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What's New

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What's New in Tecnomatix Plant Simulation 15

What's New in Tecnomatix Plant Simulation 15

Tecnomatix Plant Simulation 15 provides a number of new and improved features.

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Important Changes in Plant Simulation 15

We made important changes in *Tecnomatix Plant Simulation* 15. For this reason you have to adapt simulation models which you created in previous versions of *Tecnomatix Plant Simulation*, when you open them in *Tecnomatix Plant Simulation* 15.

Important Changes in Plant Simulation 15.0

- We added the object AGVPool to the *Resource Objects*. You can use it to create *automated guided vehicles* for your installation that are not bound to a fixed route network.

We also added the object **Marker**. You can use it to set waypoints along which the *AGVs* drive from the *AGVPool* to its destination.

- We added the object **CostAnalyzer**  .
  To facilitate cost analysis, we also added the tab **Costs** to the *material flow objects*, the tab **Costs** to the *Part* and to the *Container*.

Important Changes in Plant Simulation 14.2

- We added the tabs **Poses** and **Joint** to the **3D Properties**. Together with the joints you can define joint kinematics.

- We added the sub-tab **Transport** to the tab **Importer**. In this context we moved the settings for the **Exit strategy > Carry part away** from the tab **Exit** to this sub-tab. These settings replace the **Exit strategy > Carry part away**.
  If you query the **exit strategy** with the attribute **ExitStrategy**, the return value is not **carry part away** any more. For this reason you have to change models that query this return value by using the attribute **TransportImp.Active**.

  > Note:
  >
  > If you neither entered an **MU target** into the *transport importer* nor a **Destination** into the *part*, the object uses the **strategy** for determining the destination, which you entered on the tab **Exit**.

- We changed where *Plant Simulation* places duplicated or derived classes when you duplicate or derive one of the built-in classes in the *Class Library*. You now find the new class in the folder **User Objects**.
  When you create a new model this model is now called **Model**.
  The sample *Frame* in the folder **UserObjects** is now called **MyFrame**. It contains, by default, an *Entrance Interface*, a *Conveyor*, a *Station*, and an *Exit Interface*.

- We changed the names of the information flow objects below. Now the names of the list objects match the names of the data types.

Up to Version 14.1	From Version 14.2 on	Data Type
TableFile	**DataTable**	*table*
CardFile	**DataList**	*list*
StackFile	**DataStack**	*stack*
QueueFile	**DataQueue**	*queue*

The topic **The Conveyor** shows how to use the new name instead of the old name when **updating a model to the current version**.

Important Changes in Plant Simulation 14.1

We changed the names of the following material flow objects in Plant Simulation 14.1:

Up to Version 14.0	From Version 14.1 on
Assembly	*AssemblyStation*
Line	*Conveyor*
ParallelProc	*ParallelStation*
SingleProc	*Station*
Entity	*Part*

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Simulation and Animation Relevant Changes

We made changes that are relevant for the simulation and the animation in *Tecnomatix Plant Simulation* 15. For this reason you have to adapt simulation models, which you created in previous versions of *Tecnomatix Plant Simulation*, when you open them in *Tecnomatix Plant Simulation* 15.

Simulation- and Animation-Relevant Changes in Plant Simulation 15.0

- We changed the behavior of the method **delete** of the *DataTable*. If you activated the setting **Column index belongs to contents** in previous versions, the following instructions also deleted the column index:

  ```
  DataTable.delete({"ColumnB", *})
  ```

  As this is unexpected behavior and is desired in rare cases only, *Plant Simulation* does not delete the column index any more from version 15 on.
  If you would like to delete the column index as well, to have to explicitly include the column index with the instruction:

  ```
  DataTable.delete({"ColumnB",0}..{"ColumnB",*})
  ```

  The range definition `{"ColumnB", *}` now only sets the contents of the *DataTable*. The index is not contained any longer if it belongs to the format.

- We change the call sequence of controls of the *Exporter* and of the *Worker*. In previous versions it could happen that the **Order control** was executed before the **Release control** of the *Exporter* or that the **Order control** was executed before the **Release control** of the *Worker* when moving an MU. In this context the call sequence of the **Entrance control** and of the **Order control** changed as well. From this version on the **Entrance control** is executed before the **Order control**.

- We changed how the legs of graphics of **type** > **Floorspace** for a *Store* look. These now also have a square foot print. This may cause different simulation results in models in which *Workers* walk underneath the *Store* and for which you selected **Worker obstacle** > **Graphics**.

Important Changes in Plant Simulation 14.2

- We changed the behavior of *Plant Simulation* when using the **Pull** control. The active MU (**@**) now designates the part (MU). When **unblocking** the value is void.

- We significantly improved the performance of *Plant Simulation* when **importing** MS Excel files. Importing is now several hundred times faster than before. To do so, we import the raw values from Excel and convert the data in *Plant Simulation* itself. When importing date into columns of data type *string* we convert numerical values in *Plant Simulation* itself. The *Plant Simulation* format might not match the format that was set in Excel.

Important Changes in Plant Simulation 14.1

- We minimally improved the accuracy when calculating the **CheckMUDistance** event. This can affect the simulation results, for example throughput and relative occupancy and when other events exist which occur at the same time but when it counts which of these events is processed first.

- We minimally improved the accuracy when calculating the **Bump** event. This can affect the simulation results, when other events exist which occur at the same time and when it counts which of these events is processed first.

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New Features of the Material Flow Objects

Tecnomatix Plant Simulation 15 provides a number of new features.

New Features in Plant Simulation 15.0

- To facilitate cost analysis with the **CostAnalyzer**  , we added the tab **Costs** to the *material flow objects*, the tab **Costs** to the *Part* and to the *Container*, and the tab **Costs** to the *Worker*.

- We added the setting **Workpiece carrier** to the *Container*. You can use it to model the carrier on which the part is transported from processing station to processing station in your facility. Statistics then does not collect the values for the carrier, but for the transported part. In previous versions this was cumbersome to achieve. This setting also affects routing the parts.

- We added the **Tabs** menu to the material flow objects. If you hide tabs that you do not need, *Plant Simulation* opens the dialog faster and you can change to those tabs faster that you need in your daily work

- We added the check box **Booking point** to the settings of the **Sensors**. It sets that the **booking point** of the part triggers the sensor.
  We also changed the dialog of the **Sensors** in this context, and we added the attribute **BookPosition**, the event **SensorBookPos** to the **event list** and the optional parameter **BookPos** to the **sensor control**.

- We added the menu command **Random Seed Value** to the **Tools** menu of the *material flow objects* and the *fluid objects*, which can create random numbers. To change the random seed value, select the command and type in another value into the dialog.

- We added the read-only attribute **CurrentDestinationAngle** to the *Turntable*.

- We made the read-only attributes **FrontLocation** and **RearLocation** of the MUs observable.

