

UNITED STATES OF AMERICA

NATIONAL TRANSPORTATION SAFETY BOARD

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Investigation of:

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TOWING VESSEL *MARQUETTE WARRIOR*
NEAR VICKSBURG, MISSISSIPPI
ON NOVEMBER 21, 2021

Accident No.: DCA22FM005

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Interview of: ROBERT WARDEN, Owner
BOB HARRISON, Shop Foreman
Warden Electric

Via telephone

Friday,
January 7, 2022

APPEARANCES:

BART BARNUM, Investigator
National Transportation Safety Board

██████████ ██████████ Chief Warrant Officer
United States Coast Guard

ADAM DAVIS, Attorney for Marquette Transportation Co.
Phelps Dunbar

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I N T E R V I E W

1
2 MR. DAVIS: -- send it to you all, so I can get that to you
3 all today. But sure, I'll stay on the line, just let me know if
4 you need anything, but otherwise, I'll just stay quiet until the
5 end of the meeting.

6 MR. BARNUM: That's super, thank you.

7 Well, okay, Mr. Warden, like I said, this is Bart Barnum from
8 the NTSB. I appreciate you taking the time today -- you and
9 Mr. Harrison to answer a couple of questions we had and also thank
10 you for that report you sent over. It was very informative.

11 MR. WARDEN: Absolutely.

12 MR. BARNUM: So, with that being said, I guess we'll get
13 started here. Do you have any objection for us to record this
14 interview today?

15 MR. WARDEN: No.

16 MR. BARNUM: Okay, thank you, and so today is January 7th,
17 2022, we're conducting a telephonic interview with Mr. Rob Warden
18 from Warden Electric and his associate Mr. Harrison. On the line
19 today from the Coast Guard, [REDACTED] [REDACTED] as well as
20 Mr. Adam Davis, counsel representing Marquette. This interview is
21 in conjunction with the loss of steering and grounding of the
22 *Marquette Warrior*, which occurred on November 21st, 2021, at
23 approximately 12:10 p.m.

24 INTERVIEW OF ROBERT WARDEN AND BOB HARRISON

25 BY MR. BARNUM:

1 MR. BARNUM: All right, so just my first question, Mr.
2 Warden, to you is basically I know you mentioned most of this in
3 that report you sent over, but if you could for us on the line
4 today just kind of explain your understanding of the casualty and
5 kind of why we're talking to you today? What was your involvement
6 with the generator and what is your current involvement with it?

7 MR. WARDEN: I guess our -- two parts to that I guess, our
8 initial involvement to the original generator goes back to last
9 January. January 21st, 2021 is when the generator originally came
10 to our facility. I believe it was just needing a standard
11 reconditioned machine work, replace the bearing. We do these
12 hundreds of times a year and we had that ready to go right at
13 about a week later, almost to the day was when our last labor day
14 was on January 28th.

15 It was not then picked up until February 3rd, 2021, which we have
16 a signed and dated delivery ticket, and then the next thing we
17 knew about it was it did come back to our facility on November
18 29th of 2021.

19 We noticed the terminal block -- it was noted on the work
20 order, nothing, you know, out of the ordinary -- or nothing was
21 stated when it did come back. An estimate was given to Marquette
22 and approved, again, nothing was said as far as that the generator
23 was just in your facility, it was just repaired earlier. We got
24 the approval and then a few days later, I received a call from one
25 of the port engineers asking about certain situations with the

1 wiring and that's when we first started to get involved with it,
2 that there was a potential issue with this generator.

3 MR. BARNUM: Okay, understood. Now, you said you conducted a
4 standard refurbishment on the refurbished one of these, could you
5 just -- and you said bearings you change out. What else is done
6 in a standard refurbishment and what was done on this one, do you
7 recall?

8 MR. WARDEN: I'm going to allow our shop foreman, Mr. Bob
9 Harrison, to explain that because he can go over the detailed
10 steps better than I can.

11 MR. BARNUM: Thank you.

12 MR. HARRISON: Okay, so on a standard recondition, once they
13 come in, we tear these things down, search the three phase linings
14 as far as the main stater, exciter, armature, do ground testing on
15 all the windings. We do a voltage (indiscernible) across the main
16 armature to make sure that we don't have a shorted pole or an
17 oddity as far as -- the generator itself is not magnetizing on one
18 pole or not enough compared to the others. They should all be
19 equal. At that point, we do a total cleaning, baking, we redid
20 the staters and the varnish, and then re-baked them to make sure
21 that we have grip, installation integrity on the linings
22 themselves.

23 All the diodes are checked, if there's any signs of heat or
24 distortion, whether they've been bent or disturbed, they get
25 changed out. Of course, the rear bearing wall which gets changed

1 out as standard procedure. During that testing, we will put
2 a -- test the balance of the rotor and then once we do a resub on
3 this unit, we will go ahead and we spin test it here, bring it up
4 to voltage to make sure that we're putting out what the boat is
5 wired for on all three legs. And then, of course, from three legs
6 to ground, we make sure everything's correct. So, once that is
7 done, it is best you patch it up and deliver it back to that
8 customer.

