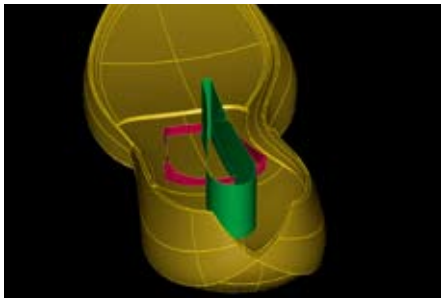
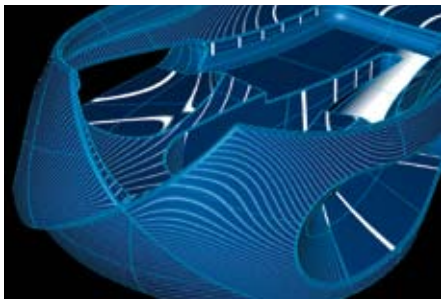
Generate theoretical edges

Convenient functions for extending surfaces and base surfaces make surface design much easier. The intersections of the extended surfaces produce theoretical edges, which are used to create the rounded model. Designers appreciate how little work is involved.



The surfaces editor extends surfaces, preparing them for intersection.

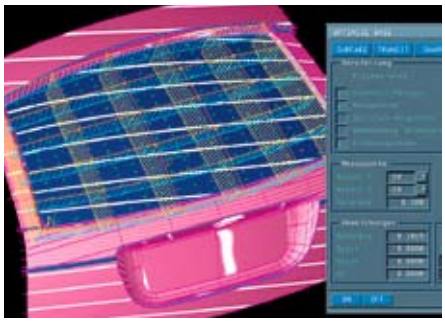
The intersection model with its unrounded surfaces.



Finally, the fillets are added and the curvature quality of the surfaces is analyzed.

Automated optimization of curvature mapping

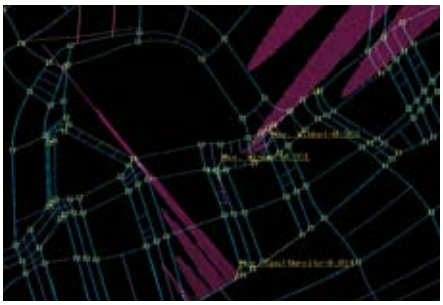
To create harmonious reflections, users change the individual surfaces' segmentation and polynomial degree values and adjust the conditions for transitions to the adjacent surfaces. Automated processes ensure the best possible compliance with these specifications, while simultaneously creating the optimum distribution of the Bezier supporting points.



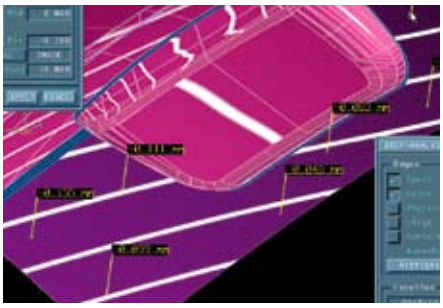
In the curvature optimization input mask, you can define defaults for the surface itself, for the transitions to adjacent surfaces and for the analyses.

Unmistakable online analysis tools

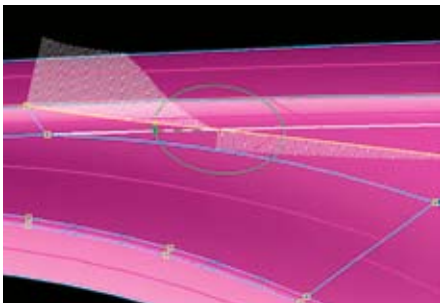
The online analysis helps you make decisions during the optimization work. You can choose to display the distances to the original surfaces, or the curvature combs, reflexes, gaps or tangent angles.



The exaggerated display shows the gaps between two surfaces and the angle deviations.



The distance display lets you quickly see the distance between the optimized surfaces and the original surfaces.



Evaluate your results with no mistakes: Curvature combs can be dragged across the part and rotated in real time.

