UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

KUBOTA NORTH AMERICA CORPORATION,

Petitioner,

v.

VERMEER MANUFACTURING COMPANY,

Patent Owner.

IPR2025-00167
IPR2025-00168
IPR2025-00169
IPR2025-00170
IPR2025-00171

U.S. Patent No. 9,321,386

IPR2025-00381

U.S. Patent No. 11,465,891

PGR2025-00016

U.S. Patent No. 12,098,063

DEPOSITION OF

MARK FLEMING, PH.D., P.E.

November 14, 2025

9:00 a.m. CST

Reported by:
Janice M. Kocek, CSR, CLR
Job No. 57603

The deposition of MARK FLEMING, PH.D., P.E., reported stenographically by Janice M. Kocek, License No. 084-002871, Certified Shorthand Reporter, Certified LiveNote Reporter, and Notary Public of the state of Illinois, held at the Law Offices of Armstrong Teasdale, 100 North Riverside Plaza, Suite 1500, Chicago, Illinois, commencing at the hour of 9:00 a.m. CST, on the 14th day of November, 2025.

* * *

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I N D E X

MARK FLEMING, PH.D., P.E.	PAGE
Examination by Mr. O'Dell	5

E X H I B I T S

EXHIBIT	DESCRIPTION	PAGE
Exhibit A	Declaration of Mark Fleming, Ph.D., P.E. Vermeer Manufacturing Company vs. The Toro Company, Patent 10,597,843	128
Exhibit 1001-00169	United States Patent 9,321,386 B1	30
Exhibit 2016-00169	Declaration of Mark Fleming, Ph.D., P.E., in Support of Patent Owner's Response to Petition for Inter Partes Review of U.S. Patent No. 9,321, 386	71
Exhibit 2017-00167	United States Patent 5,004,398	65

(Witness sworn.)

MARK FLEMING, PH.D., P.E.,

called as a witness herein, having been first duly sworn, was examined and testified as follows: 09:07

EXAMINATION

BY MR. O'DELL:

Q. All right. Good morning. Would you mind stating your name for the record?

A. Mark Fleming. 09:07

Q. Okay. Would it be all right if I just referred to you as Dr. Fleming?

A. That's fine.

Q. Okay. Great. And have you had your deposition -- you have had your deposition taken before? Tell me about your other depositions. 09:07

A. Yes, I have had my deposition taken before a few times, both in patent litigation and in -- I guess patent litigation. I gave a deposition in an IPR matter before. And I've given some product liability depositions as well. 09:07

Q. Okay. The product liability, did that have to do with tractors or loaders and machines? 09:08

A. I -- I'm trying to recall what I've been -- some were on automotive, some on fracture. I obviously analyzed off-highway equipment. I don't remember if I've given a deposition on something where there was an alleged failure or some kind of accident with a piece of off-highway equipment.

Q. Okay. Is the generic term for all this off-highway equipment -- is that a word I could use -- I tried to come up with a word -- skid steers, loaders, and things like that.

What's a generic term that I could use for that?

A. Yeah. I mean, I think the generic term goes under off-highway equipment --

Q. Okay.

A. -- which would encompass agriculture, construction equipment or -- you know, in this case one of the pieces of prior art was for working inside of a building, which would also be off-highway.

Q. Okay. Great. Thank you.

Okay. And you're appearing today as an expert on behalf of Vermeer; is that correct?

A. Yes.

Q. So I'll go over some ground rules.
You understand you're under oath, correct?
A. Yes.
Q. And when I ask you -- I interrupted you. Sorry. When I ask you a question, I will try to stop and wait for you to answer verbally with a yes. 09:09
Do you understand that?
A. Understood. 09:09
Q. Good. And you'll answer truthfully and completely. And if I interrupt that, you can say I need to keep answering and I will stop and you can keep answering so that your answer is always truthful and complete. 09:09
Do you understand that?
A. Yes, I understand.
Q. If I ask a question and you answer it, I'll assume you understood the question. If you don't understand a question, you can ask me to rephrase it. 09:10
Is that okay?
A. Yes, I'll do that.
Q. If you need to take a break at any time, just let me know and we can take breaks 09:10

throughout the day.

A. Okay.

Q. Have you ever worked on -- as an expert on behalf of Vermeer before?

A. Yes, I have. 09:10

Q. Okay. When?

A. I recall a few years back doing some analysis of a -- a skid steer product and writing a report on that.

Q. Okay. Were you involved in any re-exams or IPRs on behalf of Vermeer? 09:10

A. I believe that one was a PGR.

Q. PGR. Okay. Okay.

And who was the opposing party?

A. I believe that one was Toro. 09:11

Q. Toro. Okay. And who did you work with when you were working on the Toro matter?

A. I -- my recollection was that the firm was Armstrong Teasdale.

Q. Okay. And what attorneys did you work with? 09:11

A. The one I recall was Mr. Vander Tuig, who's here with us today.

Q. And you prepared seven reports for today -- for today's matters; is that correct? 09:11

A. Yes, I prepared them for this matter.

Q. Okay. And who did you work with to prepare those reports?

A. I recall working with Mr. Vander Tuig. And there were some other people from Armstrong Teasdale that I recall being on some of the calls that we had as well.

Q. Okay. But Mr. Vander Tuig was the primary person you worked with?

A. I would say so, yes. 09:12

Q. And did you review the patents at issue?

A. Yes, I did.

Q. Okay. As you know, there are five patents and seven IPRs and they're family members. I'd like to refer to them as the Vermeer patents if we're talking generically. If I want to talk about a specific claim of a specific patent, I'll refer -- try to identify the patent number. But for the most part I'll talk about the Vermeer patents as we go forward. 09:12

Does that make sense?

A. Okay.

Q. Are you aware of any differences other than the claims between the five patents? 09:12

A. There are obviously some differences between the patents. So I'm not going to say that there's no differences. But as far as what I analyzed, the -- the claims and the written descriptions and the -- those kind of details were quite similar to me, I would say.

Q. Good. Good. In the IPR and PGR proceedings there was a petition filed and a patent owner, which is Vermeer, preliminary response. 09:13

Did you read those two documents?

A. Yes, I did.

Q. Patent owner -- there was a petition and the patent owner preliminary response. Okay. 09:13

Did you read the institution decisions that were issued by the board?

A. I did read through those, yes.

Q. Okay. And how did you prepare for this deposition? 09:14

A. Well, going back to the beginning, I guess, I did my analysis work. I wrote reports. And then there was -- as far as in this last week or so, I spent some time reviewing documents, reviewing -- you know, including the 09:14

reports, reviewing the reports from Dr. Velinsky, reviewing the patents at issue, the Vermeer patents as you call them. I reviewed the prior art patents as well.

Q. Okay. Okay. And then the documents we just discussed? 09:14

A. Yes, the documents --

Q. The petition?

A. -- that were provided to me in this matter. 09:14

Q. Okay. We mentioned earlier calling this off-highway equipment. But in particular I think the patent refers to compact utility loader; is that correct?

A. Yes. 09:15

Q. Are there other terms for a compact utility loader?

A. Yes.

Q. Can -- off the -- can you say some of those? 09:15

A. Probably the biggest one that I've seen is mini skid steer.

Q. Okay.

A. Other ones would be like compact tool carrier. 09:15

Q. Okay. Okay. And you said this in your declaration, but you kind of refer to each of those terms interchangeably. And for the purposes of this meeting they're the same?

A. Yes. 09:15

Q. Okay.

A. Unless I would point out some specific difference.

Q. So I have a question. Does a skid steer need to be tracks or do you refer to skid steers including the wheeled versions of the machines? 09:15

A. I would say skid steers could be either wheeled or tracked.

Q. Okay. Okay. But skid steer kind of talks about how it's -- how you turn it, right? It skids to turn; is that correct? 09:16

A. Yes, the name literally talks about how you steer it.

Q. Okay. 09:16

A. You have some differential speed from one side to the other, which causes it to -- to turn one way or the other. And it ends up skidding on one side or the other.

Q. Okay. Great. Great. 09:16

At this time I'd like to discuss your background and experience. You are currently employed by Northwestern University; is that correct?

A. Well, I have two positions. 09:16

Q. Okay.

A. I'm an adjunct professor at Northwestern University and I'm also chief technical officer at Fusion Engineering.

Q. For your adjunct professorship -- professorship, what do you teach? 09:16

A. I teach primarily two classes. I teach a non-linear -- advanced non-linear finite element class and then I also teach a failure analysis class. 09:17

Q. Okay.

A. And then I also will participate -- I've filled in teaching other classes like the -- a couple years ago I taught the first finite element class when a professor was on leave of absence. I've worked with summer programs at the university with high school students and college students that want to learn about things like data science, for instance. And so those are some of the things that I do at 09:17 09:17

Northwestern.

Q. It has been a while since I've been in engineering college. Finite element, is that a math -- is that a math class?

A. No. 09:18

Q. Tell me what finite element analysis is.

A. Finite element analysis is computer simulations. So engineering involves a lot of calculations for doing your design work. And so 09:18 **finite element analysis is a way of doing detailed calculations that involves breaking -- breaking the problem down into the geometry, you know, the thing that you can look and see and touch, the material properties, what it's made** 09:18 **of, and then the loads and boundary conditions.**

And so you put all that -- you break all that up, build a model of that, and then you can do a detailed calculation to see how it moves, what the stresses are when it moves or 09:18 **when it's loaded, and, you know, how it deforms, for instance.**

Q. Okay. And what do you use that for?

A. Well, some of the things that I just talked about. So when you're doing design work 09:19

you might be looking to see, for instance, what the load paths are for a structure, where the stresses are high, where the stresses are low. You may be looking at analyzing the motion of a machine. So that's some of the big uses of finite element analysis. 09:19

Q. Is a result of this potentially modifying a design or changing the materials of a design?

A. Well, that's design work in general. So you can analyze the effect of modifying these different parameters. So if you modify the geometry, if you modify the material, what effect does that have. If you evaluate different load cases, what effect does that have. 09:19 09:20

Q. So if a member is under stress that's unacceptable, you can potentially change a characteristic of the member?

A. For instance. 09:20

Q. Okay. Is this an undergraduate class or is it graduate level?

A. The one that I teach is primarily graduate students, Ph.D. students, master students. 09:20

Q. Okay.

A. The first level one that I was talking about, that's primarily seniors and maybe some master students.

Q. Senior -- I mean, bachelor degree students? 09:20

A. Correct.

Q. Okay. Okay. All right.

Have you -- what were you doing in the 2015 time frame? Let me strike that. 09:20

Before I go there. Your other job you're working on is Fusion; is that correct?

A. Correct.

Q. Tell me about that job.

A. Fusion Engineering is an engineering consulting company. So we do consulting work for companies or people that need some kind of help. It could be on -- for instance, on patent litigation. 09:21

Q. Okay. 09:21

A. We may provide some engineering assistance on that. We may do some work on product liability. And then we also do what I call industrial consulting for people that maybe need some specialty testing or maybe they need 09:21

some finite element calculations done. We were just talking about finite element analysis. Or else they may need some material evaluation or some specialty microscope -- microscopy work done. We've got some specialty microscopes and other material evaluation work. So that's kind of a -- a broad-brush look at the kind of work that we do at Fusion Engineering.

Q. Would you say that finite element analysis is a routine part of design engineering for off-highway equipment? 09:21 09:22

A. It is heavily used in developing off-highway equipment.

Q. And finite element analysis allows you to move, change, or alter a characteristic of one member that is a potential failure? 09:22

A. Well, it allows you to evaluate how a structure performs under load. So whether it's under design loads or some kind of extreme loads, you can assess what the effect of those loads are. And then if you want to make some design changes, you can do that. 09:22

Q. Okay. But making those design changes in light of finite element analysis is part of the routine design process? 09:23

A. Well, that's part of the design process in general. And finite element analysis is one way to do it. You can do hand calculations as well. You can do testing. It kind of depends where you are in the -- in the process of the design.

Q. Okay. Okay. All right.

Let's go back. Before -- let's go to the 2015 time frame. What were you doing then?

A. Which day? 09:23

Q. I'm sorry. You pick.

A. Well, I was -- professionally speaking, I was doing by and large the same things that we were just talking about.

Q. Okay. 09:23

A. I was working at Fusion Engineering. Back then it was actually called Caulfield Engineering. We bought the company in 2019 and changed the name to Fusion. But I was still doing engineering consulting and I was also 09:24 **teaching at Northwestern.**

Q. Have you ever performed design projects or finite element analysis for Vermeer?

A. I don't recall doing any design projects or FEA work for -- if you hear me refer 09:24

to FEA, that's just a short-form acronym for finite element analysis. I -- getting back to answering your question, I don't recall doing any design or FEA work for Vermeer.

Q. Have you been involved in the design work for any off-highway equipment? 09:24

A. Yes, I have.

Q. Tell me about that.

A. I worked for six years at a company called Case, which then at some point during my tenure there they merged with New Holland and changed the name to CNH. And so I worked on designing off-highway equipment when I was there for six years. That was -- that included skid steers, skid steer loaders, as well as a variety of other pieces of off-highway equipment. 09:25

And then since that time we have worked with various manufacturers on different projects. Probably more so as far as off-highway equipment goes, in things related to like things that are in factories like forklifts and, you know, carriers for packages and things like that. 09:25

Q. What was the time frame of this?

A. Some projects I remember -- well, you 09:26

know, there's been a variety of projects that have taken place over the course of the last 20 years. So some of them -- you know, many years ago, some of them just a few years ago.

Q. You said you worked on a mini skid steer. Do you remember when that was? I'm sorry, you said you worked on a skid steer. Do you know when that was? 09:26

A. Well, the skid steers that I worked on as far as design work goes was back during my time at Case/CNH. 09:26

Q. Okay.

A. Which would have been in the late '90s, early 2000s.

Q. When you say you worked on design work for Case, is that primarily doing FEA? 09:26

A. That was a lot of the work that I did, was FEA. But we also did things like tolerance stackup analysis. We collaborated with the testing group on setting up the testing and comparing our calculations versus how it performed in testing. 09:27

I also recall participating in some like dealer surveys when we would bring dealers in and talk to them about our product versus 09:27

competitive products. So there was a variety of tasks that I did, including some FEA calculations.

Q. And FEA, would you call that failure analysis? 09:27

A. Not necessarily, no.

Q. Not necessarily. Was there a separate group that did failure analysis?

A. What do you mean by "failure analysis"? 09:27

Q. If a product fails, you would analyze why it failed.

A. As far as the work that I was doing is primarily design work.

Q. Okay. 09:28

A. And so we would be looking forward.

Q. Okay.

A. If there was an occasional issue that came up where we were looking at, you know, maybe something with tracks or something with 09:28 **various components that was having a problem that needed some kind of redesign work. But as far as field, there was other people that dealt with the issues in the field but didn't have a whole lot of interaction with them. Very, very** 09:28

occasional.

Q. Okay. Okay. What components had problems that you addressed while you were working at Case?

A. Problems from what standpoint? 09:28

Q. Problems that needed -- that you addressed with FAE -- FEA. I said the wrong.

A. Well, I recall working on the design of the mainframe, for instance, which was sort of a -- the core of the machine and, you know, 09:29 **very important structural component. So worked on that. And then worked on some of the drive system, you know, some of the structure for the drive. Worked on loader arms and connections for that. Looked at tolerance stackup analysis** 09:29 **between the various structural components related to when they were manufactured, did they fit together properly.**

There were projects I remember where we were analyzing the -- the controls, for 09:29 **instance, and, you know, whether -- you know, the feel of those, whether they were going to survive the loads that we put on them.**

There was the ROPS, the rollover protection structure, that wanted to make sure 09:30

that it could absorb -- if there was a rollover, absorb the load and protect the occupant.

So those are some of the projects. Buckets. I remember analyzing buckets. Worked with some of the -- you know, we looked at attachments as well, other attachments beyond just buckets. 09:30

Q. When you -- after your FEA of a component, would you recommend changes or reconfigurations of the component? 09:30

A. Depends what the results were.

Q. Okay. If they were poor results, would you recommend a change?

A. Obviously.

Q. When you recommended a change, did you just say this needs to be changed or did you give specific direction on how the changes should be made? 09:30

A. I mean, design is collaborative. So there would -- if there was a design issue that was found, we would get together and have a design review meeting. And there would be a path forward that we would determine and further evaluation would be done, either through testing or through calculation and -- to resolve the 09:31 09:31

issue.

Q. When you say design is collaborative, can you explain that further?

A. Right. So I was not solely working by myself designing a skid steer. There was a skid steer group. And so if I was doing a calculation and I found an issue, I may go talk to somebody else who was on the design team that maybe would have some input on that as well. And we would discuss a path forward. 09:31 09:32

Q. When you were doing your FEA, did you use CAD?

A. Yes, CAD is how the drawings are done for engineering.

Q. Have you ever worked on the design or development of a mini skid steer? 09:32

A. I don't believe or I don't recall doing any design development work specifically for a mini skid steer. The ones that I worked on were a full-size skid steer with a cab structure in it. 09:32

Q. Okay. Okay. So in the full-size skid steer, the operator, where would that person be located?

A. There's an operator seat with a cab 09:33

ROP structure around them. So they would be sitting in the operator seat.

Q. Would that be mid, center of the machine?

A. Generally it would be. 09:33

Q. When was your first experience with mini skid steers?

A. Professionally or personally?

Q. Let's go -- let's start with professionally. 09:33

A. Professionally, the first one I remember working on was when we were doing the analysis that I talked about before with the Vermeer and the -- the Toro PGR issue.

Q. Okay. And that was in the early 2020s; is that correct? 09:34

A. I don't remember the exact date. It was sometime -- sometime around 2020 but I don't remember the exact time frame --

Q. Okay. 09:34

A. -- or the exact date. But it was in that time frame.

Q. Okay. And what about personally?

A. I had seen them around. You know, the landscapers who would use them. So I had 09:34

seen them around and talked to landscapers that were using them. But I had not used them or done design work before that.

Q. What was the name of the skid steer that you eventually worked on for Case? Do you have a model name for that? 09:34

A. The -- you want the -- we always refer to them by the internal code. So I don't know -- I can't remember what the internal code was at this point. But we had the -- I always refer to them by internal codes. I don't know what the -- the marketing name was now. 09:35

But there were some that were the -- the one that was our kind of bread-and-butter product back then was the 1845. So we were working on an upgrade to the 1845. I remember doing a bunch of work on that. And there was some other skid steer products that were larger than that I recall doing work on. 09:35

And then when we merged with New Holland, New Holland also had a line of skid steers. And so did some work with the New Holland product as well. 09:36

Q. Okay. Okay. Previously you mentioned that you had worked with CAD. Do you 09:36

know the name of the software that -- the CAD software that you have experience with?

A. The one that we used back when I was at Case, CNH, was Pro/Engineer, or Pro/E it was called. So that was the one that we used many years ago for our design work. The one that we use at Fusion Engineering is SolidWorks.

Q. At Northwestern do you use it, CAD?

A. I don't. The students do. They've got SolidWorks. I believe they've got licenses of NX.

Q. When you say you work with CAD, do you input the data to CAD?

A. Generally not anymore. Back when I was at CNH I would -- I would use Pro/E for some of my work. And you know, that was where we got the -- the models that we would use as our starting point for doing our finite element analysis. So that would -- we would use Pro/E for that.

Q. So you would input the data into Pro/E when you were working at Case?

A. I generally was not making the final design changes. There were people that were specifically tasked with doing that. And so I

09:36 09:37 09:37 09:37 09:38

would more like get the -- get the CAD models from Pro/E. And then I would extract that for building finite element models.

Q. So that's part of the collaborative work design process? 09:38

A. That would be one aspect of it.

Q. At this time I would like to give you a copy of the -- what we call the '386 patent. And I'm going to give you an exhibit number here. I know you've seen this one. 09:39

MR. VANDER TUIG: Somewhat familiar.

MR. O'DELL: Somewhat familiar.

And this one, has as an exhibit label, will be Exhibit 1001. And let me say for the record that I -- just a second. 09:39

So for the label, let's make this Exhibit 1001-00169.

I would like to explain my -- my reasoning here. In the IPR -- you have seen this patent -- it's Exhibit 1001 for 09:40 some of the IPRs but not all of the IPRs. All of the IPRs refer to another Vermeer patent. And so I've also given the last five digits of the IPR number, that this is Exhibit 1001, so that when we look at it 09:40

later we'll be able to recognize what exactly you're referring to.

Does that make sense?

THE WITNESS: We'll see how it is down the road, if we remember this. 09:41

MR. O'DELL: Yeah. Yeah.

THE WITNESS: I forgot to bring my reading glasses in here. If I'm going to need to read this, can we take a three-second break and I can go grab those. 09:41

MR. O'DELL: Let's take a five-minute or ten-minute break, as long as you need.

THE WITNESS: I just need to walk down and grab them out of my bag.

(Whereupon, a recess was taken from 9:41 a.m. to 9:45 a.m.) 09:41

BY MR. O'DELL:

Q. Before we get -- move forward, you had mentioned off-highway equipment. Is off-highway equipment used to make highways? 09:45

A. Generally that would be one of the uses for it is the construction projects.

Q. Okay. What about demolishing a highway or removing debris from a highway?

A. There is equipment that's used for 09:45

that as well, yes.

Q. Okay. Okay. So off-highway equipment kind of means not cars and trucks and motorcycles?

A. Yeah, not driving -- driving and using the highways. 09:45

Q. Okay. Okay.

A. Building and demolishing or -- would go under, you know, construction or off-highway.

(Deposition Exhibit 1001-00169 was marked for identification.) 09:45

BY MR. O'DELL:

Q. Okay. Okay. All right. So I have before you the '386 patent, Exhibit 1001-0069.

A. Mine says 001 something 9. Is that 169? 09:46

Q. 00169. Thank you.

Do you see the listed inventors of this patent on the front page?

A. Yes, I do. 09:46

Q. Do you know or have you met with any of these inventors?

A. No, I do not know them.

Q. When did you first become aware of this patent? 09:46

A. I don't remember when I first became aware of it. I can't remember if it was at issue in a previous -- previous matter or not. Obviously I became aware of it in this litigation, or this IPR matter. 09:46

Q. Was this patent at issue or did you review this patent for the Toro matter?

A. Possibly. I don't remember all of the literature that I reviewed for that matter.

Q. Have you ever rendered an opinion on the validity of this patent? 09:47

A. Outside of this litigation here, I don't recall ever doing that.

Q. Let's turn to Figure 1 of the patent. Is this a CAD drawing? 09:47

A. I don't know if this is CAD or if this is drawn by hand. It doesn't say one way or the other.

Q. Does it look like it could be a CAD drawing? 09:47

A. It possibly could be. Like I said, it doesn't say one way or the other whether it's CAD drawing or drawn some other way.

Q. Would you consider this drawing to be drawn to scale? 09:48

A. I don't know if it's drawn exactly to scale or not.

Q. Are there any materials indicated in the drawing of this patent?

A. The drawing itself doesn't say the materials. The written description, I don't remember if it specifies materials or not. There may be -- there may be some. For instance, it talks about welds. So it's going to be some kind of a metallic material, probably steel welded together. 09:48

Q. Okay. Could someone of skill in the art make a contact utility loader based off this drawing?

A. Only this drawing? 09:49

Q. Let's start with only this drawing.

A. It would be a starting point. I don't know that there's enough information on only this drawing to make a complete product, though. 09:49

Q. If you were given only this drawing, do you think you have enough skill that you could make a compact utility loader?

MR. VANDER TUIG: Object to the form.

THE WITNESS: Based on only this 09:49

drawing, I don't think there's enough information that I could build a complete compact utility loader.