New Features in Plant Simulation 14.2

- We added the tab **Routing** to the *Part* and the *Container*. These automatically find their destination moving on *Conveyors*.
  We added the menu command **Route to Destination** to the *Part* and the *Container*.

- We added the attribute **DestinationWasReached** to the moving objects.

- We added the check box **Automatic processing** to the objects *Station*, *ParallelStation*, *AssemblyStation*, *DismantleStation*, and *Drain*. It sets if these objects start processing an entering MU immediately or not.

- We added the optional parameter *PredecessorNumber* to the method **create** of the MUs. It sets the number of the predecessor when the MU does not entirely fit onto the length-oriented object.

- We added the optional parameter *ConveyingDirection* to the method **insert** of the MUs. It sets the direction in which the MU will be inserted on the object.
  You can also enter `-1` as the position. Then the MU is inserted so that its booking point is located on the position 0, or at the end of the object when the MU moves in reverse.

- We extended the method **setDestination** of the *PickAndPlace Robot*. You can now also specify a sensor as the **destination object**, for example `setDestination(Conveyor.sensorID(1))`.
  The **Angles Table** of the robot can now also contain a sensor on the *Conveyor* in the column **Name**, for example `Conveyor.sensorID(1)`. This is useful if you want to set several angles on the *Conveyor*.

- We added the attribute **Location** to the **sensors**. You can use it to query the object on which the sensor is located.

- We changed the behavior of the method **outIn**. The instruction `MyPart.outIn(-1)` no longer causes an error. The object determines the time until MU exits by means of its processing time. Normally statistics does not count this time as processing time unless you specify `true` for the optional parameter *WorkOnFinishedPartAgain*.

New Features in Plant Simulation 14.1

- We added the **Strategy** > **Method at Converting Point** to the **Converter**. We also replaced the attribute *ExitForNextEnteringMU* with the attribute **ExitForMU**.
- We added the method **getStackHeight** to the *Store*, to the *Container*, and to the *Transporter* with matrix loading space.
- We added the function **Start processing when full** to the *ParallelStation*. If you clear the check box, the *ParallelStation* behaves like it did in previous versions.
- We added the settings **Relative from end** and **Length from end** to the settings for creating a **new** sensor.
- We added the read-only attribute **ResCurrentState** to the material flow objects.
- We added the check box **Stopped** to the MUs. In previous version you could only stop MUs with the attribute **Stopped**.
- We added the statistics value **Exit blocked** to the tab **Statistics** of the *Conveyor*.
- We added the column ΔL to the **Segments** table. It shows the length of the length-oriented object up to this segment.

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Changed Features of the Material Flow Objects

Tecnomatix Plant Simulation 15 provides a number of changed and improved features.

Changed Features in Plant Simulation 15.0

- We changed the default icon of the object *Track*. It now looks like this  .
- We changed the behavior of the setting **Start processing when full** of the *ParallelStation*. If the *ParallelStation* does not have to be set up, the *ParallelStation* can now also accept parts of different types without starting processing them prematurely. For type-dependent and place-dependent **processing time** or when you entered a formula as the **processing time**, the parts can then have different **processing times**.
- We made the attribute **EntranceFree** observable. For a *ParallelStation* with activated setting **Start processing when full** the attribute *EntranceFree* now returns false if not all of the processed parts have exited the station.

- We changed the behavior of the *Transporter*: In previous versions *Plant Simulation* reset an existing **TargetPosition** or **TargetDistance** respectively when *Transporters* collided and showed an error message.
  From this version on *TargetPosition/TargetDistance* are retained and the *Transporter* drives to them with the **Speed/ Acceleration** which the *Transporter* has with which the second *Transporter* collided. If is impossible to reach the *TargetPosition/TargetDistance* because the first *Transporter* with which the second *Transporter* collided, stops before that, *TargetPosition/TargetDistance* is retained as well. As soon as the first *Transporter* starts driving again, the second *Transporter* tries to arrive at the *TargetPosition/TargetDistance*.

- We changed the behavior of the *Transporter*: When you set the **TargetPosition**, for which the direction would have to be changed, for a non-stopped *Transporter* with activated **acceleration** in an **exit control**, *Plant Simulation* now shows an error message as there is no room for breaking until it's time to turn around.

- We changed the behavior of the **Buffer** if MUs have several **Out** events because you set this with the method **outIn**. In previous versions *Plant Simulation* computed a new Out event for the next MU and overwrote the event that you created with the method when the first MU exited the *Buffer*. From this version on *Plant Simulation* only computes an **Out** event for the next event if the MU does not have an **Out** event yet.

- We added the optional parameters *DropPosition* and *DropLane* to the **Drag-and-drop control** of the length-oriented objects. They designate the position at which the object is dropped and the lane on a *TwoLaneTrack*.

- We added the optional parameter *IgnoreRouteWeightingAttr* to the method **getRouteLength** of the *Part/Container* and the method **getRouteLength** of the *Transporter*. The parameter sets if the **route weighting attribute** will be ignored (`true`) or if it will be used (`false`).

- We changed the data type of the attribute **AxesOrigin** of the *Frame*. In previous versions it was a *two-dimensional array* of data type *real* with two values (real[2]). From this version on it is a *two-dimensional array* of data type *integer* with two values (integer[2]).

Changed Features in Plant Simulation 14.2

- We moved the settings for the **Exit strategy > Carry part away** from the tab **Exit** to the sub-tab **Transport** of the **Importer**. The settings on this tab replace the **Exit strategy > Carry part away**.

- We extended the function **Start processing when full** to the *ParallelStation*. Here you can now also select the setting **Recovery time starts** > **When processing is done** for the start of the **Recovery time**. For the setting **When part exits** the **recovery time** starts when the last part exits the station.

- We reduced the default **processing time** of the objects *Station*, *ParallelStation*, *AssemblyStation*, and *DismantleStation* from 1 (**1:00**) minute to 10 seconds (**0:10**). The latter value is better suited for demonstrating the flow of materials.

- We changed the behavior of *Plant Simulation* when you define failures using the **availability** and in doing so enter bounds for the MTTR. *Plant Simulation* now normally also finds a distribution of the duration of the failure if one of the bounds is located closer to the MTTR as supported in previous versions.
  If one of the bounds is located very close to the MTTR, the program cannot determine a meaningful distribution. If this is the case, please increase the distance of the bound to the MTTR.
  The new algorithm also more accurately computes the distribution of the mean time between failures (MTBF). For this reason the simulation results might slight deviate from the simulation results of previous versions.

- We corrected the behavior of the *TurnPlate*, the *TurnTable*, and the *AngularConverter*. You now cannot accidentally set the internal attribute *Backwards* via *SimTalk* any more.

- We extended the behavior of the method **setRoute** of the *Part/Container* and the method **setRoute** of the *Transporter*. You can now also specify the objects along the route in an *array* of data type *object*.

