A. So -- so C57 on page 19 is a design
24 problem that I worked on with a number of people in
25 my doctoral -- my doctoral students and

1 Derek Hogland was an undergraduate is one of the
2 authors in this paper.

3 We were looking at, like, how we could look
4 at vibration transmission in vehicles and how
5 those -- how the performance of the vehicle in
6 terms of controlling those vibrations would be
7 affected by the design of the vehicle, right?

8 So you're looking at, again, the
9 intersection of design with the -- in this case,
10 the NVH characteristics of the vehicle as well as
11 the handling.

12 I'm trying to -- so paper C66 I think also
13 is something that I should mention. This was a --
14 worked on by my doctoral student with me on looking
15 at the vibrations produced by an engine in a
16 vehicle and trying to understand the engine
17 vibration problem, which -- and its impact
18 ultimately of course on the NVH of the vehicle.

19 I think it's a lot of territory here to
20 cover. On page 5, J2 is a paper that I published
21 that along with Hedrick, H-E-D-R-I-C-K, which was
22 looking, again, in this case at NVH issues in
23 trucks, so vibration issues in trucks.

24 And that is a publication that records the
25 work of this project in the National Academy of

1 Sciences.

2 There were also other -- there were three
3 aspects of this -- the problem. I was looking at
4 the NVH problems. There was an issue on -- on
5 braking in the vehicle and -- that I was involved
6 in, but I wasn't the specific researcher on that
7 aspect, but was involved in all the research
8 meetings about it.

9 And there was a third aspect which had to do
10 with the handling, but they all had to do with
11 truck performance and mine was specifically on the
12 vibration reduction issues.

13 So page 7, number J17 -- is it 17? No, J18,
14 I'm sorry, worked at -- I did with my doctoral
15 student on a design of spindles in machine tools.
16 Again, high accuracy, high performance,
17 electromechanical servo system, and accuracy is so
18 important in those things that it's really
19 important that the bearings are preloaded so as to
20 not allow any play at all.

21 But when they are used and at -- under some
22 conditions, high speed conditions, they generate a
23 lot of heat which changes the loads on the bearings
24 and you can destroy the bearings if you're not
25 careful so you have to try to regulate the -- the

1 load so that they don't self-destruct.

2 So a lot of the work I did in the -- on some
3 of these publications have to do with the design
4 characteristics of electromechanical systems and
5 trying to improve them.

6 So Article J36 on page 9 is work that was
7 specifically looking again at the intersection of
8 design and design specifications for -- that
9 affected vehicle handling and vehicle ride quality.

10 J38 paper that I was involved in again on
11 truck mobility and handling issues, handling of the
12 vehicle, braking, lane changing, mobility issues
13 more generally speaking.

14 So I -- there are probably others, but there
15 are a lot of papers here, a lot of ground to cover.

16 **Q. That's okay. I appreciate your**
17 **willingness to go through that for me.**

18 **Sitting here today, do you know if any of**
19 **those papers or publications discussed the use of**
20 **passive isolators for vibration damping?**

21 A. We certainly talked about the control
22 of vibration transmission as a function of altering
23 the design parameters such as stiffness and damping
24 characteristics of -- of the components.

25 **Q. And in those discussions, do you**

1 recollect there being any discussion about passive
2 isolators?

3 A. I mean, all of the suspension
4 components in vehicles are passive isolators.

5 Q. So you believe your publications
6 discussed passive isolators in the sense of
7 referencing suspension components; is that correct?

8 A. I'm saying that the nature of
9 suspension components in vehicles is to -- is to
10 reduce the -- the services from the road into the
11 passenger compartment and that is done by
12 judiciously designing the damping and stiffness
13 characteristics of the suspension components.

14 So in the same sense of the isolators that
15 are talked about in the 415 Patent, this is
16 something that I worked on in the context of
17 passive suspension components in vehicles.

18 Q. Do any of your publications discuss,
19 that you can recollect sitting here today, the
20 types of isolators discussed in the 415 Patent?

21 A. I -- I want to be -- to be clear and
22 accurate and -- in responding of course, and in a
23 sense I believe I've already answered that question
24 by saying that the isolator components as described
25 in the 415 Patent indicate that they have an

1 elastic and viscoelastic property that is designed
2 to try to mitigate the vibration that are
3 potentially present in the mechanism, and that is
4 exactly what a suspension system is in a vehicle
5 and it is what -- and it's what a suspension system
6 in the vehicle is designed to do.

7 And you pick the characteristics, this
8 stiffness characteristic, and the damping
9 characteristics albeit with a different set of
10 specifications, but the design process comes out of
11 the same background expertise.

12 Q. So if I wanted to find a discussion in
13 your publications of the types of isolators
14 discussed in the 415 Patent, I should look to those
15 publications that talk about the suspension systems
16 of cars; is that fair to say?

17 A. I think no. I don't think that's a
18 fair characterization.

19 Q. Okay. Which of your articles should I
20 look to if I wanted to find a discussion
21 particularly about the types of isolators discussed
22 in the 415 Patent?

23 A. So I don't really understand the
24 question that you're asking so I'm having a hard
25 time trying to answer the question. Maybe if you

1 could rephrase that question, I'd have an easier
2 time understanding it and give you an answer.

3 Q. Sure. Do you recollect what about the
4 question you're struggling with?

5 A. You described the isolators of the type
6 in the 415 Patent and -- what do you mean by the
7 isolators of the type in the 415 Patent?

8 Q. Sure. Believe it or not, that was an
9 exact use of language that you had used in one of
10 your answers where you were describing how
11 suspension systems in cars were akin to the types
12 of isolators used in the 415 Patent.

13 So let's go back to basics on this point.
14 Do you have an understanding, one way or another,
15 of the types of isolators that are used in the 415
16 Patent?

17 MR. MURPHY: Objection. Misstates
18 testimony.

19 THE WITNESS: I think that, you know,
20 perhaps I was not as careful in selecting my words,
21 if the way that you characterized my previous
22 responses is accurate, which I don't have my
23 transcript in front of me so I don't know.

24 But the isolators that are described in the
25 415 Patent are described as the elements that have

1 the properties of elastic properties and
2 viscoelastic properties or damping properties,
3 which is a more nontechnical word that's used.

4 And I spent most of my career both teaching
5 and doing research on examining how the elastic and
6 damping properties of components affected the other
7 components in the engineering system,
8 electromechanical system in particular.

9 It was where most of my work focused and my
10 teaching and classes focused on, and so I would on
11 the one hand say that I was very specifically
12 involved with isolators of the type that are in the
13 415 Patent, but because -- not but, but because
14 that is fundamental to the kind of engineering
15 systems that I looked at and taught to my students.

16 And that -- and so I think that the answer
17 is yes, that I am very familiar with those -- with
18 the concept of an isolator in the -- in the --
19 which is talked about in the 415 Patent.

20 BY MR. HUTCHINS:

21 Q. Okay. So with that understanding, and
22 this time focused on discussions of that type of
23 isolation in particular, is there some subset of
24 the publications that you identified that you can
25 identify to me that are particularly directed to

1 **that isolation aspect?**

2 A. I can go back over and try to select
3 out those that are more specific to that question
4 that you just asked.

5 So paper 30 definitely -- J30 on page 8
6 would definitely have included the passive
7 components and looking at their characteristics and
8 their affect on -- on the overall system.

9 Potentially J31 as well, also J35, also J36.
10 You know, I can't remember all the details of each
11 one of these individual papers. Some may be better
12 on target with answering your question than others.

13 **Q. That's fine, sir.**

14 MR. MURPHY: John, we're over an hour, too.

15 MR. HUTCHINS: Whenever he's done --

16 MR. MURPHY: No problem.

17 MR. HUTCHINS: -- I'm fine taking a break.

18 THE WITNESS: J38 and J39, J40, J46. So
19 J59, J62. So J72, 73, and 76. Article C16, C49,
20 so C56, C57, potentially C73, C93, C95.

21 Now, on page 26 number 2 is a report that
22 contains the total work on that project that I
23 described before with the other two aspects being
24 the braking and mobility, that report to the U.S.
25 Department of Transportation. I think that is

1 approximately the grouping.

2 MR. HUTCHINS: Okay. Well, thank you, sir.

3 For how long did you want to take a break?

4 MR. MURPHY: What do you think?

5 THE WITNESS: 10 minutes, 5 minutes? 5,

6 10 minutes?

7 MR. MURPHY: You tell me.

8 THE WITNESS: 10.

9 MR. HUTCHINS: 10 minutes is fine. Thank
10 you.

11 (A recess was then taken at 10:14 a.m.)

12 BY MR. HUTCHINS:

13 Q. When you reviewed your declaration to
14 prepare for this deposition, did you come across
15 any errors or corrections that you'd like to make?

16 A. No.

17 Q. Now, prior to being engaged in this
18 case, were you aware of the 415 Patent at all?

19 A. No.

20 Q. And prior to being engaged for this
21 case, were you aware of any of the inventors of the
22 415 Patent?

23 A. No.

24 Q. And prior to being engaged in this
25 case, were you aware of any commercial products

1 that practiced the 415 Patent?

2 A. Could you repeat the question you just
3 asked me, please?

4 Q. Sure. Prior to being engaged in this
5 case, were you aware of any commercial products
6 that practiced or embodied the claims of the
7 415 Patent?

8 A. So prior to the engagement of this
9 case, I already testified that I wasn't aware of
10 the 415 Patent. So in that period prior to my
11 engagement, any electric park brake that I had come
12 into contact with, I wouldn't have known whether or
13 not they had anything to do with the 415 Patent
14 since I wasn't aware of the patent.

15 So that seems -- that's why I'm puzzled by
16 your question. It seems as though by definition,
17 that would have to be the answer.

18 Q. Prior to being engaged with respect to
19 this case, were you aware of any electric parking
20 brake actuators that used passive isolators?

21 A. So I guess could you be -- could you
22 clarify what you mean by the use of passive
23 isolators?

24 Q. Well, let's talk about that for a
25 little bit. Is there a difference, in your mind,

1 between passive isolators and active isolators for
2 things like noise and vibration damping?

3 A. There is a difference depending on the
4 context that you're talking about. So if you
5 mean -- if we're just talking in general here
6 outside the context of the patent, if I'm talking
7 to my students, for example, and we're talking
8 about a passive versus active vibration control,
9 then what we would be talking about in the passive
10 case is when you use the inherent material
11 properties or components that might be defined to
12 accentuate their inherent material properties like
13 a spring, you can buy something called a spring,
14 but essentially it's just a piece of material that
15 has been made to really take advantage of the
16 elastic properties of the material.

17 So elastic material and materials with
18 viscoelastic properties or components that are
19 designed to exhibit viscoelastic behavior, those
20 type of components or materials that exhibit those
21 kind of behaviors would be a way of thinking about
22 and designing a passive isolation device, vibration
23 isolation device.

24 Q. Okay. And so using -- using that
25 understanding prior to being engaged with respect

1 to this matter, were you aware of electric parking
2 brake actuators that made use of passive isolators?

3 A. Best I can remember sitting here today,
4 I can't recall a specific electronic brake actuator
5 before my engagement that explicitly had or had not
6 passive isolators.

7 Q. Prior to being engaged in this case,
8 were you aware of any of the prior art that was
9 cited in the petition?

10 A. And by -- could you be clear about what
11 you mean by the prior art?

12 Q. Sure. So in the petition, there were
13 various pieces of prior art that were cited as
14 exhibits. And in general, when I talk about prior
15 art, I'm referring to anything before the -- the
16 date of the application of the 415 Patent.

17 But I'm not asking you to give an opinion
18 one way or another as to whether something is prior
19 art, I don't think that's a matter of dispute in
20 the case, but that's not the nature of what I'm
21 asking.

22 But there were various references that were
23 cited that some of which we'll be talking about
24 later today, one by an inventor named Poertzgen,
25 for instance; one by an inventor name Boucheret;

1 one by an inventor named Weiler; there was a
2 chapter of a textbook, things of that nature.

3 Do you recollect whether you were aware of
4 any of those references that were cited as exhibits
5 to the petition, before being engaged in this case?

6 A. So if I could have a copy of the
7 petitions so that I could see a list of prior art
8 documents that were relied on.

9 Q. Certainly. And by the way, I believe I
10 have copies of everything that's an exhibit either
11 by the petitioners or the patent owners so if you
12 want to see anything, feel free to ask and I'll --
13 I'll even turn to a page that has a listing of
14 exhibits on page IV, although feel free to look
15 through whatever you want in the petition.

16 But I'll ask you if you look through the
17 list of exhibits to the petition in this case, if
18 you were aware of any of those documents prior to
19 being engaged in this case.

20 MR. HUTCHINS: Would you like a --

21 MR. MURPHY: I don't need one right now.
22 Yeah. Maybe later.

23 THE WITNESS: So looking at the list on
24 Roman numeral page 4 of the petition, which hadn't
25 been marked as an exhibit so I'll characterize it

1 that way, the prior art documents that are listed
2 here that I had some familiarity with or -- would
3 have been the Introduction to Modern Vehicle
4 Design, and I believe Dudley's Gear Handbook,
5 Exhibit 1017.

6 BY MR. HUTCHINS:

7 Q. Okay.

8 A. I believe I've had some connection with
9 some -- you know, I have seen that before this
10 matter.

11 Q. Okay. Thank you. Prior to being
12 engaged in this case, were you aware of Stoneridge?

13 A. Not specifically, no.

14 Q. Prior to being engaged in this case,
15 were you aware of ZF?

16 A. Sorry. I am familiar with a company
17 known as ZF or ZF. I don't know if it's the same
18 ZF that's part of this matter.

19 Q. Prior to being engaged in this case,
20 were you aware of what products, if any, ZF
21 companies made?

22 A. Yes.

23 Q. And which products were you familiar
24 with?

25 A. I have some familiarity with their --

1 their automated mechanical transmissions.

2 Q. Any other products come to mind?

3 A. I believe that if memory serves me
4 correctly, that I've also had some involvement with
5 their antilock braking systems.

6 Q. Prior to your engagement in this case,
7 had you ever worked with Stoneridge's law firm, the
8 lawyers you've interacted with for Stoneridge?

9 A. So could you repeat that question?
10 Because you had multiple parts to it.

11 Q. Sure. Is this case the first time that
12 you've been hired as a consultant by Stoneridge's
13 lawyers?

14 In other words, the lawyers that you're
15 working with in this case, is this the first time
16 you're working with them?

17 A. I still don't understand your question.
18 Sorry.

19 Q. That's okay. Who -- who reached out to
20 you when you were engaged in this case?

21 A. If memory serves me correctly, my
22 counsel that's next to me today, Mr. Murphy.

23 Q. Okay. And to your knowledge, is that
24 the first time you've had any interactions with
25 Mr. Murphy or his law firm?

1 A. It is the first time I have had any
2 interactions with Mr. Murphy. It is not the first
3 time I've had interactions with his law firm.

4 **Q. And had you had prior engagements with**
5 **his law firm?**

6 A. Yes.

7 **Q. In patent cases?**

8 A. Yes.

9 **Q. And how many times had you previously**
10 **been engaged by the law firm?**

11 MR. MURPHY: Objection. Lacks foundation
12 and it misstates his testimony.

13 THE WITNESS: So could you repeat the
14 question, please, or --

15 BY MR. HUTCHINS:

16 **Q. Sure. My understanding is that this**
17 **case is not the first time you've worked with**
18 **Mr. Murphy's law firm.**

19 **And I'm asking, how many other cases have**
20 **you worked with Mr. Murphy's law firm?**

21 A. So I don't know if you are speaking
22 generally or more specifically using the word
23 worked for. I've never worked for his law firm so
24 can you be more specific about what that -- what
25 you mean by worked for?

1 Q. Sure. Tell me every instance that
2 you've had any involvement with Mr. Murphy's law
3 firm prior to being engaged in this case.

4 A. So I can generally answer that by
5 saying that I have been retained to provide expert
6 opinions about some technical matters in a few
7 different cases.

8 Q. And do you know how many?

9 A. I think there were -- are or were what
10 I would call two separate cases.

11 Q. And do you remember the party on whose
12 behalf you were retained in those two cases?

13 A. I don't recall for sure on one of those
14 cases which -- who the parties were. But on the
15 other one, I can -- I can only recall -- it's a
16 foreign company and I only know it by a set of
17 letters.

18 Q. And what's that?

19 A. ATOP, A-T-O-P.

20 Q. And do you recollect when this -- these
21 two cases -- your involvement with these two cases,
22 when that occurred?

23 A. The ATOP matter is still pending and
24 the other is inactive.

25 Q. And do you remember how many years ago

1 the other case was?

2 A. Not specifically.

3 Q. Was it within the last five years, do
4 you know?

5 A. I think that would be reasonable.

6 Q. Were you ever asked to be an expert in
7 a case where you declined?

8 A. I get contacted frequently by people
9 requesting my potential availability for a matter
10 that they're involved in, some of them litigated,
11 some of them not. And I've declined to be involved
12 in -- in many.

13 Q. And were there any where you declined
14 to be an expert because of the subject matter of
15 the case as opposed to your general availability or
16 other logistical issues?

17 A. So in -- any time that I'm evaluating
18 whether or not to get involved in a matter, one of
19 the issues is the subject matter, an area in which
20 I have expertise and can provide potential
21 testimony, or if it's nonlitigated work, otherwise
22 valid opinions. So the subject matter is of course
23 important.

24 Q. And with respect to which subject
25 matters have you declined to be an expert?

1 A. That's a difficult question to answer.
2 It is --

3 **Q. Now -- go ahead.**

4 A. -- certainly areas which don't fall in
5 my expertise in mechanical engineering, mechanical
6 design, systems and controls engineering,
7 automotive engineering, those general categories
8 are certainly important to helping to describe my
9 general expertise and also manufacturing
10 engineering.

11 **Q. And so sitting here today, can you**
12 **remember any of the subject matters in which you've**
13 **declined to serve as an expert?**

14 A. I've had requests for different kinds
15 of exercise equipment, which could fall within my
16 expertise or could not, depending on what the
17 technical issue is. And I can recall specifically
18 declining being involved in several
19 exercise-related pieces of equipment.

20 **Q. Any other examples come to mind, or**
21 **just that one?**

22 A. There are also some automotive-related
23 cases that I've declined which have been more
24 focused on internal combustion engine properties,
25 you know, fuel combustion that I have some

1 expertise in, but not as much as other areas, and
2 I've declined cases that required a lot of
3 expertise in that area.

4 **Q. Anything else come to mind?**

5 A. As I'm sitting here today, I have vague
6 memory of rejecting a lot of cases, but, you know,
7 specifically what those involved at this point, I
8 don't recall.

