



## Behind the Wheels Podcast Transcription Episode 7: Wheels of Shame

### 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

This is an episode I have personally been looking forward to for a long time. We are going to be talking a little bit about our wheels of shame. Dave, go into what are the wheels of shame for a moment.

### DAVE WALTERS

Back when we were getting all these wheels in for warranty, and what we decided was there was wheels that an average person wouldn't believe that these customers would actually turn them in for warranty. And we thought, wow, this is amazing what they would turn in and thought, this should be a warrantable item. And so the wheels of shame started, let's save that wheel. Because we would take them to TMC or something like that and show pictures of these and have everybody in the tire and wheel industry laugh at them. We kept them, and there's a valuable lesson out of this. There is not soft metal, we're really good at manufacturing wheels that don't have all these issues, but this is what the customers asked us. And so we kept special wheels that you said, wow, I don't think anybody would believe this if they didn't see it. So that's what we're talking about today.

### MIKE YAGLEY

Oh, go on, Doug.

### DOUG MASON

I was just going to say, and Dave, when we start talking about these and looking through these, it makes us go back to some of our previous podcasts. These wheels became wheels of shame primarily because of neglect in some situations, poor applications in other situations. And so that is really, again, going back to what we continue to reiterate, is there needs to be a diligence in the heavy duty industry relative to wheel ends. And so this is showing a bit of that off.

**MIKE YAGLEY**

One of the things I really like about the wheels of shame is that they are extreme examples of wheel maintenance problems. And what that does for our listeners or anybody who's looking at it that might not see, we see wheels coming in every day that can be a little bit more subtle in the failure mode of that warranty wheel. These wheels really make it obvious what went wrong and what is going on.

**MIKE YAGLEY**

Dave, you said anybody could look at these wheels and say, oh, wow, so that's what's happening. We might see wheels come in that have a slightly elongated bolt hole, for example. Somebody looking at it would say, ah, I see it. I don't see it. Oh, there it is. Okay, I get it. This is something where you can look at it and just know. You don't have to think about it. It doesn't have to be pointed out to you. This is something that anybody looking at it will know that something seriously is going wrong here. And it really is great for teaching to say, yeah, this is an extreme example of something gone wrong. And yeah, the ones we're going to see every day are going to be much smaller, but this makes it easy to understand.

**DOUG MASON**

I think that's good to point out, Mike, here at the beginning of the podcast, that those who are listening to this, they're going to go, wow, you're describing this. There are pictures that go along with each of the descriptions, and they are available as well for you to look at while you're listening to the podcast or perhaps you're listening to it while you're driving and you can go back and look onto our website and find that as well. So you'll get a good understanding of what we're saying is the worst case, as you noted, Mike, of poor maintenance and not being diligent to review what's going on in your wheel end.

**MIKE YAGLEY**

Let's get started on this. Now, Dave is the service guy amongst the three of us. He is the one who sees this stuff day in and day out. So this is really his wheelhouse here. Dave, I'm going to be peppering you with the questions here and I'll try and describe what we're looking at, and then you can talk a little bit about it. The first photo, it's a wheel. We're just looking at the mounting flange or the bolt hole section of the wheel. The bolt holes are rounded out. They're very large and they don't look like normal bolt holes. What is going on with that one?

**DAVE WALTERS**

The first wheel that we're looking at is a ball seat wheel. Back in the inner days, we had the inner and outer cabinets. This is a ball seat wheel. And basically it was on a steer axle. And it was sent in and the customer said, "Oh, we got soft metal." So you can actually see the form of the nut in some of these bolt holes where this wheel was so loose, it was rattling back and forth, put that into the wheel.

**DAVE WALTERS**

If you look at the picture on the website, you'll see all these numbers. It says 153, 156, 147. Those are actually hardness checks that we perform when wheels like this come in to verify that it is not soft metal. So this was not a soft metal case. This was basically a loose wheel. And people will say, well, what causes a loose wheel? Well, again, we always talk about torque. Was it over-torqued or under-torqued? Was the mating surfaces nice and clean when you put the wheel on? Was the studs and nuts in good condition? So there's a lot of things that we look at when we do this. But if you can see a hex inside a wheel that was flopping back and forth, that's pretty scary, especially on a steer axle like this one was.