- We extended the behavior of the method **getRouteLength** of the *Part/Container* and the method **getRouteLength** of the *Transporter*. The MUs can now also write the objects along the route to an *array* of data type *object*.

- We no longer support the method *getRouteToDestination*. Instead, you can use the method **getRoute** of the *Part/Container* and **getRoute** of the *Transporter*.

- We changed the data type of the **Width** of the *Connector* from *integer* to *real*. For **3D models** you can now reduce the default width, which corresponds to 0 or 1, with values between 0 and 1, to a fraction of that.

- We changed the name of the attribute *Ctrl* of the sensor control to **Control**.

- We added the return value of data type *boolean* to the read-only attribute **StatWaitingTimeTable** of the *AssemblyStation*. As it only collects statistics values for the settings **MUTypes** and **Depends on Main MU**, the return value for the remaining settings is false.

Changed Features in Plant Simulation 14.1

- We replaced the attribute *ExitForNextEnteringMU* with the attribute **ExitForMU**.

- We do not support the method *init* of the *EventController* any more.

- We changed the behavior of *Plant Simulation* when an MU enters or leaves the loading space of **type Track** or **Line**. As it is no longer rotated by 90 degrees, the orientation of the MUs now depends on the orientation of the animation line in 2D and in 3D.

- We changed the behavior of *Plant Simulation*. The first parameter of the method **setDestination** of the pick-and-place-robot can now also be an MU or a storage place on an MU.

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New and Changed Features of the Fluid Objects

Tecnomatix Plant Simulation 15 provides a number of new and improved features.

New and Changed Features in Plant Simulation 15.0

- We added the methods **addContent** and **setCurrentContent** to the *Mixer*.
- We changed the behavior of the method **setCurrentContent** of the *Tank*. You can now also set a new material when the *Tank* is not empty.

New and Changed Features in Plant Simulation 14.2

We added the read-only attribute **ResCurrentState** to the fluid objects.

Back to What's New in Tecnomatix Plant Simulation 15

New and Changed Features of the Resource Objects

Tecnomatix Plant Simulation 15 provides a number of new and improved features.

New and Changed Features in Plant Simulation 15.0

- We added the object **AGVPool** to the *Resource Objects*. You can use it to create *automated guided vehicles* for your installation that are not bound to a fixed route network.
- We added the object **Marker** to the *Resource Objects*. You can use it to set waypoints along which the *AGVs* drive from the *AGVPool* to its destination.
- We change the call sequence of controls of the *Exporter* and of the *Worker*. In previous versions it could happen that the **Order control** was executed before the **Release control** of the *Exporter* or that the **Order control** was executed before the **Release control** of the *Worker* when moving an MU. In this context the call sequence of the **Entrance control** and of the **Order control** changed as well. From this version on the **Entrance control** is executed before the **Order control**.

New and Changed Features in Plant Simulation 14.2

- We changed the behavior of the *Worker*. All *Workers* now stop during a failure.
- We added the attributes **AdditionalServices**, **Amount**, **Efficiency**, **Shift**, **Speed** and **Worker** to the *WorkerPool*.

Back to What's New in Tecnomatix Plant Simulation 15

New and Changed Features in Plant Simulation 14.1

- We replaced the text box **Capacity** of the *Worker* with the text boxes **X-dimension**, **Y-dimension**, and **Z-dimension**. This now allows you to use an **animation area** for the *Worker* in 3D.

- We changed the behavior of the *Exporter/Worker*. When you turn on automatic mediation of the *Worker* with the attribute **AutomaticMediation**, *Plant Simulation* now immediately tries to broker the *Exporter/Worker* when the *Broker* has open requests.

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New Features of the Information Flow Objects

Tecnomatix Plant Simulation 15 provides a number of new features.

New Features in Plant Simulation 15.0

- We added the command **Manage Breakpoints** to the *Method Editor*. We also added the commands **Breakpoint Active** and **Breakpoint Settings** to the *Method Debugger*.

- We added a key combination to delete all breakpoints, including those in the *EventDebugger*: To do so, hold down the **Shift** key while you click **Delete all Breakpoints**.

- We added the setting **Simulation mode** to the object *PLCSIM_Advanced*. You can use it to execute data exchange with the PLC in **real-time** or **stepwise**.

- We added the command **Open Debugger** to the context menu of the *Method* in the *Frame*.

- We added the method **getColumn** to the object *SQLite*.

New Features in Plant Simulation 14.2

- We added the tab **Filter** to the **PLCSIM_Advanced Interface**.

- We added the attribute **HasInitValue** to the *Variable*.

- We added the optional parameter *WithIndexes* to the method **copyFormatTo** of *lists* and *tables*.

- We show the exact value with 17 floating point digits on the context menu of the tab **Variables** of the *Method Debugger* for local variables of data type *real*, *length*, *weight*, *speed*, and *acceleration*.

New Features in Plant Simulation 14.1

- We extended the functionality of the *Method Editor*. When you select text with keyboard keys (**Shift** key+arrow keys) or with the mouse pointer, *Plant Simulation* highlights all occurrences of the text

fragments in the *Method* in color, compare **Find**. You can then jump to these occurrences via the ribbon like you would to any other bookmark or by pressing the **F2** key.

- We added the button for inserting **instance breakpoints** to the **Method Debugger**. We also removed the buttons for **Searching** and for **showing the line numbers**.

- We added the command **Step into Encrypted Methods** to the *Method Debugger*.

- We added the method **writeExcelXMLFile** to the lists and tables.

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Changed Features of the Information Flow Objects

Tecnomatix Plant Simulation 15 provides a number of changed and improved features.

Changed Features in Plant Simulation 15.0

- We changed how *pre-formatted methods* are created. Previously these were created with *SimTalk-1.0-syntax* if **New Syntax** was deactivated in the class of the *Method* in the folder *InformationFlow*. From now on *pre-formatted methods* are always going to be created with *SimTalk-2.0-syntax*.

- We changed the behavior of the methods **executeIn** and **executeNewCallChain** of the object *Method* and of user-defined attributes of data type *method*. In the called *Method* the anonymous identifier ? now references the caller, i.e., the *Method* which contained the methods *executeIn* or *executeNewCallChain*, or if the caller is a user-defined attribute of data type *method* it references the location of this user-defined attribute.
  In previous versions the anonymous identifier ? referenced the *EventController* for *executeIn*. For *executeNewCallChain* the anonymous identifier ? was VOID in previous versions.

- We changed the behavior of the **AttributeExplorer**. The results table is now sorted according to **path**, **name**, or **label**. As in previous versions, the *AttributeExplorer* first shows the data of the objects you specified and then the data that is defined by the query.
  In previous versions the order in which the results were shown was determined by the sequence in which you inserted the objects into you model. This was not reproducible afterwards any more.

- We changed the behavior of the **DataTable**. When you create a new model the setting **Column index belongs to contents** is deactivated by default. For new models the column index belongs to the format and will thus be inherited when you deactivate inheritance of the contents.