BY MR. O'DELL:

Q. Okay. What do you need to know to make a complete compact utility loader? 09:49

A. I would want to see other angles. I would want to see cutaways, detailed drawings, component drawings. Things like that are usually what we rely on in engineering if we want to actually make a complete, final product. 09:50

Q. If there's not something in this drawing, do you think you'd know how to engineer it otherwise?

MR. VANDER TUIG: Object to the form. 09:50

THE WITNESS: You're talking about engineering or you're talking about actually manufacturing a complete product?

BY MR. O'DELL:

Q. Both. 09:50

A. Well, there's not sufficient information on just this one drawing to completely design a compact utility loader. And also the same answer for manufacturing one.

Q. Okay. What if you considered all the 09:50

drawings of the patent?
MR. VANDER TUIG: Object to the form.
THE WITNESS: What's your question with regards to considering all the drawings? 09:51
BY MR. O'DELL:
Q. Do you have enough information to build a compact utility loader considering your knowledge of the art and these drawings?
MR. VANDER TUIG: Same objection. 09:51
THE WITNESS: I would say I could get pretty -- pretty far along with designing a -- a compact utility loader just using these, you know, making some assumptions about scaling. 09:51
Obviously things like the -- the drive line, I don't think there's a whole lot of detail on the drive line components here, what engine would be used. But as far as the structure goes, I believe the 09:52 structure is laid out well enough to proceed with a -- in developing a design.
BY MR. O'DELL:
Q. Okay. Is there an engine in this -- in these drawings? 09:52

(Witness reviewing document.)
THE WITNESS: There's something I see in -- through a -- in Figure 3. I can't tell if that's an engine or some other internal component. There's not -- there's not a detailed drawing of an engine. But there's something I can see through some kind of a window and the side view that is Figure 3. 09:52
BY MR. O'DELL:
Q. Would you say that routine engineering and design principles would allow you to select and provide an engine that would work in this without further description from the patent? 09:52 09:53
MR. VANDER TUIG: Object to the form.
THE WITNESS: That would be one thing that would be done as far as engineering project for designing product like this, would be to work with, you know, engine -- engine designers in an engine group in coming up with an engine that would work in this application. 09:53
BY MR. O'DELL:
Q. Similarly for the hydraulics, 09:53

hydraulics are known. An engineer or design team could design the -- and choose the proper hydraulic mechanisms for this machine?

A. That would be one thing that is done as far as the design work is to come up with hydraulic pumps, hydraulic lines, routing, hydraulic cylinders for making the -- making the hydraulics work. 09:53

Q. As far as the pivot points and locations for the linkages and the actuators, they are shown generally in the figures. But would you say a design engineer could identify and place the pivot points for the linkages and actuator through -- through routine engineering and design? 09:54

MR. VANDER TUIG: Object to the form. 09:54

THE WITNESS: Yes, that could be done using these drawings that are in the patent.

BY MR. O'DELL: 09:54

Q. Okay. If finite element analysis shows a weak point or a failure, potential failure, a typical engineer design POSITA would know how to make changes to accommodate that?

MR. VANDER TUIG: Object to the form. 09:55

THE WITNESS: That would be something that could be done as part of design work.

BY MR. O'DELL:

Q. Okay. I believe all of these pictures show a track; is that correct? 09:55

A. No.

Q. Let me say that again. I believe all these pictures show a track or accommodations for a track; is that correct?

A. I guess the way I would answer it, the figure on the front page shows a track. And then Figure 1, Figure 2, and Figure 3 show a track. And then Figure 4, Figure 5, Figure 6, and Figure 7 do not show a track or four wheels, either one. 09:56

Q. In Figure 1, what is No. 30 referring to?

(Witness reviewing documents.)

BY MR. O'DELL:

Q. I certainly want you to consider the entire patent. But one place to look at would be column 3, line 25. 09:58

A. Yeah, there it is. I usually look at these on the computer where I could search for the No. 30. And I wanted to give you the -- the 09:58

right term.

Yeah, that's the -- yeah, column, line -- column 3, line 25, they call it the drive opening. So it's going to be the opening in the side of the frame where the drive line comes through to drive the -- you know, it's got tracks. It's going to drive the -- the -- they say it's going to drive the hub 26. So 30 -- item No. 30 is going to be a drive opening. And the hub 26 extends through there. 09:58 09:59

Q. Would you agree that that accommodates a track system as shown in figures 4 through 7?

A. That's what it -- what the written description for this embodiment is talking about, is you got a -- a hub that extends through the -- through the mainframe. 09:59

Q. Okay. So yes?

A. In this particular case, yes, the -- the hub will drive that kind of a sprocket piece there. Let's see if that's called out, No. 22. Yeah, the drive sprocket is connected to a hub and the hub goes through the drive opening to, in this case, drive the track. 10:00

Q. Would you consider it a routine 10:00

design engineering for a person of ordinary skill in the art to make a wheeled version of this compact utility loader?

MR. VANDER TUIG: Object to form.

THE WITNESS: There -- there would have to be some structural changes probably. But there are compact utility loaders with wheels and some with tracks. 10:01

BY MR. O'DELL:

Q. So is that a yes? 10:01

A. Can you restate your question?

MR. O'DELL: Can you repeat the question?

(Record read as requested.)

MR. VANDER TUIG: Same objection. 10:01

THE WITNESS: I would say that's routine. Obviously it would be some challenges, some design challenges but something that could be done by a person of skill in the art. 10:01

BY MR. O'DELL:

Q. Okay. What structural changes would be made, for example?

A. Well, like this track, for instance, has an elevated drive. You'd probably change 10:02

the drive system a little bit. And there would be some associated structural changes that would happen to go from a wheeled system to a -- so there's a couple ways that it could be done.

One would be where you've got a drive right at each wheel. So you'd have to put in structure to drive each wheel. Or else you could have some kind of a drive with chains going to the front and rear wheels to drive them, one side versus the other. 10:02

Q. So in that one there would be a drive mechanism let's say in the rear with a chain or other connection mechanism to the corresponding wheel in the front.

Is that what you were describing? 10:02

A. No, not quite.

Q. Okay. Could you help me with that?

A. So some kind of a drive sprocket that has chains going to the front and back wheels to drive -- to drive those. Or else have some kind of a drive mechanism, some kind of hydraulic drive, for instance, right at each of the four wheels. 10:03

Q. So those are two options for having wheeled systems? 10:03

A. Potentially, yes.

Q. Okay. Are there other options?

A. There might be some kind of electric motors that you would have at the wheels.

Q. Are any of these skid steers that are wheeled rear-wheel drive? 10:03

A. Which ones are you talking about?

Q. Skid steers in general.

A. The ones that I've been familiar with that I recall had all the -- all the wheels that drove. 10:03

Q. Okay.

A. Power going to all of the wheels.

Q. Okay. Is it a possibility to be rear-wheel drive only? 10:04

A. I suppose if you wanted to disconnect the drive going to the front wheels, then you would only have rear-wheel drive.

Q. Potentially it could be a cheaper option for some applications? 10:04

A. I don't know if it's cheaper or not.

Q. But potentially could be an option for some applications?

MR. VANDER TUIG: Object to form.

THE WITNESS: Potentially. Like I 10:04

said, it's not something that I've seen. So I don't know the -- the cost benefit analysis on driving only rear wheel versus all four wheels.

BY MR. O'DELL:

Q. Is it your opinion that the patent drawings in general should be to scale?

A. Is it my opinion?

Q. That they should be to scale.

A. Close -- close to being to scale. I mean, do they represent the final product? You know, that's -- as an engineer, I don't necessarily rely on patent drawings to absolutely be to scale. But in general I would think that they're close to being to scale.

Q. We just talked about the drive motors. How is the drive motor connected to the engine?

A. You're talking about the drive that drives the -- drives this unit through the hub?

Q. Yes.

A. I don't recall if it says the specifics of the drive line for this one. In general, though, there's some kind of -- some kind of a transmission that comes from the --

from the engine. And it will transmit the -- the power and the -- and change the speed from the engine. And then have shafts that come out so you could have some kind of hydraulic drive, for instance, some other kind of transmission that transmits the power and the torque from the engine and then out -- you know, it's got to turn it and come out to the sides to drive the -- you know, in this case to drive the tracks or to drive the wheels. 10:07

Q. The way you're describing it, are engines in these compact utility loaders or skid steers in general, are they typically aligned with front-rear -- like is the cam aligned with the front-rear -- let me rephrase that. 10:07

In a front-wheel drive car, an engine will be transverse driving the wheels. Will the engine be aligned in line with the skid steer?

MR. VANDER TUIG: Object to form.

THE WITNESS: I'm trying to remember the engine alignment. The ones I recall are more in line with the -- with the axis of the vehicle. 10:07

BY MR. O'DELL:

Q. Okay. 10:08

A. But I can't say that all of them are that way.

Q. Okay. Do drive motors come in different sizes and shapes?

A. You're talking the engine? 10:08

Q. No. Talking about the drive motor of the patent.

A. In general, yes, drive motors are going to come in different sizes and shapes.

Q. Okay. Does a POSITA decide when designing a skid steer the size and shape of the drive motor? 10:08

A. To a certain extent. I mean, you would -- a designer of a product like this would work with suppliers of components, engine, drive line components, hydraulic motors, to select the correct component and -- that would work within their -- within their design, both for space and for power requirements and whatever else you need for your design. 10:08 10:09

Q. Is a drive motor different for track assembly versus wheel assembly?

A. There may be some differences. But in general you're trying to accomplish the same thing of taking the power and the torque from 10:09

the engine and transmitting it to make the -- the vehicle move.

Q. Let's turn to Figure 5 of the patent. Do you see the letter R in the figure?

A. Yes, I do. 10:10

Q. What is that?

A. That was a -- it's kind of a center of rotation. I believe there's a specific name for it, though.

(Witness reviewing document.) 10:10

THE WITNESS: I'm looking at column 5, line 33, it looks like. It calls it a rotational axis R.

BY MR. O'DELL:

Q. And what is this rotational axis? 10:10

A. Well, that's going to be the rotational axis of that -- I guess the shaft for the -- for the drive line.

Q. Do you see the number D5 in the figure? 10:11

A. Yes, I do.

Q. What is that?

A. D5 is the distance from the bottom of the mainframe structure up to the rotational axis. 10:11

Q. Is it common that a portion of the mainframe is -- will be below the rotational axis as shown in this figure?

A. Sorry. I don't quite understand your question. 10:11

Q. Is it common that a portion of the mainframe is below the rotational axis as shown in this figure?

A. I would expect so, yes.

Q. Another way to say it, is it common that D5 would be greater than zero or -- yeah, greater than zero? 10:12

A. For a skid steer, I would expect it to be greater than zero.

Q. Is there a minimum D5? 10:12

A. I don't know that there's a minimum.

Q. Would that be something that your FEA would assist in checking?

A. That would probably be more based on what components were available for designing your drive line, how big they were. And then obviously for designing the structure to accommodate that, things like FEA testing would be done to ensure that your mainframe structure can actually support the loads that are 10:12 10:13

associated with that.

Q. All right. Let's turn to Figure 2. And what is D1?

A. D1 is the distance from the bottom of the track in this figure, which I assume is ground level. But from the bottom of the track up to the rotational axis.

Q. Is it common that the rotational axis has a distance from the ground, such a skid steer that's greater than zero? 10:13

A. Yes, I would expect so.

Q. Why does the distance D1 matter?

A. Well, that's going to be -- it's going to be related to the things like the center of gravity of your machine and the operational characteristics, where you're -- where you're driving it from versus where you're engaging the ground or the floor or whatever you're driving on. 10:14

Q. Let's turn back to Figure 1. What is element 12? And I certainly encourage you to look at the entire patent, but column 2, line 46, could help. 10:14

A. Yes, column 2, line 46, loader includes an attachment plate 12. So it's an 10:15

attachment plate.

Q. Have you ever used a skid steer?

A. Yes.

Q. Tell me about replacing attachments. Where do you store your attachments for your skid steer? 10:15

A. Well, it -- we were doing engineering work. So we had our engineering, you know, storage facility where we would put our -- our attachments. And we could switch out attachments from there. If we were working on road construction or other construction projects, you know, that's up to the -- you know, whoever controls the site, where the attachments would go. 10:15

Q. Okay. Is it commonplace to have the attachments like on a drive -- driveway or a parkway or a piece of road that's not being used?

A. Well, typically you would want to have the unused attachments off to the side, whether it's -- you know, it really depends on what the site is. Like I say, we were doing engineering work and I was using them in the -- more in like a proving-grounds-type environment. 10:16 10:16

So we had them either off to the side if we were out in the field or they'd be stored in some kind of a shop area.

Q. Let's think of a job site. You're digging a hole at some field. Would you store the attachments in the hole? 10:16

A. Where you're trying to dig?

Q. Yes.

A. Most likely not.

Q. Would you store them -- let's say where your pickup truck or trailer, whatever brought the skid steer to the job site, would you store them near that? 10:16

A. Potentially.

Q. Potentially would you store them on a driveway or piece of road that's not being used? 10:17

A. Potentially.

Q. So when you change out attachments, you just drive the skid steer to where your attachments are located to pick up the new attachment? 10:17

A. Yeah, obviously you'd have to take your skid steer to wherever the attachment is.

Q. Are attachments sold with a skid steer? 10:17

A. Well, typically they're -- I guess there's two places you can get attachments to go with the skid steer. You can get them from the manufacturer or could be like an aftermarket company. 10:18

Q. Are there ever any applications where only one attachment is needed?

A. I'm sure there are, yes.

Q. What is a common attachment for a mini skid steer? 10:18

A. I would say a bucket is a common attachment to put on the ends of the loader arm for a mini skid steer.

Q. What's another common attachment?

A. You may have something like a -- maybe like a small mower that you would put on there. 10:18

Q. Mower?

A. A mower, yeah, if you want to do some kind of mowing or cutting. 10:18

Q. Are mini skid steers ever used for snow removal?

A. They could be, yes.

Q. Snow removal like on a parking lot or a road? 10:19

A. Yeah, for instance. Yeah, that's where you'd want to remove snow from.

Q. All right. I want to go back to your work experience.

Is it fair to say that you've worked on equipment with engines? 10:19

A. Yes.

Q. What type of engines?

A. I mean, most of them I recall were diesel engines. There may have been some gasoline engines in some of our equipment. But most of them I recall were diesel engines. 10:19

Q. The equipment that you worked on, how were the engines secured to the mainframe?

A. Some of them -- most of them would be probably bolted through some kind of a -- you know, engine mounts, for instance. There may be some like large tractors where the engine is actually a part of the drive line itself. But if it's something that's got, you know, a mainframe like we're talking about here, usually it's going to be coupled with some kind of an engine mount. 10:20 10:20

Q. An engine mount. So the patent talks about an engine bracket. Are those the same 10:20

terms or are they different?

A. I would say that they're different.

Q. Okay. Is it common to have an engine bracket?

A. That's one way to attach the -- between the engine mount and the frame, for instance, would be -- depending on the geometry that you're working with, you may have a bracket or, you know, you may just bolt it directly to like a flange on the frame or to the side wall of the frame. It really depends on the geometry that -- of the engine and the mainframe that you're working with. 10:21 10:21

Q. You mentioned earlier that the engines were often aligned in the -- with the axis of the machine. In those scenarios, is it common to mount the engines through brackets or other mounts to the sides of the mainframe versus the front and back of the mainframe? 10:21

A. My recollection from seeing those, I recall them being mounted more to the sides than to the -- the front and the back. But there may have been some -- something else on one end as well. Like I say, it really depends on the package space that you have, where you're 10:22 10:22

locating the engine at within your mainframe environment.

Q. When an engine starts up, it torques; is that correct?

A. Yes. 10:22

Q. And for that reason, is it desirable to have brackets and/or mounts on the sides of the frame?

A. Yes, you do need to withstand the torque of the engine. So you would have to have some kind of a -- you know, whether it's brackets or mounted directly to flanges or frame, you would need some kind of resistance to the engine torque, you know, through the mainframe. 10:22 10:23

Q. And this was true back when you were working on Case as well?

A. Yes.

Q. Would you say this is fundamental?

A. As far as resisting the torque of the engine -- 10:23

Q. Yes.

A. -- to the mainframe? Yes, you'd have to -- that's sort of like basic engineering, is that you need to have your -- your structure 10:23

designed in order to withstand the torque of the engine and have it come as a torque output to drive wheels and other applications.

Q. Is the lift mechanism of the Vermeer patent a four-bar mechanism as that term is used in the art? 10:23

A. I would say, you know, in a broad sense, yes, it's a four-bar linkage or four-bar mechanism.

Q. What is a four-bar mechanism? 10:24

A. In this context, it is a geometric setup whereby the loader arms are lifted through moving bars that are connected to the mainframe. So you have the -- the lower link of the -- of the connecting bars. They're connected to the mainframe. And then those links are connected to -- at the other end to the loader arm. 10:24

As opposed to a radial lift mechanism where you would have usually the -- the rear part of it, of the loader arm, would be connected directly to some kind of structure of the mainframe. And it would pivot about a fixed point. 10:24

A four-bar mechanism pivots on the mainframe about two lengths -- or two rotational 10:24

points through two lengths to lift the loader arm.

Q. Okay. What does the actuator do in a four-bar mechanism?

A. Well, the actuator is what's going to cause the loader arms to move relative to the mainframe. 10:25

Q. Does a person of ordinary skill in the art know how to arrange the actuator to manipulate -- manipulate the four-bar mechanism to do a vertical linked -- vertical lift operation? 10:25

MR. VANDER TUIG: Object to form.

BY MR. O'DELL:

Q. Let me have some water and let me say that again because my voice got unclear. 10:25

Would a person of ordinary skill in the art know how to position and arrange an actuator to make a four-bar mechanism perform a vertical lift operation? 10:26

MR. VANDER TUIG: Object to form.

THE WITNESS: I guess I would ask for some clarification on your question.

BY MR. O'DELL:

Q. You said earlier, if I'm -- correct 10:26

me if I'm wrong, that the actuator allows the four-bar mechanism to do the relative movement. And the four-bar mechanism is something which provides the vertical lift operation.

A. Correct. 10:26

Q. Would a person of ordinary skill in the art know how to design and position the actuator to achieve that result?

MR. VANDER TUIG: Object to form.

THE WITNESS: I guess I would answer your question by saying from a high-level perspective a person of skill in the art would know how to position the actuator to make the -- the setup move. Whether they get it to work right or not, that's a different -- different question. 10:26 10:27

That's why I was a little bit confused with your question. Because you have to design the -- the length of the linkages correct, the position of the linkages, and -- in order to achieve the vertical lift and to not have the interference. And so in general, yes, you can design four-bar linkages. You need to design one that works, though. 10:27 10:27

BY MR. O'DELL:

Q. Would you say that a person of ordinary skill in the art would be someone who knows how to design one that works?

MR. VANDER TUIG: Same objection, object to form. 10:27

THE WITNESS: To work, I would say a person of ordinary skill in the art would know how to design a -- a four-bar mechanism and to put an actuator in there. And there would be some calculations involved in order to make it work according to the way that you need it to work. 10:27

BY MR. O'DELL:

Q. So it may not work the first time but with adjustment and engineering you could make it work? 10:28

MR. VANDER TUIG: Object to form.

THE WITNESS: I would agree with that. I mean, we see it here in this patent that they did make a four-bar mechanism work. So obviously it's something that can be done. 10:28

BY MR. O'DELL:

Q. Could that be done back when you were 10:28

working at Case on a regular skid steer?

A. Yes, you could design a four-bar linkage. We did have four-bar linkages. I believe our New Holland skid steer had some kind of a vertical lift mechanism four-bar linkage. And we had other pieces of equipment that used four-bar linkages as well.

Q. And this is back in the early 2000s?

A. Around that time frame.

Q. When you're doing the lifting operation, the length of the actuator will change; is that correct? 10:29

A. Yes.

Q. Do you know the stroke length of the actuator in the Vermeer patent? 10:29

A. I don't have that information with me.

Q. Do you think it would be routine engineering and design for a POSITA to select the stroke length to make the four-bar mechanism of the Vermeer patent work correctly? 10:29

MR. VANDER TUIG: Object to form.

THE WITNESS: That would be part of your design work, is to select the actuator that works with your design and your -- the 10:29

kinematics of your design or the design of the motion.

BY MR. O'DELL:

Q. Would that be routine for a person of ordinary skill in the art in the 2015 time frame? 10:30

A. To select an appropriate hydraulic cylinder?

Q. Yes.

A. Yes. 10:30

Q. If the -- if the four-bar mechanism interferes with something such as the tracks or other member of the machine, would you consider it routine design engineering to modify the four-bar mechanism to accommodate that interference? 10:30

MR. VANDER TUIG: Object to form.

THE WITNESS: To accommodate it or to eliminate it?

BY MR. O'DELL: 10:31

Q. Either.

A. I mean, obviously you can't have a machine that you're trying to use that has interference. So there would be some design work that would be done to eliminate that 10:31

interference. And that would involve -- you know, that could potentially involve structure. That could involve moving internal components such as engine and drive line components, things like that. 10:31

So it's something that can be done. But depending on what and where the interference is, it could be quite involved to make those changes.

Q. And this is true in the 2000 time frame -- early 2000s time frame when you were working at Case? 10:31

A. Yes.

Q. And either a simple change or a complex change but a change could be made? 10:31

A. I mean, generally, yes, changes can be made.

Q. What are the benefits of having lower lift -- pivot points for a four-bar mechanism?

A. All the pivot points? 10:32

Q. Pivot points described -- well, let's see. Hold on a second.

Let's go with Figure 5 and pivot points P1 and P3. First let me ask, what are P1 and P3? 10:33

A. P1 is the pivot point on the mainframe that attaches to the forward link, or forward linkage, for the loader arm. And P3 is the pivot point on the mainframe that attaches the rear linkage to the rear of the loader arm. 10:33

Q. Okay. Are there benefits to having P1 and P3 lower on the mainframe?

A. Yes, I believe there are.

Q. Name one benefit.

A. Well, if you have those points lower, you're -- you've got the -- the structure for the -- for the mainframe can all be down there versus if you've got some kind of a tower structure like you do with the -- with the radial lift arms, where you've got to have a higher structure. So your -- your center of gravity then becomes lower. And also your -- your center of force is going through those points. So that will be lower. 10:33 10:34

Q. Is that true in the early 2000s when you were working at Case? 10:34

MR. VANDER TUIG: Object to form.

THE WITNESS: Is what true?

BY MR. O'DELL:

Q. The benefit that you just described, 10:34

is that true of pivot points for -- let me start over.

You mentioned earlier that Case made vertical lift skid steers in the early 2000s.

A. I believe it was the New Holland skid steer that had the vertical lift. The ones I remember for Case were the radial lift skid steers. 10:34

Q. What time frame were the New Holland vertical lift machines? 10:35

A. The ones I remember were from the late '90s, early 2000s.

Q. Did any of them have pivot points on the mainframe?

A. I recall that they do, yes. 10:35

Q. And is it likely that one reason they had it on the mainframe was for the benefit you just described, which was lowering the center of gravity?

MR. VANDER TUIG: Object to form. 10:35

THE WITNESS: I don't remember where all the pivot points were on the New Holland. So I don't want to overstate exactly where they were. There may have been some that were up on like the upper 10:35

structure, the cap or a higher structure on the vehicle.