9 **Q. Okay. Do you recollect when you were**
10 **retained with respect to this case?**

11 A. Generally speaking, I was retained
12 sometime in 2023.

13 **Q. And do you remember if it was in the**
14 **first half or second half?**

15 A. I don't recall exactly, but I could
16 check my records. A round guess would be first
17 half of the year.

18 **Q. Are you aware that there's a district**
19 **court litigation pending between Stoneridge and ZF?**

20 A. Not specifically.

21 **Q. Is it your understanding that you're**
22 **retained with respect to an IPR proceeding and not**
23 **a district court litigation?**

24 A. Could you rephrase that question,
25 please?

1 Q. Sure. Is it your understanding that
2 you're retained to -- to work for Stoneridge with
3 respect to a district court litigation between
4 Stoneridge and ZF?

5 A. I'm not sure what the law firm that
6 retained me is thinking about my services in the
7 future so I can't answer that question.

8 Q. Okay. Are you aware of whether any
9 court or the Patent Trial and Appeal Board has
10 found your testimony to lack credibility?

11 A. Can you define what credibility --
12 lacks credibility means?

13 Q. I'm using credibility in its ordinary
14 sense; in other words, that your testimony was not
15 considered to be credible or believable.

16 A. I guess I don't know how to answer that
17 question because I don't know what that -- what
18 that means, that my testimony wasn't considered
19 credible.

20 Q. Okay. Are you aware of a court or the
21 Patent Trial and Appeal Board ever issuing an
22 opinion in which your opinions were criticized?

23 A. I was involved in one case in the early
24 2000s in which I was involved in an intellectual
25 property matter that involved mechanical drawings

1 that were used by one company being taken by an
2 employee who left and took the drawings with them
3 and provided them to a -- his subsequent
4 employee -- employer.

5 And it was, not surprisingly, some
6 litigation that arose out of this. And in fact,
7 the person who shared this information went to jail
8 for his activities.

9 The company that I represented, which had
10 these drawings stolen, asked me to participate in a
11 trial to try to -- and to provide testimony about
12 the drawings, which I did, and the jury awarded the
13 company that -- or the law firm and the company
14 that I represented through the law firm was -- won
15 the case and was awarded \$40 million in
16 compensation. Round numbers, that's what I
17 remember.

18 The other side appealed and it went to a
19 federal appeals board or -- I don't know the proper
20 word, but it was not the full board, it was a
21 subset of three judges I believe, and they felt
22 that there were some things that were not right
23 about the way the trial went on and remanded it, if
24 that's the right word, to be retried.

25 And in their opinion they criticized the

1 fact that I had developed for the trial a technique
2 for systematically reviewing the design drawings
3 and coming up with this method to evaluate whether
4 or not they had been copied or not.

5 And they said that the technique that I had
6 developed had not been peer-reviewed and criticized
7 me for having used this non peer-reviewed method.

8 Q. And do you recollect where the trial
9 occurred, in what state?

10 A. Michigan.

11 Q. And do you recollect roughly what year
12 this was?

13 A. 2004.

14 Q. And do you recollect who the party was
15 that you represented?

16 A. Mike's Train House.

17 Q. I'm sorry. Can you stay that one more
18 time?

19 A. Mike's Train House.

20 Q. Thank you. Other than that instance,
21 do any other instances come to mind?

22 A. No.

23 Q. Have you ever been declared by a court
24 to your knowledge to not be an expert with respect
25 to any particular subject matter?

1 A. Not that I'm aware of.

2 Q. If you have your declaration, 2005, in
3 front of you, I'm going to ask you some questions
4 about that.

5 If you could turn to paragraph 20 on page 7
6 of Exhibit 2005. Let me know when you're there.

7 A. Yes, I'm there.

8 Q. And in paragraph 20, you note that in
9 preparing this declaration, I have reviewed all
10 filings and exhibits associated with IPR2023-00273.

11 Do you see that?

12 A. Yes.

13 Q. Other than the filing and exhibits --
14 filings and exhibits in IPR2023-00273, were there
15 any other materials that you recollect basing your
16 opinions on in this case?

17 A. Basing my opinions on the ones that I
18 relied on and basing my opinions on are listed in
19 my declaration.

20 Q. So other than any documents you
21 specifically referenced in your declaration and
22 what's described in the materials considered
23 section of your report in paragraph 20, were there
24 any other materials upon you -- which you based
25 your opinions?

1 A. Of course I have a large collection of
2 textbooks and papers and treaties that I've -- that
3 informed me more generally, but the specific
4 opinions expressed in this report come from --
5 well, come from -- generally from that background,
6 but are to the -- need to support what I -- my
7 opinions in terms of available documents, those are
8 listed in this report.

9 Q. Do you recollect how much time it took
10 you to review the materials you listed in
11 paragraph 20 of your declaration?

12 A. I don't recall that information.

13 Q. Did you conduct any research or study
14 any materials other than what's described in
15 paragraph 20, to familiarize yourself with the
16 level of skill that a person of ordinary skill in
17 the art would have with respect to the 415 Patent?

18 A. So can you repeat that question,
19 please?

20 Q. Sure. Did you conduct any research or
21 study any materials other than what's listed in
22 paragraph 20 to familiarize yourself with the level
23 of skill that a person of ordinary skill in the art
24 would have with respect to the 415 Patent?

25 A. So I want to be clear that what's

1 listed in paragraph 20 are just the materials
2 associated with the -- the petition, right?

3 And my declaration -- so my -- as stated in
4 paragraph -- I have reviewed all the documents and
5 exhibits associated with the IPR2023-00273 and I
6 have my general expertise and background materials
7 that I had to review in order to gain that
8 expertise, but that's my general expertise, not
9 specific to this particular matter.

10 So I think that it's fair to say that the
11 opinions expressed in here are supported by the
12 documents that I list in paragraph 20.

13 Q. Okay. Now, in -- still on page 7 of
14 your declaration in paragraph 22, you note that
15 you've -- I'm sorry. Let me know when you're at
16 paragraph 22 of your declaration.

17 A. I'm sorry. Paragraph 22?

18 Q. Yeah. Page 7, paragraph 22.

19 A. Okay.

20 Q. Okay. In paragraph 22 of your
21 declaration, you note that you've -- you've been
22 advised that patent claim terms are to be given
23 their plain and ordinary meaning.

24 Do you see that?

25 A. Yes.

1 **Q. Now, throughout your analysis in this**
2 **case, did you apply the plain and ordinary meaning**
3 **of the claim terms of the 415 Patent?**

4 A. So the -- this section on claim
5 construction goes on for paragraph 22, 23, 24, and
6 25, and I think that more fully explains what I did
7 in terms of -- there's no formal claim construction
8 procedure as I understand it in an IPR proceeding.

9 There's no hearing, court -- there's no
10 court to claim what the claim construction should
11 be, and my understanding of, by my discussions with
12 counsel, is laid out in these four paragraphs.

13 **Q. And my question was in your analysis**
14 **that you applied in this case, can you think of any**
15 **claim terms to which you did not ascribe the plain**
16 **and ordinary meaning of the term?**

17 A. All of the terms that I used in this
18 report fit under the descriptions involved in these
19 four paragraphs which are more than just saying
20 that I gave them their plain and ordinary meaning.
21 I mean, there's more description here to -- to
22 amplify what I mean by that.

23 **Q. Much more description. That's why I'm**
24 **asking you to tell me if in your analysis in this**
25 **case, there are any claim terms you can think of to**

1 which you applied a meaning other than the plain
2 and ordinary meaning.

3 MR. MURPHY: Objection. Misstates
4 testimony.

5 THE WITNESS: My understanding is that all
6 of the descriptors here in paragraphs 22, 23, 24,
7 and 25 are the guidelines that one is to follow in
8 terms of claim construction within the context of
9 an IPR proceeding.

10 And I'm not, you know, a legal person
11 skilled in the art that can give a label to that.
12 I have put in my report what I understand is a
13 proper claim construction methodology, if you will,
14 to follow for authoring this analysis that I've
15 authored.

16 BY MR. HUTCHINS:

17 Q. Is it your understanding that sometimes
18 in patent cases, claim terms are given their plain
19 and ordinary meaning?

20 MR. MURPHY: Objection. Lacks foundation,
21 vague and ambiguous.

22 THE WITNESS: I don't understand what you're
23 asking me. Could you rephrase your question,
24 please?

25 BY MR. HUTCHINS:

1 Q. Sure. Do you have an understanding
2 that there are times in patent cases where claim
3 terms are given their plain and ordinary meaning?

4 MR. MURPHY: Same objections.

5 THE WITNESS: So in patent litigation that
6 I've been involved in more generally, not just IPR
7 matters, the term claim -- plain and ordinary
8 meaning is a phrase that I've heard used many times
9 in terms of claim construction.

10 Exactly what the full context of plain and
11 ordinary meaning means in these different matters I
12 think is different -- certainly could be different.

13 Within the context of this IPR proceeding,
14 this is what I understand to be a proper claim
15 construction methodology to use.

16 Whether you call it plain and ordinary
17 meaning as a placeholder for all of this or we need
18 to have all these paragraphs, I don't know. That's
19 up for legal people to argue.

20 BY MR. HUTCHINS:

21 Q. That's -- that's fine. So am I correct
22 that sitting here today, you don't know one way or
23 another whether in patent cases, claims are
24 sometimes given their plain and ordinary meaning?

25 A. I'm saying that in patent cases, claim

1 terms are sometimes given their plain and ordinary
2 meaning and I -- but what I'm telling you is that
3 what that means specifically is not completely --
4 what that -- that -- what I understand plain and
5 ordinary meaning to be is something that includes
6 these concepts that are laid out here in 22, 23,
7 24, and 25.

8 **Q. Okay. Now, do you have an**
9 **understanding that sometimes in patent cases, claim**
10 **terms are given a meaning other than their plain**
11 **and ordinary meaning?**

12 MR. MURPHY: Objection. Lacks foundation.

13 THE WITNESS: I understand in matters that
14 I've been involved with, that claim construction is
15 a part of the process that ultimately is determined
16 by the court and you have a court-ordered claim
17 construction.

18 And my lay understanding of that is that
19 sometimes terms are given generically their plain
20 and ordinary meaning with pages of description
21 supporting that argument, and sometimes they're
22 given something that's not their plain and ordinary
23 meaning with pages and pages of supporting
24 arguments.

25 So I think that these concepts are quite --

1 from my lay perspective again, involve a number of
2 factors. And my understanding of these -- some of
3 these factors, at least as I applied in this case,
4 are laid out in paragraph 22, 23, 24, and 25.

5 BY MR. HUTCHINS:

6 Q. For instance, in paragraph 23, you note
7 that a patent claim term may have a known meaning
8 in the art, correct?

9 A. I also understand this is what the
10 paragraph says that if a patent claim recites a
11 term having a known meaning in the art, then that
12 term should be construed according to its known art
13 accepted meaning, unless specification attempts to
14 redefine the art accepted meaning of the term.

15 Q. Is it all right if we call a term that
16 has a known meaning in the art, a term of art?

17 A. As a temporary matter I will agree to
18 that --

19 Q. Sure.

20 A. -- placeholder.

21 Q. With respect to the 415 Patent, are you
22 of the view that any of the claim terms are terms
23 of art that should be given a meaning other than
24 their plain and ordinary meaning?

25 A. I think that you are trying to ask me

1 to do claim construction and I was not asked to do
2 that. I simply have used what is outlined in
3 paragraph 22 through 25 to be the claim
4 construction concepts that I should apply to this
5 matter.

6 **Q. And did you apply the concept in**
7 **paragraph 23 of determining whether a term was a**
8 **term of art to any of the claim terms in the 415**
9 **Patent?**

10 A. Could you -- I've had a little chance
11 to reread that paragraph and think about things a
12 little bit. Can I -- and I want to make sure I
13 answer your question.

14 Could you repeat it, please?

15 **Q. Sure, I certainly can. So the question**
16 **was, did you apply the concept in paragraph 23 of**
17 **determining whether a term was a term of art, to**
18 **any of the claim terms in the 415 Patent?**

19 A. I think that I can generally answer
20 that by saying that I -- I certainly was cognisant
21 of all of the claim terms when I was reading the
22 claims and reading the specification and all the
23 material.

24 And -- and I certainly was not, in
25 presenting my arguments here, trying to do

1 something that was not consistent with
2 paragraph 23.

3 Q. And in your review of the claims of the
4 415 Patent, did you come across any claim terms
5 that you believed to be a term of art?

6 A. I think that -- I don't believe there
7 is any place in my declaration where I have made a
8 statement that a particular term has a known
9 meaning in the art.

10 Q. And accordingly, you have no opinions
11 on that one way or another; is that correct?

12 A. No. That's not what I said.

13 Q. Okay. So is -- so I was asking you for
14 your opinion and you said there wasn't any listed
15 in your report.

16 Sitting here today, do you have an opinion
17 one way or another as to whether the claim terms of
18 the 41 -- 415 Patent, are terms of art that you
19 care to share?

20 A. Well, I haven't asked myself that --
21 let me start that answer again, please.

22 So I have not specifically addressed in my
23 report that issue. I don't believe -- if I have,
24 I'd be happy to comment on it, but I don't believe
25 that I've made a declaration -- not a declaration,

1 but a statement where I said that this particular
2 term should be construed according to its known art
3 accepted meaning.

4 Q. And am I correct you have nothing to
5 add to that here today?

6 A. At this time, I have no further comment
7 about that.

8 Q. Okay. And if we continue on in
9 paragraph 23 of your report, there's a reference to
10 the fact that a patent specification may attempt to
11 redefine the art accepted meaning of a term.

12 Do you see that generally at the end of
13 paragraph 23?

14 A. Yes.

15 Q. And do you have an opinion one way or
16 another as to whether with respect to any of the
17 claim terms of the 415 Patent, the 415 Patent's
18 specification redefined that claim term?

19 A. So I do say in paragraph 22 that my
20 claim construction analysis focuses on intrinsic
21 evidence, including how the claim term is used in
22 the claim's specification and prosecution history.

23 I also understand that dictionaries or other
24 extrinsic sources may assist in determining the
25 plain and ordinary meaning that cannot override a

1 meaning that is unambiguous from the intrinsic
2 evidence.

3 So my claim construction understanding that
4 I used in this analysis was to give the terms their
5 general plain and ordinary meaning, but in the
6 context of the specification, and I think that is
7 described hopefully clearly in my report.

8 Q. Now, in your answer you mentioned
9 dictionaries or other extrinsic sources. Do you
10 recollect as far as your analysis in this case,
11 relying on any dictionaries or extrinsic sources
12 for claim construction?

13 A. I don't recall relying on extrinsic
14 sources -- extrinsic sources to assist in my
15 understanding of the plain and ordinary meaning of
16 the claim terms.

17 Q. Okay. And in reviewing the manner in
18 which the specification described the claim terms
19 of the 415 Patent, did you come to a conclusion one
20 way or another as to whether the 415's -- 415
21 Patent's specification redefined any claim terms?

22 A. So in my declaration, there are two
23 terms that I speak about directly in my claim
24 construction section of the declaration.

25 One is a sub-frame and the other is an

1 actuator housing. These are both relatively
2 generic terms, but of course from an engineering
3 perspective or person of ordinary skill would
4 understand that these terms have some -- have some
5 meaning.

6 But to -- but they're so generic that one
7 has to understand them in the context of what is
8 described in the patent specification to have a
9 better understanding what that plain and ordinary
10 meaning is.

11 Q. And so do you have an opinion one way
12 or another as to whether the 415 Patent's
13 specification provides a definition for the term
14 sub-frame?

15 A. I think that the specification provides
16 in its largest context, it introduces a sub-frame
17 as part of its embodiment and one of ordinary skill
18 in the art would understand that this sub-frame in
19 this context has some specific important features
20 that are more specific than just mentioning to
21 somebody who's an engineer in saying, what's the
22 definition of a -- of a sub-frame?

23 And my understanding is that that is an
24 important part of what I had to understand about
25 the claim terms. Yes, we're applying the plain and

1 ordinary meaning, but what is that meaning in the
2 context of this patent.

3 Q. And so are you of the view that in the
4 415 Patent, the specification effectively defines
5 the sub-frame as having certain features or
6 benefits?

7 A. I think that you used some terms there
8 that concern me overly constraining the process. I
9 simply say that the specification, as I said in
10 paragraph 22, that the analysis focuses on how the
11 claim term is used in the claims and the
12 specification and in the prosecution history.

13 Q. And was your reticence to my use in the
14 question of the phrase effectively defines?

15 A. That was one of my concerns, yes.

16 Q. Okay. So am I correct that sitting
17 here today, you don't feel comfortable saying one
18 way or another whether the 415 Patent's description
19 of sub-frame would rise to the level that you would
20 consider it to be a definition of that term; is
21 that fair to say?

22 A. I guess what I'm saying is that my
23 understanding is that for the purposes of this
24 declaration, and in fact for the purposes of this
25 whole IPR proceeding, that no formal claim

1 construction is done that there -- that claim
2 construction is done according, at least in part,
3 to -- by the steps that I've outlined in the
4 paragraphs that we've been talking about, 22
5 through 25.

6 And those paragraphs have guided the way
7 that I have looked at the claims and the claim
8 terms and have come to my opinions.

9 What that means ultimately for district
10 court cases down the road if such things exist and
11 what the claim construction ought to be, I'm not in
12 a -- I haven't been asked to and I'm not in a
13 position to offer claim construction arguments.

14 Q. Sure. I'm -- I'm trying to ask you
15 what your thoughts on the 415 Patent were when you
16 did your analysis and I'm -- and so my question, as
17 simply as I can state it is, are you of the view
18 that the 415 Patent's specification provides a
19 definition for the term sub-frame?

20 A. I think -- so the answer is I can't
21 answer that question specifically because I don't
22 know what you mean by definition.

23 I'm not doing a claim construction opinion
24 here, but I can say that I think that the
25 specification helps one of ordinary skill

1 understand what is meant by the claim term
2 sub-frame and actuator housing.

3 Q. Okay. And why are you having trouble
4 with my term definition? Do you not know what a
5 definition is?

6 If I wanted to ask you does the 415 Patent
7 have a sentence in it where it says, as used
8 herein, sub-frame means X, could we all agree
9 that's a definition?

10 Because I'm not trying to use the term
11 definition in any unusual way. All I wanted to
12 know is if you thought there was a definition of
13 the term sub-frame in the 415 Patent, to please
14 tell me.

15 If you don't have an opinion on that one way
16 or another, that's fine. That's -- that's all I'm
17 trying to dive down to.

18 So do you -- do you have an opinion one way
19 or another as to whether the 415 Patent's
20 specification provides a definition for the term
21 sub-frame?

22 A. I think I've answered that to say that
23 I have not come to an opinion on that specific
24 question, but that my analysis here was guided by
25 the specification's use of the word sub-frame and

1 actuator housing, and that guided my analysis of --
2 that's contained in my declaration.

3 MR. HUTCHINS: Okay. We've been going about
4 an hour so why don't we take a break. How --
5 Dr. Stein, for how long would you like to break?

6 THE WITNESS: 10 minutes? That would be
7 fine with me.

8 MR. HUTCHINS: That's fine with me; is that
9 okay?

10 THE REPORTER: Yeah.

11 MR. MURPHY: Thank you.

12 (A recess was then taken at 11:38 a.m.)

