Auto Physical Damage

Episode 4: What Vehicle Lightweighting Means for Collision Repair

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Ryan and Edwin Pope, principal analyst at IHS Markit, discuss the growing use of lightweight materials in new automobile design and construction. While these alternatives are helping to improve safety, boost fuel economy and reduce costs, they are also creating new challenges affecting insurance claims and the delivery of proper and safe repair.

Ryan Mandell: Welcome back to the Mitchell Collision Podcast. I'm your host, Ryan Mandell, and I am very excited to have with me today my guest, Edwin Pope, who is a principal analyst at the research firm IHS Markit—focusing primarily on automotive lightweighting. Welcome, Edwin, how are you doing?

Edwin Pope: I'm doing great, Ryan. Thanks for having me.

Ryan Mandell: It's absolutely my pleasure. I had the chance to hear Edwin speak at the Automotive Lightweight Materials Conference a few weeks ago back in Detroit. And he did an amazing job presenting some really interesting content around where the industry is headed, the use of lightweight materials and how that's impacting really the entire automotive industry. So we had a chance to talk there and I thought it would be great to have him provide some insights to our listeners. And so before we jump right in, Edwin, why don't you just give everyone a little bit of background on who you are, kind of what you've done in the industry, and what your

role is at IHS Markit.

Edwin Pope: Awesome. So I'm an absolute gearhead. There's no other way to say it other than 15W-40 is probably running through my veins right now. I've spent a lot of time personally on car stuff. Professionally, I didn't start automotive until 2015 when General Motors hired me on and I started working on, let's say, the last couple of variants of the seventh gen Corvette. I was around for the launch of Grand Sport and I was around for the launch of the ZR1—and then through the entire design cycle, through the manufacturer validation builds for the eighth generation Corvette. And I've been with IHS Markit now for almost four years this coming fall and I focus a lot on body in white out of my material research. But I keep a keen eye on the other material research kind of initiatives that have to do with maybe R&D efforts or things in chassis or even some of the electrification material stuff.

Ryan Mandell: Awesome. And just for everyone's clarification, because I think the term body in white is not used as much in the collision industry. So maybe just give a quick definition of what you mean by body in white components.

Edwin Pope: Okay. So automotive OEMs will call it body in white if it essentially goes through the body shop. Things like a crossbar beam that are installed afterwards, you're, let's say, subframe for your engine transmission rear differential aren't included in that. But, basically, if you go to, let's say, an enthusiast and go the shell, the chassis, and you're looking to get that project car. Those are some of the terms you're going to see in the wider industry for what we're calling body in white. And in this scenario, we're not including the plastic trim, any of the gutter trim on the top, the front fascia, the rear fascia, rocker covers, right? This is traditionally your stamped mild steel components, and you know, that's moving over to aluminum and composites and so on.

Ryan Mandell: Yeah. So pretty much kind of what we would think of in, you know, the collision repair space as more of the major component parts. So, you know, hoods, fenders, doors, quarter panels, deck lids, roof panels, those are the kind of things you're talking about?

Edwin Pope: Yeah. B-pillar, shock towers, rocker panels, right? For our own internal research purposes, we don't consider like a truck frame is actually part of the body in white. We consider it as part of the chassis, actually, so part of the suspension architecture. But we do keep an eye on that too, right, because those are changed into higher strength steel.

Ryan Mandell: Definitely. So talk about why you've seen automakers really moving to these lighter weight materials. You know, clearly, I think fuel economy is one of the big drivers. Does that continue to be the primary driver of why OEMs are moving more of their substrate construction to these lighter weight components?

Edwin Pope: I think it's a double-edged sword, right? So you've got fuel economy considerations. But, ultimately, another way to think about this is efficiency. And what I mean by that is cost efficiency as well. Right? Automakers keep adding more and more content to these cars, whether it's some ten-way power adjustable seat or the touch screen in your head unit or more speeds to your transmission or, whatever. You need to offset that somewhere, right? So, traditionally, automakers have really looked at body in white is how they can kind of offset the additional content that they're adding to these vehicles and maintain like an EPA test weight class. But the best-in-class solutions that are available on the market right now for lightweighting are both at the same time. They're a cost reduction activity at the same time as you're actually reducing weight of the component. And when that happens, it's very easy to get kind of all the oars rowing in the same direction in these large organizations to make the change to a new material.