BY MR. O'DELL:

Q. What's another benefit of having low pivot points, P1 and P3 from Figure 5, of the Vermeer patent? 10:36

A. Well, like I said, when you have all of your support structure, your pivot points down low, then you just have to design the mainframe to support it down low. You don't have to have some kind of a tower structure that you would have to support that. 10:36

Then your support is lower so you should lower the center of gravity so hopefully have a more stable machine. And then when you're -- you've got some kind fore-aft loads, those loads are going through a lower structure. As opposed to having something that's up high that may be shifting your center of gravity front to back, you know, which was an issue for radial arm machines. 10:36 10:37

Q. Is working with the center of gravity a fundamental component of designing a skid steer, at least at the time you were working with Case? 10:37

A. That was one of the things that we would want to evaluate, was where was the center of gravity. Because a lot of times in the construction equipment you're working in uneven environments. And so you would -- for a skid steer or a mini skid steer, where you're working on sloped surfaces, you'd want to keep the center of gravity at a lower level in order to increase stability. 10:37

Q. Okay. And that stability is pretty important to this equipment; isn't it? 10:37

A. That's one of the important aspects of it.

Q. Still referring to Figure 5 of the Vermeer patent and pivot points P1 and P3, would a POSITA engineer/designer be able to move the pivot points to different locations? 10:38

MR. VANDER TUIG: Object to form.

THE WITNESS: You can always move them to a different location. 10:38

Are you saying and still have a working design or just move them?

BY MR. O'DELL:

Q. And have a working design.

A. It's probably possible. 10:38

MR. O'DELL: I think I would like to take a five- or ten-minute break at this time.

(Whereupon, a recess was taken from 10:39 a.m. to 10:57 a.m.) 10:39

MR. O'DELL: I have a new exhibit to provide, and that is Exhibit 2017-00167.

(Deposition Exhibit 2017-00167 was marked for identification.)

BY MR. O'DELL: 10:58

Q. Let's look at Figure 1 of this picture. What type of equipment is this?

A. Which part of the equipment are you looking at?

Q. I don't know. Show me all the -- 10:59
give me a description of what all is in the figure there.

A. Well, I would describe that as a skid steer loader. And it's got a mini backhoe attachment mounted on the front of it. 10:59

Q. Okay. Do you know if this is a compact utility loader or if it's a mini skid steer -- or it's a regular skid steer?

A. Appears to be a regular skid steer. It's got a cab on it. 10:59

Q. Okay. What is element 22?

A. They call them lift arms. I would call them loader arms.

Q. Is this a radial loader arm or radial lift arm? 11:00

A. Yes. That is a configuration, it is a radial lift arm, loader arm.

Q. Are radial lift arms or loader arms popular still today?

A. They still exist. So there are some machines that have radial lift arms. 11:01

Q. Is there any benefit of a radial lift arm over a four-bar mechanism?

A. I guess the main thing I would think is the simplicity of the structure, less moving pieces. 11:01

Q. Does that mean it's more reliable?

A. Not necessarily. Just the simplicity of the structure.

Q. What's good about simplicity? 11:01

A. You have fewer moving parts. So you've got like fewer rotational axes or fewer joints to make sure that you're getting grease on. And so you can not have to worry about so many -- you know, so many different components 11:01

that are moving.

And you've still got to have all of the -- all of the structure to take all of the load. So I don't know if it's more or less reliable. But you do have fewer moving parts with a radial lift mechanism versus a four-bar linkage.

Q. Is there anything that a radial lift can do that a vertical lift cannot?

A. Nothing immediately comes to mind. 11:02

Q. Why would anyone make something other than a vertical lift for a skid steer?

MR. VANDER TUIG: Object to form.

THE WITNESS: Like I say, it could be some aspects of design simplicity that -- 11:02 that they want. Or maybe that's what they know how to make so they keep making the radial lift mechanism.

BY MR. O'DELL:

Q. Okay. Where does the lift arm or 11:02 load arm 22 attach to the vehicle?

(Witness reviewing document.)

THE WITNESS: Well, it attaches in the rear up there on -- there's a callout 24. I'm trying to find it in the -- where 11:03

24 is in the patent. They call it upright supports, looking at column 3 where it calls it upright supports.

BY MR. O'DELL:

Q. Okay. 11:04

A. So it attaches high up on that structure in the rear on those upright supports.

Q. Do upright supports 24 provide weight-bearing support for the lift arm?

A. What do you mean by "weight bearing"? 11:04

Q. Do they support the downward force of the lift arm at the pivot point shown?

A. They're going to support whatever forces are put through the loader arm. So if there's a vertical load, it will support the 11:04 **vertical load at that end. If there's a horizontal load, it will support the horizontal load. And if there's any kind of side-to-side load, it will also support that.**

Q. What is item No. 16 in this figure? 11:04

A. In column 3 they refer to 16 as a mainframe.

Q. Does the mainframe support the loader arm 22?

A. Indirectly. So yes, because the -- 11:05

the upright support 24 is going to be attached to the mainframe. And so ultimately going from -- you know, you could either look at it as going from ground level or either engine level. But you're going to be having the -- the load path is going to go from the mainframe 16 that we're talking about up through the upright supports and ultimately to the -- the rear end of the loader arms.

Q. Would you say that the wheels 20 also support the loader arm? 11:06

A. Indirectly.

Q. Are there any pivot points for the loader arm on the mainframe?

(Witness reviewing document.) 11:06

THE WITNESS: There appears to be item No. 26. So item No. 26 is a hydraulic lift cylinder and it is attached where the -- that part 16 meets the upright support, there's a -- a pivot point there that then goes to another pivot point on the loader arms. 11:07

BY MR. O'DELL:

Q. I'm sorry. I don't see that. I'm not disagreeing with you. I just don't see it. 11:08

I'm looking at Figure 1 and I see the actuator 26. And there's a circle on upright element 24. We call that upright support 24. Is that correct, that circle is on upright support 24?

A. Well, I see where that actuator 26 -- 11:08

Q. Yes.

A. -- or they call it a hydraulic lift cylinder -- where the hydraulic lift cylinder disappears behind the -- the right edge of the upright support. Right there where the upright support meets the -- the mainframe, that's where I see the -- the circle there that to me indicates a pivot point. 11:08

Q. Do you see the number 26 drawn in Figure 1, the actual reference numeral 26? And is that on top of part of the mainframe 16? 11:09

A. It appears as though if -- where it has item No. 26, I see it going along what appears to be the upper edge of the mainframe. I can't tell if there's any -- anything, a lip or something, behind that. But I see it going along at least the upper edge of the mainframe. 11:09

Q. All right. The next document I'm going to provide is one of your declarations. 11:10

MR. O'DELL: This will be Exhibit 2016-00169.

(Deposition Exhibit 2016-00169 was marked for identification.)

BY MR. O'DELL: 11:11

Q. So first let me explain what I'm trying to do and then I'm going to have you identify this document.

I know that you provided seven declarations. And we've talked before that the 11:11 subject matter from all seven IPRs is similar. And the questions I have I think can all be made addressing this one. So that's why I've identified this -- this one to -- for discussion points. 11:11

And so with that said, can you tell me what this exhibit is?

A. I will just read you what the title is.

Q. You bet. 11:11

A. This is the Declaration of Mark Fleming, Ph.D., P.E., in Support of Patent Owner's Response to Petition of Inter Partes Review of U.S. Patent No. 9,321,386.

Q. For the record, could you read the 11:12

bottom part, the footer?

A. Where it says Vermeer Manufacturing?

Q. Yes.

A. Vermeer Manufacturing Company - Ex. 2016 Kubota vs. Vermeer, IPR 2025-00169, page 1 of 120. 11:12

Q. Thank you.

In your declaration your paragraphs are numbered so I'm going to refer by paragraph number. So can you please go to paragraph 43, which begins on page 12 of this document? 11:13

A. And I have pulled the clip off of here. So I hope that's okay.

Q. That's okay.

A. Otherwise I can't get the pages open. 11:13

Q. Does Vermeer still have or still sell radial lift mini skid steers?

A. I'm not sure what their entire product line is. So I -- I'm not sure if they still have -- you're talking vertical lift or radial? 11:13

Q. Radial lift.

A. Radial lift. I'm not sure what their entire product line is for mini skit steers and whether they had a radial lift or not. 11:14

Q. Did you provide this picture that's in your declaration at the end of paragraph 43?

A. It was one that -- I think the attorneys had that. So we used that from some work that -- or some photo that they had.

Q. Does this appear to be a Vermeer compact utility loader?

A. It does appear to be a Vermeer, yes.

Q. Does it appear to be a radial lift compact utility loader?

A. Yes, it does.

Q. So should we say at some time Vermeer made and sold radial lift compact utility loaders?

A. Yes.

Q. But you're not able to answer if they're still selling them today?

A. I'm not sure what their product line is currently.

Q. Let's move to paragraph 47 of your declaration. Can you read this paragraph?

A. To myself or out loud?

Q. To yourself is fine.

(Witness reviewing documents.)

THE WITNESS: Okay.

BY MR. O'DELL:

Q. How do you calculate center of gravity?

A. You want to calculate it or you want to measure it? 11:16

Q. Or measure it.

A. And you want front to back or vertical center of gravity?

Q. Tell me both.

A. Well, if you were going to measure front to back, you would put scales under the four corners, or you could do the front and the back, and then take the various ratio to come up with where the center is between the front and the back. And I guess if you do the four corners, then you get the side-to-side center of gravity as well. 11:16

Then if you wanted to measure it for the -- the vertical, you could either do like a tilt test or tip the -- tip the vehicle and weigh the four corners again and see how much shift you have in the front to back. And that would allow you to calculate the vertical center of gravity as well. 11:16

If you wanted to calculate it, then 11:17

you would have the -- the weight of all the various components and the location. And you would go through and essentially do the same thing, where you come up with, you know, how is the weight distributed and -- and then determine from that where the center of gravity is.

Q. Would a POSITA be able to calculate or measure both the front/back and the vertical center of gravity?

A. You're saying measure it or calculate it?

Q. Both.

A. If you had the -- if you had the unit, you would be able to set up a test and do whatever testing you needed to do.

If you didn't have the unit and all you had was -- first of all, if all you had was a picture, you wouldn't know what the various weights of the component are. But if you had all of the information for all of the -- you know, all the structure and all the components, I think a POSITA would be able to calculate that as well.

Q. Do you know the center of gravity in the design process?

A. I don't understand your question.

Q. You've just described measuring and calculating the center of gravity of an actual machine.

A. Correct. 11:18

Q. In the design process, do you know the center of gravity through your CAD and software?

A. That would be something that would be calculated. And of course that depends what 11:18 **part of the design process you're in. Because early on when you're just laying out the -- the geometry, you may not know exactly which engine and which componentry you're going to use, which is -- those are big, heavy pieces that are going** 11:19 **to affect the center of gravity.**

So at some point during the design process when the design has been finalized and all the density and weight of all the structure is known, you know, the engine type and all the 11:19 **componentry, when you have the -- the lift mechanism designed so that you can understand what the center of gravity is when you've got the raised arms versus lowered arms, then you could calculate that with the design** 11:19

information. If you -- if you're the actual designer of the product you would know that. If you're looking at someone else's product, you would have to go and measure that.

Q. I think we talked about this before, but understanding the center of gravity is an important part of the design process; is that right? 11:20

A. That would be one of the factors that you would consider when you're -- when you're -- I assume you're talking about designing a mini skid steer. 11:20

Q. Uh-huh.

A. That would be one of the pieces of data that you would be paying attention to. 11:20

Q. And having a lower center of gravity on the vertical dimension is an important benefit?

A. It can be, yes.

Q. Are there situations when it's not? 11:20

A. I mean, I can't think of one right now. But yeah, in general try to get the center of gravity down in a reasonable area.

Q. Does the center of gravity affect a vehicle's operation during turning, accelerating 11:21

or de-accelerating?

A. Yes, I would think it does.

Q. How is that?

A. Are you talking about vertical center of gravity? 11:21

Q. Yes.

A. Yeah. So when you're -- when you're turning, for instance, you've got a force that's essentially -- you know, centrifugal force that's pushing it to the side. So your 11:21 **side-to-side stability and your side-to-side movement will be affected by how high the center of gravity is. Particularly when you're operating on, you know, rough, uneven surfaces, which you often are if you've got -- if you're** 11:22 **working in a construction environment.**

And then the acceleration/ deceleration, the higher the center of gravity, the more front-to-back movement of the -- of the skid steer you could have as you're accelerating 11:22 **or decelerating.**

Q. And these were all true when you were designing in the early 2000s for Case?

A. Yes. These are fundamental principles that I'm telling you. 11:22

Q. How does raising the bucket affect the center of gravity?

A. Typically raising the bucket is -- you know, raising the bucket, raising the loader arms is going to, first of all, raise the center of gravity vertically. Depending on the layout of your loader arms, you could also get some shift of the center of gravity from front to back.

11:22

Q. Okay. In this paragraph we just read, 47, you talked about an advantage of having the mass of the mainframe reduced. Explain that to me.

11:23

A. So if you are going from, say, a vertical -- or a radial lift machine that we just looked at, for instance, in this previous patent where you have to have that -- that vertical support structure --

11:23

Q. Can you tell me the exhibit number you're looking at?

A. Yes. I'm looking at Exhibit 2017-00167.

Q. Okay. Thank you.

A. And that was the skid steer loader for a skid -- or a backhoe mounting device for a skid steer loader. It's the '398 patent.

11:24

But what I was pointing out there was that you've got the -- that vertical support structure. And for a vertical lift machine or radial lift machine, that's got to be a fairly substantial structure in order to accommodate those loads.

And so if you -- instead of having that higher pivot point, if you lower the pivot point down where you are supporting it on the lower mainframe structure, then that's where I'm talking here about the mass of the mainframe being reduced.

Q. Was that true as an advantage when you were at Case?

A. In general you try to get the weight of the machine to be at a -- an acceptable level. You know, you need to -- especially for a machine like this, you need some weight for counterbalance. But you know, the weight of the machine -- the higher the weight of the machine, the more work the engine has to do to propel the machine versus doing the -- the lifting or other things that you want to do.

Plus you could -- if you're working in like landscaping, for instance, where you've

got a very heavy machine, you start leaving, you know, a lot of tracks in the grass and tear up the -- the work environment that you're actually trying to work. So that's kind of a fundamental issue that we deal with in this kind of machinery. 11:25

Q. I see that the compact utility loader by definition has a weight kind of high limit -- high limit. Is that part of the same thing where they're trying to keep the weight down? 11:26

MR. O'DELL: Could you read my question back, please?

(Record read as requested.)

THE WITNESS: You're talking about the 1500-kilogram, which is roughly 3300 pounds, that's the number that they have come up with where you -- below that, they would call it a compact utility loader. But yes, you're keeping the weight down to a -- below that level. 11:26 11:27

BY MR. O'DELL:

Q. This paragraph, 47, of your declaration also talks about improved visibility as being a key factor. Can you explain that?

A. Yes, visibility in construction 11:27

equipment or off-highway equipment in general is an important issue that we deal with. And so if you have the -- the machine that has the loader arms lower versus having the higher pivot points that when you raise the arms like you would for this '398 patent, Exhibit 2017-00167, when you raise those loader arms -- when they're already in a high position in the rear, when you left them up, then it can affect the visibility, particularly the side-to-side visibility. 11:27 11:28

Q. Has that always been a design goal for skid steers in general, including when you were at Case?

A. Visibility is always something that we take into account because you want the operators to be able to see what they're doing, where they're going. 11:28

Q. Let's turn to pages 50 and 51 of your declaration, paragraphs 117 and 118.

A. I've got 117 starting on page 49. 11:29

Q. Yeah. Okay. There are drawings on page 50 and 51. Did you write this part of your declaration, paragraphs 117 and 118?

A. Yes.

Q. How did you obtain these figures? 11:29

A. You're talking the figure on page 50?

Q. Yes.

A. So first starting on page 50, the -- the tracks came from the patent of Bares. I can't remember the number but it's the Bares patent. So that's where the track came from. The CAD model for the KR996 is something that myself and my team put together based on the figures from the KR996 patent.

11:30

Q. Tell me in more detail how you did that, you and your team did that.

11:30

A. Well, we reviewed the KR996 patent. And it had several different images in there. And so we looked at those. We could sketch over that. So import that into -- we used SolidWorks. So we imported that into SolidWorks. And then we could sketch over that, look at the various -- you know, all the various angles and kind of have that laid out here.

I think there's a figure a few pages back that gives a little bit more detail. But we based that on the -- the drawings and the figures from the KR996 patent. And we could do some -- some overlays and then scale things off of there.

11:31

11:31

Q. Did you do -- personally do the overlays?

A. I did not do that. I've got one of my engineers who did the -- the CAD drawing for me. 11:31

Q. Okay. Are these your engineers at Fusion?

A. Yes.

Q. And did he do this under your direction? 11:32

A. Yes, it was under my direction.

Q. So he imported the KR996 patent figure into CAD by overlaying -- overlaying the patent Figure 1?

A. That was part of the work that was done. 11:32

Q. Okay. And then who colored the picture?

A. It's colored automatically.

Q. The CAD software colors it automatically? 11:32

A. I imported this and so I made this figure right here. So he had done the CAD drawing. And then I imported that into another software. And when you import it, it just 11:32

assigns random colors to the -- to the parts.

Q. For page 51, is the story the same for those minus the arrows?

A. The story as far as how it was made?

Q. Yes. 11:33

A. Yes, with the difference being that the track came from the patent of Bares.

Q. Okay. You said you imported this into another software from the CAD software?

A. Yes. 11:33

Q. What was the other software?

A. That software was called Abaqus.

Q. Okay. Did you do that?

A. Yes.

Q. Okay. How did you align the tracks 11:33 of Bares to the image?

A. You can see on page 50 that we've got an overlay there. So we had scaled it to have the same track width -- or the track length, if you will, between the track and the wheeled 11:34 **vehicle.**

Q. The track system has a drive unit different from the wheels of KR996, right?

A. You're talking the elevated sprocket and drive? 11:34

Q. Yes.

A. That is correct.

Q. In the last sentence of paragraph 118 you say (as read): Given these issues, a POSITA would not be motivated to combine the track system of Bares with KR996-JP705 machine, and would not have a reasonable expectation of success in doing so. 11:35

Can you explain what issues you're talking about? 11:35

A. The major thing I saw -- first of all, if you look at the figure on page 50, you can see that the track is going to interfere with -- there's kind of a triangular-shaped structure there. It's kind of a brown/tan color in this particular image. That track is going to interfere with that structure. 11:35

That structure is -- in my experience, is usually some kind of a tank for fuel or hydraulic fluid. So it's critical to the operation of an internal combustion engine and a hydraulically driven device. 11:36

So you've got interference there to start with. That's more on the external. And then you've got -- looking at the internals, 11:36

going to page 51, you can see that if you're going to elevate the -- the track -- or have an elevated track with an elevated sprocket and drive -- the drive motors that are shown in the KR996 patent are kind of a cylindrical shape -- and you can see when you elevate those to be the drive mechanism, you're now not only interfering with that triangular-shaped structure but you're also passing through different parts of the mainframe. You're passing through the -- the engine structure. And so it would require a pretty extensive redesign of this KR996 vehicle to accommodate this track system.

Q. Let's talk about that fuel container, that brownish/gray triangular shaped. Are there different sizes and shapes of fuel containers?

A. Yes.

Q. Would it be possible to select a different size or shape container and still to have it work?

A. I don't know if you could or not. You know, these -- you want to have a certain volume of fuel for certain length of operation. And so if you put a very tiny tank on there, then you'll wind up with a situation where the

machine may not operate as long as you need it to.

And so then you've got a -- you know, for instance, this KR996 is supposed to be for operating inside of buildings. You don't want to be constantly having to go and get more fuel. So making a much smaller tank could be problematic from that standpoint.

Changing the shape of it, you still have to be concerned with the -- the path of the loader arm. So if you make very much of a change to the -- to the location of that, then you're going to start, you know, potentially impacting that with the loader arms. And then you could have, you know, either an environmental or a safety issue where you're spilling -- spilling hydraulic or diesel fuel or gasoline.

Q. What is the volume of this tank?

A. I don't know what the volume of this tank is.

Q. But you're telling me that you, Dr. Fleming, could not position a fuel tank to make this -- this machine work that accommodates this sprocket? You're not able to do that is

what you're saying?

A. Not with the teachings of this patent. If you want to design a completely different machine that doesn't follow the teachings of this patent, then, you know, that's a different situation. 11:39

But as far as following the teachings of this patent and having it work as the inventor expected but changing things like hydraulic fluid reservoirs and things like that, I -- 11:39

Q. You can't do it?

A. Not with the teachings of this patent.

Q. What do you mean by "not with the teachings of the patent"? Are you saying that there's no possibility of repositioning that hydraulic fuel container that would allow the KR996 to work as it is intended? 11:40

A. What I'm saying is that when you start making these kind of changes to, for instance, how much fuel or hydraulic fluid is in the tank, then you start getting into a different machine. 11:40

You put a -- a very small tank on 11:40

there, for instance, you know, put on a -- you know, a coffee-cup size machine or something very small, then it's not going to operate very long and it's not going to be a useful machine. So I don't think that a person of skill in the art would be motivated to make a much smaller tank.

Q. Can they make -- can it work with a smaller tank? Let's say if it's -- you raised it up 10 percent, the bottom of that tank, so it no longer interfered with the sprocket, would it work? 11:40 11:41

A. So then --

Q. Even with the 10 percent reduction of hydraulic fluid? 11:41

A. So raise the tank so that you're raising the center of gravity of the machine?

Q. Raise the bottom of the tank, yes, 10 percent?

A. Thereby raising the center of gravity of the machine? 11:41

Q. Uh-huh. Uh-huh.

A. I don't know that it would work because, you know, you start -- you start putting on a smaller and smaller tank, is it 11:41

going to run for as long as is intended, do as much work as is intended.

You know, I can't say that you start putting on a smaller tank, raising the center of gravity, that you're going to be getting a machine that's still consistent with the teachings of this patent.

Q. How long is it intended -- how long is the KR996 machine intended to run? 11:41

A. They don't give a specific time that they intend it to run. But I know that they are intending to operate in a building. So if you have to be constantly going and getting more fuel or refueling, then that's not preferred by operators. 11:42

Q. Is it ever possible to move the sprocket? 11:42

MR. VANDER TUIG: Objection to form.

THE WITNESS: What do you mean?

BY MR. O'DELL:

Q. To a different location away from the fluid reservoir?

A. You want to move the sprocket down?

Q. Any different location that doesn't interfere with the fluid reservoir. 11:42

MR. O'DELL: I'm saying reservoir.
THE WITNESS: If you were to move -- I guess I would want a clarification on that. Do you want to maintain this kind of triangular-shaped track? 11:43

BY MR. O'DELL:

Q. It's just a track. I think the track is going to be triangular even if you moved it, let's say, to the right and down.

A. Well, if you want to put on a really tiny track so that you just take this same -- this same track shape, start with that, and you shrink the track down in order for it to get down to where it is in the top image on page 51, you're going to wind up with a -- with a track system that is very small. And then you're going to have a device that's unstable or has much less stability from front to back and possibly from side to side. 11:43

But definitely from front to back, you're going to have a very small footprint that you're operating this machine from. So that's not a preferred option in my opinion. 11:44

Q. Not a preferred option but not possible? 11:44

A. I would say not possible to have a functioning machine that customers would want to use with such a tiny little track.

Q. When we talked about the Vermeer patent, we talked about a POSITA being able to convert the Vermeer patent's tracks to wheels. And you said that was within the capabilities of one skilled in the art. 11:44

Do you still believe that's true?

A. From what standpoint? 11:44

Q. Converting the Vermeer patent tracks to a wheel-drive system, you said that that was within the capability of a person of skill in the art.

Do you believe that to be true? 11:45

A. From the standpoint of what I answered on that, I believe it to be true. What I'm saying on this patent here, if I want to follow the teachings of this patent but try to incorporate this track, you have a lot of interference. And if I want to then start coming up with a completely different machine that has to move the engine, move other drive line components, move hydraulic motors and hydraulic drives, I'm no longer following the 11:45 11:45

teachings of the KR996 patent. I'm designing a completely different machine.