13 BY MR. HUTCHINS:

14 Q. And if you could turn to page 12 of
15 your declaration, which begins with paragraph 38,
16 and tell me when you're there.

17 A. Yes.

18 Q. Okay. Paragraph 38 mentions that the
19 patent owner submitted a preliminary response to
20 the petition, you understand they submitted that.

21 Do you see that?

22 A. Yes.

23 Q. To your knowledge, did you have any
24 role in formulating the technical arguments in the
25 preliminary response?

1 A. To my understanding, I did not have any
2 role. At least not that I know of.

3 Q. And in paragraph 39, you note that the
4 patent -- that it's your understanding that the
5 patent owner disclaimed claims 1 through 4, 6, 9
6 through 13, and 20 through 23 of the 415 Patent.

7 Do you see that?

8 A. Yes.

9 Q. To your knowledge, did you have any
10 role in providing any technical analysis that led
11 to the decision to disclaim those claims?

12 A. Not to my knowledge, no.

13 Q. And then you note at the end of
14 paragraph 39 that you considered the disclaimed
15 claims, to the extent that they relate to claims
16 that are still present in this case.

17 Do you see that?

18 A. Yes.

19 Q. And there, you're talking about the
20 fact that a disclaimed claim may in fact be part of
21 a claim that was not disclaimed because it forms
22 the independent claim for that claim?

23 A. I'm not sure I completely understood
24 your question.

25 Q. Okay. Well, that's okay. I tried to

1 cut to the chase, but we can take it in -- in
2 pieces.

3 Can you tell me what role, if any, the
4 disclaimed claims played in your analysis in this
5 case?

6 A. Well, as you just said, I think, that
7 there are some dependent claims that are left to be
8 considered and to the -- so they rely on the
9 independent claim.

10 And even if that independent claim has been
11 disclaimed, it still is there in the sense that
12 it's part of the dependent claim that exists.

13 Q. Thank you. And that is what I was
14 trying to convey, but you did it better.

15 And other than -- other than that, which you
16 just described, did the disclaimed claims play any
17 role in your analysis?

18 A. Well, I think that generally the whole
19 patent still provides the basis for my general
20 understanding of -- of the arguments that I have
21 put forth in my declaration and so the disclaimed
22 claims are still part of the patent, at least I
23 would say from a technical point of view, not a
24 legal point of view.

25 Q. Sure. And was there any particular

1 technical information contained in the disclaimed
2 claims that you recollect relying on in forming
3 your opinions in particular?

4 A. I don't recall anything in particular
5 as I'm sitting here other than in -- for example,
6 with respect to claim construction, understanding
7 the claims, I read all of the claims and all of the
8 patent and other intrinsic evidence to help me
9 understand what the claims mean and what the patent
10 is, invention is. And so in that context, I looked
11 at all of the claims.

12 Q. On -- still on page 12 of your report,
13 in paragraph 41, you -- you say this case relates
14 to an electronic parking brake actuator, EPBA, for
15 a vehicle.

16 Do you see that?

17 A. Yes.

18 Q. When you say this case, you are --
19 you're referring to the 415 Patent or are you
20 referring to arguments in the IPR or something
21 else?

22 A. So my general meaning of that was that
23 it relates to this IPR matter, but my understanding
24 of the IPR matter is in the context of this
25 petition that ZF filed to try to invalidate the 415

1 Patent, and so the patent is about an electronic
2 brake actuator.

3 Q. Thank you. I understand, yeah.
4 Sometimes lawyers refer to case to mean like a
5 legal proceedings, like an IPR, and sometimes we
6 refer to case to actually refer to a patent so
7 that's the only reason I ask, but thank you for the
8 clarification.

9 A. Okay.

10 Q. Is it your understanding that the
11 claims of the 415 Patent are limited to an
12 electronic parking brake actuator for a vehicle?

13 A. Could you repeat that question, please?

14 Q. Sure. Is it your understanding that
15 the claims of the 415 Patent are limited to an
16 electronic parking brake actuator for a vehicle?

17 A. I don't believe I've commented on that
18 question in the context of my declaration. If you
19 feel there's some vague or unclear statement on my
20 part that relates to that issue, please point it
21 out and I'd be glad to clarify what I meant.

22 Q. Am I correct that sitting here today,
23 you don't have an opinion one way or another as to
24 whether the claims of the 415 Patent are limited to
25 an electronic parking brake actuator for a vehicle?

1 A. It's not a question that I've
2 considered.

3 Q. If you could turn to page 13 of your
4 declaration, and I'll draw your attention to
5 paragraph 46. You can tell me when you're there.

6 A. Okay.

7 Q. And you note that in the 415 Patent,
8 the shaft of the motor 300 is coupled directly to a
9 gear train, which in the embodiment includes a
10 drive pulley 302, a driven pulley 304, and a drive
11 belt 303.

12 Do you see that?

13 A. I see that sentence, yes.

14 Q. Is there anything else in your view
15 that's part of the gear train of that embodiment?

16 A. Well, the next sentence says the drive
17 pulley 302 is driven by the motor and the driven
18 pulley 304 in turn drives a planetary gear set 306,
19 which makes an output shaft 308 is ultimately used
20 to operate caliper 106 as a parking brake.

21 Q. It does in fact read that. So which,
22 if any, of the additional elements in the sentence
23 that you just read, are also part of the gear
24 train?

25 A. I think that it's clear from my

1 description, which if you go on to the next
2 paragraph, the motor and gear train are mounted on
3 a sub-frame and the sub-frame is then mounted into
4 the actuator housing.

5 And that includes as shown in -- for
6 example, Figure 6 shows the sub-frame with the
7 motor and the gear train components although it
8 doesn't actually show the belt.

9 I don't think it does. It's a little bit
10 hard to tell because it's upside down, the figure.
11 Oh, it does show in Figure 4, of course when it's
12 actually installed in the actuator housing.

13 **Q. So am I correct that a planetary gear**
14 **set 306 and output 308 are also part of the gear**
15 **train?**

16 **A.** Planetary gear set 306 is definitely
17 part of the gear train, and that's coupled to
18 output shaft 308, which is the output of the gear
19 train. We could quibble about whether that's
20 actually part of the gear train or not.

21 **Q. Okay. To your knowledge with respect**
22 **to parking brake actuators, does the term drive**
23 **train have a particular meaning?**

24 **A.** A drive train -- could you repeat the
25 question, please?

1 Q. Sure. To your knowledge with respect
2 to parking brake actuators, does the term drive
3 train have a particular meaning?

4 A. For purposes of this report, I have not
5 tried to differentiate the meaning between drive
6 train and gear train. I don't know, but I would
7 guess that I probably use those terms somewhat
8 interchangeably.

9 Q. And so is it fair to say that if -- if
10 you don't have an opinion one way or another which
11 components referenced in paragraph 46 are
12 components of the drive train of the actuator?

13 A. As I just said in my previous
14 statement, I don't believe I've differentiated
15 between the gear train and the drive train in this
16 declaration.

17 If I have, please show me and I'll clarify
18 because it's possible that I tried to make some
19 distinction that I'm not recalling as I just sit
20 here.

21 As I sit here, I would say that the drive
22 train and the gear train are the same and thus
23 includes all the things described in paragraph 46.

24 Q. Okay. Thank you. Could you turn to
25 page 14 of your declaration? And I'll direct you

1 to paragraph 48. And you can tell me when you're
2 there.

3 A. I'm there.

4 Q. Now, the first sentence of paragraph 48
5 begins, quote, the 415 Patent discloses a
6 sub-frame, which is a frame for a subassembly of
7 the EPBA.

8 Do you see that?

9 A. Yes.

10 Q. Do you know one way or another whether
11 the plain and ordinary meaning of the term
12 sub-frame, is a frame for a subassembly?

13 A. This sentence is not trying to define
14 general plain and ordinary meaning of sub-frame,
15 but to rather describe how the 415 Patent discloses
16 a sub-frame, which is a frame for a subassembly
17 used in an electronic parking brake.

18 Q. I don't disagree with anything you
19 said, which is why I was asking you a slightly
20 different question, which is do you have an opinion
21 one way or another whether the plain and ordinary
22 meaning of a sub-frame is a frame for a
23 subassembly?

24 A. So I think we've gone around on this
25 quite a bit today, and I don't mean that

1 disrespectfully, but maybe I'm not understanding
2 what you're -- you're getting after.

3 But in my analysis, my understanding of the
4 plain and ordinary meaning of the term sub-frame,
5 is one which is gleaned from the term itself and
6 also the context in -- that it's used in the
7 specification as we talked about before back in --

8 **Q. Fair enough. Then maybe I can clarify**
9 the question that will maybe help, maybe not, but
10 we'll see.

11 If you were -- outside -- when I -- when I
12 said -- in that question when I said plain and
13 ordinary meaning of the term sub-frame, I was
14 referring to the -- its meaning in ordinary
15 parlance, not specifically tied to the 415 Patent.

16 So in other words, plain and ordinary as I
17 was using it in that question, meant if you were
18 talking about a sub-frame to your colleagues or
19 your students and discussing what a sub-frame was,
20 and you had an understanding in your mind of the
21 ordinary meaning of a sub-frame, you weren't
22 attempting to give it any special meaning, is a --
23 with that understanding, do you have an opinion one
24 way or another whether a fair definition of the
25 plain and ordinary meaning of the term sub-frame,

1 is a frame for a subassembly?

2 A. I would argue that in such a
3 circumstance that you describe, meaning I'm talking
4 with my students and somebody uses the word
5 sub-frame or maybe I use the word sub-frame, this
6 is a very generic term that doesn't have a lot of
7 definitive meaning other than that somehow there's
8 a frame and there's some sub-frame within that or
9 some structure that has some frame within that
10 larger structure.

11 And I don't believe that that general
12 understanding of the term -- I mean, it's such a
13 general term that I don't know what specifically
14 would be a good definition for it. It's just kind
15 of a placeholder name.

16 Q. Okay. Thank you. If you could turn to
17 page 15 of your declaration, and I'll direct you to
18 paragraph 49, and you can tell me when you're
19 there.

20 A. Okay.

21 Q. And in paragraph 49, you note that the
22 use of a sub-frame in the 415 Patent has various
23 benefits.

24 Do you see that?

25 A. Yes.

1 Q. Do you have an understanding one way or
2 another as to whether any of the claims of the 415
3 Patent require those benefits?

4 A. So I don't know how you want to define
5 the word require. My understanding, as laid out in
6 my report which required me to do a claim -- to use
7 a claim construction as part of my analysis, that
8 in that context, the understanding of what role
9 that sub-frame, as discussed in the specification,
10 is important to understanding the, quote-unquote,
11 requirements of the claim.

12 Q. So one benefit you note in the second
13 sentence of paragraph 49 is that the motor/gear
14 assembly can be removed from the rest of the
15 actuator as a package (or subassembly) without
16 needing to decouple the motor from the gears.

17 Do you see that?

18 A. Yes.

19 Q. Do you know if the claims of the 415
20 Patent require a subassembly -- let me start over.
21 Excuse me. I was looking at the word assembly and
22 accidentally put that in my question.

23 A. Sure.

24 Q. Do you have an understanding one way or
25 another whether the claims of the 415 Patent

1 require a sub-frame to have the feature that the
2 motor/gear assembly can be removed from the rest of
3 the actuator as a package without needing to
4 decouple the motor from the gears?

5 A. I believe that this was a key idea that
6 the 415 Patent was trying to leverage the fact that
7 there was a subassembly that could be easily
8 removed and also easily assembled, tested outside
9 before assembly.

10 I also think that from an engineering
11 perspective, they were clear to -- that the -- that
12 the benefit of having this -- the drive train or
13 the gear train all contained within this
14 subassembly, has the benefit that the potential
15 vibrations created within that drive train are sort
16 of naturally isolated to the interior of the -- the
17 housing, you know, inside of the electronic park
18 actuator and you put this subassembly into the
19 housing, put the housing cover on, and you've
20 produced a way to isolate the vibrations that are
21 produced by the drive train from getting to the
22 surfaces -- the large radiating surfaces,
23 acoustically radiating surfaces.

24 So you're trying to keep those vibrations
25 from coupling to the actuator housing, to the brake

1 caliper housing, but really specifically the
2 actuator housing here as a way of reducing the
3 noise.

4 So it's a clever design, and it seems that
5 one of ordinary skill would understand the design
6 principles along with the -- you know, the
7 isolators that are called out specifically in the
8 claims as an overall attempt at coming up with an
9 electronic brake system that indeed has a quieter
10 function.

11 **Q. And so because of the importance of**
12 **that benefit that you just described, it's your**
13 **view that in order to meet the claims of the**
14 **415 Patent, a sub-frame has to be designed such**
15 **that the motor gear assembly can be removed from**
16 **the rest of the actuator as a package without**
17 **needing to decouple the motor from the gears; is**
18 **that correct?**

19 MR. MURPHY: Objection. Misstates
20 testimony.

21 THE WITNESS: I'm saying that the benefits
22 of the embodiment that is shown is that it can be
23 removed as a single unit.

24 There are variations on that that could also
25 be -- you know, there are other embodiments that

1 would allow for that easy assembly, easy removal
2 that look different than this embodiment and could
3 still include the advantages that I described in
4 this paragraph as well as the advantages that I
5 just articulated a few moments ago about the
6 inherent benefits of the design.

7 BY MR. HUTCHINS:

8 Q. If a piece of prior art is lacking the
9 benefits you list in paragraph 49, can it possibly
10 meet the claims of the 415 Patent?

11 MR. MURPHY: Objection. Incomplete
12 hypothetical, lacks foundation.

13 THE WITNESS: Yeah, I don't understand the
14 question. Can you rephrase the question, please?

15 BY MR. HUTCHINS:

16 Q. Sure. What I'm trying to get at is
17 whether you have an understanding one way or
18 another as to whether the claims of the 415 Patent,
19 require a sub-frame to possess the benefits you
20 list in paragraph 49.

21 I think we're in agreement that you believe
22 these benefits are an important benefit of the
23 embodiment actuator shown in the specification of
24 the 415 Patent, and I'm asking you a slightly
25 different question, namely are the benefits that

1 you list in paragraph 49, requirements of the
2 claims of the 415 Patent?

3 A. So the claims are part of the patent
4 along with the specification and other things that
5 make up the intrinsic evidence of the invention.

6 And my understanding is that there is a
7 connection in this case that we're talking about
8 that one -- in order to understand what the
9 requirements are of the claims, what the claims
10 mean, one has to understand what the claim terms
11 mean and we've already discussed at some length
12 that the claim terms have this meaning, which comes
13 from the specification.

14 And I think one of ordinary skill would
15 understand these -- would understand these claims
16 in the way that I've talked about them in my
17 declaration and specifically have articulated that
18 the prior art that's in the petition, do not read
19 on these claims because of the various reasons that
20 I've given, which include that they don't have a
21 sub-frame.

22 Q. And one of the reasons you believe the
23 prior art does not possess a sub-frame, is because
24 they lack the benefits disclosed in paragraph 49 of
25 your report; is that correct?

1 A. So I believe that one of ordinary
2 skill, POSA, would -- P-O-S-A -- would understand
3 these benefits that I've talked about and would
4 understand in evaluating the claim terms in the
5 context of this patent specification, whether or
6 not Poertzgen -- that Poertzgen doesn't have a --
7 have a sub-frame and an actuator housing, at least
8 the petition describes that that patent does.

9 But I've analyzed what they propose -- that
10 petition proposes and Dr. Lequesne proposes as a
11 sub-frame, and I disagree that it's not the
12 sub-frame which is claimed.

13 **Q. And -- I'm sorry. Were you done?**

14 A. So the -- and that what is claimed is
15 informed by what is talked about in the
16 specification.

17 **Q. And so one of the reasons that you**
18 **believe Poertzgen lacks a sub-frame, is because**
19 **what was pointed to as a sub-frame in Poertzgen in**
20 **your view, lacks the benefits that are described in**
21 **paragraph 49 of your report; is that fair to say?**

22 A. I think that that's not the -- if you
23 will, the primary reason. The primary reason is
24 articulated in my report in terms of the specific
25 features of that claim -- the -- I don't know what

1 the proper word is.

2 What is articulated by ZF in terms of what
3 Poertzgen's sub-frame is, there are arguments about
4 why that can't be a sub-frame which include how the
5 term sub-frame and housing are used in the claims
6 and how they're different, but ultimately is
7 also -- leads to the benefits that I describe in
8 this paragraph.

9 **Q. In your view, if I'm determining**
10 **whether a piece of prior art has a sub-frame, is it**
11 **relevant for me to consider whether the sub-frame**
12 **is arranged such that the motor/gear assembly can**
13 **be removed from the rest of the actuator as a**
14 **package without needing to decouple the motor from**
15 **the gears?**

16 **A. As I said, it's part of the reasoning**
17 **or the understanding that POSA would come to as to**
18 **what a sub-frame is and what it isn't.**

19 And it's why I've argued in the -- in my
20 declaration -- well, we can go to my declaration,
21 the details of why the Poertzgen supposed sub-frame
22 doesn't -- actually is not a sub-frame.

23 **Q. Okay. I'd like to turn to paragraph 50**
24 **of your report, which is on page 16. So just tell**
25 **me when you're there.**

1 A. Okay.

2 Q. And in paragraph 50, you identify
3 various isolators shown in the 415 Patent in
4 Figure 7 including an isolation bushing 318, an
5 isolation bushing 322, and an isolator 326.

6 Do you see that?

7 A. Yes.

8 Q. Now, would it be apparent to a person
9 of skill in the art, just from looking at Figure 7,
10 whether 318, 322, or 326 were isolators?

11 MR. MURPHY: Objection. Calls for
12 speculation.

13 THE WITNESS: So if I understand your
14 question, you're saying that if some -- a person of
15 ordinary skill only saw Figure 7 and knew nothing
16 else about the 415 Patent, would they have any
17 understanding as to what 318, 322, and 326 are?

18 BY MR. HUTCHINS:

19 Q. Yes. With the added statement that
20 would they have any understanding specifically that
21 326, 318, and 322 were isolators?

22 A. So what do you mean by -- I'm not sure
23 how you're using the word isolator.

24 Q. I'm using it exactly as the claims of
25 the 415 Patent do.

1 A. Well, as I understand and read the
2 patent claims, an isolator is generally described
3 explicitly in the claims as a material having both
4 elastic and viscoelastic properties, something like
5 that.

6 Whoops, sorry. I wish I had such good luck
7 when I was fishing catching things. So it says
8 that in claim 5, for example, said actuator further
9 comprising a component isolator having a spring
10 constant and damping constant and the said isolator
11 coupled between said motor and said sub-frame. So
12 it actually describes specifically that the
13 isolator has these mechanical properties.

14 So does a person of ordinary skill in your
15 hypothetical, understand that that's what -- that
16 these isolators are objects which have this
17 characteristic of elastic and viscoelastic
18 behavior?

