

1 UNITED STATES PATENT AND TRADEMARK OFFICE

2
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD

4 TETRA TECH CANADA INC., § CASE IPR 2019-00619
5 Petitioner, § PATENT NO. 7,616,329
6 VS. § -and-
7 GEORGETOWN RAIL EQUIPMENT § CASE IPR2019-00662
8 COMPANY, § PATENT NO. 9,441,956
9 Patent Owner. §

10 CROSS-EXAMINATION OF

11 JOHN KAINER

12 FEBRUARY 12, 2020

13 [REDACTED]
14 -----
15
16 CROSS-EXAMINATION of JOHN KAINER, produced as a
17 witness at the instance of the Petitioner, and duly
18 sworn, was taken in the above-styled and numbered cause
19 on February 12, 2020, from 8:52 a.m. to 10:34 a.m.,
20 before Molly Carter, Certified Shorthand Reporter in and
21 for the State of Texas, reported by machine shorthand, at
22 the offices of Holland & Knight, LLP, 111 Congress
23 Avenue, Suite 540, Austin, Texas, pursuant to the Federal
24 Rules of Civil Procedure.
25

A P P E A R A N C E S

FOR THE PETITIONER, TETRA TECH CANADA INC.:

Mr. Aaron L. Parker
Mr. David C. Reese
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP
901 New York Avenue, NW
Washington, DC 20001-4413
Phone: (202) 408-4000
aaron.parker@finnegan.com
david.reese@finnegan.com

Mr. Preston Hopson
TETRA TECH
3475 East Foothill Boulevard
Pasadena, CA 91107
Phone: (626) 470-2481
preston.hopson@tetrattech.com

FOR THE PATENT OWNER, GEORGETOWN RAIL EQUIPMENT COMPANY:

Mr. Dana M. Herberholz
PARSONS BEHLE & LATIMER
800 West Main Street, Suite 1300
Boise, Idaho 83702
Phone: (208) 562-4900
dherberholz@parsonsbehle.com

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1 JOHN KAINER,
2 having been first duly sworn, testified as follows:

3 EXAMINATION

4 BY MR. REESE:

5 Q Mr. Kainer, good morning.

6 A Good morning.

7 Q Can you please state your name and address for
8 the record?

9 A John Kainer, 303 Preakness Place, Georgetown,
10 Texas.

11 Q And you understand that you're under oath this
12 morning?

13 A Yes, sir.

14 Q And that means you're sworn to give testimony
15 as you would in front of a judge and jury in court?

16 A Yes.

17 Q And there's nothing preventing you from giving
18 me your full testimony today?

19 A No.

20 Q And if you don't understand any of my
21 questions, just ask me to clarify. Is that fair?

22 A Yes, sir.

23 Q So we'll plan to take a break every 60 minutes,
24 but if you need a break earlier than that, just let me
25 know.

1 A Okay.

2 Q I just ask that if we're in the middle of a
3 question you just answer the question --

4 A Okay.

5 Q -- before we take a break. Does that sound
6 good?

7 A That sounds good.

8 Q Okay.

9 A I do have a nasty cigarette habit, so --

10 Q Oh, okay.

11 A -- during your break, I will probably take the
12 elevator down.

13 Q Okay.

14 A If that's okay --

15 Q Okay.

16 A -- with you gentlemen.

17 Q Of course. I understand.

18 MR. REESE: Don't we, Aaron?

19 MR. PARKER: Uh-huh.

20 Q (By Mr. Reese) Yeah. So during break, you know
21 you are not able to discuss the substance of your
22 testimony with your Counsel?

23 A Yes.

24 Q Okay. So have you ever been deposed before?

25 A Yes.

1 Q Approximately how many times?

2 A Once.

3 Q Once. And was that in District Court?

4 A I don't remember. I know Dana mentioned it
5 when I -- but I don't remember it.

6 Q Do you remember the date when you were deposed?

7 A Not exactly. It was a few years ago.

8 Q Okay. Was it in a courtroom?

9 A No. It was in an attorney's office.

10 Q Okay.

11 A Similar to this.

12 Q Okay. Was it regarding a patent matter?

13 A Yes.

14 Q Okay. So you understand we're here today to
15 discuss the declarations you prepared --

16 A Yes.

17 Q -- in this case? And is it okay with you if I
18 refer to U.S. Patent No. 7,616,329 as the '329 patent?

19 A Sure.

20 Q And the U.S. Patent No. 9,441,956 as the '956
21 patent?

22 A Yes.

23 Q And specifically, you were asked to prepare a
24 declaration for each patent; is that correct?

25 A Correct.

1 Q And these relate to matter numbers IPR
2 2019-00619 and IPR 2019-00662.

3 A Okay.

4 Q Is that consistent with your understanding?

5 A I'd have to see the papers again --

6 Q Okay.

7 A -- to verify that that is the exact number.

8 Q Okay. I can go ahead and give you your
9 declarations now. This has been previously marked
10 Georgetown Rail Exhibit 2008. And here is Georgetown
11 Rail Exhibit 2008 that was provided in IPR 2019-00662.
12 Do you recognize this document?

13 A Yes, I do.

14 Q What is it?

15 A It's my, my declaration.

16 Q Did you write this declaration?

17 A Yes, I did.

18 Q Approximately how long did it take you to write
19 this declaration?

20 A A few days.

21 Q Few days? Approximately how many hours?

22 A I'm guessing here.

23 Q Okay. No, approximation is fine.

24 A 8, 8 -- 16.

25 Q 16? About 16 hours? Okay. Did you talk with

1 anyone when you were preparing your declarations?

2 A No.

3 Q Okay. How many hours did you spend preparing
4 for this deposition?

5 A About five.

6 Q About five?

7 A (Nodding head.)

8 Q And did you spend time yesterday preparing for
9 this deposition?

10 A No, I did not. It was Monday.

11 Q Okay. Did you speak with Gregory Grissom
12 yesterday regarding his deposition?

13 A No, I did not.

14 Q Okay. So you did not speak with Gregory
15 Grissom yesterday?

16 A I did speak with Gregory --

17 Q Okay.

18 A -- but not about that.

19 Q Not about the deposition?

20 A Huh-uh.

21 Q Okay. Do you know a Dr. Alan Conrad Bovik?

22 A I have met him before.

23 Q When did you meet him?

24 A It was in regards to the last deposition I was
25 involved with.

1 Q Okay. So the same, that single deposition you
2 were a part of?

3 A Yes.

4 Q Okay. So you have not spoken with him
5 regarding your declarations in these cases?

6 A No.

7 Q About anything to do with these matters?

8 A No.

9 Q Okay. So are you an inventor of the '956
10 patent?

11 A I believe -- yes, I am one of the inventors on
12 the '956.

13 Q Okay. So you're familiar with the disclosure
14 of the '956 patent?

15 A Yes.

16 Q Are you familiar with the entire disclosure of
17 the '956 patent?

18 A I have reviewed it briefly.

19 Q Okay.

20 A I did not read the whole document again
21 recently.

22 Q And you're familiar with the '329 patent?

23 A Yes.

24 Q Okay. And are you an inventor of the '329
25 patent?

1 A No.

2 Q Okay. So when did you start working at GREX?

3 A 2006.

4 Q Okay. And what was your title when you
5 started?

6 A I was a software developer.

7 Q Okay.

8 A Something like that.

9 Q And you've been at GREX since 2006, correct?

10 A Yes.

11 Q And what's your current title at GREX?

12 A Aurora technical coordinator.

13 Q Okay. And what was your job before you started
14 at Georgetown?

15 A I was -- I worked in the Northern Virginia area
16 as a software programmer.

17 Q For which company?

18 A Two different companies: System Planning
19 Corporation and CompuQuest.

20 Q And can you recall the approximate years you
21 worked for each of these companies?

22 A Let's see, I started at SPC in 1986, I believe.
23 And I started at CompuQuest somewhere around 1990, '91.
24 Those are approximate.