Ryan Mandell: And I think a lot of times they're actually even able to improve crashworthiness in some instances. I mean, I read this study, I think it was from Ohio State University, talking about how a high-grade aluminum will actually absorb more crash energy than mild steel will simply just because of the properties of the

metal and how it disperses that energy.

Edwin Pope: It's that on top of, let's say, crash zones, right? So depending on the architecture of a new vehicle, some of the distances where we used to have a solid foot to two to sometimes even three before you get cabin intrusion are changing whether you're putting different items in there or, for example, the EV trend, right? Your crash zone is shortening. Right? So it is a matter of that impulse mitigation and making it to where it doesn't hurt an occupant, but within that distance without creating a problem—either intrusion into the cabin or whatnot.

Ryan Mandell: Right. Absolutely. And you mentioned aluminum. You mentioned the composites. You know, we've seen manufacturers move into this, you know, more of a mixed material approach: this suite of materials. Where do you see that headed in terms of what is going to be the dominant material being used? Do you think aluminum is that material? Or do you think it's moving in a different direction?

Edwin Pope: It's not a winner-take-all market. That's the tough news for anybody listening here that's a repairer. There's even, you know, in the EV market where people think aluminum is great for the whole battery enclosure. Our market analysts are seeing a split between the lid and the tray. So the top of the battery pack might be one material and the bottom half, maybe a second material. You look at rear liftgate and glass reinforced thermoplastics are really starting to ramp up. While you still see a front bumper beam, you know, extruded aluminum really works well for that particular application. So when we're looking at this, there are some, let's say, winners in certain sections of the car. And it's really going to be hard for some of these players to oust something like I call it gigapascal steel. So any hot stamped, press hardened are these very high grade steels that OEMs are pushing all the way up until like 2500 is where I've seen the highest R&D numbers hit right now. This is like beyond the old school boron and martens site kind of door crash beam because that's where it entered the market for cars. And so your A-pillars and B-pillars are really focusing on this material to where there's even a couple of models that went all aluminum and they kind of backpedal a little bit because they found out that's really a good material for that spot.

Ryan Mandell: And I think when, you know, you mentioned the challenge for collision repair shops and having to deal with all these mixed materials, thinking about the 2500 in terms of that rating for ultra-high strength steel. I mean, you're not repairing that kind of material, right? I mean, no, there's nothing you could do to be able to maintain that structural integrity.

Edwin Pope: No. And some of this stuff is it's not just the material rating anymore, Ryan. It's also the construction methodology. This year, the U.S. Steel Association in their Great Designs in Steel, actually featured a Tier one supplier that's now taking tube and essentially hot pouring it like a balloon and a set of dyes. And this traditionally with two stamped parts that have a flange here and, you know on either side of my fingers here and maybe some adhesive and some welds down it. Right? And these guys are removing all of that. So in the past, you may have, you know, really been able to spot weld, kind of drill out these guys and replace a whole part maybe on a car. But now if you're going to turn that into a single component, this changes the name of the game for that individual spot.

Ryan Mandell: Yeah. Kind of thinking about, you know, for a lot of GM vehicles—and I'm sure you're certainly familiar with those—when you're replacing a quarter panel, you're buying a unit side in many, many instances, but you're still able to section out the quarter panel in most applications today. But what you're talking about is essentially losing that ability to be able to section in some of these pieces that are currently welded in.

Edwin Pope: You might. One of the materials I'm keeping a keen eye on, SGA, is one of the first adopters. Ford adopted previously, but they're calling it steel laminated sheet. There's an aluminum laminated sheet version, too, but it's like an ice cream sandwich with metal on the outside and polymer on the inside. It's known as quiet steel, smart steel. There's all these trademark brands and different kind of formulations between what the cookie looks like and what the cream filling looks like in the ice cream sandwich metaphor. Right? And I'm sure that the

