

COMPETENCIES FOR THE FUTURE

INTERVIEW WITH HEADS OF EDAG COMPETENCE CENTERS

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Alternative drive systems, digitization, autonomous driving, industrial 3D printing, new materials. Now, more than ever before, the automobile is on the threshold of being reinvented, to enable it to incorporate ecological and sociopolitical changes. This implies a technological transition which independent design engineering companies in the automotive industry can help to shape and define. On the basis of these expectations, the EDAG Group has established competence centers for Lightweight Design, materials & technologies and Electric Mobility since 2008, to develop solutions, concepts and strategies for important future-related issues in the engineering services business, and expand technical competencies. In 2016, the Competence Center for Integral Safety took up a third subject of strategic relevance throughout the automotive industry.



What is the intention behind the competence centers (CCs)?

Martin Hillebrecht: Our competence centers are "enablers" for EDAG, to make it possible to identify our customers' requirements as early as possible, and provide concepts, solutions and pre-competitive competencies for the development of the automobile of the future, which we can then implement with the manufacturers and suppliers.

The issues addressed in the CCs are geared to the strategic levers for the development of the automobile, i.e. their future solutions and pre-competitive technologies.

From a technological point of view, where do you see the greatest movement?

Martin Hillebrecht: At the moment, alternative drive systems are among the greatest technological challenges. In this field, engineering specialists like EDAG are called on to develop specific vehicle architectures to permit the optimum integration of the power units and energy storage systems. The modular body concepts now possible offer enormous freedom of design, and this must be exploited. At the same time, the additional weight introduced into the car must be compensated for. On account of the battery powered drive systems, hybrid drive systems and fuel cells with or without range extenders, specially due to target ranges, Lightweight Design has undergone an enormous renaissance. Eight years ago, we presented the "EDAG Light Car" technology carrier, a reliable initial concept for scalable electric platforms.

Marc Hohmann: Parallel to this, in the CCs, we work hand in hand with the technical divisions on the drive concept itself. Battery management and battery analysis/maintenance through to charging concepts are among the things our research activities center on.

Jörg Hölzig: A further megatrend is networking the vehicle with the customer's external data world, other road users and the backend servers of the infrastructure operators and other mobility service providers. Intelligent usage and netwo-



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king of vehicle, traffic and infrastructural data respecting ultimate standards for data security and protection of the user's private sphere, is one of the essential conditions for implementing autonomous driving; we see this as one of the important key technologies for the future of the automobile.

How is know-how transferred from the competence centers to EDAG's technical divisions?

Martin Hillebrecht: We provide coaching and support for technical innovations from the vision to market readiness. In this way, we form a central interface in the Company, and communicate between the various technical departments and with external partners. The important thing here is interdisciplinary thinking, a necessary gift that not every expert has.

Jörg Hölig: Our pilot projects and the examples of innovative developments we present and communicate on the market are indicative of our future potential, and stimulate dialog – we see ourselves as interior and exterior innovation catalysts.

Lightweight Design is a central subject throughout the industry. What new developments do you see in this important area?