- We enhanced the functionality of the methods **writeFile** and **writeObjectFile** of the *DataLists* and *DataTables*. For these you can now also enter `System` as equivalent to `ANSI` for the optional parameter *CodePage*.

- We added optional parameters to the method **step** of the object *SQLite*.

- We added a return value to the method **executeStatement** of the object *SQLite*.
- We deleted the setting for the **Allocated memory** from the dialog **Text File Format**.
- We removed the command **Tools > View > Tooltip Includes Type Info** from the *Method-Editor*. The command **Show Tooltip with Completion** now always shows the type information.
- We do not support the read-only attribute *InheritsProgram* of the *Method* any more. Instead you can use generic access with the attribute **getAttribute**.

```
var bInherit:boolean
getAttribute("Program", bInherit)
print bInherit
```

Changed Features in Plant Simulation 14.2

- We changed the names of the information flow objects below. Now the names of the list objects match the names of the data types.

Up to Version 14.1	From Version 14.2 on	Data Type
TableFile	**DataTable**	*table*
CardFile	**DataList**	*list*
StackFile	**DataStack**	*stack*
QueueFile	**DataQueue**	*queue*

- We changed the behavior of the **Method Debugger**. When the *Method Debugger* was opened because of a runtime error and when you then close it, *Plant Simulation* now terminates all call chains without asking and stops the simulation.
  If you only want to terminate the incorrect call chain and continue the simulation, press the **F5** key instead of closing the *Method Debugger*.
  If you do not want to terminate the incorrect call chain, you can continue the incorrect *Method* in a certain line of code by calling the context menu command **Set Next Statement**, or by placing the input cursor into this line and by pressing **Ctrl+F10**, or by holding down the **Ctrl** key and double-clicking this line. Then press the **F5** key to continue executing the *Method* in this line.
- We renamed the method *methCall* of the *Method* to *executeIn*.
  We renamed the method *newCallChain* of the *Method* to *executeNewCallChain*.
- We extended the behavior when **checking in** a model in *Teamcenter*. You can now select if you want to create a new revision.
- We improved the behavior of the *Teamcenter interface*. You can now specify the **environment** instead of the **server** in the dialog of the object *Teamcenter* and in the **Teamcenter Login Dialog**. You can select the **Environment** from the list of the environments configured in the TCCS, provided

environments are configured there. We also added the command **Change Environment or Server** to **File > Teamcenter** in which you can change the settings later on.
The *Teamcenter interface* now also supports logging in to Teamcenter via *Single-Sign-On* (SSO). To do so, you have to select the TCCS environment in which the settings of the SSO-Server are configured. When logging in via SSO, you do not have to enter the **user name** and the **password**.
We support logging in via SSO in the login dialog to Teamcenter as well as in the dialog of the *Plant Simulation object Teamcenter*.

- We changed the return value of the methods **max**, **min**, **sum**, **maxAttr**, **minAttr**, and **sumAttr** of lists and tables.
  - If the designated list range has a uniform data type, the return value now also has this data type.
  - If the data type is not uniform, the return values are converted to the data type *real* and the method returns the data type *real*.
- We extended the functionality of the **PLCSIM Advanced** interface. You can also allocate signals in the Input/Output/Marker range via their address. This is useful if you want to access memory in the virtual PLC for which no identifiers were assigned in the PLC program.
  Open an existing group by double-clicking it. Or create a new group, click **Apply**, and then double-click the new group. Enter a percentage sign followed by a character that sets the range, and the address as the identifier. Compare these examples:
  - %I100 for an Input signal at address 100
  - %Q40.7 or %O40.7 for an Output signal at bit 7 of address 40
  - %M5 for a Marker signal at address 5

Changed Features in Plant Simulation 14.1

- We changed the behavior of the **Step Into** mode of the *Method Debugger*: In previous versions this mode also jumped into encrypted methods. From this version on this is not the case any more. When the next instruction is the call of an encrypted *Method*, the command **Step Into** instead behaves like the command **Step Over**.
- We changed the behavior of the object **Variable**. When you clear **Show units**, *Plant Simulation* does not show the distribution parameters any more.
- We changed how *Plant Simulation* sorts table columns of data type *object*: In previous versions empty rows were sorted like the string VOID. From now on empty cells are sorted at the end of the column for ascending sorting; they are sorted at the start of the column for descending sorting (**sort**, **inOrder**).
- We do not support the method *increment* of the *TableFile* any more. You can use the **+=** operator instead, for example

```
TableFile[x,y] += 1
```

instead of

```
TableFile.increment(x,y)
```

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New and Changed Features of the User Interface Objects

Tecnomatix Plant Simulation 15 provides a number of new and improved features.

New and Changed Features in Plant Simulation 15.0

- We added the object **CostAnalyzer**  .
  To facilitate cost analysis, we also added the tab **Costs** to the *material flow objects*, the tab **Costs** to the *Part* and to the *Container*, and the tab **Costs** to the *Worker*.

- We added the check box **Inheritance box** to the command **New Check Box** of the object **Dialog**.

- We enhanced the behavior of the setting **Display in Frame** of the *Chart*. It now provides the setting **3D image quality** provided 3D is activated.

- We changed the behavior of the **HtmlReport**.
  It now sorts according to the object names. Let's say that you show a table with statistics data of all objects in the current *Frame* with the instruction `[current, %States]`. The report then sorts the object order according to the object names.
  If you show all *Drains* with the instruction `[.MaterialFlow.Drain*]`, the report sorts the order of the *Drains* according to their names.

- We changed the behavior of the **HtmlReport** for collecting and displaying object instances, compare **Collect Object Instances and Show Them in the Report**.

- We added the **GanttChart** to the objects which the **HtmlReport**, compare **Display a GanttChart**.

- We added the method **exportChart** to the **GanttChart**.

- We added the method **getPartFlowData** to the *SankeyDiagram*.

New and Changed Features in Plant Simulation 14.2

- We renamed the object *WorkerSankeyDiagram* to **SankeyDiagram**. It replaces the object *SankeyDiagram*, which previous versions provided in the **Toolbox** under **Tools**. The *SankeyDiagram* can display *Sankey flows* of parts as well as *Sankey flows* of *Workers*, who walk freely within the area or walk on *FootPaths*.

- We changed the behavior of the **Dialog**. In previous versions the *Dialog* was closed when the focus/the mouse was located in a dialog item of type **New Edit Text Box** and when you pressed the **Enter** key. In this case the *Dialog* interpreted pressing the **Enter** key as being identical to clicking **OK**. When the standard buttons OK, Cancel, Apply are shown, the *Dialog* will not be closed any longer when the **Enter** key is pressed.
  If the edit text box has a **Callback argument**, now the *Callback Method* of the *Dialog* will be called and the *Callback Method* is assigned the **callback argument _Enter**.

