



Behind the Wheels Podcast Transcription

Season 2 BONUS: The Evolution of Tire Pressure Monitoring Systems with Doran Manufacturing

ANNOUNCER

You're listening to Behind the Wheels with Doug Mason, Dave Walters, and Mike Yagley. This is a show where we talk about heavy truck and medium duty axle ends. Doug, Dave, and Mike bring close to 100 years of experience and expertise in the transportation business.

Join us once a month to learn new things about axle ends. Sponsored by Alcoa® Wheels, the global leader in aluminum wheel innovation.

MIKE YAGLEY

Welcome to another episode of Behind the Wheels. I'm Mike Yagley.

DOUG MASON

I'm Doug Mason.

DAVE WALTERS

And I'm Dave Walters.

MIKE YAGLEY

Well, we're really honored today to have with us Lee Demis from Doran Manufacturing. Lee's representing Doran, he's an expert in TPMS systems. I'm really looking forward to this discussion. TPMS is one of those technologies we see growing around the world. It's already really taking hold in Europe and we're starting to see it really grow here in the US also. So looking forward to hearing the latest on TPMS. Welcome Lee.

LEE DEMIS

You're welcome. I appreciate you having me on today.

MIKE YAGLEY

Let's just dive right into it. You want to give us a little background, give us a little bit of an introduction to Doran?

LEE DEMIS

I'd love to Mike. So, Doran manufacturing, based in Cincinnati, Ohio was founded in 1953 by two engineers who named the company after their wives, Dorothy and Anne. At that time, Doran was focused on electrical interconnection components, these little brass terminals that go inside of appliances and electric motors to make the wiring easier and safer. Over time, Doran evolved into more of a transportation safety provider. We make sleeping child check monitors for school buses, incandescent and led light monitors for the school bus industry. And then in the early two thousands expanded into tire pressure monitoring systems for over the road, commercial truck and trailer fleets. And over the years have expanded the TPMS business into the off-road segment, working with construction companies, mines, quarries, and equipment OEMs all over the world.



1616 Harvard Ave. Cleveland, OH 44105

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MIKE YAGLEY

So the TPMS is practically on every automotive vehicle out there now. And now it's moving into heavy truck. Why don't you give us a little bit of a background of where TPMS came from, where it's at and maybe we can talk a little bit about where it's going?

LEE DEMIS

Sure. So if we look at the history of TPMS, really started in the automotive industry, I think the first passenger vehicle with a tire pressure monitoring system installed was a 1986, Porsche 959. So, it really started in Europe on some of the high-end luxury vehicles. And the first US passenger vehicle with a tire monitoring system was a 1991 Chevy Corvette. Where we really saw TPMS start to take off was after the tread act was passed. Which mandated that any 2008 and newer passenger vehicle had to have some type of tire pressure monitoring system on it. And that really stemmed from the Firestone tires and Ford Explorer incidents from the late 1990s.

MIKE YAGLEY

So, how's Doran work? How's Doran fit into all of this?

LEE DEMIS

Great question. So in the early two thousands Doran's owners saw what was happening in the automotive space and wanted to continue our path in more of the commercial and industrial markets that we served. So we looked at tire pressure monitoring. We're served as kind of a national dealer distributor for a number of years, of a couple of different manufacturers, a couple of different styles of systems. And at the time they were more geared towards direct-to-consumer applications like RVs. And again, we really wanted to get more into that commercial, industrial space. So in 2008, we launched our own proprietary Doran 360 series of tire pressure monitoring. Again, focused on that commercial truck and trailer type customer.

MIKE YAGLEY

Now there's a lot of different TPMS strategies out there. I think the old Corvette, you mentioned the Corvette here. And the first TPMS system we saw here in North America was a band mounted TPMS. And now we're seeing all sorts of different ideas. Tell us a little bit how the Doran system is set up.

LEE DEMIS

So Doran offers a couple of different styles of tire pressure sensor. The main solution, the most popular solution that Doran offers today is a wireless valve stem mounted solution. Very simple and easy to install, very simple and easy to maintain. Think of it as a fancy valve cap, that's going to thread right on the end of the valve stem, capture pressure and temperature information, and transmit that data to a receiving module of some type that will vary by fleet and vary by application.

MIKE YAGLEY

You had mentioned, there was a second technology that you guys are using, what is that second one?