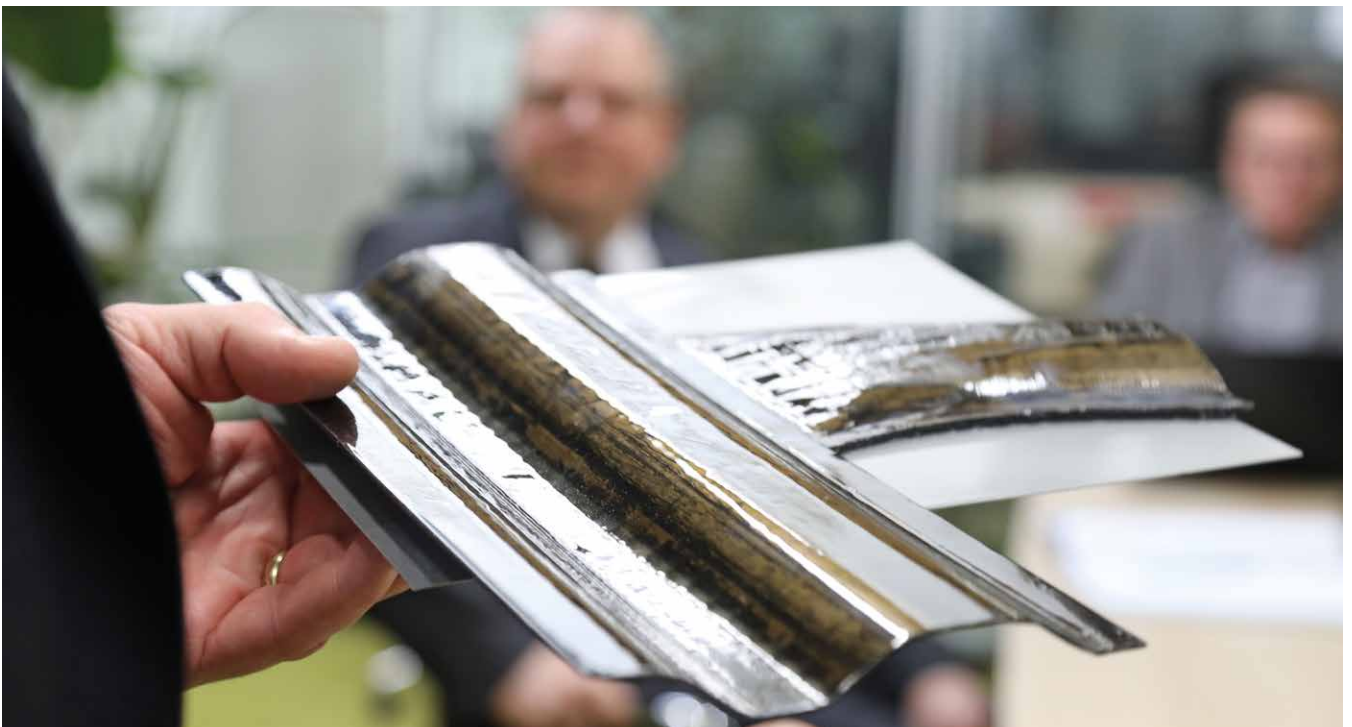
Martin Hillebrecht: Although Lightweight Design and materials have always been the royal discipline for the vehicle manufacturers, ambitious CO₂ targets have brought with them completely new pressure levels. This has given rise to material and concept competition among the car manufacturers, sometimes in parallel competition, and highly dynamic. In the result, it is possible to reverse the weight spiral for the first time ever. Automobile manufacturers are currently working all out on the development of vehicles due to go into production between 2018 and 2022. The new cars with conventional drive systems are to weigh approx. 100 kg less, provide high rigidity for excellent handling and meet demanding legal crash load cases.

Economical lightweight steel design for mass production still predominates, but things become far more challenging when it comes to steel-intensive hybrid



design for mid-sized luxury cars. Where premium manufacturers can afford it, aluminum and material mixes are used. Even though ultra-Lightweight Design only accounts for about 1 percent of the market in the royal discipline, EDAG is nevertheless active in this area, develops many of these special vehicles, and plans the corresponding production plants.

Every material must be in the right application and right place to achieve the ideal effect. What is striking, however, is how little time it now takes for new technologies to be industrialized: take, for example, the production of carbon components or qualification of industrial 3D printing for prototyping and production equipment. We are also involved in hybrid concepts such as those being researched at the Open Hybrid LabFactory in Wolfsburg. These are aimed at the era after 2030.



How intensive is your cooperation with universities?

Martin Hillebrecht: Networks are always bad for people who don't have them. For years now, we have been using these contacts as a trend radar to scan the entire environment – customers, suppliers, competitors and universities. To put it in a nutshell, we are technically always up to the minute. What is more, our close cooperation with universities enables us to meet ambitious young talent for our technical departments, so we can recruit young people who are willing and able to approach technically demanding challenges with fresh ideas and their eyes wide open into the Company.