9 MR. BARNUM: Okay, now how about documentation for this
10 particular refurbishment, do you document everything that was
11 done? How do you keep track of --

12 MR. HARRISON: Yes.

13 MR. BARNUM: You do?

14 MR. HARRISON: When we tear this down, all out readings as
15 far as our voltage drop readings, our resistance readings are all
16 documented on the work order. And then when it leaves, our
17 voltage readings is documented on it, what we -- what it ran
18 voltage wise and -- you know, so we have a record of it down the
19 road.

20 MR. BARNUM: Okay.

21 Mr. Warden, would that be possible -- would it be possible
22 for us to get our hands on that and review that?

23 MR. WARDEN: Yes, and I can send it to you right now or after
24 the meeting.

25 MR. BARNUM: All right, thank you. It's my understanding in

1 this particular generator, the voltage was also changed.

2 MR. HARRISON: Yes, the voltage was initially -- it was a 208
3 volt motor -- generator and it was changed over to 480 volts when
4 they redid the slope.

5 MR. BARNUM: And is that something that you all accomplish in
6 your shop and how is that done?

7 MR. HARRISON: Yes, so that is strictly just an external
8 connection that is done on a -- on the terminal plate itself and
9 we do that and set it up for what the customer requests prior to
10 leaving it. This way when we do our spin test, we know that it is
11 hooked up and it's putting out the way it's supposed to.

12 MR. BARNUM: Okay, so you change the voltage by, what, un-
13 volting (sic) some --

14 MR. HARRISON: Resetting the windings -- main state of the
15 windings.

16 MR. BARNUM: Okay.

17 MR. HARRISON: Yeah.

18 MR. BARNUM: And then those are tightened, and then the
19 generator's tested before it leaves your shop to make sure it's
20 the right voltage.

21 MR. HARRISON: Yeah, correct.

22 MR. BARNUM: All right, so now I kind of want to shift to
23 the -- when the generator was returned to you all, I guess in the
24 end of November. If you can just walk me through that -- I don't
25 know, either one of you? What did you see when you received it?

1 I understand initially that you had a work order just to repair it
2 and then after, you found out that there might've been some damage
3 in there. So, what did you see for damage and what do you think
4 happened?

5 MR. HARRISON: Okay, so initially when this thing came in, we
6 had seen that the -- we had a wiring harness from the upper
7 control box, which is basically your voltmeter, end meter, engine
8 controls, that type of thing. That was draped down and actually
9 rubbed onto a terminal post from the main stater. It had shorted
10 out and caused one of the leads to mark off of the main stater at
11 that terminal box. It also at that point had marked the harness
12 in two. So, that was the initial assessment, the rest of the
13 generator was not affected. We did go through and verified
14 everything, you know, a normal procedure as far as testing
15 windings, and voltage drop, and all that again because that's
16 just -- everyone that come is gets that done no matter what.

17 MR. BARNUM: And how did it test?

18 MR. HARRISON: The generator itself tested find. Everything
19 in it was fine. We did have to, of course, return the lead that
20 had burnt and replace the terminals on there going through the
21 terminal block and also the terminal block.

22 MR. BARNUM: Okay, so the terminal block, the leadings, and
23 the wiring harness were all damaged components you replaced?

24 MR. HARRISON: Yes, and I think they have the pictures for
25 those showing that.

1 MR. BARNUM: Yes, and that's kind of my next question. I do
2 see the pictures in your report kind of showing where the control
3 box is mounted directly on top of the generator. So, this harness
4 you're speaking of, just to help me visually, that ran from that
5 black control box down into the actual insides of the generator,
6 correct?

7 MR. HARRISON: That is correct. That's how they're wired,
8 yes.

9 MR. BARNUM: Okay, and the terminal block --

10 MR. HARRISON: Inside the generator and (indiscernible).

11 MR. BARNUM: I'm sorry, go ahead and finish.

12 MR. HARRISON: Inside the generator itself, there are current
13 transformers on your leads and extension leads that go from that
14 terminal block and the generator main leads up to that black
15 controller that you see in the top of this generator.

16 MR. BARNUM: Okay, yes. So, I don't know if you had a chance
17 to look at the pictures that we sent over yesterday that show some
18 damaged wiring within the generator. You can see those current
19 transformers, you can see a terminal blocked. Did you have a
20 chance to look at those?

21 MR. WARDEN: Yes, and I'm printing them out right now. Yes,
22 we had a little bit better review of them on our phones.

23 MR. BARNUM: Okay, I'm just trying to understand what I'm
24 looking at here and I think you guys would be able to help me.
25 The terminal block in your report is a fiber block. It looks like

1 you removed one of the posts from it. Is that the same block that
2 I'm looking at in these pictures that I sent you?

3 MR. HARRISON: Yes.

4 MR. BARNUM: Just on your picture, you have all the leads
5 removed and all the wiring removed.

6 MR. HARRISON: Correct.

7 MR. BARNUM: Okay, so explain to me how this could happen?
8 How did this wiring harness -- how did it come in contact with
9 those posts on that terminal block?

