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Event Transcript

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<u>RIVEROS-JACOBSON:</u>
Thanks Steve.

Good morning.

In 2006, for the first time, aluminum will eclipse iron to become the second most used automotive material for light vehicles in the world. Clearly, we think that's great news.

Today we're going to share with you some detailed information on the global growth of aluminum content with some figures that are coming from an updated report which was just completed. What its going to establish is the following: that aluminum is not only well established as a cost-effective solutions provider, but it has been steadily climbing the ranks as the most often selected material option for a wide array of automotive applications.

Secondly, we're going to discuss with you findings from a new value study which was just completed as well, and it demonstrates how under the right circumstances, aluminum's unique values can be taken even further to develop future vehicles that are cost-effective, that are safe, and that are performance oriented, while at the same time addressing light-weighting and fuel efficiency.

We're also going to talk about safety. That always present argument about size and weight and how that relates to safety performance in a vehicle.

In the past year, there have been separate studies done by the aluminum industry, as well as Honda, that clearly confirm that size, more so than weight, is a better determinant of vehicle safety.

This is pretty well-timed data since the National Highway Traffic Safety Administration plans to publish its new CAFE structure for SUVs, pickups, and minivans in the next thirty days or so.

It's clear that this new rule is designed to help automakers maximize the safety and fuel economy benefits that high-strength and low-weight materials like aluminum can provide.

Why is aluminum the fastest growing material of choice around the world?

The answer can be looked at in four ways. First of all, it's a discussion around fuel economy. Cars that are made lighter with aluminum use less fuel. Statistics will show that approximately a ten percent weight reduction is equivalent to about eight percent fuel-efficiency, and I think that's important to all of us. As I was driving here last night, I pumped gas at my car and the price was $2.69 a gallon. And today's prices around the

Detroit metro area show that the average price, and I guess you'll have to hunt around for this because I didn't find it last night, is $2.43 per gallon. That signifies literally a 24 cent increase in just the last two weeks, compared to a national average of about $2.33 a gallon. So…pretty sobering argument.

Second is a discussion around the environment. Ninety percent of all automotive aluminum is recovered and recycled.

Additional to that, lighter aluminum-weight vehicles reduce greenhouse gasses. And these two points are incredibly important in the effort to address global warming trends.

I'm happy to share with you that Alcoa researchers have developed a global sustainability model that forecasts that the use of additional recycled material and aluminum in the transportation markets will actually make aluminum greenhouse gas neutral by the year 2017. This makes the aluminum industry the first in the world to credibly establish that claim.

The third reason for aluminum's continued growth is safety. Pound for pound, aluminum can be significantly stronger and stiffer than steel. Strength is only part of the equation. Crash energy absorption becomes absolutely critical because the materials used to build the car should be designed to absorb more of the energy in a crash, so it's not passed along to the vehicle occupants.

If you take a look at this slide, we show how design of alloys and actual design of parts in their functioning environments can allow you to look at how energy can be dissipated. And as you can see that particular aluminum component folds predictably to absorb the majority of the energy in a crash.

Keep in mind that based on its properties, aluminum can absorb twice as much energy in a car crash as compared to steel.

And last, but not least, a fourth factor in aluminum's growth performance….(brief pause)…sorry about that.

Last, but not least, a fourth factor in aluminum's growth performance is a discussion around the use and the adoption of aluminum in high-performance vehicles. What I really want to stress is that today's growth report confirms, and you will see when we discuss it further, that aluminum is not just for super-luxury cars. As you can see around the room and as you can see from your packets, one of the things that we show is that today's family cars and trucks use an incredible amount of aluminum. From the hood of the very familiar Ford F-150, which is the top selling truck in North America, to the tailgate of the Expedition, aluminum continues to be a very cost-effective way for us to help automakers design vehicles and meet exacting standards for today's consumers.

Let's take a look at some specific data and numbers.

What I'm going to discuss right now is a brief overview of the results of a Ducker study.

The Ducker research company has been collecting detailed aluminum-content data for light vehicles in North America for several decades now. For the purposes of this study, we are defining light vehicles as passenger vehicles, SUVs, pickup trucks, and vans.

Dick Schultz, who is to my left this morning, is from Ducker Worldwide, and he's available afterwards to take any questions with respect to the data that we're going to look at in this report.

What's very significant also here, is that this report embraces a look at data that is not just North America based, but is also looking at two other significant market segments, one of which is Europe, and the other one of which is Japan.