LEE DEMIS

So the second technology is a banded solution inside the tire. And we went down that path kicking and screaming because we do feel so strongly that the external valve stem mounted solution is the best for customers. But as you know, it takes enough customers to say, "Look the only way we're going to buy this and to do business with you is if it's inside the tire." Eventually you cave and you find a solution that's going to work for them. So we have gone down that path, but the valve stem solution is the one that is really our main driver.

DOUG MASON

A quick question, I'll jump in real quick Mike. Between the two, obviously you lean more towards the external versus the internal. Can you give some pros and cons of both of those systems?

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LEE DEMIS

Sure. So looking at the banded solution first, the pro is that it's inside the tire. There's no risk of theft. There's no risk of the sensor coming off of the valve stem. And it's closer to the wheel, it's closer to the bead to get internal tire temperature. The negative of the inside of the tire sensors is that they're inside the tire. It makes programming more challenging. It makes ongoing system maintenance more challenging. And it certainly makes the initial installation of the system more challenging, because the tire and wheel has to be demounted from the asset.

LEE DEMIS

With the valve stem mounted solution. We could walk right up to a truck or a trailer today and within an hour have a complete system installed and transmitting data to not only the driver, but back to a fleet maintenance manager. Because it's such an easier system to install.

DAVE WALTERS

You know, we have a customer in common that basically requested us to put another separate valve hole in, just to have your unit go into that. Could you tell us about, what would a positive thing that would be for our listeners?

LEE DEMIS

Sure. So if you look at one of the potential negatives of a valve stem mounted solution, is that unless the sensor is designed to be flow through, where you can inflate the tire through the sensor, which there are challenges in that type of design. Or if you're using additional valve stem mounted hardware, like a T fitting. In order to inflate the tire, you need to remove the sensor from the valve stem. So what Alcoa has brought to market for any customer now, is a way to leave the sensor on one valve stem and have a flow through cap on another stem on that dual valve stem wheel. To really make the inflation of the tire and ongoing maintenance that much easier for our fleet customers.

MIKE YAGLEY

What are the big problems you've seen with the TPMS over the years? I mean, starting with the beginning and for example, I'm just going to go to that band mounted system, not yours, I'm not very familiar with your system. But I know that we were involved with band mounted systems when I was in the automotive side of the business. That was a very precise system, when it came to securing that band. It was something that there was a lot of concern about making sure that that band was properly maintained, day in and day out in the field. This was an automotive application, so it didn't get the same kind of mileage that a heavy truck does.

MIKE YAGLEY

When I think about those band mounted systems, I go back to my experience again, back in the automotive side, of course. But that was something that always made me a little bit nervous, was the level of maintenance expertise we'll say, the maintenance excellence that you would need to have to make sure that that band stayed secure no matter what out in the field, after maintenance was done to it. I'm sure that all these different technologies have similar problems that you've had to deal with. Maybe you could tell us a little bit about the historical problems you've seen with TPMS.

LEE DEMIS

Sure. I'd be happy to Mike. So going back in time, looking at some of the early system limitations. I mentioned the challenge of getting consistent, reliable communication from tire pressure sensor to the receiving module. And for the most part, tire pressure monitoring system providers today have solved that issue, some better than others obviously. I'm biased that Doran does have the best solution available, but I'm paid to be that way. But if you look at other system limitations, even specific to Doran. The first systems that we launched were great for a truck application or a truck with a married trailer, where they were always connected to that same trailer. And in some of the first communication we had with fleet customers, they said, "Well, this is great, but our trucks and trailers aren't married. We need a solution that will allow for monitoring both truck and trailer in a drop and hook fleet application where one truck could connect to any trailer in the fleet at any given time."

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LEE DEMIS

So as the technology progressed from Doran, we were able to launch the smart link system, which allows you to monitor both truck and trailer. From their fleet said, "Well, this is great that we're giving drivers the information there in the cab, but we really want to get that data back to the home office so that we can direct traffic if we have a low-pressure event." Again, the goal of all of this is to prevent catastrophic tire failure, to maximize the consistency of inflation pressure. So that we're maintaining tires, you're getting maximum tread life. We're not damaging casings along the way, so that tires can be retread.

