Planets X Version 5.1 Release Notes

July 31, 2015

[ANSYS Compatible Version]
Planets X 5.1 is for use in ANSYS Workbench 16.0. If you are using Version 5.0, please uninstall it, and then install and use Version 5.1.


[New Planets X Version 5.1 Features]

1. 2-Color Molding Analysis Function (No special license is required to use this function. It is available as one of the core functions. Refer to Section 3.11 in "4. Packing/Holding Pressure/Cooling Analysis Manual".)

2-color molding (or different material molding) is a so-called integral molding technique which allows two resins made of different materials to co-exist inside one molded product. It has the advantage of enabling the manufacture of molded products (including electronic components, medical instruments, and optical components) that have much greater designability characteristics compared to conventional molding processes that use a single resin. The disadvantage, on the other hand, is that the technology to cause the two resins to successfully bond during the molding process is critical, and this increases the degree of difficulty of configuring the molding conditions. The purpose of this analysis function is to reduce the amount of trial and error required to configure these molding conditions in the run-up to creation of a test mold. In fact, depending on the process design goals, 2-color molding can be sub-categorized into several molding processes, including the ones listed below. The 2-color molding analysis function in this release supports all of these molding processes (however, at present three or more types of resin material cannot be supported).

１）　Bi-injection molding
　　　After a first molding, the mold and resin are changed, and then a second molding is carried out. Because the resin of the first molding, which is bonded to the resin of the second molding, is re-melted during the second molding, it is possible to identify the re-melting points and evaluate warpage of the integral molding product.
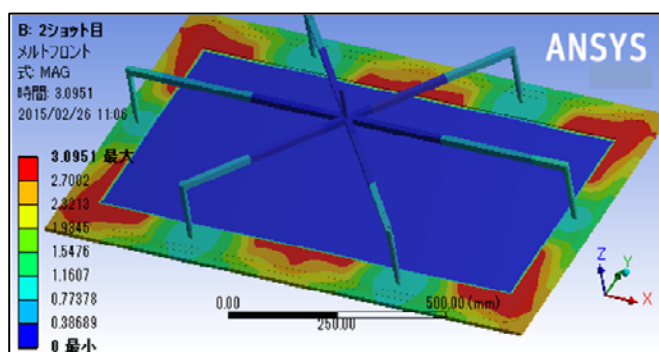
Example of application to an automobile sunroof

2） Co-injection molding
Two types of resin are simultaneously injected into the same mold from different gates. In the case of co-injection, the two resins meet in the process of filling, generating the first weld line. However, since the subsequent pressure balancing causes the resins' bonding interface to move, the second weld line, which is different from the first, occurs when the filling is done. It is possible to predict the occurrence of this second weld and evaluate the state of the bonding interface between the resins (infiltration), including prediction of air trap regions (voids) near the weld.
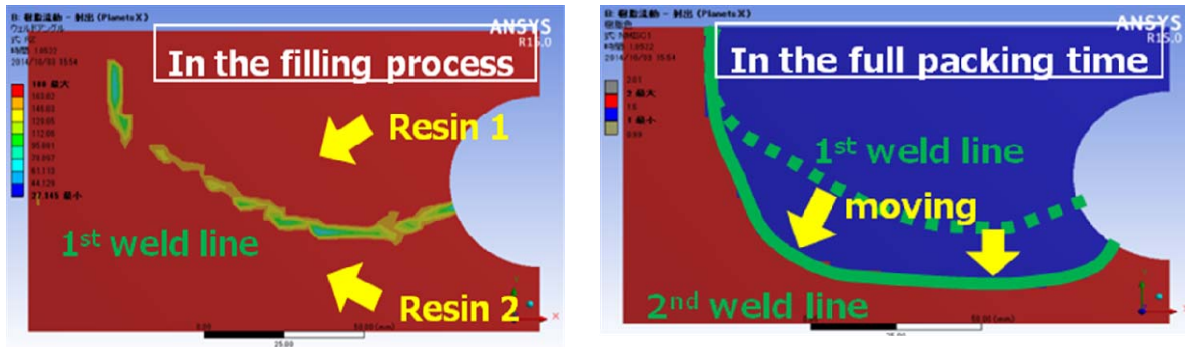
Example analysis in which a weld line occurring near a circular hole has moved by the end of filling

