Planets X Version 5.2 Release Notes

[ANSYS Compatible Version]

Planets X 5.2 is for use in ANSYS Workbench 16.0. If you are using Version 5.X.X, please uninstall it, and then install and use Version 5.2.

[Upgraded Features in Planets X Version 5.2]

1. Enhanced functionality in 2-color molding (bi-injection molding)

(No special PlanetsX option license is required to use this function. It is available as one of the core functions. For more information, refer to Section 3 in "25. 2-Color Molding Analysis Manual".)

In previous versions, when performing temperature coupled analysis, the temperature profile of the product of the first molding was assumed to be uniform at the time of the second molding. Starting from this version, the analysis is performed by taking into account the actual temperature profile of the product of the first molding. This allows a more accurate view of the re-melted status of the first molding product at the time of the second molding. At the same time, it is now possible to more accurately evaluate the warpage of these kinds of integral molding products. Three or more consecutive moldings are now supported.
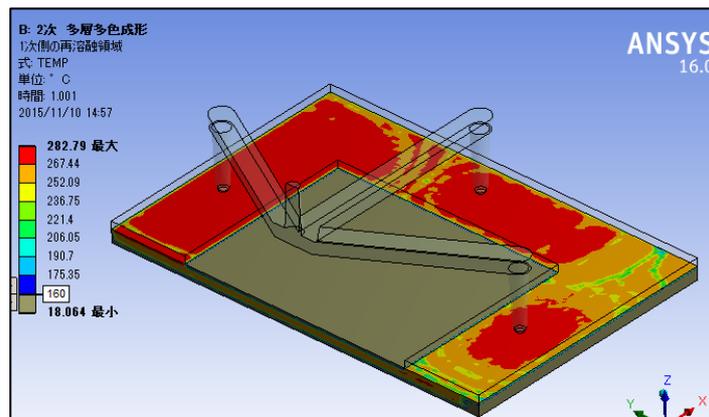

Figure 1: Temperature profile of the re-melted areas (160 ℃ or more)
of the product of the first molding

2. Analysis Function Linking PlanetsX Fiber Orientation Analysis and Modal Analysis

(The PlanetsX Fiber Orientation Analysis option license is required to use this function. For more information, refer to Section 8 in "18. Structure Linkage Analysis Manual".)

When performing vibration (eigenvalue) analysis of composites containing glass fibers and similar materials, it is now possible to perform eigenvalue analyses that take into account the flow history. It is possible to perform composite material eigenvalue analyses that take into account linear anisotropic materials by performing PlanetsX Fiber Orientation Analysis before eigenvalue analysis,

and then calculating the anisotropic mechanical properties (Young's modulus, elastic shear modulus, and Poisson's ratio) from the resulting fiber orientation profile.
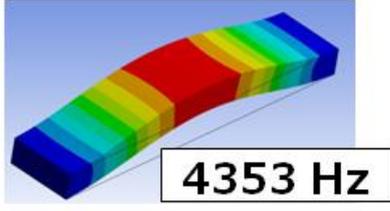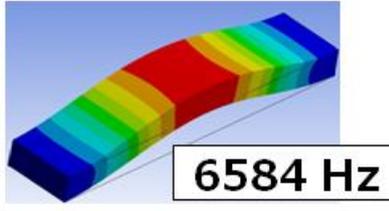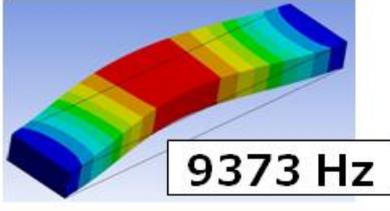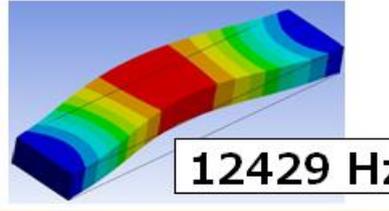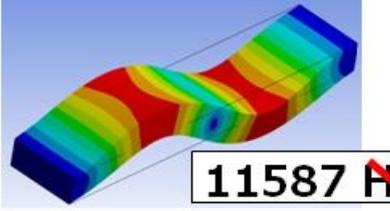
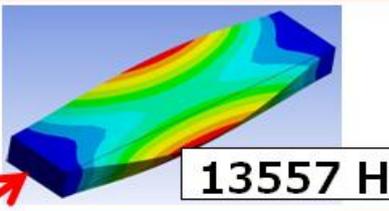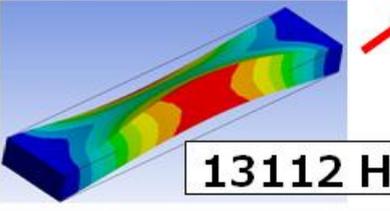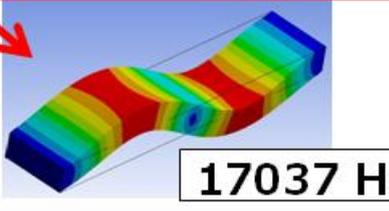| Natural vibration mode	Isotropic (assuming random fiber state)	Anisotropic (execution of Fiber Orientation Analysis)
1st-order mode	4353 Hz	6584 Hz
2nd-order mode	9373 Hz	12429 Hz
3rd-order mode	11587 Hz	13557 Hz
4th-order mode	13112 Hz	17037 Hz

Figure 2: Natural frequency analysis results (natural vibration modes up to the 4th order) for a plate-shaped composite material fixed at both ends. The left side is an isotropic material (random fiber state) and the right side is an anisotropic material (execution of PlanetsX Fiber Orientation Analysis). In the deformation of the anisotropic material, the third-order and fourth-order modes have swapped places compared to the isotropic material.