LEE DEMIS

So as the Doran and other technology improved, at the same time, the telematics providers were really upgrading their technology. The PeopleNets, the Qualcomms at the time, now Omnitracs the Pedigrees, the Geotabs. They were grabbing more and more data off the J1939 CAN bus of the truck, which allowed third-party providers like Doran to begin sending and broadcasting tire pressure and temperature data onto the trucks network. Which could then become visible to the driver on their in-cabin ELD screen. But more importantly, communicated off the truck so that fleet management could tell that driver, hey, you're right rear inside drive tire is down to 70 PSI, pull off at the next exit, inflate the tire. We'll keep an eye on it. And if it keeps losing pressure, we'll be proactive in scheduling that maintenance call for you to replace the tire rather than having to have a roadside repair and replacement take place.

MIKE YAGLEY

You know, I have to say that the TPMS, that example you gave specifically, of losing air on the inner dual. It's something that happens so frequently out in the field. Those inner duals just don't get the same kind of love and attention that some of the other physicians do. They run a little bit low, all that load transfers to the outer dual and that outer dual is taking all that additional beating, the wheel on the tire. So the TPMS is a great solution for that. And that's just about tires, it's about the wheels too, the additional life you get out of your wheels that gives you.

LEE DEMIS

You can look at it from the maintenance of the equipment, the tires, the wheels, the trucks, the trailers. But it also just makes life that much easier for a driver. It's not fun walking around our cars and trying to check tire pressure, especially here in the winter months. To the point where very few people do it and to be on your hands and knees, trying to fit a gauge to that inside dual tire or with the outside dual with the valve stem pointing in, trying to get a gauge or a chuck on that tire. It's hard and people don't want to do that. To me, there's technology available today that makes that so much easier. It makes it so much more accurate. You key the ignition on in the truck and within seconds, you know exactly what pressure is in every one of your tires. The peace of mind that that brings knowing that everything's inflated properly before you get out on the road, that's invaluable.

DOUG MASON

I've got another question for you, Lee. I know that you're probably following very closely what's happening from a legislation standpoint. And obviously we continue to hear that TPMS may become mandatory on commercial vehicles as well. Do you have any recent understanding as to where that is here in North America?

LEE DEMIS

I'll start in Europe, because they seem to be kind of at the front edge of a lot of this type of technology and legislation. We are hearing word that there will be some legislation in Europe over the next few years that mandates some type of tire monitoring system. I would be shocked if that doesn't progress to North America. From the Doran perspective, we're more in favor of less legislation and let the forward-thinking fleets invest in the best technology available to allow them to operate more efficiently. Let the technology be the driver, not the federal government. And it allows... We feel also is that if it's mandated, then it's a race to the lowest level of technology that meets the qualifications or the standards. And again, we want to provide a high degree of technology, a high level of expertise in technology to the industry. And we would rather the technology be the driver for that.

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DAVE WALTERS

Lee, if I could ask you, many of our listeners out there, there's really two types of systems of TPMS. There's an active, and there's what we'd call the passive system. You tell them what the difference of that is? And I know the active system is really only prevalent in trailers and if you kind of addressed that, I think that'd be good information for our listeners to have.

LEE DEMIS

Sure. So this goes back to some of my first days at Doran, 13 years ago, where much of what we were doing was just educating fleets and customers, the difference between an automatic tire inflation system and tire pressure monitoring. Dave, as you mentioned, automatic tire inflation is very prevalent on the trailer side of the industry. And that's a system that will actively pump air into tires to maintain inflation pressure.

LEE DEMIS

Where Doran and the tire monitoring systems come into play is an electronic system that will communicate pressure and temperature data and tell you exactly what air is in the tire. Early on, we saw it was a one or the other. A fleet may run tire pressure monitoring on trucks, inflation on trailers. We've seen some fleets completely go away from inflation on trailers and run TPMS on both assets. And we're also seeing a push now for automatic tire inflation integrated with tire pressure monitoring. So you get the benefit of the inflation system, inflating that tire, that has picked up debris and is losing air. But you're also getting that electronic monitoring side of things to communicate to fleet management, to tell them which tire is losing air, that's causing that inflation system to run. And it really combines the best of both worlds.

