

Solid Edge • Teamcenter Express • Femap

## Benalu

Optimizing aluminum vehicle bodies

### Industry

Automotive and transportation

### Business challenges

Create vehicles that transport the maximum weight allowed

Reduce vehicle weight while meeting client needs

Meet contractual commitments for vehicle delivery

### Keys to success

3D design created with Solid Edge

Fast access to design information using Teamcenter Express

Design optimization performed with Femap

JT data format

### Results

Existing data easily retrieved for re-use

Designers are freed up to do design work

Finite element analysis work moved in-house; more parts are optimized

Design information available immediately throughout the company



**A design process built on Solid Edge, Femap and Teamcenter Express helps Europe's leading manufacturer of all-aluminum truck bodies maintain its number-one position**

### 7,600 tons of aluminum

Benalu is a leading European manufacturer of aluminum bulk cargo transport vehicles. The first company to introduce an industrial vehicle made with aluminum, Benalu today is renowned for its exceptional knowledge and creativity in the area of reducing vehicle weight. Benalu has also

successfully developed a business providing spares and repairs. Positioned in a market that fluctuates from one year to the next, this company of more than 300 people earns more than 30 percent of its revenue from exports. It produces 2,000 to 2,200 vehicles during the course of an average year, with a recent high of nearly 3,000 units.

A pioneering company since it was founded in 1967, Benalu is the result of a union of a financier and an engineer, Dominique Bonduelle and Hubert Pora respectively, who joined forces at a time when they saw aluminum largely used for manufacturing saucepans and airplanes.

**“Benalu is now turning toward Solid Edge with synchronous technology, which permits design in a more flexible way.”**

Bertrand Sibile  
Purchasing Director  
Benalu

Bonduelle and Pore felt that it was possible to create a lucrative business with aluminum transport vehicles. They expected aluminum vehicles to be significantly more expensive than similar models made of steel, but much lighter in weight and requiring a different design to maximize the transport payload. They were right.

Today, continuing its founders' vision, Benalu uses 7,600 tons of aluminum per year, producing primarily the chassis and bodies of transport vehicles. The company is supplied with axles, wheels, hydraulic cylinders (indispensable for the balancing of the body on its chassis), components (braking equipment) and accessories (for signaling) that the company puts together to make semitrailers of 7 to 13.5 meters in length, with a usable volume in the body hull of 20 to 90 cubic meters. Benalu also has a presence in Sweden, where the mega-lorry, otherwise known as the European Modular System (EMS) is allowed. Since these are not subject to weight limits imposed in France, long-length lorries may be up to 25.25 meters long and weigh up to 60 tons.

Beyond its primary domains (solid bulk cargo transport), Benalu uses its knowledge for the storage of non-processed and non-liquid products, such as building products (sand, gravel), agricultural products (cereals, beets) and industrial products (coke, scrap, powders, residues, various waste). Benalu also makes containers and mobile hulls for use with multimodal transport, particularly the carriage of scrap railway stock, as well as hulls for chassis-cabs.

#### **CAD must support customization**

All the Benalu vehicles are made to order, designed according to either the type of load transported, the demands of a client or region, or the regulations of a particular country. “The customized portion of a vehicle is approximately 35 to 40 percent,” says Bertrand Sibile, purchasing director at Benalu who is also in charge of the



technical order processing department, and sales administration.

To develop these products, five people work in the Benalu design office, along with five others working in technical order processing. The latter are in charge of the customization work for the clients' orders. “The design office sets out the main principles, which will become the vehicle of tomorrow,” says Sibile. “Then, when the orders arrive in sales administration, they are sent to the technical order processing department, where the plans for adaptation are made, as are all design plans for completely custom vehicles.”

Benalu has been using computer-aided design (CAD) software since 1987 to develop its vehicles. “In the beginning, we were working with a 2D system, and then later we moved to a 3D system that was more powerful, but considered obsolete. It didn't have the means to leverage our existing data, meaning that all the work undertaken during the course of the previous ten years was going to be lost,” Sibile recalls. “Furthermore, the IT (information technology) architecture was beginning to age, while the price of workstations was dropping. In summary, we had to react and change!”