25 Q Okay. And you were at CompuQuest from 1991 up

1 until --

2 A 2003.

3 Q '03? Okay.

4 A '03.

5 Q And then where were you employed between 2003
6 and 2006?

7 A I was self-employed.

8 Q Okay. Could you take a look at your
9 declarations for me real quick? So this looks like
10 Paragraphs 1 through 23 of each document are pretty much
11 the same, Paragraphs 1 through 23. I was just wondering
12 if you could take the time to confirm that, just so if I
13 ask you a question about a paragraph in one of the
14 declarations, you'd understand that, you know, your
15 answer would be applicable to both declarations.

16 A (Reviewing documents.) That appears to be
17 correct. I don't know why I was thinking it was the same
18 until Paragraph 18. But from what I'm looking at this
19 now, that appears to be correct. But I do understand
20 that it will relate to both.

21 Q Okay. So we agree that if I ask a question
22 relating to one of these paragraphs, you'll understand my
23 question applies to both of your declarations?

24 A Yes.

25 Q And if it's, you know, if it's not one of these

1 paragraphs, I'll be more specific and say Paragraph 20 --

2 A Okay.

3 Q -- of this declaration. Okay?

4 A Sure.

5 Q So can you please turn to Paragraph 5 of either
6 declaration?

7 A Okay.

8 Q Go ahead and take your time and familiarize
9 yourself with Paragraph 5.

10 A (Reviewing document.)

11 Q Okay. So towards the bottom of that paragraph,
12 you state, "Part of Aurora is controlled by proprietary
13 source code (the 'Aurora Source Code') executed by a
14 processor of the Aurora system." Do you see that?

15 A Yes, sir.

16 Q Is that correct?

17 A Yes.

18 Q And that's an accurate statement?

19 A Yes.

20 Q So when you are referring to the Aurora system,
21 I just want to kind of discuss what exactly that means
22 and what systems that includes. Does that include the
23 Aurora Xi system?

24 A Yes.

25 Q Does it include the Aurora Xiv system?

1 A That was a new term to me. I believe that's
2 just referring to the second version of our Xi trucks,
3 those that are on a Freightliner. But I -- that's a new
4 term to me.

5 Q The Aurora 4 is a new term to you?

6 A Yes.

7 Q Okay. What about the BallastSaver?

8 A Yes, I'm somewhat familiar with that.

9 Q Okay. And is the BallastSaver incorporated
10 into your statement here of the Aurora system?

11 A BallastSaver is a unique product.

12 Q Okay. So the BallastSaver and the source code
13 of the BallastSaver is separate from the system and
14 source code of the Aurora system?

15 A That is mostly correct. We did add LIDARs to
16 the Aurora system relatively recently, and we had parts
17 of the code that were used to process BallastSaver
18 re-factored so that it could actually process the LIDAR
19 data as collected on Aurora.

20 MR. HERBERHOLZ: Counsel, before I forget, I
21 want to make sure that we designate our transcript as
22 protective order material and confidential under the
23 protective order.

24 MR. REESE: Okay.

25 Q (By Mr. Reese) Now, if I understand how these

1 Aurora systems work, they're on high rail vehicles --
2 high rail vehicles; is that correct?

3 A Yes.

4 Q So the first Aurora system, when did the first
5 Aurora system, when was that first sold or used by
6 Georgetown? Do you recall?

7 A I believe our first customer was in 2005.

8 Q Okay.

9 A I could be off on that.

10 Q Okay.

11 A Since I didn't start till 2006.

12 Q Okay. So the Aurora Xi -- how is the Aurora Xi
13 different from the Aurora?

14 A We incorporated a backscatter x-ray on the
15 system onto the vehicle.

16 Q So is the Aurora Xi a separate high rail
17 vehicle from the Aurora vehicle?

18 A Yes.

19 Q Okay.

20 A They're similar.

21 Q They're similar? Well, okay. So you said, but
22 the Xi includes x-ray technology?

23 A Yes.

24 Q But the Aurora does not include x-ray
25 technology; is that correct?

1 A That is correct.

2 Q Okay. The Aurora, what type of technology does
3 the Aurora use?

4 A It uses two lasers to transverse the surface of
5 the track. It has some cameras that capture that
6 reflected light source, and it has some peripheral
7 navigation equipment, GPS, gyroscopes and, and wheel
8 encoders.

9 Q Okay. And approximately what year did
10 Georgetown start selling the Aurora Xi? Do you recall?

11 A Not exactly. No, I would be coming up with an
12 approx- --

13 Q Was it around 2010? Around 2012?

14 MR. HERBERHOLZ: Objection, form and scope.

15 THE WITNESS: I would be conjecturing on the
16 time frame at this point. It was -- that's probably not
17 far off.

18 Q (By Mr. Reese) So how long have you worked at
19 Georgetown?

20 A Since 2006.

21 Q And you are the -- what's your current title,
22 current role?

23 A Aurora technical coordinator.

24 Q The Aurora technical coordinator. Now, is the
25 information of when the Aurora Xi being used and sold,

1 would that be information the technical coordinator for
2 the Aurora track inspection system would have?

3 MR. HERBERHOLZ: Objection, form and scope.

4 THE WITNESS: I'm just bad at remembering
5 dates. So yeah, I mean, I do remember when we, when we
6 implemented it. I just don't remember the dates.

7 Q (By Mr. Reese) So you do remember implementing
8 it, just not the dates?

9 A Exactly.

10 Q Okay. And you have no knowledge of a third
11 high rail vehicle that is the Aurora 4?

12 A I assume that that's a marketing term that's
13 referring to our Freightliner trucks versus the F-550,
14 which are both Xi trucks. So in my mind, I always refer
15 to them as just Aurora Xi.

16 Q I see.

17 A Just two versions of vehicles that they're on.

18 Q Right. So there's an Xi, and then there's an
19 Xiv, which after speaking with Gregory Grissom yesterday
20 in marketing said it's referred to as Xi, and then the
21 Xiv. So -- okay.