19 **Q. Looking just at Figure 7.**

20 A. No. You -- I'm asking -- you said
21 that --

22 **Q. Yes. I'm sorry. Yes. Would they**
23 **understand that 326, 318, and 322 are isolators**
24 **having a spring constant and a damping constant**
25 **just from Figure 7?**

1 A. No. The question -- I'm sorry. I'm
2 not understanding your question. So --

3 Q. Sure. Let me break it down. Do you
4 see Item 322 in Figure 7?

5 A. 322?

6 Q. Correct. There's an Item 322 in
7 green --

8 A. Yes.

9 Q. -- in your report in Figure 7. Do you
10 see that?

11 A. Yes.

12 Q. Okay. Would a person of skill in the
13 art from looking at Figure 7, know what material
14 322 is made of?

15 A. All they're doing is looking at this
16 figure?

17 Q. Correct.

18 A. And they don't have any descriptive
19 material about it?

20 Q. Not from the 415 Patent.

21 A. So I would say that in general, are you
22 asking me whether an engineer can look at a -- any
23 drawing and determine from that drawing whether or
24 not -- what the -- all the properties are of the
25 parts that are in that drawing? And in general,

1 they would not be able to do that.

2 Q. Now, does -- would they know that 322,
3 whatever its made of, that material would have a
4 spring constant and a damping constant?

5 Let me start over because I said they, but
6 we were referring to a POSA so I'll put that in
7 explicitly.

8 Would a POSA, looking at Figure 7,
9 appreciate that 322 has a spring constant and a
10 damping constant, even though they may not know
11 what those constants are?

12 A. By just looking at this drawing, so a
13 person of ordinary skill in the art is supposed to
14 know everything that's relevant to electronic brake
15 parking systems at the time of the invention.

16 So even if they don't know about the
17 415 Patent, they may have seen, you know, literally
18 hundreds of electronic parking brakes, right?

19 So that's why in answering your previous
20 question, I took it back to if you asked a generic
21 engineer to look at an engineering drawing, would
22 they be able to tell everything about the
23 functionality of the parts that are represented in
24 the drawing, and I said no.

25 So you're taking it this step closer to our

1 situation here by saying, well, this is a POSA,
2 looking at just Figure 7 doesn't really make sense
3 as a question to me because the POSA knows a lot
4 about electronic park actuators and --

5 Q. So let me clarify that aspect of it.
6 So I agree with you. We're talking about a POSA
7 who has the knowledge he has leading up to the
8 415 Patent. He still has that knowledge and he
9 looks at Figure 7 but nothing else from the
10 415 Patent.

11 And my question was simply, would the POSA
12 appreciate that 322 has a spring constant and a
13 damping constant even if he doesn't know what those
14 constants are specifically as a specific number or
15 value?

16 A. So if you, again, take this
17 hypothetical that you're presenting to me and ask,
18 if I show an engineer a part, whether it's in a
19 drawing or it's the actual part, and ask them
20 whether or not if they have an understanding that
21 this part has some elasticity, some
22 viscoelasticity, and for that matter some inertial
23 property, their answer would be, of course, what
24 part doesn't have those properties?

25 So theoretically speaking, every material

1 properties are such that anything that you make has
2 those three basic properties: Inertial properties,
3 elastic properties, and viscoelastic properties.

4 Q. Okay. I think I understand your
5 answer. Thank you.

6 In your view, according to the 415 Patent,
7 does a bushing or an isolator have to reduce a
8 certain amount of vibration before it will be
9 considered an isolator?

10 A. So the 415 Patent is proposing to use
11 vibration isolators as a way to mitigate the
12 propagation of vibrations through their proposed
13 electronic brake actuator.

14 And it in fact informs POSA that there's a
15 process that you'll have to go through to pick the
16 elasticity and viscoelastic properties of these --
17 of these isolators in order to achieve vibration
18 reduction or vibration transmission reduction.

19 Q. And do the claims require any
20 particular quantity or amount of vibration
21 transmission reduction of its isolators, or will
22 any vibration reduction, no matter how small,
23 qualify a part to be an isolator?

24 A. I think that your question begs the
25 answer I gave before, which is would any engineer

1 understand that any part has compliance and
2 viscoelastic and inertia, and therefore, do all
3 parts in all machinery provide some change in the
4 way that vibrations are propagated through the
5 machine?

6 And when you ask the question in that sort
7 of generic theoretical perspective, then the answer
8 is yes, all parts bend and therefore have some
9 effect on transmissibility.

10 But if you ask those engineers, are all the
11 parts acting as vibration isolator, they would say,
12 no, of course not.

13 MR. HUTCHINS: I'll just take a brief pause
14 here because I don't want to make anyone
15 uncomfortable. I don't know when you normally eat,
16 but I don't -- I'm not trying to starve anybody
17 out.

18 So I don't know when people at the table eat
19 or not, or when you want to take a lunch break or
20 not because I'm utterly flexible, but -- so I want
21 to do whatever you want.

22 MR. MURPHY: Are you at a good stopping
23 point?

24 MR. HUTCHINS: I mean, it don't matter for
25 me.

1 MR. MURPHY: Okay.

2 MR. HUTCHINS: For my purposes -- you know,
3 so whatever you guys want. I just wanted to touch
4 base because I don't want you to be, or you, to be
5 unhappy.

6 MR. MURPHY: Factor me out of it if --

7 THE WITNESS: Yeah. Let's take a lunch
8 break.

9 MR. HUTCHINS: Okay. That's fine.

10 (A recess was then taken at 12:45 p.m.)

11 BY MR. HUTCHINS:

12 Q. Dr. Stein, we were -- before the lunch
13 break, we were looking at Figure 7 on page 16 of
14 your declaration.

15 So if you could turn to page 16 of your
16 declaration. And specifically we were talking
17 about the isolators in Figure 7, and my question
18 is, would a -- if a person of skill in the art just
19 prior to the 415 Patent were looking to purchase
20 what I'll call bushings like 322 as shown -- that's
21 shown in Figure 7 for instance, what are the
22 various types of materials that he would have
23 readily available to purchase bushings in?

24 A. I mean, bushings in my experience could
25 be made out of all sorts of different types of

1 materials.

2 Q. Are they commonly made of plastic?

3 A. No, I wouldn't say that. You know, it
4 depends on the context. Bushings could be made out
5 of bronze and they can be made out of different
6 kinds of plastics and -- it depends on the
7 application.

8 Q. Okay. Does the 415 Patent describe
9 what materials the isolators should be made of?

10 A. It's my recollection that the 415
11 Patent talks about the isolators in terms of its
12 functional characteristics, that is to have elastic
13 and viscoelastic properties, but doesn't specify
14 the materials as I recall sitting here.

15 Q. Do you recall if the 415 Patent
16 excludes any materials from being isolators?

17 A. As I said, it doesn't focus on the
18 materials that could be used, but rather the
19 properties that the materials have to have in terms
20 of their so-called stiffness and damping qualities
21 so that's what has to be determined.

22 Q. Does the 415 Patent require -- excuse
23 me. I'll start over.

24 Does the 415 Patent describe what materials
25 the sub-frame should be made from?

1 A. I don't recall.

2 Q. On paragraph 51 of your declaration on
3 page 16, do you have that handy?

4 A. Yes.

5 Q. You note in the first sentence of
6 paragraph 51 that, while some of the isolators in
7 the 415 Patent are bushings, bushings are not
8 necessarily isolators. Do you see that?

9 A. Yes.

10 Q. Does the 415 Patent set forth any
11 objective test to determine whether a bushing
12 between two parts, is an isolator rather than just
13 a bushing?

14 A. So could you help me by saying what do
15 you mean by an objective test?

16 Q. Sure. I'm attempting to distinguish an
17 objective test from a subjective one. So as I
18 would use the terms generally speaking, a
19 subjective test is one that there's really not much
20 of a good way to tell if you're right or wrong.

21 Different people might have different
22 opinions, I could say one thing, you could say
23 another, the other three people in this room could
24 say something different and there's really no way
25 to truly determine which of us is right.

1 An objective test, on the other hand, is one
2 that has an objective criteria that you can judge
3 against to know whether you're right or wrong. And
4 so it's really in that most general sense that I'm
5 attempting to use objective as opposed to
6 subjective.

7 And so with that understanding, do you know
8 if the 415 Patent sets forth any objective test to
9 determine whether a bushing between two parts is an
10 isolator rather than just a bushing?

11 A. My understanding of the 415 Patent is
12 that it is concerned with the issue of buying an
13 object, which can be called an isolator, it might
14 be called a bushing by some, that has elastic and
15 viscoelastic characteristics such that the right
16 type of isolator can be chosen to provide effective
17 mitigation of vibration transmission.

18 Q. And does the 415 Patent provide any
19 objective standard for determining what makes an
20 isolator the right kind of isolator or what makes
21 an isolator effective?

22 A. The 415 Patent assumes that a person of
23 ordinary skill in the art would be able to utilize
24 the teachings in the 415 Patent to realize a
25 working version of what is claimed and that person

1 would be able to choose the material in a way that
2 could be objectively determined to reduce the
3 amount of vibration.

4 **Q. So is the -- do you view the 415 Patent**
5 **as setting forth a standard such that any bushing**
6 **that reduces the amount of vibration, is an**
7 **isolator?**

8 A. I'm -- I'm not sure that I understand
9 where your concern is about bushings and isolators
10 in the 415 Patent in terms of differentiating
11 between the function of those two different
12 descriptors that have been used in this litigation.

13 But I'm not sure that, as I'm sitting here,
14 that I could say that the 415 Patent is very
15 concerned about the term that is used for
16 describing the objects which are meant in their
17 invention to reduce vibration transmission.

18 **Q. If I were holding a bushing in my hand**
19 **and I wanted to know if that bushing was an**
20 **isolator as that term is used in the 415 Patent, is**
21 **all I would have to know that it reduces vibration**
22 **to any degree?**

23 A. As I mentioned before on a completely
24 theoretical basis, any component that you put in a
25 mechanical system has the properties of elasticity

1 and viscoelasticity and therefore affects the
2 dynamic nature of the system and thus the vibration
3 transmission.

4 That's not what the 415 Patent is talking
5 about when it's talking about vibration isolators.
6 It's talking about a specific component which is
7 designed and is chosen designed with specific
8 levels of elasticity and specifically levels of
9 viscoelastic damping such that it can attenuate the
10 transmission of vibrations in a particular
11 electronic parking brake system.

12 **Q. So is the distinction between a bushing**
13 **that's an isolator and a bushing that's not an**
14 **isolator, is the intent of the designer and whether**
15 **or not he's intending to use that bushing**
16 **specifically to dampen particular vibrations?**

17 **A.** I don't think that your question is
18 well-formulated. And I don't mean that
19 disrespectfully, I just --

20 **Q. We all do the best we can, sir.**

21 **A.** It doesn't make much sense to me
22 because a bushing and an isolator -- so a vibration
23 isolator, which the -- is the type of isolator that
24 is talked about in the 415 Patent, is different
25 from a -- the traditional function of a bushing.

1 A bushing normally provides some type of
2 retention of a shaft or allows for the rotation of
3 a shaft inside of a housing -- centers the shaft
4 within the -- within the -- the housing within the
5 housing receptacle and it acts like a bearing
6 surface.

7 Now, do bushings have any compliance
8 associated with them? Yes, you -- just like all
9 materials have some level of compliance.

10 Is it possible that a bushing could be made
11 such that it has some desirable level of compliance
12 and damping that might make it also useful as an
13 isolator? That's possible.

14 **Q. On the point you just raised about**
15 **bushings helping with alignment, for instance, or**
16 **allowing rotation, do the isolators 318, 322, and**
17 **326 in Figure 7 of the 415 Patent, aid in alignment**
18 **and/or allow rotation of components?**

19 A. I would generally say that 322 and 318
20 allow for rotation. That is there are shafts that
21 are going through them. My understanding of 326 is
22 that that is not the case.

23 **Q. And do 322, 318, or 326 aid in**
24 **alignment?**

25 A. There would be some alignment

1 functionality to 318 and 322, but not 326.

2 Q. So it's certainly the case that
3 bushings can both aid in alignment and/or allow
4 rotation and also serve an isolating function,
5 correct?

6 A. I said that isolators -- those
7 isolators can act with the property of also being a
8 bushing, right? That's what I said.

9 I said before that, my previous answer, that
10 bushings are primarily used as a way of providing
11 alignment and, you know, isolating the rotation of
12 say a shaft from a -- from a housing and that can
13 be also chosen with properties that might help with
14 vibration reduction.

15 Q. Okay. And if I -- if I were holding a
16 bushing in my hand and I claimed this bushing was
17 an isolator and my friend claimed it wasn't an
18 isolator, is there anything in the 415 Patent you
19 can point me to that would definitively tell us
20 which of us is correct?

21 A. I mean, your hypothetical -- again, no
22 offense intended -- doesn't make any sense to me as
23 an engineer.

24 Q. So -- well, here's perhaps what I'm
25 struggling with. Paragraph 51 begins with a

1 sentence, while some of the isolators in the 415
2 Patent are bushings, bushings are not necessarily
3 isolators.

4 Do you see that?

5 A. Yes.

6 Q. And I'd like to focus on the concept
7 that bushings are not necessarily isolators. And
8 when you say bushings are not necessarily
9 isolators, just by way of background, you're
10 referring to isolators as that term is used in the
11 415 Patent, correct?

12 A. Yes, vibration isolators.

13 Q. Okay. And what I'm struggling with is
14 what criterion would I use to know whether a
15 bushing was or was not an isolator.

16 Because I'll lay it bare, when I read the
17 415 Patent, but I'm not an expert, I did not find a
18 clear criterion that would tell me whether some --
19 a bushing was an isolator or not. I did not find
20 something that would resolve that dispute if I were
21 having it with my friend.

22 And so I'm asking you if you can point me to
23 anything in the 415 Patent that sets forth an
24 objective criterion for determining whether a
25 bushing would or would not be an isolator.

1 A. So in the sense of wanting to achieve
2 the vibration isolation that is the objective of
3 the isolators in the 415, 415 teaches one how to go
4 about designing these isolators, namely if you go
5 back to the patent and you look at some of the
6 figures towards the end of the patent, I think
7 they're 9 and 10 -- 9 and 10, yes, they teach and
8 provide to one of ordinary skill the way to
9 conceptualize what the properties of the -- of
10 these isolators that are important to achieve the
11 claimed noise reduction.

12 And a person of ordinary skill would say,
13 oh, yeah, I'm going to have to pick an isolator
14 based upon Figures 9 and 10 and go forward with my
15 engineering work to choose an isolator that gives
16 me -- that has the right stiffness, the K, right,
17 damping, B, as shown in Figures 9 and 10, to give
18 me the kind of vibration performance that I'm
19 looking for.

20 So I think the 415 is pretty clear that
21 the -- what the process is for getting those
22 isolators, but what it doesn't say because it
23 depends on what the property is of the rest of the
24 system, you can't design K2 and B2 in Figure 10 or
25 K1 and B1 in Figure 9 until you have picked out the

1 motor and thus know the motor inertia and the motor
2 mass and the housing mass.

3 All those things become important when you
4 try to then establish what the properties are of
5 the isolator so that it provides reduction in
6 vibration transmission.

7 **Q. And is that why, in your view, the 415**
8 **Patent does not set forth an objective standard for**
9 **determining whether a part, no matter how it was**
10 **made, is an isolator?**

11 A. The 415 teaches that a vibration
12 isolator in the context of this -- of its
13 teachings, needs to have the appropriate stiffness
14 and damping values that match the characteristics
15 of the rest of the system such that vibration
16 levels are reduced.

17 **Q. But the 415 Patent doesn't tell you**
18 **what quantitative value is appropriate, correct?**

19 A. Because it doesn't -- it doesn't
20 specifically define how big, or small, or fat, or
21 skinny that this parking brake actuator needs to
22 be. And depending on how you design it and what
23 materials you use, the isolators will be different.

24 **Q. You've -- now, you mentioned that when**
25 **the 415 Patent uses the term isolator, it means**

1 vibration isolator.

2 Are there other types of isolators?

3 A. So I do talk about this in a generic
4 way in my declaration. So on page 24,
5 paragraph 70, I start out, description of what an
6 isolator is and the fact that, in general, an
7 isolator can mitigate the transmission of some
8 energy between two components, paragraph 70. But
9 that --

10 Q. Oh. Go ahead. I'm sorry.

11 A. -- vibration isolation is what is the
12 focus of the 415 Patent.

13 Q. And is there a difference between a
14 vibration isolator or a noise isolator, or are they
15 the same in your view?

16 A. Well, is there a difference between
17 vibration and noise?

18 Q. Okay. Let's take a step back because
19 maybe I didn't understand my question. Is there a
20 difference between vibration and noise, sir, in
21 your view?

22 A. Vibration and noise are different
23 things.

24 Q. And does that lead you to the
25 conclusion that vibration isolators are different

1 **than noise isolators?**

2 A. No, not necessarily.

3 **Q. Are they -- are they necessarily**
4 **co-extensive?**

5 A. I'm not sure what you mean by
6 co-extensive.

7 **Q. Can I have a vibration isolator that's**
8 **not a noise isolator or vice versa?**

9 A. So noise is -- is -- is -- is sound
10 that, as humans, we perceive -- usually is
11 perceived as something that's unpleasant. It
12 doesn't actually have to be, but usually a sound
13 that's unpleasant.

14 So certainly not all sounds are unpleasant,
15 but all sounds do have vibration as the basis of
16 what it is we perceive as sound. Vibrations of an
17 object can create sound waves in the air which we
18 perceive as -- as sound.

19 It also can create vibrations that we don't
20 hear, but there's still vibrations present, it's
21 just that we don't call it sound because it may be
22 out of the range of human hearing and it may not be
23 in the range of what we might call noise.

24 So vibration is a more general term that
25 describes something oscillating, moving back and

1 forth, and vibrations do cause sound waves which we
2 do hear as sound.

3 Q. So am I correct if I were to think of
4 it in my own mind at a high level, would I be wrong
5 if I were to think of noise isolators as a subset
6 of vibration isolators?

7 A. I think that I might be able to
8 generally agree with that statement.

9 Q. If you could turn to page 17 of your
10 declaration, and I'll draw your attention to
11 paragraph 53. And you can tell me when you get
12 there.

13 A. Okay. I'm there.

14 Q. And in paragraph 53, you note your
15 objection to including an electrical engineering
16 graduate with two years of experience with
17 electromechanical devices as being a person of
18 ordinary skill in the art; is that correct?

19 A. I say, specifically, I object to
20 petitioner's inclusion of electrical engineering as
21 a degree that a person of ordinary skill in the art
22 could hold and be considered one of ordinary skill
23 in the art because the issues in this case do not
24 relate to electronics or electricity.

25 Q. So in your view, can an electrical

1 engineer ever be a person of skill in the art with
2 respect to the electromechanical actuators of the
3 415 Patent?

4 A. Well, it -- could you rephrase that
5 question, please?

6 Q. Sure. I'm trying to understand your
7 opinion. Is it your opinion that having an
8 electrical engineering degree is disqualifying to a
9 person of ordinary skill in the art with respect to
10 the electromechanical actuators of the 415 Patent?

