

The change in markets and the globalisation of the footwear industry over the last two decades has left its mark in all industrial environments. Product ranges and choices increased as the market changed from being producer driven to customer driven. As a consequence, all manufacturing companies have had to change both their product and organisational structures.

A modern manufacturing philosophy

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Within the last few years, the basic conditions for all producing industrial areas have changed enormously. The process is dynamic and is going faster and faster towards the future. Anybody who wants to go with this development has to be dynamic and react to changes very quickly. This metamorphosis has become a basic for survival. If a company wants to grow in such a tough situation, it has to seek special niches or be more innovative than others, and perhaps itself define the trends of tomorrow.

Desma has changed from a special machine manufacturer to a technological leader and the newly defined guidelines point to a bright future. Selected strategic steps have been decided upon to guide the company on this new roadmap and the following are some examples of the new philosophy.

Product development

The focus of product development is on customer requirements combined with environmental constraints such as special laws and standards.

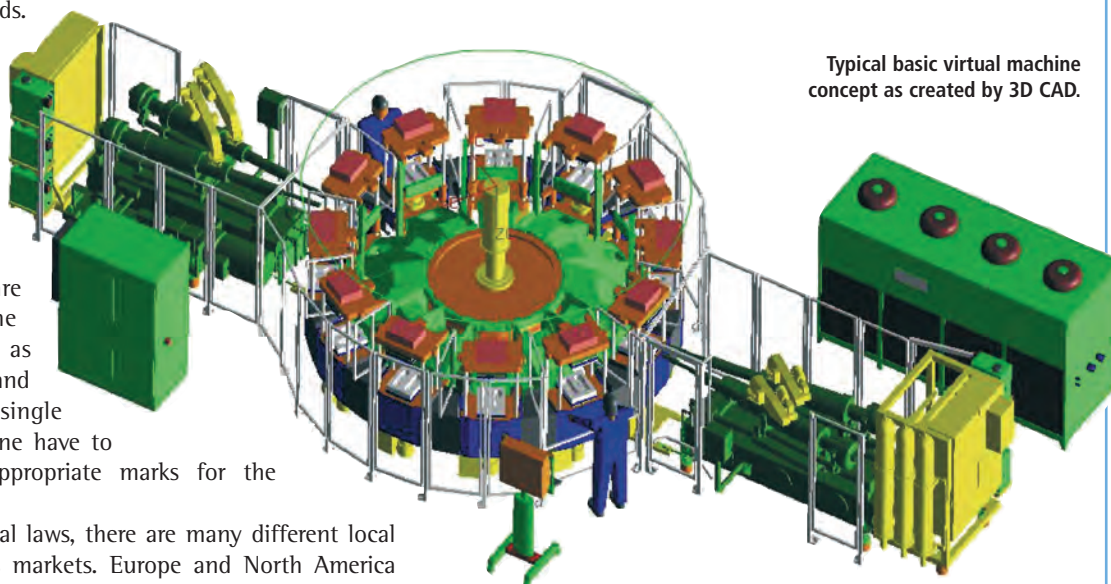
For all machines operated within the European Community the CE mark has to be taken into account. These standards are oriented on the safety of all equipment used. Additionally, there are different marks in the global market such as UL for North America and CCC for China. All single components in a machine have to be signed with the appropriate marks for the different markets.

In addition to technical laws, there are many different local restraints in the world's markets. Europe and North America

have a short history in regard to development laws to protect nature and the environment. The common sense of these regulations is beyond question and directs us in a special way towards different actions and principles in our daily work. Examples of worldwide environmental protocols are those of Montreal and Kyoto.

The Desma design team is developing engineering solutions providing the lowest possible energy consumption over the whole product life cycle. This is really one of the most important considerations that the user of the machine has to calculate within his production investment costs over the lifetime of the product. If this is done in an objective way, both the economic and ecological arguments are moving in a positive direction.

A comparison of machines for producing the same product reveals an astonishing difference. A comparable machine can be twice the weight of the Desma machine. The key to this lies in the intelligence applied to design.➤



Typical basic virtual machine concept as created by 3D CAD.

WORLD FOOTWEAR

Design

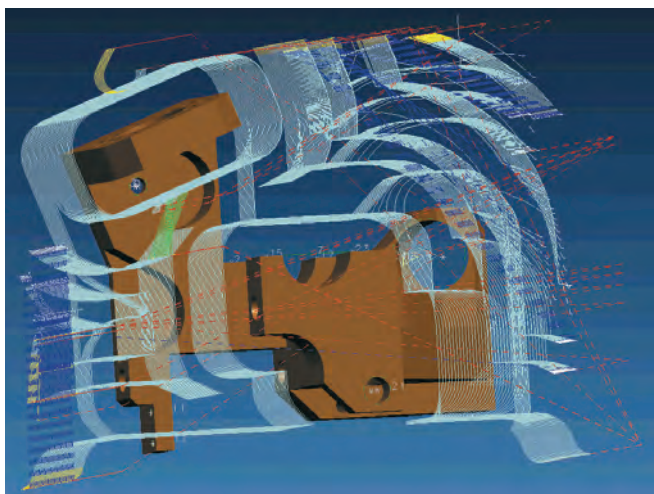
The design department is driven by technological and economic factors. Taken together it results in really intelligent designs created with the most modern tools for the task. Desma has spent over sixteen years developing special CAD systems to process complex designs in the right way and in the right time. For seven years, it has used a 3D CAD-System for the design of all machines so that a virtual machine can be built and virtually tested through the computer before it is physically built.