10 MR. HARRISON: The way the harness is laid in there, I can
11 only assume that it was laid down across it and it was rubbing on
12 that terminal post. We do not wire the generators. Once they
13 leave here, we have no control over that, so I don't know how they
14 do it out there -- or on the boat when they do installings. For
15 us here, it's not a -- when we test them here, the harness itself
16 is off to the side. So, once we put the cover back on this thing,
17 you ship it back to the shipyard or to the warehouse, or wherever
18 it's going to, at that point it's whoever is putting this thing on
19 runs the leads where he can run them.

20 MR. BARNUM: Okay, that wiring harness, where is that
21 attached within the terminal walk and what exactly are those wires
22 for?

23 MR. HARRISON: Okay, so on the -- if you're looking at the
24 terminal block with all the wires and everything on it, you will
25 see some that are going up underneath the nuts and some smaller

1 wires -- not the big, thick wires, the smaller wires.

2 MR. BARNUM: Yes, sir.

3 MR. HARRISON: Okay, so those are what we call sensing wires.
4 Those wires come off of there and go up to your voltage regulator,
5 that's what regulates the output and maintains the output voltage
6 of the generator. Other leads that are in there go to -- you look
7 at one of the pictures, you'll see what looks like a donut wrapped
8 around the main line.

9 MR. BARNUM: Yep.

10 MR. HARRISON: Those are your current transformers. So,
11 those leads also come off that current transformer and then go up
12 to that black box up top to (indiscernible).

13 MR. BARNUM: Okay.

14 MR. HARRISON: So, you also have the main lugs side, you'll
15 see some smaller leads. Those are your voltage leads that
16 actually go up to your voltmeter and amp meter gauge panel up top
17 so they can actually read the voltage that's just generally
18 putting out while it's running. That's pretty much all the small
19 leads that are coming down into this control.

20 MR. BARNUM: Super, so if you've got them printed out now,
21 that second picture that was in the group that I sent you, can
22 you -- are you able to see that photo? It shows the terminal
23 block with some -- a damaged ring terminal in one of the main
24 leads.

25 MR. HARRISON: Yes.

1 MR. BARNUM: Okay, so that corrugated -- it looks like the
2 same harness on your picture that corrugated sheet jacketing on
3 the group of wires. Is that the same wiring harness which you
4 have a picture of in your report that you cite the damage?

5 MR. HARRISON: Yes, so that is the wire -- so, when it came
6 into us, the wire loom and the wires were basically severed at
7 that point. In this picture, they look like they're still all
8 together, but I think once they moved this thing around, they were
9 actually severed.

10 MR. BARNUM: Okay, what else are -- do you see in that
11 picture? I mean, I think I described it as one of the main leads
12 that looks like it's kind of burned off. Is that accurate or what
13 else are you seeing for damage?

14 MR. HARRISON: Okay, so -- yeah, so that one terminal post
15 right there is the initial cause. The damage is right there. The
16 two main leads that you're looking at going to that post, there's
17 still one attached to it and then one burned off right there.
18 Those are actually wire number five and number eight, which are
19 the center tap of the winding part of the connection of this
20 winding for high voltage. So, both of those actually went to that
21 terminal post along with a small sensing lead and that's it.

22 MR. BARNUM: Okay.

23 MR. HARRISON: So, main lines were coming on the opposite
24 side.

25 MR. BARNUM: Okay, and then there's more damage on the next

1 photo, three, kind of showing the same thing. Now, looking at
2 these photos, would you -- I mean, to me -- not as an electrician,
3 but to me, having some experience with these things having seen
4 something like this happen before, it almost looks like that is
5 the initiating event. That looks like, you know, the major -- the
6 most damage there. Would you agree with me or how would -- you
7 know, having a main lead like that blow it off, how would that
8 happen?

9 MR. HARRISON: Well, without being there, it's just going to
10 be a hypothesis on my part. But the leads that you see -- the
11 small leads that you see, as they start -- if they're rubbing
12 against a nut or dredge on this thing, this thing starts to arc.
13 So, those leads go from what we consider phase A, B, and C
14 respectively and should not cross or arc out to another one. So,
15 if they start to rub through and do arc out, it's kind of like a
16 welding arc, it just starts to heat up and there's a point where
17 you're stuck having melt down as far as the wires, terminals, that
18 type of thing, and then that's what happens.

19 MR. BARNUM: Okay. All right, understood. Would another
20 theory be -- could one of these ring terminals -- one of these
21 leads, could they become loose, could they rotate?

22 MR. HARRISON: If they were rotated, I guess they could come
23 loose. The damage that I've seen as far as when it came in here,
24 we don't feel it was a loose connection that initiated this.
25 Through our past experience, it looks to be a arcing or a rubbing

1 of these sensing leads that had actually caused this damage.

2 MR. BARNUM: Okay. All right, so these main leads, these
3 lugs, these are actually -- these would've been the taps that you
4 would've had to change to change the voltage, right, on this
5 generator -- move these wires around?

