Tech Q & A once again highlight of ERA Show

Part I

(Editor's note: Moderators Alan Melton, Larry Hagemeister and Bob Thomas were joined by 60 rebuilders at this spring's roundtable discussion at the Electrical Rebuilder's Association (ERA) Trade Show in Kansas City. This open microphone forum has come to be the high point of the show weekend for many rebuilders. Following is a transcript of the discussion.)

Alan Melton: Good morning everyone. Welcome to the roundtable this morning. We've been doing this for many years and we've had a lot of fun doing it. Learned a lot, shared a lot of ideas. Hopefully someone in this room will be able to answer your question and help you solve the problems of the world. We have three of us up here this morning. Myself, Larry Hagemeister and our ERA technical advisor, Bob Thomas. He's the face behind the phone when you call in and ask for advice.

We have some assignments from Polly. One of the things that we wanted to talk about in some seminars but we didn't have time within the seminars was alternator decoupling pulleys, RVC regulators, we've got a separate document on those. Some things we talked about—air codes a little bit yesterday, we can talk more about them today.

Larry Hagemeister: Where did you stop?…Repaired units service vs. rebuilt. Technical articles which is some of the stuff that I brought on that table. And the reason for bringing that stuff is that we're going to talk about it because at these roundtables we've had discussions in the past about what we're doing here and we've never had a hands-on on what those articles were about. A lot of stuff on that table there are things that I brought that basically we can talk about and look over and discuss how come and the issues in the industry with all the parts that we get that aren't right and why we've got to figure that out.

Bob Thomas: I don't know what there is to say, everybody got one of these little stickers. There's a phone number on there. I'd like to say one thing though, I don't know the answer to every question but I get lucky a lot of the times and somebody does have a problem that I've already made, a mistake that I've already made, and I can help them and if you come up with a problem that maybe I can't figure out I usually know somebody that I can either refer you to or I can call that person myself and get back with you. So I've kind of done all of those things. Sometimes I'll look up a wiring diagram, I've faxed wiring diagrams for charging systems to people that didn't have access to wiring diagrams in their shop. So I don't know… well, what's this got to do with seminars? Yeah, actually the wiring diagrams are Mitchell wiring diagrams. I've got wiring diagrams going back on passenger cars to 1960 in my shop and pretty much all the way up to 2008. I've got some import ones that go back into the 50s, and then I've got a lot of wiring diagrams from the 1940s back. Kind of the window that I don't have is the 1950s so if anybody ever runs into the Mitchell wiring diagram book that they printed that has cars from the 1950s let me know because I didn't buy it when it was available and it's one of the worst mistakes I ever made.

Melton: One of the topics that we were asked to talk about was the RVC regulators. Bob and the ERA Technical Committee have published an article about those in the [May] newspaper. Has everyone seen that article? I mean that seems to be the big question of the day is these later model alternators are making us nervous. Were all of you in my seminar talk yesterday? Did I leave you with more questions or overnight did you think of things that you'd like to go over again on that? Anybody have a question on that stuff? Come on somebody has to wake up and talk this morning. I can't do this for two hours by myself.

Oh yeah on the handouts that I had yesterday I did not have enough. If you want to get a copy of that we have posted it on the ERA Web site. But if you would like me to send you a copy I can e-mail it to you, I can mail it to you. I'd rather send it to you electronically but please see me or anyone in the ERA booth and leave you name and information and we will get you that document. I was totally surprised and happy to see 70 people in that room yesterday. I had no idea how many people would be here. It was a very nice turnout.

On that thing that we talked about yesterday, Joey [Cline] helped me, that was a lot of information in a very short amount of time. And I'm impressed with myself if I got it through to you because it was not easy to pull all that information together and make sense out of it.

