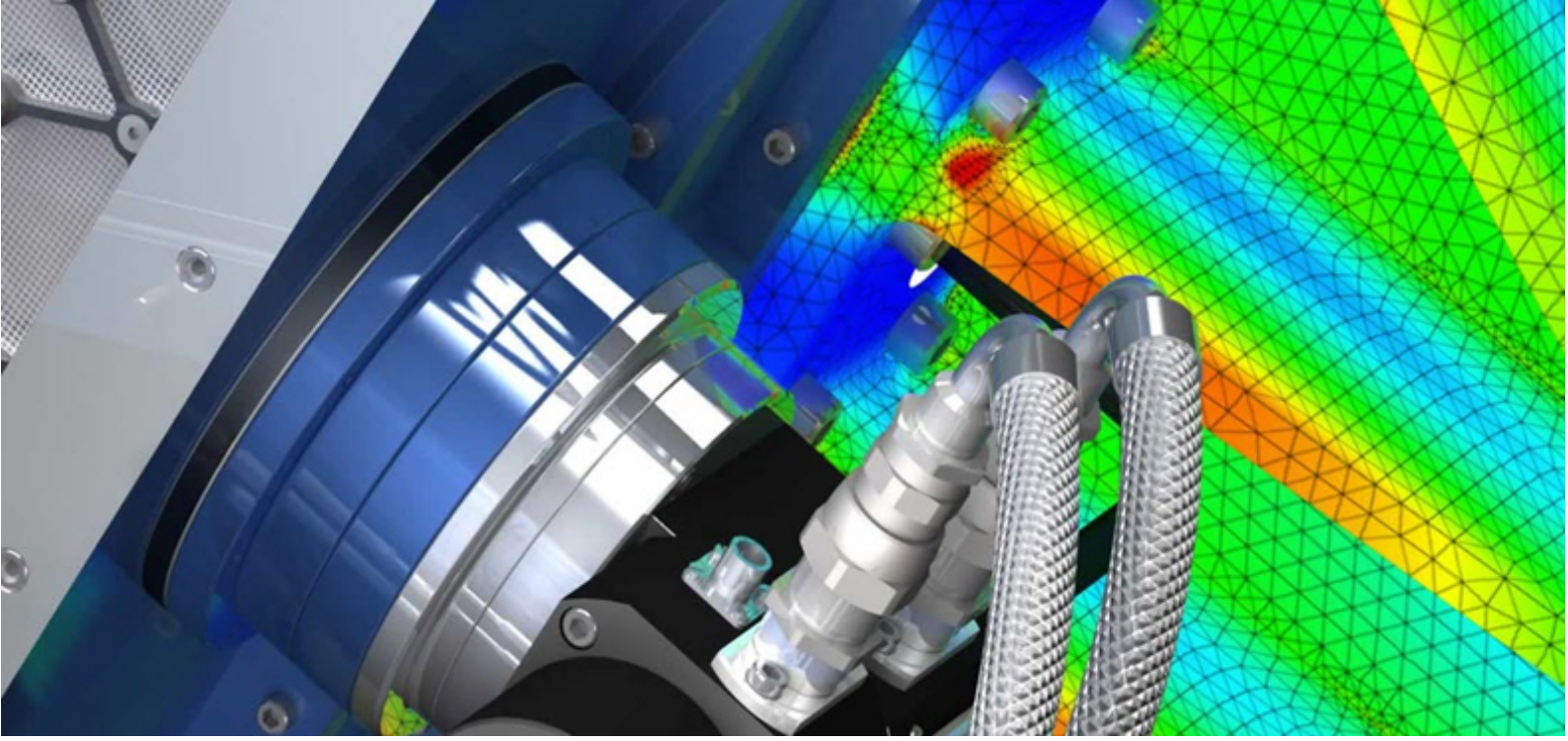
WHITE PAPER

How to Design your Products more Effectively with Simulation

SOLIDXPERTS
by solidxperience



Introduction

Nowadays, you're likely overwhelmed at work and would enjoy the presence of an extra virtual assistant. Whether you need solutions for finite element, finite volume, or any number of other analyses, the right tools enable you to realize your project designs and validations much more efficiently. You'll be able to speed up the creation of simulation studies, test designs, and move from simple functional product concepts to optimized designs.

This white paper will cover the essentials of different solutions that allow you to create and validate your designs more quickly.