6 MR. HARRISON: Yes.

7 MR. BARNUM: Okay.

8 MR. HARRISON: That is correct.

9 MR. BARNUM: And then once you moved them, how are they
10 attached? I see that -- what is that, a lock nut? How are they
11 secured?

12 MR. HARRISON: Okay, so these -- this particular unit here
13 was secured with -- these are half-inch 13 studs with a locking
14 nut and -- excuse me, locking washer and nut that would tighten
15 down, compressing the --

16 MR. BARNUM: Okay, are they torqued at all -- are they -- is
17 that a torqued connection?

18 MR. HARRISON: They can be a torque connection. We have
19 never torqued these as far as a (indiscernible), it's never been
20 required. Typically, when these things go out to the boat, the
21 electricians make their connections, bring their leads in from the
22 boat, and then do all the final tightening and, you know, wiring
23 as far as what they need on the boat. So, for us here, torquing
24 them all and then they go out there, there have to -- they undo
25 some of these connections, and then put their connections on, and

1 then tighten them all back down, so it's kind of redundant to do
2 that.

3 MR. BARNUM: Okay, and then that kind of leads me right into
4 my next question. I was kind of under the impression that once
5 the generator left your facility, it was kind of like a turned key
6 product, they bolted it up to the prime mover and maybe plugged a
7 couple things into the control box, but there wasn't anything that
8 needed to do within the generator itself. I'm hearing from you
9 something a little different. What inside the generator here are
10 they adding, are they having to unbolt and retighten?

11 MR. HARRISON: Okay, so the generator itself is repaired and
12 sent back as a unit and you were correct as far as having it
13 mounted up. But they do have to get into the control box and when
14 they initially came down here, they had lead it on with the same
15 thought that they don't have to get into the control box in order
16 to do anything once it's -- you know, once it's bolted to the
17 engine. Well, you can't hook it to your boat without getting into
18 this control box and removing leads, and removing nuts, and
19 putting your lines on. So, if you're look at this picture, the
20 (indiscernible) that you see -- and I guess it's on -- what is it,
21 picture three, is that right?

22 MR. WARDEN: Two.

23 MR. HARRISON: Picture two.

24 MR. BARNUM: Yes, sir.

25 MR. HARRISON: Okay, see on the far, top righthand corner,

1 there is a real thick main lead beside the current transformer
2 going to that first stud?

3 MR. BARNUM: Yes.

4 MR. HARRISON: So, that right there, that is one of their
5 main leads, so those nuts inside have been removed and if you'll
6 notice that our lead that is going to the current transformer is
7 on top of their lead, which means that they've taken the lead that
8 we had bolted down initially off, put their lug on there, and then
9 put ours back on top, and then tightened it down.

10 MR. BARNUM: Okay, great, understood. Those -- if we're
11 looking at the same picture two, the lugs, the leads on the -- I
12 guess to the right of the photo, those are the ones that are going
13 to their switch boards?

14 MR. HARRISON: Going to their switchboards.

15 MR. BARNUM: And then the ones closer to --

16 MR. HARRISON: So, when we --

17 MR. BARNUM: The one with the blown-out lead, the ones on the
18 left of the photo, those would not have to be removed, those
19 would've been tightened and secured in your shop?

20 MR. HARRISON: Yes, so that is something that would've been
21 tightened here and unless they changed the voltage or adding a
22 synching lead for another meter or something like that. You know,
23 again, these are all things that we had no control over once that
24 leaves here.

25 MR. BARNUM: Right.

1 MR. HARRISON: A lot of times the generator might come in at
2 one voltage, send it out, and then they hook it for another
3 voltage out there or they change that control box out. It's a lot
4 of different things that happen once it leaves our facility.

5 MR. BARNUM: Okay, now that -- now the wiring harness and all
6 the sensing wires, it looks like in the picture I'm looking at
7 that they're attached to the generator side lugs, not the shipside
8 lugs, not the ones that they would've had to change out. Is that
9 correct?

10 MR. HARRISON: Now, there are some current transformers that
11 you see on the right side where they put their terminals at.
12 Those leads from the current transformers are a part of that wire
13 room that you see going across there on that burned terminal?

14 MR. BARNUM: Yep, okay.

15 MR. HARRISON: And then the sensing leads are also -- you'll
16 see some small sensing leads on that side also that is part of
17 that wire loom that comes back to the --

18 MR. BARNUM: Now, from -- coming down from the control box,
19 this wiring harness that is in question here, is that -- I mean,
20 is there a bunch of slack in that, or is it just enough, or how is
21 it secured so it doesn't do this?

22 MR. HARRISON: So, there's enough slack inside this wire loom
23 that when they remove this top, block control box and the plate
24 that it mounts to, they unbolt that and they slide that off to the
25 side so they can get in there and make all their connections and

1 then that is put back up on top.

2 MR. BARNUM: Okay.

3 MR. HARRISON: So, in theory, this thing should be run when
4 they put their control box back on top, this thing should be run
5 off of the side so we don't have these sitting by themselves on
6 these berms.