22 A Okay. I --

23 Q So you are familiar -- which, yeah, I mean --

24 A Yeah.

25 Q Just figuring out the nomenclature.

1 A I never refer to it that way.

2 Q Okay.

3 A But I'm certain that that's what it's referring
4 to.

5 Q Okay.

6 A We added multiple additional cameras.

7 Q So the Aurora Xiv includes the Aurora
8 technology?

9 A Yes. Yes.

10 Q Includes the Aurora Xi technology?

11 A Yes.

12 Q And does it also include the BallastSaver
13 technology?

14 A It has the LIDARs on it, which allows us to
15 collect data similar to what BallastSaver does.

16 Q Okay. And do you recall approximately what
17 year Georgetown started offering the Aurora 4 to its
18 customers?

19 MR. HERBERHOLZ: Objection, form, scope.

20 THE WITNESS: Again, I'm guessing about four
21 years ago.

22 Q (By Mr. Reese) So 2016 approximately?

23 A It's a conjecture.

24 Q Was the Aurora Xi sold to consumers before
25 Aurora 4 was sold to consumers?

1 MR. HERBERHOLZ: Objection, scope. Counsel, I
2 don't know where we're going with Aurora 4. This is not
3 a part of his declaration. I think we're well beyond the
4 scope of his declaration.

5 MR. REESE: Well, his declaration is focusing
6 on the Aurora system and the source code of the Aurora
7 system. He just said himself he refers to them all as
8 the Aurora system.

9 MR. HERBERHOLZ: You're asking him about when
10 Aurora 4 was sold, which is, again, well beyond the scope
11 of his declaration. So --

12 MR. REESE: But it's the scope, within his
13 personal information. He's the technical coordinator of
14 the Aurora system.

15 MR. HERBERHOLZ: I'll allow some leeway, but I
16 think we're getting fairly far afield.

17 Q (By Mr. Reese) Okay.

18 A I was referring to the Xi system and the Aurora
19 systems.

20 Q For which -- in response to which question?

21 A This whole declaration.

22 Q Oh. So it was the Aurora -- all the Aurora
23 systems?

24 A All the Aurora systems, yes.

25 Q So the original Aurora, the Aurora Xi, and the

1 Aurora Xiv?

2 A Yes.

3 Q Okay. So I know we briefly discussed this, but
4 the Aurora, the Aurora Xi and the Aurora Xiv and the
5 BallastSaver systems include different hardware?

6 A Additional hardware.

7 Q Okay. So the Aurora generates lasers and
8 cameras to scan the railroad track?

9 A That is correct.

10 MR. HERBERHOLZ: Objection, form.

11 Q (By Mr. Reese) Does the Aurora Xi use x-ray
12 technology to scan the internal structure of wooden ties?

13 A Yes, as well as the cameras system that's on
14 standard Aurora.

15 Q And the Aurora 4 incorporates technology from
16 both the Aurora and the Aurora Xi?

17 A That is correct.

18 Q Could we go back to Paragraph 5 of your
19 declaration?

20 A Yes.

21 Q Let's go back to the same sentence, towards the
22 bottom, starting with, "Part of Aurora is controlled by
23 proprietary source code --"

24 A Yes.

25 Q -- "the Aurora source code, executed by a

1 processor of the Aurora system." I just want to discuss
2 what you mean by the Aurora source code. So are you
3 referring to the source code of the Aurora, original
4 Aurora system?

5 A I was referring to the source code associated
6 with all of our systems.

7 Q So the source code associated with the Aurora?

8 A Aurora.

9 Q The Aurora Xi?

10 A Yes.

11 Q And the Aurora --

12 A Xi-4.

13 Q -- Xi-4? Okay.

14 A As you referred to it.

15 Q Yeah.

16 A Yes, I understand the context.

17 Q What about the BallastSaver? Is that source
18 code also included in the Aurora source code referred to
19 in your declaration?

20 A Yes.

21 Q Okay.

22 A The re-factored version. We also have a
23 product called BallastSaver that is unique to the Aurora
24 system.

25 Q Okay.

1 A So that's where my somewhat confusion is coming
2 in.

3 Q So the original Aurora system, did it identify
4 ballast?

5 A Not using the LIDAR --

6 Q Okay.

7 A -- system.

8 Q The BallastSaver uses LIDAR to identify
9 deficiencies in the ballast?

10 A Yes.

11 Q Okay. So approximately how many lines of code
12 are in the Aurora source code then? Just approximately.

13 A I'm pulling this out of you-know-where. Over
14 a million.

15 Q Over a million lines? Okay. So the portions
16 referred to in your declarations are just, you know, a
17 small number of those lines of code?

18 A Oh, yeah. Those are small, very tiny snippets.

19 Q Okay. And just going back to Paragraph 5, you
20 note here, "The Aurora source code has been developed and
21 updated internally by Georgetown over the course of 16
22 years." Do you see that?

23 A Yes.

24 Q And that's an accurate statement?

25 A Yes. I believe it was started in 2003. Yes.

1 Q So how many, approximately how many different
2 versions of the source code have been provided since
3 2003?

4 A Oh, geez. Early on it was constantly updated.
5 We're on -- I mean, there have been minor releases and
6 major releases. We're right now on 3.6, Version 3.6.

7 Q And what would be an example of a minor
8 release?

9 A A bug was found in one of the releases, and it
10 was resolved.

11 Q And an example of a major release?

12 A When we transferred from our new Aurora system,
13 from Aurora 1 to Aurora 2, that was a major, major
14 release, because it was -- the code was -- the guts of
15 the code from the original Aurora 1 were used to, and
16 re-factored into a different source code language and
17 into a more structured programming format.

18 Q And when you refer to Aurora 1, which Aurora
19 system are you referring to?

20 A The original Aurora system.

21 Q And when you are referring to Aurora 2, which
22 Aurora system are you referring to?

23 A The same Aurora system, just updated code. It
24 was re-factored, re-, re-started from scratch, using the
25 guts of what was in the Aurora 1 code.

1 Q Do you recall approximately what year that
2 updated code or the source code of the Aurora 2 was
3 implemented?

4 A Started working on it in 2009, if I recall
5 correctly. We probably spent about two years working on
6 it. So ball park figure, 2011 is when we started
7 providing it.

8 Q And why was that done? Why were those updates
9 made?

10 A The code on the original one was put together
11 to try to figure out how to use all of this technology we
12 were using. Essentially, all it did at that point in
13 time was measure plate cut. We added additional
14 functionality into the Aurora 2 system that would start
15 analyzing the surface of the tie.

16 Q Uh-huh.

17 A Let me back up. In addition to plate cut, it
18 would also measure concrete ties. So we would use it to
19 look for rail seat abrasion on concrete ties.

20 Q So can you give me an example of something that
21 was added in the X-2 in 2009 and 2011?

22 A Updated tie finding software; mechanisms to
23 avoid, to identify obstructions that may be covering up
24 parts of the tie or parts of the tie plate that would
25 obstruct our plate cut measurement. I believe we added

1 find spikes into the algorithm at that time. And that
2 was when we created a mechanism to actually grade the
3 entire wood ties.

4 Q Okay. And when was the next major change after
5 X-2?

6 A We've been working on that code regularly since
7 then, to this date. Still in the process of, of being
8 worked on.

9 Q Okay.

10 A I can't tell you how many versions, how many
11 releases.

12 Q Was a major change incorporating the x-ray
13 technology?

14 A That was a -- that was the other -- that was a
15 major change, yes.

16 Q Okay. Have there been any other major changes
17 like that?

18 A Well, we then added the capability to process
19 the LIDAR data, using information from the BallastSaver
20 technology that was completely independent.

