



# Sustainable Outbound Logistics for Worldwide Mobility

Centralization of global outbound logistics at the  
Mercedes-Benz Untertürkheim Plant

Mercedes-Benz



Competition entry for the European Award for Logistics Excellence



View of both halls for  
Mercedes-Benz  
Central Shipping Department  
at Stuttgart harbour.

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# Between Globalization and Individualization

## Logistics in keeping with global automotive production

Mass production of automobiles has changed dramatically since its beginnings at the turn of the 20th Century. Where individual production processes were located close together spatially at the beginning, a continuously widening branched network of suppliers and vehicle plants has developed in the course of division of labour in production. With the evolution stimulus of globalization, automotive production has finally developed into a worldwide network of value-added stages. This development has ultimately defined logistics as a core competency: Its capabilities guarantees linkage of the individual value-added stages to form a global value-added network.

### Influential factors for logistics



### Worldwide Growth

The Mercedes-Benz Untertürkheim Plant has assumed the role of a First Tier supplier in the worldwide Daimler AG production network. Here, at the traditional headquarters of the group, the inventor of the automobile produces assemblies for the vehicle drive train – the so-called Powertrain: engines, transmissions and axles which are shipped from here to motor vehicle plants around the world. The plant therefore not only acts as a First Tier supplier for the company internally but also as a supplier for a series of external customers who install major assemblies from Untertürkheim.

In the course of globalization, its number of customers has increased continuously. This development will continue in the foreseeable future, particularly in emerging markets such as China and India, where the demand for automobiles is increasing continuously and new production facilities are being erected. A further increase in the scope of shipping is therefore pre-programmed. One example of this is shipment of so-called CKD (Completely Knocked Down) assemblies which are disassembled into individual parts and assembled ready for use by the customers, for which an increase of nearly 100 percent in comparison to 2003 is expected by 2008 – a trend which will have to be taken into account by outbound logistics.



Untertürkheim Plant,  
Headquarters of the Daimler Group.



Ecological sustainability starts with development of low-emission and finally emission-free automobiles. However, it also requires outbound logistics to harmonize economical aspects with environmental protection.

### Megatrend Individualization

Today, the individuality of the future owner plays a key role when purchasing a new automobile. Whether passenger car or truck, Mercedes-Benz purchasers expect a vehicle custom-tailored to their personal requirements and desires. A long line of equipment, options and details makes virtually every car unique although it is still necessary to produce it within the scope of a mass production process. Today, for example, final customers can choose between a variety of possible combinations of engines, transmissions and axles systems in the Powertrain sector. The task of outbound logistics is to manage this increasing individualization and ensure smooth production in the motor vehicle plants.

### Economy and Ecology

Construction of automobiles requires consistent and permanent checking and improvement of the cost efficiency within the scope of the overall value-added process – without compromises in the high quality demands placed on Mercedes-Benz vehicles. One integrating factor in the value-added network is the special role of outbound logistics: by optimizing and standardizing processes, advancement of logistic capabilities and implementation of innovative logistic concepts, it contributes to economical performance within the entire production process.

As factors for overall sustainability, economy and ecology are inseparable for the Daimler Group. Continuous peak performance on the global sales markets is possible only by harmonizing economic success and effective environmental protection. Outbound logistics based on ecological sustainability is just as much a part of the corporate responsibility as development of low-emission or finally emission-free automobiles.

### Responsibility and Obligation

In addition to the influential factors described, it is also necessary for outbound logistics to place equal importance on the expectations of various demand groups. Shareholders demand an increase in the value of the Group and of the Brand. Motor vehicle plants and final customers around the world depend on observance of delivery deadlines as well as maximum quality. The public, on the other hand, expects the group – and its outbound logistics sector – to assume the responsibility for the use of valuable resources. Employees appreciate recognition of their work and a secure occupational perspective. And last, but not least, the reputation of the Mercedes-Benz brand places high requirements on fulfilment of its claim of delivering premium quality on all areas.

### Innovation as Tradition

In consideration of this background, the group has decided to completely revamp the Outbound Logistics Department at the Untertürkheim location and base it consistently on economic, socio-economic and ecological values.

With the logistic solutions of the Mercedes-Benz Central Shipping Department at Untertürkheim presented here, the plant is opening up a new chapter connecting the origins and future of the automobile within the sense of its corporate tradition and its deeply rooted pioneering spirit. With this premises, the plant has reconceived and implemented its outbound logistics with the demand for „Sustainable Outbound Logistics for Worldwide Mobility“.



# Between Production and Assembly

The role of global outbound logistics at the Mercedes-Benz Untertürkheim Plant

Regarding the wide range of products at the Untertürkheim plant and the increasing number of its customers around the world it becomes evident how extensive the realignment of outbound logistics has to be.

## Powertrain Production

The development of the Untertürkheim Plant is distinguished by continuously high production quantity: in 2007, a total of 1.02 million engines, 1.35 million transmissions and 1.32 million axle systems were produced in the seven sub-plants distributed in the Neckar Valley. Cast and forged parts such as connecting rods, crankcases and brake discs used in the assembly are produced at the plant.