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### Episode 7: Wheels of Shame

#### MIKE YAGLEY

I'm going to come back to this one in a minute, but I think it's going to be helpful to talk a little bit about our next wheel in the wheels of shame here. And now this one, it looks similar, but this time the bolt holes are elongated. And if you could imagine a dashed line ... Typically, if you think about bolt holes, you have 10 circles on the mounting flange in the bolt hole area of the wheel. In this picture, what you see is each one of those little round bolt holes is like an oblong that looks like a dash.

#### DAVE WALTERS

We call it the peanut wheel. It looks like a peanut.

#### MIKE YAGLEY

Yeah, it looks like those bolt holes have turned into peanuts.

#### DOUG MASON

It's like having a long slot where you slide something back and forth.

#### MIKE YAGLEY

Yeah. They look like they're probably about two inches long, each of them.

#### DAVE WALTERS

At least, yeah.

#### MIKE YAGLEY

So this is the same thing, right, Dave?

#### DAVE WALTERS

Now this one's on a hub piloted wheel. And the different between a hub pilot and a ball seat, a hub piloted, we tell everybody the hub actually lines up the wheel and you bolt it into place. So when a hub piloted wheel comes loose, the cab nuts or the studs, and we know by this that the studs didn't break because that's what caused this peanut shape looking holes. But they actually start moving back and forth on the hub. And they're going back and forth, back and forth, as he drives the truck.

#### MIKE YAGLEY

Every time they start and stop. Every time they start and stop, that wheel is moving back and forth.

#### DAVE WALTERS

At any point, they're moving. Once that joint becomes loose, these wheels start to move. A hub piloted still has that hub in there. That hub's kind of keeping it straight. And I've seen them to where they've actually wore the tangs off the hub also because they become so loose. But since we're not manufacturers of hubs, we never kept those. But this wheel was so loose that it just went back and forth, back and forth. And again, the first thing the customer will say, soft metal. First thing they tell you, soft metal. I've been doing this for 32 years in Alcoa and soft metal's really not something that I've ever seen is the cause of this. And it's neat to see because you go, wow, this is really bad. Oh, it is.

#### DOUG MASON

Shouldn't there have been some signs in both of these situations that the driver or the service people should have picked up on and not allowed it to get to this point?

#### DAVE WALTERS

Yeah. Most of the time, these wheels, the drivers should feel and say, wow, something is vibrating. Something's not right. But a great maintenance director one time told me, "My drivers never break down alongside the road, unless they have to. Somehow they get these things limped into the next truck stop or something." Well, this is going further than just the next truck stop.



**MIKE YAGLEY**

So, I want to just quickly go back to that first photo. Like Dave was saying, when you have a hub piloted wheel, that hub keeps the wheel only twisting back and forth. It just shimmies back and forth. But everything's in line with each other. Where with the stud piloted wheels, the old stud piloted wheels, or ball seat wheels, what's happening there is the wheel is not touching the hub. And so it has the ability to move both rotate in place. It can move up, it can move down. And so that's why when you look at the ball seat wheel and the way that one is elongated, it's elongated in a circle because the wheel can bounce around in every direction. Where when you have in a hub piloted system, it's all going to be like those peanuts. Instead of a bigger circle like you get with a ball seat one, you get the peanuts that show up with the hub piloted one.

**MIKE YAGLEY**

Let's go on to the next one, Dave. This one is sort of an unusual one. It's also got the elongated, but it's not nearly as bad as the first one. What's unusual about this?

**DAVE WALTERS**

What's unusual about this is this was like an outer door, okay? And you can see on this one that the fretting between what the inner wheel was and this one, was unbelievable. It just took out a lot of metal threading. It was loose for a long time. As the wheels would twist and turn, it was actually taking a lot of metal out. That ran loose for quite a while.