3） Sandwich molding
A primary molding material (skin) and secondary molding material (core) are injected in succession into the same mold. It is possible to control the injection timing and temperature of the core material and evaluate the final thickness allocation between the skin and core layers.
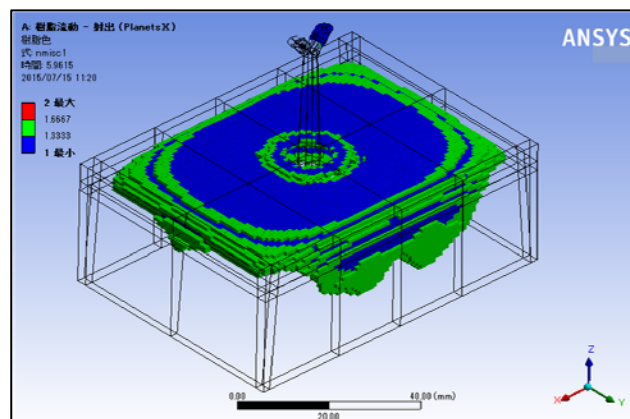
Example analysis of the distribution of the core material in a hollow box-shaped molded product

2. Void Tracing Function (No special license is required to use this function. It is available as one of the core functions. Refer to Section 3.3.9 in "4. Packing/Holding Pressure/Cooling Analysis Manual".)

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This function makes it possible to visualize how the air traps (voids) formed during the filling process move in accordance with the surrounding resin flow field, using a flow-line display. The flow-lines are color-coded for each void, and by adding points along the lines at intervals defined by a number of outputs, it is possible to examine the movement speed. In addition, since identification numbers for the voids are provided at the beginning of the lines, by comparing them with the output result text file, it is possible to verify the specific elapsed time versus coordinate numerical values.
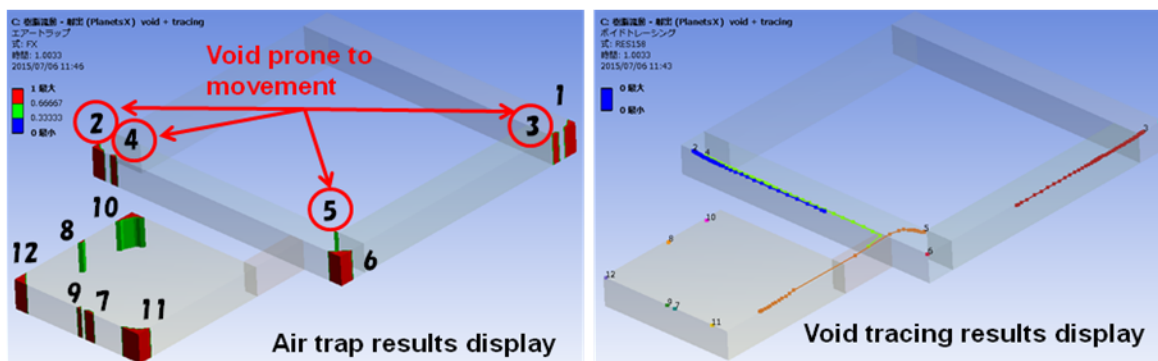
Left: Result of marking the void regions when voids are formed
Right: Flow-line display of the movement of the voids after they are formed

3. Boundary Condition Mapping Function (No special license is required to use this function. It is available as one of the core functions. Refer to Section 3.9 in "4. Packing/Holding Pressure/Cooling Analysis Manual".)

This function can be used when performing 2-Color Molding Analysis, for example, where it is possible to configure the first color resin inlet point and the initial placement using the previous operation buttons, but there are no equivalent buttons for the second color resin. In this case, you can select the target geometry region for the inlet point and initial placement by selecting **Setting Conditions** from the context toolbar and then selecting **Option Boundary Condition**. These boundary conditions are mapped to the nodes in the target region. In addition, the function can be used for:
　・Specifying the prefilled area of the hot runner
　・Setting the initial temperature of the prefilled area
　・Setting the temperature constraints
This function should prove quite useful for meeting a wide range of user needs in the future.

4. Hot Runner Setting Function (No special license is required to use this function. It is available as one of the core functions. Refer to Section 3.10 in "4. Packing/Holding Pressure/Cooling Analysis Manual".)