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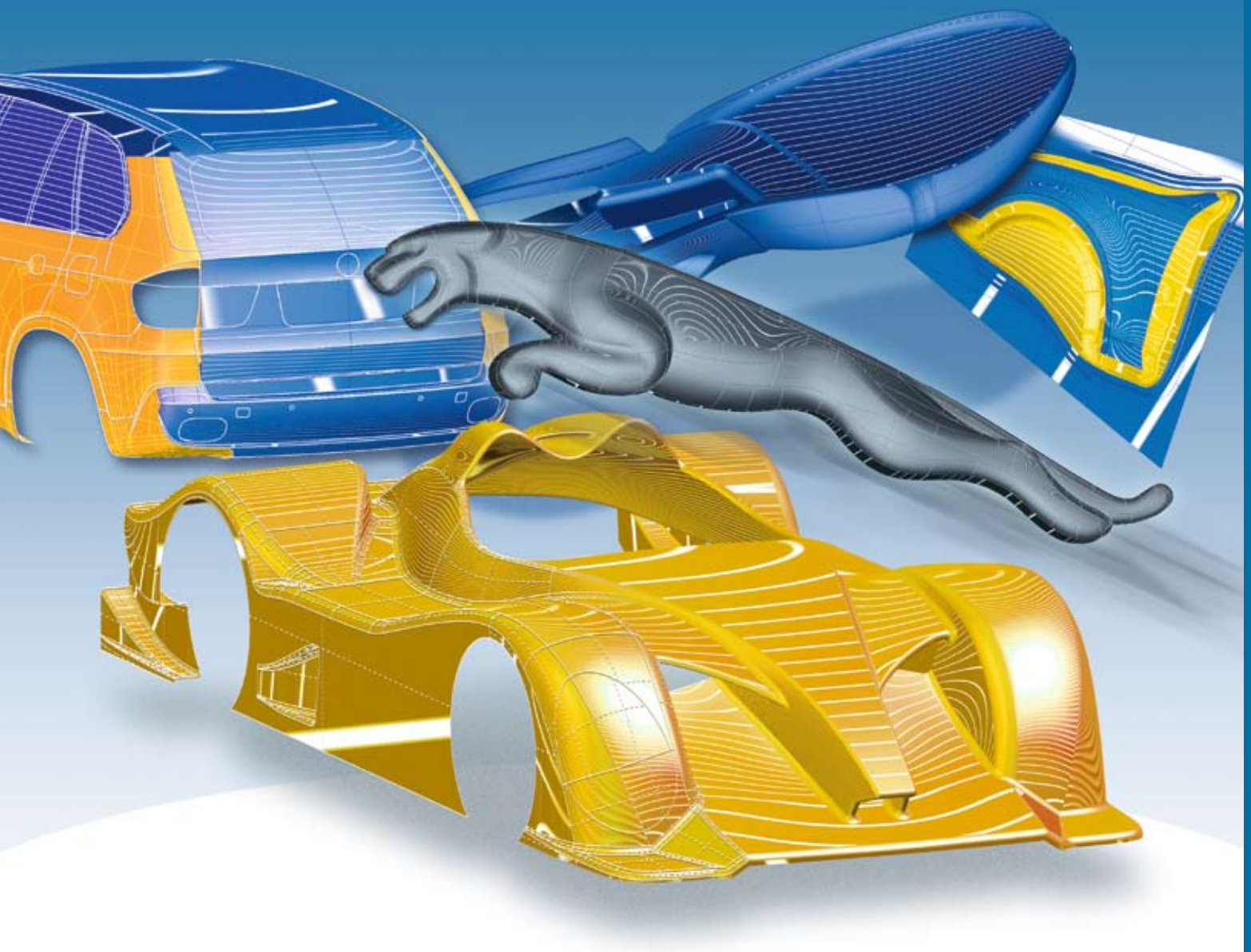


CLASS A SURFACES IN DESIGN AND DIE MANUFACTURING – EASIER AND FASTER THAN EVER BEFORE.

Tebis Optimizer

With the Tebis Optimizer technology, you can give your CAD surface models that final, high quality polish that will really accelerate all the subsequent process steps. This gives you independence from the work processes used in prior steps while letting you meet the surface quality requirements of the subsequent steps. So you can continue your creative design process both onscreen and manually using measurement and scanning technology. Often doing this means working under time pressure using multiple CAD and reverse engineering systems, with different operating modes and different data formats. Using Tebis, you have a central surfaces platform that imports surfaces created under any system, provides a wide range of functions for designing ruled and sculptured surfaces and enables reverse engineering to scanned meshes. The Optimizer module gives surface models Class A quality and makes them immediately re-usable for new design and manufacturing steps. The die and mold manufacturing industries also have to be able to both make last minute changes to the CAD data set and achieve high end surface quality. Here, too, the broad spectrum of Tebis surface technology enables fast and safe processing.

Save time creating high end surface models with first class reflection curves

With the Tebis Optimizer expansion module, you can create mirror smooth CAD surfaces at high speed. It doesn't matter whether the surfaces were created by reverse engineering or designed in a CAD system. Import the CAD surfaces and start the analysis functions.