New and Changed Features in Plant Simulation 14.1

- We added the object **GanttChart**. It replaces the *GanttChart* and the *GanttWizard* that previous versions of *Plant Simulation* provided. The *GanttChart* visualizes parts on resources.

- We added the methods **getAnnotations** and **setAnnotations** to the *Chart*. They replace the attribute *Annotations*.

- We added the read-only attributes **GetAverage** and **GetStandardDeviation** to the object *Display*.

- We enhanced the functions that *Plant Simulation* executes when you click **Select an Object or an Object Attribute to be Displayed on the HTML Page** in the *HtmlReport*.
  The dialog **Object Parameters** now recognizes statistics types and shows the respective column parameters. For objects, which record statistics values, the *HtmlReport* now also shows the columns and you can enter which columns you want to show.

Back to What's New in Tecnomatix Plant Simulation 15

New and Changed SimTalk Features

Tecnomatix Plant Simulation 15 provides a number of new and improved features.

New and Changed Features in Plant Simulation 15.0

- We added the method **asObject** to the *arrays*.

- We added the method **join** to the *arrays*.

- We added the method **pop** to the *arrays*.

- We changed how *Plant Simulation* displays empty **arrays**. These are now displayed with an empty space between the brackets, like this `"[ ]"`. In previous versions they were displayed without the empty space like this `"[]"`.
  This also affects the global function **to_str**:

```
var a : real[]
var s : string := to_str(a)  -- s := "[ ]"
```

- We changed the behavior of the **equal operator** and of the **not equal operator** for *arrays*.
  In previous versions the equal operator always computed the value false if the data types of the *array* were different. Suppose that an *array* of data type *real* was compared to an *array* of data type *length*, *Plant Simulation* always computed false, even if the values were identical.
  If an *array* of data type *any* was compared with an *array* that did not have the data type *any*, the result was always false as well.
  From version 15 on this behavior applies:
  When comparing *arrays* of different data types, *Plant Simulation* creates a runtime error and opens the *Method Debugger* in the following cases:

  - *Arrays* of data type *real*, *length*, *time*, speed, and *weight* based on their content.
  - *Arrays* of data type *any* are compared to other *arrays* based on their content as well.

  Arrays of data type *integer* cannot be compared with *arrays* of data type *real*, *length*, *time*, *speed*, or *weight*.

- We changed the behavior of the function **throwRuntimeError**: In case the method does not run as a subroutine, i.e., when no caller exists, *Plant Simulation* opens the *Method debugger* at the position which contains the function *throwRuntimeError*. If the method is encrypted, *Plant Simulation* opens a message box instead that shows the message.

- We extended the upper bound of the parameter *Lambda* of the **Poisson**-distribution from 700 to unlimited. The value of the parameter *Lambda* has to be greater than 0 though.

- We changed the names of the distribution parameters of the **Uniform** distribution: In previous versions they were called **Start** and **Stop**. From this version on they are called **Lower Bound** and **Upper Bound**.

New and Changed Features in Plant Simulation 14.2

- We added the method **contains** to the *arrays*.

- We added the read-only attribute **Magnitude** to the *arrays*.

- We added these functions to check if a string has a valid date/time format: **isValidDateString**, **isValidDateTimeString**, and **isValidTimeString**.

- We added the function **datetime_to_str**.

- We extended the global functions *min* and *max*, compare **Functions for Numerical Values**:

  - You can now also pass more than two parameters to both functions.

  - Both functions can now handle additional data types. In addition to numerical values (*integer*, *real*, *length*, *weight*, *speed*, *acceleration*) the functions now also process parameters of data type *date* and *dateTime* as well as parameters of data type *string*. You cannot mix data types arbitrarily

though, i.e., all data types either have to numerical, or all data types have to be of data type *date* and *dateTime*, or all have to be of data type *string*.

- We changed the behavior of the method **connectAutomatically**. It now does not return false any more when you try to connect a class. Instead, the program opens the *debugger*.

- We changed the return values of the method **getSimTalkTypename**. It now returns for the data types *table/stack/queue* instead of *list* these strings:

Data Type	Up until version 14.1	From version 14.2 on
table	*list*	*table*
stack	*list*	*stack*
queue	*list*	*queue*

For local variables of data type *any*, which were assigned a special object, for example a sensor, the return value now is not of data type *object* more, as such a special object cannot be assigned to a local variable of data type *object*. Instead *getSimTalkTypename* now returns **sensor**, **lane,**, **storage place**, **3D object**, or **3D animation** depending on the type of the special object.

- We changed the behavior of **switch** instruction for values of data type *real*. These no longer check for exact equivalence.

- We changed the behavior of print instructions for values of data type *length*, *weight*, *speed*, and *acceleration*. These now show the unit after the value in the *Console*.

New and Changed Features in Plant Simulation 14.1

- We changed how to enter *arrays* in *SimTalk 2.0 Methods*. Up until now you had to use the function *makeArray*. Now you can enter *arrays* directly into the source code:

```
var a : real[3]
a := [1.4142, pi, sin(0.5)+1]
```

This makes it easier to enter an *array* and it also makes your source code considerably shorter.

- We changed how you enter lengths into *SimTalk 2.0 source code*. Now you can also specify the **Length** with a physical unit. You can enter one of these units: m, mm, km, cm, yd, ft, and in.

```
var len := 1.0ft
var len := 1.0ft
var s : speed := 10.5m / 1:30
```

- We added an optional parameter to the function **num_to_hex**, with which you can set if *Plant Simulation* creates a 64-bit hexadecimal number.

- We added the function **throwRuntimeError**.
- We added the function **enableFullScreenMode**.

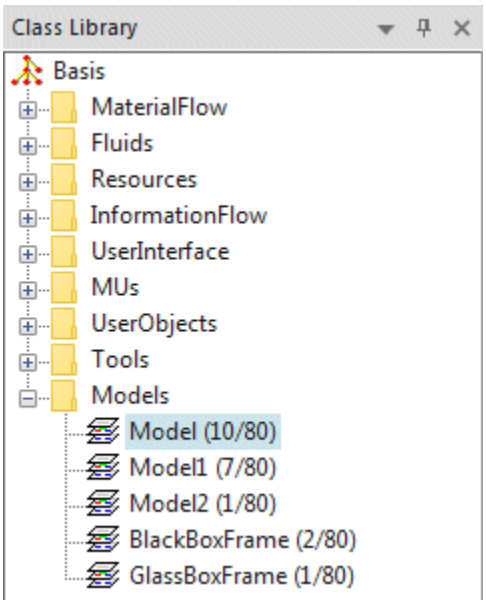
Back to What's New in Tecnomatix Plant Simulation 15

Miscellany

Tecnomatix Plant Simulation 15 provides a number of new and improved features.

