

## **Why simulate?**

Reference: Aberdeen group; simulation driven design; Benchmark report

*“Getting it right the first time”: Test virtually!!!!*

### **How does it work?**

A development route consists of several stages. It starts with an idea and knowledge of the product. Before one can start with serial production different design stages have to be executed: concept generation, testing, prototypes, zero serial (production process).

Eventually the aim of every product is satisfying the determined performance criteria. A artificial turf must perform like a natural turf pitch, a pump must pump with a certain life span and a machine must have a certain accuracy.

The real performance appears if the product (partly) has been made.

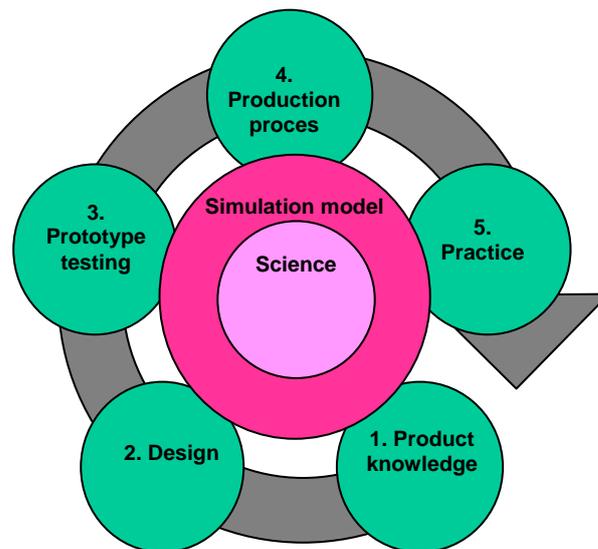
What if the developed product does not fulfill the predetermined performance criteria? The design process starts all over again until the desired goals are reached. During this process a lot of trial and error has to be done because you do not exactly know what to change to obtain the desired performance. Often, due to lack of time, money or knowledge you must stop and accept a suboptimal design!

This whole process can be done more rapidly, cheaper and with better results!

## How?

REDEN is able to build a virtual model of your product. Using this virtual model we can carry out most of the tests which otherwise must be done on your physical products. As a result of this in the early design stage you will already know if your product fulfills to the desired performance!

If during the virtual tests a product does not satisfy the desired performance simply by changing the relevant parameters the performance will change. This virtual testing can be done for only a fraction of the cost of real live testing. Using our virtual modeling approach we know exactly which design parameters will have influence on the performance and which modifications therefore will be most effective!



### **What can we test virtually?**

- Movements
- Distortions
- Stiffness and strength
- Friction
- Impact
- Dynamic behavior
- Exactitude
- Ultrasounds/Eigen frequencies
- Life span
- crack increase
- To warm up/cool down
- Flow
- Magnetism
- Seismic influences
- production steps
- Et cetera

Types of material behavior that we take into account during modeling::

- Large distortions/not linear behavior (material and geometry)
- Velocity dependent / viscous-elastic behavior
- History dependent/plastic distortion
- Exotic material/composite structures
- Failure behavior and failure mechanism

### **What means all this for the designer?**

Using our virtual products we can make influences of design parameters on the performance transparent. Because of this we can make clear how sensitive the performance is with the variance of design parameters. And we can stipulate within which borders a parameter must lie in order to get the specified performance with a large degree of robustness (6 Sigma). Also influences of production can be taken along!

### **Ergo**

Virtual testing will give you insight in the relation between performance and design parameters. This will give you the ability to make significant decisions concerning the feasibility of certain concepts already at the design stage. As a result, you need less test models and prototypes, you achieve a solid knowledge base and the design process of your products will dramatically improve.