



CADENAS PARTsolutions

Strategic Parts Management at
MAN Truck & Bus AG



The Parts World of MAN Truck & Bus AG

Overview of Cooperation with CADENAS

A Strong Partnership for the Future

Since the beginning of 2009, MAN Truck & Bus AG has been implementing CADENAS' strategic parts management system PARTsolutions. It is PARTsolutions' goal to simplify the finding, reducing and managing of CAD parts in companies and thus reduce costs in the longrun.

Studies claim that about 70% of manipulable total product costs can be traced back to planning in the development phase. CADENAS' strategic parts management with the geometric similarity search is already used in the construction phase and is used primarily in engineering at MAN.

MAN Truck & Bus AG is the largest enterprise of MAN Group and one of the leading international commercial vehicle manufacturers for trucks and buses. About 270,000 parts (according to the status of 2010) pertain to the entire part stock of MAN Truck & Bus, of which each article number generates around 3,000 to 4,000 EUR per year.

Overview of Part Stock at MAN Truck & Bus AG

- 115,000 – MAN own parts
- 113,000 – Same and repeated parts (MAN goods classification)
- 40,000 – MAN standard parts (MAN goods classification)
- 30 of the current 400 CADENAS supplier catalogs are used actively

Initial Situation at MAN Truck & Bus AG

- The prior MAN parts management PartsMan did not contain the complete parts coverage of MAN Truck & Bus.
- A number of different systems for managing part data were consulted. There were almost no interfaces between these.
- Not all locations had access to the same systems.
- The prior solution could not be implemented with different CAD systems.
- A high-performance supply of the previous software solution to all locations was not possible.



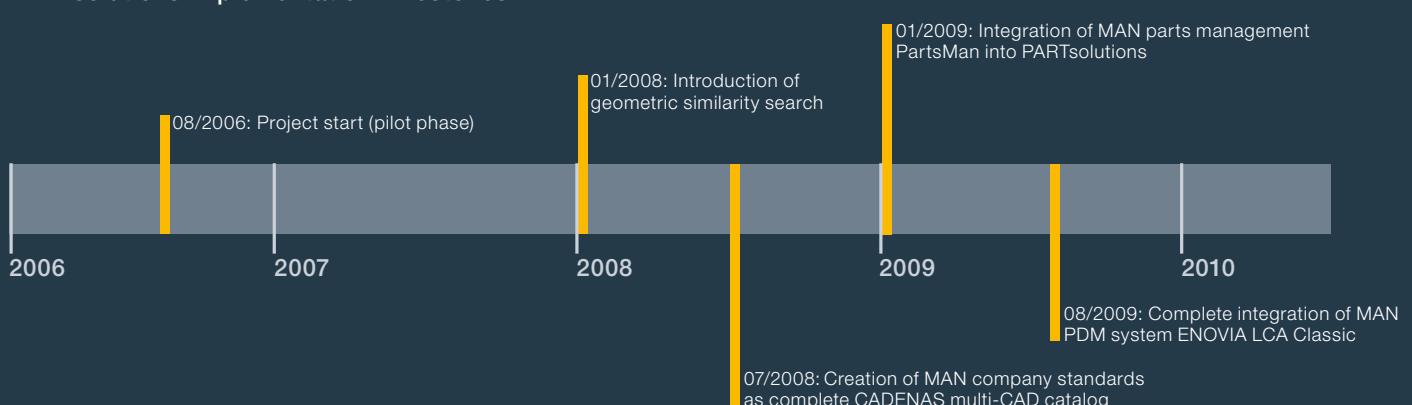
Philip Kraus
Technical Project
Management at
MAN Truck & Bus AG

"First of all, PARTsolutions offers us the opportunity to find all single parts including complex geometries in all locations and from all systems. Thanks to the scalable architecture, PARTsolutions can be globally implemented at more and more workstations at MAN without a problem."

CADENAS' software PARTsolutions serves as the central and corporation-wide solution for managing the complete MAN parts master and is currently being used at about **1,300 workstations** worldwide.