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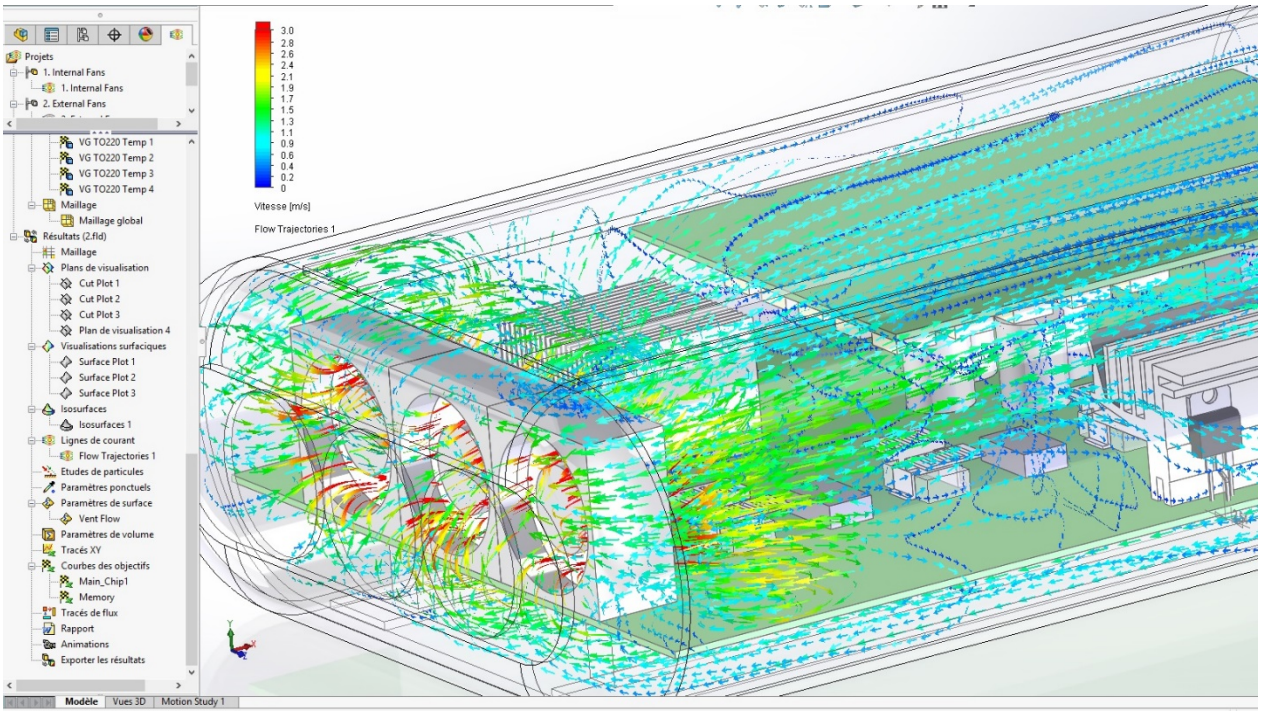
Expensive Design Validation

Prototyping to perform a physical test is a classic and useful method to validate a design. However, some designs may take more iterations than others and could result in loss of time and increased costs. Solving this issue means finding a more effective way to evaluate designs since generally, time allotted to the design phase is limited. So why not try testing virtually?

Several solutions offered by **SolidXperts** will allow you to validate your designs even faster. It all depends on the need or the problem in question.
All our simulation solutions communicate bidirectionally with **SOLIDWORKS**. So there is no need to worry if changes are made in **SOLIDWORKS**.