**MIKE YAGLEY**

What we're looking at here is a wheel that has the ... I keep using the term mounting flange. The mounting flange is that whole flat surface that has the bolt holes and it also has the hub pilot or the bore of the pilot bore. That whole area, we call that the mounting flange. And that whole mounting flange, I don't know how to put this. It looks like it's been hit with sandpaper or something. It's a little bit shiny, but very, very rough at the same time.

**DOUG MASON**

Looks like an abrasion type of surface. Very rough, rough sandpaper, perhaps, to a piece of wood that obviously this is on aluminum. Like Dave was saying, the wearing away that was occurring on this was significant.

**MIKE YAGLEY**

It'd be interesting to measure the thickness of that mounting plan. I wonder how much was taken off of that.

**DAVE WALTERS**

Yeah, and that's hard to do a lot of times. You can [inaudible 00:11:11] it, but it's consistency the whole way around. It's tougher to do that. But you would think that you're driving a truck and these wheels are moving back and forth and grinding and making noise and doing all this stuff. And you're thinking, he's still driving that truck down the road. And then when they get it off, they say, ah, it's got to be soft metal. That wheel's got to be soft. They send it in us to get a warranty. So that's why this one made the wheel of shame because of the metal move.

**MIKE YAGLEY**

That fretting, yeah. That's impressive.



**DOUG MASON**

The next one, it really gives a little more visual example of what perhaps you might see relative to identifying that you have loose nuts from a distance. And Dave, can you go in and explain a little more of these two pictures?

**DAVE WALTERS**

Yeah. Technically you're going to see rust streaks. Rust streaks is probably your first indication that something's loose. Now on this one, again, it was an outer door, we know because it's by the cab nut. As hub piloted, it can't normally move back and forth. But the thing about it is you can tell that this one was ... When the nuts were put on, they were not tight. This wheel basically could beat around between the nut and the wheel, which is a different indication of what happened. So when you see this type of failure, you're really knowing that they either caught this wheel on installation or never got the nuts tight. So a little different of an indication of what went on. Because the other ones, we can tell the studs were in place. Or we don't know if the studs might've broke, some studs could have broke on this wheel, and the wheel starts moving even more. When you see the impression of the nut body, the nut flange into the wheel, you know that this was either cocked or the torque was so low that it never was even tight at all.



**MIKE YAGLEY**

I'm going to just quickly try to describe what we're looking at here. We have a couple of pictures in front of us. What the pictures have is, if you look at each of the bolt holes, has a black streak coming straight out from the bolt hole out toward the tire. So you have these 10 dark black streaks that are coming out from the bolt hole toward the tire, over the face of the disk. And then around each bolt hole, it's almost like ... it looks like a washer. It looks like there's a washer glued to the wheel or that it's indented into the wheel. You can see that each bolt hole has this weird washer. Like Dave said, that's from being loose or cocked or something. And that's actually the wheel moving around that's causing that washer look to be on that, right where the bolt hole is. You got anything more to add to this one, Dave?

**DOUG MASON**

I have a quick question, Dave. Relative to the other two, obviously like you said, we were looking at the interface between either the outer and inner dual when they were elongated. And in that case, if you were looking at it from the open end as we're looking at it here, would you have expected to still see the rust streaks?

**DAVE WALTERS**

The rust streaks is a telltale sign that that wheel was loose. Even today when you do a pre-trip, one of the criteria is to look for rust streaks. So to me, that wheel was loose for a while. Could even, like I said, been cocked on installation. And that's why the drivers are supposed to do a pre-trip and a post-trip to catch these things. Because the good thing about a hub piloted wheel, because you have the hub in there making sure that this wheel doesn't completely fall off like the old ball seat wheels could, this one was a different type of movement because the wheel was going back and forth. So that told me, like I said, either they got it cocked on installation or the nuts were never tight.

**DAVE WALTERS**

So you can just tell why this happened. And it ran loose for a while. And people always ask, how many miles? Well, you can't really tell all that. I can just tell you that this was not done in the first hundred miles. This was run loose for a while. So the amount of metal that you're moving on the wheel, it's over a hundred, but the applications and everything else that it could be in, those are telltale signs when you look at this wheel. So it's been run loose for a while. Rust streaks are the best indicator of that.