When I began this morning, I told you that in 2006, for the first time, aluminum will eclipse iron in content in a vehicle. In addition to that fact, if you take a look at this current data, it shows that aluminum content for light vehicles is going to continue its uninterrupted climb per projection, and it also shows that in the last thirty years it has enjoyed year-over-year, consistent, uninterrupted growth. The current projections from the Ducker study are that this uninterrupted growth will continue at a rate of approximately eight to ten pounds per vehicle, or about three percent, for the foreseeable future.

Another look at this data also shows us some interesting things. Number one: regardless of the market segment that you look at here, and right now we have some information in front of you with respect to North America, Europe and Japan, the light vehicle aluminum content essentially, if you take a look at these charts, between 1990 and the projections for 2006, shows essentially a two time growth in the use of aluminum content in vehicles.

It's also interesting to note that if you look at the adoption rates, those for Europe are about one and a half times higher than they are for the comparative markets of North America and Japan.

Why do we think that might be? Well, here's another look at the data. Both in North America and Europe, and I think the focus on light-weighting and fuel efficiency is evident, the approach to it has been slightly different. In North America, automakers have focused on light-weighting by adding aluminum content to the powertrain, and you can see that very clearly in the data as you look at the content growth between 2002 and 2006, whereas in Europe, it's a slightly different situation with the use of diesel engines, and manual transmissions. But where Europe clearly demonstrates a broader approach to innovation is the fact that aluminum adoption in the inside, as well as the outside of the vehicle, is taken into account. So you see a much more accelerated growth in the adoption of aluminum in basically the body-in-white, in closures, in instrument panels, heat shields, things of that nature.

Here's another look at the data that also confirms again that the primary focus in North America and the primary drivers for the growth of aluminum have indeed been in the powertrain. If you take a look now at North America and the content, it shows you clearly, once again, that in applications that are slightly more innovative with respect to where you put aluminum in a car, Europe leads the pace.

In 2006, we expect approximately 43 million vehicles to be assembled in North America, Europe and Japan. And they're going to require an unprecedented number of large aluminum parts and applications. There will be nearly 100 million wheels, over 40 million suspension arms, 22 million engine blocks, and approximately 14 million closures. Clearly, clearly exceeding the performance of just a few years ago.

Aluminum has a presence as a mainstream metallic material for nearly all automotive components as you can see from this chart.

So what does this study tell us, in summary? Not only are we excited about the fact that again aluminum and the content of aluminum in a vehicle have surpassed that of iron and will do so in 2006, but also, that basically the total aluminum content will be nearly 12 billion pounds. This is 25 percent more aluminum than the aluminum required in the year 2000. The over 580-or-so million pounds of aluminum sheets for closures, instrument panels, structures and body components is a literal 100 percent increase over the aluminum requirement of just four years ago in 2002.

The two million high aluminum content vehicles that are going to be built, that will be intensively high in aluminum content, will contain over 500 pounds of aluminum each. And there will be 100,000 complete aluminum bodies which will be critical to our quest to make aluminum the leading material for automotive light-weighting. So this is very significant for us and very exciting for us to know that the amount of aluminum in vehicles is not only increasing, but also that it is spreading across market segments. It's not only a material that you find in super-luxury vehicles, it is a material that you can bring to bare with perspective to light-weighting, with perspective to innovation, and with perspective to fuel efficiency and care of the environment in more than just one segment of the vehicle on the market…lightweight vehicle market.

I'd like to now turn this over to Martha Brooks.

BROOKS:
Good morning everybody.

The global content report that Misha just took us through documented the continued strong growth of aluminum in the automotive market. The data demonstrates that aluminum used in light-duty vehicles is technically viable and economically viable across the market today.

The second study that we're releasing today, I will take you through in just a moment, talks about the possible future of intensive use of aluminum in mass produced cars, mass produced light-duty vehicles. This study was conducted by IBIS Associates, an independent consulting firm that specializes in technical and economic analysis of materials in manufacturing technology, and goes into a great deal of detail on the economics of the design in a future state.

This study indicates that under the right conditions, aluminum intensive automobiles can be very practical as a cost-effective alternative for improving fuel economy in light-duty vehicles.

Before I go into the detail of the numbers here, I will just remind you that what we're looking at here is the value proposition of a future cost-to-benefit state of play where automakers have worked through the learning curves associated with using aluminum in their body-in-white.

First I'll take you through the methodology of the study, which is important to understand as we look at what's possible in the near future.