Bob Thomas: How many of you guys have worked on RVC alternators? Have run into them? OK. Well, about a third. Basically you know the big difference in the voltage regulator is in the alternator but the voltage regulator doesn't decide what the voltage set point is. The control unit determines that and in most of these applications the control unit is going to be the PCM. Or the ECM or whatever the vehicle has of the two. And there's a very wide—what you have to be aware of—is there is a very wide range of voltage set points that you can see depending on the vehicle, depending on the conditions. And if you were to put one of these alternators on a car or pickup truck, because a lot of them are on pickup trucks, and start the engine up and put your meter on there and you'll see that the voltage is going up to about 14 and you, like I do, I always let it run for a while and then you walk away and do something and then you come back about 10 minutes later you might see 12.6 and many people have made this mistake and thinking oh no, something's happened to this alternator and pull it back off the truck. And then when you pull it back off the truck and you put it on your test bench it goes back to 14.2. Well 12.6 was normal because there was no load on the system.

So if that happens to you, turn on the headlights. And you'll see it come back up again. Because as soon as the PCM sees that the headlights have been turned on it adjusts the voltage. And there's an article that Wes and I did and it's in the newspaper that Polly is giving out at the show—it's the May edition. I don't know if anybody has any questions about RVC. What RVC stands for is Regulated Voltage Control. Jim?

Jim Thomas: One of the things that we've run into in that particular system has been a problem with corrosion in the cable. And on the cable whichever positive or negative that happens to be attached to if you have an issue with corrosion in that cable it obviously creates a major issue with the way that system works. And for some reason we've seen quite a few of the cables having internal corrosion and if you look fairly closely at the design of the negative cable end in

particular, they didn't do a very good job of sealing that cable off. It's a factory-crimp scenario but there's really no sealing that was done that would block the corrosion from getting inside the cable. And we've had numerous issues with the negative cable end, in particular, being corroded inside the cable which then has thrown that whole system out of whack. And I think it's something that it really creates a bigger problem by that design.

Rebuilder: Jim was that a top post or side post?

Jim Thomas: In this particular case it was a side post and obviously that seems to be a bigger corrosion issue with the side post batteries at least what we see versus the top post but there are some new top post applications as well.

Melton: Does that have the aluminum wire instead of copper wire, too?

Jim Thomas: We did see a couple of different sources. We've actually seen the aluminum wire one and we've seen the copper wire one but it seems like the corrosion issue that we saw repetitively have been the copper wire one. And I think some of it has to do with the fact that we're in a high agricultural area and these guys are out in all kinds of conditions and so on but these things, particularly the negative cable, that seems to be the one that we're seeing the biggest problem with. And like I say obviously if your unit is attached to the negative cable and you've got a corrosion issue, then it throws that system really out of whack.

Melton: I've just noticed it recently but a lot of the battery cables are aluminum in a lot of the new vehicles. Has anybody else seen that?

Jim Thomas: We've definitely seen it. It hasn't been as prevalent as… we're not seeing the newer cars quite yet but I think as the later cars come along that there's more aluminum in them.

Melton: I didn't think aluminum was as good a conductor and I was wondering if it would corrode more. That could be what you're talking about.

Rebuilder: I was wondering if the same type of regulation control is also folding over into the industrial market, too.

Melton: In my experience the industrial market runs about five years to ten years behind the automotive market. But the biggest advance I've seen in the industrial market is adding a sensing wire to the alternator so they're actually sensing at the battery. Freightliner is our neighbor. They're right next door to us. And I've been walking around their electrical building for years and telling them to put a sense wire in. Cause they only had a $20 million-a-year battery problem. They have finally added a sense wire. I don't know if their warranties have dropped in batteries yet but I thought for $20 million a year a piece of wire might pay off. But they're just starting to do that.

Hagemeister: There is one, that New Holland has that thermistor in there. That's a nightmare if anybody's worked on that one yet. Get rid of that regulator and it's trouble. But that, I don't know if anything was ever written in the paper about that but it's a New Holland that has that thermistor in there that senses the heat because the battery's on top of the hood over the engine getting real hot and they're trying to shut it down and so the thermistor interrupts the sense voltage of the alternator regulator and causes the thing to do all kinds of things, especially when the tractor gets four or five years old.

