



Behind the Wheels Podcast Transcription

Season 2 Episode 6

Loading: A Heavy Responsibility Part 1

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

One of the questions we get over and over and over again from our customers, has to do with loading and how loading works. What's going on. How you load wheel. What kind of restraints. What kind of limits we have. So, we're going to dedicate this whole episode to loading. To a discussion on loadings and some of the critical things that we find over and over again that hopefully it'll be really informative to all of you, our listeners. Let's just start off with some just general comments about loading. When a customer is going out and trying to understand loading of their vehicle, Dave, what should they be looking for? Where do they start?

DAVE WALTERS

Well, the first thing I tell a customer when he is, and again, some of them are after the fact and some are before the fact. So, if it's after the fact, a guy bought a truck, you'd say, go open your front door and look, there's a little tag on your door, and it will tell you the limits on your axles, your steer axle, your tandems, and it will tell you all that. When the OEM built that truck, they put the limits on the door. And what most of the people don't understand is the lowest limit, say on an axle, it could be the lowest limit of the hub. It could be the wheel, it could be the tire, or it could be the axle. So, people will say, "Well, I've got an 18,000-pound axle." But technically you've got the wrong load rated wheel on there at 7,400 and the tire.



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DAVE WALTERS

So that's why your door says 1480 or whatever. So going to the doors important. Now, they call you before the fact and say, "Well, I'm specking this truck out, here's what I'm going to run." It's easier to say, look, if you're going to put an 18,000-pound axle years ago, Alcoa sent out a bulletin that these truck manufacturers saying you're putting an 18,000-pound axle truck manufacturer. You're going to put at least a 9,000-pound load rated wheel to match that actual, because we're getting a ton of warranty back from guys from these running the 22.5, eight quarters instead of a nine inch or a wide base. So, there's a lot of things that happens when it comes to loading.

MIKE YAGLEY

It's funny because when it comes to specking out the axle limits, and that's one of the things I go to when I talked to customers one of the first questions I have is, well, what's your axle rated to. You can swap out the wheels. You can swap out the hubs pretty easily, relatively easily, but swapping out the axle that ain't going to happen. So once that customer knows that axle limit that is written in stone and they can start working around that. But like you said, they need to be careful about the wheels they spec out on top of that. Anything else, any place else they should be looking to start off when they're thinking about purchasing a vehicle, when there's, they're thinking about what they're going to be doing, Dave,

DAVE WALTERS

What I always tell somebody, everybody, it used to be gross vehicle weight. Now most of the CVSA inspections are per axle. So, you got to understand that I have an 18,000-pound front axle on 34,000 pounds rears, and then my trailers this, so now you got to realize whatever load I'm carrying, I got to make sure that none of these axles are going to be overloaded. So, there's more thoughts into, and especially when you get into flatbed application where they're hauling different loads with the same trailer and under a lot of flatbeds, that's when you get into the spread axle trailers and they have to know where to put that load, to center that load out and make sure that they can carry that legally.

MIKE YAGLEY

Doug, one of the things I've seen over and over again, we'll get back to that spread axle, because there's a lot there, I think. But I wanted to, first of all, talk a little bit about the difference between static loading and dynamic loading. And Doug, maybe you can take that one. What is the difference with static loading and dynamic loading, and specifically, how does that affect the wheel?

DOUG MASON

When you think about it, you get into a situation where you have just a point load you're talking about a static load, or when we're talking about the dynamic load, you're really talking about fatigue that's occurring as the vehicles going down the road. And Dave has some good stories. He was just sharing with us before we started the podcast about different customers and say, "Hey, I'm lifting this load and I'm placing it on here. Should I be concerned about that?" You like, "No, that's a static load." You basically have to get to the yield point of the material, which is significantly high relative to all of the stuff that's going on before you're going to have any issue. You've got to create a yielding point out of that static to have a failure. And that would be just a collapse on the spot.

DOUG MASON

But when you're talking about dynamic loading, you've got this cyclical load that's occurring and there's a specific fatigue limit, they would call it. A certain stress level, low level that we're talking about. That if you exceed that for a certain number of cycles, you're going to start creating a crack in the wheel. And many times, we'll see where vehicles are overloaded, perhaps on different axles. And we'll talk about other situations where you can maybe not overload the axle, but you can overload the wheel itself by what you're doing. And we'll talk about that is now you've increased that load, that stress level to a point that in a finite number of cycles, you begin creating a crack in the wheel. So, I don't know if that's kind of what you're looking for, but that's how I would maybe describe it. That difference between static and dynamic and really creating a fatigue situation, which is what our guys and on the road are going to ultimately see.