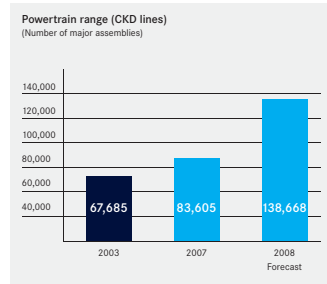
## Powertrain Logistics

All production lines for delivery to international motor vehicle plants and customers are handled by the plant Outbound Logistics Department. In detail, shipping is subdivided into three primary sectors:

The PbP sector (Part by Part) includes preservation, packing and shipment of complete engines, transmissions, axle systems and components. From 2003 to 2007, the number of handling units in this sector has increased by nearly 52 percent from 630,000 to 960,000.

In the CKD sector (Completely Knocked Down), major assembly kits which are to be assembled in the destination country for commercial legal reasons, are preserved, packed and shipped. In 2008, twice as many CKD kits are to be shipped as in 2003, according to present plans.

Finally, replacement parts for worldwide supply are preserved and packed for long storage times in the Parts Department and then sent to the Central Parts Department at the Global Logistics Centre.

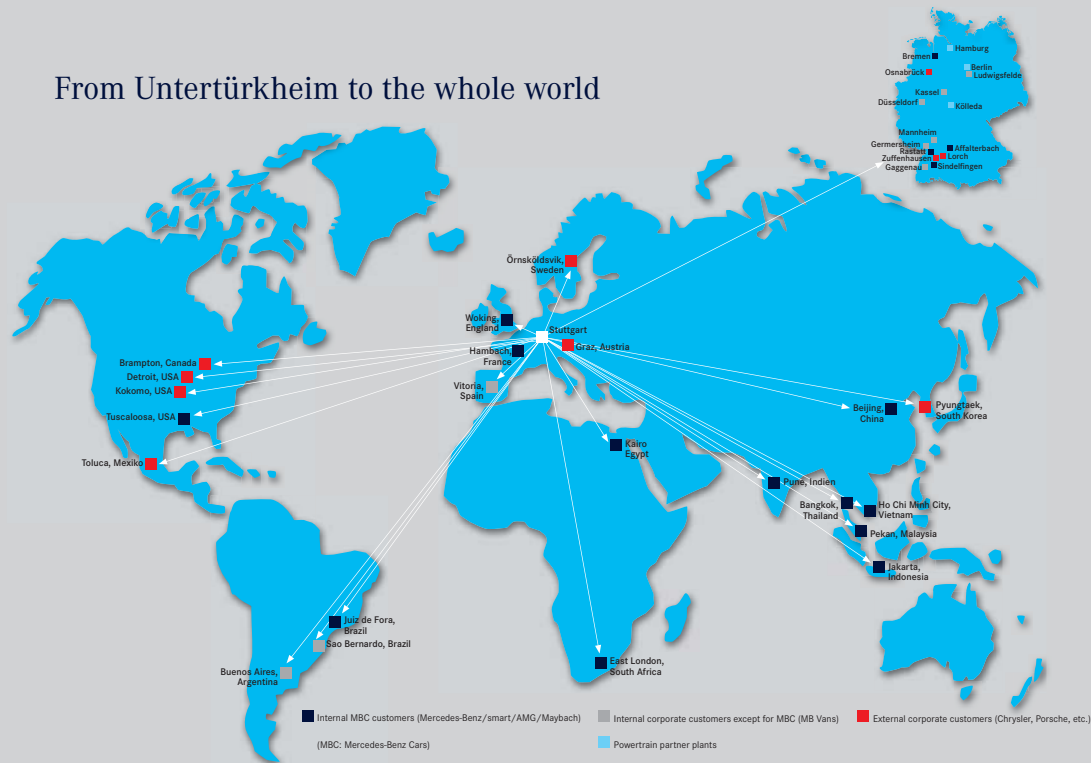


A series of supporting and controlling services are required to fulfil these basic tasks: for example, quality assurance guarantees maintenance of the high Mercedes-Benz quality in outbound logistics. Development of cargo carriers, as well as standard and special packaging ensures optimum protection for the assemblies during shipment and optimization of the container loads for economic shipment. Planning and sale of cargoes as well as export handling and documentation ensure smooth transport procedures. And finally, outbound logistics is also responsible for making up detailed assembly instructions for assembly of the kit delivered at the foreign CKD production and assembly companies.

## Powertrain Customers

In the course of globalization, the customer structure for the Untertürkheim Plant has changed just as have the number of delivery addresses. More customers with increasingly specific desires in more and more countries with increasingly complex freight and shipping regulations confront outbound logistics with continuously increasing challenges - today and in the future: new alignment of outbound logistics at the Untertürkheim Plant requires development of highly flexible and scalable solutions with this background.

# From Untertürkheim to the whole world



# Between Sale Contract and Presentation of Key

The customer determines the processes



The influential factors described for global automotive production as well as the production line and worldwide customer structure form the framework for the complex requirements placed on the Outbound Logistics Department at the Untertürkheim Plant. However, they are always made concrete by the final customers – or more precisely by their orders. These desires decide what is to be produced and where which shipments are required at any given time.