21 Q Okay. How many different versions of the code
22 that are in your declaration have been provided for the
23 Aurora system?

24 A Would you repeat that question?

25 Q So your declaration refers to source code.

1 A Yes.

2 Q In Paragraphs 7 through 15, I believe.

3 A Yeah.

4 Q How many different versions of this source code
5 have there been since its inception?

6 A I couldn't tell you. I mean, it depends on
7 what you refer to as a version.

8 Q All right. Okay.

9 A I mean, is a bug fix a version change?

10 Q Approximately how many different versions,
11 including the bug fixes?

12 A I should have looked at the source code. We
13 had all of this in our repository.

14 Q Uh-huh.

15 A We were probably -- early on, we were getting a
16 version release about every three months. That probably
17 happened for about 30, 40.

18 Q Over what, approximately what time period?

19 A 2011 to present.

20 Q Okay. What about before 2011?

21 A We were developing the Aurora 2 system at that
22 point. We were still using the Aurora 1 for our
23 production collections at that point.

24 Q Okay. So how many different versions were
25 there of the Aurora 1 source code?

1 A That part I don't know. That was, that was
2 started before I ever joined.

3 Q All right. But you were there from the years
4 of 2006 to 2011 --

5 A Yes.

6 Q -- when you guys started doing the --

7 A Yes.

8 Q -- Version 2; is that correct?

9 A Yes.

10 Q So you were there a couple of years?

11 A A few years, yes.

12 Q So how about the time that you were there, how
13 many different versions of the source code of the X-1
14 system?

15 A We didn't do as good a job of keeping track of
16 version numbers back then.

17 Q Yeah.

18 A Again, this is conjecture here. Estimation.

19 Q Yeah, I understand.

20 A 20.

21 Q 20? Okay.

22 A Yeah.

23 Q And each time, the percentage of source code
24 that would change would be different?

25 A Yes.

1 Q Okay. Depending on if it was a minor change or
2 a major change?

3 A Yes.

4 Q Depending on how many lines changed?

5 A Yes.

6 Q Okay. So let's move to Paragraph 4 of your
7 declaration.

8 A Okay.

9 Q Go ahead and familiarize yourself with
10 Paragraph 4.

11 A (Reviewing document.) Okay.

12 Q So the first sentence, you state that the
13 Aurora assists its customers with the evaluation of the
14 condition of their wooden cross-ties ('ties') and other
15 railroad track bed components, including tie plates. Do
16 you see that?

17 A That is correct.

18 Q Is that an accurate statement?

19 A Yes.

20 Q So in addition to wooden cross-ties, what other
21 railroad track bed components does the Aurora evaluate
22 the condition of?

23 A We look for missing fasteners, missing spikes.
24 Well, with the addition of Xi, we look for hollow or
25 rotten ties. We identify, try to identify muddy tracks.

1 There's probably something I'm missing. I mean, plate
2 cut orientation, you know, whether it's differential
3 plate cut or plate cut that's even on both sides of the
4 rail. That's what I'm recalling right now.

5 Q Okay.

6 A There may be additional components.

7 Q Does the Aurora evaluate the condition of
8 concrete cross-ties?

9 A We don't look at the condition of concrete
10 cross-ties except right near the rail seat area to
11 determine if there's rail seat deterioration where the,
12 the concrete fasteners have actually eaten into the
13 concrete itself.

14 Q So the Aurora system evaluates whether there is
15 rail seat abrasion?

16 A Yes.

17 Q Does it evaluate whether there has been
18 chipping in the concrete ties?

19 A We've attempted it.

20 Q Okay. Cracking in the concrete ties?

21 A We can see big cracks. We can't see hairline
22 cracks.

23 Q Okay. Does the Aurora evaluate the rail?

24 A Not specifically. But we do look to see, where
25 there are joint bars, if there's gaps in the rail.

1 Q What about the rail base? Does it look for
2 rail base corrosion, for example?

3 A Well, what's the difference between rail base
4 corrosion and rail seat abrasion?

5 Q Maybe the application? Maybe you find more
6 rail base corrosion in tunnels and curves?

7 A I, I guess I think of those terms somewhat
8 interchangeably.

9 Q Is rail base corrosion applicable to both
10 wooden cross-ties and concrete cross-ties?

11 A No, but rail seat abrasion is similar to plate
12 cut. In concrete ties, it's similar to plate cut on
13 wooden ties.

14 Q Okay. Does Aurora evaluate the condition of
15 ballast?

16 A With the addition of the LIDAR systems, we get
17 approximate ballast coverage.

18 Q Okay.

19 A But not really the -- so yes, that would be a
20 condition of the ballast.

21 Q Okay. And you said the Aurora does not
22 evaluate the condition of the rail?

23 A Other than looking for gaps, from my
24 recollection, other than looking for gaps where there are
25 joint bars.

1 Q What about the spacing of the rail?

2 A The spacing between the two rails?

3 Q Uh-huh.

4 A The gauge?

5 Q Uh-huh.

6 A We've attempted that, too. We're not as
7 accurate at that as we should be, so --

8 Q Okay.

9 A -- from my recollection, we're not delivering
10 that to the customer.

11 Q What about superelevation?

12 A I don't recall us ever reporting that.
13 Technically, I guess with our measurement system we
14 could.

15 Q Okay. So let's turn to Paragraph 6. And so
16 we're talking here about factors in grading wood ties.
17 In addition to plate cut, can you please provide -- what
18 are some other factors that are taken into account when
19 determining the condition of wooden cross-ties?

20 A And this was, again, added later on.
21 Initially, we did not look for splits in ties, or if, if
22 there were edges that were fraying. That was added
23 after, as during the development of the Aurora system.

24 Q Uh-huh.

25 A They were, basically became value-added

1 features. We -- I mean, obviously, you've added the Xi
2 to do that. If the plates are, if the fasteners are
3 missing, if -- with the addition of Xi, hollow ties.

4 Q Does the Aurora system assess the surface
5 condition of the ties?

6 A Yes.

7 Q Does it assess, or does it find cracks in the
8 cross-ties?

9 A Yes.

10 Q Does it measure the size of the cross-ties? Or
11 excuse me, the size of the cracks?

12 A We don't measure it explicitly. We measure the
13 amount of area that appears to have cracks relative to
14 the tie.

15 Q Okay.

16 A But we don't give them measurement in inches as
17 to how --

18 Q Okay. What about the depth of the cracks?

19 A No.

20 Q What about through the use of x-ray technology?

21 A We still can't measure the depth. X-ray just
22 shows us where these conditions occur.

23 Q What about the severity of the cracks?

24 A And the severity, based on, yes, based on the
25 signal return.

1 Q Okay. Can the Aurora system identify splitting
2 of the tie, if the tie is split?

3 A Yes. The Aurora system identifies splits.

4 Q Can it identify tie length?

5 A Yes.

6 Q Tie width?

7 A Yes.

8 Q Spike height?

9 A Yes.

10 Q Tie warpage?

11 A We do -- that is a measurement that we make,
12 yes.

13 Q Skew angle?

14 A Yes.

15 Q Warping?

16 A Yes.

17 Q Curvature of the tie?

18 A Curvature of the tie. You mean is the tie --

19 Q Not so much -- yeah, let's go with that for
20 now.

21 A No.

22 Q Okay. What about just in like a curve of the
23 track and curvature of the tie there?

24 A We do measure curvature.

25 Q Okay. Does it assess whether a tie is missing?

1 A Yes.

2 Q Does it assess whether the tie is broken?

3 A Indirectly, as a result of looking at splits
4 and stuff.

5 Q Okay.

6 A And if it's, if the edge is off.

7 Q What about the positioning of the tie, whether
8 it's improperly positioned, for example?

9 A We measure the distance between ties, so we do
10 report the distance from one tie to the next. We let our
11 customers decide whether it's positioned properly or
12 improperly. But we do look at skew angle and report that
13 information to them also.