Q. And one of those things is the interference of this fluid reservoir with the sprocket? 11:46

A. Well, you've got the interference potentially with the sprocket, interference with the track. You're going to have interference with the -- with the engine. You have -- potentially have to redesign some of the other 11:46 **structure of the vehicle as well. So you wind up with a very big redesign of this machine to accommodate those tracks.**

Q. Is it your opinion that the figures of the KR996 are drawn to scale? 11:46

A. They were drawn to scale enough that we were able to complete these -- complete these CAD models.

Q. I don't understand that. You could -- you overlaid the picture. So whatever the 11:46 scale was, you could complete the CAD drawings, right?

A. Correct.

Q. So do you -- do you think the figures of the KR996 are drawn to scale? 11:47

A. From the standpoint of -- to be able to draw these to assess the teachings of the patent and to evaluate the alternatives proposed by -- in the prior art combinations proposed by Dr. Velinsky. 11:47

Q. So is that a yes or a no?

A. From -- can you restate your question?

Q. Is it your impression that the figures of KR996 are drawn to scale?

A. Subject to what I said before where we were able to do the overlays and to analyze these, I would say that they're drawn to scale to that -- you know, to sufficient -- or to sufficient scale for us to be able to do this analysis work. 11:47

Q. I apologize but I can't understand the answer. I understand that your overlay is mapped to it. But what I'm asking is the underlying image, is that drawn to scale? And you said, well, our overlay was -- matched it. 11:48 Of course it did. You overlaid it. But is the -- are the patent drawings to scale? And what scale is it?

A. What do you mean by "what scale is it"? 11:48

Q. How tall is the KR996 machine?

A. It doesn't give specific height. So when we were doing our evaluation of it, we were looking at comparing -- looking at, first of all, the size of the operator gives you some concept on there. Looking at the size of the wheels. And then looking at the size of the loader arms compared to other units that we were looking at as well in order to come up with a -- with a scale. 11:48 11:49

You know, ultimately for the work that we were doing, the important thing was not the absolute dimension but the relative dimension of this track of Bares and how it would fit in there because we were looking at the -- the track width of those tracks and whether it would fit on the machine by scaling it up or scaling it down. 11:49

Q. When you put the Bares tracks on the KR996 machine in the figure on page 50, did you try to make any adjustments of size or configuration to make it work? 11:49

A. Like I said, what we did was we had our CAD model and I overlaid the -- the tracks of Bares. And I maintained the proportions and 11:50

scaled it up so that the track width was the same as a wheeled vehicle.

Q. So you did no design or engineering or modification in an attempt to make it work?

A. I did not try to -- first of all, just to clarify, you're talking about modifications to the KR996 design? 11:50

Q. Or to Bares or to the sizes or positions of either.

A. I did not try to redesign the KR996. I was trying to follow the teachings and the drawings, following the teachings of patent to see whether the combination that was proposed by Velinsky -- by Dr. Velinsky would actually work. And what I found is that it would not. 11:50

Q. So you -- is it correct that you tried to bodily incorporate the drawing from KR996 with the drawing from Bares of the tracks?

MR. VANDER TUIG: Object to form.

THE WITNESS: What I'm showing here is -- first of all, on page 50 you can see that there's an overlay. 11:51

BY MR. O'DELL:

Q. Uh-huh.

A. So we did the scaling there. And 11:51

then you can see furthermore on page 51 in the middle of the page there that we actually drew up the tracks from Bares and put that -- removed the tires and wheels from the KR996 and tried to replace that on the KR996. 11:51

And that's what we're showing there where we see the interference with the -- that tank and with the engine and other pieces of the structure.

Q. So would you describe that as trying to bodily incorporate the tracks from Bares onto the KR996 machine? 11:52

A. What do you mean by "bodily incorporate it"?

Q. Just taking the exact figure as it is from Bares onto the exact figure as it is in KR996 and see if they work. 11:52

A. Yeah, from a high level I would say that's how we ended up scaling those, was tracking the track from Bares and overlaying it on there while maintaining the same track -- track length that we had on the KR996. 11:52

Q. In the picture in Figure 1, there are -- let's say the picture at the bottom right. On the tracks there is a reddish big circle and 11:53

a bluish big circle.

Do you see those?

A. Which page and which figure are you looking at?

Q. Page 51, the bottom right figure -- I think you're kind of consistent with the colors. But anyway, in the track there is one wheel that's red and one wheel that's blue. 11:53

Do you see that?

A. Yes, I do. 11:53

Q. What is the purpose -- or what are these circles -- those four circles in between those two wheels, one of which is colored yellow?

A. You're talking the little ones? 11:53

Q. Yeah, little ones.

A. Those are I think called idler wheels. That's what I call them anyway. Idler wheels that support the -- the track between the two larger wheels that the track goes around, you know, the one that you said was blue and the other one that was kind of reddish. 11:54

Q. Do the idler wheels as shown in this figure exhibit any downward force on the track?

A. I would state it a little bit 11:54

differently than that. Generally idler wheels resist upper movement of the middle of the track. But I don't know that they're necessarily exerting a downward force when the vehicle was just at rest or suspended up in the air, for instance.

Q. Would you say the downward force is applied to the blue and red wheels through the track to the ground and that's where the downward force would be? 11:54

A. Well, the track is supporting the weight of the vehicle. And it is -- then goes through all of those wheels up to that carriage, which is kind of that gray-colored elongated piece. 11:55

Q. Uh-huh.

A. And then somehow that carriage would be attached to the mainframe of the vehicle in order to transmit the load between the ground and the mainframe. 11:55

Q. When you say "all of those wheels," do you mean both of those wheels or do you mean all six of the wheels?

A. From a high level I'd say all six of those wheels. 11:55

Q. Okay. Do you know what the term "kinematic diagram" is?

A. Well, kinematics is the study of movement. And so a kinematic diagram is going to be a diagram showing what the movement, in this case the movement of the links and the pivot points is. 11:56

Q. Is a kinematic diagram necessarily a CAD diagram?

A. Not necessarily. 11:56

Q. Does a kinematic diagram describe the shape, size, width, or length of the members?

A. In general in a kinematic -- kinematic analysis you would be looking at the endpoints. So because of that, then you would be looking at the length of the members. Not necessarily the -- the thickness or anything like that. But you're interested in how the linkages move and how the pivot points move, rotate. And so that's what a kinematic diagram would show. 11:56 11:57

Q. What purpose does the kinematic diagram have in the process of designing equipment?

A. Where I've looked at them before is 11:57

when you have some kind of a structure that moves and you want to know how to adjust, you know, linkage positions. Then you would be looking at are you achieving the overall goal of whatever you're trying to design. In this case trying to design some kind of a vertical lift mechanism, for instance.

You'd be looking at -- if you have pivot points as shown in the -- you know, take the Vermeer patent, you have those pivot points, do you get the vertical lift movement that you want. If you have this KR996, do you have the movement that you want.

If you move those pivots points, do you still get the movement that you want or you start running into interference problems or does the mechanism not move. And what I found was, doing some of the kinematics on Dr. Velinsky's alternatives, you start moving those linkage points around and you start running into problems of interference or problems of the lift arms not actually lifting properly.

Q. Let's go turn back to page 20 of your declaration. In paragraph 63, which spans page 20 to 21, can you read that paragraph to

11:57 11:57 11:58 11:58 11:59

yourself?

A. Paragraph 63?

Q. Yes.

(Witness reviewing documents.)

THE WITNESS: Okay. 11:59

BY MR. O'DELL:

Q. Is it ever advantageous to have a separate dedicated machine?

A. For what?

Q. For any job. Is there ever a job 11:59 where it's advantageous to have a separate dedicated machine, a machine you describe as having a unique purpose?

MR. VANDER TUIG: Object to form.

THE WITNESS: There can be. 12:00

BY MR. O'DELL:

Q. Can you give an example?

A. Maybe it's all the construction noise I hear outside or something. But one that comes to mind is a sheepsfoot, where you're trying to 12:00 **compact soil when you're laying out a roadway like we described earlier, You may have a dedicated machine for -- for compaction.**

Q. Is there ever a job situation where it would be advantageous just to have a loader? 12:00

A. There would be.

Q. Turning to paragraph 138, here you mentioned -- you were talking about KR996; is that correct?

A. I believe that is the section it's in. Let me read the paragraph to make sure.

(Witness reviewing document.)

THE WITNESS: Yes, we're talking about KR996.

BY MR. O'DELL:

Q. You also mentioned the detachable feature -- fixture 41; is that correct?

A. In paragraph 138, yes, I mention the detachable fixture 41.

Q. Would you say that the detachable fixture 41 that holds the loader is an important part of the compact utility loader of the KR996?

MR. VANDER TUIG: Object to form.

THE WITNESS: What do you mean by "important"?

BY MR. O'DELL:

Q. Is it important for performing loader operations? Is it critical?

A. If you are -- I guess to step back a little bit. You've got a machine here that has

a detachable loader unit and then a detachable arm. And go through the teachings of the patent, it talks about you can have one vehicle and then you could put these loader unit and arm unit on there for green building deconstruction work.

When you want to attach the loader unit to the mainframe of the -- of the machine, or the main body as they call it, then you would do that through the -- the fixture 41. So the fixture 41 where the -- the linkage for the loader arms attaches would then be connected to the mainframe of the -- of the machine.

And so that's -- that's how that operates. And so when you have it configured for operation as a loader, then you would be having loads going through that fixture and through that combination plate down into the mainframe of machine.

Q. Would you say that when you're operating as a loader that the detachable fixture is a critical component of the machine?

A. I mean, it's one of many components that are critical. So when you're operating as a loader, everything from the -- the bucket to

the wheels is critical and all parts in between.

Q. You discussed throughout your declaration that the wheels of the KR996 are used to engage with the guides of the bogie and pull it in. An example of that can be shown in the figure of paragraph 138, which is on page 62; is that correct? 12:05

A. What are you pointing to specifically in that figure?

Q. The wheels of KR996 are used to engage with the guides of the bogie and pull it in? 12:05

A. Yes.

Q. Referring to paragraph 100, we talked -- you show the wheels we just talked about, 150, the -- tell me what you called those wheels again. 12:06

A. Which wheels are you talking about?

Q. 150.

A. The idler wheels? 12:06

Q. Idler wheels. Yes, let me start over again.

At paragraph 100 of your declaration you have a picture of Bares, Figure 6, and it includes a track assembly, which is similar to 12:06

the track assembly that you combined with the KR996 that we discussed early. And in that discussion we discussed the wheels between the main wheels, the idler wheels 150; is that correct? 12:07

A. Yes, we discussed those.

Q. Is it possible that those wheels are made of rubber?

A. I'm not sure what Bares made those out of. 12:07

Q. Is it possible that those wheels could be made out of rubber?

A. Yes, anything is possible. I don't know if that would be a -- a good place to use rubber wheels or not, though. 12:07

Q. Are there any advantages of using rubber there?

A. There could be advantages or disadvantages. You could -- if it's a lighter-weight application, you may get some advantages from rubberized wheels of, you know, like reduced noise or a smoother ride. But it could be at the expense of not as tough and durable as something like a steel wheel. 12:08

Q. Would they be cheaper to make than a 12:08

steel wheel?

A. I'm not sure what the relative costs would be between the steel versus the rubberized wheel.

Q. Would a rubber wheel flex when the pressure is either coming down or up from the ground against it? 12:08

A. You're talking a solid rubber wheel that's real small?

Q. Yeah. Let's try that. 12:08

A. I would say probably not, no.

Q. Are you saying the rubber compresses?

A. Not to the extent of a full pneumatic tire like we're looking at over here or -- or a larger tire. You may get just a very small amount. But also if you look at the position of where these idler wheels are, they are not on the inboard edge. 12:09

So even if you had something that could have a lot of compression, it's clear on the outboard side of the track and not on the inboard side where it would ever engage the -- that -- the guides of the bogie. 12:09

Q. Are the KR996 solid rubber wheels or air-inflated wheels? 12:09

A. They appear to be pneumatic tires.

Q. Why do you say that?

A. Just looking at the -- at the design of them and my experience on different types of wheels. Usually if you've got some kind of a solid rubber, you'll see some holes more out towards the track where it gives a little bit of compressibility. I didn't see anything like that that said to me that it was not a pneumatic tire. 12:09 12:10

Q. Did you see a pneumatic inflation valve?

A. I don't see it but, you know, sometimes those are on the inboard side, too. So I don't see one way or the other whether there's a valve to air it up or not. 12:10

Q. Okay. Is it possible that the wheels 150 of Bares could extend to the inward side of the track?

A. I don't see that it does. I see that there's what appears to be some kind of a ridge going through the center of the track. And it appears like those wheels 150 are on the outboard side of that ridge. 12:10

Q. Could they be on the inside portion 12:10

of the ridge?

A. That's not what I see there in that photograph on page -- or that image on page 43.

Q. I'm not asking what you see. I'm asking could they be on the inside of the ridge? 12:11

A. I don't know that they could be. I don't see any teachings in Bares that say that. And based on the -- the carriage mechanism that I see there, it looks like they've got them designed to go on the outboard side to support the outer -- outer part of the track. 12:11

Q. So you're unwilling to consider a modification to that drawing?

MR. VANDER TUIG: Object to form.

THE WITNESS: I'm not trying to redesign to come up with a modified design for this. I'm trying to follow the teachings of the patent as I see them. 12:11

BY MR. O'DELL:

Q. Would you say you're following the teachings as they're bodily incorporated into this drawing? 12:11

MR. VANDER TUIG: Object to form.

THE WITNESS: That's what I'm following, is what I see in the patent and 12:12

the teachings of the patent.

BY MR. O'DELL:

Q. What is wheel 152 made of?

A. I don't know that it says what wheel 152 is made of. 12:12

Q. Could it be made of rubber?

MR. VANDER TUIG: Object to form.

THE WITNESS: Like I said, I don't recall seeing that it said it was made of any particular material. 12:12

BY MR. O'DELL:

Q. Let's turn back to page 50 of your declaration, 50 and 51.

A. If you get to a good place to take a break, I'd like to take a short break. 12:13

MR. O'DELL: Yes, in fact, we can take a lunch break. I do have more questions but I don't have a lot more questions. So take a lunch break.

THE WITNESS: I usually just take a short break. So if you want to take 15, 20 minutes. 12:14

MR. O'DELL: Let me take 30 minutes because we're also going to strategize and eat. So let's be here at 12:45. 12:14

(Whereupon, a recess was taken
from 12:14 p.m. to 1:06 p.m.)

AFTERNOON SESSION

MARK FLEMING, PH.D., P.E.,

having been previously duly sworn was examined and testified further as follows:

RESUMED EXAMINATION 01:05

BY MR. O'DELL:

Q. I'm going to go back to your declaration, paragraph 138. And really it's -- I'm going to refer to one sentence and one drawing. And really I want the drawing on the 01:06 next page. Yeah.

So we have the main body 11 and the detachable fixture 41 of the KR996 machine. Is it likely or -- that the main body 11 is all welded together? 01:06

A. I don't know that the patent says that it's completely welded or not. When I look at the layout of it, I see that it's most likely -- mostly, if not entirely, welded just based on what I can -- what I can see from the -- the 01:06 design of the structure.

Q. Okay. Okay. For fixture 41, is it likely or could it -- is it a good chance that it is also all welded together as -- as for the pieces of fixture 41? 01:07

A. I would give the same answer as I gave for the main body, that the layout of the structure, it did appear that it was mostly, if not all, welded.

Q. Okay. Okay. I think we had -- I think both parties recognized that when fixture 41 attached to body 11, it's done so in a detachable way. Do you know what that is, that detachable connection is? 01:07

A. You're talking when the fixture 41 is on main body 11? 01:08

Q. Yes.

A. There is a -- I believe they call it a combination plate. So the -- the fixture is rolling on the bogie, the wheels of the bogie, drawn in by the wheels of the -- of -- you know, that are attached of the main body, draws that in. And then there is a mechanism under there that has a hydraulic cylinder and some kind of cam mechanism that has some rollers that will then press that structure up against the combination plate. 01:08 01:08

Q. So is it a pressure fit into that combination plate that holds it in place?

A. It's those rollers that hold it in 01:08

place.

Q. Okay. So when you're doing the lifting operation, it's the rollers that are holding it in place?

A. That's the -- what's pressing the part of the fixture that's up against the combination plates that is holding it in position. 01:09

Q. Okay. Okay. Are you a welder?

A. Not really. I have -- 01:09

Q. Amateur welder?

A. I have -- is there a category below amateur welder? I have welded but I cannot say that I'm good enough that you would want me to weld anything for you. 01:09

Q. Have you ever welded something together that was supposed to be detachable but for some reason is not working?

A. But not defective?

Q. It's defective. It's not working. 01:09

A. I guess I don't follow your question.

Q. Is it possible that if this mechanism that you described for connecting the fixture 41 to the body 11 is failing, could you tack weld it on? 01:10

A. Tack weld?

Q. The fixture 41 onto the body 11. If the mechanism that's holding those two units together is failing for some reason, could you tack weld it?

A. Tack weld is not going to hold.

Q. Could you do another type of weld that would hold?

A. Well, maintaining the removability feature?

Q. No, no.

A. If you want to design a --

Q. Nope, nope. That's not the question.

A. Sorry. Go ahead and ask your question.

Q. Could you weld together the fixture 41 to the body 11?

A. If you wanted to design a different machine, then -- and eliminate the removability feature, then you would -- that would be welded. But then you've got a completely different machine, completely different design that is not with the teachings of this patent.

Q. But it could be done?

A. If you wanted to teach a way or

design a way from what's in this patent and destroy the removability feature, then you could do some kind of permanent attachment. As opposed to what's in this patent that, you know, it's a selectively detachable or removable piece. 01:11

But I would say your -- if you're having trouble with some kind of failure of a mechanism, you're much better off fixing it, not trying to do some kind of a cowboy way of attaching it together. 01:11

Q. Okay. Okay. What if it's an emergency situation and that's the only way of you connecting it, if someone's life is at risk?

MR. VANDER TUIG: Object to form. 01:11

BY MR. O'DELL:

Q. Could you do it? Could you weld it together?

A. I can't imagine somebody's life being at risk that you need to do this. You know, I would say if you have to go and -- if somebody's life is at risk, first of all, going and getting a welder and bringing it in and doing that is going to take much more time than, you know, going to some other alternative. 01:12 01:12

Q. Is it an alternative?

A. What's that?

Q. Welding. If you had a welder there, is it an alternative?

A. I would say it's not a very good alternative to be modifying a design in this matter. And you're destroying the selectively removable feature that is, you know, with the teachings of this patent. 01:12

Q. Would the loader still work if you welded it? 01:12

A. It may or it may not. I mean, you start putting in a lot of welds, you start to get weld-induced distortion. These are some pretty thick pieces they have there. So I just can't make a blanket statement that just simply slapping weld on there to eliminate the removability feature is going to work and not to create some other problems. Like I said, you know, you get weld-induced distortion or things like that that are particular problems when you're doing some kind of field modifications. 01:13 01:13

Q. But it could be done?

A. Like I said, I'm not going to make that blanket statement that it's going to work. 01:13

Q. Okay. Okay. Let's turn to page 70 of your declaration. There are seven drawings on this page, correct?

A. Seven figures, yes.

Q. Yes. Let's start with the top left figure. Where did that come from? 01:14

A. I'd say the kinematic part, going back to what we talked about before with the figures, came from Dr. Velinsky. That was one of his alternatives that he said that -- he suggested and was created by somebody. He said it was created by Kubota's counsel. So that's where that came from. 01:14

And then we were doing some animation of that to see how and if that would work in conjunction with the KR996 part. And what we found was -- you can kind of see a progression from left to right as you are lowering the mechanism that you actually cannot get the bucket all the way to the ground before you start to interfere with the tires of the structure. 01:15

And then if you -- ultimately along the right, if you force it to go all the way to the ground by ignoring the contact interference, 01:15

you're actually interfering with the structure of the vehicle.

Q. Is there any modification that could be made to the loader arm that could prevent it from engaging with the wheel or the body of the machine? 01:15

MR. VANDER TUIG: Object to form.

THE WITNESS: We could move the pin locations back to where they originally were. That's one modification I would know. 01:15

BY MR. O'DELL:

Q. What if you made the top most red portion of the loader arm longer?

A. Coming up with another new design? 01:16

Q. Uh-huh.

A. I don't know what that would do for the overall stability of this vehicle if you then have the loader arm -- or the -- yeah, the loader arm and the bucket extending farther forward. So I have not evaluated the stability of changing the loader arm design. 01:16

Q. Earlier we talked about part of the design process was working with the center of gravity and the stability of the unit. 01:16

Would a POSITA know how to make modifications to alter the center of gravity if a longer loader arm was needed?

A. Are you talking fore-aft or vertical?

Q. Both of them. 01:16

A. They -- there would be some design work that could be done. But you know, it's not within the teachings of this patent.

Q. But there would be some design work that would be done? 01:17

A. Yes, possibly some pretty extensive design work.

Q. Okay. Okay. But it could be done?

A. Like I said, there could be some extensive design work that's done to possibly find a kinematic solution that would not have interference. But I'm not sure what that would be with this KR996 part, you know, and ignoring that you've -- you've now removed the lower pivot locations from the place where they actually were on the fixture and put them down somewhere on the mainframe. 01:17

Q. What about the next figure, which is Figure 8, annotated with lower pivot points written below it, where did that come from? 01:18

A. So Dr. Velinsky had also offered another alternative, lowering the pivot points. And so we at Fusion Engineering annotated that to show what would happen with that particular configuration when you lower the pivot points. 01:18

And what we found on that one is that actually the bucket starts going down and then it actually rotates rearward and the bucket starts going backward and up in the air. And both on this one and on the other one, you are getting the loader arms back in the operator areas as well. 01:18

So it's not just the movement of the -- the movement of the loader arms. You've also got a potential safety issue where you're putting loader arms right back in the operator compartment. 01:19

Q. Could a POSITA rearrange pivot points, not the ones at the bottom but other pivot points, or the length of the loader arm or the position of the pivot points on the loader arm in such a way to make this work? 01:19

MR. VANDER TUIG: Object to form.

THE WITNESS: I'm not sure if you can make this configuration work or not. 01:19

BY MR. O'DELL:

Q. Did you try?

A. I did not try to fix Dr. Velinsky's designs, no.

Q. Is it your opinion that determining market demands and competitor benchmarking are evidence of nonobviousness? 01:19

A. I guess I would put it by saying that reviewing those types of secondary considerations would be supportive of my opinion of nonobviousness. 01:20

Q. Do you believe -- is it a true statement that customer demands provide a strong motivation for a POSITA to make a modification?

A. That could be one thing that it would be used for, is what is the customer asking for in the marketplace. 01:20

Q. The alleged evidence of secondary considerations, is that directed primarily to vertical lift? 01:21

A. I would say primarily, yes.

Q. I think you have a copy of the Vermeer patent, what we're calling the Vermeer patent, the '386 patent.

A. Yes. That was 1001-00169. 01:21

Q. If you could open it up to Claim 1. And I'm going to tell you there's going to be two versions of Claim 1, one in the original and one in the re-exam. But they're both the same so either one works.

MR. O'DELL: Is that correct? Maybe someone could verify that.

Yes, that's correct. Okay.

BY MR. O'DELL:

Q. Do you have it? 01:22

A. I am looking at paragraph 6 -- or column 6 with the claims, uh-huh.

Q. What in Claim 1 is describing vertical lift?

A. In general I would say it's the linkages, that you've got -- you've got the mainframe with the linkage. And there's some discussion of the linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm so -- and then the actuator as well that's pivotally attached to the mainframe and also to the loader arm.

So that's the beginnings of the description of a -- of a linkage that would lead to a vertical lift mechanism. 01:23

Q. I believe you said earlier that skid steers have vertical lift. Did they have this type of linkage that's being described here?