## From Order to Automobile

In 2007, nearly 1.3 million customers worldwide purchased a vehicle from Mercedes-Benz Cars\* – more than ever before in the history of the group. Here, each of them configured an automobile custom made to his personal requirements and preferences from a wide range of model versions, equipment options and details.

Whether in North or South America, Asia or Africa, upon signing the purchase contract, the final customer starts a process cycle within the global Daimler value-added network. Worldwide switches are then set in a widely branched system of suppliers for provision of all components required to produce the vehicle. At the end of this cycle, the customer receives his car where he ordered it – from his dealer.



## Customer Ordering Process

The task of the Outbound Logistics Department at Untertürkheim in this context is to provide the right major assemblies in the correct quantity at the right location at the right time at the right costs and in the right quality. The information and material flow required for this purpose is controlled by the overall logistics at the Untertürkheim Plant in a so-called customer ordering process. The Outbound Logistics Department develops its capacity in close cooperation with the preceding stages of the customer ordering process.

### Program Planning

First all orders are consolidated in program planning and assembly assignment. Time and quantity planning right down to the day is communicated to the production and assembly departments at the assembly plants by using state-of-the-art intranet applications.

### Material Procurement

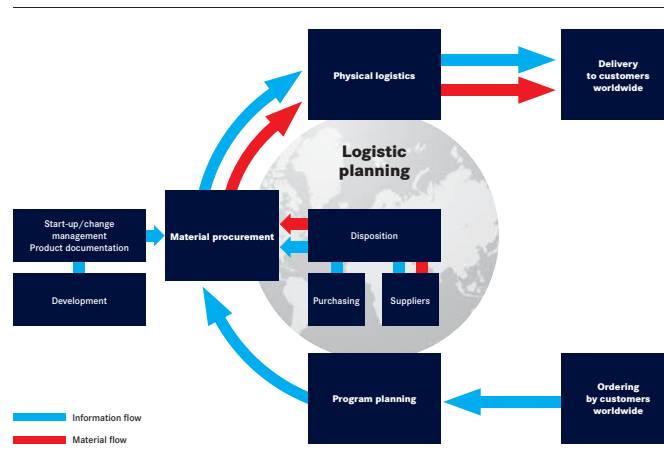
At the same time the Product Documentation and Assignment Planning Department provides its input to the process: It documents all required individual parts for the engines, transmissions and axles and compiles them in parts lists. Here, more than 70,000 part numbers and drawings are updated continuously.

\* Mercedes-Benz Cars includes the corporate brands Mercedes-Benz, smart, AMG and Maybach

Further increasing shipment quantities require optimum design of overall logistics and interfaces.



## Performance Spectrum: Control of Customer Ordering Process



Time and quantity planning as well as parts lists are then forwarded to the Material Planning and Controlling Department for disposition of the parts required for production. The network of external part suppliers is controlled in real time, using the eBusiness platform „Supplier Management Base“.

### Physical Logistics

In production, the material flow control determines the processes: in the Supplier Logistic Centres, the flow of goods is already bundled outside of the plant store. At the plant, the assembly lines are supplied precisely in terms of time, quantity and sequence. An assembly plan broken down to the day guarantees optimum utilization of the production facilities.

From the view point of the vehicle plants and further customers, the decisive part of the customer ordering process then begins with outbound logistics. Its capability secures smooth production around the globe.

Based on new alignment of outbound logistics, this means: integration into the overall logistic concept requires optimum design of the interfaces and permanent advancement of the processes with the objective of increasing shipment quantities with increasing complexity and individualization.

# Complexity Requires Consistency

## Objectives of global outbound logistics

The influence of worldwide automotive production, the role of the plant as First Tier supplier for a continuously increasing number of customers as well as the complex requirements of the customer ordering process form the scenario from which we derive a concrete objective for outbound logistics for the future at the Untertürkheim location.

In their entirety, these targets require a new, consistent mode of thought for outbound logistics, a strategy to satisfy the various dimensions of the scenario described.



Globalization, growth and increasing complexity present new challenges for outbound logistics.

1. Outbound logistics satisfies the high quality demands of the Daimler Group and the Mercedes-Benz brand through the use of comprehensive quality management for the tasks for which it is responsible.
2. It reduces overall costs significantly by consistent utilization of savings potentials in the areas of personnel costs, investment costs and operating costs.
3. It optimizes processes, creates synergic effects and process reliability by full coverage implementation of sturdy and standardized processes.
4. It makes optimum use of the limited areas resulting from the geographic location of the plant.
5. It provides the prerequisites for further growth through scalable, highly flexible solutions.
6. It proves its comprehensive responsibility for the environment through a logistic totally directed to ecological sustainability.
7. It creates for all employees a working climate distinguished by recognition and motivation, even in the face of personnel restructuring, which is accomplished as a matter of principle only after working out socially compatible solutions.
8. It perceptibly contributes to the value added for its customers.
9. It satisfies the innovative force of the group by developing and implementing innovative logistic solutions.