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MIKE YAGLEY

One of the things when I'm talking to customers and they're asking me, "Hey, can I..." Occasionally, we'll give a customer and okay, an approval to overload our wheels to some specific weight rating. And they'll be looking for it and they'll say, "Hey, can I overload the wheels by 100 pounds?" So, throw a number out there. And the thing is, what they don't understand is, and we have to spend a little bit of time explaining to them exactly what you just said. If you're just talking about having 100 pounds but the wheel is not moving. It's just sitting there. You're just going to put 100 extra pounds onto the wheel. That wheel is not going to crack. What causes the wheel to crack is load plus distance traveled. When you have, and tires, the tire guys are completely different.

MIKE YAGLEY

They're worried about inflation pressure. And they'll be looking at that. We're looking at the distance traveled at that load. And that's really getting into what you were talking about. How many times that wheel is going to spin around. How many cycles is it going to go through? Is it going to roll a million times? Is it going to roll 500,000 times? It's going to roll, basically, if you think of a wheel crack happens, if you take a stick or something and you bend it back and forth and back and forth and back and forth, and it eventually will start to break. That's what happens with a wheel crack. It's not the load itself that does it. It's the load plus how many times it goes through that cycling, you can put a lot of weight. Our wheels can take a lot of weight if they're not moving.

MIKE YAGLEY

If they're just sitting there, once you start moving, then it's how many times is it going to cycle? How many rotations is that wheel going to go through with that extra load? That's the difference between static and dynamic loading? The static is where it's just sitting there and just being loaded. And then the dynamic is where it's rotating at that extra load. And that's what kills a wheel is when you have extra load and driving down the road for 100,000 miles, well, that's going to cause a problem.

DOUG MASON

One cycle versus millions and millions of cycles if you want to think of it that way. One cycle huge load, many, many million cycles cannot.

MIKE YAGLEY

Right. And going back to bending, if you have a piece of metal and you're trying to bend that piece of metal, if you bend at once, well, it's going to even with a lot of bend, it's going to stay as one piece it's going to be okay. But when you start bending it back and forth and back and forth and back and forth, it'll eventually give. And that's what the cycles do is they just bend it a little bit, a little bit, a little bit until it finally gives. The amount of load that it takes to damage a forged aluminum wheel. If you're just static if you're just putting load on it is unbelievably high. You're not going to get there no matter, it's very, very difficult. You have to put a lot...

DOUG MASON

You're going to break something else.

MIKE YAGLEY

Yeah. You're going to break a lot of other things first. You're going to be blowing out tires first. That's not the problem. But once you start putting that cycle on there, once you start putting those rotations on there, the requirement to do any damage goes way, way down. That's what's causing the problem or more of the cycles. So hopefully that makes that a little bit clearer.

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DAVE WALTERS

I could bring up one thing. Years ago, and I'll get some good points from marketing for this one. Years we forged aluminum wheel and a steel wheel. And we have these mega presses out in Cleveland where we manufacture the wheels. And what we did was put them in the press and see how much tonnage it would take to deflect the aluminum wheel against the steel wheel. And it was like 240% more pressure to deflect four-inch aluminum wheel two inches in a steel. So, my calls all the time is the refuge guys calling saying, "Well, on front end loaders, what if I'm going to a concrete site that's throwing away really heavy loads?" And that ain't going to hurt you a bit. The hydraulics put them in the back of the truck. It gets when you get the load on the truck.

DAVE WALTERS

That's what we're worried about. I was just telling them guys earlier the other day, we got a call from a fire company, and they are putting their repellent equipment inside our wheels, webbing, and then repelling down these cliffs. And they're like, "Is that wheel... That wheel doesn't even... 200-pound guy doesn't even know anything." So many stories of saying static loading is so different than dynamic. And like I said that crush test that we did years ago really proved that there's a big difference between the forge to aluminum wheel on a steel wheel.

MIKE YAGLEY

Oh, yeah. It's thousands of pounds to get a forged aluminum wheel to crush. If you want a static load, you want to crush it. You've got to get into the thousands of pounds. And it's only going to give a quarter inch, a half inch, something like that. Then I'd have to go look at the data again, but it was, it was impressive. You're right, Dave. Well, great discussion guys. I think that does it for our listeners.

MIKE YAGLEY

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