This system helps the company to create products to fit exactly into the new philosophy.

These tools also allow us to integrate real intelligence into single components and assemblies. The use of FEM (finite element method) offers the possibility of reducing part structures to the necessary design parameters. All boundary conditions are defined mathematically and the computer calculates the stress within each single part. The result is an image with the different regions of stress and acting forces shown in different colours. An additional iteration is done by optimising the design in areas where the stress is too large and making a secondary calculation.

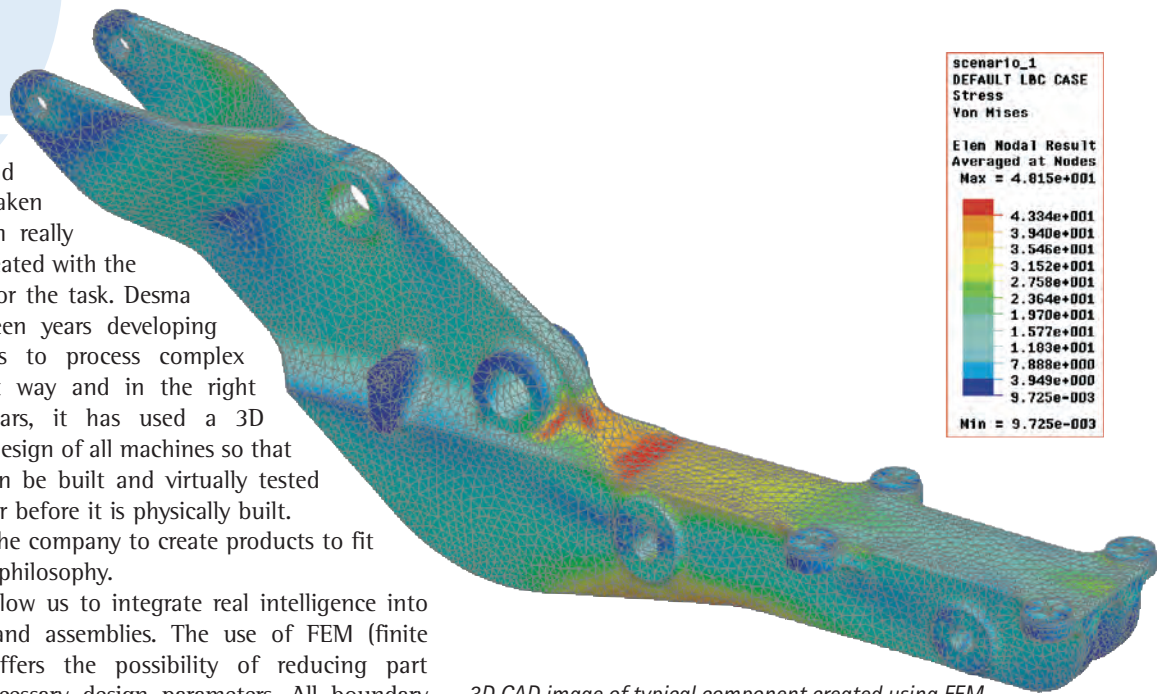
As a further step, different ways of automating this process called structure optimisation are being evaluated. The principle is to go direct from the defined forces to the "computer designed part". This principle is not new as it has happened daily in nature for millions of years with the growing of trees. The basics are the same and both are based on the laws of mathematics and physics. The transfer across to a technical application is called Bionic.

The result of all these techniques is lighter machines, consuming less constructional material and less energy, which will directly influence product lifecycle costs. It also leads to further positive environmental aspects as less energy consumed means lower gas emissions at power generating plants.



NC milling paths of a part machined completely in a single sequence.

MANAGEMENT



3D CAD image of typical component created using FEM.

Production

The company carries out all production itself in a modern machine shop and using high technology equipment for the flexible manufacture of all key parts. This gives it the possibility of short delivery times and, more especially, the know-how to manufacture the parts in house. This helps the overall equation through less work on each part.

Five-axis milling machines are used to produce a component from a single piece of material where it would previously have been prefabricated from separate sections. The big advantage is once again the increased quality of the parts as they do not need to be dismantled and re-fastened to the machine table, but can be machined in a single sequence.

Another advantage in having one's own production ability is the experience gained in all the different methods of machining. If this feeling in the design department is lost, the design will not be created in the optimised way, opening the possibility of faults such as poor quality, low reliability, wasted energy and, most importantly, lower consumer satisfaction. Production in Europe can be done only with a high grade of automation and this is why Desma has invested heavily in the most modern equipment for the production of main machine parts. Automation has the potential to make Europe strong and competitive.

Knowledge transfer

Desma is located in the north of Germany where some of the world's high technology products are developed and manufactured: sections for the Airbus A380, the Ariane's booster rockets, silent submarines, the fast Transrapid and many others. The company is liaising with the development offices of these high tech producers in order to transfer some of their experience to the industrial manufacture of footwear. This combined with a highly motivated team of engineers and technicians will give it the possibility to be a world leader in our markets.