And the problem with agricultural equipment, like we all know, is they're 10, 15, 20 years old, and we're still working on them because they last a long time. I was just going to touch on one point that Jim made about the battery cables and the reason I was interested in the side post is because we, GM has gotten away from the side post battery and went to the top post and the reason for that is, if you didn't know to share with your customers, I have a lot of my customers ask me, "Why did they get away with that? Why did they even start that in the beginning?"

Well, what happens to those batteries is a lot of them have the blanket on the battery to protect the battery from thermal runaway. Because there's no fan running under the hood so these batteries are cooking underneath the hood and as they heat up when the battery was made in the polyurethane-type cases they have when they cut the holes for the side posts it leaves microscopic cracks around the battery. So as this battery heats and contracts under the hood over the years of the battery, it starts leaking around those posts because that polyurethane changes its values and it starts leaking. So even wrapping the blankets with, or putting the blankets on the batteries didn't keep them cool enough and they start leaking around those battery posts. So just information for your customers if they ask, but that is a big problem with those corrosion—the battery looks nice and clean, take it down and it's all corroded.

Rebuilder: I was going to speak to the point that he asked about the computer controls and some of that electronics showing up on the industrial equipment. John Deere industrial—ran into…one of my rail yard customers are seeing an automated start sequence that's pulling different kinds of chip board panels for meters using it in their chippers now where they're pulling sense off the alternator to run engine rpm in computer controls in their systems. So that stuff is in there and it's coming on the industrial side.

Melton: How many of you work on Honda boat motors? Most of the Honda boat motors have your 4-wire CFRIE&L alternators fully functioning in your 4-stroke Honda boat motors. They got 50, 60, 80 amp alternators on those larger engines.

Hagemeister: A few weeks back Hank Henke had an issue with springs on plungers on heavy-duty starters, 3530 MTs and up. Can we hear some discussion about any resolution to that problem?

Rebuilder: I don't have a question about that. My question is about cabling… Through the years they used battery cable, and I've noticed in the last several years to make cables they've been using welding cable. What's your thought on using welding cable instead of battery cable on applications?

Jim Thomas: I can tell you from our standpoint that we've been making all of our battery cables out of welding wire for the last ten years and we've had absolutely no failures and no issues. At some point one of the old wives' tales that went around was that welding wire wouldn't hold up to certain types of oil and conditions that you get on a semi for instance. But with the new type of coating that they're putting on the outside of the welding wire today there's no issues with that



(L to R) Bob Thomas, ERA President Larry Hagemeister and Alan Melton moderated the two-hour roundtable discussion.



Often referred to as too short, sixty rebuilders participated the roundtable which wrapped up with a review of hands-on failed units and components.

at all. And we actually for quite a few years made all of the battery cables for one of our local RV manufacturing operations and they put them into all their motor homes, big pusher diesels. So we've had a lot of experience with it and we've never had any failures or issues and it's worked out very well. And it's still a large portion of our business for all of the ag applications and different types of things like that. We make a lot of cables.

Hagemeister: That's a very good point and I think all rebuilders should use welding cable. The issue is that you get a lot better jacket on the cable than you do battery cable. The current travels on the outside of the strands of the wire—you've got a lot more wire per given size of cable, 1 gauge or whatever size—makes a lot better way to build a cable and besides that most of your competition is going to use battery cable. And you've got one up on them because you're using welding cable which is like better yet. Yeah, very usable.

Rebuilder: The only thing that I have to add to that is that if you've got a long run on that cable it's not stiff so you've got to support it. So you know you're going to have to use tie straps and make sure that you don't let it sag down and which I am sure Jim knows.