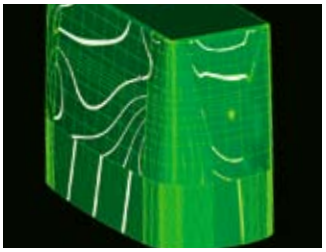
Unwanted effects on the surfaces, such as waves or visible transitions between individual CAD surfaces, are immediately visible. You will be able to identify gaps, tangent errors and areas designed with too many individual surface patches instead of a large trimmed surface. Tebis Optimizer provides convenient optimization functions for quick and uncomplicated repairs to the problem areas detected. It starts with functions for improving surface structure. What's special in Tebis: The boundary curves of all the individual surfaces can be processed as a group. To accomplish this, users can use the edge model to delete, move, streamline and generate new boundary and trim curves. Tebis manages the original surfaces in the background as references, guaranteeing that the optimized boundary curves will always lie on the original surfaces.

Users decide which surfaces will be repaired and which surfaces will be copied over from the original surfaces. To improve the curvature properties, a variety of parameters can be assigned to each surface and conditions can be defined for the transitions to the adjacent surfaces. Time-saving automated processes and useful options help you create harmonious curvature transitions. The users determine how close the optimized surfaces will be to the original surfaces.

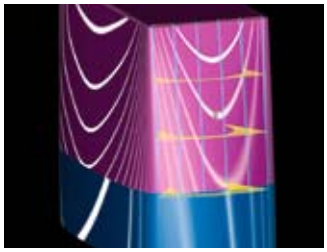
For subsequent optimization of surfaces from any CAD systems

Time pressure, designer turnover, tolerant CAD algorithms, approximating interface runs and automated healing procedures are the main sources of quality problems in surface models. That's why CAD surface descriptions often contain unnecessarily patch transitions in their individual surfaces, barely distinguishable band-shaped surface pieces and unintentional gaps and kinks. Using this as a foundation for your subsequent design and manufacturing processes is risky and creates a lot of follow-up work – especially for visible parts.

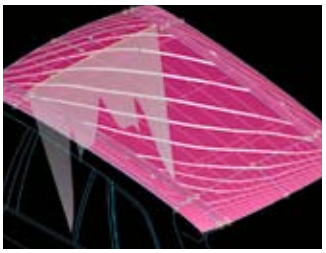
The Tebis Optimizer lets you fix this type of surface model very quickly. You won't have to redesign entire parts. The subsequent processes benefit from the optimized surface quality. This is true both for design work, such as offsetting and trimming, and for NC programming, such as five-axis milling. The early-stage investment in optimization work thus amortizes quickly.



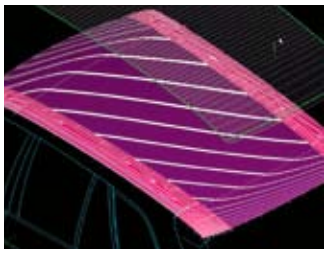
Overstructured surface models: Too many surfaces, poor highlighting properties.



After optimization, only the necessary surfaces exist. Zebra shading and curvature combs have the best curvature properties.

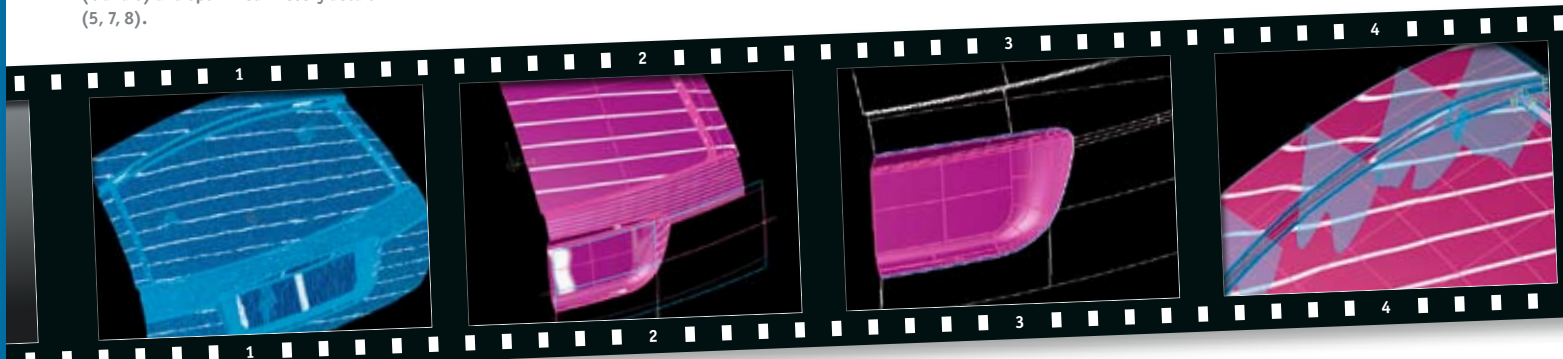


Before optimization, the curvature combs and curvature transitions show room for improvement.



