

InCar – Innovations for the automotive future

Press conference

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Statement by

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and

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Check against delivery

Ladies and Gentlemen,

Welcome to our press conference. Today my colleague, Dr. Kroos, and I would like to present the results of our InCar research project. We are pleased to see so many of you here.

InCar is the most extensive package of manufacturer-independent innovations ever developed by a supplier. The project draws on the full automotive capabilities of the ThyssenKrupp Group. The companies involved have expertise in the areas of materials development, engineering, production technology, component production, equipment and tooling manufacture, and prototyping. They hold leading positions in their specialist areas. And they represent more than 100 years of experience of the ThyssenKrupp Group as a partner to the automotive industry.

These synergies enabled us to optimize several automotive subsystems in parallel in the InCar project. They put us in a position to offer solutions to several central development goals of our customers. And they allowed us to validate our innovations in such a way that our customers can integrate them into production at low cost. We know of no competitors who can offer anything similar.

Under the InCar project we developed more than 30 new solutions for the body, powertrain and chassis – innovations for automotive progress in respect of fuel consumption, emissions, costs and functionality. I would now like to present you some of the outstanding solutions. My colleague Dr. Kroos will then explain the basic concepts behind the InCar project.

Ladies and Gentlemen,

We know that the auto industry is currently in a difficult situation. But that doesn't alter the fact that the further growth of individual mobility represents a key issue for the future. That's why the automotive industry remains an important market for ThyssenKrupp. The Group is the twelfth-biggest automotive supplier in the world. In the 2007/2008 fiscal year, automotive sales accounted for roughly 20 percent of the ThyssenKrupp Group's total sales of around 53 billion euros.

As an integrated materials and technology group, we know that technical innovations are drivers of new growth. Systematic innovation management is a key factor for sustainable business success. If they are to successfully overcome the current situation, OEMs need to produce cars that are less expensive, more efficient and above all more eco-friendly. To that extent, InCar has arrived at exactly the right time. The project's development priorities were agreed with our customers.

Take climate protection, for example: Reducing CO₂ emissions is one of the most urgent development goals for automotive manufacturers. From 2012 the European Union will require average emissions of manufacturers' new vehicles to be below 130 grams of CO₂ per kilometer. Penalty payments will be charged for excess emissions. InCar can make a major contribution to meeting these CO₂ minimization requirements.

Combining the "cleanest" InCar solutions can reduce CO₂ emissions per kilometer by up to 17.63 grams compared with the current state of the art, corresponding to a potential avoidance of penalty payments for excess emissions of roughly 1,500 to 1,740 euros for each newly registered car. The exact level of payments depends on the fleet average emissions and the average vehicle weight of the respective manufacturer.

The biggest contribution is made by our newly developed variable valve lift system. It allows the volume, composition and utilization of the air/fuel mixture in the engine to be controlled in such a way that fuel consumption is significantly reduced. The valve lift systems permit reductions in consumption of up to five percent, which equates to CO₂ savings of around 124 grams per kilometer. The cost premium compared with conventional valve trains is just 146 euros. In low-load operation this can be combined with cylinder deactivation to boost fuel economy gains to 20 percent.

This example shows that innovations in the powertrain offer the greatest potential for reducing emissions during driving. But tailpipe emissions alone are only part of the goal of the Kyoto Protocol for worldwide greenhouse gas reductions. A vehicle's impact on global warming can only be fully assessed if emissions during production are also included in the analysis. That's why InCar offers a comprehensive analysis of greenhouse gas emissions over the full product lifecycle.

This kind of analysis shows the strengths of steel. For example, we developed a new rear axle made from high-strength lightweight steels and compared it with an aluminum solution currently used in upper mid-size vehicles. The InCar solution weighs only four percent more than the reference, but costs only half as much.

In the comprehensive lifecycle analysis of greenhouse gas emissions, the steel solution fares much better than the aluminum reference, producing 120 kilograms less CO₂ equivalent per vehicle. This is mainly because the production process for the steel solution generates significantly lower levels of greenhouse gases than that for the aluminum assembly.