3. Heat Cycle Thermal Deformation Analysis Function
(No special PlanetsX option license is required to use this function. It is available as one of the core functions. For more information, refer to Section 7 in "18. Structure Linkage Analysis Manual".)

It is now possible to easily examine the thermal deformations (including strain and stress profiles) that occur when performing heat cycle testing on the final molded product after warpage (however, because this analysis is linear, it excludes nonlinear thermal deformations that depend on the time or the number of cycles). Particularly if insert parts are mixed, it is possible to examine the thermal

deformation due to differences in the coefficient of linear thermal expansion of the resin and each part, letting the shape of the warpage be the starting line.
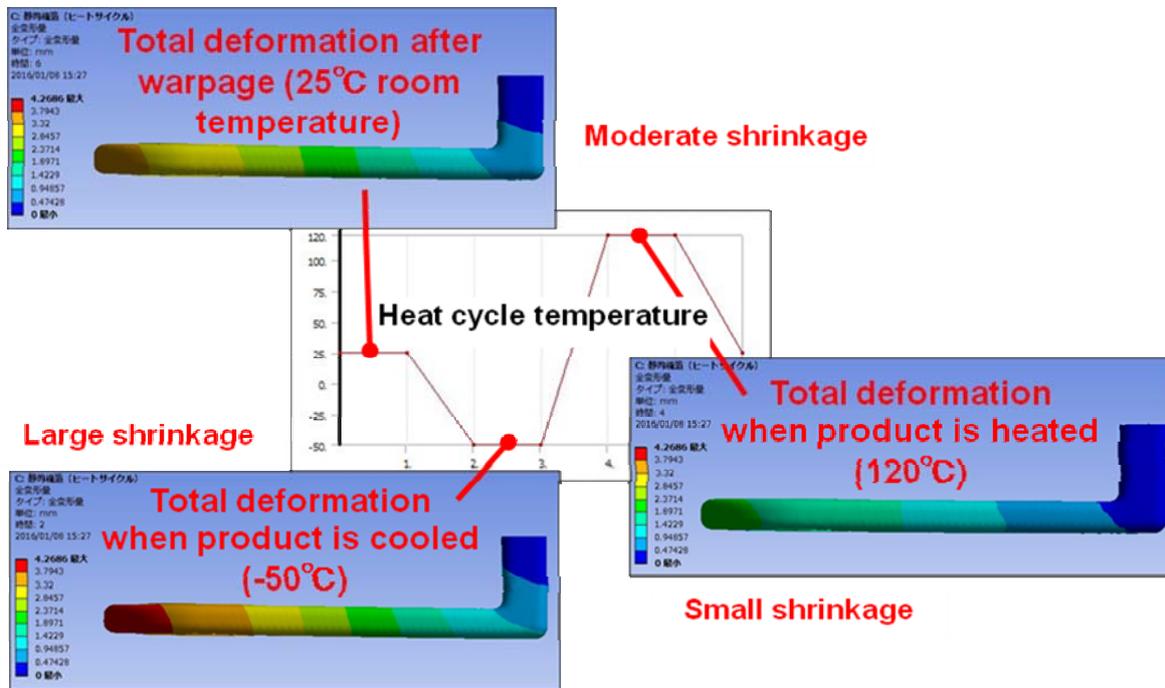

Figure 3: Profiles of the total amount of deformation of a product in a heat cycle test based on a temperature of 25°C at the time of warpage.
The amount of deformation due to thermal contraction at the time of warpage is moderate, but the deformation is maximized when the product is subsequently cooled (-50℃), and conversely minimized when heated (120℃).

4. Improved Usability of the Runner Wizard Function
(A DesignModeler license is required to use this function. For more information, refer to Section 4 in "8. Runner Wizard Manual".)

Starting with the current version, the system has been modified to use the Application Customization Toolkit (a development toolkit and execution environment for carrying out enhancements to the capabilities of ANSYS Workbench). This has helped to improve the usability of some functions. And by facilitating future enhancements, it makes it possible to respond more flexibly to the development needs of users.

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[Bug Fixes in Planets X Version 5.2]

The following bug has been resolved:

1) When performing warpage analysis by passing resin flow analysis results to static structural analysis, there was a bug that caused an error at the time of transfer between different meshes when the two analyses used different mesh shapes and pyramid elements were included in the structural analysis.