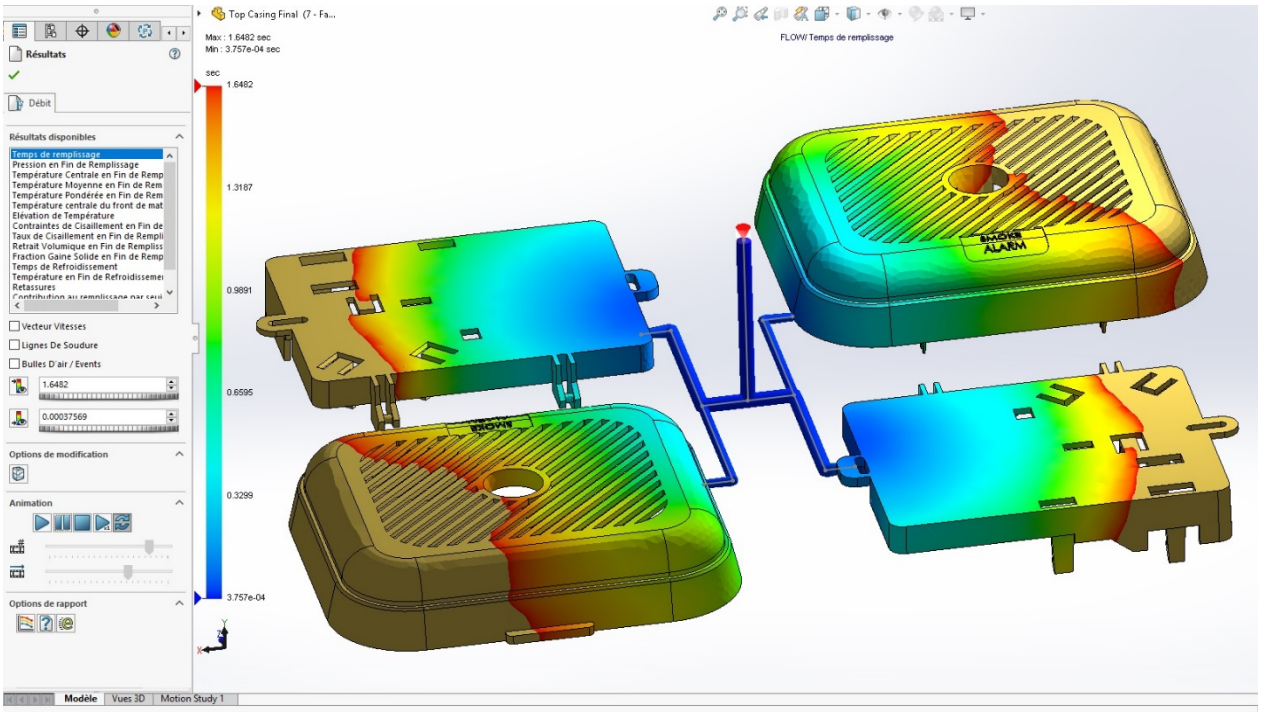
The following image shows an example of what can be accomplished using a thermo-fluidic study in **Flow Simulation**.



Here, a simple analysis is done to study the air flow and temperature of the components in this electronic box. Using varying design settings and options (the position of the fans, the shape of the heat sink, other parameters) we can make an informed conclusion on design choices based on performance, achievement of objectives, possible problems with air circulation, etc.

Simulation Productivity Tools

There are several tools available that speed up validation procedures, to ensure that designs are compliant. Many of these tools are directly related to design. For example, here is a plastic injection molding analysis.