14 Q Okay. What about assessing the wooden decay of
15 cross-ties?

16 A That's part of the Xi system.

17 Q Okay.

18 A The x-ray system.

19 Q So any other important metrics for inspecting
20 wooden ties?

21 MR. HERBERHOLZ: Objection, form.

22 THE WITNESS: I'm sure there are. They're not
23 all coming to mind at this particular point in time.

24 Q (By Mr. Reese) And the Aurora source code
25 includes algorithms for assessing these factors, correct?

1 A Correct.

2 Q And the Aurora system includes algorithms for
3 computing a tie grade, tie condition grade, based on
4 these factors, correct?

5 A Yes.

6 Q Can you explain to me how it kind of computes
7 that tie grade, based on those factors?

8 A We feed a bunch of our different measurements
9 into a discriminate analysis algorithm that, based on
10 known ties associated with either the score 1 through 4
11 or 1 through 5, depending on customer desire, and
12 correlate these measurements we've made on this unknown
13 tie to measurements that are made on known ties, known
14 tie conditions, based on audits with customers.

15 Q So the customers kind of decide what factors to
16 include in the condition grade analysis?

17 A They don't decide which factors to use. Our,
18 our team -- I'm not part of these -- goes out and audits
19 with the customers.

20 Q Okay. I see.

21 A And the customer -- between our team and the
22 customer, they decide, oh, this particular tie is very
23 good, it's a 1.

24 Q Okay.

25 A This is a very bad tie, so it's a 4 or a 5.

1 Q Okay. So the customer is providing their
2 subjective opinion as to what they think is more
3 important as it relates to the condition grading of the
4 tie?

5 A That's not exactly true.

6 Q Okay.

7 A Because we actually -- our, our data guy
8 actually determines which factors to use, based on the
9 feedback from the customers.

10 Q Okay.

11 A So the customers don't directly tell us what to
12 use.

13 Q Okay.

14 A But plate cut is definitely used for all of
15 these.

16 Q Right. So are these factors weighted in the
17 tie condition grading?

18 A Yes.

19 Q And how is that weighting determined? Is that
20 by the customer or --

21 A No.

22 Q Okay.

23 A I, I can't tell you, because that's not part of
24 the Aurora system that I work on.

25 Q But there's algorithms --

1 A I know generally what's going on.

2 Q Yeah. But there's algorithms in the source
3 code that run these computations, correct?

4 A Yes.

5 Q And so it would run a computation of tie
6 grading or giving the tie a score based on a weighted
7 summation of these tie condition factors, correct?

8 A I'm not sure "weighted summation" is the exact
9 right word, but --

10 Q Okay. Well, I just --

11 A Similar to that.

12 Q Right. Just taking into account multiple
13 factors.

14 A Multiple variables, yes.

15 Q Multiple variables.

16 A Uh-huh. Yes.

17 Q And applying weighted factors.

18 A Yes.

19 Q Okay. So let's go to concrete cross-ties. And
20 the Aurora source code also includes algorithms for
21 identifying defects and determining the condition of
22 concrete cross-ties?

23 A A little bit differently. There, we
24 concentrate on rail seat abrasion.

25 Q Okay.

1 A We have implemented some mechanisms to, to not
2 grade the ties, per se, but identify potential defects.

3 Q And what are some exemplary defects, potential
4 defects that the system identifies?

5 A If the end of the tie is cracked, cracked off,
6 you know, gross, gross breakage on a tie.

7 Q Okay. Anything else?

8 A We look for fasteners. We identify fastener
9 types and whether they're missing.

10 Q Okay.

11 A On concrete. That's all I'm recalling.

12 Q What about the width and length of concrete
13 ties?

14 A No. We don't see the whole concrete tie with
15 the lenses we use. We just --

16 Q What portion of the concrete tie is analyzed?

17 A It's centered right over the rail. God, I'm
18 guessing on actual width now. 2 feet per rail, maybe.

19 Q Okay.

20 A 2, 3 feet. I'm guessing on the number. If I
21 had the data in front of me, I could tell you.

22 Q So it would assess whether there was a missing
23 concrete tie?

24 A Yeah, it could. I don't know if we report that
25 or not, but yes, it could.

1 Q Okay. And what about if it was improperly
2 positioned?

3 A We don't make the determination of whether it's
4 improperly positioned. We give the customer the data and
5 let them make that determination.

6 Q But you kind of measure -- it measures rail
7 seat abrasion?

8 A Yes.

9 Q And provides that to the customer?

10 A Yes.

11 Q Does it include an algorithm to measure pad
12 wear in concrete ties?

13 MR. HERBERHOLZ: I'm going to object to the
14 scope. This declaration, Mr. Kainer's declaration
15 doesn't make any mention of concrete cross-ties, and I
16 think it's pretty clear you're asking questions that
17 relate to a different IPR and different patent. So
18 hopefully we can return the scope of the questions back
19 to the direct testimony.

20 MR. REESE: Well, just going back to what was
21 at paragraph -- what was that, Paragraph 5, Paragraph
22 4 -- where he says assists its customers, Aurora assists
23 its customers with the evaluation of the condition of
24 their wooden cross-ties and other railroad track bed
25 components, including tie plates. So I'm just

1 investigating what these other railroad track bed
2 components are and how they're inspected.

3 MR. HERBERHOLZ: I think it's pretty clear --

4 THE WITNESS: I'm not --

5 MR. HERBERHOLZ: -- he's talking about wooden
6 cross-ties there.

7 THE WITNESS: Yes.

8 MR. REESE: "And other railroad track bed
9 components."

10 Q (By Mr. Reese) So is another railroad track
11 component the rail? Is it the ballast? Is it concrete
12 ties? I mean --

13 A Okay. I guess I was not referring to concrete
14 ties on this at all.

15 Q So --

16 A I was referring to the components on the rail
17 associated with wooden ties.

18 Q Okay. I'll see if we can find -- but there are
19 wooden cross-ties and concrete cross-ties, correct?

20 A Yes.

21 Q Okay. So in Paragraph 5, you say, "Cameras
22 capture the reflected light, and Aurora generates images
23 of, and data relating to, various track components." Is
24 a concrete tie a various track component?

25 A Of course.

1 Q Okay. So would you then think a concrete
2 cross-tie is within the scope of that sentence?

3 MR. HERBERHOLZ: Objection, form.

4 THE WITNESS: We use the exact same technology
5 to capture wood ties and concrete ties, with the
6 difference, with the difference, only difference being
7 the lens that is provided.

