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Audi A4 – Car Body Development Facelift

BMW M5 – Bumper Development

Mercedes-Benz Atego – Noise Encapsulation

Bertrandt Engineering Network – Test and Trial

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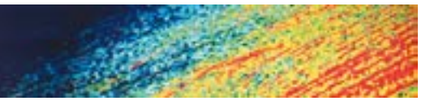


Editorial

In recent years have stricter legislative requirements and customer demands further increased the importance of safety for both vehicle occupants and pedestrians. At the same time, protecting the environment continues to be a vital task. Modern technologies and the use of new materials, call for innovative testing procedures that allow vehicles to be assessed and tested either in all their details or as an integrated system. As a result, testing remains an area with a promising future.
Bertrandt entered the testing field ten years ago. As a means of expanding our range of services – even going as far as the entire development of modules and derivatives – testing was an area that needed to be integrated in order to round off the services offered by Bertrandt.
Bertrandt began its testing activities in 1995 in Munich with two climate chambers. Just one year later, security was provided for a roadster production series, by means of carrying out extensive component testing and environmental simulation. In the following years, we continuously expanded our range of testing services – from the testing of vehicle seats to environmental simulation and vehicle fuel tanks. An airbag laboratory was also set up. Within just five years, we were able to transfer this experience and expertise to four of our operating sites.
Today, more than 200 Bertrandt employees are involved in enhancing the safety of future vehicle generations. Or, as Bernd Mogwitz, the Testing Division's Head would put it: "At Bertrandt, the customer benefits from 1 000 years of testing experience."
Convince yourself by testing us. We present an insight into our testing services on pages 18 and 19.

Other articles too give evidence of our flexibility and our ability to work under pressure. Join us and AMG as we drive through the Arabian Desert, admire the new face of the Audi A4, and take a glance at the production of the Volkswagen Golf. Experience DaimlerChrysler's quiet and lightweight Atego-Class or enjoy the thrills of the BMW M5.
The Bertrandt Engineering Network has a lot to offer – surely for you too.

Dietmar Bichler

Audi A4
More than Just a New Face

Four years after its market launch, the A4 has undergone a comprehensive product upgrade, as Audi brings it in line with its new design concept. For Bertrandt Ingolstadt, this was another opportunity to prove its potential as a development service provider.

A wide-ranging project

Bertrandt was asked to provide a whole package of measures for the A4. Both the saloon and the estate version, the Avant, were to be given a product upgrade that went far beyond the usual facelift. This included a whole range of new approaches: changing the complete front end to accommodate the single-frame design, introducing new gaps and tornado lines on the sides as well as implementing pedestrian protection measures on the existing front end. The rear was modified to include the new two-piece design for the lights, with the result that the boot lid and rear hatch for the saloon and Avant needed to be redesigned. The change in the shut line meant that the luggage compartment lining also had to be modified.

By including further areas of responsibility, such as project management, tolerance analyses, FMEA, functional design and testing, the project required a high level of independent development work. As the project proceeded, the large number of changes required and the extensive package of measures meant that the vehicle had to be treated as a completely new development.

Project management ensures smooth processes

Due to the customer requirements and the complexity of the project, Bertrandt set up a project management (PM) team consisting of a steering group, a project leader and several persons responsible for individual parts of the package.

The team's main tasks at the start of the project included precise week-by-week planning of the processes and the provision of PM tools from kick-off to the lifetime of the components. Within the framework of the overall project, their job was to monitor the specified planning and to initiate control measures if required. On the basis of this coordinated and targeted cooperation, the engineers set to work on the development process.

Functional body design

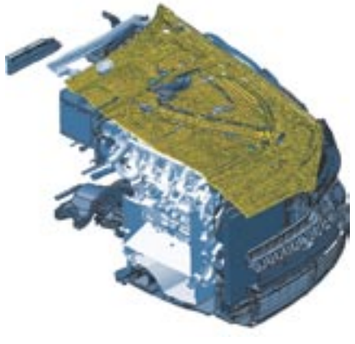
A typical example of how the different divisions worked together was the coordination between the simulation

and design teams. Bertrandt engineers worked on projects ranging from the functional design of the closures right up to the simulation of the entire body in terms of function and crash behaviour. Bertrandt provided for the requirements to be independently checked and for modification suggestions to be prepared, which were then submitted to the customer.

Front-end structure of the Audi A4 with the Head-Form-Impactor.

Virtual and real-life testing of pedestrian protection

This close cooperation was especially necessary in the area of pedestrian protection. The challenge lay in constructing sections of an already existing front-end structure in order to be more pedestrian-friendly. One of the measures was to modify the boundary surface of the bonnet, as deformed by the impact of a pedestrian's head. The part was made collision-free using DMU cycles in the same way as a real component.
In addition to the virtual proportion of the process chain "Pedestrian Protection", some of the final testing of the real hardware was also carried out at Bertrandt in Ingolstadt.



Boundary surface of a bonnet deformed by a Head-Form-Impactor: simulation of penetration as basis for package adjustments.

Scope of the* Audi A4 *project in brief

Project Management

Analyses
FMEA
Tolerance Chain Analysis

Digital Car
Digital Mock Up

Body-in-White
Bonnet, Wings, Water Container
Boot Lid and Rear Hatch, Tank Covers
Superstructure, Doors
Adaptation of Front End and Floor
Add-on Body Parts

Interior
Centre Console
Cup Holders
Luggage Compartment Lining

Electrics
Lights Development

Simulation
Complete Vehicle Simulation
Pedestrian Protection Simulation

Testing
Pedestrian Protection Testing (sub-areas)
Component Testing
Coordination of Crash Tests

Design in every corner – premium all round

Inter-divisional cooperation was also necessary in the designing process. For example, when the CATIA models of the rear hatch were completed, it became apparent that the frame areas did not meet the optical requirements. With the aid of the surfacing team, the surfaces were modified in coordination with the designers, with the result that the design now fully meets the expectations of a premium vehicle.

Supporting activities improve development quality

The success of the development also depended on a wide range of supporting activities. These included preparing newly designed or modified FMEAs for the relevant assemblies, tolerance chain analyses for determining clearances and adjustment ranges, functional dimension catalogues for these tolerances, documentation for the release of components and, as a central part of the development, carrying out the simultaneous engineering (SE) meetings with Audi employees from the corresponding divisions at the Bertrandt office.

A new aspect was the systematic implementation of design-accompanying DMUs with collision reports on every component release. As a result, the series launch was equally trouble-free with regard to component collisions.

Parts logistics and safety coordination

In the A4 project, Bertrandt was for the first time asked to work on the car's safety aspects. Bertrandt Ingolstadt and Bertrandt Projektgesellschaft (BPG) worked hand in hand. The concrete projects included monitoring the parts logistics and coordinating the crash tests – experience that can now be used for further customer projects.

Summary and conclusion

Following its successful work on the Audi A3, the development of the product upgrade for the A4 saloon and the Avant was for Bertrandt Ingolstadt a further major project in which efficient cooperation could be successfully continued. The result can now be seen on the road – expressive and full of character: the new face of the Audi A4. ■

Robert Werner, Ingolstadt

BMW M5

The Exclusive Toy for Adults

Bumper Development for a Synthesis of Elegance and Superior Performance

Bertrandt Neckarsulm

A car that dreams are made of: the new BMW M5. The finest and at the same time most powerful M5 ever. Bertrandt Neckarsulm was involved right from the start, having been commissioned by BMW M GmbH to develop a bumper system that complements this car's unique combination of pure driving pleasure and unrivalled performance.

Premium quality in both design and function

At BMW M GmbH, the development of a new vehicle always begins with the aim of producing a vehicle that unites the ultimate in sporting prowess and performance. But such ambitions also make the highest demands on the development process. As the leading competence centre for bumper and front-end development in the southern German region, the Bertrandt office in Neckarsulm was the obvious choice as the partner for BMW M GmbH in this project.

For the M5, the high-performance concept meant that different demands in terms of engineering and design had to be taken into consideration compared to the sports package offered as an option in the 5-Series, the development of which was also supported by Bertrandt Neckarsulm. Attention to the finest technical details characterised the work of the engineers in the two development projects. For example, in the M5 this included the air flow guidance integrated into the under floor, which guides the air under the vehicle to the rear, where it flows through the rear bumpers via a large diffuser opening. In the sports package for the 5-Series on the other hand, it was necessary to integrate the ACC distance radar system.

Bumper development without the bumps

The development work required was defined together with the system suppliers REHAU and BMW M GmbH at simultaneous engineering (SE) meetings every two weeks and was then systematically put in practice in an uncomplicated manner by all partners involved.

Toys for the boys:
The new BMW M5
10 Cylinders
250 km/h
507 bhp
520 Nm

The transformation from CAD model into repetition part: the BMW M5 Bumper (top right and bottom) and the BMW Sports Package (middle).

Once the concept phase had been completed, the individual parts were designed using CAD tools. Even at this early stage, it was important for REHAU to be intensively involved in the process chain in order to utilise the synergies and insights from the series. A vitally important aspect was that all supplier-specific requirements from tool making, assembly, finishing, logistics, etcetera, were included in the development in good time.