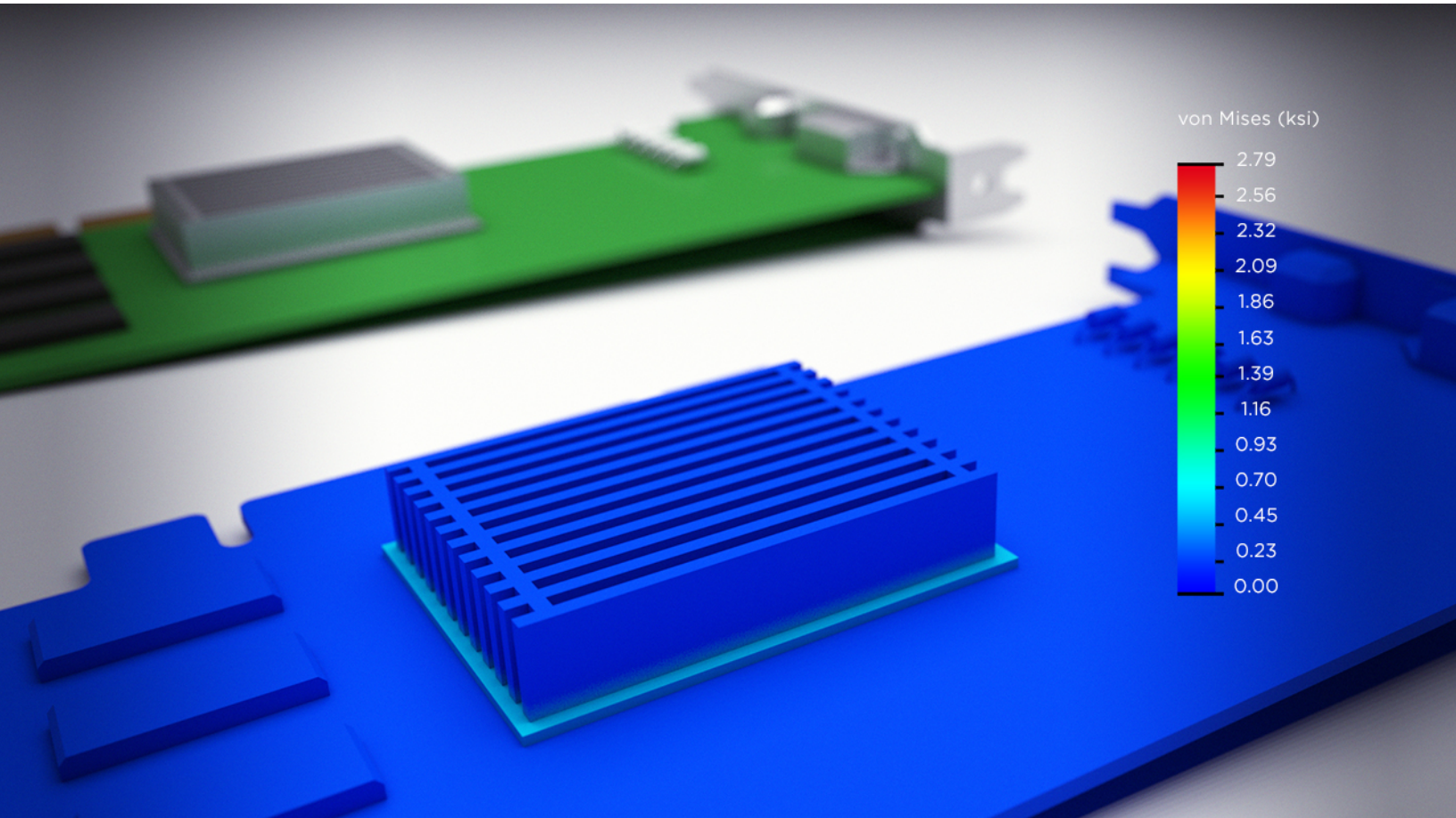
In the picture above, we can see how the polymer is filled in a family mold. The uniformity of the flow in the four cavities can be improved thanks to a channel balancing tool. Channel design can be done automatically by **SOLIDWORKS Plastics** to reduce cycle time and to avoid problems with the parts produced by uneven injection concentration.

If welding is an important element in the mechanical design of a structure, it is possible to calculate the required sizes at the weld seams in order to meet, for example, safety factor criteria.

If you do not have enough time to find SN curves for fatigue analysis or mechanical properties, you can also access online material databases, from **SOLIDWORKS** or their partners, to shorten your search time and to obtain material data applicable to your parts and analyzes.

For designs that involve heat transfer, electronics or buildings for example, there are tools to represent electronic parts that greatly simplify the steps in creating the analysis. Even construct result plots for building 'comfort' that accelerates the interpretation of analysis results. A more enriched library of electronic and building data is also available and ready to use.