7 MR. BARNUM: Okay, now I guess this may be a question for
8 them as well, but why are they moving that top panel with the
9 control box on it? It looks like there's two side panels that you
10 can easily take off to attach your shipboard leads on?

11 MR. HARRISON: Yes, there is two side panels that you can
12 take off. The accessibility and the room, it just tends to be
13 easier for them to take the top of the box off.

14 MR. BARNUM: Okay, but just to be clear, we don't actually
15 know if that's what they did?

16 MR. HARRISON: No, I do not.

17 MR. BARNUM: Okay.

18 MR. HARRISON: Again, once it leaves this facility, I have no
19 idea who's been into this box, what's been changed, you know, I
20 don't have any idea.

21 MR. BARNUM: Okay, looking at it the way it came back --

22 MR. HARRISON: All they did --

23 MR. BARNUM: Looking at it the way it came back to you,
24 Mr. Harrison, was there those sensing wires, that wiring harness,
25 did it look like it was just shoved in there? Did it look like

1 someone had moved those wires around since it left your shop or
2 was it kind of -- did it have the same wire nuts on it that you
3 put on it when it left? Was it -- did it look like someone had
4 been in there?

5 MR. HARRISON: Well, I know that somebody has been into the
6 box. The problem we have is when it came back to us, as I said in
7 the beginning, this harness is -- was basically severed. So, at
8 some point, it did not look like this when it initially had come
9 back in.

10 MR. BARNUM: Right.

11 MR. HARRISON: The harness is actually severed in two
12 separate pieces. The wires were laid out there and the wire loom
13 itself was -- just had the butt ends sticking out from it.

14 MR. BARNUM: Okay, thank you for all that. So, just a couple
15 more questions here I think.

16 MR. HARRISON: I can tell you --

17 MR. BARNUM: Go ahead, Bob.

18 MR. HARRISON: I can tell you that typically, these things
19 when they -- when we wire these things up, if you'll notice on
20 this picture two here, the bottom righthand corner, you'll see a
21 wire tie with one of the (indiscernible) leads strapped to the
22 bead?

23 MR. BARNUM: Yep.

24 MR. HARRISON: Okay, so are (indiscernible) leads, when they
25 leave here, we strap them to those leads to keep them facing out

1 of our terminal block, not to go into the terminal block. So,
2 it's -- unfortunately for us, you know, it's hindsight being what
3 it is, I can tell that -- you know, I know that they've been into
4 the box in -- I think it's picture three, there's actually a
5 wiretap that is laid up on top of the terminal block that's either
6 been cut or severed.

7 MR. BARNUM: Yes.

8 MR. HARRISON: So, these have been moved at some point and
9 again, I don't know when this thing was out at our shop or in the
10 six months prior to them being put back on the boats.

11 MR. BARNUM: Have you -- in your experience, have you
12 seen -- I'm assuming you've seen a generator in a similar state,
13 but have you heard of, you know, these lugs loosening up over
14 time, whether it be from vibration, or heat fluctuations, or what
15 not?

16 MR. HARRISON: Any lug, any screw-type terminal that is under
17 a load or a heat situation can -- you know, the copper consistency
18 of the lugs themselves can loosen up. You know, it's no different
19 than your household lugs and your screws, so they can loosen up.
20 With the vibration and everything that's on here, I don't know
21 what procedures are as far as checking with the boat as far as
22 their usage or what not if they tighten them periodically or
23 whatever. But, yeah, any type of compression type fitting to it
24 can come loose, yeah.

25 MR. BARNUM: If that compression type fitting was tightened

1 properly, would you expect it to come loose after 600 operator
2 hours?

3 MR. HARRISON: No, I would not.

4 MR. BARNUM: Okay. All right, looking your report, I just
5 want some identification things here, the -- I guess the first
6 picture in your report, there's a fuse -- there's a bank of fuses
7 there next to the terminal block. What are those fuses for?

8 MR. HARRISON: That is actually sitting beside the inside of
9 that black box.

10 MR. BARNUM: Oh, okay, that's what confused me.

11 MR. HARRISON: (Indiscernible) green cover, those three fuses
12 are going up to your voltage meters up top.

13 MR. BARNUM: Okay, so that picture one, it's not
14 actually -- those aren't allocated, they're actually on the cover
15 of the control box?

16 MR. HARRISON: That's correct. That terminal box has been
17 set onto the cover so we can get in there.

18 MR. BARNUM: Okay, so those fuses you said go to -- what did
19 you say, a voltage meter?

20 MR. HARRISON: Yeah, there's a -- it's like a switch up there
21 from A, B, and C phase and voltage and average so it can read a
22 monitor.

23 MR. BARNUM: So, if someone needed to access these fuses to
24 change one out if they had changed one, they wouldn't actually be
25 going within the generator's terminal box, they could be doing

1 this from the control box above?