Electric Mobility is picking up pace. What subjects are you dealing with at the moment?

Marc Hohmann: Electric Mobility is a very diverse subject area. The rapid development of new technologies and changes in mobility behavior and utilization concepts call for expert technological knowledge and vehicle concepts specialists.

In the competence center, we principally deal with the full range of subjects, starting with new mobility concepts and innovative system concepts through to the technological examination of individual components and materials. Our current focus is on working out innovative vehicle concepts, which are directly taken up by the experts in the technical divisions, and incorporated into customer projects.

What effects does e-mobility have on existing business models?

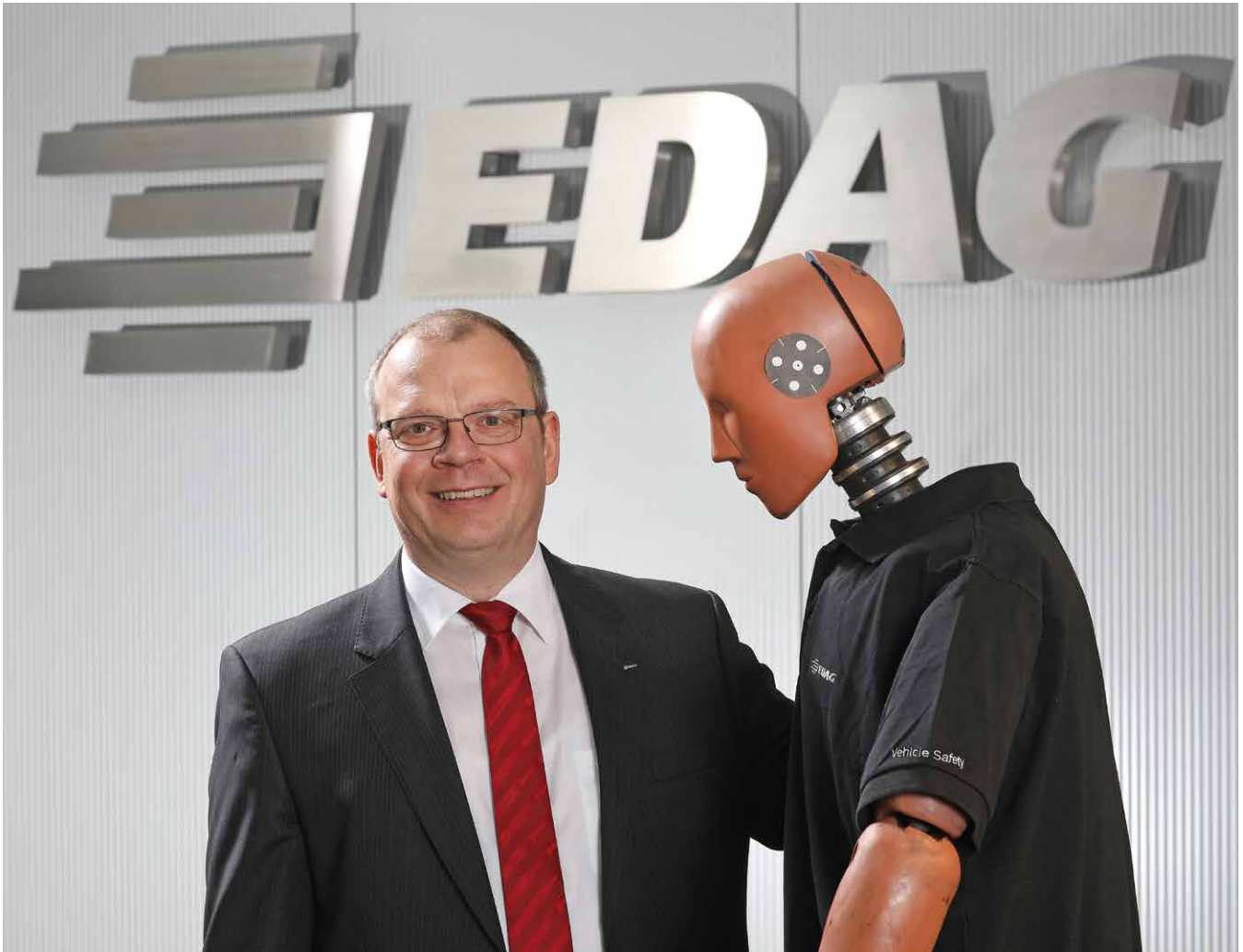
Jörg Hölig: At the moment, the sustained changes occurring in our industrial sector are calling into question business models which have taken almost a hundred years to develop, and forcing market participants to cooperate more closely – even across industry boundaries.

