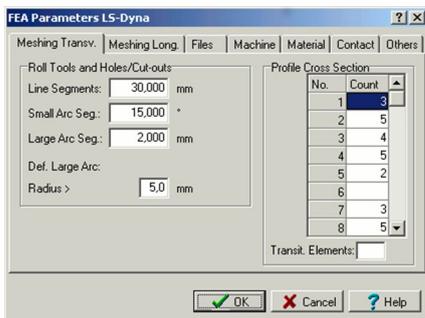


What's New? – Rel. 5.1

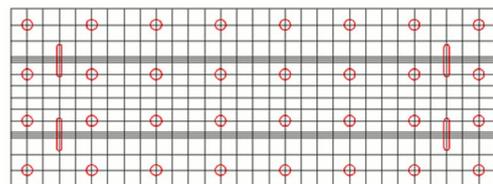
FEA Simulation with LS-DYNA

After designing roll forming tools for a new profile the designer wants to verify if the roll tools are able to produce the profile cross-section within the given allowances. The FEA (Finite-Element-Analysis) simulation of the roll forming process enables the designer to validate and optimize his roll form design. New is the interface to the leading FEA system **LS-DYNA**.

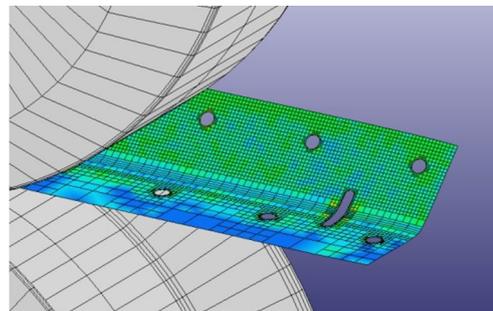


After designing the flower pattern and the roll tools the parameters for the simulation like meshing longitudinal and transversal, material etc. are entered. Then **PROFIL** creates the files with the simulation model automatically. Afterwards the **LS-DYNA** solver can be started and after performing the FEA simulation the designer gets precise information about the stress and strain within the whole profile and the deformation. By dimensioning the CAD drawing the designer can check, if the final profile is within the given allowances. If not, he can modify his design before the roll tools are manufactured.

Prepunched Holes and Cut-Outs



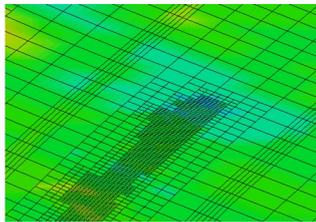
If prepunched sheet should be roll formed, the holes/cut-outs simply can be defined in a 2D CAD drawing with any shape and position. The drawing is saved from CAD in DXF format. **PROFIL** extracts the holes/cut-outs from this file and copies them to the files with the simulation model.



After running the FEA solver the simulation result shows if the shape and position of the holes/cut-outs is as desired in the final profile after leaving the roll forming machine.

Adaptive Refinement

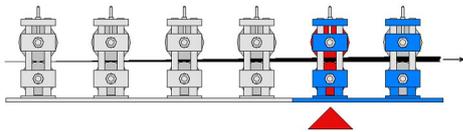
LS-DYNA has the special feature to remesh automatically.



This means, if the preset meshing is too large, the simulation does not break, but the FEA system refines the meshing during the simulation automatically. This causes a higher stability and robustness against incorrect parameterization. Prepunched holes and cut-outs are meshed automatically as well.

Restart After Optimizing the Roll Tools

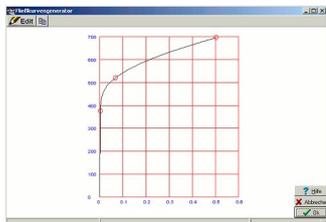
If the simulation result shows that rolls have to be modified, it is not necessary to repeat the whole simulation starting at the first stand.



Instead, the simulation can be restarted at the certain stand whose rolls were modified. This saves computation time.

Curve Generator

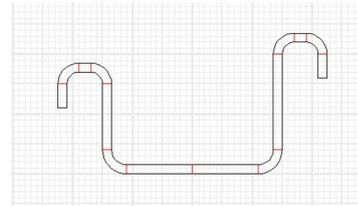
Often the exact stress-strain-curve of the used material is not available and cannot be obtained shortly. Nevertheless the designer wants to proceed a FEA simulation with approximate values.



The curve generator is a handy tool for creating a stress-strain-curve quickly by defining three characteristic curve points. The three points are: Yield point, tensile breaking stress point, and a medium point that controls the bulge of the curve. The curve has a tangential connection to the Hookean line (defined by the Young's modulus) and is continuously rising with rising strain (true strain for FEA, not nominal strain from the tensile test).

More info: www.ubeco.com

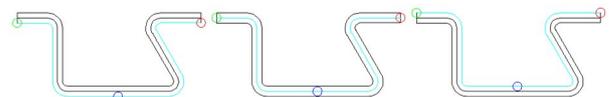
Grid



In order to have a better overview of the size proportion during profile and roll design it is helpful to have a graph paper in the background. Example: While choosing the width of side extensions at rolls. Grid lines distance and color can be preset by the user.

Import Sheet Top Side and Center Line from CAD

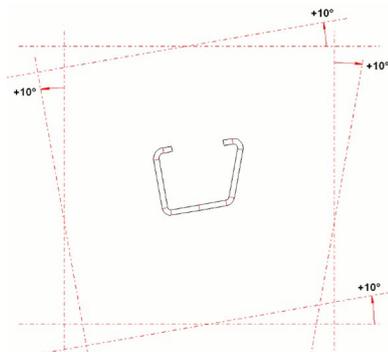
The function „Profile, Read CAD Contour” is used to import a profile cross section from a CAD drawing in order to develop the flower pattern in PROFIL afterwards.



Not only the profile bottom side (left), but also the top side (right) can be imported now. In case the origin CAD drawing only contains one contour line that represents the sheet center line also this line can be imported. All other lines do not need to exist. The sheet thickness is preset as a parameter in all three cases.

Inclination Angle also for Top and Bottom Shafts

In special cases, e.g. if subsequent processing of the profile behind the exit of the roll forming machine needs a certain angular positioning, it is not possible to turn the profile to the optimal angle required for roll forming purposes



Thus it is necessary to turn the machine shafts in the optimal angular position. This can be done now for top and bottom shafts, too, as well as for side shafts.