In order to shorten the development time for this vehicle, it was decided not to build prototype tools but to begin immediately with building the series production tools. The model makers did, however, produce a small number of SLS parts in order to confirm the designs. The components that were produced using the series tools were then able to reveal the strengths and weaknesses of the designs. Knowledge gained from this and from the results of trials and testing was used to definitively optimise the components ready for the series launch.

During this phase, only minor modifications to the components were carried out. The main focus was producing fast, uncomplicated and cost-effective solutions in order to allow changes to be carried out at this late stage without high tooling costs.

Additional contracts confirm development work

As an indication of how efficient the cooperation was, Bertrandt Neckarsulm was able to qualify for further development contracts during the course of this project. These included the development of the boot lid cover for the M5 as well as the preparation of quality regulations, configuration drawings and measurement plans for both vehicles.

"In my role as Team Leader Exterior at Bertrandt Neckarsulm, I am able to conclude that during this development it once again became obvious that success always depends on the people involved. It is only with highly motivated and committed employees that a project of this type can be completed so successfully."

Outlook

At BMW M GmbH, a follow-up project is on the agenda. Thanks to the good results in the M5 and 5-Series Sports Package projects, Bertrandt Neckarsulm was considered in the awarding of development contracts for the vehicle exterior. The entire Bertrandt development team is looking forward to being a partner once again in the new project. ■

Ralf Würtemberger, Neckarsulm

Scope of the BMW M5 *project in brief*

Exterior
Bumper Front/Rear
Grilles
Air Guides Front/Rear
Sills
Cover for Boot Lid

Scope of the BMW 5-Series M Sports Package Saloon and Touring *project in brief*

Exterior
Bumper Front/Rear
Grilles/Covers
Air Guides
Sills

Scope of the BMW M 5/BMW 5-Series M Sports Package Saloon and Touring *project in brief*

Quality Management
Quality Regulations
Configuration Drawings
Measurement Plans
ECE-R26 Test

Lightweight and Quiet

Increasingly large engines in trucks, growing restrictions on noise emissions and weight and cost requirements are all conflicting factors in the development of noise encapsulation systems. DaimlerChrysler commissioned a new generation of noise encapsulation systems from the supplier Carcoustics, which chose engineering services provider Bertrandt as its partner for the development work. Together they broke new ground in the course of developing a new noise encapsulation system for lightweight DaimlerChrysler Atego trucks.

Bertrandt Technikum
Bertrandt Projektgesellschaft

New blow moulding technology used

The basis for the evaluation of noise emissions from commercial vehicles is having the vehicle drive past under acceleration. DaimlerChrysler's objective was to replace the existing noise encapsulation system with one that produced at least the same levels of noise reduction but was significantly lighter. Another requirement was for the system to remain undamaged if the vehicle was subjected to a ground impact in the front axle area.

The initial stage of the project involved the organised examination and sorting of around 400 relevant records in order to produce a geometric basis for the development of the component. In the next stages of the development process a blow moulding technique for the creation of large flat components, which had been used several times by Carcoustics, was to be employed. This technique allows the production from one material, and even in one component, of cells for the engine side and flat panels for the road side of the vehicle that have acoustically effective resonance absorption. The process, which had not been used before for truck encapsulation systems, received the approval of the DaimlerChrysler managers and was chosen for use in the lightweight Atego trucks.

Concept produced for new system

The next stage was to develop a blow moulding concept for a capsule of this size, and in particular height (1 000mm x 800mm x 300mm). The engineers considered the option of fixing the side walls on with film hinges, which would allow them to be folded down into the tool position with no undercut.

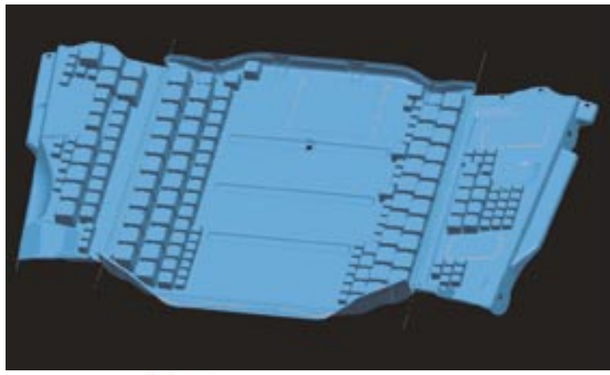
Weakening the product in this way would help to meet the customer's requirement that a ground impact in the sump area would not cause any damage to the noise encapsulation system. It was calculated that, as a result, the side walls would bend outwards and the floor would flex until it touched the sump. The capsule, which is attached to the vehicle chassis, would therefore form a parallelogram which in the case of lateral acceleration tends to result in a pendulum effect occurring. In order to resolve this problem, the capsule was divided into two parts. The back part acts as a support for the side walls. The two folded side walls are fitted in the correct position first using lugs and then attached to the back part of the capsule using locking nuts. One additional benefit of the process is the fact that components such as the sump drain plug are easily accessible for maintenance without the need for the manufacture of any additional parts. The maintenance cover is attached to the capsule using a film hinge.

Capsule safety ensured using FEM simulation

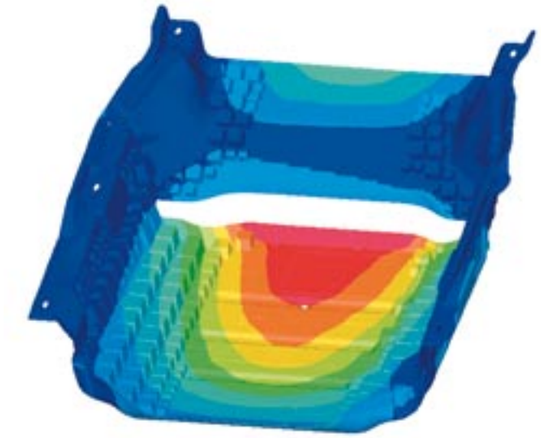
The multiple "weak points" in the capsule prompted Bertrandt to carry out an FEM simulation to test the safety of the component. Both mechanical properties and high temperatures were taken into account. Despite the complex fixed support the results of the FEM simulation only highlighted a small number of critical areas. As a result only a few slight modifications were needed before the data was submitted on schedule to the prototype tool release stage.

Components produced in one step, without additional processing, were thoroughly tested by DaimlerChrysler on a test bench which simulated poor road conditions with the addition of weights (ice/snow/sand). The capsule passed all the tests without problems and was ready for volume production. ■

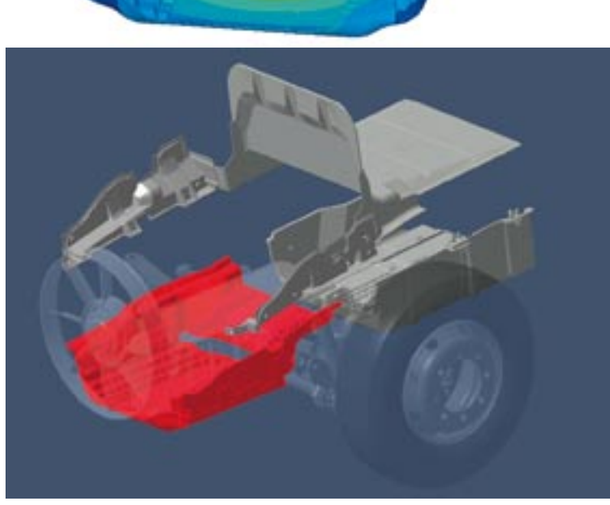
Axel Schmidt, Ehningen



CAD model of the noise encapsulation system in the tool position.



Simulation of deformation.



Position in the vehicle where the noise encapsulation system is fitted.

Scope of the* Mercedes-Benz Atego *in brief

Powertrain: Engine
Development of Noise Encapsulation System
Concept Creation
Development
FEM Simulation
FMEA

Volkswagen Golf: Assembly Frame

As a rule, weddings generally take place at the registry office. The fact that this major milestone in life also forms part of the production process for cars is something only known to automotive industry insiders. The chassis mechanisation department at Bertrandt in Wolfsburg has made a significant contribution in ensuring that the Golf can get married thousands of times a day at the Wolfsburg plant, as the assembly frame developed by the engineers forms the “marital” basis between the chassis and the car body.

Prototype of an assembly frame (orange) built to test the functioning before series production.

Volume-produced frame under construction.

Volume production of the new Golf. The assembly frame makes positioning the chassis components easier.

From *Design through* to *Prototype Testing* and *Production*

Bertrandt Wolfsburg

R+D and production join forces at an early stage

The team working for Jens Schlittchen, Manager of the Production Planning Department, and Christian Schirmer, Production Equipment Development Team Leader, started planning the development of the assembly frame for the front-wheel-drive Golf in 2000, and remained involved in the process right through to volume production. The client, the Volkswagen PWP-M2 department, included the team, as an external partner, in the process development before the actual deadline for action. This started with a kick-off meeting in the Volkswagen training centre at Schulenberg near the Okertal dam in Germany’s Harz mountains. The objective was clearly defined: to bring together the Production Department and the R+D team at an early stage, in order to lay the foundations for efficient process planning.
Bertrandt Wolfsburg already had extensive experience of simulations and chassis work. As a result, the team was given the task of coordinating the prototype construction and the frame testing.