2 MR. HARRISON: That's correct, yes.

3 MR. BARNUM: Right, okay. You said the generator is fixable,
4 what -- how much is it going to cost to fix it?

5 MR. HARRISON: I think we had that estimated around 28
6 hundred dollars. A good portion of that is the terminal block.
7 For some reason, (indiscernible) puts premium on those. But other
8 than just a slight recondition and, you know, doing the standard
9 procedure that we do when these generators come in, again, this
10 was estimated out before we knew the true cause and everything
11 that happened on it.

12 MR. HARRISON: Okay, and I'm wrapping up here, this might be
13 my last question just maybe to you, Mr. Warden or Mr. Harrison,
14 maybe both. What could have been done in this instance to prevent
15 this from happening?

16 MR. HARRISON: There's a -- hindsight being what it is, I
17 mean, there's a lot of different procedures that can be tested,
18 but human nature being what it is, you know, these things can be
19 torqued down. You know, those (indiscernible), they bounce,
20 they're jarred, it's not uncommon to have connection issues or a
21 bolt come loose, I'm sure. We have -- you can tighten these down
22 to certain torque rating, check them periodically. The issue is
23 if it's a torquing problem, you know, that's one thing. My
24 personal opinion on this from the get-go, the harness itself, it
25 needs to be not located on top of the terminal block. So, when

1 that box is reset -- or re put onto this generator, that wiring
2 harness needs to be routed in such a manner that these wires are
3 not crisscrossing one another on top of this terminal block. You
4 know, these threads on top of these terminals are, in fact, sharp,
5 so they will ware just because the normal vibrations with the
6 engine running and the generator vibrating.

7 MR. BARNUM: So, just some standard housekeeping or how would
8 you get in there after you reassemble --

9 MR. HARRISON: Well, I mean, initial instillation, I guess,
10 you know, I would want to make sure that this thing is routed off
11 to the side and not draped across the leads like they are now; you
12 can have a burnout like this. We have just recently sold them
13 another terminal block for I guess another vessel that they had
14 a -- during their mission testing or whatever, they found another
15 incoming lead from their ship that was burned. So, I think
16 they're making some changes to verify and check things
17 periodically, which is a good thing to do, and again, I don't know
18 their procedures, I don't know any of the boat line's procedures
19 out here and what they require or don't require. I'm talking from
20 a repair end of it. If I'm wiring a box up here, I don't want my
21 leads just draped across the terminals, I don't want them pinched
22 between other wires, or (indiscernible) in the housing, so I will
23 want them routed in such a manner that, you know, that's not going
24 to happen or the chances of that happening are going to be slim to
25 none.

1 MR. BARNUM: You said you didn't actually torque the main
2 connections when it leaves the shop, you just tighten them. Is
3 there any kind of check? I mean, is there quality control, is
4 your mechanic -- will he attach the leads and then you come behind
5 him and put a wrench on it too? How is that confirmed that those
6 connections are tight.

7 MR. HARRISON: Okay, so when we tighten the leads down
8 here -- and again, this is one of those areas where we set it up
9 for a certain voltage here so we can test run it on our test amp.
10 So, at that point, we have to make sure all the connections are
11 tight, otherwise if we're testing it back here, we're going to
12 halt during running. So, we verify that the connections are
13 tight, make our test run and what not, and then at that point,
14 they do the weight and it's ready to be sent out. So, yeah, I
15 mean, the bolts, nuts, whatever's attaching these things together
16 and some don't have a terminal block, they're just bolted
17 together, they are tightened down to the point where they can't
18 come apart. Now, because we don't know what the end is going to
19 be as far as where they're putting these gens (sic) at. It
20 doesn't always go back on the same boat; this one did. So, where
21 they're putting it, what voltage they're hooking up for is
22 always -- basically, a lot of times it's depends on the boatyard
23 or whoever's installing this.

24 MR. BARNUM: Okay, thank you both for that. I might have
25 another follow up here, I'm going to look through my notes.

1 But [REDACTED] do you have any questions for these gentlemen?

2 CWO [REDACTED] You did a good job covering all the questions
3 that I had planned on asking.

4 MR. BARNUM: Okay, good.

5 Mr. Davis, do you have any questions?

6 BY MR. DAVIS:

7 1MR. DAVIS: Just on the follow question, I want to make sure
8 I understand this. You mentioned that if the compression lug was
9 tightened properly, you would not expect that it would come loose
10 after 600 hours of operating hours, is that correct?

11 MR. HARRISON: No, any compression lug, if it's tight, after
12 600 hours you would not think there would be an issue as far as
13 looseness, no.

14 MR. DAVIS: So, I mean, is there -- when do you -- how many
15 hours based on, you know, your office would you think that that
16 could potentially become an issue?

17 MR. HARRISON: That all depends on the situation. Of course,
18 you know, in the perfect world, this should never happen. But
19 depending on the vibration of the boat, depending on the heat
20 fact, how much load they're putting on this, how hot the terminals
21 are getting, it's all going to play into the effect. So, there's
22 absolutely no way for me to know, you know, a relative time this
23 might loosen up and again, this -- from the get-go, this is not,
24 in my opinion, a connection -- a loose connection issue.