**DOUG MASON**

And once, Dave, just to maybe loop bit back to one of our previous ones while someone's listening here, if they were to inspect, and obviously it was not this severe of condition, but they found the rust spots, obviously they could correct the situation and get the torque correct. But now you have the rust spots. Those can be removed and they can be at least lessened so that you can still see the indication on future installations of the wheel. Correct?

**DAVE WALTERS**

Yeah. One of the big things they talk about is if this wheel is not damaged to the point of this, where this wheel needed to be taken out of service, you can remove the rust streaks. On aluminum wheel, what I tell somebody is normally you're going to take something, it could be a scotch brake pad on a hand sander type of things or something to take them away. It could be an SOS pad. Steel wheels, a lot of times they have to be repainted because the rust streaks are so prevalent, when you get them removed is to repaint the wheel. So if the wheel is damaged like this one where the bolt holes ... You can just see where this thing was damaged tremendously around the bolt holes.

**DOUG MASON**

Yeah. These are obviously to be taken out of surface. Definitely. These are not to be continued, obviously. That's why they're on the wheels of shame. But for those who see that this issue going in their own applications and the wheel is not damaged but you just have the rust streaks, you can continue to clean that up and move forward.

**DAVE WALTERS**

Yes.

**MIKE YAGLEY**

Okay. Hey, that was a great discussion, guys. We have plenty more wheels in our wheels of shame, so we'll have that in another future episode. Got a couple of questions from some customers. This is from an owner operator, Charles Skipworth. And he's got a question about, what is the best cleaning and polished to use on my Alcoa wheels? Who wants to take that one?

**DAVE WALTERS**

Here's what I tell somebody. It really depends on the severity of where the wheel is. I can truthfully say that there's two types of cleaners that are used. And one is for more dirtier or harsher looking wheels. And some of them are very mild just to get the stuff off of it. And then when you go into polishing the wheels, polishing is pretty much the same for every wheel. I always would recommend ... And again, I'm not on their payroll or anything, but I've seen this works better in the field, is Mother's Mag Wax is a great product. And once you get to the point where you want to start polishing the wheel ... Again, cleaner, you've got to really look at it. Some of the cleaners are heavy duty and they'll take the polish out and really make you mad. So if the wheel doesn't need that heavy duty cleaner, don't use that heavy duty cleaner. Use a more milder cleaner. Again, Mother's makes those products too.

**DAVE WALTERS**

But Mother Mag Wax, I've never recommended that to somebody that said, wow, okay, it works. It takes a lot of work, I agree. And the other big key is once you get it looking nice and shiny, buy Mother's Caribbean Gold Wax and put a coat of wax on them, and that will keep that wheel nice and shiny for a long time to come. So I know this is not supposed to be commercial, but I don't know how else to answer that.

**DOUG MASON**

Hey, what works, works.

**MIKE YAGLEY**

Exactly. If somebody is doing a good job out there, we have no problem saying so. Okay, so great.

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#### DOUG MASON

And then just for a second, you mentioned polishing, Dave, and the polishing compound. There is also some equipment out there that can really bring back a polish to a wheel as well, if you wanted to go that route. Correct?

#### DAVE WALTERS

Oh, absolutely. Again, if you want to do it yourself, there are now machines out there. A lot of tire dealers and truck dealers have them. And you can actually take the wheel in. Again, I'm going to be so non-commercial, but VIS makes a tremendous polishing machine. I've seen them at many tire dealers and truck dealers. They put the wheel in. It's very professional. They know not to take off too much metal. It brings back the wheel to looking brand new. So there are other options out there. And again, the people say, well, what does that cost? Well, it depends how bad your wheel when you go in. It depends if they have to run it through the machine once or twice or three times, and what they use. But there are other options out there. Again, like I said, if you go to a tire dealer or a truck dealer and they have a VIS machine, I've seen great results. They can bring these wheels back to brand new and they don't hurt the integrity of the wheel whatsoever.