11 A. I don't consider that to be a
12 sufficient background to understand the issues that
13 are at hand in this litigation.

14 Q. Is it a sufficient background to
15 understand the subject matter of the 415 Patent?

16 A. The 415 Patent is largely concerned
17 with mechanical design and its effect on vibration
18 transmission in these mechanical components, and
19 those are largely, if not relatively exclusively,
20 the domain of what I would consider a mechanical
21 engineer to be involved with.

22 Q. So is it your view that a person of
23 skill in the art, has to have a mechanical
24 engineering degree?

25 A. I think that a person having mechanical

1 engineering degree would be an appropriate
2 background for understanding the 415 Patent issues
3 that we're talking about in this litigation.

4 **Q. But is it exclusively so?**

5 A. There are a lot of things that build up
6 the background of an individual, but my statement
7 here only is that electrical engineers, as I
8 understand it from being a teacher for 40 years in
9 the college of engineering at Michigan, electrical
10 engineers are not taught mechanical vibrations.
11 They're not taught about noise control, vibration
12 control, and they're not taught mechanical design,
13 and those are fundamental issues in this case.

14 **Q. If -- if a person were cursed with an**
15 **electrical engineering bachelor's degree from the**
16 **University of Michigan as I am, as it so happens,**
17 **is there some --**

18 A. Sorry.

19 **Q. -- is there some amount of real-world**
20 **experience in the automotive arena I could gain**
21 **that at some point in time would bring me up to the**
22 **level of a person of skill in the art with respect**
23 **to the subject matter of the 415 Patent?**

24 A. I mean, it's really a question with --
25 that obviously the answer is if somebody's spent

1 enough time doing mechanical design and vibration
2 work, that they -- reading on the side, learning
3 about the standards and all of the stuff that goes
4 into what mechanical engineers learn the basis of
5 in their degree, then they -- an electrical
6 engineer learning all that material on the job
7 would eventually of course be in a position of
8 having a sufficient background.

9 But I only say that the inclusion of
10 electrical engineering as a degree seems to not in
11 itself qualify someone as having -- being a person
12 of ordinary skill.

13 Q. Do you have a sense of how many years
14 of relevant work experience it would take me, maybe
15 five, or 10, or more before I would be a person of
16 skill in the art having --

17 A. You, specifically?

18 Q. Any -- anybody with a bachelor's in
19 electrical engineering.

20 A. I mean, I haven't made a study to
21 figure out what that number ought to be so I guess
22 I'm not willing to give you a number today.

23 Q. And so in paragraph 53 of your
24 declaration, the last sentence says, this case
25 relates to EPBAs which do include motors, but this

1 case does not relate to the contents or control of
2 the motor itself.

3 Do you see that?

4 A. Yes.

5 Q. And do you still believe that to be the
6 case?

7 A. I mean, I would say that the statement
8 is generally true as a mechanical engineer and as a
9 teacher of mechanical engineering, we teach
10 students about electronic motors, and electric
11 motor control, and the use in electromechanical
12 systems as a required topic.

13 And Dr. Lequesne's qualifications as an
14 expert in motor control I don't think is
15 particularly relevant to the issues that are more
16 generally addressed in my declaration.

17 Q. And is it your view that the control of
18 motors is not particularly important to the claims
19 of the 415 Patent?

20 A. So the control of the motor in an
21 electronic parking brake is not articulated in the
22 415 Patent. It is articulated in other prior art
23 patents that are in the petition that I read and --
24 and does give a person of ordinary skill in the art
25 reading those patents an idea about what's

1 important and what's perhaps less important in
2 terms of the design, and I've talked about some of
3 those things in my declaration.

4 So POSA does need to understand the larger
5 context and would understand that this
6 electromechanical system is going to be controlled,
7 this is an actuator under control and the
8 implications for the design of the mechanical
9 system.

10 Q. Is it your view that the claims of the
11 415 Patent require the motor to be controlled in
12 any particular way or is it agnostic as to that?

13 A. I have to review all of the claims, but
14 as I sit here, I don't believe that the claims
15 mention anything about the motor control, but it
16 may be mentioned in the specification somewhere.

17 Q. But as far as you understand it, the
18 claims of the 415 Patent, for instance, could cover
19 fast motors, or slow motors, or strong motors, or
20 weak motors, or reliable motors, or unreliable
21 motors, et cetera; is that fair to say?

22 A. No. I don't think that's fair to say
23 at all.

24 Q. Okay. Good. So let's -- let's talk
25 about that. In your view, do the claims of the 415

1 Patent, require that the motor operate at any
2 particular speed?

3 A. There isn't a specific speed
4 requirement that is described in the 415 Patent,
5 no.

6 Q. Okay. Is there any particular size
7 requirement in the claims of the 415 Patent with
8 respect to the size of the motor?

9 A. No.

10 Q. Is there any particular power output
11 requirement with respect -- with respect to the
12 strength of the motor?

13 A. Not specifically in the claims, no.

14 Q. Is there any particular reliability
15 requirement with respect to the operation of the
16 motor in the claims of the 415 Patent to your
17 knowledge?

18 A. I mean, all of these different
19 engineering features of designing a product would
20 be part of POSA's -- in POSA's understanding of
21 electric park brake systems and would know about
22 how to size the motor, how -- how much torque the
23 motor would need to have, what the maximum speed
24 capability of what the motor might have to be given
25 the brake system that it's connected to and the

1 gear train that is desired to be designed.

2 There's a lot that goes into actually
3 producing one of these products and the patent, as
4 is typical, is only talking about a particular
5 feature of this and assumes that one of ordinary
6 skill in the art understands the more general
7 context that this -- that is electronic parking
8 brake systems.

9 **Q. And is that why, for instance, the**
10 **claims don't require that the motor operate in any**
11 **particularly reliable manner versus unreliable?**

12 A. I mean, it isn't part of what is
13 claimed as the invention in the 415 Patent.

14 **Q. Could you look at paragraph 54 of your**
15 **declaration, which is on page 18, and tell me when**
16 **you get there?**

17 A. Yes. I'm at 14 --

18 **Q. And --**

19 A. At 54. Excuse me.

20 **Q. Yeah. Paragraph 54 of your**
21 **declaration. And just about the dead center of the**
22 **paragraph, you reference the issues in this case**
23 **which relate to noise attenuation and vibration**
24 **damping for an actuator.**

25 **Do you see that?**

1 A. Yes.

2 Q. Now, did the fact that the attorneys in
3 this case were disputing whether isolators in
4 particular were obvious, influence your conclusion
5 that the person of ordinary skill in the art, would
6 have a particular focus on noise attenuation and
7 vibration damping?

8 A. Could you repeat that, please?

9 Q. Sure. Did the fact that the issues in
10 this IPR relate to disputes over whether isolators
11 are obvious, influence your conclusion that a
12 person of skill in the art, would have -- have to
13 have a focus on noise attenuation and vibration
14 damping?

15 A. It seems to me that the issues of noise
16 attenuation and vibration damping are clearly set
17 out as objectives in the 415 Patent, a POSA reading
18 the 415 Patent, would understand these to be key
19 issues.

20 Q. Okay. So the fact that many of the
21 disputed claim terms in this case relate
22 specifically to isolators, did not influence your
23 conclusion that a person of skill in the art would
24 have had a couple of years focused on noise
25 attenuation or vibration damping; is that correct?

1 A. I think that the person of ordinary
2 skill in the art comes from the -- I mean, I'm not
3 a legal person and the concept of a POSA is a legal
4 construct, not a technical construct.

5 So whether I'm trying to figure out what the
6 POSA is that I'm trying to deem as how they would
7 think about this problem space that I'm working in,
8 in this case the 415 Patent, I think about what are
9 the -- what is the technology that is -- is set out
10 in the patent and -- and, you know, what do these
11 things look like in terms of technology that is
12 produced, and how complicated is it, and what kind
13 of background do you need to understand what these
14 issues are, and that's what determines who one of
15 ordinary skill in the art should be from my lay
16 perspective.

17 **Q. And when you're considering the level**
18 **of person of ordinary skill in the art for the**
19 **415 Patent, what role, if any, did the disclaimed**
20 **claims play in your analysis?**

21 A. I mean, I don't think that I can answer
22 that question specifically because I look at the
23 patent as a whole, the field as a whole, what's
24 being presented.

25 And I wouldn't say that my -- my definition

1 for a person of ordinary skill in the art, comes
2 from claims 3 and 4, for example. It comes from
3 the patent as a whole and the intrinsic evidence as
4 a whole.

5 Q. You are aware that, as issued, most of
6 the claims in the 415 Patent did not recite an
7 isolator at all, correct?

8 A. I'm not remembering the details of what
9 was issued at this point. Could you please refresh
10 my memory on that? Because I'm not remembering.

11 Q. Sure. Let's -- we can look at a claim.
12 How about claim 1, can you pull up claim 1 of the
13 415 Patent?

14 A. Sure. Okay. I have claim 1.

15 Q. And so give claim 1 a read and tell me
16 when you're done.

17 A. Okay.

18 Q. So we can agree that claim 1 doesn't
19 recite an isolator, correct?

20 A. That's correct.

21 Q. Can we agree that a person of skill in
22 the art with respect to the subject matter of
23 claim 1, does not in fact need two years of
24 experience with vibration isolation, vibration
25 damping, or noise attenuation?

1 A. In order to do what?

2 **Q. Be a person of ordinary skill in the**
3 **art with respect to the subject matter of claim 1.**

4 A. I don't understand how that is relevant
5 to the 415 Patent. It's only one claim and
6 actually doesn't speak to the -- you know, the
7 major objective of the -- of the electronic park
8 actuator.

9 **Q. And in your view, the major objective**
10 **of the 415 Patent was the use of isolators; is that**
11 **correct?**

12 A. I would say that that is certainly one
13 of the major objectives was the ability to reduce
14 the amount of -- ultimately how much noise the
15 electric actuator makes and it's proposed through
16 design and mechanical design and through the use of
17 isolators to come up with a system which produces a
18 reduction in the noise that's perceived, you know,
19 sound that's perceived by the operator of the
20 vehicle.

21 **Q. But we can agree claim 1, for instance,**
22 **of the 415 Patent doesn't require any noise**
23 **attenuation, correct?**

24 A. There's no explicit description of
25 isolators in claim 1, but so there's no -- there's

1 no isolators described, but that the overall design
2 feature of the electronic parking brake is also
3 part of the design, that is as I talked about
4 before, the idea of getting all of the drive train
5 components and the motor onto this internal frame
6 that is then surrounded by the housing as a way of
7 isolating any vibrations that are produced from
8 the -- from the drive train.

9 So to the extent that those ideas are
10 captured in claim 1, then it does have to do with
11 noise reduction.

12 Q. Am I correct that none of the claims of
13 the 415 Patent exclude noisy actuators?

14 A. I don't understand that question.

15 Q. Sure. Can you point me to a claim of
16 the 415 Patent that excludes noisy actuators?

17 A. I mean, I can't point you to such a
18 claim because claims don't, in my experience,
19 exclude something that's as undefined as what you
20 just described.

21 Q. Well, in fact, the reason you can't
22 point me to any claim is because there's no noise
23 restriction in any of the claims of the 415 Patent,
24 correct?

25 A. Clearly, the patent as a whole is

1 attempting to reduce the amount of noise produced
2 by an electric brake actuating system, and the POSA
3 reading this 415 Patent would understand that.

4 **Q. So if I build an actuator that's as**
5 **loud as a lawn mower, am I free and clear of the**
6 **415 Patent claims in your view?**

7 A. The patent is an attempt to define some
8 novel teachings about how to design electronic
9 parking brake systems. It doesn't exclude somebody
10 from being a bad engineer and creating something
11 that maybe follows the patent claims but functions
12 terribly.

13 **Q. So in paragraph 57, you set forth what**
14 **you believe the definition of the person of skill**
15 **in the art should be with respect to the 415**
16 **Patent; is that correct?**

17 A. I had a chance now to read paragraph 57
18 to refresh myself. And your question about that
19 was?

20 **Q. In paragraph 57, you set forth what you**
21 **believe the definition of the person of skill in**
22 **the art should be with respect to the 415 Patent;**
23 **is that correct?**

24 A. I set out what I describe as a more
25 precise definition of a POSA at the time of the

1 invention.

2 Q. And applying that definition, I'd like
3 to spend some time talking with you about what
4 types of information about isolators the person of
5 skill would have gleaned by virtue of his
6 mechanical engineering or automotive engineering
7 degree and his two years of experience focused on
8 vibration isolation.

9 Can you elaborate for me upon what types of
10 information about isolators the person of skill in
11 the art would possess?

12 A. So all of mechanical engineers that
13 I've trained in this time period, would all have
14 understood basic mechanical vibration systems,
15 understand the role of damping, stiffness, and
16 inertia, and the behavior of vibrating systems and
17 have an understanding that one of the consequences
18 of vibration of mechanical parts is that they
19 introduced -- can introduce, you know, noise,
20 audible -- audible sound and can also, you know,
21 introduce a -- a difficulty in controlling the
22 position of a -- of an actuator system that's
23 trying to control the position like an electronic
24 park brake.

25 And they gain that experience in their

1 different mechanical design classes, in their
2 control classes, in their -- in their systems
3 classes.

4 Some students also take advanced classes
5 or -- or technically in-depth classes on vibration,
6 but they don't all have that.

7 And the noise isolation part, some of the
8 standards and the way that that's done in
9 engineering, is something that they would -- could
10 get some of in some of the courses that we teach,
11 but I gave several years of experience in the field
12 to gain a facility with some of those skills that
13 are used to apply to the specific domain of
14 electronic parking brake actuators.

15 Q. And would they have learned about how
16 to design and collect appropriate passive
17 activator -- passive isolators? Excuse me. I'm
18 getting tired so I'm going to start that question
19 over.

20 Would a person of skill in the art have
21 learned about how to design and select appropriate
22 passive isolators?

23 A. I think on a basic level they would,
24 yes.

25 Q. And what are some of the various

1 materials that they would have understood would
2 generally make good passive isolators?

3 A. Ones that have good -- have appropriate
4 levels of stiffness and damping for the particular
5 realization of the mechanical system that they're
6 going into.

7 Q. And are there particular classes or
8 types of materials that spring to mind?

9 A. So there -- the classes in the areas of
10 systems and dynamics and vibrations that we teach,
11 do teach them how system response is affected by
12 choices of stiffness and damping, and so they would
13 learn the fundamentals of that in their
14 undergraduate courses.

15 What was the rest of your question? I want
16 to make sure I get on the --

17 Q. Oh, no. I just wanted to know if you
18 thought they would be aware that particular classes
19 or types of materials would be thought of as being
20 good isolators.

21 A. Yes. So in that context -- thank you
22 for refreshing my memory. So the materials part of
23 it, so we -- the class -- all of our mechanical
24 engineering students have to take materials
25 classes, and within the context of our materials

1 and manufacturing courses, they are taught what are
2 the properties of different types of materials, how
3 we classify their properties, and would have with
4 that knowledge, the design classes, vibrations
5 classes, dynamics classes that we teach, would have
6 the requisite fundamentals to address the issues
7 for the 415 Patent.

8 **Q. Okay. Would they be familiar with**
9 **identifying sources of vibration and pathways for**
10 **transmission of vibration?**

11 A. I think they would have some basics for
12 that. We teach them gear trains, drive trains, and
13 what some of the issues are with that, alignment
14 issues, wear issues.

15 So would they know exactly what kind of wear
16 patterns develop in electronic brake actuators?
17 No, but again, two years of experience in getting
18 field data and -- et cetera, et cetera, they would
19 hone in on the details of what's relevant to that
20 particular product.

21 **Q. They could likely identify the gear**
22 **train or motor as a possible source of vibration?**

23 A. Yes, for sure.

24 **Q. Would they be familiar with systems**
25 **that use multiple or overlapping isolators?**

1 A. If by that you mean would they
2 understand that there could be more than one
3 vibration isolator used in a system, I think they
4 would understand that, yes.

5 Q. Okay. I can't remember how long we've
6 been going so I don't even know, but --

7 A. I don't, either.

8 MR. MURPHY: It has been over an hour.

9 MR. HUTCHINS: Okay. I don't want to make
10 anyone uncomfortable so why don't we can take a
11 little break --

12 MR. MURPHY: Sure.

13 MR. HUTCHINS: -- and then --

14 THE WITNESS: Appreciate your attention to
15 that.

16 (A recess was then taken at 2:33 p.m.)

17 BY MR. HUTCHINS:

18 Q. Dr. Stein, if you could turn to page 19
19 of your declaration and I'll direct you to
20 paragraph 59. And you can tell me when you're
21 there.

22 A. Yes, I'm there.

23 Q. And is this in a section of your report
24 called claim construction and underneath, a
25 subsection called sub-frame.

1 Do you see that?

2 A. Yes.

3 Q. Let me ask you first, in general, for
4 purposes of your analysis, were you asked to apply
5 a particular meaning to the term sub-frame or a
6 particular claim construction to the term
7 sub-frame?

8 A. I mean, I -- I think I object to the
9 premiss of your question, which is that I was told.

10 BY MR. HUTCHINS:

11 Q. Well, no. That's what I'm asking. Let
12 me be clear. No, I wasn't intending to disparage
13 anything, I was asking you sometime -- let me take
14 even a step further back.

15 Sometimes experts are provided claim
16 constructions and says, I'd like to you apply this
17 claim construction and go about your business.

18 So that's what I'm asking in this instance,
19 whether that happened or not. So let me -- with
20 that general background, let me ask the question
21 again.

22 With respect to the term sub-frame, were you
23 provided a claim construction that you were to
24 apply with respect to your analysis?

25 A. So I guess to go back to your premiss

1 of the question, which is in some cases experts are
2 given the claim construction, my experience is that
3 you're given that, but through a court order that
4 says, this is the claim construction, like it or
5 not, right? And so then you deal with the
6 court-ordered claim construction.

7 There is none in this case and so claim
8 construction was, you know, a topic on the table
9 for us to talk about and so I -- the initial
10 material that we talked about some hours ago about
11 the ordinary meaning is legalese that was provided
12 to me by counsel, but then the specific instruction
13 here of sub-frame is my understanding of what makes
14 sense for this 415 Patent.

15 Does that help answer your question?

16 **Q. Yes. So, one, it's my understanding**
17 **you were not provided a claim construction by**
18 **anyone and told to apply that, correct?**

19 A. Correct.

20 **Q. And am I correct that you undertook to**
21 **review the 415 Patent and develop your**
22 **understanding of what a person of skill in the art**
23 **would think a sub-frame was within the meaning of**
24 **the 415 Patent; is that correct?**

25 A. Yes.

1 Q. And if I wanted to read in your report
2 what you thought the definition of a sub-frame was
3 to a person of skill in the art as that term is
4 used in the 415 Patent, where should I look in your
5 report?