PARTsolutions Implementation Milestones



Seamless Integration of PARTsolutions

Direct Access to Other MAN Part Information Sources

The seamless integration into existing software environments of MAN Truck & Bus AG delivers non-redundant data storage and helps further consolidate the parts stock:

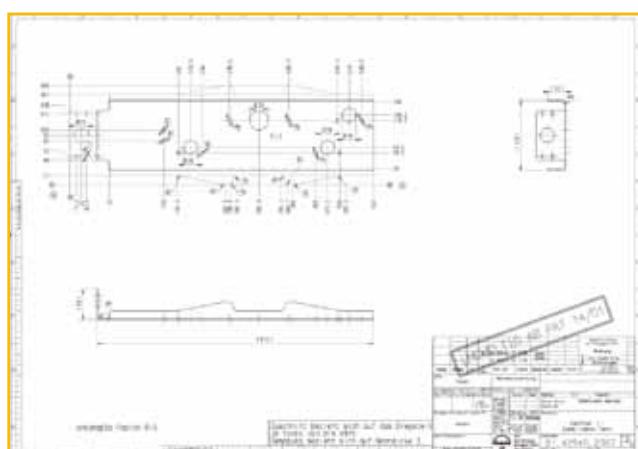


Johannes Kern
Technical Project
Management at
CADENAS GmbH

PARTsolutions was integrated in the following systems at MAN.
Here is an excerpt of the most important integrations:

- CAD systems: CATIA V4 and V5, Autodesk Inventor
- PDM systems: ENOVIA LCA und CATIA V4 VPM (amongst other things, all parts which receive the status "constructive release" will be transferred to PARTsolutions daily)
- Master technical data information system (German: SADIS) (MAN-own ERP system as mainframe application)
- Electronic sketching information system (German: EZIS)

"The integration of the numerous MAN administration systems into CADENAS PARTsolutions was carried out step-by-step. The following connection of the web-based electronic sketching information system for example, was possible without a problem thanks to a successful overall architecture."



EZIS (the electronic sketching information system) is the electronic archive for the technical documents of MAN Truck & Bus AG. It is a web-based application, which can only be reached through PARTsolutions. This enables a simpler access to all released 2D sketches and standard documents.

Automated Classification

PARTsolutions Simplifies the Internal Classification Process at MAN

MAN Truck & Bus standardization department profits greatly from PARTsolutions due to the fact that many internal processes of classification become automated thanks to the CADENAS software.

- The existing MAN goods classification and the MAN functional group classification were completely integrated into PARTsolutions.
 - For all MAN corporate and company standards, PARTsolutions offers an automatic geometry generator for all CAD systems with high attention to detail.
 - The application for article numbers for standard parts is stored as a workflow in PARTsolutions.
 - The standardization department reaches the goal of high data consistency with more evaluations and reports.

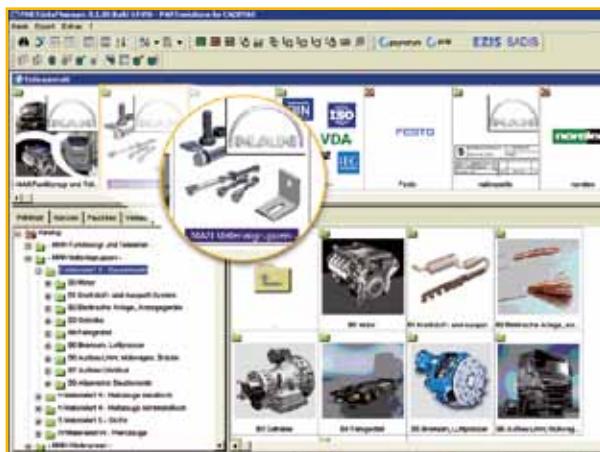
The Standardization Department ESS at MAN Truck & Bus AG:

For more than 30 years, MAN standardization department has been providing classifications and attributes. The decades of experience in standardization guarantee high-quality data as well as a target-oriented structure.

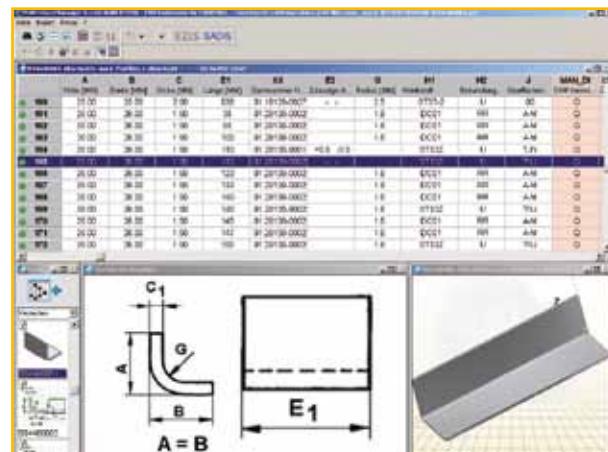


Frank Jürgens
Manager Standardization
Department ESS at
MAN Truck & Bus AG

“The consequent use of the parts management system PARTsolutions already enforces the reduction of part selection in the early stage of development.”