MR. VANDER TUIG: Full size skid steer? Did you say full size? 01:23

MR. O'DELL: Yes.

BY MR. O'DELL:

Q. Skid steers in general.

A. The ones that I remember, they did have linkages, some down lower on the mainframe. 01:23 **And then the ones that I'm recalling that were full size had another link that was higher up on the -- either on the frame structure or on, you know, a part of the ROPs that was reinforced to carry some of the load.** 01:24

Q. Did any of them have both pivot points on the mainframe?

A. On the lower part of the mainframe?

Q. Uh-huh.

A. I don't specifically recall one from, 01:24 **you know, many years ago that had them down low.**

Q. Or a regular skid steer, you don't?

A. I don't recall one.

Q. What do you think is the point of novelty of Claim 1? 01:24

MR. VANDER TUIG: Object to form.

THE WITNESS: From a general standpoint, I would say that for a mini skid steer, putting the -- the pivot points down lower on the mainframe was the -- the novelty. As opposed to being up higher, particularly when you have like the -- the rotary lift mechanisms, the radial lift mechanisms are going to lower your -- your rotation points and having what is going to be a four-bar linkage for lifting the loader arms. That is where the novelty came in for this particular patent. 01:25 01:25

BY MR. O'DELL:

Q. In the Toro matter, I believe the prior art used by Toro showed a regular skid steer with linkages pivotally connected to the mainframe. And I believe you discussed the re-exam where that was discussed and said that -- in your declaration that the inventive -- invention was applying that to a mini skid steer; is that correct? 01:26 01:26

A. I would want to see where I said that, if you recall.

Q. Okay. I summarized it but -- if I 01:26

can direct you to paragraphs 58 through 61 of your declaration.

(Witness reviewing document.)

BY MR. O'DELL:

Q. What was the argument made by Vermeer that allowed it to be successful in the re-exam discussed in those paragraphs? And is it the same argument that you're making now with regard to secondary considerations? 01:28

A. Well, if you look at paragraph 60, it talks -- I talk there about the evidence from Vermeer citing that Toro said it spent significant time and money to maximize lift capacity of an existing radial lift compact utility loader. So I guess that's the -- the argument from Vermeer that I cited. 01:29

Q. Is it important that this is referring to a compact utility loader instead of a regular utility loader? 01:29

A. For what? 01:30

Q. For this argument to succeed.

A. I mean, ultimately that's what this patent and what that examination was about, was a utility -- or a compact utility loader. So that's what I was looking for, was arguments 01:30

about the compact utility loader and -- but you know, there's also some discussion of full-size skid steers and what they had.

Q. To be clear, you've never designed a compact utility loader? 01:30

A. I've not designed a compact, no. The ones I worked on were full-size skid steers.

Q. So you have not personally experienced the difficulties -- the alleged difficulties described in this paragraph -- 01:30 these paragraphs of your declaration?

A. Not from the standpoint of designing a compact utility loader.

MR. O'DELL: One more item and we're going to have to give this a new exhibit 01:31 **number. And for now we can say Exhibit A, I guess.**

(Deposition Exhibit A was marked for identification.)

BY MR. O'DELL: 01:32

Q. Is this a declaration that you prepared, Dr. Fleming?

A. Appears to be, yes.

Q. On page 77 of the declaration, is that your signature? 01:32

A. Yes, it is.

Q. And at paragraph 130 you declare "all statements to be true, made herein in my own knowledge are true, and all statements made on information and believed to be true" and so forth in that paragraph; is that true? 01:32

A. Yes.

Q. On paragraph 99 of this paper you say that "changes needed to increase the pin height of the CTX50" -- which is a mini skid steer -- 01:33
"were routine design changes well within the capability of those of ordinary skill of the art applying known techniques based on design and market incentives as of the effective filing date of the '843 patent," which was 2015. 01:33

Is that what that says?

A. Yes.

Q. You can explain that?

A. Yes. From my memory of this project, what we did was we were looking at what it would take to increase the pin height up there by the bucket close to that -- I'm looking at page 59 -- close to where that F is. We were looking at what it would take to increase the pin height. 01:33

And what we found was there was some 01:34

real estate there that the actuator -- and we've got them listed there, A through F -- the actuator could be changed by 6 inches, moved up -- or sorry, the bottom pivot of the -- of the actuator and the rear length pivot were moved up 2.4 inches. So you know, finger -- a couple of fingers apart.

And then we've got some other changes there that -- you know, shortening -- shortening a link, increasing the -- one other link a little bit. So those -- those are laid out there, A through F, where the -- in order to achieve that -- that lift height, we were looking at what would it take to increase that in order to be able to dump into larger dumpsters, is my recollection on this.

And so that was what we found, is that you could make those changes there in order to achieve some additional lift height to dump into a larger dumpster.

Q. So were you willing to make changes to this reference in this case?

A. I was looking at what it would take to achieve more lift height for the bucket.

Q. What motivated you to change the lift

height?

A. We were looking at the size of different dumpsters and the height of different dumpsters. And I don't remember now the precise heights. They should all be laid out within the report. But our motivation was to be able to dump into larger construction dumpsters, we would increase the lift height a little bit.

Q. Was that a response to customer demand? 01:36

A. I don't remember if it was necessarily customer demand. It's been a few years since I did that. So I don't remember all the details of -- of what was motivating it. But I remember the -- we were looking at the increased lift height for the larger dumpsters. 01:36

MR. O'DELL: I may be done but I'd like to go over our list to make sure I've covered every document. So if I could take a short break and it will -- I won't leave. If we can come back in ten minutes. And then I may have one or two questions or we may be done. But we'll see. 01:37

(Whereupon, a recess was taken from 1:37 p.m. to 1:49 p.m.) 01:49

MR. O'DELL: I am done and we can close the cross-examination.

MR. VANDER TUIG: I have no questions for the witness and we'll read and sign.

(Whereupon, the deposition of Mark Fleming, Ph.D., P.E., was concluded at 1:49 p.m.)

CERTIFICATE OF REPORTER

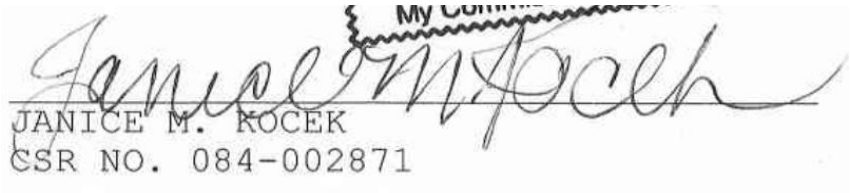
I, Janice M. Kocek, Certified Shorthand Reporter, Certified LiveNote Reporter, and Notary Public in and for the State of Illinois, County of Cook, the officer before whom the proceedings were taken, do hereby certify that the foregoing transcript is a true and correct record of these proceedings; that said proceedings were taken in Stenotype notes by me on the 14th day of November, 2025, at the Law Offices of Armstrong Teasdale, 100 North Riverside Plaza, Suite 1500, Chicago, Illinois 60606, commencing at 9:07 a.m. CST and ending at 1:49 p.m. CST.

I further certify that present on behalf of Petitioner Kubota North America Corporation were David O'Dell and Kelly Gehrke Lynch of Haynes and Boone, and present on behalf of Patent Owner Vermeer Manufacturing Company was Marc Vander Tuig of the Law Firm of Armstrong Teasdale

I further certify that I am not related to, nor associated with any of the parties or their attorneys, nor do I have any disqualifying interest, personal or financial in

the actions within.

Dated this 17th day of November, 2025, at LaGrange Park, Illinois.



JANICE M. KOCEK
CSR NO. 084-002871

A
a.m 1:22 2:8 29:16,16 65:5,5 133:14
Abaqus 85:12
able 29:1 64:16 73:16 75:7,14,22 82:16 88:25 93:5 94:17 95:1,11,14 130:15 131:6
absence 13:21
absolute 96:13
absolutely 42:14
absorb 23:1,2
accelerating 77:25 78:20
acceleration/ 78:17
acceptable 80:16
accident 6:6
accommodate 36:24 46:23 59:15,18 80:5 87:13 94:13
accommoda... 38:12 88:24
accommoda... 37:8
accomplish 44:24
account 82:15
achieve 56:8 56:21 130:13 130:19,24
achieving 102:4
acronym 19:1
actions 134:1
actual 70:16 76:3 77:1
actuator 36:14 55:3,5,9,19 56:1,8,13 57:10 58:11 58:15,24 70:1,5 124:21 130:1 130:3,5
actuators 36:10
additional 130:19
addressed 22:3,7
addressing 71:13
adjunct 13:7 13:10
adjust 102:2
adjustment 57:16
adjustments 96:21
advanced 13:13
advantage 79:11 80:13
advantageous 103:7,11,25
advantages 107:16,18,21
affect 76:16 77:24 79:1 82:9
aftermarket 50:4
AFTERNOON 113:1
ago 13:19 20:4 20:4 27:6 125:21
agree 38:11 57:19
agriculture 6:17
ahead 116:14
air 100:6 109:16 122:9
air-inflated 108:25
align 85:15
aligned 43:13 43:14,18 52:15
alignment 43:21
alleged 6:6 123:18 128:9
allow 35:12 74:23 89:18
allowed 127:6
allows 17:14 17:17 56:1
alter 17:15 121:2
alternative 117:25 118:1 118:4,6 122:2
alternatives 95:3 102:19 119:10
amateur 115:11,13
America 1:4 133:17
amount 108:16
analysis 8:8 10:22 13:15 14:6,8,11 15:6 17:2,10 17:14,24 18:2,23 19:2 20:19 21:5,8 21:10 22:15 25:13 27:19 36:21 42:3 95:15 101:14
analyze 15:11 21:11 95:11
analyzed 6:3 10:4
analyzing 15:4 22:20 23:4
and/or 53:7
angles 33:7 83:19
animation 119:14
annotated 121:24 122:3
answer 7:7,11 7:14,18 33:24 37:10 56:10 73:16 95:17 114:1
answered 93:17
answering 7:13,14 19:3
anymore 27:14
anyway 99:7 99:18
apart 130:7
apologize 95:16
APPEAL 1:2
appear 73:6,8 73:9 109:1 114:3
appearing 6:23
appears 65:24 69:16 70:18 70:20 109:21 109:23 128:23
application 35:23 107:20
applications 41:20,23 50:6 54:3
applied 100:8
applying 126:21 129:13
appropriate 59:7
area 49:3 77:23
areas 122:12
argument 127:5,8,16 127:21
arguments 127:25
arm 50:12 54:17,20 55:2 61:3,5 63:21 66:4,5 66:7,7,13 67:20,21 68:9,12,14 68:24 69:11 69:14 88:11 105:2,4 120:4,14,19 120:20,22 121:3 122:20 122:22 124:20,22
arms 22:14 54:12 55:6 61:15 66:2,3 66:8,8,11 69:9,22 76:24,24 79:5,7 82:4,5 82:7 88:14 96:8 102:22 105:12 122:11,14,16 126:12

Armstrong 2:6 3:14 8:19 9:6 133:12,21
arrange 55:9 55:18
arrows 85:3
art 6:19 11:4 32:13 34:9 39:2,20 54:6 55:9,18 56:7 56:12 57:3,8 59:5 90:6 93:8,14 95:4 126:16 129:12
asking 95:18 110:4,5 123:16
aspect 28:6
aspects 64:12 67:15
assembly 44:22,22 106:25 107:1
assess 17:20 95:2
assigns 85:1
assist 46:18
assistance 16:22
associated 40:2 47:1 133:23
assume 7:19 47:5 77:11
assumptions 34:14
attach 52:5 67:21 105:7
attached 69:1 69:18 100:18 114:7,17 124:18,20,21
attaches 61:2 61:4 67:23 68:6 105:12
attaching 117:11
attachment 47:25 48:1 49:21,23 50:7,9,12,14 65:20 117:3
attachments 23:6,6 48:4,5 48:10,11,15 48:17,21 49:6,18,20 49:24 50:2
attempt 97:4
attention 77:15
attorneys 8:20 73:4 133:24
automatically 84:19,21
automotive 6:2
available 46:20
aware 9:24 30:24 31:2,4
axes 66:22
axis 43:22 45:13,15,17 45:25 46:3,7 47:7,8 52:16

B

B 4:6
B1 4:14
bachelor 16:5
back 8:7 10:21 18:8,17 19:2 20:10 26:15 27:3,14 40:19 47:20 51:3 52:19 52:22 53:16 57:25 58:8 63:20 74:7 74:11,13,15 74:22 79:9 81:12 83:21 92:18,20 102:23 104:24 111:12 113:7 119:8 120:9 122:11,16 131:21
background 13:2
backhoe 65:19 79:24
backward 122:9
bag 29:14
Bares 83:4,5 85:7,16 86:6 96:14,19,25 97:8,18 98:3 98:11,16,20 106:24 107:9 109:18 110:7
bars 54:13,15
based 32:13 32:25 46:19 83:8,22 110:8 113:19 129:13
basic 53:24
bearing 68:10
beginning 10:21
beginnings 124:23
begins 72:11
behalf 6:24 8:4 8:11 133:16 133:19
believe 8:12 8:15 24:17 27:10 34:20 37:4,7 45:8 58:4 61:8 62:5 93:9,15 93:17 104:5 114:13 123:12 125:1 126:15,18
believed 129:5
benchmarking 123:6
benefit 42:2 61:9,25 62:17 63:4 66:12 77:18
benefits 60:18 61:6
bet 71:20
better 117:9
beyond 23:6
big 15:5 46:21 76:15 94:12 98:25 99:1
biggest 11:21
bit 40:1 56:17 83:21 99:25 104:25 109:7 130:11 131:8
blanket 118:16 118:25
blue 99:8,21 100:8
bluish 99:1
board 1:2 10:17
bodily 97:17 98:11,13 110:21
body 105:9 113:12,14 114:2,7,11 114:17 115:24 116:2 116:17 120:5
bogie 106:4,11 108:23 114:15,15
bolt 52:9
bolted 51:16
Boone 3:4 133:19
bottom 45:23 47:4,6 72:1 90:10,18 98:24 99:5 122:19 130:4
bought 18:18
Boulevard 3:15
boundary 14:16
bracket 51:25 52:4,8
brackets 52:17 53:7,12
bread-and-b... 26:14
break 7:24 14:17 29:10 29:12 65:2 111:15,15,17 111:19,21 131:20
breaking 14:12,13
breaks 7:25
bring 20:24 29:7
bringing 117:23
broad 54:7
broad-brush 17:7
brought 49:12
brown/tan 86:15
brownish/gray

87:15
bucket 50:11 79:1,3,4 105:25 119:20 120:20 122:7 122:8 129:22 130:24
buckets 23:4,4 23:7
build 14:18 33:2 34:8
building 6:20 28:3 30:8 91:12 105:5
buildings 88:5
bunch 26:17

C

C 3:1
cab 24:20,25 65:25
CAD 24:12,13 26:25 27:1,8 27:12,13 28:1 31:15 31:16,19,23 76:7 83:7 84:4,13,20 84:23 85:9 94:18,21 96:24 101:9
calculate 74:2 74:4,23,25 75:7,10,22 76:25
calculated 76:10
calculating 76:3
calculation 14:19 23:25 24:7
calculations 14:10,12 17:1 18:4 20:21 21:3 57:11
call 11:3 16:24 21:4 28:8 38:3 66:2,3 68:1 70:3,8 81:18 99:18 105:9 114:13
called 5:3 18:17 19:10 27:5 38:21 85:12 99:17 106:16
calling 11:11 123:23
callout 67:24
calls 9:7 45:12 68:3
cam 43:14 114:20
cap 63:1
capabilities 93:7
capability 93:13 129:12
capacity 127:14
car 43:16
carriage 100:13,17 110:8
carrier 11:25
carriers 19:22
carry 125:15
cars 30:3
case 6:19 19:10 20:16 22:4 26:5 27:4,22 38:19,24 43:9 53:17 58:1 60:12 61:21 62:3,7 63:25 78:23 80:14 82:13 101:6 102:5 130:22
Case/CNH 20:11
cases 15:15
category 115:12
Caulfield 18:17
cause 55:6
causes 12:22
center 25:3 45:7 47:15 61:16,18 62:18 63:14 63:19,22 64:2,8 74:2,8 74:14,16,23 75:6,9,24 76:3,7,16,23 77:6,16,22 77:24 78:4 78:12,18 79:2,5,8 90:17,20 91:4 109:22 120:24 121:2
centrifugal 78:9
certain 44:13 87:22,23
certainly 37:20 47:21
CERTIFICATE 133:1
Certified 2:3,4 133:4,5
certify 133:8 133:16,22
chain 40:12
chains 40:8,19
challenges 39:18,18
chance 113:23
change 15:18 17:15 23:13 23:15 39:25 43:2 49:18 58:12 60:14 60:15,15 88:12 130:25
changed 18:19 19:12 23:16 130:3
changes 17:22 17:24 23:9 23:17 27:24 36:24 39:6 39:22 40:2 60:9,16 89:21 129:9 129:11 130:8 130:18,21
changing 15:8 88:9 89:9 120:22
characteristic 15:19 17:15
characteristi... 47:16
cheaper 41:19 41:21 107:25
checking 46:18
Chicago 2:7 133:14
chief 13:8
choose 36:2
circle 70:2,4 70:13 98:25 99:1
circles 99:12 99:12
cited 127:16
citing 127:12
claim 9:18 124:1,3,13 125:25
claims 9:25 10:4 124:12
clarification 55:23 92:3
clarify 97:6
class 13:14,15 13:20 14:4 15:21
classes 13:12 13:18
clear 108:20 128:4
clip 72:12
close 42:10,10 42:15 129:22 129:23 132:2
CLR 1:24 134:8
CNH 19:12 27:4,15
code 26:8,9
codes 26:11
coffee-cup 90:2
collaborated 20:19
collaborative 23:19 24:2 28:4
college 13:23 14:3
color 86:15
colored 84:17 84:19 99:13
colors 84:20 85:1 99:6
column 37:22 38:2,3 45:11 47:22,24 68:2,21 124:12

97:13 105:18 114:14,22,24 115:7
combinations 95:4
combine 86:5
combined 107:1
combustion 86:21
come 6:10 36:5 43:3,8 44:3,9 54:2 74:13 75:4 81:17 96:9 110:16 119:6 121:25 131:21
comes 38:6 42:25 67:10 103:19
coming 35:22 93:22 108:6 120:15
commencing 2:8 133:14
common 46:1 46:6,10 47:8 50:9,11,14 52:3,17
commonplace 48:16
compact 11:13 11:16,24 32:23 33:3,6 33:23 34:8 34:13 39:3,7 43:12 65:22 73:7,10,13 81:7,18 103:21 104:17 127:14,18,24 128:1,5,6,13
compaction 103:23
companies 16:17
company 1:7 4:10,11 16:16 18:18 19:9 50:5 72:4 133:20
compared 96:8
comparing 20:21 96:4
compartment 122:17
competitive 21:1
competitor 123:6
complete 7:15 32:19 33:2,6 33:11,18 94:17,17,21
completely 7:12 33:23 89:3 93:22 94:2 113:17 116:21,22
complex 60:15
component 22:11 23:9 23:10 33:9 35:5 44:17 63:23 75:19 105:22
componentry 76:14,21
components 21:21 22:2 22:16 34:18 44:15,16 46:20 60:3,4 66:25 75:2 75:21 93:24 105:23
compresses 108:12
compressibi... 109:8
compression 108:20
computer 14:8 37:24
concept 96:6
concerned 88:10
concluded 132:7
conditions 14:16
configuration 66:6 96:22 122:5,25
configured 105:15
confused 56:18
conjunction 119:16
connected 38:22 42:17 54:13,15,16 54:21 105:12 126:17
connecting 54:15 115:23 117:14
connection 40:13 114:9
connections 22:14
consider 31:24 37:20 38:25 59:13 77:10 110:12
consideratio... 123:10,19 127:9
considered 33:25
considering 34:4,8
consistent 91:6 99:6
constantly 88:6 91:13
construction 6:18 29:22 30:9 48:12 48:12 64:4 78:16 81:25 103:18 131:7
consulting 16:16,16,24 18:20
contact 32:13 119:25
container 87:14,19 89:18
containers 87:16
context 54:11
controls 22:20 48:14
convert 93:6
Converting 93:11
Cook 133:7
copy 28:8 123:22
core 22:10
corners 74:12 74:16,21
Corporation 1:4 133:17
correct 6:24 7:3 8:25 11:14 12:17 13:4 16:7,12 16:13 25:16 37:5,9 44:17 53:4 55:25 56:5,20 58:12 70:4 76:5 86:2 94:23 97:16 104:4,12 106:7 107:5 119:3 124:6 124:8 126:22 133:9
correctly 58:21
correspondi... 40:13
cost 42:2
costs 108:2
counsel 119:12
counterbala... 80:19
County 133:6
couple 13:19 40:4 130:6
coupled 51:22
course 20:2 76:10 95:21
covered 131:19
cowboy 117:10
create 118:19
created 119:11 119:12
critical 86:20 104:23 105:22,24 106:1
cross-exami... 132:2
CSR 1:24 134:8
CST 1:22 2:9 133:15,15
CTX50 129:10

73:19
customer 123:13,16 131:9,12
customers 93:2
cutaways 33:8
cutting 50:20
cylinder 59:8 69:18 70:9,9 114:19
cylinders 36:7
cylindrical 87:5