market will have some differentiation there, whether or not it's like honeycomb or something odd. Right? But if you imagine that from a repair standpoint and, you know, mind you this is in a roof structure rail in a currently produced car. And if you imagine that as an outer panel, well, what do I do? I mean, I've got aluminum foil thin sheet on either side of this polymer. I'm not doing a weld and kind of just grind pack on this. That's not going to work for a quarter, right? So where are you going to fix this? Are you going to, maybe I don't know, bridge a gap and leave a gap between these panels and back it with some type of fiberglass matrix or something? This isn't going to be, you know, just bought up to two pieces, steel welded up, grind it, clean body filler and paint it. It's going to need some innovation. And that particular kind of set up is pretty cheap, right? Right now it's about $5 a kilogram for OEMs to embrace this. That's kind of, let's say, the fence that's out there for OEMs. Part dollars per kilogram is commonly held is like the dividing line between things that are too expensive for adoption and stuff that, you know, ultimately gets into vehicles. And there's some solutions that go negative in this scale as that product line advances. I think that $5 per kilogram goes down to a dollar or less, depending on raw materials and how these guys form it. So, and then I look at a body side, you can only go so thin, right? There's going to have to be something if they want to keep the lightweighting trend going. And this is like one of those materials with pull and replace, right? So if I'm an OEM, I can take the dye that I've got today, pull out the mild steel, slap this stuff in it, change my spot-weld parameters a little bit and move on with life and save, you know, 10 pounds, 20 pounds or more pretty quickly.

Ryan Mandell: How much do you think automakers are considering collision repair in that design and engineering phase? Is there a dedicated point during the engineering process where this comes into play or is it kind of an afterthought?

Edwin Pope: Depends on the OEM. Right? I think we talked about this a little bit at the conference. Which is like there is an OEM here in the US that essentially doesn't build it all into it. Giant casting, building a battery pack into your vehicle architecture itself, you're not repairing that. I'm not going to, right? I'm all about throwing a car in the rotisserie and welding and everything. But, you know, that scares me halfway up the street personally. And I'm not a collision repair expert. On the other end, there are some considerations. You know, in the engineering program I worked on, that was part of the consideration at a fundamental level that prohibited certain material collection, joining strategy, and even how we assembled the vehicle was to ensure that collision repairs wouldn't be insane. For example, if you look at like a Ferrari or a Lotus compared to a Corvette. There's a few instances where you get this clamshell construction, these big fiberglass components, and you hit something at like five miles an hour. The fiberglass cracks. And then your Lotus is on the marketplace with a salvage title because of some cracking in the fiberglass for a fender bender. And, you know, that is a consideration for a designer. GM, Ford and other OEMs that are mainstream definitely look at this stuff pretty early on when it's kind of like, let's say, on the drawing board for the car.

Ryan Mandell: I think that's really helpful to know because I think there's a lot of people in our industry, we don't get to see, you know, behind that curtain. We don't get to see, you know, where this comes into play for automakers. So I think knowing that for a lot of companies, that is pretty crucial to that design and to the engineering steps and the decisions being made. I think that's, hopefully, reassuring to some people knowing that they're actually taking into account.

Edwin Pope: Right. And I guess the assuaging of the audience here would essentially be, remember, people will have to build these cars on factory lines. We're not to the point unless you're like our rival—which is a commercial vehicle at this point—building these highly automated assembly lines yet. And, you know, UAW is probably going to fight here in Michigan to make sure that people are still employed in factories. And in a lot of scenarios, it is more efficient to have a skilled labor force than attempt to automate the whole thing. I think, you know, there's some disruption potential and there would be some players move around in niche sectors. But, yeah, there is a human touch element and to me, you know, watching the Tesla design cycle for this stuff, when he really wanted to automate almost the entire assembly line and then had to backpedal away from it and realize

that people are important in building cars. So if it has to be built by a person, it'll probably be somewhat repairable by a person in certain circumstances. Right?

Ryan Mandell: And that's a good point, because I think that's something we often forget, is that this is not an automated process. You know, we see pictures of the robots doing all this welding and things like that. But we tend to and, you know, myself included, we tend to forget that this is a very people-reliant process that relies on humans to actually do a lot of this work. So I think that is helpful to remember when we're thinking about collision repair and we're thinking about what goes into how these vehicles are designed and how they're ultimately constructed and assembled. You know what I'm thinking about in terms of all these different materials and, you know, you said there's no one material that's going to really dominate. You know, I think that's the challenge for collision repairers. And, so many we've been kind of hearing about these OEM-certified networks and the growth of these. And that's, you know, that's definitely something that I think we're going to see continue in the marketplace. But as a body shop, how do I start to strategize around this? How do I build my business and insulate it from these changing materials and really start to put myself in the best position to capitalize on this shift really just away from my old steel?