MAN goods classification is integrated with largely intuitive images such as a “normal” CADENAS supplier or standard parts catalog.



The goods classification chapter contains all MAN classification tables including a 3D preview.

Enhancement of Conventional Search Methods

PARTsolutions Simplifies the Finding of Parts

Great importance is still attached to the conventional form of classification when searching for parts at MAN. However, not all parts can be classified textually, since these are often too complex or very specific. A comprehensive classification is therefore

almost unfeasible. At this point, the strategic parts management system by CADENAS comes into focus: PARTsolutions completes the existing possibilities in the search for parts, while simultaneously offering MAN numerous new functions.

The particular combination of the different search functions offers engineers and purchasers more freedom and significantly increases the retrievability of MAN parts.

Search with the help of classifications:

Conventional:

- Aside from personal knowledge through long term experience, hierarchical classifications traditionally belong to the methods of enterprise knowledge management.
- Tool classifications are especially convincing in part areas which can be easily grouped, classified and acquired.

New:

- With PARTsolutions, classification data for MAN own parts can automatically be taken from the CAD geometries.
- For standard classifications concerning MAN standard and supplier parts, PARTsolutions offers "pre-classified" content from which standardization profits significantly.

Search in catalogs:

Conventional:

- Thumbing through paper catalogs in search for the fitting part in supplier catalogs is very time-consuming.

New:

- PARTsolutions offers more than 400 electronic product catalogs from well-known manufacturers thus expanding the conventional paper catalog search.
- With PARTsolutions engineers are able to "thumb through" MAN's own parts using the arrow keys, as well as receive 3D previews. This is also possible with unclassified parts (functional groups).

Search with help of the Geometric Similarity Search:

New:

- With PARTsolutions, all search results can continue to be refined. Thus a sort of "iterative" search method is made available in which the conventional search functions are expanded upon through the search for similar parts with the help of geometry. In this way, unclassified parts or parts not able to be classified may be found as well.
- In order to avoid duplicates, with the help of a 3D geometry it is possible to check whether a part already exists at MAN in the CAD system during the construction phase. This also cancels out the need for specifying textual attributes. An additional check before part release is possible.
- The geometric similarity search can also take place with a simple 2D sketch without a CAD system when using PARTsolutions version 9. This additional search function will be implemented at MAN in the future.



Alexander Reuter
IT Department Head,
CAx Applications,
Methods & Infrastructure
at MAN Truck & Bus AG

"PARTsolutions is an inherent part of the global MAN PLM strategy and offers our engineering departments innovative opportunities in order to be able to work globally, efficiently and successfully."



Stefan Riedelsheimer
Standardization and Catalog
Creation at CADENAS GmbH

"For years, the standardization department at CADENAS has been actively contributing to the cross-market implementation of classification systems in the standardization and catalog areas. We "standardizers" have also quickly realized that the geometric similarity search needs to be an essential element in parts management."



Paradigm Shift in Search of Parts

PARTsolutions' Geometric Similarity Search

The similarity search completes classification.

The geometric similarity search is a technological paradigm shift for finding and comparing CAD parts.

It is the goal of the geometric similarity search, to find similar or equal CAD parts in an unlimited parts master through an intuitive user interface. With its innovative and trendsetting search methods, the search enables the internal processes of MAN Truck & Bus to be further optimized and contributes to the overall product innovations of MAN.

Advantages of the Geometric Similarity Search:

- A user-friendly operation system simplifies the finding of parts.
- No textual entries necessary to carry out search.
- A construction assistant enables automatic result suggestions.
- Saves time and costs.



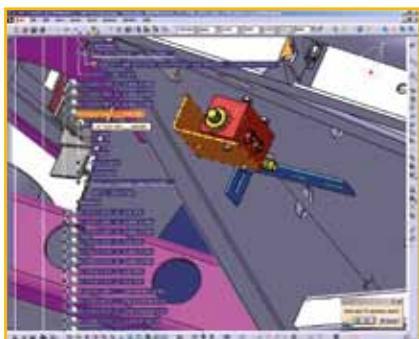
Search Directly Within the Design

Advantages of the Geometric Similarity Search for Engineering

For several years, PARTsolutions has been enjoying a high degree of acceptance, especially in engineering. The geometrical similarity search is the consistent amelioration of the PARTsolutions functional range.