# New Modes of Thought

## Mercedes-Benz Central Shipping Department at Untertürkheim

New modes of thought are manifested by a three-dimensional strategy and its consistent implementation. The basic idea is concentration of all administrative and operative logistics tasks in one central area. Moreover, the strategy integrates tasks going far beyond the conventional understanding of outbound logistics, thereby creating an enhanced competency centre. Finally, it satisfies the socio-economical and ecological requirements with a concept of comprehensive sustainability.

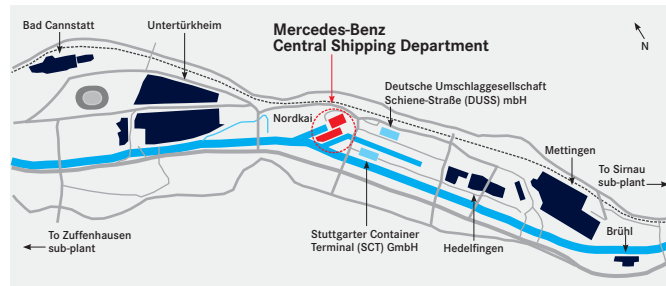
### 1. Strategy of Concentration

The overall project focuses on establishment of the Central Shipping Department in the spatial centre of the seven sub-plants located in the Neckar harbour with its excellent traffic connections. Here, all operative and controlling activities for outbound logistics have been consolidated concentrating the basic competencies at one location. In order to erect the first building complex at the selected site, it was first necessary to fill the harbour basin; for the second construction phase, the removing of tank storage facilities was necessary.

Even during the first planning phase, the cost structure played a decisive role. For this reason, an investor model was selected with which the group had the buildings and logistics areas built by an investor from whom they were then leased for a long period. This allowed the project to be realized with a compact investment volume: the IT and infrastructure in the logistics buildings cost a total of €12 million.

**Bundled competencies – Lean processes**  
Two logistics buildings with a total of 32,000 sq. m. of floor space as well as a cargo carrier store with floor space of 2,000 sq. m. were constructed on a 70,000 sq. m. lot. All global outbound logistics processes for the plant are concentrated within this area.

Optimum location: The Central Shipping Department in the middle of the seven sub-plants.



Optimum utilization of space and space-saving storage.



In 2004, Part-by-Part handling was put into operation in building 1. Complete engines, axles and transmissions as well as components are received, documented, checked, preserved, packed, loaded into containers and shipped to motor vehicle plants around the world.

In December 2007, CKD handling, packing of replacement parts as well as long and short time preservation of parts and parts kits was started in the second building. The work now handled under one roof with short paths previously required a number of buildings and storage rooms with long transport routes in one of the sub-plants. A further effect: the number of preservation stations was reduced from 4 to 2. This reduces maintenance costs, increases process reliability and streamlines processes.

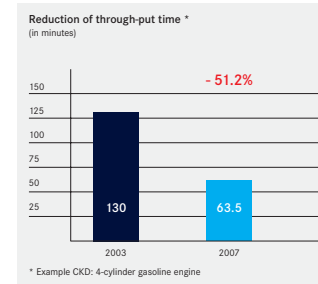
In the second construction phase, parts of national shipments – which were previously located in two different sub-plants – were concentrated. This alone has reduced the transport work in this sector by nearly 40 percent.

In addition to operative shipment handling, logistics control was also consolidated at one location. Streamlined coordination processes, quicker implementation of new processes and efficient solutions for all logistics control tasks going beyond any specific department are the result.

**Transport paths shortened decisively – areas utilized intelligently**

This centralization has perceptibly reduced truck trips between the seven sub-plants spread over a distance of nearly ten kilometres in the Neckar Valley. This reduces the traffic on the narrow valley roads – to the advantage of the residents and the environment.

In the Central Shipping Department itself, the building architecture provides for shorter paths and throughput



times – from delivery, unloading, receipt, testing, preserving, packing, right down to shipping. For example, the routes for the forklifts have been reduced by 63 percent in comparison to the Brühl location. The shorter distances can be managed with fewer forklifts – reducing maintenance and energy costs.

Cargo carriers, packing aids and parts to be shipped are arranged for quick access. This ensures shorter throughput times. Today, a disassembled four-cylinder engine passes through the CKD area in only 63.5 minutes; in 2003 it still took 130 minutes. This means that the logistics throughput times have been reduced by more than fifty percent. The higher productivity reduces costs and accelerates the entire logistics process.

New reliable, cost-optimized information and material flow processes were developed, implemented and documented centrally.

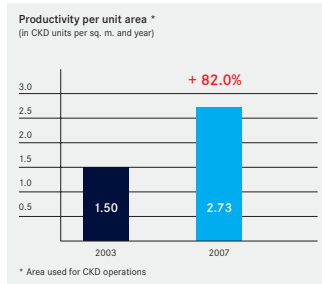


High-shelf storage facilities with five levels each for packing aids and large CKD parts as well as 7.5 meters high Paternoster shelves and storage towers for a total of 4,570 CKD small cargo carriers utilize the height of the buildings making full use of storage space. This allowed reduction of the CKD small parts storage facilities from 670 sq. m. (2003) to approx. 220 sq. m. today – an area reduction of 67 percent.