Frame in several parts for different applications

The challenge in developing the assembly frame was to create a frame in three parts to accommodate the future range of different Golf models. It had to be possible to put the drive train, the gearbox, the exhaust system and the engine in different positions on the frame. As a result, an individual, movable platform was developed for the drive train, which was assembled on a separate production line. The platform was then incorporated into the subsequent progress of the assembly frame. The exhaust system was mounted on a fixed frame and the rear axle on an additional mobile framework.

Prototype construction and volume production

A prototype frame was constructed in close cooperation with the Diakonische Werk in Kästorf, in order to ensure that the frame functioned correctly before volume production started. Finally, the complete chassis mechanisation tool was built by Volkswagen in hall 54, with Bertrandt’s support, and made ready for production in only three months, just in time for the start of production. The Bertrandt team was involved both in the production start-up and in the subsequent fine-tuning processes.

Objective: Complete planning process for chassis mechanisation

The team’s successful provision of complete engineering services resulted in it being awarded follow-up contracts for other VW models. The experience that the team acquired in preliminary planning, concept development, draft designs and production support for the assembly frame led to other projects being initiated under the management of the PP-F4 department, which allowed the team to further extend its skills. Consequently, DMU assembly simulations, layout creations, frame construction for prototypes and series production, together with line balancing for chassis mechanisation, can easily be incorporated into existing projects. The objective of the project team is now to handle the complete planning process for chassis mechanisation. ■

Heidi Wolfarth, Wolfsburg

Scope of the Volkswagen Golf Assembly Frame _project in brief_

Launch Support: Assembly frame
Design and development
Prototype
Construction support before series production

Mobile Camera in the Desert

G-Class Mercedes Converted to form a Base for High-Performance Camera

"AMG expects flexibility," said Marcus Grass, Vehicle Construction Team Leader and Ingo Schulz, Body Shell Team Leader, describing the long-term collaboration between Bertrandt Technikum and Mercedes-AMG. AMG entrusted Bertrandt with a very special customer assignment: converting a G-Class XXL into a vehicle for filming the wild life of the Arabian Desert. The particular challenge of this project was to synchronise technology and function.

Project requirements

Anyone who makes wildlife documentaries will tell you that wild animals are very difficult to track down. And when you do manage to find them, every second counts. The customer therefore needed an off-road vehicle that could accommodate a tripod with a large camera and lens for filming the shy inhabitants of the desert. The vehicle had to meet certain requirements, which included being able to withstand off-road use on desert tracks and the tough desert conditions, with sun, sand and temperatures ranging from 0 to 50°C. The converted vehicle also needed to be able to "camouflage" the camera and the exterior had to look like a standard G-Class in order not be confused with other special vehicles, such as military versions of the off-roader.

Sealing and closure concept

The engineers focused their development efforts on designing a removable roof with a hydraulic column on a rotating plate. The camera and the cameraman would be located under this removable roof. The roof system had to continue to open and close in dusty, sandy, hot conditions, so the choice of materials played an important role. The first option was a glass fibre roof with a sandwich construction, but this could not be used because of the heat conditions. Instead the original steel roof was retained and a frame with guttering was developed, similar to that of a sunroof. The sealing system was adapted so that the roof could be manually locked after it had been lowered and so that no water would penetrate. In addition, the engineers experimented with different types of component in order to find out how much pressure was needed to close the roof. Ingo Schulz describes the opening mechanism as follows: "Two levers on each side are folded down and rotated. As they are turned the roof moves up about two centimetres from its base and is then raised by the hydraulic column." To lower the roof again, the locking position of the rotating plate had to be correct, as the roof could only be lowered in the control position. For this reason, the Bertrandt engineers used ball-and-socket joints to ensure that the rotating plate locked in the correct position.

The design of the hydraulic column

The design of the hydraulic column presented the engineers with a challenge. It only had to raise the roof to a specific point, so that the camera mounted on the side of its tripod could film at specific angles pointing upwards and downwards. The roof and the hydraulic column were designed to rotate on the plate while filming. The roof remained horizontal and protected the camera from the sun.

Rotating platform for the camera and free from play tripod

The rotating plate was the central part of the system and was located in the back of the vehicle. It had to be possible to turn it 360 degrees with relatively little effort. In order to allow the plate to be turned manually, a special gear mechanism was used. The rotating plate had to move smoothly. Because of its sliding action it also had to be free from play, maintenance-free and resistant to high temperatures.
The plate had a diameter of 1130 mm and was designed to accommodate a load of around 400 kg. The engineers mounted the rotating plate on a truck turntable which had rubber rollers instead of ball bearings. "It was a challenge to balance the weight on the rotating plate inside the vehicle and to achieve the maximum rotation," explains Markus Grass. The uneven distribution of weight was a result of the weight of the roof and hydraulic column. The weight had to be distributed evenly across the

Background: G55 XXL for Wild Life Documentaries in the Desert

The design of the vehicle is based on a G-Class with an extended chassis and a wheelbase of 3430 mm. The G-Class celebrated its 25th anniversary in 2004 and is still constantly under development.
Bertrandt's concept for the filming vehicle was presented to the AMG project managers, who were impressed by the solution. The G55 XXL, a Mercedes-AMG vehicle in small-scale production, had to be modified by the Bertrandt engineers. Markus Grass and Ingo Schulz, along with three other employees, started work in October 2003 and delivered the finished vehicle in March 2004.

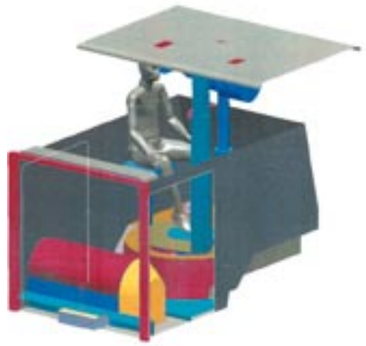
Interview with Peter Alber, Project Leader, Manufacturing and Small Series Projects at AMG

B*m*: When awarding the contract for the conversion of the G-Class XXL, you decided in favour of Bertrandt as your partner. What were the reasons that determined your choice?
Peter Alber: The main reason was the principle of "everything from a single source" and the short communication routes.

B*m*: Did the cooperation, specifically in this project, live up to your expectations? Are you satisfied with the quality achieved and the expertise in carrying out the conversion?
Peter Alber: Only an effective collaboration could have produced the results, which convinced even our most demanding customers

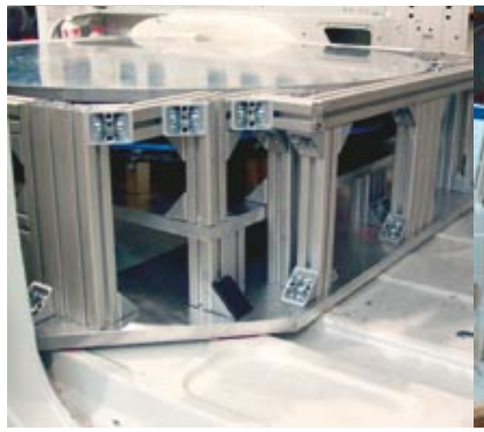
B*m*: In your view, is there still potential for improvement in this cooperation?
Peter Alber: Such projects will always make great demands on any cooperation. This project was successful because of the short communication routes and the clearly defined responsibilities. This procedure should also be possible in the future. I would particularly like to mention the workshop performance of both companies. Their quality and expertise in carrying out the conversion made a great contribution to the success of the project.

Equipped to cope with shifting sand dunes. Four retractable struts ensure that the vehicle has a firm footing.



Animated representation of the lifting roof.

Rotating plate: the key component of the design.



The substructure of the rotating plate in the vehicle.

AMG G55 XXL

entire circular plate. "We used a system from a truck," says Ingo Schulz. The results were perfect!

Safely anchored in the desert

A very important criterion was the ability to anchor the vehicle safely to the ground in the desert, because the camera lens with a diameter of 30-35 cm could pick up the tiniest movement at a distance of 18 km. A levelling system and four retractable struts gave the vehicle a secure base.

Interior and trim

The interior trim was handmanufactured by Bertrandt from tread plate. The high-quality appearance of the interior was complemented by levers, release devices and polished rotating components made of stainless steel. All the components with the exception of the base for the rotating plate, the tripod and the camera were manufactured at Bertrandt. This included the construction of the profile, the turntable, the rotating plate, all the steel components, stainless steel trim, small plastic components and rotating parts.
"The project was a big success and the customer was very satisfied with our ideas," says Markus Grass very pleased. "This is a good reason for continuing to develop our conversion skills." ■

Monique Saier, Ehningen

Scope of the G55 XXL *project in brief*

Vehicle Construction: Vehicle Conversion
Interior Disassembly
Cutting out the roof
Separating the Bodywork Consoles
Adapting the steel roof
Manufacturing all the components needed
Development and Installation:
Reinforced frame for the platform
Painting the vehicle
Seat Unit: fitting the seat
Extending the Body Shell
Assembly

Body-in-White
Concept
Engineering

Tool Making
Manufacturing the tools for the roof

Chassis
Levelling system and retractable struts

Documentation
Animation

Exterior
Seals
Roof Systems

The structure in place. Bertrandt's development and conversion skills on display.