What we did was analyze the cost of what could be, trying to put it just slightly into the future, not exactly what are the economics today, if I buy a part tomorrow. So we're looking at the end-state, at high-volume manufacturing. We are going to think through the engineering problem of resizing the powertrain component to go with a lighter-weight vehicle, and we've gone to a normal manufacturing learning curve, and we've used only components that are available in the study. So we've not assumed any new technological leaps. We based our work on an average, mid-sized family sedan that was designed to be an aluminum intensive, safe, and highly fuel efficient automobile. It was part of the partners for a new generation vehicle program, done together with the Department of Energy. It's a real car, not something that's designed on a piece of paper only.

We have not ignored the very real stamping and assembly challenges associated with aluminum. They're still part of the future cost analysis. We've taken into account the capital required to build this kind of a vehicle. And what we've done is look at existing powertrain combinations, put them along a regression line, and said 'if you have a vehicle that weighs X amount less, what sort of powertrain could you choose to give you equivalent acceleration?'

And all of the economics associated with the fuel economy were discounted at a seven percent rate to come up with an NPV figure for the fuel economy. And the fuel consumption, as I mentioned, is calculated on an equivalent acceleration basis, an equivalent size basis vehicle, so that it's only the mass and the powertrain that are changing with the use of aluminum.

The cost that we used for aluminum in the study is a $1.50 a pound, which we took directly at the midpoint from the freedom car project; we didn't attempt to assess that ourselves. And the cost that we used for the steel comparison was $0.35 to $0.37 a pound, which was a middle of the road sort of price from the time we started the study; neither a peak value, nor a low value.

What were the results?

This chart shows that the mass on the baseline steel car, 1,564 kilograms would go down to 1,288 kilograms in an aluminum intensive, mass produced vehicle.

The primary weight savings, that is the weight associated with the body-in-white, with the cradle, and with aluminum wheels, the parts that are actually changing to aluminum in this analysis, was 163 kilograms. However, when you take 163 kilograms out of the structure, you have some secondary weight savings possible as well with other components that can be downsized. So, for every pound that you take out of the structure, you can take out 0.68, excuse me…for every kilogram you can take out 0.68 kilograms in ratio in secondary weight savings as well, and that's the 112 kilogram figure you see there.

To move from steel to aluminum in the aluminum structure components, again the body-in-white, the cradle, the wheels, you incur a cost premium of $630. However, that can be partially offset by secondary cost savings of $527 when you chose the smaller driveline componentry. Your overall curb-weight in the vehicle is down about 17.6 percent.

One more chart on detail before we get to what that means in fuel economy. This shows some of the selective systems we went through in the analysis in the IBIS study to understand the actual weight and cost of each of the componentry, and you can see in the detail here where the weight comes out and how the cost moves. Just by way of note, the body figure here is more than just the aluminum componentry, it includes the graphs, the paint, the sealers, and that's why you see a larger weight for the body figure.

That 17.6 percent savings in mass translates to more than 15 percent savings in average mileage per gallon. So we go from a 21.7 miles per gallon vehicle, to a 25.1 miles per gallon vehicle. That figure could move up or down depending on the driving cycle that you use. This particular one, only a 10 percent decrease in mass lead to a nine percent improvement in mile per gallon. There have been some studies where you can see greater than 10 percent improvement in mile per gallon if you have more city driving. Think about a postal vehicle that is doing stop and start and moving very slowly, those are all aluminum for good reason. So the more city driving you do, the greater the benefit in miles per gallon, of course.

Just so you understand the assumption on fuel cost here, this was $2.50 per gallon, a little bit less than Misha paid last night. $2.50, it's 10,000 miles per year over a 12-year period to get this net present value, and so you save something on the order of $1,300 over the life of the vehicle in fuel with accompanying greenhouse gas savings, etc. So for $100 cost premium that we went to in the previous page, you can save $1,300 in fuel over the life of the vehicle. And if you don't get the secondary weight savings and the secondary cost savings, it would be something like a $600 to $700 cost premium which brings you the $1,300 savings in fuel.

A lot of engineers think about costs per kilogram or cost per pound when they're working on weight savings. If you did only the body-in- white, only the structure with the closures, the doors, you'd be looking at $3.51 price, excuse me, cost-premium per kilogram, or $1.59 a pound, if you prefer your data in pounds. If you were to get the weight savings of the secondary engineering components, but not any cost savings, just the weight, so let's say you didn't get any cost savings from those componentry, that would come down to $2.03, or $0.92 a pound. If you got both the weight savings of the secondary componentry, and the cost savings associated with the secondary componentry, you would come all the way down to $0.37 a kilogram, or $0.17 a pound as a cost premium for an aluminum intensive vehicle. That brings your cost of miles per gallon improvement down to $30.