6 A. So I assume that you're somehow unhappy
7 with what's written in paragraph 59 and 60 and 61,
8 which are all about using -- and 62 and 63 --

9 Q. Okay.

10 A. -- are all about my constructing of the
11 word sub-frame in the context of, you know, this
12 report --

13 Q. And I'm --

14 A. -- for litigation.

15 Q. And, again, I apologize if you thought
16 I was disparaging your -- your opinions in some
17 way. I'm not neither happy nor unhappy, I was
18 simply trying to determine where you thought your
19 claim construction of sub-frame was and if -- and
20 if the answer is, I set it forth in paragraphs 59
21 through 63, then I'm perfectly happy with that
22 answer.

23 Was I -- in that -- does that -- does what I
24 say change your answer at all or no?

25 A. No. It doesn't change my answer.

1 Q. Okay. Very good. Okay.

2 A. I think it's laid out here.

3 Q. Okay. Now, to be able to determine
4 whether an object in a device is a sub-frame, as
5 that term is used in the 415 Patent, do I need to
6 know how that component interacts with an actuator
7 housing?

8 A. I'll ask you to repeat that so I can
9 make sure I catch every word.

10 Q. Certainly. To be able to determine
11 whether an object in a device is a sub-frame, as
12 that term is used in the 415 Patent, do I need to
13 know how that component interacts with an actuator
14 housing?

15 A. I mean, I don't really understand your
16 question. You half are using, you know, terms from
17 the patent, but your premise of the whole
18 hypothetical is that -- or I mean, some space that
19 has nothing to do with the 415 Patent so I don't --
20 I don't know where I'm asked to answer that
21 question from.

22 Q. Sure. Can we look at Figure 6 of the
23 415 Patent?

24 A. Figure 6 in the patent itself? Okay.

25 Q. Okay. Now, in Figure 6, can we agree

1 that the plate 312 is the sub-frame?

2 A. The sub-frame -- it's part of the
3 sub-frame.

4 Q. And what else is part of the sub-frame?

5 A. So the structure on -- in Figure 7,
6 which is -- which is labeled 314 I believe is also
7 what's called the top part of the sub-frame I
8 believe. So there's -- it's sort of a sandwich,
9 right.

10 Q. Is it your -- are you of the -- are you
11 of the view that Figure 6 and Figure 7 are the same
12 embodiment?

13 A. No. I don't think they are.

14 Q. Okay. So let's focus on Figure 6. And
15 my question was, is 312 the sub-frame in Figure 6?

16 A. So it -- 312 is definitely at least
17 part of the sub-frame, but I believe that the
18 unmarked part of the frame that doesn't have a
19 number, it looks like 304 is the number, but I
20 believe that that's a mismarking because 304 refers
21 to the driven pulley.

22 Q. I understand what you're saying. So
23 you're saying that the sub-frame in Figure 6 is --
24 is perhaps a combination of 312 and the unnumbered
25 plate on the bottom of Figure 6, that's at least in

1 part to the bottom of the lowest gear in Figure 6?

2 A. Yes.

3 Q. Okay. Now, if -- if I were to place a
4 cylindrical housing over the motor 300 that just
5 encapsulated the motor 300 and affix it to the top
6 of plate 312 in Figure 6, is 312 still part of the
7 sub-frame in your view?

8 A. Well, I think that your question is
9 incomplete. I don't think it can be answered.

10 Q. So am I correct that if I were to take
11 a cylindrical cup-shaped housing and place it over
12 the motor 300 so that it enclosed the motor 300 and
13 affixed the rim of that housing to the upper face
14 of plate 312, 312 at that point may or may not
15 still be a sub-frame in your view; is that correct?

16 A. And that's a hypothetical. I'd have to
17 think about it a little bit more. I don't -- I
18 think it's an incomplete hypothetical.

19 What does the rest of the system look like?
20 You don't have a brake caliper then which the
21 housing is connected to. I don't know what the
22 rest of the system looks like so it's -- it's a
23 little bit hard to answer your question.

24 Q. Okay. Fair enough. And let me ask
25 you, in determining whether 312 is a sub-frame, is

1 it relevant to know how the actuator is or isn't
2 attached to a brake caliper?

3 A. So I'd have to give it some more study.
4 It's possible that this Figure 6 actuator sub-frame
5 assembly -- I mean, it is a sub-frame assembly as
6 shown in Figure 6 and your design of having a
7 separate housing that goes over the motor without
8 telling me the rest of what this thing looks like,
9 leaves me to kind of speculate about what the
10 overall role of the -- of this sub-frame or
11 subassembly, whether or not it would still be --
12 well, this -- let's start over again.

13 This frame, this image that's shown in
14 Figure 6, is a sub-frame. A subassembly and as
15 part of the embodiment or other embodiments, so the
16 rest of the caliper is shown in the -- in this --
17 in the 415 Patent could be part of an electronic
18 brake actuator that clearly would be -- would meet
19 the claims, assuming that it has some of the
20 vibration isolators which are not shown in this
21 figure.

22 So you're trying to use this sub-frame
23 assembly and starting to put things around it and
24 ask me if it's still a sub-frame assembly. It is,
25 but whether it becomes a viable -- whether that

1 electronic part actuator -- brake actuator, excuse
2 me, is -- meets the claims, I don't know.

3 Q. And to be clear, I wasn't asking you
4 for an opinion as to whether the device as a whole
5 would meet the claims. I was asking you whether
6 plate 312 would still be a sub-frame as that term
7 is used in the claim.

8 And -- but with that understanding, am I
9 correct that you can't give a conclusion one way or
10 another as to whether in my hypothetical where I
11 place a cylindrical housing over the motor 300 and
12 affix it to the top face of 312, whether or not 312
13 is still a sub-frame as that term is used in the
14 patent?

15 A. So what are you calling the cylinder
16 that you placed over the top of the motor?

17 Q. Well, I'll call it a motor housing, but
18 it's a -- it's simply a cylindrical cup that
19 encloses the motor and the lip of the cup is
20 adhered to the top of plate 312. So the motor 300
21 is now no longer visible because it is completely
22 enclosed in a cylindrical housing sitting over it?

23 A. It wouldn't be completely enclosed
24 because the output shaft of the motor is sticking
25 through the plate.

1 Q. I was referring to the top part of it,
2 but fair enough. The bottom part of Figure 6 is
3 un -- is unchanged in my hypothetical.

4 A. Right. And so your cylinder doesn't
5 enclose it as per the actuator housing so it's not
6 an actuator housing, at least as I understand the
7 actuator housing.

8 But it is a cylinder that covers the motor,
9 the bottom part of the motor or the -- the part of
10 the motor that's shown above the plate, but is --
11 in this incomplete hypothetical, it remains unclear
12 as to how the final electronic brake actuator, that
13 is, where is the housing -- actuator housing and
14 other things that are called out in the claims, you
15 haven't given to me. So I'm ...

16 Q. And is that why then you cannot say one
17 way or another whether 312 is a sub-frame?

18 A. No. I said it is a sub-frame.

19 Q. Oh, I apologize. Okay. Fair enough.

20 A. It is a sub-frame.

21 Q. But it's unclear whether the device as
22 a whole would meet the claims because --

23 A. Well --

24 Q. -- I gave you an incomplete
25 hypothetical; is that correct?

1 A. Yeah. And what I'm -- what I don't
2 quite understand is you put this cylinder over the
3 top of the motor and you ask, is this still a
4 sub-frame, and I would answer that, yeah, it's
5 still a sub-frame and potentially even with the cup
6 that you have described as being put over the
7 motor, this whole unit could still be put into the
8 claimed actuator housing and -- you know, and be
9 able to, quote-unquote, complete the assembly of
10 the -- of the electronic parking brake.

11 **Q. I understand. Thank you. So -- oh, go**
12 **ahead, I'm sorry. Go ahead.**

13 A. So it is a sub-frame assembly and if
14 you put that over the top of it, I would say it's
15 still a sub-frame assembly, but I don't understand
16 how the total device is going to look when
17 assembled.

18 **Q. And am I correct from the manner in**
19 **which you answered that question, that in your**
20 **view, an actuator housing is not an actuator**
21 **housing as that term is used in the 415 Patent**
22 **unless it completely encapsulates an actuator?**

23 MR. MURPHY: Objection. Misstates
24 testimony.

25 THE WITNESS: So I would ask -- I've been

1 thinking a little bit about your question, but I
2 now have forgotten some of the details of the
3 question so if you could repeat it for me, I would
4 appreciate it.

5 BY MR. HUTCHINS:

6 Q. Certainly. Is it your understanding
7 that as the term -- let me start again.

8 Is it your understanding that the term
9 actuator housing in the 415 Patent refers only to a
10 housing that completely encapsulates the actuator?

11 A. So the 415 Patent refers to an actuator
12 housing as that which encloses the actuator. The
13 term actuator housing is used to refer to the
14 housing 301, such as in Figure 5 or Figure 4, as
15 being so -- I've lost my place, I'm sorry.

16 Term actuator housing is used to refer to
17 the housing 301, which is the outer casing of the
18 actuator 102. It is not the casing of the brake
19 caliper 106.

20 I guess that I would be glad to analyze a
21 different design of an actuator housing to see if
22 it meets the claims that also did not entirely
23 include the sub-frame assembly. I -- it's too
24 difficult of a job to answer your question
25 specifically. There's just too many possibilities.

1 Q. So sitting here today, you don't have
2 an opinion one way or another whether actuator
3 housing, as that term is used in the 415 Patent,
4 requires the housing to completely encapsulate the
5 actuator; is that correct?

6 A. I'm not sure if that's a requirement.

7 Q. Okay. Do the claims of the 415 Patent
8 patent require the housing to have any particular
9 shape or size in your view?

10 A. In as much as a person of ordinary
11 skill in the art would understand, that if you
12 built an actuator that was the size of a coffee cup
13 and then you designed a casing for that -- you
14 know, an actuator housing for that that was the
15 size of this table, that this would not be a
16 reasonable design.

17 So there is some idea that the subassembly
18 needs to be placed into the actuator housing to
19 house it and to help mitigate the sound
20 transmission and to interface with the brake
21 caliper in such a way that the brake can be engaged
22 and disengaged and so there are some compatibility
23 constraints here given the size of the brakes
24 you're using and the size of the actuator, the
25 weight.

1 So one of ordinary skill would understand
2 that this is -- this casing is constrained, it just
3 can't be anything.

4 **Q. Do the claims of the 415 Patent require**
5 **the casing to have any size constraint? And by**
6 **casing, I meant actuator housing.**

7 A. I think that the 415 Patent, which
8 includes the claims and the specification and all
9 the rest of the intrinsic evidence, indicates that
10 there are a series of components that fit together,
11 brake caliper and the housing, inside the housing
12 is the sub-frame and the actuator itself. And so
13 these are all meant to work together and one of
14 ordinary skill would understand that.

15 **Q. Would one of ordinary skill believe**
16 **that there was an actuator housing that was just**
17 **too large to ever fall within the scope of the**
18 **claims of the 415 Patent?**

19 A. I don't believe that a person of
20 ordinary skill would say, oh, I've just created --
21 designed this beautiful electronic brake actuator,
22 it looks exactly like the one on the 415 Patent
23 except that I'm going to make the housing twice as
24 big so that I don't infringe the patent. I don't
25 think that's what a person of ordinary skill would

1 do, would not get them around the patent's claims.

2 Q. And that's because the claims of the
3 415 Patent don't in fact set any size limit on the
4 size of the actuator housing, true?

5 A. Because a person of ordinary skill in
6 the art would know what the size constraints
7 generally need to be. It's understood, it's
8 implied.

9 Q. I'm sorry, I'm not sure I quite
10 understand your last answer. Do the claims of the
11 415 Patent in your view, implicitly contain a size
12 restriction that's not stated explicitly?

13 A. I'm saying that the claims and the
14 patent have an invention which includes the housing
15 that matches up -- that meets up with the brake
16 caliper, and that inside the housing is an actuator
17 and a sub-frame assembly, and that one of ordinary
18 skill in the art would want to make that as small
19 as possible because size and weight are always an
20 issue on a vehicle, but it would have to be large
21 enough to be big enough to contain whatever
22 actuator, subassembly you designed in order to give
23 you the performance that you needed.

24 So it's implied how big or small this thing
25 has to be, you just can't make it any old size.

1 Well, you can make it as big as you want, but then
2 it would still infringe the patent but you wouldn't
3 be able to sell any of them.

4 Q. Thank you. I understand. Can you turn
5 to page 23 of your declaration, and I'd like to
6 draw your attention to paragraph 68, and you can
7 tell me when you're there.

8 A. Okay. I'm there. I'm at paragraph 68.

9 Q. Okay. And you mention towards the top
10 of paragraph 68 that in your view, among others,
11 Poertzgen -- the Poertzgen and Weiler references
12 disclose EPBAs with hard-mounted components.

13 Do you see that?

14 A. Yeah. And Drennen as well.

15 Q. Correct. And Drennen as well. And can
16 we agree that Poertzgen and Weiler don't actually
17 describe their devices as being hard-mounted?

18 A. That is a term the 415 system -- 415
19 Patent uses, which I thought was an appropriate way
20 to describe the prior art that units like
21 Poertzgen, and Drennen, and Weiler all are systems
22 that do have precision gear trains, drive trains
23 that are all constructed through hard-mounting the
24 components in precise relationship to one another.

25 And specifically Poertzgen, as I recall

1 sitting here, is quite concerned about the accuracy
2 and speed of response of his actuator and it's
3 consistent with wanting that accuracy and speed and
4 response to have your drive train mounted as a
5 hard-mounted system --

6 Q. And --

7 A. -- and --

8 Q. Oh, I'm sorry. Go ahead.

9 A. And Weiler or Weiler -- which actually,
10 I think Weiler is probably closer to the right
11 pronunciation, or Weiler, also is quite concerned
12 with precision and worried about where he places
13 the sensor to measure the motion of the drive train
14 components by measuring the actuator, the motor
15 motion, and is also an example of a system where
16 all the parts are precisely located with respect to
17 one another.

18 Q. And maybe my question wasn't clear.

19 Can we agree that neither Weiler nor Poertzgen uses
20 the term hard-mounted or hard-mounting?

21 A. I don't know if they use that term
22 explicitly.

23 Q. Okay.

24 A. I don't recall.

25 Q. Okay. But you were of the view that

1 the 415 Patent uses that term explicitly. So just
2 so the record is clear, can you point to me where
3 in the 415 Patent you were thinking?

4 A. My colored version is easier to find
5 things, but let's see if I can -- column 3,
6 line 16, it will be understood that depending upon
7 the particular mounting location and techniques,
8 i.e., hard-mounted versus soft-mounting through an
9 elastic member, operation of an actuator may cause
10 a variety of audible noises as later detailed
11 herein. An actuator consistent with the present
12 invention may be configured for tailoring the
13 audible noise of the actuator to a desired level.

14 Q. And -- thank you. Now, is it -- do you
15 have an opinion one way or another as to whether
16 any of the claims of the 415 Patent exclude
17 hard-mounted actuators?

18 A. I mean, the 415 Patent is teaching
19 against hard-mounted mounting. It's teaching
20 soft-mounting through elastic members.

21 Q. And so it's -- you're of the opinion
22 that the claims of the 415 Patent in fact do
23 exclude hard-mounted actuators, correct?

24 A. It's saying that hard-mounted systems
25 can be responsible for causing the transmission of

1 noise through the hard-mounted joint, and as later
2 detailed herein, an actuator consistent with the
3 present invention may be configured for tailoring
4 the audible noise of the actuator to a desired
5 level.

6 And as we learned from the claims and from
7 the embodiments, that's a soft-mounted system
8 that's being claimed.

9 Q. So if I have a hard-mounted actuator, I
10 avoid the claims of the 415 Patent, correct?

11 A. That's not -- that's an incorrect
12 characterization of what I said.

13 Q. I wasn't characterizing what you said
14 one way or another. My question is, if I have a
15 hard-mounted actuator, I avoid the claims of the
16 415 Patent, correct?

17 A. To the extent that the actuator is
18 required to have an elastic, viscoelastic member
19 between the actuator, the motor, and the sub-frame
20 assembly, if a motor doesn't have that, then it
21 would not meet that claim limitation of that claim.

22 Q. So is it your view that any device that
23 has an isolator between the motor and the sub-frame
24 is, by definition, soft-mounted?

25 A. How are you defining isolator?

1 **Q. Exactly as it's used in the claims of**
2 **the 415 Patent.**

3 A. So in the claims of the 415 Patent, it
4 says an isolator that has the characteristics of
5 elastic and viscoelastic properties with the
6 implied understanding that you would design these
7 properties to mitigate the vibration transmission
8 in your particular system.

9 So if a system doesn't have any elastic,
10 viscoelastic material between the motor and the
11 sub-frame, then it wouldn't meet that particular
12 claim limitation of that particular claim.

13 **Q. But that's not what my question was.**

14 A. Okay.

15 **Q. So let me -- let me be precise.**

16 A. Sorry about that.

17 **Q. That's okay. Are you of the view that**
18 **any actuator that has an isolator between the motor**
19 **and the sub-frame is, by definition, soft-mounted?**

20 A. So I think your question your
21 hypothetical is -- you know, leads one to
22 proverbial no answer because unless we constrain
23 the idea of this isolator to be designed in such a
24 way as to produce some desired level of functional
25 vibration reduction in the context of the mounting,

1 so if -- as we talked about before, all materials
2 have elastic and viscoelastic properties.

3 So if you want to say that anything has that
4 property, so anything that I stick between the
5 motor and the sub-frame constitutes an isolator
6 because it has stiffness and damping, then I would
7 say that that is an -- is not -- not consistent
8 with what the 415 is taking about.

9 They're talking about an isolator between
10 the motor and the frame that provides a
11 viscoelastic mounting that helps to reduce the
12 vibration that's being transmitted, not just
13 anything that gets in there.

14 **Q. Do the claims of the 415 Patent require**
15 **any particular hardness or softness to the**
16 **isolator?**

17 A. I believe that the 415 requires and
18 assumes -- let me back up.

19 The 415 Patent teaches one of ordinary skill
20 where to apply their skills at doing vibration
21 reduction to electronic park braking by
22 specifically putting and designing isolators in
23 particular places, namely the motor mount, for
24 example, as one example, and it has other places,
25 which we've seen in the figure before.

1 And it assumes, as we also talked about
2 before, that one of ordinary skill in the art would
3 know how to go about picking that isolator so that
4 its stiffness and damping characteristics would be
5 appropriate for the properties of the electronic
6 park brake being built such that vibration
7 attenuation of some that -- of some amount is
8 achieved.

9 **Q. So is that another way of saying the**
10 **claims of the 415 Patent do not require any**
11 **particular hardness or softness to the isolator?**

12 A. The claims do not have any specific
13 numbers for the stiffness and viscoelastic
14 constants that could be used -- that could be found
15 for a particular realization of an isolator, but it
16 clearly understands that it's within the skill of
17 an ordinary person -- a person of ordinary skill in
18 the art to be able to, you know, choose an isolator
19 that has the stiffness and damping qualities that
20 are useful in the context of the electronic park
21 brake that they're building.