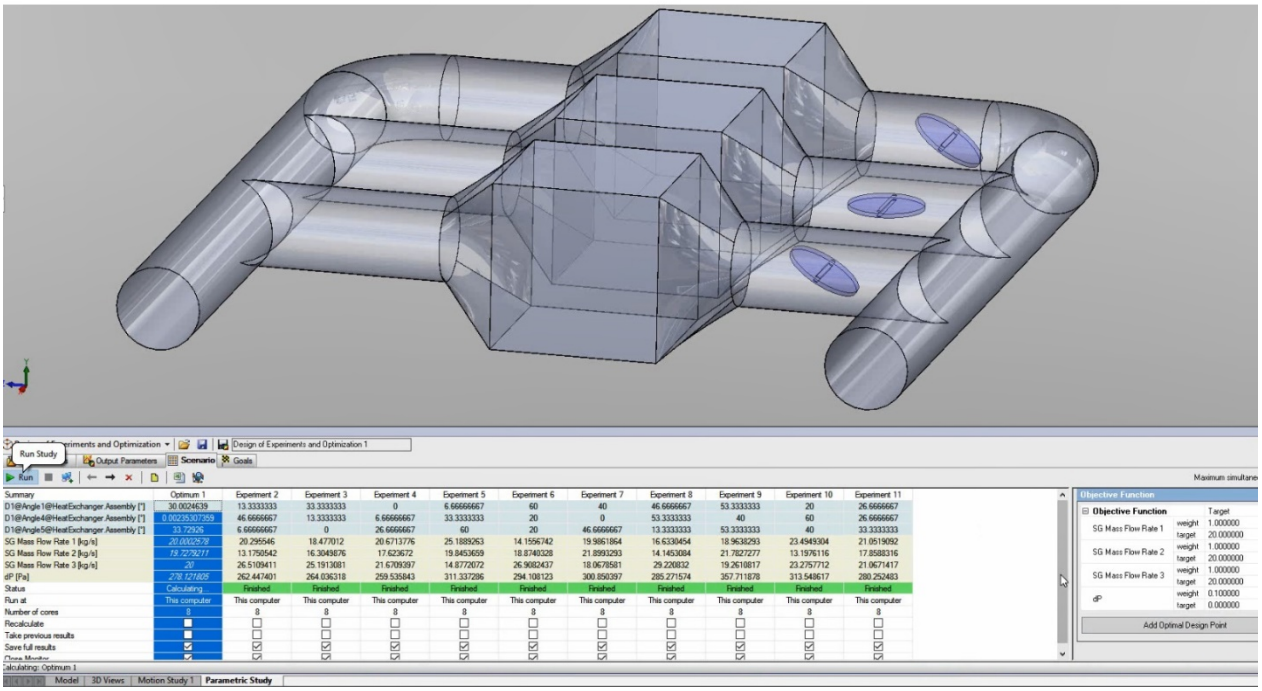
Several other productivity tools are available to help you validate your designs, which is an essential step in guiding your manufacturing decisions.



Design Optimization

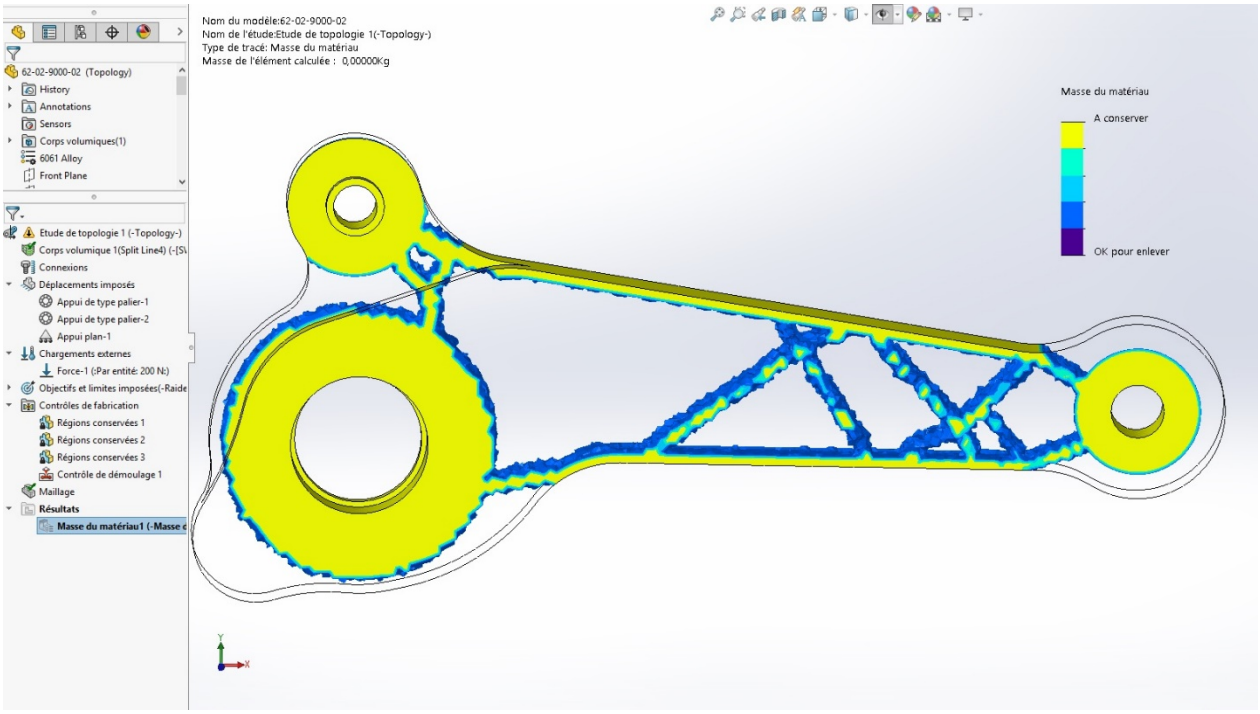
Finally, we have many tools to achieve better design elements, but how do we get the best of everything? There are several methods, but the most effective is 'optimization'.