A comprehensive analysis of greenhouse gas emissions has been carried out for each new development under the InCar project, along with a monetary analysis based on the penalty payments set out in the EU's CO₂ regulation. The CO₂ assessment was prepared by PE International, which consults to almost all the world's auto manufacturers on issues including the preparation of ecological assessments. The assessment was certified by TÜV Nord. We believe that our lifecycle approach provides customers with valuable decision-making aids for a holistic implementation of climate protection targets in automotive construction.

Ladies and Gentlemen,

Before you start thinking InCar is only about CO₂, let me emphasize once again that the project is also about reducing costs and enhancing functionality. We aim to give our customers options and help them in their decision-making. That's why we developed several alternative solutions for the door, B-pillar, seat crossmember, longitudinal member, roof and side panel. Depending on their development objectives, customers can choose from a lighter, less expensive or functionally enhanced version.

The cost- and function-optimized concepts also include highlights that clearly demonstrate the quality of our InCar solutions. For example, the DampTronic select variable damping system delivers substantial cost savings. It allows drivers to choose between a tight sport tuning or a normal suspension setting for greater comfort. Such systems are already available in the form of continuously variable shock absorbers, but these require extremely complex sensors and

control units and are correspondingly expensive. DampTronic select is not continuously variable, offering the choice of two settings, but costs 44 percent less than conventional solutions and thus opens up the benefits of adjustable suspension to a broad customer group.

Our integrated steering system is a good example of what we understand by improved functionality. The InCar engineers integrated the steering gear for an electromechanical power steering system into a front axle beam. The current state of the art is to attach the steering housing to the front axle as a separate part. Integration frees up packaging space, which is at a premium in the front end. The space can be used, for example, to accommodate active stabilizers or hybrid drives.

I hope I have managed to convey an impression of the diversity, goals and quality of our InCar solutions. I will now hand over to Dr. Kroos.

Ladies and Gentlemen,

I too would like to welcome you here today and thank you for your interest in our forward-looking project. Up to 100 engineers and technicians from twelve ThyssenKrupp companies were involved in the InCar project. Developers and key account managers selected the most promising concepts from roughly 460 initial ideas. We discussed our ideas with customers in high-level workshops, and on this basis defined the development priorities whose results we are presenting to you today. The budget for InCar was 35 million euros.

The economist Joseph Schumpeter once said: "Innovation is putting a new product into practice, not just inventing it". With InCar we are offering the auto industry a broad spectrum of innovative technologies which can be introduced into production at low cost. Much of our efforts went into comprehensively validating the new solutions. It is not just the breadth of the InCar project that makes it so unusual, but also the depth of the newly developed solutions.

There are two reasons for this: First, development cycles for new cars have more than halved in recent years, from 65 months to 30. Under these conditions, the success of automotive innovations is determined not only by their technical and cost advantages, but also by how quickly they can be introduced into production.

Second, the majority of innovations from suppliers arise as a result of concrete customer requirements or as part of joint development projects with customers. Independently developed innovations have to be comprehensively validated. This is an essential requirement if customers are to be willing and able to adopt the new solutions. The advantage of the innovations versus the current state of the art has to be plausibly verified. Moreover, customers expect answers to the most important manufacturing and cost questions.

The InCar project based its solutions on an upper mid-size car. This segment is regarded as an innovation driver in the auto industry. New developments are introduced in this class and then transferred over time to higher-volume models. The benchmarks for our powertrain and chassis solutions are parts and assemblies which represent the state of the art in the upper mid-size category.

As a benchmark for our body solutions we designed our own body-in-white. For this we went to the same lengths and used the same development and simulation tools as those employed by auto manufacturers to develop and validate new vehicles before moving to hardware. Our customers have confirmed that the quality and maturity of our reference body matches that of a vehicle concept developed by an OEM.

Our body-in-white is a demanding benchmark. Central quality criteria such as stiffness characteristics and lightweight index are in the best-in-class range. The body has the potential to achieve a five-star Euro NCAP rating. This is the standard we set to demonstrate that our body solutions represent a significant improvement over the current state of the art in terms of lightweighting, costs or functionality.