Edwin Pope: So you're hitting the nail on the head here, Ryan. And I think no matter where you're sitting in the world and even my competitors will agree with me on this one, the name of the game is ripping mild steel out of these vehicles. And it's to the point that I've talked with some steelmakers and said, hey, you guys are talking about production limitations for your line and you have secondary products for like heavy equipment stuff. Why aren't you using higher grade steel for this and literally changing your foundry over towards these higher grades of steel across the marketplace? So I just want to put that nugget kind of out there before I answer your question. But I think the best way to handle that is to start learning how to be a little bit more of a specialist and a little less of a generalist. There are a few changes coming in, like plastic fascia that will probably help with repairability. And there's also a driver on another side for recycling where you may not see some fascias even want to be repaired anymore because, you know, recyclers are starting to stand up their capabilities of processing fascia materials and other materials. So that's a fundamental change, I think, in the industry. Is it better to pull and replace and send it off to a recycler or is it better to just spend the man hours? That's going to become a pinch point for anybody across the entire value chain. And then I think there's some specialty tests and equipment, things that'll be out there. For example, if I run into my barn and have a problem with a crack in aluminum, I'm going to go ahead and do like a penetration test, which is a dye and a spray and a whole thing. Right? Fairly simple and straightforward, but it's a skill set. And once you start honing in on this stuff, as we see the material count continue to raise in the auto industry, I think we're going to see people start saying, hold on a second, I'm good at this over here. I don't necessarily know if I want to play over here. I don't want to buy the equipment. My manpower is really good at this over here. Let me figure out how I can kind of hone it in a little bit. And it may not be brand only is what I would submit to you. The trend that I'm personally seeing and this is on a global basis, right? So this is North America, Europe, Greater China—and we're working on looking to Japan and Korea as well. But realistically, there's some behavior that linked themselves to where a vehicle competes and what it costs, what type of vehicle it is to where we see some clumping of material choices within what are traditionally called segments, but they're not quite behaving like A segment, B segment and so on. It's the mix of like price, vehicle size and customer base. And you'll see these little groups of vehicles kind of having these similar mixtures, and it may be across brands.

Ryan Mandell: Interesting. Yeah, I think certainly a challenging environment, but not one that is insurmountable, you know, and I think that looking at more specialization and really seeing where do you have the right technicians, the right training, the right equipment to where you can compete and be best in class in that lane that is most profitable for you.

Edwin Pope. I agree with that one, Ryan. Especially when you start dealing with people who are ultimately your customers—not the insurer, but the owner of the vehicle is who you're dealing with. And there are behaviors and

expectations in these groups of people. Right? I'm the type of guy I've got no problem with, you know, going into a dirty place or anything like that. But, you know, if I'm in like a G-Wagon or some other, you know, six figure car, I might not be too happy about dust in the body shop. But that's normal, right? So, you know, these are things depending on how you face your audience, how you're dealing with your clientele, that maybe are some considerations for these body shops if they're really business savvy. And I can make a really good metaphor here of just pit stops. So you go to a gas station and there's actually market diversity in gas stations. Next time you go on a road trip, check it out. You'll have some gas stations that are kind of rundown. What's going on here? There's maybe a handful of, let's say, mainstream products. And then you'll go into the far other end of a gas station that's been newly built, has LED backlit mirrors in the place. And you've got like walls of different products and everything else to where you're wondering what's the dividing line between the thing in a grocery store? And I would encourage these business owners to think about it in that light of starting to know your customer base a little bit better and figuring out who you want to serve and having that customer focus at the forefront of how you decide this.

Ryan Mandell: Absolutely. Well, Edwin, I can't thank you enough for your time today. I really appreciate you spending this time with us and providing these insights. I think it's a really interesting perspective for folks in our industry. And I'm very grateful for your insights, for the research that you do and for sharing all that with us.

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