The simple search functions promote the willingness of engineers to search for existing parts and thus significantly increases the reuse of MAN parts.

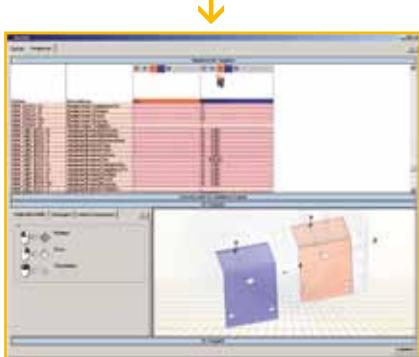
Example:



In the respective CAD system, a part is created, whose 3D geometry is consulted for the search.



In PARTsolutions, the users are shown a list of all results of the geometric similarity search with the respective percent value of geometrical conformity.



The geometrically similar part that was found can then be compared and measured with the constructed part in a 3D view.



Lutz Ginsberg

Director of
Development City
Bus at MAN Truck &
Bus AG

"Engineering is enthralled by the new search methods that PARTsolutions offers. Especially the combination of classification and pure geometric similarity is a big hit. The fast and complete 3D preview has become indispensable."

Advantages at a glance:

All important search functions for design and construction are summarized in CADENAS' strategic parts management system.

Resulting in:

- A higher willingness to search for and research parts
- Increased use of standard and supplier parts
- Minimal training needed

All Important Parts Information at a Glance

The Combination of the Search for Attributes and Geometries

Through the combination of conventional databases with the geometric similarity search, all available 3D CAD parts at MAN Truck & Bus AG could, for the first time ever, be found and reused using different textual and

geometric attributes. In addition, PARTsolutions offers "pre-classified" content from a number of electronic CAD catalogs that are created and pre-classified by CADENAS as well as manufacturers. In combination with

MAN parts information from the different administrative systems, this database creates a unique knowledge pool that can be used across the entire group.

PARTsolutions Search Database				
Data comes from different information sources.	V4, V5 archive (file-based)	Dassault ENOVIA LCA	V5 special catalog (ca. 1000 MAN sketch stickers)	SADIS
Dassault V4 VPM	CADENAS standard data (pre-classified content)	MAN company standards	Manufacturer/supplier data (pre-classified content)	Classification data of the standardization department ESS



PARTsolutions



CATIA

All information relevant for part selection in MAN part stock, as well as pre-classified catalogs from CADENAS, are pulled into the search and displayed on one interface.



Summary and Prospect

The PARTsolutions Project at MAN Truck & Bus

Improvements through PARTsolutions:

- The parts management system integrates all MAN parts from different part information sources and supports all current CAD systems.
- Access to part information, especially from worldwide MAN locations is possible.
- Research and search possibilities according to specific parts were optimized and considerably simplified.
- MAN's internal processes were optimized across all departments.



Jürgen Heimbach
CEO, CADENAS GmbH

"MAN Truck & Bus has offered us some good ideas for improvement concerning details for coming versions. As a very customer-oriented company, we appreciate all suggestions and are looking forward to a long and positive partnership."

Other planned project steps:

- Release management: The new version 9 offers many important functionalities, such as for example searching based on a 2D sketch without a CAD system.
- Supplier integration: Suppliers and MAN partners will be connected to the parts management system.
- Expansion of number of workstations: More MAN departments wish to gain access to PARTsolutions, among them the architecture department, variant management, and the MAN subsidiary in Brazil.



Stefan Bernhardt
Chief Department Manager
IT Engineering at
MAN Truck & Bus AG

"We see the project that implemented PARTsolutions as a great success. We have gained many new functionalities that have fundamentally simplified and improved a number of processes at MAN Truck & Bus."

Printed in Germany
Text and images non-binding.
Subject to change based on technical progress.

MAN Truck & Bus AG

P.O. Box 50 06 20

D-80976 Munich

www.man-mn.com

A member of the MAN Group

CADENAS Technologies AG

Berliner Allee 28 b + c

D-86153 Augsburg

www.cadenas.co.uk