25 MR. DAVIS: Okay.

1 MR. HARRISON: That's your impression that this was a loose
2 terminal that was on there, I do not feel that's the case.

3 MR. DAVIS: Okay, that's -- and I'm just making sure what
4 you're saying is, yeah, the vibration -- that's not what -- and I
5 haven't seen those reports, so I'm sorry if I'm asking a question
6 that's in your report.

7 MR. HARRISON: Oh, yeah, I understand.

8 MR. DAVIS: And these two main connections that are in
9 this -- I don't know if I'm looking at the right photograph, but
10 it's the two thick ones that are burned, obviously, and those are
11 the ones you've been talking about, is that right?

12 MR. HARRISON: That's correct.

13 MR. DAVIS: And those two -- you were talking about the one
14 of the outside where you can, like -- you can tell, you know for a
15 fact that those lug nuts were disconnected, but in relation to the
16 ones that are burned, you're not sure -- you can't tell just by
17 looking at the photo whether those were undone and torqued again
18 during instillation, is that correct?

19 MR. HARRISON: That is correct, yes, I have no way of knowing
20 that.

21 MR. DAVIS: All right, yeah, but you can tell by looking at
22 the other ones, but you can tell by looking at the one that
23 actually failed, is that right?

24 MR. HARRISON: That is correct.

25 MR. DAVIS: Okay, and then so -- and then your -- what -- I

1 think I can get from what you're saying is that -- you're saying
2 that these smaller wires are just running on top of the thicker
3 burned wires that could potentially cause -- you're saying that
4 those -- that could be the potential -- that's what you're kind of
5 looking at right there is these wires laying up?

6 MR. HARRISON: Yes, and what I explained to them initially on
7 this thing was that when this thing came in -- did you look at the
8 very top of the center terminals?

9 MR. DAVIS: Uh huh.

10 MR. HARRISON: Do you see the arcing on the very top of these
11 terminals in picture two? You can see some shiny spots on the
12 very top of those terminals?

13 MR. DAVIS: Okay.

14 MR. HARRISON: Okay, that right there tells me there another
15 lead going across those terminals or something close enough to
16 those terminals that is able to arc there. It's not in any of
17 these pictures that we're seeing, but it is there.

18 MR. DAVIS: Yeah, so that raw metal is evidence to you of
19 arcing?

20 MR. HARRISON: Yea, that is correct. So, initially I had
21 said that we -- what's going to happen if these small leads start
22 to rub on this terminal? Everybody thinks if one lead touches
23 another, it's just going to have a big explosion and that's not
24 always the case. So, just really coming through this thing, you
25 get, like, a small -- and I'm going to call it, like, a welding

1 arc, okay? That's our slick ring and that welding arc creates
2 heat. The more it creates a heat, the more insulation fails on
3 the wires, so -- and that's -- again, when you look at these
4 pictures, that what was apparent to me when this thing came in.
5 This was not something that instantaneously happened, this is
6 something that happened over a period of time. I realize that
7 they're saying this is running for 600 dollars, whatever the case
8 may be, but this has happened over a period of time.

9 So, there's certain things that these leads would cause
10 things to happen, flickering of the lights, low voltage drops, amp
11 drops on the -- the air should be higher on some legs than the
12 others because of the amp because it's got to fluctuate because of
13 this arcing, voltage unstable. So, there's a lot of things that
14 this thing causes by doing this right here. It's not like you
15 just had a wire, and you blew it in half, and it's open, and it's
16 done. This -- it took -- for the amount of heat that is on this
17 stud, and the burn on these terminals, it took a long period of
18 time for this to do what it's doing, so it's not an instantaneous
19 hot.

20 MR. DAVIS: Okay, thank you for answering my questions.

21 BY MR. BARNUM:

22 MR. BARNUM: Well, gentlemen, this is Bart again. Just a
23 couple more, thanks for the time. The terminal box of this -- I
24 guess that's what we're calling it, the interior of this
25 generator, is that what it's referred to when you unbolt the sides

1 and the top, it's called the terminal box?

2 MR. HARRISON: Junction box, yes.

3 MR. BARNUM: Okay, the junction box, is that something that
4 you would expect to be inspected from an onboard personnel
5 routinely?

6 MR. HARRISON: I don't know their procedures as far as that.
7 I guess, you know, if I was going out and I'm hooking this thing
8 up, I would want to make sure that I have everything put in place,
9 and tightened down, and connected properly. I do service calls on
10 electric motors and stuff like that and I have worked on
11 generators before, other than the bolts and (indiscernible). It's
12 the standard procedure to make sure that my connections are
13 properly tightened no matter what they are, whether they're lugs,
14 or bolts, or whatever they are, and then that we're not
15 interfering with something else that's in this particular junction
16 box.

17 MR. BARNUM: Right.

18 MR. HARRISON: So, whether it's a generator or a motor, for
19 me that would be the standard procedure. Now, I don't know their
20 procedures and I don't want to tell you that I do because I don't.

21 MR. BARNUM: Right, so after everything has been hooked up on
22 board, after everything has been tested, the unit is running,
23 periodically, you know, monthly, biannually, would you expect for
24 someone to be looking inside here?