22 **Q. With respect to the claims of the**
23 **415 Patent that talk about the motor being mounted**
24 **to a sub-frame, do the claims require any**
25 **particular form of mounting in your view?**

1 A. Do the claims require a particular kind
2 of mounting of what?

3 **Q. The motor to the sub-frame.**

4 A. The claims -- some of the claims, and
5 more generally, the spirit of the 415 Patent when
6 seen as a whole, clearly is advocating for the
7 motor to be soft-mounted to the sub-frame assembly
8 as a first -- as one of its recommendations or one
9 of its teachings I guess is a better word.

10 **Q. Okay. But when I'm asking you about**
11 **what the claims require, I'm not really asking**
12 **about the spirit of the disclosure as a whole. I'm**
13 **asking about the claims in particular.**

14 **And so with that understanding, do you have**
15 **a view one way or another as to whether the claims**
16 **of the 415 Patent require any particular type of**
17 **mounting when the motor is mounted to the**
18 **sub-frame?**

19 A. So claim 24 says, in part, providing a
20 second motor isolation bushing between said
21 sub-frame and said motor.

22 So it's specifically called out in claim 24
23 that amongst other things that are in the claim,
24 that the -- the motor is mounted through an
25 isolation bushing -- an isolation bushing, a

1 vibration isolation component.

2 Q. Okay. And so my first question to you
3 then is when claim 24 says, providing a first motor
4 isolation bushing between said portion of said
5 actuator housing and said motor, are you of the
6 view that the isolation bushing has to completely
7 prevent the motor from touching the actuator
8 housing?

9 A. So could you read back your question,
10 please?

11 Q. Sure. When claim 24 says, providing a
12 first motor isolation bushing between said portion
13 of said actuator housing and said motor, are you of
14 the view that the isolated -- isolation bushing has
15 to completely prevent the motor from touching the
16 actuator housing?

17 A. Are you talking about the part of the
18 actuation housing which is in the region of the
19 bottom of the actuator where the bushing is, or are
20 you talking about any part of the actuation
21 housing?

22 Q. Let's take the former first.

23 A. That only the bottom part of the
24 actuator housing?

25 Q. Correct, in the same region.

1 A. And --

2 Q. Put another way, let's say there's -- I
3 have the motor and it's attached to the sub-frame
4 and let's say there's a square inch of real estate
5 abutting between the motor and the sub-frame.

6 A. Okay.

7 Q. And let's say I have an isolator that
8 doesn't cover the whole square inch. It's between
9 the motor and the housing but it doesn't prevent --

10 MR. CALDERON: John, the housing or the
11 sub-frame?

12 MR. HUTCHINS: The sub-frame. If I
13 misspoke, I apologize.

14 BY MR. HUTCHINS:

15 Q. So I have the motor and the sub-frame
16 and I place an isolator between them; however --

17 A. I thought you were talking about the
18 motor and the housing.

19 Q. The -- the -- I'm talking about claim
20 24 so whatever claim 24 says. To let's go back to
21 claim 24.

22 A. It says between said portion of
23 actuator housing and said motor.

24 Q. You know -- okay. So I said it right.
25 I said it right the first time.

1 **Okay. So we're talking in reference to**
2 **claim 24, but I apologize for any confusion --**

3 MR. CALDERON: I think you're still
4 conflicting --

5 MR. HUTCHINS: Hang on. Hang on. I'm the
6 only one who's going to ask the questions. So let
7 me please start over and ask the question.

8 BY MR. HUTCHINS:

9 **Q. So we're talking in claim 24 and we're**
10 **talking about a first motor isolation bushing**
11 **between the portion of said actuator housing and**
12 **said motor.**

13 And what I'm asking you is if I place that
14 isolation bushing between the motor and the
15 actuator housing, but right next to that bushing,
16 the motor is still contacting the housing, do I
17 avoid the claim?

18 A. Well, I would say first of all, you're
19 a bad engineer.

20 **Q. I'll accept that.**

21 A. If in that region, the claim does not
22 explicitly say that make sure that this isolator is
23 sufficient to prevent any part of the actuator
24 housing from touching the bottom of the motor, it
25 doesn't say that explicitly, but one of ordinary

1 skill would know if you want to isolate the
2 vibrations that are in the motor casing from
3 getting into the actuator housing, you wouldn't
4 want it to be touching and you would design the
5 isolator to be sufficiently large, we're only
6 talking about a square inch, I think was your
7 example so that that didn't happen.

8 Q. So the claim doesn't require it, but
9 it's a good idea from an engineering standpoint; is
10 that fair to say?

11 A. It says, to provide the isolator, and I
12 think a person of ordinary skill would understand
13 that that would mean that you'd -- the intent is to
14 separate the motor from touching the housing, but
15 it doesn't explicitly say that.

16 Q. Do the claims of the 415 Patent require
17 any particular mechanical tolerances with respect
18 to the claimed actuators?

19 A. So I -- before we were talking about
20 size requirements in the claims and there are no
21 numerical sizing requirements nor are there any
22 specific tolerances on sizes or parameters that are
23 part of the design.

24 Q. Do -- excuse me. Oh, I didn't hand it
25 to you yet. I'm going to hand you what's been

1 marked as Exhibit 1010, and that's a patent by a
2 gentleman named Boucheret.

3 Do you recognize that?

4 A. Yes.

5 Q. And you discuss Boucheret in part on
6 page 23 of your declaration in paragraph 69. If
7 you could look at that paragraph for a moment and
8 let me know when you're there.

9 A. Yes.

10 Q. In paragraph 69, you state in your
11 second sentence, Boucheret relates to a motor for a
12 fan.

13 Do you see that?

14 A. Yes.

15 Q. And is it your understanding that
16 Boucheret describes his motor as being limited to a
17 motor for a fan?

18 A. You know, it says that, this
19 invention -- on column 1, opening paragraph, this
20 invention relates to a device for a resilient
21 fastening of electric -- of an electric motor
22 within a housing, especially one adapted to supply
23 an electric current to a motorized fan unit in a
24 motor vehicle.

25 Q. And in your view, would a person of

1 skill in the art reading that believe Boucheret's
2 motor to be limited to a motor for a fan?

3 A. It seems to be the primary focus, and
4 then later on at the end starting on column 4,
5 line 44, this invention of course is not limited to
6 the embodiment described.

7 Other versions can be envisioned for
8 fastening the retaining members of the housing,
9 one, for example, by positioning the spigots 25 on
10 the additional faces and the apertures faces 28,
11 and the apertures 26, on the second terminal
12 portions 27 of the retaining member.

13 However, any other removable fastening means
14 may be envisioned on the condition that it remains
15 within the scope of the claims given below.

16 In addition, the device described above is
17 adapted for a motor having four fastening lugs, but
18 it is clear that it's possible to provide housing
19 having a smaller or greater number of cavities
20 according to the number of fastening lugs on the
21 electric motor.

22 Finally, the retaining member 22 can
23 comprise of all having a central portion identical
24 to that described above and including part of the
25 fastening means such as, for example, the spigots

1 25, the latter being extended at right angles by a
2 first end portion of the same type as that
3 described above for supporting the lower axial face
4 of the damping elements, such that a retaining
5 member would have a transverse cross section of the
6 form of the reversed letter L.

7 So all of the variations that are described
8 as being different from the embodiment are
9 basically fans that are being stuck inside a -- a
10 housing.

11 **Q. So is the answer to my question then**
12 **based on all of that, it's your view that, yes, a**
13 **person of skill in the art would read Boucheret and**
14 **believe its motor to be limited to a motor for a**
15 **fan?**

16 A. Fan or similar type of continuously
17 operating motor that could be used potentially for
18 something other than a fan, but is operating at
19 constant speed and is anchored through their
20 invented rubber feet.

21 **Q. And can we agree that Boucheret does**
22 **not in fact discuss at all what speed its motor**
23 **operates at?**

24 A. I don't remember that kind of detail
25 being provided.

1 Q. Okay. Nor does it describe whether its
2 motor operates continuously or intermittently,
3 correct? To your recollection?

4 A. It's a fan. Fans run at constant speed
5 over long periods of time relative to electric
6 parking brake actuators, which are on for a second
7 or two. That's the metric that I was using as the
8 comparison.

9 Q. So despite Boucheret not actually
10 mentioning the continuous or intermittent operation
11 of its motor, a person of skill in the art reading
12 Boucheret would know that its motor was limited to
13 motors that operated continuously because of the
14 references to a fan that you described in
15 Boucheret; is that correct?

16 A. That would certainly be part of the
17 clue.

18 Q. I don't mean to interrupt, I just
19 wasn't sure if you're still formulating an answer
20 or if you're done and I should ask another
21 question.

22 A. I'm sorry, I'm just --

23 Q. No, that's fine. You can formulate
24 your answers, I just didn't --

25 A. Yes. No, I'm still --

1 Q. If you were waiting on me --

2 A. No, I'm not.

3 Q. -- then I would ask another question.

4 Okay.

5 A. I'm looking for additional information.

6 That would inform a person of ordinary skill in the
7 art that this is a continuously operated motor that
8 is being given mounts to -- to provide some
9 isolation between the motor and the housing.

10 Well, I would argue that, I mean, there's
11 all this description of the embodiment as being a
12 fan and one of ordinary skill in the art would
13 understand that fans run at a constant speed, or at
14 any rate, long periods of time relative to the
15 short-burst nature of an electric parking brake
16 actuator and --

17 Q. Do -- oh, I'm sorry. Go ahead.

18 A. -- and that the nature of this design
19 problem is -- is quite different than using the
20 motor for driving a geared drive train to produce
21 precision motion at the other end of the drive
22 train, which is a whole different and more
23 complicated problem and one which the electronic
24 park brake is trying to work with in the context of
25 also trying to provide, you know, quieter

1 operation.

2 Q. Are any of the claims of the 415 Patent
3 limited, in your view, to short-burst motors?

4 A. It's the field of art. It's an
5 electronic brake actuator which is engaged and
6 disengaged over a short period of time.

7 Q. If I have a motor that operates over a
8 long period of time, can I avoid the claims of the
9 415 Patent based on that feature?

10 A. I mean, are you claiming that Boucheret
11 is anticipation art for the 415 Patent? It's a
12 continuously operating actuator. That's not what
13 has been proposed.

14 Q. Can you point me to anything in the
15 claims of the 415 Patent, that requires the
16 actuator motor to be controlled to be what you
17 would consider a short-burst actuator?

18 A. To begin with, I would argue that a
19 person of ordinary skill in the art would
20 understand that's how these systems work.

21 It says in the background of the invention
22 that the electric parking brake systems have been
23 provided in vehicles to allow the application and
24 release of the parking brake by electric signals
25 eliminating the current mechanical connection,

1 i.e., cable and lever.

2 These systems typically include an
3 electromechanical actuator connected to a brake
4 caliper, either by a cable as in a drum -- as in
5 the drum in head or directly attached to the brake
6 caliper.

7 The actuator converts electrical power to
8 rotational mechanical power -- output power excuse
9 me, for moving the cable or drive screw and
10 applying the brakes.

11 So we're talking about applying brakes, in
12 particularly in a parking brake situation. This is
13 a very short event.

14 **Q. And what you just read me in the**
15 **background of the invention section of the**
16 **415 Patent, it is your understanding, correct, that**
17 **that functionality you read to me is required by**
18 **the claims of the 415 Patent, true?**

19 MR. MURPHY: Objection. Misstates
20 testimony.

21 THE WITNESS: It is the intent of this
22 invention to create an electric parking brake that
23 is better noise performance. I'll loosely term it
24 that way.

25 And the whole patent is about how to isolate

1 the noise in the positioning system of the
2 actuator, namely the motor and gear components
3 trying to keep those components from radiating
4 noise to the environment and over a parking brake
5 application period, which I claim is short and --
6 and the -- I mean, it says in claim 1, it's an
7 electric parking brake system.

8 And at the end of claim 1, it says, being
9 configured for driving said brake caliper between
10 engaged position and released position.

11 And -- okay. It doesn't say that it happens
12 in one second or two seconds. It certainly doesn't
13 happen over two minutes.

14 BY MR. HUTCHINS:

15 Q. If it did happen over two minutes
16 because I was a lousy engineer, would I avoid
17 claim 1?

18 A. You wouldn't avoid claim 1, but you
19 would understand if you were a person of ordinary
20 skill that there is no reason in the world to look
21 at Boucheret as a way to solve any problems that
22 you think that you have with your electrically --
23 electromechanical actuation system for applying
24 brakes.

25 Q. And so at the end of all that, we can

1 agree that none of the claims of the 415 Patent set
2 a time limit for how the motor is controlled or
3 operates, true?

4 A. I think that the claims in the context
5 of the specification and field of invention are
6 clearly envisioning an engagement and release of
7 the brakes in -- on the order of a second or two,
8 as is what people expect when they put their
9 parking brakes on.

10 Q. Okay. And if an actuator operates in a
11 timeframe longer than that, it can successfully
12 avoid the claims of the 415 Patent in your view,
13 true?

14 MR. MURPHY: Objection. Misstates
15 testimony.

16 THE WITNESS: So my view, as I stated a few
17 minutes ago, was that a person of ordinary skill
18 would not look to Boucheret to help design a
19 short-burst actuator such as this parking brake,
20 and you're asking a different question.

21 BY MR. HUTCHINS:

22 Q. I am indeed. I don't know why you're
23 mentioning Boucheret in fact.

24 My question was directed specifically to the
25 claims of the 415 Patent and asking you if you

1 thought those claims set a requirement for the time
2 period in which the motor operates.

3 A. So let's ask your question a slightly
4 different way. I just want to make sure I'm
5 understanding your question.

6 So let's say that you bought one of the
7 415 -- assuming you can -- actuators and you
8 were -- put it on your car, or you sold 1,000,
9 200,000 units, or 2 million units or whatever, and
10 you -- it clearly has all the features, all the
11 claim features of the 415 Patent except that you
12 told the computer, well, I'm going to set the
13 engagement time and the disengagement time to one
14 minute instead of having it in one to two seconds.

15 Q. Correct, sir.

16 A. And the question is, by doing so, would
17 you avoid infringing the 415 Patent?

18 Q. Yes, sir.

19 A. So in that case hypothetical that I
20 laid out, then it would meet every limitation of
21 all these claims and it would infringe --

22 Q. Okay.

23 A. -- the 415 Patent.

24 MR. HUTCHINS: If you -- oh. I'm sorry?

25 MR. MURPHY: I was just going to say, we've

1 been going an hour and a half. I don't personally
2 need a break, but I just want to --

3 MR. HUTCHINS: Oh, no. It's fine.

4 MR. MURPHY: -- maybe poll the room.

5 MR. HUTCHINS: Yeah, of course we can take a
6 break. Again, I don't want anyone --

7 MR. MURPHY: Do you need one?

8 THE REPORTER: I would like a five-minute
9 break if we could.

10 MR. HUTCHINS: Certainly. And we're
11 probably coming -- how much time do we have left?
12 We can go off the record.

13 (A recess was then taken at 4:06 p.m.)

14 BY MR. HUTCHINS:

15 **Q. So Dr. Stein, if you could look to the**
16 **bottom of page 23 of your declaration, we were**
17 **looking at paragraph 69. And you can tell me when**
18 **you're there.**

19 A. Okay.

20 **Q. And at the very bottom of page 23,**
21 **referring to Boucheret, you state that there is no**
22 **intricate complex arrangement of components**
23 **constituting a gear train mechanism.**

24 **Do you see that?**

25 A. Yes.

1 Q. Now, can we agree that Boucheret
2 doesn't set forth one way or another what
3 components are positioned between its motor and,
4 for instance, a fan of a car's AC unit?

5 A. In the embodiment, it shows a motor in
6 a housing which is designed to conduct -- or not
7 conduct, but to funnel the flow of air, as I
8 remember.

9 Q. And does -- does Boucheret show what
10 the drive shaft of its motor is connected to?

11 A. It doesn't even show the drive shaft.

12 Q. So from reading Boucheret, one can't
13 tell one way or another what the drive shaft of
14 Boucheret's motor is connected to, true?

15 A. Well, it says it drives -- the motor
16 drives the fan and shows the housing and shows
17 where the air goes. So --

18 Q. Does it show what's interposed between
19 the fan and the motor's drive shaft?

20 A. So it does not explicitly show how it's
21 connected to the fan.

22 Q. Okay. And are you -- are you in a
23 position to know one way or another whether HVAC
24 units in automobiles have gear trains interposed
25 between the motor and the fan?

1 A. So is Boucheret restricted to this kind
2 of configuration?

3 Q. I'm not asking you about Boucheret,
4 sir.

5 A. Okay.

6 Q. So to the extent you thought my
7 question was directed particularly to Boucheret --

8 A. Yeah, I did.

9 Q. -- it was not.

10 Are you in a position one way or another to
11 know whether HVAC units in automobiles have gear
12 trains interposed between the motor and the fan?

13 A. I've not seen one. I've seen motor
14 fans in HVAC systems and they are generally driven
15 either directly by the motor or I've seen them
16 driven by a belt, but less frequently.

17 Q. Now, at the top of page 24 of your
18 declaration, you state Boucheret only requires
19 loose tolerances between its components.

20 Do you see that?

21 A. Yes.

22 Q. Can we agree that Boucheret does not
23 discuss one way or another what mechanical
24 tolerances exist between the drive shaft of its
25 motor and the fan?

1 A. So if Boucheret drives a fan directly
2 which is one possibility, and so there are no drive
3 train components at all, just the shaft connected
4 to a fan, then vibrations of the motor or motions
5 of the motor from say out of balance, only become a
6 problem if the fan blade ends up touching the
7 housing, which of course is significant, but you
8 can have a lot of freedom to allow the rotation of
9 the fan within the housing.

10 If there is a belt mechanism that drives the
11 fan, which is the only other type of drive I've
12 seen for a fan, then motions of the motor become
13 even less important because the belt is able to
14 accommodate the -- the change in -- in tolerance
15 between the fan's axis of rotation and the motor's
16 axis of rotating.

17 **Q. And can we agree that none of what you**
18 **just described is stated in Boucheret?**

19 A. It's what a person of ordinary skill
20 would understand about fans and motors driving fans
21 and why they wouldn't look to that as a -- as a
22 prior art reference to combine with an electronic
23 park brake system.

24 **Q. So the answer to my question was**
25 **correct, none of that is stated in Boucheret, true?**

1 A. Best of my recollection, there is no
2 discussion about that in Boucheret.

3 Q. Could you turn to paragraph 75 of your
4 declaration, and it's on page 26, and tell me when
5 you're there.

6 A. I'm there.

7 Q. And this is a paragraph talking about
8 systems that are less concerned with precision such
9 as where a motor output is not coupled to a series
10 of other mechanisms.

11 Do you see that?

12 A. Yes.

13 Q. And you state a little further down in
14 paragraph 75, such systems are less likely to
15 create vibrations and transmit them through the
16 system.