The search for a modern product lifecycle management (PLM) solution, and one that was able to leverage data created previously, moved the company squarely in favor of Solid Edge® software from Siemens PLM Software. “The only real

solution that was offered to us came from a reseller exclusively dedicated to the Siemens Industry Software solutions. They demonstrated to us that Solid Edge was the solution to our problems," says Sibile. The reseller also proposed recovering the historical CAD data as part of a package deal. "In doing this, we recovered 200 gigabytes of data from our old CAD system, which enabled us to re-use that information effectively."

After a short training period (six days), the designers who were used to working with the old CAD system had no difficulty moving to Solid Edge with synchronous technology. Even the novices easily learned Solid Edge. Everyone soon understood that what they created on the screen was strictly reflected in reality, as if they had created it in modeling clay. The use of synchronous technology reinforced their positive perception of the virtual world.

#### **Optimizing designs with Femap**

Solid Edge was implemented for the 3D design of new products, as well as for the retrieval of existing designs for products in the standard series. The elements that are modeled are validated via structural analysis, which is now being performed internally to a much greater extent through the use of the Siemens PLM Software's Femap™ software. Femap is also used to mesh the CAD models.

The linear stress analysis isn't carried out on a complete vehicle, but on the parts of the vehicle for which boundary conditions and other specifications are known. "This allows us to iterate internally with the aim of exploring and pre-validating the part, thus optimizing it a way that that we could not do when analysis was performed by an external provider," says Sibile.

In the Benalu factory, aluminum sheets are cut, profiles are produced, and assemblies are welded. Production is flexible, whatever the series, with production runs varying from a single vehicle to 100 vehicles. The company may produce up to 100 of some vehicles, without any options or variants, in a year. Ten vehicles ordered by the same client is considered a large series.

#### **Better information management**

In the past, the technical order processing staff had to edit the drawings for each individual vehicle. Today, all data relating to a Benalu vehicle is archived under its order number in Teamcenter Express software, also from Siemens PLM Software. Teamcenter Express is both easy to use and deploy.

When the clerk in the manufacturing workshop needs to edit elements or reprint a plan, Teamcenter Express comes into play. The clerk can either enter the order number for the vehicle or search by key word or attribute, and then edit the desired PDF documents directly, without having to ask the order processing department for the files. Not having to respond to this type of request, the order processing department can use its time more effectively – designing and adapting the vehicles to the needs of the clients.

Similarly, the purchasing department no longer has to call upon the design office to obtain the documents it needs. It can access Teamcenter Express directly and be assured that it will receive the correct version. Design office data is available throughout the factory, immediately,

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Bertrand Sibile  
Purchasing Director  
Benalu



## Solutions/Services

Solid Edge  
[www.siemens.com/solidedge](http://www.siemens.com/solidedge)

Teamcenter Express  
[www.siemens.com/plm/teamcenterexpress](http://www.siemens.com/plm/teamcenterexpress)

Femap  
[www.siemens.com/plm/femap](http://www.siemens.com/plm/femap)  
JT  
[www.siemens.com/plmcomponents](http://www.siemens.com/plmcomponents)

## Customer's primary business

Benalu is the leading European manufacturer of all-aluminum vehicles.  
[www.benalu.com](http://www.benalu.com)

## Customer location

Liévin  
France

extending the benefit of this solution across the company and throughout the entire product lifecycle.

People who do not have access to CAD software view design models in the JT™ data format. Siemens PLM Software's JT data format is an open and widely used technology for 3D visualization, collaboration and data sharing in today's PLM environments. "The JT format is used internally in every department wishing to view the data in 3D," explains Sibile. "This format also allows us to share 3D presentations with partners, prospects, and clients, without them needing direct access the CAD server."

Sibile continues, "We have recently started to use software that allows sales administration to create proposals. From there, clients' specifications are uploaded directly into Teamcenter Express."

With Solid Edge, Teamcenter Express and Femap, Benalu is remaining true to its motto of providing "a hundred models... plus yours." The comprehensive product lifecycle management technologies from Siemens PLM Software is putting Benalu well out in front of competition in the arena of customized aluminum body design.



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