Images on film. The G55 XXL safely on its way home.

Safety will not be Compromised

1 000 Years of Testing …

Quoting Bernd Mogwitz, Head of the Testing and Trials Division: “Testing is always destructive …”

“… and testers are the natural enemy of designers!” This is how the specialists from the Testing and Trials Department describe their relationship with the development engineers. This does not really represent the reality of the internal Bertrandt Network, but there is nevertheless some truth behind the saying. This is because the Testing Department has to give its full approval of the function, appearance and safety of a new development, despite the increasing number of models, shorter development times and growing pressure on costs. In addition, new legal requirements present developers and therefore testers with a constant string of new challenges. Nothing stays the same, and so the engineers have to use new technologies, materials, processes and test procedures to meet the enhanced requirements.

Strategic partner

With five testing sites in Munich, Ingolstadt, Ehningen, Wolfsburg and Rüsselsheim, the testing department effectively covers the whole of Germany. However, every site in the Bertrandt Engineering Network can offer testing services, because of the close internal links within the network.

A total of 200 Bertrandt employees working in development areas covering more than 10 000 m² are responsible for testing the vehicles of the future to the limit. This means that Bertrandt currently has 1 000 years of testing experience, that can be put into effect on its customers’ behalf. Another 200 years’ worth of expertise is being built up every year.

As a strategic partner to the manufacturing and supply industries, the company is already one of the leaders in the provision of innovative testing services. The Testing and Trials Department, which has an organisation covering all the Bertrandt sites, has the job of bringing together experience from throughout the company and systematically making use of synergies in order to meet customers’ requirements in the most effective way possible. ■

Safety will not be Compromised

1 000 Years of Testing …

… and joined yearly by an additional 200.

Functional and Life Cycle Tests

More than 1 000 individual components in each vehicle have to fulfil a specific function. A driver's door, for example, has to withstand more than 100 000 load changes. Before these components can be put into use, their movements have to be analysed and their functions evaluated in order to ensure that the components have been developed correctly.

Rigidity and Structural Investigations

Will the door withstand impact? How does the bodywork react to a head-on crash? Simulations allow the safety requirements to be tested before the first prototype is built.

Vehicle Conversion and Integration

Developing electronic bus networks for an entire vehicle, building measurement vehicles or documenting installation tests. Working on the networked hardware is an exciting job and produces real-life results.

Tank Systems and SHED Measurements

A tank system is a complicated affair. Does the bleed valve fit? Are emissions being discharged? How high is the pressure? Modern measuring technology and mini-SHEDs (sealed housing for evaporative determination) help to ensure that the requirements of environmental legislation are met, that the vehicle has a fuel supply and that the driver's hands are clean.

Environmental Simulation

Heat in summer, cold in winter, travelling on bumpy roads, the sea breeze. Environmental simulation helps to ensure that cars do not break down in extreme temperatures and under tough conditions.

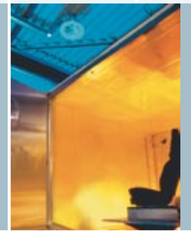
Seat Testing

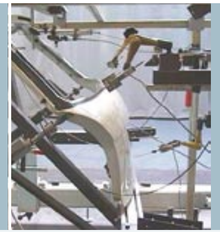
Loading, unloading, rotating, and sliding forward. In order to ensure that a seat will last, it has to undergo long-term load tests, vibration tests and aging tests before it is put into use. It goes without saying that the built-in electronic systems must continue to function.

Electro-dynamic Vibration

Modern vehicles are just like a busy, mobile electronics laboratory. Electronic components and systems are subjected to stresses in the high frequency range in order to ensure that they can withstand loads in real life.







Passive Vehicle Safety

The bonnet and the interior components deform and the airbags inflate. Dynamic tests are used to ensure that protection systems function correctly when they come into contact with a human body. Work in this area includes designing the test environment, drawing up the testing criteria and finalising the concept and the documentation.

Active Acoustics

The sound of an engine sends a shiver down car lovers' spines. At an early stage in the development process the way in which noise develops is recorded, background noise is analysed and transmission routes are evaluated.

Passive Acoustics

Creaks and rattles from the vehicle interior are certainly not welcome! This means identifying the source of unwanted noises and finding suitable combinations of materials.

Wind and Function Noises

Who would want to drive a car wearing headphones? Testing engineers make sure that car drivers and passengers only hear the noise of the car functioning and that no whistling noises spoil the pleasure of the journey.

Recording Measurement Data on the Move

How do components behave when they interact? Mobile recording of measurement data puts the spotlight on how individual components and complete systems react to vibration.

Vibration and Pulsation Tests

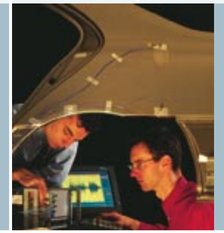
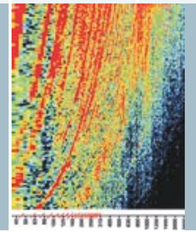
Conditions which are specific to railways, roads, aircraft and ships can be simulated using multi-channel Hydro pulse testing machines. Evaluation procedures provide information about the life cycle of the structures being tested.

Crash Preparations

A crash requires effective preparation. From the legal requirements through to the test environment and the test itself, engineers have to take into account all the prerequisites in order to ensure that the results can be analysed effectively and fed back into the vehicle development process.

Operator Model

There are some things that you just do not want to have to take care of yourself. You would expect a comprehensive service to be provided. For example the operating of climatic chambers and test benches. But also fleet management. Or carrying out long-term driving tests of the first prototypes …





ISOFIX The Latest Development

Child Safety System Developed for the New Ford Focus

On this project, Bertrandt Cologne, together with the sites in Ehningen and Rüsselsheim, was able to demonstrate its modular and networking skills. The result of the cooperation between Ford and the development service provider Bertrandt is the integrated ISOFIX child restraint system in the new Ford Focus, which was implemented without any changes to the structure of the seats.

Project launch managed by Bertrandt Cologne

The project began with the benchmarking of the ISOFIX restraint system and its implementation. CAD studies were carried out at the same time to determine the current status of the concept, the legal requirements for the ISOFIX anchor points and the way in which they are attached to the vehicle.
Once the findings of the concept phase had been verified and the initial CAD models created, this phase was completed and approved by the customer. Following the release of this phase, the necessary FE analyses could be carried out by the simulation engineers in Cologne. The results were presented to the project team by the relevant Ford employees. After the design of the individual components and the assembly had been tested in theory, work started on making the initial prototypes.

Prototypes from Ehningen

The sample components were planned and developed together with colleagues from the Ehningen Metal Prototype Construction Department. They were used for the initial installation tests, comfort evaluations and further testing. In addition to Bertrandt's tests, the prototypes were also used for complete vehicle crash tests and tests carried out by the manufacturers of child seats. The functionality and shape of the insert guide was determined using SLS prototypes in installation tests on the production line, in collaboration with the Ford Design, Marketing and Craftsmanship Departments. Static tension tests which confirmed the results of the FE analyses were carried out at the same time.

Endurance testing in Rüsselsheim

The major test was an endurance test of folding down the seat back carried out by Bertrandt in Rüsselsheim, in order to evaluate the effect of the anchor point on the seat covering and the foam of the seat back. As the current design had no negative effects, the prototype was released for initial small-scale production of ten items.

Process support at Ford

Another part of the project involved providing support for a number of Ford processes. These included the preparation of CAD data, the flow of information and the release to purchasing, logistics and marketing, together with technical support for the Ford department in the choice of suppliers and further test planning. The "Top Tether" sticker for the vehicle interior was also developed by Bertrandt. Bertrandt Cologne also provided support during the compilation of the operating manual.

The system is used in all body types including 3, 4 and 5 door models and the Turnier.

Cooperation with component manufacturers

The final, brief design loop involved minor adjustments to the components, in cooperation with the component suppliers, to accommodate the requirements of the manufacturing process. This had no impact on the tests already carried out. Bertrandt employees from Cologne, together with the Ford department, were responsible for coordinating and implementing this change and tracking the components through the customer's process. The project was completed on schedule with the final acceptance of services.

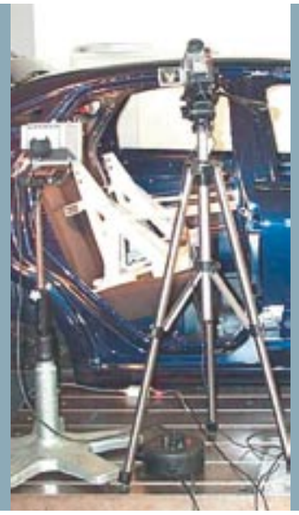
Summary

Both the customer and the Bertrandt employees involved felt that the ISOFIX project run by the Bertrandt Engineering Network had been both a pleasure to work on and a success. The network worked well and joint projects are always enjoyable. Bertrandt is looking forward to new challenges as part of other projects and the opportunity to collaborate with Ford in the future. ■

Volker Bavendiek, Andreas Schürmann, Köln

FE analysis according to the SFAD 2 test criterion: oblique pull – integrated components subjected to the effects of force.