8 Q (By Mr. Reese) And just the Aurora system, in
9 general, inspects concrete cross-ties, correct? In your
10 declaration, you're providing a declaration regarding the
11 capabilities and functionality of the Aurora system; is
12 that correct?

13 A Could you repeat the question?

14 Q So your declaration is focused on the Aurora
15 system.

16 A Yes.

17 Q And the Aurora system inspects concrete
18 cross-ties.

19 A Yes.

20 Q In addition to other railroad track bed
21 components.

22 A Concrete ties and wooden ties.

23 Q Let's take a step back to --

24 A Different algorithms associated with both.

25 Q Yeah. Let's take a step back. So what does

1 the Aurora system inspect? What features of the railroad
2 track does the Aurora system inspect?

3 A I thought I just answered that, but --

4 Q All right. But that includes concrete
5 cross-ties?

6 A Yes.

7 Q The Aurora system inspects wooden cross-ties?

8 A Yes.

9 Q It inspects rails?

10 A It inspects gaps in rails.

11 Q Okay.

12 A We don't determine rail wear.

13 Q It inspects fasteners?

14 A Yes.

15 Q It inspects the ballast?

16 A Yes.

17 Q It inspects the pads?

18 A It doesn't inspect the pads because you can't
19 see the pads directly. But we do take into account pad
20 thickness when we're computing rail seat abrasion on
21 concrete ties.

22 Q It inspects joint bars?

23 A Yes -- it identifies joint bars.

24 Q Okay. It assesses rail base corrosion?

25 A Our concrete measurements do.

1 Q So can you please -- what does the Xi
2 specifically identify and inspect?

3 A Hollow ties.

4 Q For what purpose? What is it assessing?

5 A Essentially the density of the, of the wood
6 ties.

7 Q Okay. And why is that important?

8 A Well, if hollow -- if ties are hollow, they're
9 going to eventually fail and not provide toehold to the
10 track.

11 Q So is that an important factor that it
12 analyzes?

13 A Yes.

14 MR. HERBERHOLZ: Objection, form.

15 Q (By Mr. Reese) Does the -- do the x-rays --
16 does the x-ray technology, or does the Xi identify cracks
17 in the cross-ties?

18 A Does the Xi identify cracks?

19 Q Uh-huh.

20 A Not -- no, not per se.

21 Q What do you mean by that?

22 A The surface, the surface part of Aurora detects
23 the splits.

24 Q Okay.

25 A Aurora Xi may show voids where those splits

1 are.

2 Q So would that help determine the size and depth
3 of those cracks?

4 A Again, we don't determine depth.

5 Q Okay.

6 A And the size is a relative size.

7 Q Okay. And you said the BallastSaver is a
8 separate system?

9 A We have LIDARs on the Aurora system. We also
10 have a specific truck that is called BallastSaver that
11 does not have the standard Aurora collection system on
12 it.

13 Q Do the Aurora systems include GPS?

14 A Yes.

15 Q And how do they use the GPS technology?

16 A We, we fuse it with our gyro data, basically an
17 INS system in our encoder data to give an accurate
18 location of where we are in the physical world.

19 Q Okay.

20 A And correlate that position with, with a
21 milepost.

22 Q Do the Aurora systems account for tilt
23 correction?

24 MR. HERBERHOLZ: Objection, scope, again.

25 We're well beyond the scope of this declaration. And I

1 think it's clear that these questions are being elicited
2 for purposes of another IPR dealing with a totally
3 unrelated patent. And, in fact, I instruct the witness
4 not to answer.

5 MR. REESE: Really?

6 (Counsel conferring off the record.)

7 MR. REESE: You want to take -- we can go ahead
8 and take a break now. It's almost been an hour anyway.

9 MR. HERBERHOLZ: Okay.

10 MR. REESE: Thank you.

11 (Recess from 9:40 a.m. to 9:55 a.m.)

12 Q (By Mr. Reese) So did you discuss anything with
13 Counsel during your break?

14 A We were talking about the Astros and their
15 cheating.

16 Q The Astros? Yeah. Nice. And you understand
17 you're still under oath?

18 A Yes, I do.

19 MR. HERBERHOLZ: Counsel, could I make just a
20 note for the record --

21 MR. REESE: Yes.

22 MR. HERBERHOLZ: -- briefly? Before the break,
23 I objected to some of the questions about concrete tie
24 inspection.

25 MR. REESE: Yes.

1 MR. HERBERHOLZ: And about rail, rail seat
2 abrasion and about tilt correction. The basis for my --
3 the concern of my objections was, among other things,
4 that we're beyond the scope of the direct testimony. But
5 also there's another IPR petition pending, as you know.
6 It's IPR 2019-01581. It's relating to Patent 8,081,320.

7 It's our position that Mr. Kainer isn't here to
8 address concrete tie inspection, rail seat abrasion, tilt
9 correction, or anything that's addressed in this other
10 IPR petition. We're happy to call the Board today if we
11 need to do that to resolve the dispute that we have, but
12 Mr. Kainer is not here to address those questions.

13 MR. REESE: But he is here to address the
14 Aurora system and the source code of the Aurora system,
15 correct?

16 MR. HERBERHOLZ: As it relates to the contents
17 of his declaration, yeah, which is limited to wood ties.

18 MR. REESE: In the declaration, he is the
19 technical, the technical coordinator for the Aurora track
20 inspection system. Correct?

21 MR. HERBERHOLZ: Are you asking me questions?

22 THE WITNESS: That is my title.

23 Q (By Mr. Reese) Yeah. Yeah. That is your
24 title. And the Aurora system inspects various railroad
25 track components, correct?

1 A Yes.

2 Q And the Aurora uses, executes source code when
3 assessing these railroad track components, correct?

4 A Yes.

5 Q Okay.

6 MR. REESE: So I don't see how that's not
7 within the scope, concrete, the inspection of concrete
8 ties is not within the scope of his declaration.

9 MR. HERBERHOLZ: Yeah, and I think we have a
10 disagreement there. So like I said, if we need to call
11 the Board to resolve that, that's fine. But we don't
12 intend to have Mr. Kainer address those issues today.

13 MR. REESE: Okay.

14 Q (By Mr. Reese) Well, I'm going to hand you a
15 copy of a brochure that I've marked as Tetra Tech Exhibit
16 1050 for IPR 2019-00619. And I've also -- I'm also going
17 to hand you the same brochure but within Exhibit 1050 for
18 IPR 2019-00662.

19 MR. HERBERHOLZ: Counsel, were these attached
20 to Mr. Kainer's declaration?

21 MR. REESE: No, they were not.

22 MR. HERBERHOLZ: Okay. I'll just object to the
23 use of them in this proceeding. But go ahead. Do you
24 have another copy of 1050?

25 MR. REESE: Yes.

1 MR. HERBERHOLZ: Thank you.

2 Q (By Mr. Reese) So have you seen these documents
3 before, Mr. Kainer?

4 A I've seen the surface of them. I never read
5 these things.

6 Q Okay. Take your time.

7 A (Reviewing document.) I assume they're
8 identical. I have not verified that, but -- (Reviewing
9 document.) Are these both identical?