We think this kind of comparison compares very well to other technical opportunities that are out there.

We have bedded our assembly and welding costs and all of the details, engineering assumptions with an OEM. Again, it's a real vehicle, not pie in the sky, all technologies that exist, but we need to go through a manufacturing learning curve to get to the high-volume production.

So the take away here is that cost-effective solutions exist with aluminum intensive cars and trucks, and we think they can be economically viable and high-volume, mass produced vehicles. This is not only the preview of luxury vehicles.

One more comment I'd like to make on the subject of cost and fuel economy is to think briefly about what we've seen with hybrids in the very near past. I think we've all been presently surprised by the consumer reaction to hybrid technology and the willingness of consumers to pay a premium for the associated fuel economy and environmental benefits. The economics I just shared with you on aluminum intensive vehicles show that aluminum can be cost competitive as well, without a hefty premium up front, to allow the consumer to enjoy fuel economy and lowered emissions. Even more exciting is the thought of what an aluminum intensive hybrid vehicle might bring to the world. We are contemplating a study on that very subject, and hopefully soon we will bring you some data on that in the very near future.

So, to recap, we know that aluminum use is rising very quickly. We have understood the cost-benefit to the automaker, and that there are really more benefits to the consumer than we had first supposed.

Against this backdrop, I would like to review some information around the proposed CAFE structure, and the issue, return to the issue of safety that Misha mentioned at the onset in her remarks.

The National Highway Traffic Safety Administration, NHTSA, is in the final stages of making its recommendation for the future CAFE program as it relates to SUVs and other light trucks. This new rule making, which should be out early next month, is probably going to be based on size-based standards for light trucks, as opposed to weight-based standards.

Many experts agree that once this is finalized, NHTSA may work to a similar sort of framework for cars, for passenger cars. That's quite important to us. We think NHTSA took the specific approach to the size-based standard in order to help solve the safety problems, that in previous years meant that down-weighting meant downsizing. And we think that was possibly the wrong direction to go from a safety point of view, and we've done some work to support that.

In fact, recently Transportation Secretary Mineta was visiting a leading auto supplier here in Detroit and the Associated Press quoted him as saying that they promoted fuel saving technology, such as lightweight aluminum parts and brakes that can harness energy and power hybrid motors. They understand what lightweight materials can do for both safety and fuel economy.

We commissioned a set of research with DRI, Dynamic Research Inc., who are leaders in the field of crash and safety modeling, people that NHTSA themselves use in many of their own safety studies to understand the relationships between size and weight. This study shows that aluminum can help automakers produce bigger cars and trucks that consumers demand, without adding weight and without compromising fuel economy or safety.

We asked DRI to see how the crash worthiness and crash compatibility with other vehicles would be effected if we slightly redesigned a typical SUV. For part of the study, we cut an SUVs weight by 20 percent, but kept its size the same. For the other part of the study we increased the SUVs size by about four and a half inches, but kept the weight the same. In the real world we think automotive engineers do a little bit of both. We saw that with the Jaguar, they cut out some weight, and used some of the weight savings to increase size and increase safety by expanding the front and the rear crumple zones.

For our modeling, we took 500 virtual collisions with an SUV, hypothetical Ford Explorer, and several different situations. 85 of the 500 were single vehicle crashes, some rollovers, some hitting fixed objects like poles, 415 of them were two vehicle crashes. We used the Accord as a passenger car in the model, and also some of the crashes were SUV to SUV, so Explorer to Explorer.

I have here just a very, very brief video clip of the work we did. We used the industry's front and side impact crash data test, and models the vehicles to match the crash forces that the vehicle and the dummy experience in the safety test. Here are some examples of what we did.

Can you start the video?

(Video clip show)

So the dummy has sensors in many locations to know exactly how the injury would occur. We belted the dummy in, of course. The first crash is hitting a pole. You can see down below. Second crash is vehicle to vehicle, SUV to SUV. And the third one is a rollover simulation here. So 500 different simulations, understanding the impact to both drivers in the event that it was a two-car crash or the SUV driver alone in the event that it was another kind of a crash.

What did we find?