By saving space and simultaneously increasing quantities, it was possible to improve the productivity per-unit area by 82 percent compared to 2003. Considering the predicted growth in CKD business, the Central Shipping Department has made provisions for handling increasing quantities for shipment.

A further aspect of intelligent use of available areas: free areas in the thickly populated Neckar Valley are capital for growth and are urgently required. Centralization of the Logistics Department at Untertürkheim has provided for such areas at the remaining sub-plants which can now be used for production, etc. Particularly the sub-plant in Brühl profits from this. Here, nearly 17,500 sq. m. were free for other purposes by centralization of the CKD and parts facilities.

**Sequences standardized - robust processes implemented**  
At the bottom line the purpose of centralization was to re-define and standardize all processes, create synergic effects and eliminate redundancy. Reliable, cost-optimized information and material flow processes were developed, implemented and centrally documented in the Central Shipping Department along the entire process chain. This creates the necessary prerequisites for developing defined operative logistics processes using external service providers.



The potential present in standardization of processes is demonstrated by shipment of major assemblies for the Mercedes-Benz M class produced in Tuscaloosa (USA): up to the end of 2003, the major assemblies were preserved at the sub-plant in Plochingen, repacked in overseas cargo carriers and transported to Bremerhaven by truck. Here, they were packed in containers. This entire process has been redefined by standardization of the procedures for overseas shipment:

Today, the principle of „Full Container Load“ applies for PbP handling (complete major assemblies and parts): preservation, packing and making full use of the containers' capacities is accomplished at the Central Shipping Department. It was possible to significantly reduce the work required for handling as well as the costs while significantly increasing the process reliability. The PbP section will continue to profit from this standardization, because the process is designed to allow changes in the program thus ensuring efficient management of new tasks.



## 2. Strategy of Integration

Reducing outbound logistics to simply fulfilling pure transport tasks would be insufficient for the Central Shipping Department. It also includes further assignments which generate perceptible benefit and additional value for the „added value network of automobile construction“. The advantage of centralization applies equally for integration of these tasks, because it allows utilization of previously unavailable synergic effects.

### Retention of value by preservation

Usually, preservation of major assemblies and parts kits is associated with production. This work has been moved out of the various sub-plants and consolidated at the Central Shipping Department. Preservation is a measure for retaining the value in the true sense of the word and its central handling opens up new possibilities for quality assurance and cost reduction.

Centralization allows, for example, economic use of robots. Previously it was necessary to immerse or spray parts and then turn them by hand to allow excess wax to drip off. This work-intensive process has been made superfluous by modern robot facilities leading to a significant increase in productivity with simultaneous reduction of the personnel required:



The quantity of parts preserved increased by nearly 33 percent from 488,462 parts (2003) to 648,466 (2007). The personnel required were reduced by one quarter in a socially-compatible manner, thereby increasing the personnel productivity by 77 percent.

### Reliability through comprehensive quality management Prevention

In the course of preventative quality management, the quality engineers for the Powertrain plants continuously exchange information and data with the Central Shipping Department. If the engineers at a plant detect a deviation in quality, they report it immediately to the Central Shipping Department. This ensures that shipment of the part in question can be stopped within sufficient time. Meaning: production-related quality deviations do not affect customers.

### Auditing of overall process chain

Quality interruptions are counteracted within the outbound logistics process with an innovation known as PDCA control circuit (Plan Do Check Act). Continuous auditing of parts and packages was introduced along the entire shipping process chain. It covers the reception of goods from production, packing, loading, shipping and finally the reception of the delivery at the customer's site.

\* Poka Yoke: prevention of inadvertent errors

Centralization also allows economical use of robots. The advantages: optimum quality assurance, significant increase in productivity and considerable costs reduction.

This auditing begins by identifying the parts using sample comparison or based on photographic documentation. Then the parts are weighed to determine the quantity. As a final step they are packaged with maximum dimensional accuracy using the Poka Yoke principle\*. This process is supplemented by photographic documentation during loading as well as supervision of the parts and packages along the shipping route by means of data loggers. The PDCA control circuit allows the entire process to be closely supervised at all times. Auditing results are continuously fed back to improve all sub-processes. Customers benefit from a minimum quota of transport-related defects achieving a high degree of production reliability.

### Quality testing at customers\*

The responsibility of the Central Shipment Department for the quality of its work also covers subsequent processing at the customers'. Employees of the Central Shipping Department regularly check random samples to ensure that major assemblies and parts delivered have not been damaged during transport. Packaging, preservation and the condition of the component are examined in detail, the results flow directly into permanent optimization of the central shipping logistics processes within the scope of the continuous improvement process. For customers this again means higher production reliability.

Cargo carriers and transport packaging developed on site contribute to increasing utilization of transport capacity, reduce costs and increase process reliability for customers.



The central location in the Neckar harbour in Stuttgart with direct connection to the network of rails and roads is the key to implementation of a futuristic trimodal transport concept.