10 Q Yes, they are both identical. Could you turn
11 to Page 1, second paragraph, second sentence? By
12 measuring -- the second paragraph says, "By measuring how
13 those x-rays reflect back, the system can produce an
14 image of each wood tie's internal structure that reveals
15 flaws that other inspection methods might miss --
16 everything from hollow sections caused by decay to the
17 depth and size of cracks."

18 A Okay.

19 Q So the Aurora Xi system assesses the depth and
20 size of cracks?

21 A Indirectly. This is marketing material.

22 Q Well, please explain.

23 A Well, again, we don't give a measurement of
24 inches on either depth or size of cracks. We determine a
25 portion, how large of a portion from the backscatter

1 image encompasses the tie area. And the larger that
2 percentage, the worse the condition of the tie, internal
3 condition of the tie.

4 Q And the Aurora system includes source code --

5 A Yes.

6 Q -- to determine that assessment?

7 A Yes.

8 Q Okay. Will you turn to Paragraph 18 of your
9 declaration.

10 A Okay. This paragraph is slightly different
11 from the two, referring to the two different patents.

12 Q Let's go ahead and -- it doesn't matter
13 actually. So whichever one you have in front of you.

14 A Okay.

15 Q Which one is the -- could you just read the --
16 well, which one do you have in front of you? Is it the
17 '329 or the '956? The '956?

18 A The '956.

19 Q Okay. And you state in this paragraph, "I have
20 been informed that claim terms are typically afforded
21 their ordinary and customary meaning from the point of
22 view of a person having ordinary skill in the subject
23 matter of the patent based on the content of the patent."
24 Is that correct?

25 A Yes.

1 Q That's an accurate statement?

2 A Yes.

3 Q So what is your understanding of the meaning of
4 a person of ordinary skill in the art?

5 A One who has some technical experience to be
6 able to understand terms such as blob analysis, what is
7 a, what is a, what is a frame, what is a, what is a
8 contour, et cetera, et cetera.

9 Q Okay. Would you turn to Paragraph 9 of your
10 declaration.

11 A Okay.

12 [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

11/11/2019

1 [REDACTED]
[REDACTED]

3 MR. REESE: Let's take a quick break.

4 (Recess from 10:10 a.m. to 10:21 a.m.)

5 Q (By Mr. Reese) Mr. Kainer, I'm going to hand
6 you a copy of a article entitled "Building Track for
7 Profitability" that is previously marked as Exhibit 2017
8 in each of the 00619 and 662 matters.

9 MR. HERBERHOLZ: Counsel, was this an exhibit
10 to Mr. Kainer's declaration?

11 MR. REESE: No, but it is an exhibit to this
12 proceeding, these matters.

13 MR. HERBERHOLZ: I'll object to its use here.

14 Q (By Mr. Reese) Have you seen this document
15 before, Mr. Kainer?

16 A No.

17 Q I would just like to turn to Page 18. 18 of
18 56. There's an article within the page, it says
19 "Products for High Productivity."

20 A I see that.

21 Q Go ahead and familiarize yourself with that
22 passage there, please.

23 A Should have brought my readers with me.
24 (Reviewing document.) Okay.

25 Q Going to the last sentence of this passage, it

1 says, "Finally, the mathematical algorithms to collect
2 and measure up to 25 various tie assessment metrics,
3 including splits, warping, tie skewing and spike height,
4 were improved, allowing for flexibility in calibrating
5 inspections to consumer-specific criteria, as well as
6 further refining Aurora's ability to locate and identify
7 rail base corrosion early, where applicable." Do you see
8 that?

9 A I do. But I must inform you that this was not
10 part of my deposition.

11 Q Do you mean your declaration?

12 A I mean my declaration. Excuse me. I know. My
13 mistake.

14 Q Does the Aurora system include a processor for
15 executing the mathematical algorithms discussed in this
16 sentence?

17 MR. HERBERHOLZ: Objection, form.

18 THE WITNESS: I believe what they're referring
19 to here is at one point in time we did put a processing
20 system on the truck to try to assess things in near real
21 time. And I'm guessing this was the time frame when that
22 was done. We prototype tested that a few times, and it
23 sort of worked. But we've since abandoned actually
24 having an online processor. All the data is processed
25 back in the office.

1 Q (By Mr. Reese) Okay. So does the Aurora source
2 code execute algorithms collecting and measuring these
3 metrics?

4 A Yes.

5 MR. REESE: I have no further questions.

6 THE WITNESS: Okay.

7 E X A M I N A T I O N

8 BY MR. HERBERHOLZ:

9 Q Just a couple of brief questions, Mr. Kainer.
10 We talked about a number of different track defects that
11 Aurora detects today; is that correct?

12 A Correct.

13 Q And we talked about detection of plate cut, in
14 particular?

15 A Some.

16 Q There were questions about missing fasteners?

17 A Yes.

18 Q There were questions about inspection of joint
19 bars?

20 A Yes.

21 Q And you've been with Georgetown since 2006?

22 A Correct.

23 Q Of all the measurements that were discussed
24 today, the track inspection measurements, which of those
25 is the most important?

1 A Tie plate was the first thing that we
2 implemented in Aurora.

3 Q I'm sorry, tie plate?

4 MR. REESE: Objection, leading.

5 THE WITNESS: Plate cut was the most important
6 thing. We have since, in that time frame between its
7 initial development and now, we have added improvement
8 capabilities that allow us to assess condition of the
9 tie, as well as the condition of the plate cutting, these
10 other metrics.

11 Q (By Mr. Herberholz) And is that true since
12 you've been with Georgetown Rail Equipment Company since
13 2006?

14 A Yes. That Aurora plate cut measurement was in
15 the original Aurora system.

16 MR. HERBERHOLZ: I have no further questions.

17 R E - E X A M I N A T I O N

18 BY MR. REESE:

19 Q So, Mr. Kainer, is assessing the surface
20 condition of ties a factor when grading wood ties?

21 A Could you repeat the question?

22 Q Is assessing the surface condition of ties a
23 factor when grading wooden ties?

24 A Yes.

25 Q Does the Aurora source code include algorithms

1 to assess the surface condition of ties?

2 A Yes.

3 Q Is finding cracks a factor when grading wood
4 ties?

5 A Yes.

6 Q Does the Aurora source code include algorithms
7 for finding cracks in cross-ties?

8 A Yes.

9 Q Is splitting of the tie a factor when grading
10 cross-ties?

11 A Yes.

12 Q Does the Aurora source code include algorithms
13 for determining a split in a tie?

14 A Yes.

15 Q Is tie length and tie width factors when
16 grading ties?

17 A I know we measure that. I am not -- I believe
18 we do use length in some of the, for some of our
19 customers, but I'm not as familiar with that aspect of
20 the source code.