I really don't like looking at this, makes me very uncomfortable. Can we move on to the next slide? Thank you.

When analyzing this sort of crash data and safety data, we speak the language of equivalent life units; in this case, lower numbers are better. That means we're safer when the numbers are lower.

So after we ran our 500 simulations of the baseline vehicle, this is the baseline steel SUV Ford Explorer against the Honda Accord, we did the same 500 tests with an aluminum SUV that had been designed and understood exactly how the light SUV would operate, and then we did 500 more, not changing the material necessarily, but having a slightly longer SUV, so its isolated the effect of weight and size in these two models that we've done here. And what did we find? The top four sets of numbers here are what happened to the SUV driver and the bottom ones are what happened to the other driver, and as you would assume, in the baseline set of accidents, the other driver has more injuries. So it has a higher number, you see the subtotal for other drivers, 4.87 against the subtotal for the SUV driver of 3.13. So the other driver has more injuries than the SUV driver, that's common sense.

When you lightweight the vehicle, but you don't change the size, overall you have 15 percent fewer injuries. You see the bottom line total at 6.79. However the SUV driver has a few more injuries than they would in the steel, in the steel case, again common sense.

In this particular scenario of the light SUV, what we didn't do was take care of the design changes that could be pursued by automakers to mediate some of that, and of course we didn't change the nature of the other cars on the road. So in the SUV to SUV, that's where you see the biggest change. So if you've got a steel SUV against a lightweight SUV, that's the biggest change in the data there.

If you were to move to the same weight, but a larger size, another four and a half inches, you'd see an even greater reduction in injury rate, bottom line 26 percent decrease. And in this scenario where you have five as the variable, everybody is better off, not just the other driver. So the SUV driver is better off than in the initial situation, and the other driver is significantly better off than in the initial situation.

In any case, varying both the weight and the size provides the societal benefits in terms of reducing energy, injury and making roads a safer place.

So what have we learned?

We learned that if we take the weight out of an SUV and don't shrink it, we have less energy to absorb, and we still have the vehicle structure around us to absorb the energy. Further, this SUV is much less damaging to the other vehicle, particularly the traditional passenger car.

But if we increase the crush zone, even by a few inches, four and a half inches, it can have a very significant and positive safety benefit to all in the SUV to SUV collision. Also in the SUV crashing in to a fixed object, also in the SUV crashing in to a car. In this scenario we believe aluminum has the most to offer for increasing both safety and environmental performance.

We have now explored in this study every possible combination of weight reduction and increased length, but we think, in the real world, engineers would make those trade-offs. Automakers could use aluminum or other lightweight materials to save some weight and add a little more to the crush zone length. This should significantly improve safety of our cars and trucks, while reducing both fuel consumption and emissions. In short, everybody wins.

This is not the only attack on the subject of the interrelations between size and weight on safety. Honda North America also conducted a study, they used a completely different methodology, not the simulation methodology we used, but rather statistical analysis of accidents that have actually happened, and came up with extremely similar results. That particular study has been filed with NHTSA as a matter of public record, and you have copies of it in your materials today.

For the takeaway, many have long believed that size and weight were synonymous where safety was concerned. This study proves that size, not weight, is a better determinant of vehicle safety. NHTSA has obviously recognized that in the draft rules that are coming out and we all, in society, stand to benefit for that.

The final thought I'd like to leave you with is really the poster-child for all of the engineering and data that we been speaking about for the last few minutes, and that is the story of the Jaguar XJ, which had been made with steel. Their designers opted to improve the next-generation XJ by upgrading it to advanced aluminum frame and body panels. The result is a car that's longer, taller, and wider, but 400 pounds lighter. The engineers believe it's safer than its predecessor, and it's got four miles per gallon better fuel economy, best in its class.

So those designers used aluminum to take weight out, and offer the consumer a car that was bigger and safer than the heavier model it replaced. And that was possible through the crash absorption properties of aluminum and the cars longer crush zone that protected its occupants, and by allowing other safety features to be engineered into the car without the usual weight penalties that they carry.

And if you can imagine that sort of technology being used with a Ford Explorer, or Chevy Tahoe, or Jeep® Cherokee, Nissan Pathfinder…the list goes on and on. It really does bode for a lighter, safer, cleaner, more fuel efficient future for all of us if this technology can be adopted, and I think, simply put, aluminum can build a better car now, today, not in 20 years.

It's all there, and we are happy to show you the supporting data today and take your questions as they come.