### CKD services

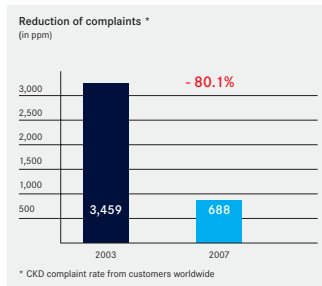
The CKD business is distinguished by high growth rates at the Untertürkheim Plant. In order to fulfil the Mercedes-Benz Quality standard at all times and at every location, the Central Shipping Department provides illustrated CKD assembly instructions via intranet for each kit. Experts are available immediately at all times to answer any questions from the CKD plants.

The Central Shipping Department has also established new methods for service quality with its S.W.I.M. program. Using the motto „Shortest Way for Information and Material“ it provides consulting services on assembly questions for the CKD plants as the central contact partner. Additionally it provides support for new production programs from assembly tests up to start of production and secures production in foreign CKD plants through quick supply in the event of any delivery deviations.

With these services the Central Shipping Department ensures smooth production in the worldwide CKD plants, minimizes delays in vehicle assembly and thereby contributes to keeping promised delivery deadlines.

### Result

Preventative and permanent quality assurance and process optimization as well as introduction of comprehensive service has led to significant reduction in the complaints in CKD business. In 2003, 3,459 complaints were received on one million parts delivered. In 2007, the figure was only 688 – a reduction of 80.1 percent.



### Packaging development

In the course of centralization, the packaging development sector was also integrated as a functional area in the Central Shipping Department. Here, the personnel focus on optimization of existing as well as development of new cargo carriers and transport packaging. Two objectives are to increase transport capacities and maximize the compaction factor for return transport as empty goods. The following examples also show that costs were reduced and the process reliability for customers increased:

A newly developed standard cargo carrier accepts engines of different types and sizes, thereby allowing use for various models.

Plastic capsules for shipment of transmissions are not only decisively lighter than metal racks, they can be compacted much better when empty so that they require only half as much space. This significantly reduces costs for return transport.

Transport of axles also requires the best possible use of capacities. Here as well, a newly developed, more compact cargo carrier makes it possible to ship approximately 7,800 axles in one container instead of the previous number of 4,320 axles.

The Packing Development Department incorporates the requirements of the worldwide vehicle plants and other customers of the Untertürkheim Plant: employees from the

Central Shipping Department travel to customers where they determine the specific requirement to develop custom solutions within short time. Production of standard packaging is then outsourced to other companies with binding specifications. On the other hand, cargo carriers and packaging for special orders are produced in-house. Central determination of requirements, central development and central production contribute to reliability of the production processes at the vehicle plants.

### Reputation for reliable worldwide supply of replacement parts

Mercedes-Benz also satisfies the expectations of its customers by ensuring that genuine replacement parts for vehicles purchased today remain available in the long term. The parts requirement for 20 years is therefore planned in the current production of models.

The purpose of the Central Shipping Department is to supply the central parts warehouse, the GLC (Global Logistics Centre) in Gernersheim as required.

After delivery from production, the parts are preserved for long-term storage, packed and delivered according to request, on the precise day. Process optimization has improved utilization of the truck transport capacities to GLC from 72 to 98 percent; centralization has increased the productivity in the packaging sector by 41 percent in comparison to 2003.

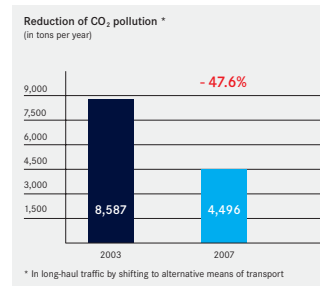
### 3. Strategy of Multidimensional Sustainability

Finally, the third sub-strategy focuses on alignment of the Central Shipping Department to the ecological and socio-economic challenges of the future. Here, the concept of centralization also shows its strength by allowing solutions which would not have been possible with decentralized division of the labour and spatial separation.

### Global thinking – trimodal shipment

One of the significant criteria for deciding in favour of the location was the possibility of handling the anticipated increasing quantities for shipment in an ecologically responsible manner. From the very beginning, focus was on the possibility of access to all types of transport. The central location at the Neckar harbour in Stuttgart with direct connection to the network of rails and roads is the key to a sustainable trimodal transport concept. Rail, road or water? The best means of transport in terms of logistics, economics and ecology can now be chosen as the case requires.

The proximity to the Stuttgart container train station and Stuttgart Container Terminal (SCT) at the harbour allows more intensive utilization of rail and inland waterway transport. In comparison to 2003 when remote transport was exclusively handled by truck, the carbon dioxide emissions were reduced by 4,091 tons in 2007. This corresponds to a reduction of the CO<sub>2</sub> emissions by nearly 48 percent.



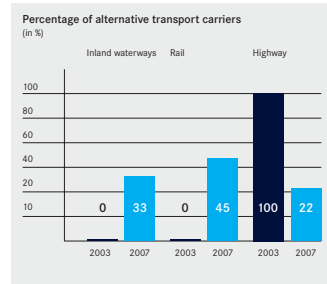
With intensive renaturalization measures, the significant reduction of solvents as well as reusable, environmentally-compatible packaging, the Mercedes-Benz Central Shipping Department fulfils its responsibility for ecological sustainability.



Road traffic has been reduced by 2.9 million kilometres per year. Currently, 78 percent of the international transport volume is handled by rail and water.