21 Q So the -- does the Aurora source code include
22 algorithms for identifying the length and width of ties?

23 A Yes.

24 Q Is spike height a factor when grading wood
25 ties?

1 A Yes.

2 Q Does the Aurora source code include algorithms
3 for identifying spike height?

4 A Yes.

5 Q Does the Aurora source code -- excuse me -- is
6 tie warpage a factor when grading wood ties?

7 A Yes.

8 Q Does the Aurora source code include algorithms
9 for determining tie warpage?

10 A Yes.

11 Q Is skew angle of a tie a factor when
12 determining the condition of a tie?

13 A Again, it can be, depending on customer, but we
14 do measure it.

15 Q Does the Aurora source code include an
16 algorithm for identifying the skew angle of a tie?

17 A Yes.

18 Q Is the warping of a tie a factor when grading
19 wood ties?

20 A Again, for some customers, yes. For some
21 customers, no. But we do measure it and report it.

22 Q So the Aurora source code includes an algorithm
23 for identifying the warping of a tie?

24 A Yes.

25 Q Is the curvature of a tie a factor when

1 determining the grading of a tie?

2 A When you say the curvature of a tie, are you
3 referring to the curvature of the track or the curvature
4 of the tie itself?

5 Q Curvature of the track.

6 A Yes. Some of our models include grading
7 differently in height and curvature areas.

8 Q So the Aurora source code includes algorithms
9 for determining the curvature of the track?

10 A Yes.

11 Q And curvature of the tie?

12 A I'm not sure what you mean --

13 Q Okay.

14 A -- by curvature of the tie.

15 Q Curvature of the tie, okay. Is whether or not
16 the tie is missing a factor for determining the condition
17 of a tie?

18 A No, because we can't determine the condition of
19 the tie if it's not there.

20 Q Does the Aurora source code include algorithms
21 for assessing whether the tie is missing?

22 A Yes.

23 Q Does the Aurora system include algorithms for
24 determining whether the tie is broken?

25 A We don't have a parameter broken, per se, but

1 if width happens to be much more smaller, it could be
2 broken in that dimension. If it's broken on the outside
3 edge, the length will be different. So depending on how
4 the model is created to grade particular ties, it could
5 be a factor.

6 Q Okay. Is the positioning of a tie a factor
7 when grading cross-ties?

8 A What do you mean by the positioning of a tie?

9 Q Improper positioning of the tie, is that a
10 factor when grading cross-ties?

11 A I do not believe that we use that in our
12 models. But, but we do report tie positions relative to
13 each other.

14 Q So the Aurora source code includes algorithms
15 for assessing the position of the tie?

16 A Yes.

17 Q Is the decay of a tie a factor when determining
18 the condition of the tie?

19 A Yes, with our Xi system, with the addition of
20 our Xi system.

21 Q Okay. Does the Aurora source code include
22 algorithms for assessing the decay of cross-ties?

23 A Yes.

24 Q Are there any other metrics that you're aware
25 of for inspecting wooden cross-ties, or factors for

1 inspecting wooden cross-ties?

2 A Well, you left plate cut out of there.

3 Q Okay. So you said the Aurora Xi system
4 includes x-ray technology, correct?

5 A Yes.

6 Q And that's used to determine the condition of
7 wooden cross-ties?

8 A It's part -- it is a factor in determining the
9 condition of cross-ties. We also use the surface
10 measurements.

11 Q So the x-ray algorithms -- so does the Aurora
12 source code include x-ray algorithms?

13 A Algorithms to process the x-ray data.

14 Q Okay. The x-ray algorithms are used to
15 identify wooden decay and deterioration?

16 MR. HERBERHOLZ: Objection, asked and answered.

17 THE WITNESS: Excuse me? Could you repeat
18 that, please?

19 Q (By Mr. Reese) Are the x-ray algorithms in the
20 Aurora source code used to identify wooden decay and
21 deterioration?

22 A Yes.

23 Q Are the x-ray algorithms in the Aurora source
24 code used to find cracks in the cross-ties?

25 MR. HERBERHOLZ: Objection, asked and answered.

1 MR. REESE: I don't believe I asked this
2 question with respect to the x-ray algorithms.

3 MR. HERBERHOLZ: I thought we spent the whole
4 morning asking those questions.

5 THE WITNESS: Again, it measures relative
6 voids, density loss within the tie.

7 Q (By Mr. Reese) Okay. Are the x-ray algorithms
8 in the Aurora source code used to determine the size of
9 the cracks?

10 MR. HERBERHOLZ: Objection, asked and answered.

11 THE WITNESS: Again, it's relative to the whole
12 area of the tie. We don't give them a length and width
13 measurement in inches or centimeters, or whatever unit of
14 measurement you choose.

15 Q (By Mr. Reese) Do the x-ray algorithms in the
16 Aurora source code determine the severity of the cracks?

17 MR. HERBERHOLZ: Same objection.

18 THE WITNESS: Yes, we do, because the surface,
19 we're going to see many more cracks in the surface,
20 detect many more cracks on the surface of the tie. So
21 indirectly, the answer is yes.

22 MR. REESE: Okay. I have no further questions.

23 MR. HERBERHOLZ: No further questions. Thank
24 you.

25 (Deposition concluded at 10:34 a.m.)

CHANGES AND SIGNATURE OF WITNESS

WITNESS NAME: JOHN KAINER

DATE OF DEPOSITION: FEBRUARY 12, 2020

PAGE/LINE	CHANGE	REASON FOR CHANGE
6		
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I, JOHN KAINER, have read the foregoing deposition and hereby affix my signature that same is true and correct, except as noted above.

JOHN KAINER

1 UNITED STATES PATENT AND TRADEMARK OFFICE

2
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD

4 TETRA TECH CANADA INC., § CASE IPR 2019-00619
Petitioner, § PATENT NO. 7,616,329
5 VS. § -and-
6 §
GEORGETOWN RAIL EQUIPMENT § CASE IPR2019-00662
7 COMPANY, § PATENT NO. 9,441,956
Patent Owner. §

8
9
10 - - - - -
REPORTER'S CERTIFICATION

11 CROSS-EXAMINATION OF JOHN KAINER

12 FEBRUARY 12, 2020
13 - - - - -

14 I, MOLLY CARTER, Certified Shorthand Reporter in and
15 for The State of Texas, hereby certify to the following:

16 That the witness, JOHN KAINER, was duly sworn by the
17 officer and that the transcript of the cross-examination
18 is a true record of the testimony given by the witness;

19 I further certify that pursuant to FRCP Rule
20 30(e)(1), that the signature of the deponent:


21 XX was requested by the deponent or a party before
22 the completion of the deposition and returned within 30
23 days from date of receipt of the transcript. If
24 returned, the attached Changes and Signature Page
25 contains any changes and the reasons therefor;

1 _____ was not requested by the deponent or a party
2 before the completion of the deposition.

3 I further certify that I am neither attorney nor
4 counsel for, related to, nor employed by any of the
5 parties to the action in which this testimony was taken.

6 Further, I am not a relative or employee of any
7 attorney of record in this cause, nor do I have a
8 financial interest in the action.

9 Certified to by me on this 13th day of February
10 2020.

11
12
13 
14 MOLLY CARTER, CSR, RPR, ERR
CSR NO. 2613, Expires 04/30/2022

15 Lexitas - Firm Reg. No. 17
16 1016 La Posada, Suite 294
17 Austin, Texas 78752
18 Telephone: (512) 465-9100
19
20
21
22
23
24
25

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