First, we must control the parameters associated with dimensions (thickness, length, diameter, distance, number of repetitions, etc.). It is possible to use a table to determine several solutions and automatically find the best options based on pre-set criteria like safety factors, stress results, a specific pressure differential, etc., all aiming at predetermined objectives (to reduce the mass of a component, for example). The following image shows a case where a designer questions the proper angular position of certain parts to achieve precise goals.



Knowing that the flow rate of the fluid passage in each pipe depends on the angular position of the blue cylindrical parts in the image, we are able to find the optimal angles in order to achieve targeted values of mass flow, as well as differential pressure. **Flow Simulation** has therefore changed the parameters associated with the angle values until the objectives were obtained.

Another method is a topology study, which allows you to obtain a geometry of an optimal design meeting the criteria, to minimize the mass for example, but at the same time makes sure the part can be physically manufactured, based on common manufacturing methods.



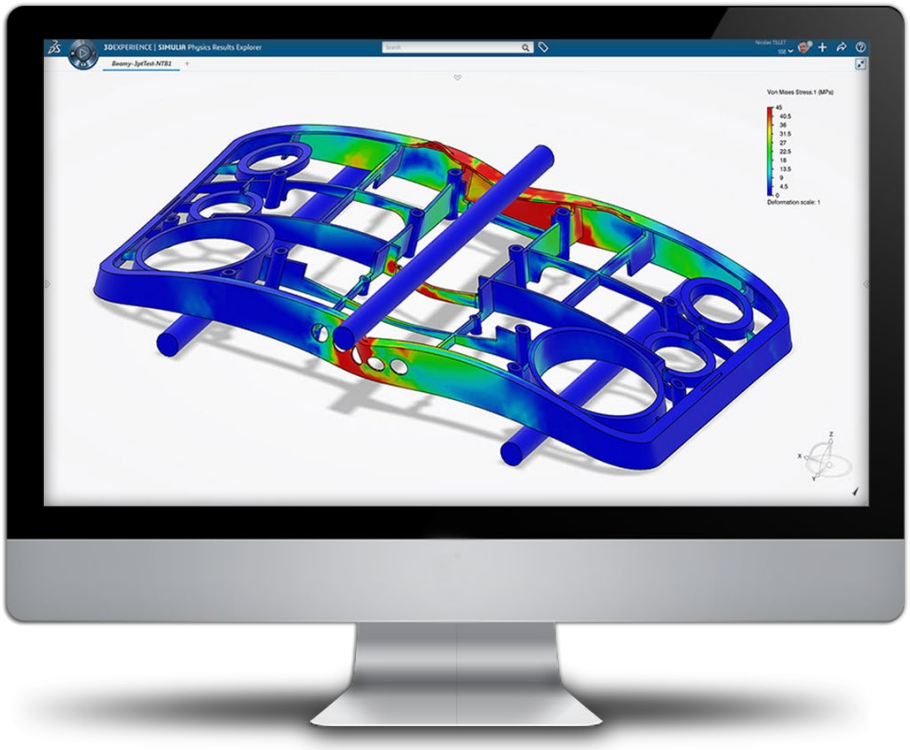
The image above shows a result obtained from a topology study in **SOLIDWORKS Simulation** to indicate to the user what the optimal design would be. It allows you to visualize areas from which material can be removed without reducing the rigidity of the piece. Smoothing of the material will provide a final geometry of a manufacturable part which can be exported to a new part or configuration of the same document.

Optimization is an automatic calculation tool that will allow you to eliminate oversizing without affecting product performance to reduce the weight and the associated costs. It will also allow specific objectives to be achieved by offering an ideal design while respecting the set criteria. An optimized design is generated quickly, saving time, effort, and money.

In conclusion

It is normal to find yourself in a situation where you have to make good decisions quickly, because time always matters. To avoid wasted designing time, analysis and simulation tools can help you assess product performance as well as lead you to optimal designs in less time. This saves on costs and time required for prototyping.

SolidXperts, a certified team in all **SOLIDWORKS** solutions, is a value-added reseller that will take you by the hand and offer you the best to optimize your work performance. Feel free to contact us for more information about our solutions and we will be happy to assist you.



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