External testing on the SFAD 2.



Child seat fitted in the new Ford Focus.

Scope of the ISOFIX system anchor point *project in brief*

Interior: Seating
Development of ISOFIX Restraint System

Analyses
Benchmarking

Quality Management

Supplier Management
Change Management
Supplier Support

Start-up Management
Process support for production tests

Project Management

Documentation

Simulation

Rapid technologies
Rapid Prototyping: Functional Prototypes, Small-scale Production
SLA/SLS: Functional Prototypes

Toolmaking

Component Testing
Component Endurance Tests

ISOFIX system allows children to be transported safely

Child seats need their own attachment system, because when the adult safety belt is used as a fastening the child seat is often incorrectly fitted. Studies have shown that around 60% of child seats are not installed correctly. One solution to this problem is the fixing system for child safety systems defined in ISO standard 13216-1, which was first presented in 1997 at the IAA.

Latches lock the seat to the vehicle

Ford is offering an ISOFIX system in its new Ford Focus. Class 0 and I child seats (baby seats and seats for children weighing up to 18 kg) can easily and safely be fastened to the outer rear seats. Two ratcheting arms with latch connectors lock into anchor points which are fixed to the floor of the vehicle or to the seat between the back and the seat cushion. This allows the child seat to be locked firmly to the vehicle. In the case of an accident, the forward movement of the child seat is immediately limited as the vehicle decelerates.
In order to make it easier to fit the latch connectors, there is an insert guide which can be fitted to the anchor point. This also prevents the latches from damaging the seat cover. The anchor points are mounted on a plate which is bolted to the vehicle floor behind the back seat.

"Top Tether" fastening prevents the seat rotating

A sticker is used to identify the mounting point for the "Top Tether". This is an additional fastening which prevents the child seat from rotating. It takes the form of a strap which pulls the seat back of the child seat backwards and prevents it from rotating towards the front seat. Ford Werke GmbH in Germany will only allow ISOFIX child seats to be used in combination with the top tether or a supporting strut to prevent them from rotating, because of the resulting increased levels of safety.

RF1

Exciting Contours in a New Dimension

"Design a vehicle whose appearance reflects both the character of a trike and the performance of a sports car." These were the specifications issued by Harald Schmitz, Managing Director of Rewaco Spezialfahrzeuge GmbH, to the development service provider Bertrandt in Cologne in June 2004. The Design Modelling team was happy to oblige – and set to work designing a very special trike.

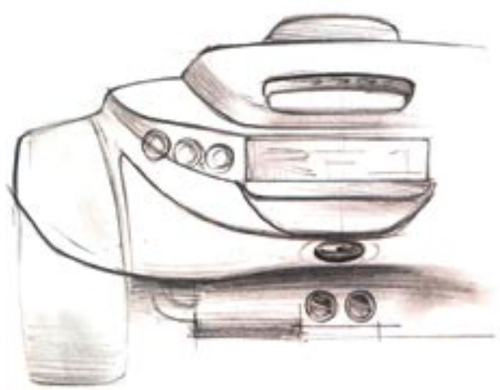
Design development on the prototype

As a small-series manufacturer, the Managing Director of Rewaco Spezialfahrzeuge GmbH took a new approach to the development of the RF1 Trike series, and asked the Design and Modelling team to rework an RF1 study that had first been presented in May 2004.
The team at Bertrandt Cologne, which was led by Norbert Grün, Team Leader Design Modelling, had six weeks to complete the project. In this period, the prototype was provided with a modelling substructure and a new three-dimensional shape was developed in modelling clay.
Harald Schmitz came to inspect the product several times during this phase and looked at several design solutions before deciding on the final design together with Norbert Grün.

1:1 Prototype in series quality

A full-scale symmetrical model of the final design draft was then modelled in series quality, taking into account the manufacturing requirements of the outer skin parts – a prerequisite for the subsequent tooling and production process at Rewaco.
The result was the RF1, a trike that promises the ultimate in fun on three wheels – and not only because of its attractive design. Powered by a 1.6-litre Ford Zetec engine installed in a tubular frame, the trike offers impressive performance. With a power-to-weight ratio of 5 kg per bhp, the 115-bhp GT version of the RF1 can easily match powerful sports cars in a sprint. ■

Frank Beifuß, Köln



Scope of the RF1 Rewaco Trike _project in brief_

Design
Clay Models
Shape Optimization

New form: clay modelling in the studio at Bertrandt Cologne.

Rewaco Spezialfahrzeuge GmbH was formed in 1990 by Harald Schmitz and Andreas Hauri to develop and manufacture trikes. The current company headquarters, consisting of a workshop, warehouse, offices and showroom, are in Lindlar, about 40 km to the east of Cologne. With a production and administration staff of eighteen, each vehicle is individually planned and built by hand according to customer specifications. At the company's manufacturing plant in Poland, 30 employees produce frames and chassis components. The plant also assembles the separate auxiliary units. With an average annual production of 500 vehicles, Rewaco is one of Europe's largest trike manufacturers.

Three questions for Harald Schmitz, Managing Director of Rewaco Spezialfahrzeuge GmbH

B*m*: Mr Schmitz, how did you hear about Bertrandt Cologne?

Harald Schmitz: As is so often the case in life, it was just by chance – through the brother-in-law of one of our employees who works as a vehicle designer at Volkswagen. At the time, I was already convinced by the merits of the RF1 study, but I didn't think its lines were sporty enough. So the idea of talking to Bertrandt about the project came indirectly via Braunschweig.

B*m*: Can you tell us something about the new vehicle?

Harald Schmitz: With the RF1 series, we are offering a trike that opens up new dimensions in terms of design and performance – a vehicle with sporty aesthetics combined with state-of-the-art technology.

B*m*: Looking back, how would you evaluate the job done by Bertrandt Cologne?

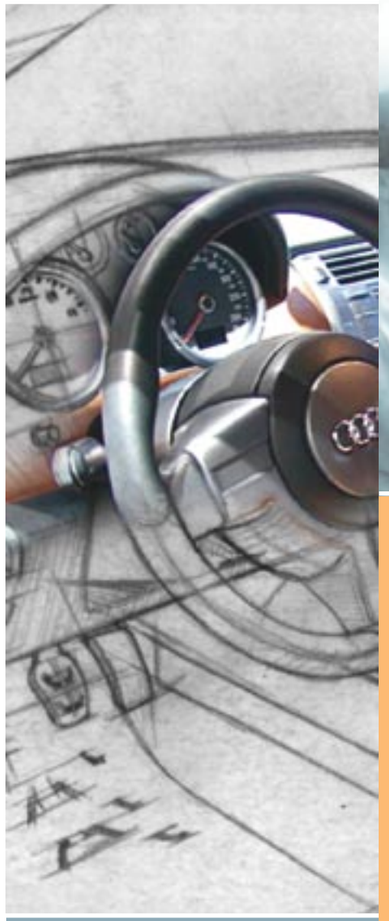
Harald Schmitz: We found a very competent partner in Bertrandt, one that is able to perform optimum design modelling that is ideally suited to our company's needs – without any restrictions in our demands for high quality.

Visualisation in the Product Development Process

The Bertrandt visualisation teams provide project support services for all stages of the product development process. For technical products, ongoing visualisation support is available from the styling and design stages through to the production release, maintenance, and repair and recycling phases.

The power of visual representation

The importance of visualisation becomes clear at the latest during the assessment of the design and engineering concepts and the maintenance and operating processes. The visual quality of a product is a decisive factor in determining the image which the customer has of it. Visualisation acts as a link between design and technology and forms an important milestone in the value chain at Bertrandt.



Design – Communicating a product's feel and message

Design makes the essential features of a product visible and tangible. It encourages people to run their eyes and their hands over a vehicle or a technical product and to discover the product's message. As a development service provider, Bertrandt supports customers during the design stage, right from the beginning of the product development process.
The product message is portrayed in the form of traditional sketches, computer graphics or complete 3D real-time representations of entire vehicles or components.

Visualisation – Making the essential and invisible features of a product visible

Definition

Visualisation is a fundamental element of modern communication. It helps to transform the ideas in the heads of developers, designers and marketing strategists into an appropriate form of communication. "A picture is worth a thousand words", as the saying goes, and anyone who has given training courses or presentations knows just how true this is.

Implementation

Visualisation takes a wide variety of forms. Traditional hand drawings still play a role and can even be simulated on computers.
Retouched photos, imported graphics and CAD files reworked in 2D and 3D graphics tools play just as important a part as standard presentation and web applications.

Bertrandt has links to all the current CAD systems and databases used by its customers. Ongoing training and software and hardware updates help to ensure that the members of Bertrandt's visualisation teams have all the skills and innovative abilities they need.

Benefits

Only when the visualisation of ideas, concepts, prototypes and end products is truly successful does it attract the necessary attention. The close links between the teams in all areas including design, testing and administration allow orders to be implemented effectively. The interaction of skills in different fields ensures that workflows are optimised. In this way, Bertrandt can offer significant advantages over agencies that have to acquire the necessary technical background, CAD data access and technical information via indirect routes.
As a result of the interplay of technical expertise and artistic expression, the visualisation teams at Bertrandt can offer the perfect combination of technical skills and creativity.