With the present quota of 33/45/22 percent (water/rail/road), the Daimler Group utilizes the sustainability potential of the available means of transport in international traffic to a high degree. Annually, road transport has been reduced by nearly 2.9 million kilometres – to the relief of humans and the environment.

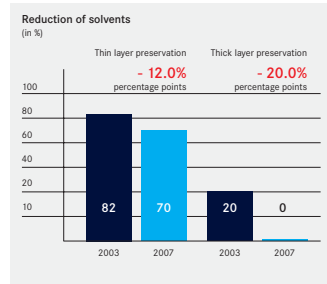
With its trimodal traffic concept, the Central Shipping Department also satisfies the requirements of the Daimler Group for comprehensive, ecological sustainability relating to the development of new low emission and finally emission-



free drive systems as well as the layout of all production and logistics processes.

#### Compensation for nature

Following the principle of ecological sustainability, extensive renaturalization concepts have been worked out and realized. For example, to compensate for filling in a part of the harbour basin, an old arm of the river Neckar has been returned to its original, natural state. On the grounds of the Central Shipping Department itself, there are now two natural ponds as well as a near-natural dry meadow. In the meantime, a wide



variety of natural plants have returned. The two buildings' roofs have resulted in the largest contiguous green covered roof in the larger Stuttgart area. This area of 32,000 sq. m. was renaturalized by airborne seeds.

A gabion wall, a supporting wall filled with gravel from the river Neckar, has been erected along the two logistics buildings on the Neckar side. The river bank, which was sealed to date, now offers a habitat for a variety of insects and small animals. The natural zone around and on top of the Central Shipping Department covers more than half of its entire area.

#### Solvents reduced decisively

The use of solvents was reduced significantly in thick layer preservation, from 20 percent in 2003 to zero percent in 2007; for thin-layer preservation, the reduction rate was from 82 to 70 percent. In order to completely avoid wax or oil preservation, VCI foils (Vapour Corrosion Inhibitor) are being used increasingly. After transport, these foils can simply be removed and be disposed of as common domestic waste due to their composition. The advantage: washing off the thick-layer preservation at the vehicle plant has become obsolete, thus minimizing the waste of resources and further reducing the use of solvents.

#### Optimizing packaging and cargo carriers for greater environmental protection

The strategy of economical and ecological sustainability also applies for the use and development of packaging and cargo carriers. Selection of the materials is influenced by the environmental compatibility and reusability in addition to economic factors. The Central Shipping Department obligates manufacturers of packaging to submit a recycling plan for all materials used.

Reusable cargo carriers which can hold a variety of product versions are used wherever practical under logistical and ecological aspects. Today, their quota in Part-by-Part shipment is 80 percent. Where use of reusable cargo carriers is not practical ecologically or logistically, for example for CKD shipment, one-way packaging is used, which is either recyclable or disposable in an ecological manner.

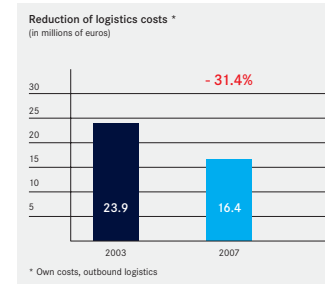
#### Socio-economic aspects:

##### Cooperation instead of outsourcing

As a rule, the question of socio-economical sustainability involves contrary interests: Competition requires reduction of costs in the personnel sector – however, this is not in the interest of the employees themselves. The Central Shipping Department has also found an innovative solution to this problem:

In order to reduce personnel costs, a flexible cooperation model was developed, which separates the controlling and operative tasks: controlling logistics tasks such as

coordination with vehicle plants, material disposition and coordination of the delivery processes, shipment handling and development of packaging, export customs handling, purchasing of freights, handling of special requirements as well as quality assurance remain within the responsibility of Mercedes-Benz staff. The operative logistics handling, by contrast, is outsourced to external service providers using a bidding procedure. This effectively eliminates dependency on a single service provider, while allowing orders to be placed with other service providers as required, in order to optimize



costs or counteract any quality deviations. In this manner, the Central Shipping Department maintains complete control of the logistics quality, costs and performance at all times and in all cases. Implementation of this cooperation model reduces operating and personnel costs by at least 30 percent – depending on the type of work outsourced – without having to dismiss one single employee. This restructuring was laid out in a socially-compatible manner on the one hand through natural fluctuation and, on the other, by offering qualified Mercedes-Benz employees the opportunity to take over controlling logistics responsibilities.

#### 4. Consistency is Worthwhile: Investments and Profitability

In addition to the questions of process reliability, quality and sustainability, it is equally necessary to examine the profitability of the project. Reorientation and restructuring in the magnitude described requires substantial investments. Three years after start-up, the Central Shipping Department made up a balance sheet: logistics costs have been reduced from € 23.9 million (2003) to € 16.4 million (2007), a decrease of 31.4 percent. The predicted cost advantage of centralization is more than clear with savings amounting to nearly € 7.5 million per year. This means that the investment volume of approx. € 12 million was amortized in less than two years.