#### MIKE YAGLEY

The only comment I'd like to add to what Dave was saying is when you're selecting a polish, if you take your wheels in to any source to polish them to put them into a machine, you need to be very careful there. Those polishing machines can take an awful lot of metal off very quickly, and that could cause you to lose your roll stamp. Now what's in that roll stamp as required by the federal motor vehicle safety standards. So if that roll stamp disappears on you, if it's polished away to nothing, then your wheel is no longer legal and you're going to have to scrap it. So when Dave talks about being very selective about who you take that to, he's exactly right. You need to be very, very careful about how much metal they take off of that wheel, because there's a certain amount of risk that you have to be aware of.

#### MIKE YAGLEY

The next question we have is from Dave Cook. He's asking, we have seen some wheels come into the shop with hairline cracks between the stud holes. What will cause them? Do you want to take that one, Dave?

#### DAVE WALTERS

Oh yeah, this is my bread and butter. When you get cracking between the stud holes, the first thing you got to look for is torque. People will say ... Every time I'm on any of these shows, I do a lot of the Dave Nemo shows and stuff, tire guys talk inflation, wheel guys talk torque. Why? Well, torque is very important. You're stretching that stuff to a certain point. Basically when you tighten that or overtighten, which is mostly the case in our industry because they use one inch guns that can put out 1200 or 1300 foot pounds of torque. That nut is only supposed to be torqued to 450 to 500 foot pounds.

#### DAVE WALTERS

You're supposed to also, in a hub piloted wheel system, use motor oil to put a couple drops of oil on the threads and a couple of drops in between the flanges and nut, in the body of the nut. And you got to torque that correctly. If you over torque that thing, you're basically putting so much more stress on where the bolt hole goes on the mountings flange and everything else. That's where you start getting those hairline cracks, from bolt hole to bolt hole. This is probably the most common reason for this.

#### DAVE WALTERS

Now you can also look at if you don't have proper backing. And in our service literature, we tell you how much backing should be on that. If you don't have backing going past the bolt holes, you're really not doing that wheel justice. And it'd be like a brake drum that's warped or out of shape. Could be you're running on a steel inner, aluminum outer and you're not getting proper backing. So those are the two big things that I've seen in the industry. There's always these rare things that could happen. But that's going to get you 99% just torquing back up on wheels are extremely important.

**DOUG MASON**

I guess maybe one other thing to add in there if you're talking about the torque is you can have worn or damaged nuts as well. And like you said, that's probably a lower percentage, but you need to ensure that you're using the proper grade of nut and that it's in proper condition as well.

**DAVE WALTERS**

Absolutely. And again, I always tell people it's about cleaning. Cleaning the surfaces, cleaning the studs. And if you don't start with proper hardware, you're just chasing something that's not going to work. So there are things. But torque, again, I always tell somebody, most of the time it's a torque issue. It can be a backup issue at times and it can be hardware. So again, cleaning is important. But if you're getting mostly hairline cracks between the bolt holes, definitely look in your torque program.

**MIKE YAGLEY**

And I'm just going to quickly just chime in with the importance of that backing. We, of course, in the design area, we do a lot of computer analysis, a lot of studies on trying to understand what happens with our wheels in different conditions. And if you shrink the mounting surface, if you shrink that backup that the wheel is mounting to, let's say you have a steel wheel inner and it's flexing a little bit. And because of that flex, you're reducing the amount of surface area that you're actually connecting to. The whole wheel design, that mounting surface, is really the foundation for everything else that's happening with the wheel. It's like a house, and everything else builds on top of that. If that mounting surface shrinks for whatever reason, you're going to have problems throughout your wheel.

**MIKE YAGLEY**

And these hairline fractures is one thing that can go wrong. You can have old hole cracks, hand hole cracks. It just changes the way the stresses that can have very, very serious implications. So you need to always make sure that wheel is mounting to something that is solid, that you maintain that diameter of the mounting surface. And that's especially tricky for that outer dual. So it's just something to keep in mind.

**MIKE YAGLEY**

Okay. Well, I think that does it. That closes up this episode of Behind the Wheels. Want to thank everybody for listening and really love getting the questions in. If you want to get ahold of us, you can go to our website and just ask questions at [alcoawheels.com/podcast](http://alcoawheels.com/podcast). Thanks for listening. See you next time.

**ANNOUNCER**

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