Outlook

Visualisation tasks are carried out alongside the entire product development process. In the future there will be an increased use of virtual media for visualisation. The diverse ways in which virtual media can be used will allow new technical solutions to be developed. ■

Markus Dürig, Ingolstadt

Technology – Putting ideas into practice

A technical product is the result of the collaboration of all the participants in the product development process. The quality of the collaboration also determines the product's acceptance on the market. Visualisation as an essential means of communication within the product development process also has a decisive impact on the success of the product.

Experience

Assembly Instructions
Owner's Manuals
Design Sketches
Technical Illustrations
Retouched Photos
3D Computer Animation
3D Kinematics
Presentation Documents
3D Real-time Applications
Web Applications

LengyelDesign and Bertrandt Collaborate on a Project for Deutsche Post AG

The objectives were challenging: large-scale building signage, making the company headquarters instantly recognisable and easily identifiable, high-quality presentation of the brand and adapting the symbol to fit a glass facade. LengyelDesign, which specialises in integrating product and corporate design, took Bertrandt on board and produced a solution, which can be seen at the offices of the Deutsche Post AG (the German post office) in Bonn.

The 3D post horn, which is the symbol of the German post office, adorns the "Post Tower", the headquarters of Deutsche Post AG. The horn measures 8.36 m by 6.62 m and can be seen from a long distance away. The semi-transparent yellow background covers an area of around 100 square metres. The basis of the 3D post horn is the current "post horn" symbol developed in 1997 by NitschDesign. This forms the foundation for the 3D rigid model produced by LengyelDesign. It was after the model had been produced that Bertrandt Cologne became involved.

The data from a tactile scan of LengyelDesign's rigid model was used as a guideline. The surfaces team in Cologne worked in ICEM-Surf on the free-form surface model with a scale of 1:1.

The engineers were able to put to good use the software package's versatile modification tools in the process of gathering the data. As the 3D post horn was to be mounted on a cylindrical surface, the ICEM tools allowed the model to be adapted perfectly to different surfaces, even at this advanced stage of the design process.

Before the official opening of the Post Tower, the 3D post horn was scaled down for a commemorative medal. Bertrandt Cologne supplied the CAD data needed to emboss the medal. ■

Sonja Lorenz, Köln

A big "Hello!" could be heard at the Brechgasse kindergarten in Ehningen on January 21, 2005. The reason for the warm welcome from the kids was the delivery of ten "move-it" boxes supplied by Baden-Württemberg's road safety authority, the Landesverkehrswacht. The "move it" boxes for kindergarten and primary school children are aimed at strengthening children's confidence in movement at an early stage in order to prevent road traffic accidents on the way to school. The Landesverkehrswacht is distributing a total of 48 boxes throughout Germany. The action was made possible by Bertrandt AG with its Christmas donation. ■

Action game with learning effect: the "Maxis" balance their way across the brightly coloured yellow, red and green paper board lids.

„move it" Getting Kids Moving

Handing over the first "move it" boxes was the most pleasant "duty" of the day.
(from l. to r.: Peter Löffler, President of the Landesverkehrswacht Baden-Württemberg, Dietmar Bichler, Chairman of Bertrandt AG and Claus Unger, Mayor of Ehningen)


„The Bow“.


„Sputnik“.


„4 Gewinnt“.


„Rollator“.

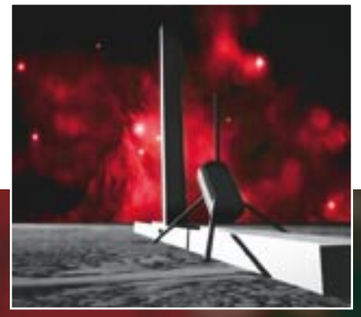

„Turbo Injection“.


„Mad Mockel“.


„The Mousetrap“.

Design Competition at the Heilbronn University of Applied Sciences

"Go Greased Lightning!" A rope is cut and "Greased Lightning" hurtles through the hall. It whizzes quietly, rapidly and effectively on its way, and in only 0.083 seconds it has reached its destination. The Heilbronn University of Applied Sciences organised a design competition for all students in the first semester of technical courses, with prize money provided by Bertrandt AG. Designer Volker Sieber, himself a former Bertrandt employee, set the challenge and, as a member of the jury, also evaluated the designs. The task that the ten teams were set was to design a very light structure that would transport a heavy weight as rapidly as possible.


Student visions: A computer graphic of the "Sputnik" design.

Focus on creativity

The preparations had been going on since October 2004. During this period, the students produced comparisons of the performance of an ant and an Ariane rocket. Jury member Gero Widmann from Bertrandt Projektgesellschaft explained: "This type of competition offers first-semester students the opportunity to carry out a task without the influence of theoretical knowledge. It's all about creativity."

Success factor: A systematic approach

"The designs were very varied and of high quality," says Professor Peter Ott of the Heilbronn University of Applied Sciences. For "Greased Lightning", Team 10 chose a steel cylinder as the heavy object to be transported and a low-friction, hollow aluminium shaft, lubricated with Teflon, to transport it. The cylinder was propelled using a spring structure. This design put Team 10 into first place with a prize of 500 euros. The jury praised in particular the students' analytical methods, which allowed them to clearly demonstrate their approach in the accompanying documentation.

The "Turbo Injection" design of Team 3 consisted of a compression spring which propelled a cast iron cylinder through an oiled Plexiglas tube. Spring systems were generally very popular. Team 7 won third prize with its "Sputnik" design, which was based on the concept of propelling a weight using a spring and string.

Democratic teams

Christian Binder, a member of the winning team, firmly rejected the idea that this sort of obligatory task could be too much of a challenge for first-semester students: "We needed the pressure. And developing a feel for the task was a very important factor in identifying a solution." Fellow team member André Jeuther added enthusiastically: "Although the teams were randomly selected there was a good chemistry between us right from the beginning. The team was genuinely democratic."

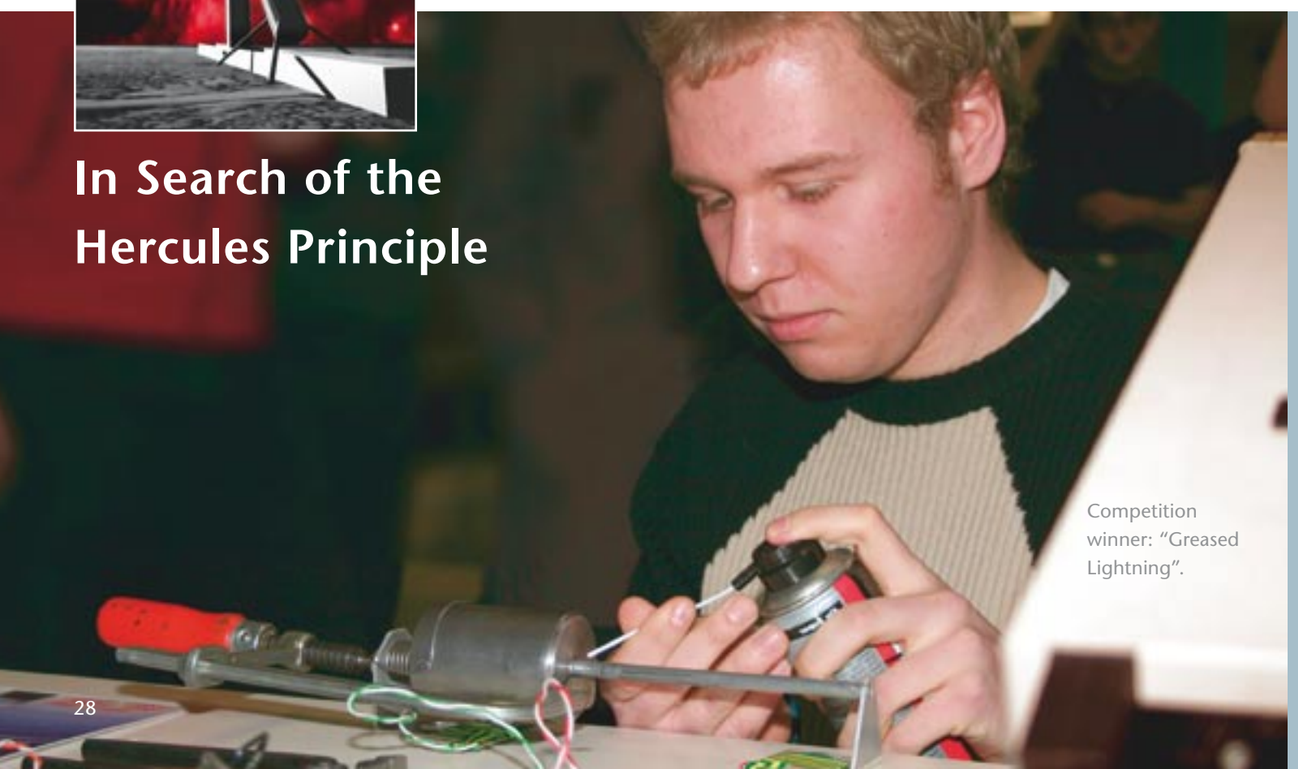
Jury member Volker Sieber summarised the competition as follows: "The students gain confidence by taking part in the competition. Above all I like the element of fun behind the whole thing." ■

Monique Saier, Ehningen


The winning team.