D

D 4:1
D1 47:3,4,12
D5 45:19,23 46:11,15
Dallas 3:6
data 13:24 27:13,21 77:15
date 25:17,21 129:15
Dated 134:2
David 3:8 133:18
david.odell... 3:9
day 2:9 8:1 18:10 133:11 134:2
de-accelerat... 78:1
deal 81:5 82:2
dealer 20:24
dealers 20:24
dealt 21:23
debris 29:24
decelerating 78:21
deceleration 78:18
decide 44:10
decisions 10:17
declaration 4:9,17 12:2 71:21 72:8 73:2,21 81:23 82:19 82:23 102:24 106:3,23 111:13 113:8 119:2 126:20 127:2 128:11 128:21,24
declarations 70:25 71:10
declare 129:2
deconstructi... 105:5
dedicated 103:8,12,23
defective 115:19,20
definitely 92:20
definition 81:8
deforms 14:21
degree 16:5
demand 131:10,12
demands 123:6,13
demolishing 29:23 30:8
density 76:19
depending 52:7 60:7 79:6
depends 18:5 23:11 48:22 52:11,24 76:10
deposition 1:19 2:1 5:15 5:15,17,20 6:5 10:20 30:10 65:8 71:3 128:18 132:5
depositions 5:16,21
describe 65:18 98:10 101:11 103:12
described 60:21 61:25 62:18 76:2 103:22 115:23 125:3 128:10
describing 40:15 43:11 124:13
description 4:7 32:6 35:14 38:15 65:16 124:24
descriptions 10:5
design 14:10 14:25 15:8,9 15:10 17:10 17:19,22,23 17:25 18:1,6 18:22,24 19:4,5 20:10 20:15 21:14 22:8 23:19 23:20,22 24:2,8,15,18 26:3 27:6,24 28:5 33:23 34:22 35:12 36:1,2,5,12 36:15,23 37:2 39:1,18 44:18,20 56:7,19,24 56:25 57:4,9 58:2,19,24 58:25 59:1,1 59:14,24 63:9 64:22 64:24 67:15 75:25 76:6 76:11,17,18 76:25 77:7 82:11 89:3 97:3,7 102:5 102:6 109:3 110:16 113:21 116:12,18,22 117:1 118:6 120:15,22,24 121:6,9,12 121:15 129:11,13
designed 54:1 76:22 110:10 128:4,6
designer 44:14 77:2
designers 35:21
designing 19:13 24:5 34:12 35:19 44:11 46:20 46:22 63:23 77:11 78:23 94:1 101:23 128:12
designs 123:4
desirable 53:6
destroy 117:2
destroying 118:7
detachable 104:11,14,15 105:1,1,21 113:13 114:8 114:9 115:17 117:5
detail 34:18 83:10,21
detailed 14:12 14:19 33:8 35:6
details 10:5 131:14
determine 23:23 75:5
determining 123:5
developing 17:12 34:22
development 24:16,18
device 79:24 86:22 92:17
diagram 101:2 101:4,5,8,9 101:11,20,23
diesel 51:10 51:12 88:17
difference 12:8 85:6
differences 9:24 10:1,3 44:23
different 15:12 15:15 19:18 44:4,9,21 52:1,2 56:16 56:16 64:17 64:20 66:25 83:13 85:23 87:9,16,19 89:4,6,24 91:21,24 93:22 94:2 109:4 116:18 116:21,22 131:3,3

differential 12:21
differently 100:1
difficulties 128:9,10
dig 49:7
digging 49:5
digits 28:24
dimension 77:17 96:13 96:14
direct 127:1
directed 123:19
direction 23:17 84:10 84:11
directly 52:9 53:12 54:21
disadvantag... 107:19
disagreeing 69:25
disappears 70:10
disconnect 41:16
discuss 13:1 24:10
discussed 11:6 106:2 107:2,3,6 126:18,19 127:7
discussion 71:14 107:3 124:18 128:2
disqualifying 133:25
distance 45:23 47:4,9,12
distortion 118:14,20
distributed 75:5
document 35:1 45:10 67:22 69:15 70:24 71:8 72:11 104:7 127:3 131:19
documents 10:11,25 11:5,7 37:18 73:24 103:4
doing 8:7 14:10,11,25 16:9 18:9,13 18:20,24 19:3 20:16 21:13 24:6 24:11,18 25:12 26:17 26:19 27:18 27:25 31:13 48:7,23 58:10 80:22 82:16 86:8 96:3,12 102:18 115:2 117:23 118:22 119:14
downward 68:11 99:24 100:4,7,10
Dr 5:12 11:2 88:23 95:5 97:14 102:18 119:9 122:1 123:3 128:22
draw 95:2
drawing 31:15 31:20,23,24 32:4,5,14,15 32:16,19,21 33:1,13,22 35:6 84:4,24 97:17,18 110:13,22 113:10,10
drawings 24:13 33:8,9 34:1,5,9,25 36:18 42:7 42:13 82:21 83:22 94:21 95:22 97:12 119:2
drawn 31:17 31:23,25 32:1 70:15 94:15,16,25 95:9,12,19 114:16
draws 114:17
drew 98:2
drive 22:12,14 34:17,18 38:4,5,6,7,8 38:9,20,22 38:23,24 39:25 40:1,5 40:7,8,9,11 40:18,20,20 40:21,22 41:6,15,17 41:18 42:16 42:17,19,23 43:4,8,9,10 43:16 44:3,6 44:8,12,15 44:21 45:18 46:21 48:17 49:19 51:19 54:3 60:4 85:22,25 87:4,4,7 93:23
driven 86:22
drives 42:20 42:20 93:25
driveway 48:17 49:16
driving 30:5,5 42:3 43:17 47:17,19
drove 41:11
duly 5:4 113:3
dump 130:15 130:19 131:7
dumpster 130:20
dumpsters 130:16 131:3 131:4,7,16
durable 107:24

E

E 3:1,1 4:1,6
earlier 11:11 52:14 55:25 62:3 103:22 120:23 125:1
early 20:14 25:15 58:8 60:11 61:20 62:4,12 76:12 78:23 107:2
eat 111:25
edge 70:10,20 70:23 108:18
effect 15:11,14 15:15 17:20
effective 129:14
either 12:14 23:24 37:15 49:1 59:21 60:14 69:3,4 74:19 88:15 97:9 108:6 124:5 125:13
electric 41:3
element 13:14 13:20 14:3,6 14:8,11 15:6 17:1,2,9,14 17:24 18:2 18:23 19:2 27:18 28:3 36:21 47:21 66:1 70:2
elevate 87:2,6
elevated 39:25 85:24 87:3,3
eliminate 59:19,25 116:19 118:17
elongated 100:14
else's 77:3
embodiment 38:15
emergency 117:13
employed 13:3
encompass 6:17
encourage 47:21
ended 98:19
endpoints 101:15
ends 12:23 50:12
engage 106:4 106:11 108:22
engaging 47:18 120:5
engine 34:19 34:24 35:4,6 35:13,20,21 35:21,22 42:18 43:1,3

43:7,16,18 43:21 44:5 44:15 45:1 51:17,18,23 51:24,25 52:3,6,12 53:1,3,10,14 53:21 54:2 60:4 69:4 76:13,20 80:21 86:21 87:11 93:23 94:9 98:8
engineer 33:13 36:1 36:12,23 42:12
engineer/de... 64:16
engineering 13:9 14:3,9 16:15,15,21 17:8,10 18:16,18,20 24:14 27:7 33:10,17 35:12,18 36:14 39:1 48:7,8,24 53:24 57:16 58:19 59:14 97:3 122:3
engineers 84:4,6
engines 43:12 51:6,8,10,11 51:12,14 52:15,17
ensure 46:24
entire 37:21 47:22 72:18 72:24
entirely 113:19
environment 48:25 53:2 78:16 81:3
environmental 88:16
environments 64:5
equipment 6:4 6:7,9,15,18 11:12 17:11 17:13 19:6 19:13,16,20 29:19,20,25 30:3 51:6,11 51:13 58:6 64:4,11 65:12,13 82:1,1 101:24
especially 80:17
ESQ 3:8,10,18
essentially 75:3 78:9
estate 130:1
evaluate 15:14 17:17 64:2 95:3
evaluated 120:21
evaluation 17:3,6 23:24 96:3
eventually 26:5
evidence 123:7,18 127:11
Ex 72:5
exact 25:17,19 25:21 98:15 98:16
exactly 29:2 32:1 62:24 76:13
examination 4:4 5:6 113:5 127:23
examined 5:4 113:3
example 39:23 103:17 106:5
exerting 100:4
exhibit 4:7,8 4:13,16,22 28:9,13,14 28:17,20,25 30:10,14 65:6,7,8 71:2 71:3,17 79:19,21 82:6 99:24 128:15,16,18
exist 66:10
existing 127:14
expect 46:9,13 47:11
expectation 86:7
expected 89:9
expense 107:23
experience 13:2 25:6 27:2 51:4 86:19 109:4
experienced 128:9
expert 6:24 8:4
explain 24:3 28:18 71:6 79:13 81:24 86:9 129:18
extend 109:18
extending 120:20
extends 38:10 38:16
extensive 87:12 121:11 121:15
extent 44:13 108:13
external 86:24
extract 28:2
extreme 17:19

F

F 129:23 130:2 130:12
facility 48:9
fact 111:16
factor 81:24
factories 19:21
factors 77:9
FAE 22:7
failed 21:12
failing 115:24 116:4
fails 21:11
failure 6:6 13:14 17:16 21:4,8,9 36:22,23 117:8
fair 51:5
fairly 80:4
familiar 28:11 28:12 41:9
family 9:15
far 10:3,23 19:19 20:10 21:13,23 34:12,20 35:18 36:5,9 53:20 85:4 89:7
farther 120:20
FEA 18:25 19:1,4 20:16 20:18 21:2,4 22:7 23:8 24:11 46:17 46:23
feature 104:12 116:10,20 117:2 118:8 118:18
feel 22:22
fewer 66:21,22 66:22 67:5
field 21:23,24 49:2,5 118:22
figure 31:14 35:3,9 37:11 37:12,12,12 37:13,13,13 37:14,16 45:3,4,20 46:3,8 47:2,5 47:20 60:23 63:5 64:14 65:11,17 68:20 70:1 70:16 83:1 83:20 84:13 84:14,23 86:12 96:20 98:15,16,23 99:3,5,24 106:6,9,24 119:6 121:23 121:24
figures 36:11 38:12 82:25 83:9,23 94:14,24 95:9 119:4,9
filed 10:8
filing 129:14
filled 13:18
final 27:23 33:11 42:11
finalized 76:18

financial 133:25
find 67:25 121:16
fine 5:13 73:23
finger 130:6
fingers 130:7
finite 13:13,19 14:3,6,8,11 15:6 17:1,2,9 17:14,24 18:2,23 19:2 27:18 28:3 36:21
firm 8:19 133:21
first 5:3 13:19 16:2 25:6,11 30:24 31:1 57:15 60:24 71:6 75:17 79:5 83:3 86:11 96:4 97:5,21 117:22 124:19
fit 22:18 96:15 96:17 114:23
five 9:14,25 28:24
five- 65:2
five-minute 29:11
fix 123:3
fixed 54:22
fixing 117:9
fixture 104:12 104:14,16 105:10,11,17 105:22 113:13,22,25 114:6,10,14 115:6,23 116:2,16 121:21
flange 52:10
flanges 53:12
Fleming 1:20 2:1 4:3,9,17 5:2,10,12 71:22 88:23 113:2 128:22 132:6
flex 108:5
floor 47:18
fluid 86:20 89:10,22 90:15 91:22 91:25 94:4
follow 89:4 93:19 97:11 110:17 115:21
following 89:7 93:25 97:12 110:20,25
follows 5:5 113:4
footer 72:1
footprint 92:21
force 61:18 68:11 78:8,9 99:24 100:4 100:7,10 119:24
forces 68:14
fore-aft 63:16 121:4
foregoing 133:8
forgot 29:7
forklifts 19:21
form 32:24 33:15 34:2 35:16 36:16 36:25 39:4 41:24 43:19 55:13,21 56:9 57:6,18 58:22 59:17 61:22 62:20 64:18 67:13 91:18 97:19 103:14 104:18 110:14,23 111:7 117:15 120:7 122:23 126:1
Forsyth 3:15
forth 129:6
forward 9:21 21:16 23:23 24:10 29:18 61:2,3 120:21
found 23:21 24:7 97:15 102:17 119:17 122:6 129:25 130:17
four 37:14 40:22 42:4 74:12,15,21 99:12
four-bar 54:5,8 54:8,10,24 55:4,10,19 56:2,3,24 57:9,21 58:2 58:3,5,7,20 59:11,15 60:19 66:13 67:6 126:11
fracture 6:3
frame 16:10 18:9 19:24 25:19,22 38:5 52:6,10 52:11 53:8 53:13 58:9 59:6 60:11 60:11 62:9 125:13
front 30:19 37:11 40:9 40:14,19 41:17 52:19 52:22 63:20 65:20 74:7 74:11,12,14 74:22 79:8 92:18,20
front-rear 43:14,15
front-to-back 78:19
front-wheel 43:16
front/back 75:8
fuel 86:20 87:14,16,23 88:6,17,23 89:18,22 91:14
full 108:13 125:4,5,12
full-size 24:20 24:22 128:2 128:7
functioning 93:2
fundamental 53:19 63:23 78:24 81:4
further 23:23 24:3 35:14 113:4 133:16 133:22
furthermore 98:1
Fusion 13:9 16:12,15 17:8 18:16 18:19 27:7 84:7 122:3

G

gasoline 51:11 88:18
Gehrke 3:10 133:18
general 15:10 18:2 41:8 42:7,14,24 43:13 44:8 44:24 56:23 77:22 80:15 82:1,12 101:13 124:15 125:8 126:2
generally 25:5 27:14,23 29:21 36:11 60:16 100:1
generic 6:8,12 6:14
generically 9:17
geometric 54:11
geometry 14:13 15:13 52:7,11 76:13
getting 19:2 66:23 89:23 91:5,13 117:22 122:11
give 23:17 28:7,9 37:25 65:16 91:10 96:2 103:17 114:1 128:15
given 5:21 6:4 28:23 32:21

86:4
gives 83:21 96:5 109:7
glasses 29:8
go 7:1 9:21 16:11 18:8,8 24:7 25:9 29:10 30:9 40:3 48:15 50:2 51:3 60:23 69:6 72:10 75:3 77:4 88:6 102:23 105:2 110:10 113:7 116:14 117:21 119:24 131:18
goal 82:11 102:4
goes 6:15 19:20 20:10 34:20 38:23 69:21 99:20 100:12
going 10:2,21 22:22 28:9 29:8 32:9 38:4,7,8,9 40:9,19 41:13,17 44:9 45:16 47:13,14 51:22 55:5 61:18 63:17 68:13 69:1,2 69:4,5,6 70:19,22,25 71:7 72:9 74:10 76:14 76:15 79:5 79:14 82:17 86:13,16 87:1,2 88:13 90:3,4 91:1,5 91:13 92:8 92:15,17,21 94:8 101:4 105:17 109:22 111:24 113:7 113:9 116:6 117:22,24,25 118:18,24,25 119:7 122:7 122:9 124:2 124:2 126:9 126:10 128:15
good 5:8 7:11 10:7,7 66:20 107:14 111:14 113:23 115:14 118:5
grab 29:10,14
graduate 15:22,24
grass 81:2
gravity 47:15 61:17 62:19 63:14,19,22 64:3,8 74:3,8 74:17,24 75:6,9,24 76:3,7,16,23 77:6,16,23 77:24 78:5 78:13,18 79:2,6,8 90:17,20 91:5 120:25 121:2
gray-colored 100:14
grease 66:23
Great 5:14 6:22 12:25 12:25
greater 46:11 46:12,14 47:10
green 105:5
ground 7:1 47:6,9,18 69:4 100:9 100:19 108:7 119:20,25
group 20:20 21:8 24:6 35:21
guess 5:19 10:22 37:10 45:17 50:1 55:22 56:10 66:14 74:15 92:3 104:24 115:21 123:8 127:15 128:17
guides 106:4 106:11 108:23

H

H 4:6
hand 18:3 31:17
happen 40:3 122:4
Harwood 3:5
Haynes 3:4 133:19
hear 18:25 103:19
heavily 17:12
heavy 76:15 81:1
height 96:2 129:9,21,24 130:13,19,24 131:1,3,8,16
heights 131:5
held 2:5
help 16:18 40:17 47:23
high 13:22 15:3 63:18 68:6 78:12 81:8,9 82:8 98:18 100:24
high-level 56:11
higher 61:16 63:1 78:18 80:8,20 82:4 125:12 126:6
highway 29:24 29:24
highways 29:20 30:6
hold 60:22 114:25 116:6 116:8
holding 115:4 115:7 116:3
holds 104:16 114:24
hole 49:5,6
holes 109:6
Holland 19:11 26:21,21,23 58:4 62:5,9 62:23
hope 72:13
hopefully 63:14
horizontal 68:17,17
hour 2:8
hub 38:8,10,16 38:20,22,23 42:20
hydraulic 36:3 36:6,6,7 40:21 43:4 44:16 59:7 69:17 70:8,9 86:20 88:17 89:10,18,22 90:15 93:24 93:25 114:19
hydraulically 86:22
hydraulics 35:25 36:1,8

I

identification 30:11 65:9 71:4 128:19
identified 71:14
identify 9:19 36:12 71:8
idler 99:17,18 99:23 100:1 106:20,21 107:4 108:17
ignoring 119:25 121:18
Illinois 2:5,8 133:6,14 134:3
image 85:16 86:16 92:14 95:19 110:3
images 83:13
imagine 117:19
immediately 67:10
impacting 88:14
import 83:15 84:25
important 22:11 64:11

64:12 77:7 77:17 82:2 96:12 104:16 104:20,22 127:17
imported 83:16 84:12 84:22,24 85:8
impression 95:8
improved 81:23
inboard 108:18,22 109:14
incentives 129:14
inches 130:3,6
included 19:14
includes 47:25 106:25
including 10:25 12:11 21:2 82:12
incorporate 93:20 97:17 98:11,14
incorporated 110:21
increase 64:9 129:9,21,24 130:14 131:8
increased 131:16
increasing 130:10
indicated 32:3
indicates 70:14
Indirectly 68:25 69:12
industrial 16:24
inflation 109:11
information 32:18 33:2 33:22 34:7 58:16 75:20 77:1 129:5
input 24:9 27:13,21
inside 6:20 88:5 109:25 110:5
instance 13:24 14:22 15:1 15:20 16:18 22:9,21 32:9 39:24 40:22 43:5 51:1,17 52:7 78:8 79:16 80:25 88:4 89:22 90:1 100:6 102:7
institution 10:16
intend 91:11
intended 89:19 91:1,2 91:8,9
intending 91:12
Inter 4:19 71:23
interaction 21:25
interchange... 12:3
interest 133:25
interested 101:18
interfere 86:13 86:17 91:25 119:21
interfered 90:11
interference 56:23 59:16 59:24 60:1,7 86:23 93:21 94:4,6,7,8 98:7 102:16 102:21 119:25 121:17
interferes 59:12
interfering 87:7 120:1
internal 26:8,9 26:11 35:5 60:3 86:21
internals 86:25
interrupt 7:12
interrupted 7:5
invention 126:21
inventive 126:20
inventor 89:9
inventors 30:18,22
involve 60:1,2 60:3
involved 8:10 19:5 57:12 60:8
involves 14:9 14:12
inward 109:18
IPR 5:20 10:7 28:19,24 31:5 72:5
IPR2025-001... 1:9
IPR2025-001... 1:10
IPR2025-001... 1:10
IPR2025-001... 1:11
IPR2025-001... 1:11
IPR2025-003... 1:14
IPRs 8:11 9:15 28:21,21,22 71:11
issue 9:12 11:2 21:18 23:20 24:1,7 25:14 31:3,6 63:20 81:5 82:2 88:16 122:15
issued 10:17
issues 21:24 86:4,9
item 38:9 68:20 69:17 69:17 70:19 128:14

J

Janice 1:24 2:2 133:4 134:8
job 1:25 16:11 16:14 49:4 49:12 103:10 103:10,24
joints 66:23

K

keep 7:13,14 64:7 67:17 81:10
keeping 81:19
Kelly 3:10 133:18
kelly.lyle@h... 3:11
key 81:24
kind 6:6 10:5 12:2,15 16:17 17:6,7 17:19 18:5 21:22 26:14 30:3 32:10 35:8 38:20 40:8,18,20 40:21 41:3 42:24,25 43:4,5 45:7 49:3 50:20 51:16,22 53:11,13 54:21 58:4 61:13 63:11 63:16 68:18 81:4,5,8 83:19 86:14 86:15,19 87:5 89:21 92:4 99:6,22 100:14 102:1 102:6 109:5 109:21 114:19 117:3 117:8,10 118:22 119:17
kinematic 101:2,4,8,11 101:13,14,20 101:22 119:7 121:16
kinematics 59:1 101:3 102:18
know 6:18 7:25 9:14 10:25 14:14 14:21 19:22 20:1,3,8

21:19 22:10 22:13,21,21 23:5 25:24 26:9,11 27:1 27:16 28:10 30:9,21,23 31:16 32:1 32:18 33:5 33:13 34:14 35:20 36:24 38:6 41:21 42:2,12 43:7 43:9 46:16 48:8,13,14 48:22 51:17 51:20 52:9 53:11,14 54:7 55:9,18 56:7,13 57:9 58:14 60:2 63:20 65:15 65:21 66:25 67:4,17 69:3 71:9 75:4,18 75:21,24 76:6,13,20 77:2 78:9,14 79:4 80:17 80:19 81:2 83:18 87:21 87:22 88:3 88:13,15,20 89:5 90:1,2 90:23,24 91:3,11 95:13 96:11 99:21 100:3 101:1 102:2 102:3,9 107:14,21 109:13 110:6 111:4 113:16 114:8,16 117:4,20,24 118:8,20 120:11,17 121:1,7,18 125:14,21 128:2 130:6 130:9

knowledge 34:9 129:4

known 36:1 76:20 129:13

knows 57:4

Kocek 1:24 2:3 133:4 134:8

KR996 83:7,9 83:12,23 84:12 85:23 87:5,12 88:4 89:19 91:9 94:1,15,25 95:9 96:1,20 97:7,10,18 98:4,5,12,17 98:22 102:12 104:3,9,17 106:3,10 107:2 108:24 113:13 119:16 121:18

KR996-JP705 86:6

Kubota 1:4 72:5 133:17

Kubota's 119:12

L

label 28:14,16

LaGrange 134:3

laid 34:21 83:19 130:11 131:5

landscapers 25:25 26:1

landscaping 80:25

large 18:13 51:18

larger 26:18 99:20 108:15 130:15,20 131:7,16

late 20:13 62:12

Law 2:6 133:12,21

laying 76:12 103:21

layout 79:6 113:18 114:2

lead 124:24

learn 13:23

leave 13:20 131:20

leaving 81:1

left 82:8 119:5 119:18

length 56:19 58:11,14,20 85:19 87:23 98:22 101:12 101:16 122:20 130:5

lengths 54:25 55:1

let's 18:8,8 25:9,9 28:16 29:11 31:14 32:16 38:21 40:12 45:3 47:2,20 49:4 49:10 60:21 60:23 65:11 73:20 82:18 87:14 90:9 92:9 98:24 102:23 108:10 111:12,25 119:1,5

letter 45:4

level 15:22 16:2 47:6 64:8 69:4,4 80:17 81:20 98:18 100:24

liability 5:21 5:23 16:23

License 2:3 134:9

licenses 27:10

life 117:14,19 117:22

lift 54:4,18 55:1,11,20 56:4,22 58:5 60:19 61:15 62:4,6,7,10 66:2,5,7,8,11 66:12 67:6,8 67:9,12,18 67:20 68:9 68:12 69:18 70:8,9 72:17 72:20,22,23 72:25 73:9 73:13 76:21 79:15 80:3,4 102:6,11,21 123:20 124:14,25 125:2 126:8 126:8 127:13 127:14 130:13,19,24 130:25 131:8 131:16

lifted 54:12

lifting 58:10 80:22 102:22 115:3 126:11

light 17:24

lighter-weight 107:20

limit 81:8,9

line 26:21 34:17,18 37:22 38:3,3 38:5 42:23 43:18,22 44:16 45:12 45:18 46:21 47:23,24 51:19 60:4 72:19,24 73:18 93:24

lines 36:6

link 54:14 61:2 125:12 130:10,10

linkage 54:8 58:3,5 61:3,5 67:7 102:3 102:19 105:11 124:17,18,24 125:3 126:11

linkages 36:10 36:13 56:20 56:21,24 58:3,7 101:19 124:16 125:10 126:17

linked 55:11

links 54:16 101:6

lip 70:21

list 131:18

listed 30:18 130:2

literally 12:18

literature 31:9

litigation 5:18

5:19 16:19 31:5,12
little 40:1 56:17 83:21 93:3 99:15 99:16,25 104:25 109:7 130:11 131:8
LiveNote 2:4 133:5
LLP 3:4,14
load 15:2,15 17:18 23:2 67:4,21 68:15,16,17 68:18,19 69:5 100:19 125:15
loaded 14:21
loader 11:14 11:17 22:14 32:13,23 33:3,6,23 34:8,13 39:3 47:24 50:12 54:12,17,20 55:1,6 61:3,5 65:19,22 66:3,4,7,8 68:14,23 69:9,11,14 69:21 73:7 73:10 79:4,7 79:23,25 81:7,19 82:3 82:7 88:11 88:14 96:8 103:25 104:16,17,22 105:1,4,7,12 105:16,21,25 118:10 120:4 120:14,19,20 120:22 121:3 122:11,14,16 122:20,21 124:20,22 126:12 127:15,18,19 127:24 128:1 128:5,13
loaders 5:24 6:11 19:15 39:8 43:12 73:14
loads 14:16 17:19,20,21 22:23 46:25 63:16,17 80:6 105:17
located 24:24 49:20
locating 53:1
location 64:20 75:2 88:12 91:21,24
locations 36:10 64:17 120:9 121:20
long 29:12 88:1 90:4 91:1,8,8
longer 90:11 93:25 120:14 121:3
look 14:14 17:7 28:25 31:19 37:21 37:23 47:22 65:11 69:3 83:18 86:12 108:16 113:17 127:10
looked 22:15 23:5 79:16 83:14 101:25
looking 15:1,4 21:16,19 45:11 65:14 68:2 70:1 77:3 79:20 79:21 86:25 96:4,4,6,7,9 96:15 99:4 101:14,16 102:4,8 108:14 109:3 124:11 127:25 129:20,22,23 130:14,23 131:2,15
looks 45:12 110:9
lot 14:9 20:17 21:25 34:18 50:24 64:3 81:2 93:20 108:20 111:18 118:13
loud 73:22
Louis 3:16
low 15:3 63:4 63:9,10 125:21
lower 54:14 60:18 61:7 61:10,17,19 63:13,14,17 64:8 77:16 80:8,10 82:4 121:19,24 122:5 125:10 125:18 126:5 126:9
lowered 76:24
lowering 62:18 119:18 122:2
lunch 111:17 111:19
LYLE 3:10
Lynch 133:18