Hagemeister: Back to Joe's question. We got quite a lot of things to talk about on that clicking issue, with the 35s you're talking about, 37s? Any of them? We talked about this at the last roundtable. There's a lot of issues and that's some of the things I brought over there about those shift forks. The difference on a 40 and 50MT and some of the problems that is causing these starters to click. And I believe it was Hank that found a problem with the plungers in the spring link, am I correct on that? You want to add to that real quick?

Hank Henke: Sure. For anybody that didn't see all the arguments going on back and forth on the Internet, we've a problem with 50MTs and six solenoids that would not work. So, you know, the chance of having six brand new solenoids which didn't work are slim to none. So we started looking and looking and pulling my hair out trying to figure out why I put the solenoids in the vice, powered them up, they would not close the contact. So I called my solenoid builder and got permission to take the solenoids apart and look inside. I figured they put the wrong shaft in the contact. Well, everything was right there. I mean just like it should be. The only way I could get the contacts to close was to physically push the plunger in. So we scrounged around and found some old cores with plungers in them and found that the spring was a half-inch shorter and a turn-and-a-half shorted.

And then I called Ronnie Charnes and Ronnie had a gauge so he checked them with a gauge and there's a difference in the poundage. Those long springs take more pounds to compress the spring. I know there's a lot of people who say, well that doesn't make any difference, but if you can't overcome the spring you're going to get a click. And I've experienced several starters that came back with solenoids burned up all related to the fact that it was low voltage. Well maybe it was that spring that wouldn't let it make all the time.

Hagemeister: Taking so many amps to hold it in. That's right…collapse it. Yeah. Those are all good points, go ahead —Ryan Scutter—comment with that.

Ryan Scutter: I was told yesterday that they're also some boots in the market today that aren't right. Even though we take and let's say we fix our own plungers and put new boots on them and use the old springs—there's some boots that the material is not right and they don't compress properly and they'll cause you the same problem.

Hagemeister: All that, everything he's talking about is exactly what we deal with all the time. Go ahead.

Henke: It's been a few years back but I had the same similar problem with 40s and 50MTs and I found that I'd bought some plungers—not sure which vendor they came from—but the cap on the bottom end of the plunger that actually pushed the contact up inside the solenoid had actually been bored a little deeper… recessed deeper and they weren't pushing the contact part up through the studs to make contact.

Hagemeister: Well that's all good points and just like on the 35MTs one of the suppliers has them with both holes slotted on those solenoids which is very nice because we can adjust it a little bit on 35MTs which is important—they need to be adjusted too—but for years that solenoid came with just the back holes round and the front ones elongated which made absolutely no sense whatsoever. So those need to be adjusted too but here's the maddening thing that just bothers me to no end and this is directed straight at our suppliers—this issue I have over here on the table with these 50MTs, 40MTs shift forks—and you can look at all this stuff when we're done and we'll talk about it—but I found that problem on those shift forks at least three years ago on a 50MT and the pictures are there and the documents and the samples of the shift forks and put this in the paper, talked to suppliers about it, it still isn't

fixed. That's what just grinds me to no end. These problems with this plunger—you just added work to us for the next ten years if they're not going to fix the problem.

Whoever is making this stuff, whoever is copying this stuff, is not doing it right and here we are all these years later, I'm sifting through 100 shift forks and I find three or four of them that are built like they actually should be and we've got to separate them and now we mark them as 50MT or 40MT shift forks which there was never a designation between the two, but now there is because somebody that's making those in some country is not copying them right. So now you've come up with another problem on the plunger, now we got another problem on the boots, when's that going to end? When we find the problem the suppliers need to attack these people and get it fixed so we're not dealing with it every day. It's what we do every day, how much time are we going to take out of our day? Here we are three years later I'm still shifting through, going through those shift forks.

Rebuilder: The funny part about the springs are, I ordered springs from my vendor and got the short springs. And yet they say there's nothing wrong with the plungers, with the springs that are on there. But you get the short springs if you order the springs.

See Part II in the August issue.

ERE