Top 10 novelties in Simufact Welding 7

1. Faster calculation of thin-walled sheet metal parts by solid-shell elements

   Through the use of solid shell elements, assemblies made of thin sheets require less calculation time because the required number of elements in the model drops significantly. The software can also convert many models with hexahedron elements into solid-shell meshes. To do this, Simufact Welding 7 checks whether clear upper and lower surfaces are present. If these specifications are identified by the conversion function, the previous hexahedron mesh can be converted to solid-shell mesh.

2. Faster and more efficient calculation of large models

   The parallel segment-to-segment calculation implemented in the new solver allows faster and more efficient calculation of large models with many contact surfaces. This contact description uses DDM (Domain Decomposition Method) a parallel computation framework which utilized parallel computation efficiently.

3. Fast calculation method for resistance spot welding processes

   In Simufact Welding 7, Simufact introduces the simplified calculation method “Thermal Cycle” for resistance spot welding processes. This method, which is already used for other welding processes, complex and large assemblies can be calculated in a shorter computing time. If the shape of the nugget is for example already known from process models or measurements, the user can additionally simplify the calculation by directly predefining temperatures in the nugget without previous calculation.

4. Simplify the model set-up with Robot assistant

   With a few mouse clicks, users can add new welding robots with multiple welding paths, heat sources and fillet seams to their models. This is useful when the user is confronted with many welds while simulating large structures or multi-part assemblies. The robot assistant simplifies the model set up for the user, since it can process all definition steps in one dialogue.

5. Automatic detection of edges with node sequences for faster model set-up

   This new feature automatically detects the edges of a component. The automatic edge detection simplifies the work on the model and helps to avoid errors when creating welding paths on curved surfaces and edges. On top, users can create complex welding paths much easier.
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6. **Practical oriented 3D measurement for a better validation of simulation results**
   Users compare their simulated model with their target design or with 3D measurement data as a reference model. They import the reference model from the measurement software into the user interface of Simufact Welding 7 and can then compare the simulated workpiece with the target design. If the engineers overlap both workpieces, they can determine the deformation. This shows the deviation between the simulated and the target design. A further functionality allows the definition of local coordinate systems by:
   - 3-2-1 plane
   - 3 points
   - Measuring table
   - Cylindrical coordinate system

7. **Fast alignment of components**
   Using the transformation matrix, engineers can position and move the workpieces quickly and individually in the software. The user can position the same workpiece independently in several models. Contact positioner allows fast alignment of components to each other. In this way, the user saves time since manual corrections are no longer required.

8. **Increased quality of simulation by adding additional coating data**
   The material properties influence the result quality of resistance spot welding processes by the resistances in the material. Simufact Welding 7 contains 16 common coatings, which enable the user to take into account the electrical properties of coated sheets and to further increase the quality of the simulation. No effort is required to determine the resistance data.

9. **Improved compatibility of Simufact Welding by incorporating UNV files**
   Simufact Welding 7 can import UNV files - improving the compatibility of the welding software with third-party software and interoperability in the process chain. The user can import result data from third parties such as from forming or casting simulation into Simufact Welding in order to edit these files or use them for subsequent calculations.

10. **Definition of clamping tools with translational and rotational stiffness**
    While welding large assemblies, usually several hundred clamping tools are required, which, like the welding itself, have an influence on distortions and residual stresses on the assembly. Until now, the stiffness in the clamp could be described exclusively perpendicular to the contact surface. With the implementation of the definition of clamping tools with translational and rotational stiffness, version 7 additionally takes into account possible rotations and the movements of the tools along the surface.

Please find a detailed description of the product functionalities on our website: simufact.com