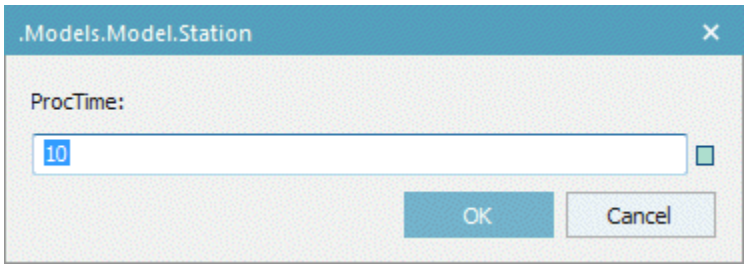
New and Changed Features in Plant Simulation 15.0

- We changed looks of the **Toolbox**.
- We changed the looks of the **Statistics Report**. The data it shows is the same.
- We added the setting **Subscription** to the tab **License** of the dialog **Preferences**.
- We added the read-only attribute **NumberOfLimitedObjects** to the *Frame*. It counts the number of objects which you can use in a **Student License** per used *Frame*.



- We changed the data that the **Profiler** shows:
  - Instead of the total time for method execution it now shows the **percentage**.
  - In addition we now also show the **Total CPU time for 3D rendering** and the **Percentage for worker path network computation**.

- We changed the looks of the window **Show Attributes and Methods**. The column **Inherited** now shows a ✔ for inherited *attributes*, *methods*, and *read-only attributes* and a **-** for not inherited *attributes*, *methods*, and *read-only attributes*. In previous versions the column showed **i** for inherited and **ni** for not inherited.
  In addition you can now change inheritance of the value of an attribute by clicking the inheritance toggle button of the value that you are editing.



> Note:
>
> This does not apply to the objects for the **Genetic Algorithms**.

- We changed the behavior of the window **Show Attributes and Methods**. It now only shows the column with the **German** names of the *SimTalk functions* when:
  You are working on a computer that runs the **German** version of *Windows*.
  You selected **German** as the **model language** of your simulation model.

- We removed the check box **Tooltip includes type info** from the tab **Editor** of the dialog **File > Preferences**. The command **Show Tooltip with Completion** now always shows the type information.

- We added the optional parameter *CanInherit* to the attribute **getAttribute**. It returns if the value of the attribute can be inherited or not.

- We added the **Data Type of the Value You Can Assign** to the **Syntax** description of the *attributes*.
  We added the **Data Type of the Return Value** to the **Syntax** description of the *read-only attributes*.

New and Changed Features in Plant Simulation 14.2

- We changed the behavior when dragging and dropping an object to a **text box**, into *Method* or into a *DataTable*: In previous versions *Plant Simulation* then entered the **absolute path**. From version 14.2 on it enters the **relative path**.

- *Plant Simulation* 14.2 and higher requires version 9 of the *SPLM License Server*.

- We extended the functionality of the command **Import Bitmap File**. The format DWG now also supports **AutoCAD 2018** files.

- We improved the behavior of *Plant Simulation* when you changed the size of text and other items under **Control Panel > All Control Panel Items > Display**. This settin not only applies to the common

Windows user interface, but also for *Frames* in 2D. In doing so, *Plant Simulation* increases the size of the *Frame*. If you select a values less than 150 %, *Plant Simulation* does not increase the size of the contents of the *Frame*.
If you select different sizes of text and other items for different monitors, this does not affect *Plant Simulation*. In this case *Plant Simulation* always uses the size set for the primary monitor. Your changes will only take effect after you logged off and on again.

- We removed support of the method *step* of the *EventController*.

New and Changed Features in Plant Simulation 14.1

- We changed the initialization of random number streams. With the previous way of initializing them it was possible that the first rolled number of a random number stream took similar values for different random number variants of the *EventController*. Due to the changed random numbers the results of short simulation runs can change.

- We added the buttons for controlling the simulation to the  **Quick Access Toolbar**.

- We added the command **Stop on Controls in Object** to the ribbon tab **Debugger**.

- We added the tab **User-defined Attributes** to these objects: **FileInterface**, **FileLink**, **Comment**, **SQLite Interface**, and **PLCSIM_Advanced Interface**.

- We added the context menu command **Revert all Objects to Standard Graphics** to the *Class Library*.

- We enhanced the function **Manage Class Library**. The dialog now also shows **deprecated libraries**.

- We added the method **hasAttribute** for all objects.

- We added the function **OpenConsoleLogFile** to the *COM Interface*.

- We changed the behavior of the attribute **Coordinate3D** for MU instances in a **3D Only** model. Now you cannot query that value any more.

- We enhanced the behavior of the *EventController*. You can now activate and deactivate breakpoints in the dialog window of the **Event Debugger**.

- We enhanced the functionality of the method **setRequiredLicense**.

- We changed the structure of the **SimTalk Reference Help** in the online help. It now consists of two separate topics: **General SimTalk Functions** and **3D-related SimTalk Functions**.

Back to What's New in Tecnomatix Plant Simulation 15

New 3D Features

Tecnomatix Plant Simulation 15 provides a number of new features.

New Features in Plant Simulation 15.0

- We added the command **Optimize Model** to the **Home Ribbon Tab**.
- We added the command **Show Sky** to the **View Ribbon Tab** in 3D.
- We added the subcommand **Mezzanine** to the command **Insert Shape**.
- We added the submenu **Transformation Inheritance** to the **Context Menu for Several Selected Objects**.
- We added **Optimization settings** to the dialog **Import Graphics**.
- We added the check box **Start at first tread** to the object **Stairs**. Select it to make the stairway start at the first tread without the stringer extending onto the floor on which the stairway rests.
- We added the settings **Bounding box of visible graphics** and **Visible graphics** to the **Obstacle for the Worker**.
- We added the number of **obstacles** and the number of the resulting **corner points** to the dialog **Show Obstacles**. The number of **obstacles** and **vertices** affects the computation of the shortest route.
- We added attributes, read-only attributes and methods of **3D Shapes**.
- We added attributes for the material of graphics, compare **Detailed Access To Graphics**.
- We matched the behavior of *Connectors* in 3D with their behavior in 2D, meaning you can now also insert anchor points.
  - The subcommand **Inherit Positions** of the command **Transformation Inheritance** now also activates inheritance of the anchor points of the *Connectors*.
  - You can now also edit the anchor points of the *Connectors* with the position manipulator. If you did not select anything in the scene, the command **Show Manipulators** also shows the position manipulator of the *Connectors* in the scene if *Connectors* are shown in the scene.
- We added the attribute **_3D.getAttribute**.
- We added two optional parameters to the method **createCuboid**. You can use them to add a colored line around the created cuboid.