The jury: Volker Sieber, Gero Widmann and Professor Peter Ott (from left).

In Search of the Hercules Principle


Competition winner: "Greased Lightning".

Long-term Connection with the Heilbronn University of Applied Sciences

This was the tenth design competition at Heilbronn and the third which was sponsored by Bertrandt. "The aim of the competition is to make studying enjoyable," explained Professor Ott the sense of it. "We want to strengthen students' commitment and improve their teamwork. You can only become a true team player if you have worked in a team." The competition allowed the students to process the information from their lectures in a systematic way. The teams were randomly selected, which ensured that foreign students were evenly distributed. This can be an advantage, as multicultural teams are often the winners.

What role does Bertrandt play? Volker Sieber and Gero Widmann both lecture at the Heilbronn University of Applied Sciences. "The competition also allows us to make our name known to a new generation of designers," said Gero Widmann. "Everyone benefits. And motivating the students is a successful result for us."

Bertrandt was also able to give the university some positive feedback on the students' implementation skills. "I'd like to thank Volker Sieber in particular for his contribution on the teaching side of the competition and Bertrandt for their sponsorship," said Professor Ott in conclusion.

New Site in Altenburg

Bertrandt subsidiaries in Germany: centrality of new site in the region between Eisenach and Dresden.

Discussion round on interesting themes: (from left) Rainer Schuler (Bertrandt Technikum GmbH, Ehningen), Michael Maximilian Lison (Managing Director of Component Suppliers Thuringia), Volker Krey (Executive board speakesperson of the Thuringian Regional Development Company).

Providing a Local Service for Customers in Thuringia and Saxony

Bertrandt moved into its new premises in Altenburg in the German federal state of Thuringia at the beginning of 2005. From this central located subsidiary, Bertrandt will in future provide development support and production services to automobile companies in Thuringia and Saxony.

Decentralised structure: Bertrandt focuses on close proximity to its customers

Gunnar Paulick, Manager of the new Bertrandt Technikum GmbH (Ehningen) site, welcomed numerous representatives of famous automobile companies, together with guests and partners from the spheres of politics and business, to the celebrations in the Bach room at Altenburg castle. Dietmar Bichler, Chairman of the Board of Bertrandt AG, highlighted the central position of Altenburg in his welcoming speech. As a result of its close proximity to the automobile companies in the region, Bertrandt will be able to offer all its development expertise to meet customers' specific requirements. The primary focus will be on development support and production-related services, ranging from project management and quality management through to logistics planning and production start-up support.

Bertrandt subsidiaries in Germany: centrality of new site in the region between Eisenach and Dresden.

Contact Details:

Bertrandt Technikum GmbH
Gunnar Paulick (Site Manager)
Mühlpforte 2
D-04600 Altenburg
Phone +49 3447 8900-11
Fax +49 3447 8900-10
E-Mail: gunnar.paulick@de.bertrandt.com

Test drive in the smart crossblade at minus degrees: (l.) Michael Wolf (Lord Mayor of Altenburg), Dr. Jürgen Aretz, Gunnar Paulick (Site Manager, Bertrandt Technikum GmbH in Altenburg).

Thuringia's new image campaign: "Welcome to the Think Tank"

In the past, the automobile industry has been an important driving force behind industrial development in Thuringia and Saxony. In statistical terms, this sector has the largest share of the overall turnover of the processing industries in both states. This makes Thuringia today one of the most modern and productive automotive and supplier centres in the whole European economy, as Dr. Jürgen Aretz, State Secretary of the Thuringian Ministry for the Economic, Technologic and Labour Affairs, explained. He was representing the Prime Minister of Thuringia, Dieter Althaus, who was unable to attend. Dr. Aretz and Michael Wolf, Mayor of Altenburg, welcomed Bertrandt to the "Thuringian Think Tank". Bertrandt's commitment will further strengthen the local economy. This is a very important step for the town and the region in its bid to become a centre for the automobile industry. ■

Range of Services: Bertrandt Technikum GmbH in Altenburg.

Service Related Production					
Project Management			**Production/Factory Planning**		
Quality Management			**Logistic Planning and Support**		
Support Start of Series Production			**Information Technologies**		
Project planning Project management Project control Multi-project management Reporting Cost- and budget planning	QM-Planning and support Audit- and process analysis QMS-Consulting Sampling processing Test equipment management	Project-/Process engineering Establishment of new part readiness for the series production under series production conditions On schedule serial production readiness Technical services in production- and assembly line	Digital Factory (Delmia) Production planning for production line Digital coverage of production process	Supplier management Warehouse management Production logistics Layout planning of premises Selection and implementation of software solutions	IT-Consulting- and support CAx-Technologies Operating models Software solutions Data bases System administration

IBOA

Fachhochschule Köln
University of Applied Sciences
Cologne

Bertrandt Cologne is a Member of the IBOA at the Faculty of Vehicle Systems and Production

Promoting cooperation between universities and industry: that is the mission of the International Board of Advisors (IBOA) at the Faculty of Vehicle Systems and Production at the Cologne University of Applied Sciences (Fachhochschule Köln). The Board, which is made up of renowned personalities from local, national and international companies and organisations, aims to reduce the gap between the academic world and industry. On the agenda are feedback discussions with professors for the purpose of further developing the teaching and research range. Furthermore, the intention is to offer more students internships and work experience in companies and to introduce a scheme for the advancement of gifted students.
Stephan Vogt, Managing Director of Bertrandt Cologne, is an active member of the new IBOA: "Bertrandt Cologne will continue to actively support cooperation with the University of Applied Sciences in Cologne within the framework of new technologies and innovations in order to offer career perspectives to highly qualified graduates in future." ■

Modular Hybrid Drive Concept

Bertrandt Rüsselsheim Participates in Research Project

The Fachhochschule Wiesbaden (University of Applied Science) with its Faculty of Mechanical Engineering in Rüsselsheim is researching into the further development of hybrid technology. Partners in this innovative research project are Bertrandt Rüsselsheim and the Institute for Machines, Drive Systems and Electronic Engineering (IMG) in Nordhausen. The project is supported by a donation in kind by Adam Opel AG – two new 1.2-litre Corsa models with TWINPORT ECOTEC engines.

The hand-over of the two vehicles by Karl-Friedrich Stracke, Executive Director Product Development at Adam Opel AG, took place on 28 January at the Opel Test Centre in Dudenhofen. Media representatives, the involved companies and the Society for the Advancement of Engineering Studies in Rüsselsheim took part in the event.
Volker Schier, Managing Director of Bertrandt Rüsselsheim, praised the decision in favour of a small car. "The challenge will be to accommodate all the components in a limited space and to keep costs under control at the same time." Matthias Will and Matthias Fritsch, who are responsible for the Powertrain and Electronics divisions respectively at Bertrandt Rüsselsheim, will form the interface at which communication is to be achieved with the University of Applied Sciences and are looking forward to working with the students. "The project will give the students a valuable insight into practical work. It will provide them with direct experience of putting theories into practice, especially in the field of hybrid technology with its promising future. After all, developing an alternative drive system involves much more than simply integrating a different drive unit." ■

Gaining experience through a joint hybrid project: project participants from industry and university at the hand-over of the Corsa models in Dudenhofen.

Bertrandt in brief

+++ Best Practice Award:
In October 2004, Bertrandt Technikum GmbH was awarded with the "Best Practice Award" by DaimlerChrysler AG, Sindelfingen. It was the aim of engineers in the Vibration Technology Division to provide DaimlerChrysler with solutions in the field of "completely knocked down" components in order to reduce freight costs. +++

+++ Design Award Baden-Württemberg:
At the presentation of the fifth international Design Award Baden-Württemberg "Focus Dialogue" on 12 October 2004, Bertrandt Technikum GmbH was awarded the "Focus in Silver" for the new Binz hearse. The design competition emphasises the dialogue between product and user. +++

+++ Euromold 2004:
At the Euromold 2004 fair in Frankfurt am Main, Bertrandt AG presented its concept of a holistic design process from the first sketch right through to virtual development and ending with the final model. The engineers demonstrated this unique combination of design and engineering with their model of a hearse for the special vehicle manufacturers Binz GmbH & Co. KG in Lorch. +++

+++ European Alliance for SMC:
Bertrandt has been a member of the European Alliance for SMC (EAfSMC) since 1 January 2005. This alliance of 19 European companies offers innovative, cost-effective composite components and systems as well as services throughout the entire process chain. The EAfSMC has made it its task to further develop technical expertise in the field of Sheet Moulding Compound (SMC) and Bulk Moulding Compound (BMC) and to make it available to a wide group of potential customers.
The Bertrandt Engineering Network offers the EAfSMC its experience in developing and designing SMC components, with the aim of providing support for customers in various sectors. +++