M

M 1:24 2:2 3:8 133:4 134:8
machine 15:5 22:10 25:4 36:3 47:15 52:16 59:13 59:23 63:15 76:4 79:15 80:3,4,16,18 80:20,20,22 81:1 82:3 86:6 88:1,24 89:4,24 90:2 90:4,17,21 91:6,9 92:22 93:2,22 94:2 94:12 96:1 96:17,20 98:12 103:8 103:12,12,23 104:25 105:8 105:13,19,22 113:13 116:19,22 120:6
machinery 81:6
machines 5:25 12:12 62:10 63:21 66:11
main 66:14 105:9 107:4 113:12,14 114:2,11,17
mainframe 22:9 38:17 45:24 46:2,7 46:24 51:14 51:21 52:12 52:18,19 53:1,15,23 54:13,16,22 54:25 55:7 61:2,4,7,12 62:14,17 63:10 68:22 68:23 69:2,6 69:14 70:12 70:17,20,23 79:12 80:10 80:11 87:10 100:18,20 105:8,13,19 121:22 124:17,19,22 125:10,17,18 126:5,18
maintain 92:4
maintained 96:25
maintaining 98:21 116:9
major 86:11
making 17:23 27:23 34:14 36:7,7 67:17 88:7 89:21 127:8
manipulate 55:10,10
manufactured 22:17
manufacturer 50:4
manufacture... 19:18
manufacturi... 1:7 4:10 33:18,24 72:2,4 133:20
mapped 95:18
Marc 3:18 133:20

Mark 1:20 2:1 4:3,9,17 5:2 5:10 71:21 113:2 132:6
marked 30:11 65:9 71:4 128:19
market 123:6 129:14
marketing 26:12
marketplace 123:17
mass 79:12 80:11
master 15:24 16:4
matched 95:20
material 14:15 15:13 17:3,6 32:10 111:10
materials 15:8 32:3,6,7
math 14:4,4
matter 5:20 8:17 9:1 11:10 31:3,5 31:7,9 47:12 71:11 118:7 126:15
matters 8:25
maximize 127:13
mean 6:14 16:5 21:9 23:19 42:11 44:13 51:9 57:20 59:22 60:16 66:17 68:10 77:21 89:15 91:19 95:24 98:13 100:22,22 104:19 105:23 118:12 127:22
means 30:3
measure 74:5 74:6,10,18 75:8,10 77:4
measuring 76:2
mechanism 40:12,13,21 54:4,5,9,10 54:18,24 55:4,10,19 56:2,3 57:10 57:22 58:5 58:20 59:11 59:15 60:19 66:13 67:6 67:18 76:22 87:7 102:7 102:17 110:8 114:18,20 115:22 116:3 117:9 119:19 124:25
mechanisms 36:3 126:8,9
meeting 12:4 23:22
meets 69:19 70:12
member 15:17 15:19 17:16 59:13
members 9:16 101:12,16
memory 129:19
mention 104:13
mentioned 11:11 26:25 29:19 52:14 62:3 104:3 104:11
merged 19:11 26:20
met 30:21
metallic 32:10
microscope 17:4
microscopes 17:5
microscopy 17:4
mid 25:3
middle 98:2 100:2
mind 5:9 67:10 103:20
Mine 30:15
mini 11:22 20:5 24:16 24:19 25:7 50:10,13,21 64:6 65:19 65:22 72:17 72:24 77:11 126:3,21 129:10
minimum 46:15,16
minus 85:3
minutes 111:22,23 131:21
Missouri 3:16
model 14:18 26:6 83:7 96:24
models 27:17 28:1,3 94:18
modification 97:4 110:13 120:3,10 123:14
modifications 97:7 118:22 121:2
modified 110:16
modify 15:12 15:13 59:14
modifying 15:8,11 118:6
money 127:13
morning 5:8
motion 15:4 59:2
motivated 86:5 90:6 130:25
motivating 131:14
motivation 123:14 131:6
motor 42:17 44:6,12,21
motorcycles 30:4
motors 41:4 42:17 44:3,8 44:16 87:4 93:24
mount 51:23 51:24 52:6 52:17
mounted 52:21 53:12 65:20
mounting 79:24
mounts 51:17 52:18 53:7
move 17:15 29:18 45:2 55:6 56:14 64:16,19,22 73:20 91:16 91:23 92:2 93:23,23,24 101:19,19 102:14,17 120:8
moved 92:8 130:3,5
movement 56:2 78:12 78:19 100:2 101:4,5,6 102:11,13,15 122:13,14
moves 14:20 14:20 102:2
moving 54:13 60:3 66:15 66:21 67:1,5 102:19
mower 50:16 50:18,19
mowing 50:20
mvandertuig... 3:19

N

N 3:1 4:1
name 5:9 12:18 18:19 19:12 26:4,6 26:12 27:1 45:8 61:9
near 49:13
necessarily 21:6,7 42:13 66:18 100:4 101:8,10,17 131:12
need 7:13,24 12:10 16:17 16:25,25 17:3 29:9,12 29:13 33:5 44:20 53:9 53:13,25 56:24 57:13

80:17,18 88:1 117:20
needed 21:22 22:6 50:7 75:15 121:3 129:9
needs 23:16
never 128:4
new 19:11 26:20,21,22 49:20 58:4 62:5,9,22 65:6 120:15 128:15
noise 103:18 107:22
non-linear 13:13,13
nonobvious... 123:7,11
nope 116:13 116:13
North 1:4 2:7 3:5 133:13 133:17
Northwestern 13:3,8 14:1 18:21 27:8
Notary 2:5 133:5
notes 133:11
novelty 125:25 126:6,12
November 1:21 2:9 133:12 134:2
number 9:20 28:9,24 45:19 70:15 72:10 79:19 81:16 83:5 128:16
numbered 72:9
numeral 70:16
NX 27:11

O

O'Dell 3:8 4:4 5:7 28:12 29:6,11,17 30:12 33:4 33:19 34:6 34:23 35:10 35:24 36:20 37:3,19 39:9 39:12,21 42:5 43:24 45:14 55:14 55:24 57:1 57:14,24 59:3,20 61:24 63:3 64:23 65:1,6 65:10 67:19 68:4 69:23 71:1,5 74:1 81:11,21 91:20 92:1,6 97:23 103:6 103:16 104:10,21 110:19 111:2 111:11,16,23 113:6 117:16 120:12 123:1 124:6,9 125:6,7 126:14 127:4 128:14,20 131:17 132:1 133:18
oath 7:2
object 32:24 33:15 34:2 35:16 36:16 36:25 39:4 41:24 43:19 55:13,21 56:9 57:6,18 58:22 59:17 61:22 62:20 64:18 67:13 97:19 103:14 104:18 110:14,23 111:7 117:15 120:7 122:23 126:1
objection 34:10 39:15 57:5 91:18
obtain 82:25
obviously 6:3 10:1 23:14 31:4 34:16 39:17 46:22 49:22 57:22 59:22
occasional 21:18 22:1
occupant 23:2
off-highway 6:3,7,9,15,21 11:12 17:11 17:13 19:6 19:13,16,20 29:19,20 30:2,9 82:1
offered 122:1
OFFICE 1:1
officer 13:9 133:7
Offices 2:6 133:12
okay 5:11,14 5:23 6:8,16 6:22,23 7:22 8:2,6,10,13 8:13,16,20 9:2,8,14,23 10:15,19 11:5,5,11,23 12:1,1,6,15 12:15,20,25 13:6,16 14:23 15:21 16:1,8,8,20 17:23 18:7,7 18:15 20:12 21:15,17 22:2,2 23:12 24:22,22 25:15,20,23 26:24,24 29:23 30:2,2 30:7,7,13,13 32:12 33:5 33:25 34:24 36:21 37:4 38:18 39:22 40:17 41:2 41:12,14 43:25 44:3 44:10 48:16 52:3 55:3 61:6 64:10 65:21 66:1 67:20 68:5 72:13,14 73:25 79:10 79:22 82:21 84:6,17 85:8 85:13,15 101:1 103:5 109:17 113:22,22 114:5,5 115:2,9,9 117:12,12 119:1,1 121:13,13 124:8 126:25
ones 11:24 24:19 41:7,9 43:21 62:6 62:11 99:15 99:16 122:19 125:9,11 128:7
open 72:15 124:1
opening 38:4 38:4,9,23
operate 88:1 90:3 91:12
operates 105:15
operating 78:14 88:5 92:22 105:21 105:24
operation 55:12,20 56:4 58:11 77:25 86:21 87:23 105:16 115:3
operational 47:16
operations 104:23
operator 24:23 24:25 25:2 96:5 122:11 122:16
operators 82:16 91:15
opinion 31:10 42:6,8 92:23 94:14 123:5 123:10
opposed 54:18 63:18 117:4 126:6
opposing 8:14
option 41:20 41:22 92:23 92:24
options 40:24

41:2
order 54:1 56:21 57:12 64:8 80:5 92:13 96:9 100:19 130:12,15,18
ordinary 39:1 55:8,17 56:6 57:3,8 59:5 129:12
original 124:3
originally 120:9
outboard 108:21 109:24 110:10
outer 110:11 110:11
output 54:2
outside 31:12 103:19
overall 102:4 120:18
overlaid 94:20 95:21 96:24
overlay 85:18 95:17,20 97:22
overlaying 84:13,13 98:20
overlays 83:24 84:2 95:11
overstate 62:23
owner 1:8 3:13 10:9,13,14 133:20
Owner's 4:18 71:23

P

P 3:1,1
P.E 1:20 2:2 4:3,9,17 5:2 71:22 113:2 132:6
p.m 112:2,2 131:25,25 132:7 133:15
P1 60:24,24 61:1,7 63:5 64:15
P3 60:24,25 61:3,7 63:5 64:15
package 52:25
packages 19:22
page 4:3,7 30:19 37:11 72:6,11 82:20,22 83:1,3 85:2 85:17 86:12 87:1 92:14 96:20 97:21 98:1,2 99:3,5 102:23,25 106:7 110:3 110:3 111:12 113:11 119:1 119:3 128:24 129:22
pages 72:15 82:18 83:20
paper 129:8
paragraph 72:9,10 73:2 73:20,21 79:10 81:22 86:3 102:24 102:25 103:2 104:2,6,13 106:6,14,23 113:8 124:11 127:10 128:10 129:2 129:6,8
paragraphs 72:8 82:19 82:23 127:1 127:7 128:11
parameters 15:12
Park 134:3
parking 50:24
parkway 48:18
part 9:20 17:10 17:25 18:1 28:4 37:2 51:19 54:20 58:23 65:13 69:19 70:17 72:1 76:11 77:7 81:9 82:22 84:15 104:17 110:11 115:6 119:7,16 120:23 121:18 125:14,18
Partes 4:19 71:23
participate 13:17
participating 20:23
particular 11:12 38:19 86:16 111:10 118:21 122:4 126:13
particularly 78:13 82:10 126:7
parties 114:6 133:24
parts 66:21 67:5 85:1 87:9 106:1
party 8:14
passing 87:9 87:10
patent 1:1,2,8 1:12,15,17 3:13 4:11,14 4:18,20,23 5:18,19 9:19 9:20 10:9,13 10:14 11:13 16:18 28:8 28:20,23 30:14,19,25 31:6,7,11,14 32:4 34:1 35:15 36:19 37:21 42:6 42:13 44:7 45:3 47:22 51:24 54:5 57:21 58:15 58:21 63:6 64:15 68:1 71:22,24 79:17,25 82:6 83:4,6,9 83:12,23 84:12,14 85:7 87:5 89:3,5,8,14 89:16 91:7 93:5,11,18 93:19 94:1 95:3,22 97:12 102:10 105:3 110:18 110:25 111:1 113:16 116:23 117:1 117:4 118:9 121:8 123:23 123:24,24 126:13 127:23 129:15 133:19
patent's 93:6
patents 9:11 9:15,17,21 9:25 10:2 11:2,3,4
path 23:23 24:10 69:6 88:10
paths 15:2
paying 77:15
people 9:5 16:17,24 21:23 27:24
percent 90:10 90:14,19
perform 55:19
performed 18:22 20:22
performing 104:22
performs 17:18
permanent 117:3
person 9:9 24:24 39:1 39:19 55:8 55:17 56:6 56:12 57:2,8 59:4 90:5 93:13
personal 133:25
personally 25:8,23 84:1 128:8
perspective 56:12
petition 4:19 10:8,13 11:8

71:23
Petitioner 1:5 133:17
PETITIONERS 3:3
PGR 8:12,13 10:7 25:14
PGR2025-00... 1:16
Ph.D 1:20 2:1 4:3,9,17 5:2 15:24 71:22 113:2 132:6
photo 73:5
photograph 110:3
pick 18:11 49:20
pickup 49:11
picture 65:12 73:1 75:18 84:18 94:20 98:23,24 106:24
pictures 37:5 37:8
piece 6:7 38:20 48:18 49:16 100:15 117:6
pieces 6:19 19:16 58:6 66:16 76:15 77:14 98:8 113:25 118:15
pin 120:8 129:9,21,24
pivot 36:9,13 54:22 60:19 60:20,21,23 61:1,4 62:1 62:13,22 63:5,8 64:15 64:17 68:12 69:13,20,21 70:14 80:8,8 82:4 101:7 101:19 102:9 102:10 121:20,24 122:2,5,18 122:20,21 125:16 126:4 130:4,5
pivotally 124:18,19,21 126:17
pivots 54:24 102:14
place 20:2 36:13 37:21 107:14 111:14 114:24 115:1 115:4 121:20
places 50:2
plate 47:25 48:1 105:18 114:14,22,24
plates 115:7
Plaza 2:7 133:13
please 72:10 81:12
Plus 80:24
pneumatic 108:13 109:1 109:9,11
point 12:7 19:10 26:10 27:18 32:17 36:22 54:23 61:1,4 68:12 69:20,21 70:14 76:17 80:8,9 125:24
pointing 80:1 106:8
points 36:9,13 55:1 60:19 60:20,21,24 61:10,19 62:1,13,22 63:5,8 64:15 64:17 69:13 71:15 82:4 101:7,19 102:9,10,14 102:20 121:24 122:2 122:5,19,20 122:21 125:17 126:4 126:10
poor 23:12
popular 66:9
portion 46:1,6 109:25 120:14
POSITA 36:23 44:10 58:19 64:16 75:7 75:22 86:4 93:5 121:1 122:18 123:14
position 55:18 56:7,13,20 82:8 88:23 108:16 115:8 122:21
positions 13:5 97:9 102:3
possibility 41:14 89:17
possible 64:25 87:18 91:16 92:25 93:1 107:7,11,13 109:17 115:22
possibly 31:8 31:21 92:19 121:11,15
potential 17:16 36:22 122:15
potentially 15:7,18 41:1 41:19,22,25 49:14,15,17 60:2 88:13 94:7,10
pounds 81:16
power 41:13 43:2,6 44:19 44:25
precise 131:4
preferred 91:14 92:23 92:24
preliminary 10:9,14
prepare 9:3 10:19
prepared 8:24 9:1 128:22
present 133:16,19
press 114:21
pressing 115:5
pressure 108:6 114:23
pretty 34:12,12 64:10 87:12 118:15 121:11
prevent 120:4
previous 31:3 31:3 79:16
previously 26:24 113:3
primarily 13:12 15:23 16:3 20:16 21:14 123:19 123:21
primary 9:9
principles 35:12 78:24
prior 6:19 11:4 95:4 126:16
Pro/E 27:4,15 27:19,22 28:2
Pro/Engineer 27:4
probably 11:21 19:19 32:10 39:7 39:25 46:19 51:16 64:25 108:11
problem 14:13 21:21
problematic 88:8
problems 22:3 22:5,6 102:16,21,21 118:19,21
proceed 34:22
proceedings 10:8 133:7 133:10,10
process 17:25 18:2,6 28:5 75:25 76:6 76:11,18 77:7 101:23 120:24
product 5:21 5:23 8:8 16:23 20:25 21:11 26:15 26:23 32:19 33:11,18

35:19 42:11 44:14 72:19 72:24 73:18 77:2,3
products 21:1 26:18
professionally 18:12 25:8 25:10,11
professor 13:7 13:20
professorship 13:10,11
programs 13:21
progression 119:17
project 35:19 129:19
projects 18:23 18:25 19:19 19:25 20:1 22:19 23:3 29:22 48:13
propel 80:21
proper 36:2
properly 22:18 102:22
properties 14:15
proportions 96:25
proposed 95:3 95:4 97:13
protect 23:2
protection 22:25
provide 16:21 35:13 65:7 68:8 70:25 73:1 123:13
provided 11:9 71:9
provides 56:4
proving-gro... 48:25
Public 2:5 133:6
pull 106:5,11
pulled 72:12
pumps 36:6
purpose 99:11 101:22 103:13
purposes 12:4
pushing 78:10
put 14:17 22:23 40:6 48:9 50:12 50:16 57:10 68:14 74:11 83:8 87:24 89:25 90:1 92:10 96:19 98:3 105:4 121:21 123:8
putting 90:25 91:4 118:13 122:16 126:4

Q

question 7:6 7:18,19,20 12:9 19:3 34:3 39:11 39:13 46:5 55:23 56:11 56:16,18 76:1 81:12 95:7 115:21 116:13,15
questions 71:12 111:18 111:19 131:22 132:3
quite 10:6 40:16 46:4 60:8

R

R 3:1 45:4,13
radial 54:18 61:15 62:7 63:21 66:4,4 66:7,8,11,12 67:6,8,18 72:17,21,22 72:23,25 73:9,13 79:15 80:4 126:8 127:14
raise 79:5 82:5 82:7 90:16 90:18
raised 76:24 90:9
raising 79:1,3 79:4,4 90:17 90:20 91:4
random 85:1
ratio 74:13
re-exam 124:4 126:19 127:6
re-exams 8:11
read 10:11,16 10:18 29:9 39:14 71:18 71:25 73:21 79:11 81:11 81:13 86:4 102:25 104:6 132:4
reading 29:8
real 108:9 130:1
really 48:22 52:11,24 92:10 113:8 113:10 115:10
rear 40:9,12 42:3 54:19 61:5,5 67:24 68:7 69:8 82:8 130:5
rear-wheel 41:6,15,18
rearrange 122:18
rearward 122:8
reason 53:6 62:16 115:18 116:4
reasonable 77:23 86:7
reasoning 28:19
recall 6:1 8:7 8:22 9:4,6 18:24 19:3 20:23 22:8 24:17 26:19 31:13 41:10 42:22 43:21 51:9,12 52:21 62:15 111:9 125:20 125:23 126:24
recalling 125:11
recess 29:15 65:4 112:1 131:24
recognize 29:1
recognized 114:6
recollection 8:18 52:20 130:16
recommend 23:9,13
recommended 23:15
reconfigurat... 23:10
record 5:9 28:15 39:14 71:25 81:13 133:9
red 99:8 100:8 120:13
reddish 98:25 99:22
redesign 21:22 87:12 94:10,12 97:10 110:16
reduced 79:12 80:12 107:22
reduction 90:14
refer 9:16,19 12:2,10 18:25 26:8 26:11 28:22 68:21 72:9 113:9
reference 70:16 130:22
referred 5:12
referring 29:2 37:16 64:14 106:14 127:18
refers 11:13
refueling 91:14
regard 127:8
regards 34:4
regular 58:1 65:23,24 125:22 126:16 127:19
reinforced 125:14
related 19:20 22:17 47:14 133:23

relative 55:6 56:2 96:13 108:2
reliable 66:17 67:5
rely 33:10 42:13
remember 6:4 19:25 20:6 22:19 23:4 25:12,17,19 26:9,16 29:5 31:1,2,8 32:7 43:20 62:7 62:11,21 83:5 125:9 131:4,11,13 131:15
removability 116:9,19 117:2 118:18
removable 117:5 118:8
removal 50:22 50:24
remove 51:2
removed 98:3 121:19
removing 29:24
rendered 31:10
repeat 39:12
rephrase 7:21 43:15
replace 98:5
replacing 48:4
report 8:9 131:6
reported 1:24 2:2
Reporter 2:4,4 133:1,5,5
reports 8:24 9:3 10:22 11:1,1
repositioning 89:17
represent 42:11
requested 39:14 81:13
require 87:11
requirements 44:19
reservoir 91:22,25 92:1 94:4
reservoirs 89:10
resist 100:2
resistance 53:13
resisting 53:20
resolve 23:25
response 4:18 10:10,14 71:23 131:9
rest 100:5
restate 39:11 95:7
result 15:7 56:8
results 23:11 23:12
RESUMED 113:5
review 4:19 9:11 23:22 31:7 71:24
reviewed 11:4 31:9 83:12
reviewing 10:24,25 11:1,2 35:1 37:18 45:10 67:22 69:15 73:24 103:4 104:7 123:9 127:3
ride 107:22
ridge 109:21 109:24 110:1 110:5
right 5:8,11 12:16 16:8 18:7 24:4 30:13 38:1 40:6,22 47:2 51:3 56:15 70:10,11,24 77:8,21 84:23 85:23 92:9 94:22 98:24 99:5 119:18,24 122:16
risk 117:14,20 117:22
Riverside 2:7 133:13
road 29:5 48:12,18 49:16 50:25
roadway 103:21
rollers 114:20 114:25 115:3
rolling 114:15
rollover 22:24 23:1
ROP 25:1
ROPs 22:24 125:14
rotary 126:8
rotate 101:20
rotates 122:8
rotation 45:8 126:10
rotational 45:13,15,17 45:24 46:2,7 47:7,8 54:25 66:22
rough 78:14
roughly 81:15
routine 17:10 17:25 35:11 36:14 38:25 39:17 58:18 59:4,14 129:11
routing 36:6
rubber 107:8 107:12,15,17 108:5,8,12 108:24 109:6 111:6
rubberized 107:21 108:3
rules 7:1
run 91:1,9,11
running 102:16,20

S

S 3:1 4:6
safety 88:16 122:15
saw 86:11
saying 56:11 64:21 75:10 89:1,16,20 92:1 93:18 108:12 123:8
says 30:15 42:22 72:2 111:4 113:16 129:16
scale 31:25 32:2 42:7,9 42:10,14,15 83:24 94:15 94:16,21,25 95:9,12,14 95:19,22,23 95:24 96:10
scaled 85:18 97:1
scales 74:11
scaling 34:15 96:17,18 97:25 98:19
scenarios 52:16
school 13:22
science 13:24
search 37:24
seat 24:25 25:2
second 28:15 60:22
secondary 123:9,18 127:9
section 104:5
secured 51:14
see 14:14,19 15:1 29:4 30:18 33:7,8 35:2,7 38:21 45:4,19 57:20 60:22 69:24,25 70:1,5,13,15 70:19,22 74:21 81:7 82:16 85:17 86:13 87:1,6 97:13,21 98:1,7,17 99:2,9 109:6 109:8,11,13 109:15,20,20 110:2,4,7,9 110:18,25 113:18,20 119:15,17 126:23