Typical molding systems adopt the popular cold runner system in which the resin of the runner is ejected together with the resin of the molding product when the mold is released, but in some cases, in order to reduce resin material costs, a hot runner system may be adopted that leaves the resin of the runner intact in the mold. The Hot Runner Setting Function was developed in response to demand for this kind of molding process. This function requires that the sprue and runner leading up to the gate in the mold are always preheated so that the resin does not solidify. At the same time, because the resin in these sections is not ejected when the mold is released, it must be kept filled at all times.
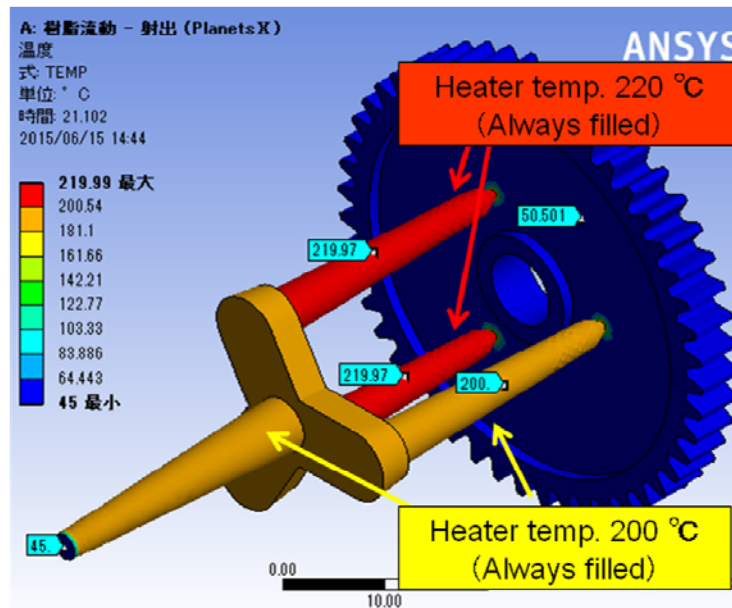
Example of hot runner configuration (temperature profile results)

5. Physical Property Input Data (File) Import Function in Impregnation Molding Analysis

(No special license is required to use this function. It is available as one of the core functions. Refer to Section 4.9 (Appendix 2 and 3) in "20. Impregnation Molding Manual".)

1） It is now possible to directly import the Permeability and Anisotropic Thermal Conductivity results calculated by the "Multiscale.Sim" multi-scale analysis tool for use as physical property input data for impregnation molding analysis.

2） When you output the values for Permeability, Anisotropic Thermal Conductivity, Inplane Rotation Angle, and Shear Angle calculated by other systems to a file as text data along with the element ID, node ID, coordinate values, and similar data, it is now possible to import the file for direct use as physical property input data for impregnation molding analysis.

6. Function for the Contour Display of Anisotropic Mechanical Properties in Fiber Orientation Analysis

(The Fiber Orientation Analysis option is required to use this function. Refer to Section 3.2.12 in "4. Packing/Holding Pressure/Cooling Analysis Manual".)

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The anisotropic mechanical properties that are output by fiber orientation analysis can now be shown in a contour display. The following items can be displayed:
- ·　Young's modulus
- ·　Elastic shear modulus
- ·　Poisson's ratio
- ·　Coefficient of linear thermal expansion

Examples of the output of Young's modulus are given below.

Young's modulus (X direction)	Young's modulus (Y direction)	Young's modulus (Z direction)
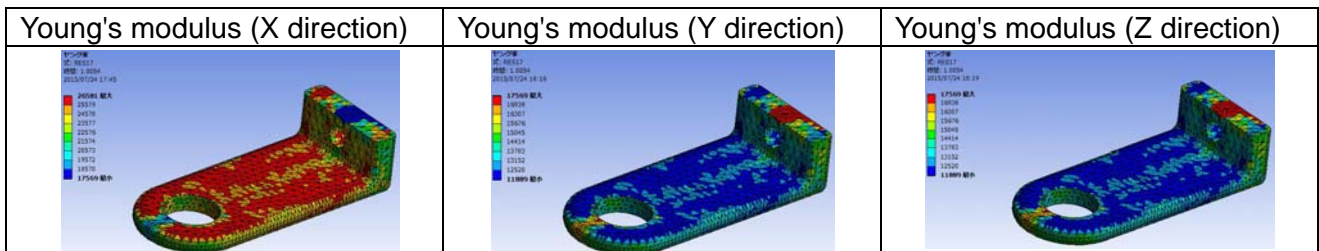
[Bug Fixes in PlanetsⅩ Version 5.1]

The following bugs have been resolved:[*]

1) In the Superimpose Analysis function, there was a bug that caused the system of units of the initial movement velocity for pressure control and clamping force control to be detected as [cm/s] despite having been entered as [mm/s].
2) In the Superimpose Analysis function, there was a bug that caused the calculation to fail to terminate at the calculation end time that was entered.
3) When using Fiber Orientation Analysis in combination with the Superimpose Analysis function, there was a bug that caused the fiber orientation results to sometimes be output as unfilled despite being fully filled.

* Items 1 and 2 are intended for customers with a license for the Injection Compression/Press Molding Analysis option. Item 3 is intended for customers with licenses for the Injection Compression/Press Molding Analysis option and the Fiber Orientation Analysis option.

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