In addition, our body-in-white allows us to take a holistic view. We do not just compare individual parts with the corresponding reference components, we can also demonstrate what effect the new solutions will have on connected body areas. Where we have developed several new solutions for one part, the reference structure serves as a platform for an objective comparison of different technologies. This facility for comparison is another advantage for customers which is currently not on offer from any other development project.

A reference structure of this level of detail and quality is a unique selling point for the InCar project. We decided on this approach rather than using a concrete vehicle as a benchmark to keep our work manufacturer-neutral. That makes it easier for our customers to adopt InCar solutions and adapt them to their own marque, design and production strategies. At the same time – and this is a key advantage of our concept – we now have our own platform on which to develop and validate future innovations.

Ladies and Gentlemen,

As Dr. Jaroni has already mentioned, the InCar team has competencies covering virtually the entire process chain. On this basis we can provide very detailed information as to how, with what equipment and at what cost the new InCar solutions can be manufactured in volume.

Let me illustrate this with a concrete example: With InCar, our customers not only get an innovative solution for a roof made from a lightweight sandwich material, but also detailed information on forming, joining, corrosion performance and painting under production conditions. At the same time we supply information on structural and crash performance and fatigue strength along with a detailed breakdown of material, equipment, tooling and production costs. In addition, customers can see the qualities of the new solution for themselves on a prototype or hand-produced sample part.

InCar innovations are not just to be found in PowerPoint presentations, they exist in hardware form as tested parts. All components have been subjected to a comprehensive cost analysis. In the body area we built 60 gray iron and plastic dies for prototype production. A further almost 300 parts were hand-produced as samples. The structural and crash performance of the new solutions were tested both virtually in simulations and in hardware tests. Powertrain and chassis parts proved their capabilities in tests on engine rigs and simulators. That means that we performed a large part of the tests normally carried out by auto manufacturers when integrating new solutions into production operations. InCar sets new standards for the maturity of its independently developed automotive innovations. This is a key success factor for our project.

Ladies and Gentlemen,

I believe that with InCar we have achieved the maximum possible for our customers and ourselves. We already received positive feedback during the course of the project. Now the first InCar innovations are being tested for introduction into production at our customers' plants. That makes us optimistic that the investment in InCar will prove to be a profitable one for our Group.

Here again, the synergies described earlier will come into play. Many of the InCar solutions offer multiple sales opportunities for the Group and its companies. For example, the integrated steering system could provide orders for steering producers ThyssenKrupp Presta, chassis specialists ThyssenKrupp Umformtechnik and of course ThyssenKrupp Steel Europe.

Our hot-stamped B-pillar solutions offer sales opportunities for the special hot stamping steels from ThyssenKrupp Steel Europe, the hot-stampable tailored blanks from ThyssenKrupp Tailored Blanks GmbH, the corresponding tools and equipment from ThyssenKrupp Drauz Nothelfer and for ThyssenKrupp Umformtechnik GmbH, a leading manufacturer of hot-stamped parts. In the hot stamping process, pre-heated steel blanks are formed and then rapidly cooled in a special die. Components produced by this method display very high strength, making them suitable for example for crash-relevant parts.

Ladies and Gentlemen,

InCar is about bringing research and development results intelligently to market. In the coming weeks we will be stepping up our marketing work and presenting InCar at congresses, symposiums and in particular carmakers' plants. Here again, we will be taking a new approach, as you will undoubtedly have noticed on your arrival. We will be visiting customers with our TechTruck, where they will be able to experience the results of our project hands-on.

Suppliers presenting their products in-house at auto manufacturers is nothing unusual. The ThyssenKrupp companies serving the auto industry have been doing it for quite some time. What is new is that our TechTruck will allow us to respond faster and more flexibly to our customers' requirements and present our developments on site without the need for any major

preparation on the part of the customer. In this way, the TechTruck is another small part of our strategy of delivering quick “InCar” innovations.

Thank you for your attention. We would now be pleased to take your questions. Then you will have the opportunity to see our InCar solutions for yourselves in our TechTruck, followed by refreshments.