# Facts in Focus

## Summary

### Initial Situation

As First Tier supplier, the Mercedes-Benz Plant at Untertürkheim supplies internal and external corporate customers around the world with engines, transmissions and axles. Production and outbound logistics in the „automotive production value-added network“ are subject to a series of influential factors: first, the demand in worldwide sales markets is increasing continuously. Due to globalization of the markets, the number of customers is also increasing continuously and will continue to increase. And finally, further increase in customization of automobiles is resulting in new challenges for production and logistics.

Conclusion: outbound logistics is gaining increasing significance as an integrating factor for the various value added stages in automobile production.

### Ramifications

In consideration of this background, the group has decided to comprehensively realign its objectives, stringently based on economic, ecological and socio-economical objectives:

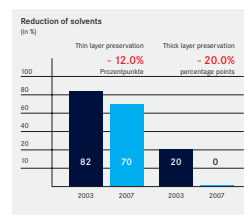
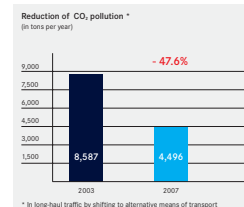
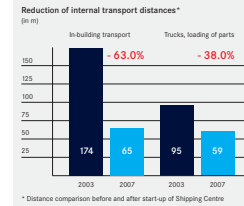
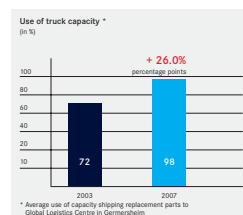
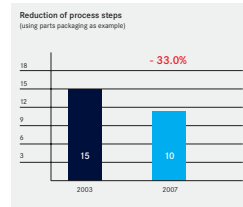
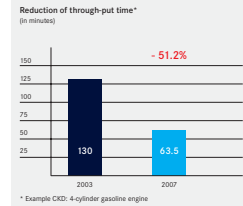
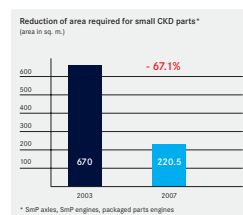
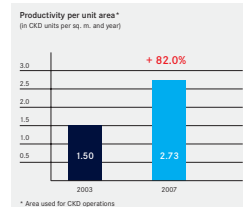
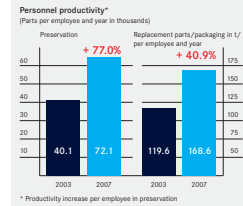
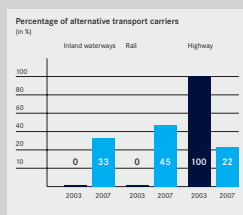
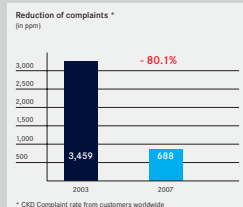
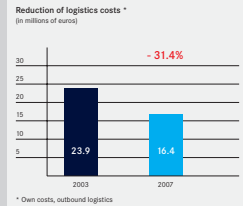
- Standardization and streamlining of logistics processes
- High production delivery reliability
- Reduction of logistics costs
- Increase of logistics quality
- Alignment with high quality demands of the Daimler Group and the Mercedes-Benz brand
- Responsibility for the environment and employees

### Strategy

A three-dimensional strategy was derived from the defined objectives. Its basic ideas included:

- Concentration: bundling of all administrative and operative logistics tasks in one central shipping department
- Integration: implementation of an expanded competency centre for outbound logistics
- Sustainability: development and implementation of exemplary ecological and socio-economic solutions

The following figures summarize successful implementation of this strategy.



# Perspectives

The future of logistics at the Untertürkheim Plant



With the Mercedes-Benz Central Shipping Department, the Untertürkheim Plant has successfully implemented the vision of concentrating global outbound logistics. The plant is consistently continuing along this path and consolidating further logistics areas with the objective of standardizing processes, reducing costs and implementing flexible solutions, which support the requirements for sustainability and premium quality.

## Concentration, Standardization, Optimization

Mid and long-term planning provides for application of the principle of consistent bundling for inbound logistics as well. Concentration of the controlling and operative logistics tasks will also provide a high potential for savings and standardization in this area.

In another important area of logistics, this work has already progressed further. Presently, new construction of a Central Container Management Facility is in progress in Oberesslingen. Here, all processes for handling reusable cargo carriers will be bundled, as of the beginning of 2009.



According to the model of the Central Shipping Department, cost efficient transfer of defined tasks to external service providers will be possible through standardization of the processes, while the controlling tasks remain with the company. Finally, it will be possible to create more pool storage facilities in the Neckar area through new construction on valuable free areas. Both projects - as well as the Central Shipping Department - are based on the best possible ecological and socio-economical sustainability.

**100 years after invention of the automobile by Gottlieb Daimler and Carl Benz, the idea of custom „Auto-Mobility“ has not lost any of its fascination. Social changes and globalization require sustainable mobility.**

**Through consistent implementation of innovative concepts, the Logistics Department at Untertürkheim Plant contributes to the world of tomorrow which, on the one hand, must satisfy the increasing requirements for mobility while simultaneously ensuring a humane and environmentally compatible development.**

# Credits

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