25 MR. HARRISON: I, myself, personally, I would think so due to

1 the amount of transfer of load back and forth on these things, the
2 amount of vibration these things have on them. Yeah, I would
3 think that this is something that is a -- being the critical
4 application, I would think that this is something that they would
5 be looking at on a routine basis.

6 MR. BARNUM: You indicated earlier --

7 MR. HARRISON: And I don't know how long it is -- I would
8 think they would.

9 MR. BARNUM: Yeah, you indicated earlier that with the
10 material evident on top of the post, that this more than likely
11 was an issue that was happening over some length of time and there
12 might've been some other indicators that something was going on.
13 We understand that this generator in this -- I believe in the
14 start circuit that a fuse had failed and also a relay had failed
15 and needed to be changed out in the starting circuit. Is that
16 something that you -- that would be -- this might
17 contribute -- this incident, this wiring here in the junction box
18 might've contributed to that?

19 MR. HARRISON: I would have to know what circuit they are
20 referring to as far as a fuse and a starting circuit because this
21 generator -- the only starting circuit this generator has is the
22 engine that's driving it. Once that thing is fired up, this thing
23 is producing power. So, I don't know what they're referring to as
24 far as a fuse, or a starting circuit, or anything like that.

25 MR. BARNUM: Okay. All right, is there any sensing wires or

1 anything that's leading from this junction box that might be tied
2 into the starting circuit for any reason that you're aware of?

3 MR. HARRISON: When you're saying the starting circuit, are
4 you talking about the physical starter of the engine?

5 MR. BARNUM: Yeah, I apologize for my question to you. I'm
6 rather ignorant of the situation, so we're requesting some more
7 information on what exactly was changed out so I can't be more
8 descriptive for you, I'm sorry.

9 MR. HARRISON: So, the black box that you see on top of this
10 generator is, in fact, the controller for the engine as far as
11 starting and everything. It's there in that box. So, I
12 don't -- I'm not aware that there was an issue as far a starter
13 issue; that's new to me.

14 MR. BARNUM: So, within that control box on top of the
15 generator, is there circuitry in there that would either prevent
16 or allow the prime mover to be started?

17 MR. HARRISON: Are you saying physically starting up the
18 engine? And this is what I'm --

19 MR. BARNUM: Yeah, let me give you more background,
20 Mr. Harrison. Our understanding is that this generator was online
21 and before the accident some time, about 72 hours -- running hours
22 and it shut down when it while it was online and what needed to be
23 done was described to us as a fuse in a five-pin relay or changed
24 out in order for it to run again. I didn't know if that would cue
25 any bells with you? Is there a five-pin relay that you're aware

1 of and the fuse maybe that --

2 MR. HARRISON: Okay, a five-pin relay would probably be a
3 starting relay or just a 12-month circuit. That's not part of the
4 electrical circuit of this generator.

5 MR. BARNUM: Okay.

6 MR. HARRISON: So, that's the 12-volt circuit that's part of
7 the engine circuit, that's completely different than what we have
8 here.

9 MR. BARNUM: Perfect, okay, thank you. So, those sensing
10 wires that were in the junction box that were presumably getting
11 eaten away or damaged over a length of time, they wouldn't have
12 been associated with that circuitry?

13 MR. HARRISON: No, they -- these are high-voltage lines and
14 the starting circuits and everything on the controller and engine
15 wise is either a 12 or 24-volt circuit.

16 MR. BARNUM: Great, okay, thank you very much. That's all
17 the questions I had for you gentlemen, I really appreciate it.
18 Unless anybody else on the line has any more questions for you
19 guys, I'm going to stop the recording.

20 BY MR. DAVIS:

21 MR. DAVIS: Just one question, is there a photograph -- is
22 there any photographs of, like, the unit when it left the shop or
23 is there any -- I was just wondering if you all took a photograph
24 before it left your shop?

25 MR. HARRISON: We do not. We did not at that time.

1 MR. DAVIS: Okay, thanks, I appreciate your time. Thank you
2 all.

3 I'll stay on the line for you, Bart.

4 MR. BARNUM: Okay. All right, it's 10:22, I'm stopping
5 the -- concluding the interview of Mr. Warden and Mr. Harrison
6 from Warden Electric. Thank you, gentlemen.

7 (Whereupon, at 10:22 a.m., the interview was concluded.)
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CERTIFICATE

This is to certify that the attached proceeding before the

NATIONAL TRANSPORTATION SAFETY BOARD

IN THE MATTER OF: TOWING VESSEL *MARQUETTE WARRIOR*
 GROUNDING NEAR VICKSBURG, MISSISSIPPI
 ON NOVEMBER 21, 2021
 Interview of Robert Warden and
 Bob Harrison

ACCIDENT NO.: DCA22FM005

PLACE: Via telephone

DATE: January 7, 2022

was held according to the record, and that this is the original,
complete, true and accurate transcript which has been transcribed
to the best of my skill and ability.



Carolyn Hanna
Transcriber