DAVE WALTERS

I'd like to interject a little bit. Most of the fleets that I deal with, they used to tell me years ago, they're like, we like the active systems on the trailers, but the blue light comes on, tells the driver something's going wrong. That hurts his eyes at night. He doesn't want to stop. So he takes the light bulb out and ruins the whole system. And they're like, you're going to have to have both because unless I know I can't fix it. So, as you said, many a fleet said the same thing. It's nice the guy in the dispatch or some place is getting a signal saying, "Hey, something's wrong and you need to work on this." So I think that's a very prevalent point.

MIKE YAGLEY

You mentioned you have the temperature monitoring, and I guess I'm curious how you're seeing the fleets using that temperature data?

LEE DEMIS

Sure, great question. So some of the Doran fleet customers are fuel haulers. And you look at the load that they're carrying and what excessive heat at the wheel end for whatever reason is causing it. And the catastrophic problem that can occur if that tire were to blow out. Or if there was a wheel end thermal event, what could occur there. So with the Doran technology, the sensor is actually capturing both pressure and temperature data. And when temperature reaches a critically high state, Doran will trigger an early warning high temperature alarm. So that not only the driver, but also fleet management can say, "Hey, we've got a potential pending issue here. Let's pull that asset over, let the wheel end cool down, inspect it. And let's see what's happening here to prevent a really bad situation from occurring."

MIKE YAGLEY

That could be brake problem, anything that might cause a temperature rise in the axle end, is going to show up in your system, is that accurate?

LEE DEMIS

That's a hundred percent accurate. It could be a brake hanging up, a bearing failing prematurely. It could be debris from the road being caught in between dual tires. It's trucking, stuff happens. So there's no one common cause. But again, what we want to do is provide that early warning so that a driver can safely pull the equipment over and inspect what's going on.

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DOUG MASON

We've been talking a lot about the maintenance features and the benefits. The TPMS system itself, what type of maintenance is required on that? And what kind of periodic review needs to be done and what is the life of the systems that you're discussing?

LEE DEMIS

Great question. So there really is very limited ongoing maintenance with the system. The tire pressure sensors from Doran are going to last in the five year range. You look at the receiving modules, a lot of our fleet customers are taking those out of an old truck and installing them back into a new asset that they're bringing into the fleet. So again, looking at the sensors, we want to make sure that they're there. We want to make sure that they're threaded onto the valve stems securely so that they are providing accurate, consistent data to the receiving module. But there's really little ongoing maintenance after that initial installation.

MIKE YAGLEY

Okay. Doug, Dave, you got any more questions for Lee?

DAVE WALTERS

The only other thing I'd like to interject on this. We kind of talked about the bands. My experience with a lot of the bands, a lot of the fleets put... I hate to say it, sealants and other things into their tires. And sometimes them sealants and that band starts causing severe corrosion and doing a lot of other things. So Lee, when you brought up about the bands, that's been a system that's just seen a lot of issues with it. And I like the idea of having two whole wheels and put the sensor in one in a valve stem where you can keep on airing up. And I just wanted to interject, you've done them bands for years. Have you seen the same things I'm seeing?

LEE DEMIS

We have. So the banded solution... Anything that's going inside the tire presents a number of challenges. Obviously you have the initial installation. You have to make sure that the band is installed properly, the sensor's in the proper placement to avoid potentially breaking it when you're mounting the tire or breaking the tire down from the wheel. And then the ongoing maintenance of the system. Again, I mentioned the Doran valve stem mounted solution with a close to five-year battery life on the tire pressure sensor. When that fails, you just walk up to the valve stem, put a new sensor on, do some provisioning of the system. And within seconds you're back up and running.

LEE DEMIS

Much more complicated with an internal sensor. This is something we ran into and had all kinds of challenges within the off-road side of our business, where liquids and chemicals inside the tire are much, much more prevalent, rim conditioners, ballast, and so forth. So to try and introduce electronic technology inside of a tire where liquids might be present and other things are happening, it's a tremendous challenge. And I mentioned... I made the comment that we went down that path kicking and screaming, offering a banded solution. It's 99.9% of what Doran offers now to fleets is that valve stem mounted solution. We do have some customers that prefer the banded solution. So we have that option for them.

MIKE YAGLEY

Well Lee, thank you so much for joining us and thank you for this discussion, did not disappoint. This is very interesting. I want to thank all our listeners for joining us on Behind the Wheels. If you want to get in touch with us, you can catch us on the Alcoa Wheels website, just click on the podcast. And there's a pic for any comments or questions. Until next time. Thanks for listening.

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