17 Do you see that?

18 A. Yes.

19 Q. And, sir, are you of the view that an
20 electric motor driving gears would be more likely
21 to generate vibrations than an electric motor
22 driving a fan?

23 A. So this paragraph is meant to say what
24 I said a few minutes ago, that if you put rubber
25 mounts underneath the motor that's connected to

1 something via belt, then you don't have to worry
2 about the motions of the motor propagating
3 vibrations into components downstream since there
4 really are few, if any, components downstream.

5 Unlike the problem with an electric brake
6 actuator which has a series of precision components
7 that are all mounted downstream of the motor and
8 any motion in any of the components in that series
9 of precisely mounted items or components can
10 cause -- can generate difficulties in the gear
11 train because things aren't aligned anymore and you
12 won't get a smooth transmission of power from one
13 end of the drive train to the other.

14 That's not an issue with a system that has
15 just a motor connected to say just a fan where you
16 can damp out the motions of an electric motor by
17 using rubber feet and not have to be concerned
18 about the fact that, okay, the rubber feet under
19 this motor allow the motor to move, but not
20 transmit vibrations to your -- the rest of your
21 system and not really affect the performance of
22 what the motor's connected to because it's a soft
23 connection, say a belt or a fan, connected directly
24 which is not constrained in space very tightly.

25 **Q. So are motors driving precision parts**

1 more likely to create vibrations and transmit them
2 through the system than motors driving fans in your
3 view?

4 A. That's not the -- what I'm -- that's
5 not what I said. That may be your question, but
6 that's not what I said.

7 So what I said was that if you -- if you
8 have misaligned parts in a drive train and that
9 misalignment could be -- come about as a result of
10 the soft-mounting of some of the components in
11 that -- that that misalignment in itself can create
12 problems for the transmission of -- of power
13 through the drive train and you could end up with
14 vibrations and noise so that don't necessarily come
15 from the motor, per se, but come from the
16 misalignment of the gears because of the soft
17 mounting.

18 Q. All right. But in this sentence you
19 say, such systems are less likely to create
20 vibrations.

21 And the such systems you're referring to are
22 systems that are not attached to precision
23 components, but rather systems like Boucheret that
24 are driving fans, correct?

25 A. I'm talking about, yes, that you can

1 add dampers to a motor in a system like Boucheret
2 and not worry about the potential deleterious
3 effects of having the motor now moving around in
4 space because it's on soft mounts, it's on rubber
5 mounts.

6 If all you're doing is driving a fan, it's
7 fine. If your output of your motor is connected to
8 a precision mechanism, then your motor moving
9 around causes the gears to move around, which
10 causes them to be misaligned, which causes a
11 problem. That's what I'm saying. It's perhaps not
12 the best worded paragraph in the world -- world.

13 Q. I'd like to talk to you a little bit
14 about the Poertzgen reference, and I know I've --
15 did I -- I can't -- did I already hand you a copy
16 of that?

17 A. I don't believe so.

18 Q. Maybe not. So take a look at -- take a
19 look at what's been marked as Exhibit 1007 and tell
20 me if you recognize this as the Poertzgen reference
21 we've been discussing today or perhaps mentioned
22 today.

23 A. Yes, it is.

24 Q. And in paragraph 81 of your declaration
25 on page 30 --

1 A. Hold on a minute.

2 **Q. That's okay.**

3 A. Declaration, page 30, paragraph 81.

4 Okay.

5 **Q. You mention that Poertzgen describes a**
6 **desire to maintain a constant distance of about**
7 **0.5 millimeters between its brake piston 18 and nut**
8 **30.**

9 **Do you see that?**

10 A. Yes.

11 **Q. And am I correct that Poertzgen does**
12 **not say what the mechanical tolerances are that**
13 **would constitute about 0.5 millimeters?**

14 A. I don't believe he specifies a
15 tolerance on that .5 millimeter specification.

16 **Q. Nor does Poertzgen describe the pitch**
17 **of the threads that the nut 30 is on, correct?**

18 A. Correct.

19 **Q. Now, in your declaration, you have**
20 **several paragraphs discussing Poertzgen's**
21 **discussion of having various sensors identifying or**
22 **determining the location of the nut.**

23 **Do you recollect that generally?**

24 A. I -- I recollect discussing sensors,
25 yes.

1 Q. Okay. And does Poertzgen teach to a
2 person of skill in the art that its actuator
3 requires sensors or is that just described as a
4 preferred embodiment in Poertzgen?

5 A. It says in claim 7 that the vehicle
6 brake, according to preceding claims characterized
7 in that the translational movement of the nut 30 is
8 detected by means of a sensor.

9 Q. And so does that language indicate to a
10 person of skill in the art that Poertzgen requires
11 sensors or instead treats sensors as simply a
12 preferred embodiment?

13 A. In claim 8, vehicle brake, according to
14 claim 7, characterizing that the sensor is a Hall
15 sensor that measures the revolutions of the output
16 shaft on the electric motor that rotates the
17 spindle.

18 Q. I don't want to interrupt you, I just
19 don't know if you're done answering the question.

20 A. No. I'm just further reading in
21 claim 9 that it talks about measuring the speed and
22 current of the electric motor as a function of
23 time.

24 So there are a number of references to
25 measuring things, sensors, and you asked me if

1 there was any -- anything in the claims requiring
2 sensors.

3 Q. No. In fact, I was asking you does
4 Poertzgen teach to a person of skill in the art
5 that sensors are required of its actuators or
6 instead that they're merely preferred embodiments
7 of it's actuators.

8 So with that question in mind and based on
9 the review of Poertzgen you just made, does
10 Poertzgen teach to a person of skill in the art
11 that sensors are a necessary part of its actuators
12 or simply a preferred part of its actuators?

13 A. I -- I'm not sure I understand your
14 question because somebody who is trying to follow
15 the teachings of Poertzgen which is, as I
16 understand it, the purpose of having patents,
17 you're free to use as much or as little as what's
18 in the patent as you would like.

19 Q. Okay. Could you turn to page 37 of
20 your declaration, and I'll draw your attention to
21 paragraph 95. And tell me when you're there.

22 A. Paragraph 95 on page 37?

23 Q. Yes, sir.

24 A. Okay.

25 Q. And in paragraph 95, you note that

1 Boucheret does not include isolators at the axial
2 ends of its motors -- of its motor.

3 Do you see that?

4 A. Yes.

5 Q. Do you know if any of the claims of the
6 415 Patent require isolators placed at the axial
7 ends of the motor?

8 A. So that's what is shown of course in
9 the embodiment.

10 Q. Yes. But I'm asking you particularly
11 about whether the claims of the 415 Patent ever
12 require that the isolators be placed at the axial
13 ends of the motor.

14 A. So it does talk about in some of the
15 claims requiring a -- an isolator in between the
16 motor and the subassembly.

17 The motor is mounted to the subassembly to
18 drive the gears which are also mounted on the
19 subassembly so it's hard for me to imagine that
20 that isolator is not at the axial end of the motor,
21 that is the end of the motor which the motor axis
22 is emanating from.

23 Q. Setting aside whether the isolator
24 would commonly be placed at the axial end, do the
25 claims require that it be so placed in your view?

1 A. The -- claim 24 claims a device which
2 provides a second motor isolation bushing between
3 said sub-frame and said motor and the motor is
4 mounted on that sub-frame which has the rest of the
5 drive train components.

6 So it seems to me that it's a requirement
7 that the requirement -- it is what is claimed is a
8 motor that has at its end where it's connected to
9 the sub-frame and the other components, an
10 isolation bushing.

11 **Q. It absolutely requires the isolation**
12 **bushing to be located where the motor is attached**
13 **to the sub-frame.**

14 **Is it your understanding that claim 24 also**
15 **requires that the motor be attached to the**
16 **sub-frame at its axial end?**

17 A. Well, it does say in claim 20, which 24
18 depends on, a method of assembling an actuator
19 comprising a motor -- excuse me -- comprising
20 mounting a motor and a gear train to a sub-frame
21 coupling said some -- sub-frame to a portion of an
22 actuator housing to at least partially enclose said
23 motor and a motor isolation cavity defined by said
24 portion of said actuator housing and said
25 sub-frame.

1 Okay. So there's a bit there that we don't
2 need, but it does say that a motor and a gear train
3 are mounted to a sub-frame. The motor is attached
4 to the gear train so it seems to me that that is a
5 requirement of claim 20.

6 **Q. It's a requirement of claim 20 in your**
7 **view that the axial end of the motor be attached to**
8 **the sub-frame; do I have that correct?**

9 A. It seems to me that somebody would
10 understand that that is what is described here. I
11 suppose with a very inventive mind, ou could think
12 of attaching the motor on its side to some
13 sub-frame and then coming up with some convoluted
14 mechanism to drive a set of gears that you placed
15 in some strange geometric relationship with respect
16 to the output shaft of the motor. But in my view,
17 only an attorney would come up with that particular
18 configuration.

19 **Q. And -- but my point was that**
20 **configuration could fall within claim 24, correct?**

21 A. I suppose it more generally could, but
22 it's not what a person of ordinary skill would
23 understand from that claim.

24 **Q. Would a person of ordinary skill in the**
25 **art at the time of the invention of the 415 Patent,**

1 be aware of electric motors that use passive
2 isolators at their axial ends?

3 MR. MURPHY: Objection. Lacks foundation.

4 THE WITNESS: Yeah. I don't understand the
5 context of the question.

6 BY MR. HUTCHINS:

7 Q. Sure. Earlier in the day we were
8 talking about the types of knowledge that a person
9 of skill in the art would have in particular about
10 isolators because he would have spent two years
11 focused on noise attenuation.

12 Do you remember that discussion generally?

13 A. Yes.

14 Q. Okay. And so my question to you is
15 would that person of ordinary skill in the art, be
16 aware of electric motors that used passive
17 isolators specifically at their axial ends?

18 A. Are you asking me whether somebody of
19 ordinary skill in the art, as we've defined it or
20 as I've defined it, would have knowledge of
21 vibration isolators being used on the output shafts
22 of electric motors?

23 Q. At the axial ends of motors was my
24 question.

25 A. Well, the axial ends in this case --

1 the axial end means the axis out -- the end of the
2 motor where the axis of the rotor or the armature
3 extends.

4 Q. I don't disagree with you, I simply
5 wanted to make sure you had the question I asked in
6 mind, but I don't disagree with you as to your
7 description of what the axial end of a motor is.

8 A. So I would assume that a mechanical --
9 a person of ordinary skill in the art as we've
10 talked about, would understand that there are
11 vibration isolators that exist in many forms and
12 that would have knowledge of the possibility of
13 using a vibration isolator at the axial end of a
14 motor.

15 Q. Okay. Could you -- I want to move a
16 little bit further into your declaration on page 38
17 and I'll draw your attention to paragraph 97. So
18 let me know when you're there.

19 A. When you say a little bit further --

20 Q. I don't think we were on paragraph 97.

21 A. Right.

22 Q. So I'm directing you further --

23 A. Okay.

24 Q. -- deeper into your declaration.

25 A. Okay. I'm sorry.

1 Q. That's okay. So page 38.

2 A. Yes.

3 Q. Okay.

4 A. I'm there.

5 Q. And in paragraph 97, you describe how
6 short-burst actuators generate a variety of
7 frequencies of vibration, which at the end of the
8 paragraph you refer to generally as a more complex
9 vibration signature having many frequencies of
10 various amplitudes.

11 Do you see that?

12 A. Yes.

13 Q. Now, does the 415 Patent discuss
14 complex vibration signatures of short-burst
15 actuators as opposed to simpler vibration
16 signatures?

17 A. The 415 Patent?

18 Q. Correct, sir. The 415 Patent.

19 A. So there is a discussion on page 11,
20 bottom of column 7, top of column 8 that talks
21 about how, depending on what your priorities are,
22 you may want to allow the propagation, for example,
23 of low frequency sound into the cabin while
24 eliminating the higher frequency sound. And --

25 Q. Oh, go ahead.

1 A. -- this is something that would be
2 consistent with understanding that there's a broad
3 spectrum of frequencies that are contained in this
4 than noise produced by these actuators that are, as
5 I talk about in the declaration, you know, quick
6 acting short-burst actuation systems which were not
7 in steady state operation.

8 Q. And other than what you just pointed me
9 to, was there any other discussion in the 415
10 Patent that you believe discusses how best to
11 select an isolator to control complex vibration
12 signatures as opposed to simple vibration
13 signatures?

14 A. That's all I see as I sit here today
15 that specifically relates to the fact that there
16 are a complex set of frequencies emanating from
17 these mechanisms.

18 Q. Could you turn to page 51 of your
19 declaration, and I'll draw your attention to
20 paragraph 122. And you can tell me when you're
21 there.

22 A. Paragraph 122?

23 Q. Correct, sir.

24 A. Yes.

25 Q. Now, at the bottom of -- of

1 paragraph 122, you note that Exhibit 1014, which is
2 a chapter of a textbook, you note that Exhibit 1014
3 does not discuss the drawbacks of using vibration
4 dampers in systems with tight tolerances between
5 adjacent components.

6 Do you see that?

7 A. Yes, I see where that -- that sentence
8 is at the end of the paragraph.

9 Q. And in fact, sir, am I correct that
10 none of the prior art that was cited in these
11 proceedings, has a discussion of the drawbacks of
12 using vibration dampers in systems with tight
13 tolerances between adjacent components?

14 A. I mean, I think that's kind of my point
15 that one wouldn't look. Poertzgen and Weiler and
16 Drennen would not have looked to put vibration
17 dampers into their systems because of the tight
18 tolerances their designs require.

19 Q. And do any of them have a discussion --
20 let me put it -- state it affirmatively.

21 And am I correct that none of those prior
22 art references or any others that are cited in the
23 IPR, contain a discussion of the drawbacks of using
24 vibration dampers in systems with tight tolerances
25 between adjacent components?

1 A. You're saying -- you're asking me
2 whether any of the prior art that is -- that we
3 talked about at the very beginning of the
4 deposition today, that list of documents, whether
5 there's a discussion in any of those documents
6 about the issues that using vibration dampers in
7 systems with tight tolerances between adjacent
8 components, talking about the potential drawbacks
9 of doing that?

10 Q. Yes, sir.

11 A. I'm not aware any of those do.

12 Q. Could you turn to the following page of
13 your declaration? And there's a discussion there
14 of Poertzgen and -- the motor of Poertzgen, and at
15 the very beginning of paragraph 125, you mention
16 that there's a rectangular shape that could be an
17 end cap of the motor.

18 Do you see that?

19 A. Yes.

20 Q. What are the various materials that a
21 person of skill in the art would believe that end
22 caps for motors are constructed of at the time of
23 the invention of the 415 Patent?

24 A. The motor casing would typically be
25 thought of as being some type of metal. And the

1 end cap would be metal, the spacer there that -- if
2 it's -- I mean, it's meant to be a mounting feature
3 of the -- of the motor casing.

4 Q. Other than metal, would they be aware
5 of the use of any plastics as an end cap of a motor?

6 A. There's no indication of what the
7 material of this motor case is.

8 Q. That's why I'm asking what would --
9 would a person of skill in the art -- what
10 materials would a person of skill in the art
11 believe they had available to them to create an end
12 cap for a motor, and you mentioned metal. And so I
13 asked you would they also know that they had
14 plastic as an option?

15 A. So I'm assuming that this end cap is
16 actually a part of the motor casing. When you look
17 at motors, they actually have as part of the design
18 of the case some interface point at the -- at the
19 axial end.

20 And so this isn't something that Poertzgen
21 has put in here. It's part of the way the motor is
22 drawn, the way the motor is shown it's terminating
23 where it then abuts against the structure that's
24 shown in the figure.

25 Q. And would a person of skill in the art

1 been aware of any plastics that were used for motor
2 casings or end caps of motors?

3 A. Given the design of the Poertzgen
4 system and all the reasons that I've given in my
5 declaration about how it's a precision-mounted
6 system, they would assume that this is a metal
7 motor casing and it's a metal interfacing with the
8 metal frame there that is part of the structure
9 that is being used to create this actuator system.

10 Q. So the person of skill in the art in
11 your view would feel constrained to use metal for
12 the end cap of the motor; is that correct?

13 A. You keep separating using the motor --
14 metal for the end cap. The end cap is part of the
15 motor so they could choose a motor that had a
16 plastic casing, though I've not really seen motors
17 used for -- in positioning mechanisms. Precision
18 positioning mechanisms are made of plastic.

19 Q. Okay. Do you know or were you informed
20 who designed the commercial products that are
21 accused of infringement in the district court
22 litigation between ZF and Stoneridge?

23 A. I told you I'm not aware of the
24 district court matters or issues at hand there.

25 Q. And have you ever heard of a company

1 called Oeschler, a German company Oeschler?

2 O-E-S-C-H-L-E-R.

3 A. I'm not sure. It sounds vaguely
4 familiar, but I don't recollect it as I sit here.

5 Q. And as you sit here, is it not within
6 your knowledge in any way that a company called
7 Oeschler is the company that actually designed the
8 products --

9 A. I'm not --

10 Q. -- that were accused of infringement in
11 the district court litigation?

12 A. I don't know anything about that.

13 MR. HUTCHINS: Fair enough. I'm sure I'm
14 very, very close to my time, but I very much
15 appreciate your kind attention and working with me
16 today as -- as we tried to get some questions
17 answered.

18 So I very much appreciate your cooperation.
19 It was a real pleasure meeting you, thank you, and
20 I have no further questions.

21 MR. MURPHY: No questions for me, either.

22 THE WITNESS: And I appreciate your patience
23 with my manners.

24 (Deposition concluded at 5:07 p.m.)

25 * * *

1 I hereby CERTIFY that I have read the
2 foregoing 180 pages, and that except as to those
3 changes (if any) as set forth in an attached errata
4 sheet, they are a true and accurate transcript of
5 the testimony given by me in the above entitled
6 action on October 26, 2023.

7

8

9

JEFFREY L. STEIN, PhD

10

11 Sworn to before me this

12

13 ----- day of -----, 20__.

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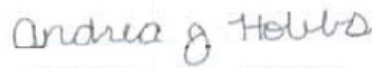
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5 I DO HEREBY CERTIFY as a Notary Public in and
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7 report the foregoing deposition, which was taken
8 down by me in a verbatim manner by means of machine
9 shorthand. Further, that the deposition was then
10 reduced to writing in my presence and under my
11 direction. That the deposition was taken to be
12 used in the foregoing entitled action. That the
13 said deponent, before examination, was duly sworn
14 to testify to the truth, the whole truth and
15 nothing but the truth, relative to said action.

16

17



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ANDREA J. HOBBS,
Notary Public.

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1 CHANGES AND SIGNATURE

2 WITNESS NAME: Jeffrey L. Stein, PhD, 10/26/2023

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16 I, Jeffrey L. Stein, PhD, have read the foregoing
17 transcript and hereby affix my signature that same is
18 true and correct, except as noted above.

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21 Jeffrey L. Stein, PhD

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24 This_____day of _____, 20_____.

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