131:23
seeing 52:20 111:9
seen 11:22 25:24 26:1 28:10,20 42:1
select 35:13 44:16 58:19 58:24 59:7 87:18
selectively 117:5 118:7
sell 72:16
selling 73:17
Senior 16:5
seniors 16:3
sense 9:22 29:3 54:8
sentence 86:3 113:9
separate 21:8 103:8,11
SESSION 113:1
set 75:14
setting 20:20
setup 54:12 56:14
seven 8:24 9:15 71:9,11 119:2,4
shaft 45:17
shafts 43:3
shape 44:11 87:5,19 88:9 92:12 101:12
shaped 87:15
shapes 44:4,9 87:16
sheepsfoot 103:20
shift 74:22 79:8
shifting 63:19
shop 49:3
short 111:15 111:21 131:20
short-form 19:1
shortening 130:9,9
Shorthand 2:4 133:4
show 37:5,8 37:12,14 65:15 101:21 106:15 122:4
showed 126:16
showing 97:20 98:6 101:5
shown 36:11 38:12 46:3,7 68:12 87:4 99:23 102:9 106:5
shows 36:22 37:11
shrink 92:13
side 12:22,24 35:8 38:5 40:10 48:21 49:1 52:10 78:10 92:19 92:19 108:21 108:22 109:14,18,24 110:10 124:19
side-to-side 68:18 74:16 78:11,11 82:10
sides 43:8 52:18,21 53:7
sign 132:4
signature 128:25
significant 127:13
similar 10:6 71:11 106:25
Similarly 35:25
simple 60:14
simplicity 66:15,18,20 67:15
simply 118:16
simulations 14:9
site 48:14,23 49:4,12
sitting 25:2
situation 87:25 89:6 103:24 117:13
situations 77:20
six 19:9,14 100:23,24
size 44:11 87:19 90:2 96:5,6,7,21 101:12 125:4 125:5,12 131:2
sizes 44:4,9 87:16 97:8
sketch 83:14 83:17
skid 6:11 8:8 11:22 12:9 12:10,13,15 19:14,15 20:5,7,9 24:5 24:6,16,19 24:20,23 25:7 26:4,18 26:21 41:5,8 43:12,18 44:11 46:13 47:9 48:2,6 49:12,19,23 49:24 50:3 50:10,13,21 58:1,4 62:4,5 62:7 63:23 64:5,6 65:18 65:22,23,24 67:12 72:17 77:12 78:20 79:23,24,25 82:12 125:1 125:4,8,22 126:4,16,21 128:3,7 129:10
skidding 12:24
skids 12:17
skill 32:12,22 39:2,20 55:8 55:17 56:6 56:12 57:3,8 59:5 90:5 93:13 129:12
skilled 93:8
skit 72:24
slapping 118:17
sloped 64:7
small 50:16 89:25 90:3 92:16,21 108:9,15
smaller 88:7 90:6,9,25,25 91:4
smoother 107:22
snow 50:22,24 51:2
software 27:1 27:2 76:8 84:20,25 85:9,9,11,12
soil 103:21
sold 49:24 73:13
solely 24:4
solid 108:8,24 109:6
SolidWorks 27:7,10 83:16,17
solution 121:16
somebody 24:8 119:11
somebody's 117:19,21
someone's 117:14
Somewhat 28:11,12
sorry 7:6 18:11 20:7 46:4 69:24 116:14 130:4
sort 22:9 53:24
space 44:18 52:25
spans 102:24
speaking 18:13
specialty 16:25 17:4,5
specific 9:18 9:19 12:8 23:17 45:8 91:10 96:2
specifically 24:18 27:25 106:8 125:20
specifics 42:23

specifies 32:7
speed 12:21 43:2
spent 10:24 127:12
spilling 88:17 88:17
sprocket 38:20,22 40:18 85:24 87:3 88:25 90:11 91:17 91:23 94:5,7
St 3:16
stability 64:9 64:10 78:11 92:18 120:18 120:21,25
stable 63:15
stackup 20:19 22:15
standpoint 22:5 88:8 93:10,16 95:1 126:3 128:12
start 25:9 32:16 62:1 81:1 86:24 88:13 89:21 89:23 90:24 90:24 91:3 92:12 93:21 102:16,19,20 106:21 118:13,13 119:5,21
starting 27:18 32:17 82:20 83:3
starts 53:3 122:7,9
state 2:5 99:25 133:6
statement 118:16,25 123:13
statements 129:3,4
States 1:1 4:14 4:23
stating 5:9
steel 32:11 107:24 108:1 108:3
steer 8:8 11:22 12:10,15,19 19:15 20:6,7 24:5,6,16,19 24:20,23 26:4,18 43:18 44:11 46:13 47:10 48:2,6 49:12 49:19,23,25 50:3,10,13 58:1,4 62:6 63:24 64:6,6 65:19,23,23 65:24 67:12 77:12 78:20 79:23,25 125:5,22 126:4,17,22 129:10
steers 6:11 12:11,13 19:15 20:9 25:7 26:22 41:5,8 43:13 50:21 62:4,8 72:17,24 82:12 125:2 125:8 128:3 128:7
stenographi... 2:2
Stenotype 133:11
step 104:24
stop 7:7,13
storage 48:9
store 48:5 49:5 49:10,13,15
stored 49:2
story 85:2,4
strategize 111:24
Street 3:5
stress 15:17
stresses 14:20 15:3,3
strike 16:10
stroke 58:14 58:20
strong 123:13
structural 22:11,16 39:6,22 40:2
structure 15:2 17:18 22:13 22:25 24:21 25:1 34:20 34:21 40:7 45:24 46:22 46:24 53:25 54:21 60:2 61:11,14,16 63:1,1,8,11 63:17 66:15 66:19 67:3 68:7 75:21 76:19 79:18 80:3,5,10 86:15,17,18 87:8,11 94:11 98:9 102:1 113:21 114:3,21 119:22 120:1 125:13
students 13:22,23 15:24,24,25 16:4,6 27:9
study 101:3
subject 71:11 95:10
substantial 80:5
succeed 127:21
success 86:8
successful 127:6
sufficient 33:21 95:13 95:14
suggested 119:11
Suite 2:7 3:5 3:15 133:13
summarized 126:25
summer 13:21
suppliers 44:15
support 4:18 46:25 63:8 63:10,12,13 68:9,11,13 68:15,17,19 68:23 69:1 69:11,19 70:3,4,11,12 71:22 79:18 80:2 99:19 110:10
supporting 80:9 100:11
supportive 123:10
supports 68:2 68:3,7,8 69:8
suppose 41:16
supposed 88:4 115:17
sure 22:25 50:8 66:23 72:18,19,23 73:18 104:6 107:9 108:2 121:17 122:24 131:18
surfaces 64:7 78:14
surveys 20:24
survive 22:23
suspended 100:5
switch 48:10
sworn 5:1,4 113:3
system 22:13 38:12 40:1,3 85:22 86:6 87:13 92:16 93:12
systems 40:25

T

T 4:6
tack 115:24 116:1,5,6
take 7:24,25 29:9,11 49:22 65:2 67:3 74:13 82:15 92:11 102:9 111:14 111:15,17,19 111:20,21,23 117:24 129:21,24 130:14,23 131:19
taken 5:15,17 20:2 29:15 65:4 112:1

131:24 133:8 133:10
talk 9:18,21 20:25 24:7 87:14 127:11
talked 14:25 25:13 26:1 42:16 71:10 77:5 79:11 93:4,5 106:14,15 119:8 120:23
talking 9:17 16:3 17:2 18:14 33:16 33:17 38:15 41:7 42:19 44:5,6 51:21 69:7 72:20 77:11 78:4 80:11 81:14 83:1 85:24 86:10 97:6 99:15 104:3 104:8 106:18 108:8 114:10 121:4
talks 12:16,18 32:9 51:24 81:23 105:3 127:11
tall 96:1
tank 86:19 87:24 88:7 88:19,21,23 89:23,25 90:7,9,10,16 90:18,25 91:4 98:8
tasked 27:25
tasks 21:2
taught 13:19
teach 13:11,12 13:13,14 15:23 116:25
teaching 13:18 18:21
teachings 89:2 89:5,7,13,16 91:7 93:19 94:1 95:2 97:11,12 105:2 110:7 110:18,21 111:1 116:23 118:9 121:8
team 24:8 36:2 83:8,11
tear 81:2
Teasdale 2:6 3:14 8:19 9:6 133:13,21
technical 13:9
techniques 129:13
tell 5:16 14:6 16:14 19:8 35:4 48:4 70:21 71:16 74:9 79:19 83:10 106:16 124:2
telling 78:25 88:22
ten 131:21
ten-minute 29:12 65:2
tenure 19:11
term 6:8,12,15 38:1 54:5 101:1
terms 11:16 12:3 52:1
test 74:20 75:14
testified 5:4 113:4
testing 16:25 18:4 20:20 20:20,22 23:24 46:23 75:15
Texas 3:6
Thank 6:22 30:17 72:7 79:22
they'd 49:2
thick 118:15
thickness 101:17
thing 14:14 35:17 36:4 44:25 66:14 75:4 81:9 86:11 96:12 123:15
things 6:11 13:23,25 14:24 18:14 19:20,21,22 20:18 33:9 34:16 46:23 47:14 60:4 64:1 80:23 83:24 89:9 89:10 94:3 118:20
think 6:14 11:13 32:22 33:1,13 34:17 42:15 49:4 58:18 65:1 66:14 71:12 73:3 75:22 77:5 77:21 78:2 83:20 90:5 92:7 94:24 99:6,17 114:5,6 123:22 125:24
three-second 29:10
tilt 74:20
time 7:25 10:24 13:1 16:10 18:9 19:17,24 20:11 25:19 25:22 28:7 57:15 58:9 59:5 60:10 60:11 62:9 63:24 65:3 73:12 91:10 117:24 127:13
times 5:18 64:3
tiny 87:24 92:11 93:3
tip 74:20,20
tire 108:14,15 109:10
tires 98:4 109:1 119:21
title 71:18
today 6:23 8:23,25 66:9 73:17
today's 8:25
tolerance 20:19 22:15
tool 11:24
top 70:17 92:14 119:5 120:13
Toro 4:11 8:15 8:16,17 25:14 31:7 126:15,16 127:12
torque 43:6 44:25 53:10 53:14,20 54:1,2
torques 53:3
touch 14:15
tough 107:23
tower 61:13 63:11
track 37:5,8,9 37:11,13,14 38:12,24 39:24 44:21 47:5,6 83:6 85:7,19,19 85:20,22 86:5,13,16 87:2,3,13 92:5,7,7,11 92:12,13,15 93:3,20 94:8 96:14,16 97:1 98:20 98:21,22 99:7,19,20 99:24 100:3 100:9,11 106:25 107:1 108:21 109:7 109:19,22 110:11
tracked 12:14
tracking 98:20
tracks 12:10 21:20 38:7 39:8 43:9 59:12 81:2 83:4 85:15 93:6,11 94:13 96:16 96:19,24 97:18 98:3 98:11,25
tractors 5:24 51:18
TRADEMARK 1:1

trailer 49:11
transcript 133:9
transmission 42:25 43:5
transmit 43:1 100:19
transmits 43:6
transmitting 45:1
transverse 43:17
TRIAL 1:2
triangular 87:15 92:8
triangular-s... 86:14 87:8 92:5
tried 6:10 97:17 98:4
trouble 117:8
truck 49:11
trucks 30:3
true 53:16 60:10 61:20 61:23 62:1 78:22 80:13 93:9,15,17 123:12 129:3 129:4,5,6 133:9
truthful 7:15
truthfully 7:11
try 7:7 9:19 77:22 80:15 93:19 96:21 97:5,10 108:10 123:2 123:3
trying 6:1 43:20 44:24 49:7 59:23 67:25 71:7 81:4,10 97:11 98:10 102:5,6 103:20 110:15,17 117:10
Tuig 3:18 8:22 9:5,8 28:11 32:24 33:15 34:2,10 35:16 36:16 36:25 39:4 39:15 41:24 43:19 55:13 55:21 56:9 57:5,18 58:22 59:17 61:22 62:20 64:18 67:13 91:18 97:19 103:14 104:18 110:14,23 111:7 117:15 120:7 122:23 125:4 126:1 132:3 133:21
turn 12:16,17 12:23 31:14 43:8 45:3 47:2,20 82:18 102:23 111:12 119:1
turning 77:25 78:8 104:2
two 10:11 13:5 13:12 40:24 50:2 54:25 54:25 55:1 99:13,20 116:3 124:3 131:22
type 51:8 65:12 76:20 116:7 125:3
types 109:4 123:9
typical 36:23
typically 43:13 48:20 50:1 79:3

U

U.S 1:12,15,17 4:20 71:24
uh-huh 77:13 90:22,22 97:24 100:16 120:16 124:12 125:19
ultimately 69:2 69:8 96:11 119:23 127:22
unacceptable 15:18
unclear 55:16
undergradu... 15:21
underlying 95:19
understand 7:2,9,16,17 7:20 46:4 76:1,22 94:19 95:16 95:17
understandi... 77:6
understood 7:10,19
uneven 64:4 78:14
unique 103:13
unit 42:20 75:14,16 85:22 105:1 105:4,5,8 120:25
United 1:1 4:14,23
units 96:8 116:3
university 13:3 13:8,22
unstable 92:17
unused 48:21
unwilling 110:12
upgrade 26:16
upper 62:25 70:20,23 100:2
upright 68:1,3 68:7,8 69:1,7 69:19 70:2,3 70:4,11,11
use 6:10,13 14:23 24:12 25:25 27:7,8 27:15,17,19 59:23 76:14 93:3 107:14
useful 90:4
uses 15:5 29:22
usually 33:10 37:23 51:21 54:19 86:19 109:5 111:20
utility 11:13,17 32:13,23 33:3,6,23 34:8,13 39:3 39:7 43:12 65:22 73:7 73:10,13 81:7,18 104:17 127:15,18,19 127:24,24 128:1,5,13

V

v 1:6
validity 31:11
valve 109:12 109:16
Vander 3:18 8:22 9:4,8 28:11 32:24 33:15 34:2 34:10 35:16 36:16,25 39:4,15 41:24 43:19 55:13,21 56:9 57:5,18 58:22 59:17 61:22 62:20 64:18 67:13 91:18 97:19 103:14 104:18 110:14,23 111:7 117:15 120:7 122:23 125:4 126:1 132:3 133:21
variety 19:15 20:1 21:1
various 19:18 21:21 22:16 74:13 75:2 75:18 83:18 83:18
vehicle 43:23 45:2 63:2 67:21 74:20 85:21 87:12 94:11 97:2 100:5,12,18 105:3 120:2 120:18
vehicle's 77:25
Velinsky 11:2

95:5 97:14 97:14 119:9 122:1
Velinsky's 102:18 123:3
verbally 7:7
verify 124:7
Vermeer 1:7 4:10 6:24 8:4 8:11 9:17,21 10:9 11:3 18:23 19:4 25:14 28:22 54:4 58:15 58:21 63:6 64:15 72:2,4 72:5,16 73:6 73:8,12 93:4 93:6,11 102:10 123:23,23 127:5,12,16 133:20
version 39:2
versions 12:11 124:3
versus 20:21 20:25 40:10 42:3 44:22 47:17 52:19 61:13 67:6 76:24 80:22 82:4 108:3
vertical 55:11 55:11,20 56:4,22 58:5 62:4,6,10 67:9,12 68:15,16 72:20 74:8 74:19,23 75:8 77:17 78:4 79:15 79:18 80:2,3 102:6,11 121:4 123:20 124:14,25 125:2
vertically 79:6
view 35:8
visibility 81:23 81:25 82:9 82:10,14
voice 55:16
volume 87:23 88:19,20
vs 4:10 72:5

W

W 3:18
wait 7:7
walk 29:13
wall 52:10
want 9:18 13:23 17:21 26:7 33:7,8 33:11 37:20 48:20 50:19 51:2,3 62:23 64:2,7 67:16 74:4,4,7 80:23 82:15 87:22 88:5 89:3 91:23 92:3,4,10 93:2,18,21 102:2,12,13 102:15 105:7 111:21 113:10 115:14 116:12 126:23
wanted 22:25 37:25 41:16 74:18,25 116:18,25
water 55:15
way 12:23 14:11 18:3 31:17,22,23 37:10 43:11 44:2 46:10 52:5 57:13 109:15 114:8 116:25 117:1 117:10,13 119:20,24 122:22
ways 40:4
we'll 29:1,4 131:23 132:4
we're 9:17 51:21 69:7 98:6 104:8 108:14 111:24 123:23 128:14
we've 17:5 71:10 85:17 130:1,8
weak 36:22
week 10:24
weigh 74:21
weight 68:10 75:1,5 76:19 80:15,18,19 80:20 81:8 81:10,19 100:12
weight-beari... 68:9
weights 75:19
weld 115:15 115:24 116:1 116:5,6,7,16 117:17 118:17
weld-induced 118:14,20
welded 32:11 113:15,17,19 113:24 114:4 115:13,16 116:20 118:11
welder 115:9 115:11,13 117:23 118:3
Welding 118:3
welds 32:9 118:13
wheel 40:6,7 40:14 42:3 44:22 99:7,8 107:24 108:1 108:4,5,8 111:3,4 120:5
wheel-drive 93:12
wheeled 12:11 12:14 39:2 40:3,25 41:6 85:20 97:2
wheels 37:14 39:8 40:9,19 40:23 41:4 41:10,13,17 42:4 43:10 43:17 54:3 69:10 85:23 93:6 96:7 98:4 99:13 99:18,19,20 99:23 100:1 100:8,13,21 100:22,23,25 106:1,3,10 106:15,16,18 106:20,21 107:3,4,4,7 107:11,15,21 108:17,24,25 109:5,17,23 114:15,16
width 85:19 96:16 97:1 101:12
willing 130:21
wind 87:25 92:15 94:11
window 35:8
withstand 53:9 54:1
witness 5:1,3 29:4,7,13 32:25 33:16 34:3,11 35:1 35:2,17 36:17 37:1 37:18 39:5 39:16 41:25 43:20 45:10 45:11 55:22 56:10 57:7 57:19 58:23 59:18 61:23 62:21 64:19 67:14,22,23 69:15,16 73:24,25 81:14 91:19 92:2 97:20 103:4,5,15 104:7,8,19 110:15,24 111:8,20 120:8 122:24 126:2 127:3 132:4
word 6:9,10
work 8:16,21 9:2 10:22 14:10,25 15:10 16:16 16:22 17:4,6 17:7 18:25 19:4,6 20:10

20:16,17 21:13,14,22 24:18 26:3 26:17,19,22 27:6,12,16 28:5 35:14 35:20,22 36:5,8 37:2 44:15,17 48:8,24 51:4 56:15 57:7 57:12,13,15 57:17,22 58:21,24 59:25 73:5 80:21 81:3,4 84:15 87:20 88:24 89:8 89:19 90:8 90:12,23 91:2 95:15 96:11,22 97:4,14 98:17 105:6 118:10,18,25 119:15 121:7 121:9,12,15 122:22,25
worked 8:3 9:9 13:21 19:9 19:12,18 20:5,7,9,15 22:11,12,14 23:4 24:15 24:19 26:5 26:25 51:5 51:13 128:7
working 6:20 8:17 9:4 16:12 18:16 22:4,8 24:4 25:12 26:16 27:22 48:11 52:8,13 53:17 58:1 60:12 61:21 63:22,24 64:4,6,22,24 78:16 80:24 115:18,20 120:24
works 56:25 57:4 58:25 124:5
worry 66:24
wouldn't 75:18
write 82:22
writing 8:9
written 10:4 32:6 38:14 121:25
wrong 22:7 56:1
wrote 10:22

X

X 4:1,6

Y

yeah 6:14 29:6 29:6 30:5 37:23 38:2,2 38:22 46:11 49:22 50:19 51:1,1 77:22 78:7 82:21 98:18 99:16 108:10 113:11 120:19
years 8:7 13:19 19:9 19:14 20:3,4 20:4 27:6 125:21 131:13
yellow 99:14

Z

zero 46:11,12 46:14 47:10

0

001 30:15
00169 30:17
084-002871 2:3 134:9

1

1 31:14 37:12 37:16 47:20 65:11 70:1 70:16 72:6 84:14 98:23 124:1,3,13 125:25
1:06 112:2
1:37 131:25
1:49 131:25 132:7 133:15
10 90:10,14,19
10,597,843 4:11
10:39 65:5
10:57 65:5
100 2:7 106:14 106:23 133:13
1001 28:14,20 28:25
1001-00169 4:13 28:17 30:10 123:25
1001-0069 30:14
11 113:12,14 114:7,11 115:24 116:2 116:17
11,465,891 1:15
117 82:19,20 82:23
118 82:19,23 86:3
12 47:21,25 72:11
12,098,063 1:17
12:14 112:2
12:45 111:25
120 72:6
128 4:8
130 129:2
138 104:2,13 106:6 113:8
14 1:21
14th 2:9 133:11
15 111:21
150 106:16,19 107:4 109:18 109:23
1500 2:7 133:13
1500-kilogram 81:15
152 111:3,5
16 68:20,21 69:6,19 70:17
169 30:16
17th 134:2
1800 3:15
1845 26:15,16

2

2 37:12 47:2 47:22,24
2.4 130:6
20 20:3 69:10 102:23,25 111:22
2000 60:10
2000s 20:14 58:8 60:11 61:20 62:4 62:12 78:23
2015 16:10 18:9 59:5 129:15
2016 72:5
2016-00169 4:16 71:2,3
2017-00167 4:22 65:7,8 79:21 82:6
2019 18:18
2020 25:18
2020s 25:16
2025 1:21 2:9 133:12 134:2
2025-00169 72:5
21 102:25
214.651.5000 3:7
22 38:21 66:1 67:21 68:24
2300 3:5
24 67:25 68:1 68:8 69:1 70:2,3,4
25 37:22 38:3
26 38:8,10 69:17,17 70:2,6,15,16 70:19
2801 3:5

3

3 35:3,9 37:12 37:22 38:3 68:2,21
30 4:13 37:16 37:25 38:8,9 111:23
314.621.5070 3:17
33 45:12
3300 81:16
386 4:20 28:8

30:14 123:24
398 79:25 82:6

4

4 37:13 38:13
41 104:12,14 104:16 105:10,11 113:13,22,25 114:7,10 115:23 116:2 116:17
43 72:10 73:2 110:3
46 47:23,24
47 73:20 79:11 81:22
49 82:20

5

5 4:4 37:13 45:3,12 60:23 63:5 64:14
5,004,398 4:23
50 82:18,22 83:1,3 85:17 86:12 96:20 97:21 111:12 111:13
51 82:18,22 85:2 87:1 92:14 98:1 99:5 111:13
57603 1:25
58 127:1
59 129:22

6

6 37:13 106:24 124:11,12 130:3
60 127:10
60606 133:14
61 127:1
62 106:7
63 102:24 103:2
63105 3:16
65 4:22

7

7 37:14 38:13
70 119:1
71 4:16
75201 3:6
77 128:24
7700 3:15

8

8 121:24
843 129:15

9

9 30:15
9,321 4:20
9,321,386 1:12 4:14 71:24
9:00 1:22 2:8
9:07 133:14
9:41 29:16
9:45 29:16
90s 20:14 62:12
99 129:8