+++ Aviation Standard EN9100:
Since 4 January 2005, Bertrandt Ingenieurbüro GmbH in Hamburg has had certification in accordance with the aviation standard EN9100. This standard is based on the requirements set out in DIN EN ISO 9001:2000 and is supplemented by specific aviation standards such as airworthiness requirements and standardised systems for the manufacture and maintenance of aviation equipment. +++

+++ Quarterly Report:
After three months of the financial year 2004/05 (01.10.2004 to 30.09.2005), total sales of the Bertrandt Group amounted to € 54.2 million. The operating profit was € 1.7 million. +++

Corporate calendar

10.-11.05.2005	Automobilforum, Stuttgart
23.-24.05.2005	University Contact Event: Bonding Fair in Karlsruhe
Mid-May 2005	Report on the Second Quarter of the Financial Year 2004/05
Mid-May 2005	Analysts Conference, Frankfurt am Main
31.05.-02.06.2005	Testing Expo, Stuttgart
03.-04.06.2005	careers4engineers automotive, Stuttgart Exhibition Centre
16.06.2005	Anniversary Event: 10 Years Bertrandt in Wolfsburg (Tappenbeck)
21.-22.06.2005	Progress in Automotive Electronics, Ludwigsburg
21.-22.06.2005	University Contact Event: Bonding Fair in Stuttgart
27.06.2005	Anniversary Event: 10 Years Bertrandt in Munich
29.-30.06.2005	University Contact Event: IKOM Technical University Munich
05.-06.07.2005	EDM Forum, DaimlerChrysler, Stuttgart
13.-25.09.2005	IAA – International Motor Show, Frankfurt am Main

Achim Wiedemer

"Never lose sight of your objective!"

Achim Wiedemer can now look back over 16 years spent working for Bertrandt. With a smile he remembers the office of 20 people in Stuttgart where he laid the foundations for his designing career at Bertrandt in 1989.

Wiedemer, who comes from the German city Offenburg, found it difficult to choose between studying meteorology and viticulture when he left school, but he finally decided to turn his third hobby, motorbikes and cars, into his profession. Even at the age of 14 Achim Wiedemer loved working on his mopeds and later earned enough money from his holiday jobs to buy his first real motorbikes. After his national service and a period of work experience in 1984 he enrolled at the University of Applied Sciences in Ulm to study automotive engineering. During his second industrial placement semester he was one of the first students from the University of Applied Sciences in Ulm to be offered one of the sought-after internships at BMW. A year later he also wrote his degree dissertation at the Munich-based company.

After he had finished his degree course, Achim Wiedemer had to decide on the course of his future career. Should he work for a car manufacturer, a supplier to the industry or an engineering consultancy? Despite receiving offers from some well-known manufacturers, Wiedemer decided to take up a position at Bertrandt. This was largely because of the positive interview he had with the then Managing Director in Stuttgart, Dietmar Bichler, who is now Chairman of the Board at Bertrandt AG, and also because some of his friends from university were already working at Bertrandt.

In those days Achim Wiedemer's job as designer still involved using ink and a drawing board, and then later the CATIA V3 software package. As a project leader and then from 1995 a head of department, he experienced, amongst other things, the introduction of the first stereo lithography system at Bertrandt, which formed the foundation for the creation of the rapid prototyping department. He also discovered that he had a special interest in areas such as cooling and air conditioning, the complete vehicle, package and DMUs. Every day at Bertrandt was different and the work was never boring. This did not change when the Stuttgart office moved to Sindelfingen in 1997, or when Achim Wiedemer, with his development team, moved to the new premises in Ehningen in 2000. After one year at Bertrandt Technikum as Departmental Manager, Achim Wiedemer took on the position of Branch Manager at the Bertrandt Projektgesellschaft GmbH (BPG) in Ehningen in December 2002. The BPG is responsible for the central control of resources, external partners and suppliers across all the Bertrandt subsidiaries and makes a significant contribution to the success of complex module or derivative projects. The careful coordination of expertise throughout the Bertrandt Group allows customers to benefit from tailor-made solutions. Achim Wiedemer can call on his many contacts and his years of experience in the industry and put them to the best possible use on behalf of Bertrandt's customers.

When he is not at work, the 42-year-old enjoys spending time at home with his family, working on his vintage cars and motorbikes and looking after his garden. Twice a year he travels with his wife and three daughters (10, 2 and 2 years old) to stay at his parents-in-law's house in Sweden, where he can refuel on energy. ■

At your service

Bertrandt – 18 offices in Europe and the USA

Bertrandt AG – Head office
Birkensee 1
D-71139 Ehningen
Phone +49 7034 656-0
Fax +49 7034 656-4100
info@bertrandt.com

Altenburg
Mühlpforte 2
D-04600 Altenburg
Phone +49 3447 8900-00
Fax +49 3447 8900-10
altenburg@de.bertrandt.com

Barcelona
Novel Bertrandt
Poligono Industrial Can Comelles Sud
C/Gresol,1 - Ap. Correos 183
ES 08292 Barcelona Esparreguera
Phone +34 93 777 87-00
Fax +34 93 777 87-13
barcelona@es.bertrandt.com

Bretzfeld
ZR Automotive
Moosbachstraße 8
D-74626 Bretzfeld-Schwabbach
Phone +49 7946 9105-0
Fax +49 7946 9105-120
bretzfeld@de.bertrandt.com

Detroit
17000 17 Mile Road Suite 200
Clinton Township
MI 48038 US
Phone +1 586 226 5100
Fax +1 586 226 9209
detroit@us.bertrandt.com

Dunton
Unit 34 Hornsby Square, Southfields
Industrial Park, Laindon Basildon
GB Essex SS 15 6SD
Phone +44 1268 564 300
Fax +44 1268 564 301
dunton@uk.bertrandt.com

Ehningen
Bertrandt Projektgesellschaft
Birkensee 1
D-71139 Ehningen
Phone +49 7034 656-0
Fax +49 7034 656-8700
bpg@de.bertrandt.com

Ehningen
Technikum
Birkensee 1
D-71139 Ehningen
Phone +49 7034 656-5000
Fax +49 7034 656-5100
ehningen@de.bertrandt.com

Garching
Dieselstraße 16
D-85748 Garching-Hochbrück
Phone +49 89 32706-0
Fax +49 89 32706-101
garching@de.bertrandt.com

Hamburg
Georg-Heyken-Straße 2
D-21147 Hamburg
Phone +49 40 7975129-0
Fax +49 40 7975129-10
hamburg@de.bertrandt.com

Ingolstadt
Lilienthalstraße 50-52
D-85080 Gaimersheim
Phone +49 8458 3407-0
Fax +49 8458 3407-111
ingolstadt@de.bertrandt.com

Cologne
Oskar-Schindler-Straße 10
D-50769 Köln-Feldkassel
Phone +49 221 7022-0
Fax +49 221 7022-100
koeln@de.bertrandt.com

Munich
Anton-Ditt-Bogen 16
D-80939 München
Phone +49 89 316089-0
Fax +49 89 316089-121
muenchen@de.bertrandt.com

Neckarsulm
Friedrich-Gauss-Straße 5
D-74172 Neckarsulm
Phone +49 7132 386-0
Fax +49 7132 386-119
neckarsulm@de.bertrandt.com

Paris
Burospace, Bâtiment 10
Route de Gisy, B.P. 35
F-91572 Bièvres
Phone +33 1 69351505
Fax +33 1 69351506
paris@fr.bertrandt.com

Rüsselsheim
Im Weiherfeld 1
D-65462 Ginsheim-Gustavsburg
Phone +49 6134 2566-0
Fax +49 6134 2566-100
ruesselsheim@de.bertrandt.com

Sochaux
Technoland
364, rue Armand Japy
F-25461 Etupes Cedex
Phone +33 3 81993500
Fax +33 3 81993501
sochaux@fr.bertrandt.com

Stadthagen
Erlenweg 6
D-31715 Meerbeck
Phone +49 5721 9274-50
Fax +49 5721 9274-51
stadthagen@de.bertrandt.com

Trollhättan
Nohabgatan 9 – 11
S-46153 Trollhättan
Phone +46 520 4865-00
Fax +46 520 4865-01
trollhattan@se.bertrandt.com

Wolfsburg
Krümke 1
D-38479 Tappenbeck
Phone +49 5366 9611-0
Fax +49 5366 9611-100
wolfsburg@de.bertrandt.com

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Bertrandt AG
Birkensee 1
D-71139 Ehningen
Phone +49 7034 656-0
Fax +49 7034 656-4100
Internet: www.bertrandt.com
E-Mail: info@bertrandt.com

Editorial responsibility:
Anja Schauser

Editorial of this Issue:
Silke Allendörfer, Claudia Conrad-Hofmann, Michaela Frank, Anke Janik, Barbara Kobler, Hartmut Mezger, Joachim Rehberger, Imre Szerdahelyi.

Layout:
Hartmut Mezger
Bertrandt Technikum GmbH

Editorial Office:
Bertrandt AG
Anja Schauser
Birkensee 1
D-71139 Ehningen
Phone +49 7034 656-4037
Fax +49 7034 656-4090
E-Mail:
unternehmenskommunikation@de.bertrandt.com

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