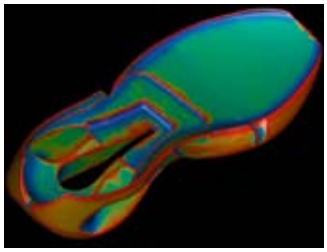
The optimized surfaces have the best strake quality.

A typical creation process (Images 1-8): First, the mesh data from scanned surfaces are processed, and then reverse engineering is used to create RSC surfaces. They are extended using CAD methods(2), correctly rounded (3), analyzed for quality (4 and 6) and optimized in every detail (5, 7, 8).

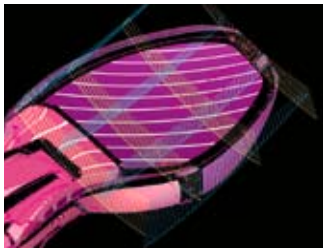


Also ideal in combination with reverse engineering RSC and CAD design functions

Using the reverse engineering method to create surfaces creates polynomial surfaces based on underlying scanned meshes. Tebis RSC provides convenient functions for quickly creating the surface structures (edge model) and the surfaces themselves (surface model). Basically, this creates surfaces with tangential transitions, with the segmentation, polynomial degree and tangential conditions automatically controlled by Tebis for your comfort. To obtain Class A quality in RSC projects, however, users have to be able to adjust these parameters. Combining RSC, CAD and Optimizer functions can put together a powerful package for Class A reverse engineering that quickly produces first class and re-usable results. With RSC and Optimizer technology, you will create surfaces close to the underlying scanned mesh. Use the CAD design functions to edit areas that you want to separate from the scanned mesh. If necessary, you can export your results through interfaces – such as into Catia V5 format, for example.



Scanned geometry with false color curvature mapping.



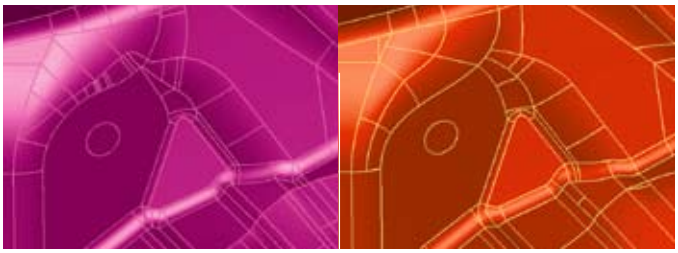
RSC and Optimizer create surfaces and analyze the curvatures.

The CAD commands create an unrounded surface model.

Finally, the fillets are created.

Intuitive handling due to the associativity of the edge model and surface model

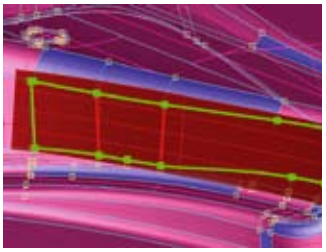
It's just as easy to create as it is to modify surface structures globally in the edge model. You create new edges and delete existing ones. A very special feature: Tebis supports both four boundary curve surfaces and trimmed surfaces (faces) with complex boundaries. This lets you create larger surface structures and span them across the entire part. In the edge model, you can also assign the individual surface areas defined properties, such as parametrizations and island cutouts.



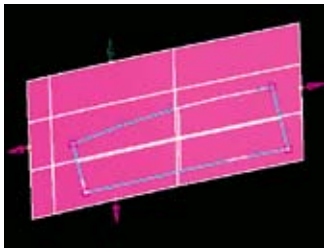
Unnecessary and not-so-advantageous surface structures can easily be corrected. The associativity of the edge model to the surface model lets the system automatically adjust the surfaces.

The foundation of all good surface models: Well-placed base surfaces

Good surface models are based on a well-planned face concept with corresponding base surfaces. That's why Tebis lets you edit base surfaces. After importing surface models, you can enlarge or reduce the base surfaces with a click of the mouse, or assign the same base surface to multiple faces. Improve your surface quality in only a few minutes.



A shared base surface is assigned to the three labeled faces



The arrow function enlarges the base surface of this face