Back to What's New in Tecnomatix Plant Simulation 15

New Features in Plant Simulation 14.2

- We added the tab **Poses**. Together with the joints you can define joint kinematics.
  We added **Methods for Poses** for objects which you can insert into a *Frame*, and for *MUs*.
- We added the tab **Joint**. Here you can define the settings for **rotating** and **translating** the animation joints of the animation objects. In this context we moved the settings for the **rotation axis** and the **rotation center** of the animatable objects from the tab **Self Animation** to this tab.
- We added the read-only attribute **_3D.ExistsWithAnimation**.
- We added the attribute **_3D.AniTranslationDirection**.

Back to What's New in Tecnomatix Plant Simulation 15

New Features in Plant Simulation 14.1

- We added the conveyor **type** > **Guide-railed belt conveyor**.
- We added a number of new extrusion profiles for the conveyor **type** > **User-defined**.
- We enhanced the **configuration options** of the conveyors considerably and we changed the **leg types**.
- We added the tab **States** to the **3D Properties** of the objects. In doing so, we moved the respective settings from the tab **Graphics** to the tab **States**.
- We added the **animation area** to the tab **MU Animation** of the **PlaceBuffer** in 3D.
- We added the setting **Wall thickness** to the dialog **Insert Box**.
- We added the buttons **Show Manipulators** and **Hide Manipulators** for most objects to the **Edit** ribbon tab. During this process we removed the context menu command **Segments > Show Segments** for the length-oriented objects and the command **Show Corner Points** from the context menu of the *Connector*.
- We added settings for positioning the imported graphic to the dialog **Import Graphics**.
- We added the **context menu for several selected objects**.
- We added the commands **Show**, **Paste**, and **Remove Texture** to the **context menu of a graphic node**.

- We added the methods **_3D.MUAnimations.AnimationPathName.getPositionAt** and **_3D.MUAnimations.AnimationPathName.Length** for saved MU animations.

Back to What's New in Tecnomatix Plant Simulation 15

Changed 3D Features

Tecnomatix Plant Simulation 15 provides a number of changed and improved features.

Changed Features in Plant Simulation 15.0

- We changed the look of the **Planning View**:
  - We now show the background of the *Frame* without a color gradient and white by default. This is not the case if you set a color of its own for the opened *Frame* or the *folder*.
  - We now always show the grid, independent of the grid settings, without a base plate.
- We changed the behavior of **3D only** models:
  In **3D only** models the positions and rotations between 2D and 3D are now always synchronized. In the past you could not deactivate the connection between positions and rotations between 2D and 3D. It was still possible though via *SimTalk* and existing models retained their state concerning their existing connection between position and rotation connections when switching the model type to **3D only**.
  The new behavior has the following effects:
  - When loading models created in previous versions, positions, rotations, and anchor points of length-oriented objects are force-synchronized based on the data from 3D.
  - The same happens when switching the model type to **3D only**.
  - *SimTalk* access to the attributes **_3D.RotationsConnected** and **_3D.PositionsConnected** do not cause an error in the *Debugger*. The assignment is ignored though and *Plant Simulation* now always returns a constant value when querying it. For **positions** the return value always is true and for **rotations** it is true in most cases, depending on the object type. In some special cases, for example for the *Variable*, the return value is false.
- We changed the behavior when you select *MU instances* and *Worker instances*. *Plant Simulation* now does not select these per window in 3D any more, but in general. In most cases this does not have any direct visible effects.
  You can see the difference though when more than one 3D window is open and these 3D windows show the same *Frame* or different parts of the same *Frame*. An instance then counts as being selected in a window when in it is selected in 3D and is also visible in this window. As opposed to previous versions you can now also select an MU in one window and deselect it in another window.

- We changed the behavior when **Lock Structure** is activated. When you hold down the **Alt** key, *Plant Simulation* selects the objects which you click. When you do not hold down the **Alt** key, *Plant Simulation* selects the *Frame instances* that are inserted in the model.

- We changed the number of 3D windows that you can open interactively. In previous versions you could open 32 3D windows, from version 15 on you can only open 30.

- We simplified the *SimTalk* access to **3D Shapes** and for **Detailed Access To Graphics**. We also added a number of new attributes and methods.

- We terminated support of the methods *_3D.MUAnimations.Animation.cancelRedirection*, *_3D.MUAnimations.Animation.isRedirected*, and *_3D.MUAnimations.Animation.redirectTo* any more. We recommend to use the attribute **_3D.AnimationObject** with additional animatable objects instead.

- We changed the display of 3D graphics: If 3D graphics are hidden because of the values you set for the **Screen coverage threshold**, the entire numeral display is now treated as an indivisible graphic, meaning that *Plant Simulation* either shows the entire number or nothing at all. In previous versions each number was treated individually, which, for example, lead to the decimal point being hidden. When you select OpenGL 4.3 or higher and have a graphics card that is suited for this, *Plant Simulation* now uses a different mode for processing stacked transparencies, for example half-transparent window in front of another half-transparent window.

- We changed the behavior of the commands **Make Animatable Object** and **Make Simulation Object**: If the command **Lock Structure** is active for one of the concerned *Frames*, these commands will not be executed when you called them in a view.

- We changed the behavior when importing graphics, which are to consist of several files. When *Plant Simulation* now does not find a reference to a file, it cancels the entire graphics import with an error message.

- We changed the looks of the legs of store graphics of **type** > **Floorspace**. These now always are square. This can lead to changed simulation results in models in which Workers walk below the *Store* and for which you selected **Obstacle for the Worker > Graphics**.

- We changed the behavior of the **Rack**. Its frame does not create a **worker obstacle** any more.

- We changed and enhanced the settings of the command **Optimize Selected Graphic**.

- We enhanced the behavior of the command **Move to Zero**. It now also apples to **JtTriStripSets**. These are graphics nodes, which do not have any child nodes and oftentimes consist of imported graphics.

- We enhanced the behavior of the command **Show Manipulators**. You can now also display them for *Frames*. We also combined the commands **Show Manipulators** and **Hide Manipulators** to a single command.

- We changed the behavior of the attribute **_3D.Dimensions**. You cannot assign negative dimensions to a *Store* any more.

- We enhanced the behavior of the mouse wheel in the **Pose Editor**. You can now also use the mouse wheel when entering the **upper limit** or the **lower limit** for the joint on the tab **Poses**.

- We changed the behavior when editing **poses**. These are not shown orange any more.

- We enhanced the behavior of the **edddison** *interface*. When you define a bounding box, you can now also set its **Name** and its **Height**.

Changed Features in Plant Simulation 14.2

- We improved the behavior of the setting **Transparent** of the objects *Display*, *Comment*, and *Variable* in 3D. These now allow the background of the *Frame* to shine through, just as the objects do in 2D, when you activate the check box.

- We changed the behavior for automatically connecting length-oriented objects which transport parts. *Plant Simulation* now also considers this exception in 3D for the objects *Turnplate*, *Turntable*, *AngularConverter*, *Conveyor*, *Track*, *Converter*, and *TwoLaneTrack*: When **Transfer length** is deactivated for one of these objects in 3D, but when a suitable MU animation path exists, then *Plant Simulation* uses the start and the end point of this animation path for automatically connecting objects and for depicting the *Connectors*. Suitable MU animation paths are **Default** or **Cross** for the *Converter*, **A** or **B** for the *TwoLaneTrack*, and **Default** for all other objects. This applies to the setting **Connect objects automatically** and for the method **connectAutomatically**.

