

## **QForm VX 8.2.1 new facilities and features**

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1. Gartfield - prediction of surface material flow defects.
2. Automatic generation of technical reports using customized Word templates \*.dotx.
3. Direct automated import of geometry from \*.step files to QForm ready for simulation.
4. New Heat Treatment module
  - 4.1. The material data required for phase transformation simulation have to include individual physical properties of each phase that may appear as the result. The final properties in every point of the workpiece after completion of the transformation simulation are calculated by the rule of mixtures using properties of each phase in the proportion defined by local phase constitution.
  - 4.2. The user can specify the complete set of possible phases that may appear in multiphase material as well as kinematics of direct and inverse transformations between the phases to allow simulation of heat treatment of different materials having polymorphic transformations as, for example, steels, Ti-alloys, some of Nialloys.
  - 4.3. Several models of phase transformations are now supported:
    - JMAK (specifying kinematics transformation by means of TTT diagrams),
    - JMAK (specifying kinematics of transformation in the form of equations that is useful for tempering simulation),
    - Koistinen&Marburger (for martensitic transformations),
    - Leblonde&Devaux (another form of the phase transformation representation).
  - 4.4. Two methods of hardness and tensile strength calculation after the heat treatment have been implemented, i.e. by using the phase properties with the rule of mixtures and by valuation of cooling time in specific temperature intervals (e.g. by t85 for steels).
  - 4.5. The material data can be now imported directly from JMatPro for simulation of quenching and tempering of steels.
  - 4.6. Water sprayer has been added as a new type of boundary condition for quenching simulation.
5. New features of the user interface
  - 5.1. Process templates for faster setup of simulations.
  - 5.2. More simple setting of simulation stop conditions.

- 5.3. Setting the number of logical processors to be used for the particular simulation.
  - 5.4. New hyperbolic sine expression for the flow stress of deformed material.
  - 5.5. Extended options for copying the source data from previous operations to the next ones: boundary conditions, tools settings with or without previously calculated results.
  - 5.6. Copying the screen image with simulation objects and legend to the clipboard.
  - 5.7. Copying graphs from the screen to the clipboard.
  - 5.8. Setting the value of resolution of a still picture or video clip with simulation results to be recorded and saved.
  - 5.9. Compact view of the left side control tabs panel.
  - 5.10. 32 bit version of QForm is not supported anymore.
  - 5.11. Possibility of setting up the workpiece axis at any intermediate operation (previously it was possible only at the first operation).
  - 5.12. Possibility of copying local boundary conditions (boxes) from previous operation and selecting parameters to be copied, i.e. with or without taking their positioning in previous operation into account.
6. Lua and programming User's Defined Subroutines
    - 6.1. Debug mode for user's subroutines.
    - 6.2. New standard subroutine for prediction of flow defects.
    - 6.3. New standard subroutine for low cycle fatigue tools failure prediction.
    - 6.4. Extended facilities for programming the subroutines.
7. Special module for shape rolling advanced and faster simulation.
8. Electric upsetting simulation module.
9. Improvements in ring rolling simulation module
    - 8.1. Taking into account the horizontal table level.
    - 8.2. Switching on and off the horizontal ring stabilization for better predicting of the ring rolling process.
    - 8.3. Variable rotational velocity of the main roll.
10. Improvements in extrusion simulation module
    - 10.1. Improved remeshing algorithms.
    - 10.2. Improved algorithms of coupled simulation of material flow and die set deformation.
    - 10.3. Several diagnostic messages have been added.
    - 10.4. Some specific extrusion process parameters have been added to the Simulation state tab, i.e. extrusion ratio, die filling time and extrusion load.

10.5. New field showing the relative velocity deviation from the average profile velocity has been added.

11. General improvements in user interface and computation algorithms of the program.

12. Automatic correction by just one click of all geometry defects when importing the model from CAD to QShape.