Marc Hohmann: Generally speaking, start-ups have far less trouble developing a car of the future than traditional manufacturers; on account of their immense experience and innovative ability, however, it would be a mistake to underestimate the latter. We have gathered valuable experience by bringing together the protagonists of the future value chain and then working together to develop visionary concepts. This role makes us a sought-after engineering partner.



JÖRG HÖLIG

Head of Competence Center for Integral Safety



What motivated you to establish the CC for Integral Safety?

Jörg Hölig: More than anything else, road users want safe mobility. Modern design principles and safety systems have helped to reduce the number of road injuries and deaths to a fraction of the all-time high recorded in 1970. Passive safety, i.e. the protection that is offered in the event of an accident, has by now reached a high level. As a consequence, further measures will be increasingly complex, while only providing small contributions to further road safety improvement. Active safety, which aims to avoid accidents or greatly reduce their severity, offers one way out of this saturation situation.



The interlinking of new accident prevention systems with passive safety systems is at the heart of integral, or comprehensive safety. The latest in sensor technology and the increasing interconnection of all safety systems in the vehicle open up new possibilities for passenger and partner safety.

But more than anything else, the intelligent link-up of information while crossing the limits of the car itself offers really fascinating potential: if the vehicle supplements its own sensor data with information on the route ahead, e.g. road condition, traffic volume or a lost cargo, then the driver's scope of perception can be considerably extended – a significant contribution towards anticipating events and therefore driving safely – and also towards a further megatrend, automated driving. With the CC for Integral Safety, we at EDAG would like to look into the potential of and possible solutions for this type of comprehensive safety, and test solution concepts.

Is there a recipe for successfully launching a product idea on the market?

Jörg Hölig (laughing): Yes, of course, there are several, and each brings about different results. No, seriously, let me give you an answer based on our experience and the way we see things. Successful products meet (or even create) the user's needs. Intuitive handling, smooth integration in the user's existing world and positive user experience are the keys to the success of a product. This means it is the consumers (and not the technologies, as is often claimed) who are the drivers of the providers of products and business models. We think that success is the result of the clever combination of technologies - with a convincing business model behind them. If the consumer is using a hi-tech product intuitively and with pleasure - then the recipe was good.

You are lateral thinkers. Is that in itself enough?

Marc Hohmann: There is nothing wrong with being a lateral thinker, or even getting lateral thinkers involved, to get a completely different angle on a particular issue. Having said that, the questions that come our way call for a great deal of technical expertise, and sometimes even specialization. We need generalists who have a feeling for the new business models to complement us. It all comes down to having a useful combination of these abilities.

Today, almost all universities offer courses that lead to innovation management qualifications. What do you think of this?

Martin Hillebrecht: Almost all universities now offer high quality further education and study courses that are supposed to lead to innovation management qualifications. From my point of view, however, sound technical engineering skills provide a reliable basis. It starts to get interesting when sufficient work experience and a clear technical specialization are combined with the special ability to think in interdisciplinary terms. Unfortunately, it is just about impossible to learn these skills during a degree course; a title is not very much help here. To be honest, your hair should already be turning gray before you even venture to take a step into professional innovation management. In addition, the Company's working environment must provide these development paths for employees, because the principle of lifelong learning is particularly important here. Innovation management in companies such as EDAG calls for ambitious and experienced engineering professionals, by all means with a start-up or consulting gene in their blood.