- We changed the looks of the manipulators of the length-oriented objects to improve usability, compare **Show Manipulators**.

- We changed the behavior of manipulators for **factory walls** and for the **fence**. You can now also set one of the dimensions to **0** by dragging the respective manipulator.

- We changed the looks of the cross hairs when you use the command **Make Animatable Object**. The cross hairs is now drawn in the maximum contrast color to the background color and is twice as thick starting from a certain distance from the object itself.

- We changed the identifiers **Extrusion path** and **Extrusion profile** to **Extrusion configuration**.

- We changed how 3D shows the individual lines in the **WorkerSankeyDiagram**. These are now terminated with semi-circles to make the transition between lines look better.

- We changed how to play translations and rotations. In previous versions you had to specify <Path>_3D.**SelfAnimations.playTranslation** and <Path>_3D.**SelfAnimations.playRotation**. Now you can also type *<Path>_3D.playTranslation* and *<Path>_3D.playRotation*.

- We changed the behavior of the attribute **_3D.ShowContent** or *_3D.getObject(...).ShowContent* respectively. It now only applies to objects, which can transport MUs, and for the *Frame*.

- We changed the behavior of the dialog **Grid Position and Orientation**. When you close it, grid position and grid orientation will now be reset.

- We changed the behavior when exporting 3D scenes, for example with the command **Export Bitmap**, for adding the picture to a *HTMLReport* or for **printing**. The picture of the 3D scene is now created with the best possible quality, i.e., the **screen coverage threshold** is ignored here.

- We renamed the attributes *_3D.SelfAnimations.EstimatedBlockAnimationTime* and *_3D.SelfAnimations.EstimatedTotalAnimationTime* to **_3D.SelfAnimations.AnimationTimeBlock** and **_3D.SelfAnimations.AnimationTimeTotal**.

- We renamed the attributes *_3D.CameraAnimations.EstimatedBlockAnimationTime* and *_3D.CameraAnimations.EstimatedTotalAnimationTime* to **_3D.CameraAnimations.AnimationTimeBlock** and **_3D.CameraAnimations.AnimationTimeTotal**.

- We removed the command **Insert Shape > Box**. To create a flat plate, type in a very small value, for example `0.01`, for the respective **dimension** of the box.

- We terminated support of the attribute *_3D.Location*.

- We terminated support of the methods *_3D.CameraAnimations.scheduleRotation*, *_3D.CameraAnimations.scheduleTranslation*, *_3D.CameraAnimations.playRotation*, and *_3D.CameraAnimations.playTranslation*.

Changed Features in Plant Simulation 14.1

- We changed where *Plant Simulation* places an object:

  - When you click an object with the mouse and then insert it on another object or a graphic.

  - When you place objects with Drag and Drop, for example a *part* onto a *Pick-and-Place-robot*.

  - When you create and insert a sensor with the mouse.

  In previous versions *Plant Simulation* projected the mouse position onto the grid and used this coordinate as the insertion or target position. From now on *Plant Simulation* uses the surface of the object or the graphics over which the mouse is located as the insertion or target position.

- We changed how to create a non-textured plate. Just type in `0` into one of the text boxes in the dialog **Create Cube**.

- We set the height of text, which you insert with **Insert Shape > Create Text** into your model to 1 cm.

- We changed how parts are animated on length-oriented objects. The length-oriented objects now longer provide automatically generated animation paths on the tab MU Animation. Instead they now animate the parts without using animation paths. This makes the enforced deactivation of the MU animation for length-oriented objects redundant.

- We changed the behavior of **Buffer** and **Sorter**. *Plant Simulation* now shows the parts stacked in 3D when these object only have a single animation point.

- We changed the behavior of the command **Select All** (**Ctrl+A**). It does not select path nodes and manipulators any more.

- We changed the behavior in a **3D Only model**. It does not show the check boxes **Connect 2D and 3D Positions** and **Connect 2D and 3D Rotations**.

- We changed the behavior when inserting *Connectors* with the mouse. When you click on an *Interface* of a *sub-Frame* while doing so, this *Interface* is now directly evaluated as the starting point or as the target. When the *Interface* is allowed, it will be connected, when the *Interface* is not allowed, *Plant Simulation* does not execute any action. When you click on any other part of the *Frame*, *Plant Simulation* behaves as in previous versions, and opens the dialog **Select Interface**.

- We changed the return value of the method **_3D.CameraAnimations.getAnimation**.

- We do not support the graphic format PLMXML any more. From this version on, you cannot import graphics in PLMXML format.

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What's New in Tecnomatix Plant Simulation 14

What's New in Tecnomatix Plant Simulation 14

Tecnomatix Plant Simulation 14 provides a number of new and improved features.

- New and Changed SimTalk Features
- Miscellany
- New 3D Features
- Changed 3D Features

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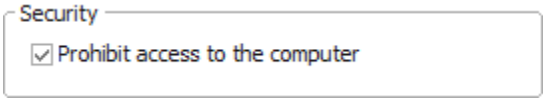
Important Changes in Plant Simulation 14

Tecnomatix Plant Simulation 14 provides a number of new and improved features.

Security

We added the setting **File > Model Settings > General >** Access to the computer is prohibited to ensure that simulation models, which you receive from others, do not damage your computer.



- To facilitate this via *SimTalk*, we added the method **isComputerAccessPermitted**.
- To facilitate this via *SimTalk*, we added the method **SetTrustModels** to the *COM interface*.
- If you activate this security setting, this also affects a number of methods that can access your computer.
- We added the start option `-TrustModels`. When you enter this **start option**, *Plant Simulation* treats models, which you receive from others as if they were your own models. When you open a model that your received from somebody else, for which the model setting permits access to the computer, *Plant Simulation* does not notify you about this.
  Models, which were saved with a version older than 14, do not receive a trust ID and thus are always considered to be models from other people. Normally access to the computer is denied when loading an old model into version 14. If you entered the start option `-TrustModels`, the old model automatically has access to the computer.
- We added the setting **Access to the computer is permitted** to libraries.
  We added another parameter to the method **getLibraryInfo** allowing you to query access to the computer.

Active Workspace in Teamcenter

We added *Active Workspace* for easier and more convenient access of *Plant Simulation* to the *Teamcenter database*.

- You can use *Active Workspace* to add your *Plant Simulation* models to the *Teamcenter database* and to later open them from the database.
  With *Active Workspace* you can:

  - Select the target folder of the model with the command **File > Teamcenter > Add to Teamcenter**.

  - Select a model with the command **File > Teamcenter > Open from Teamcenter**.

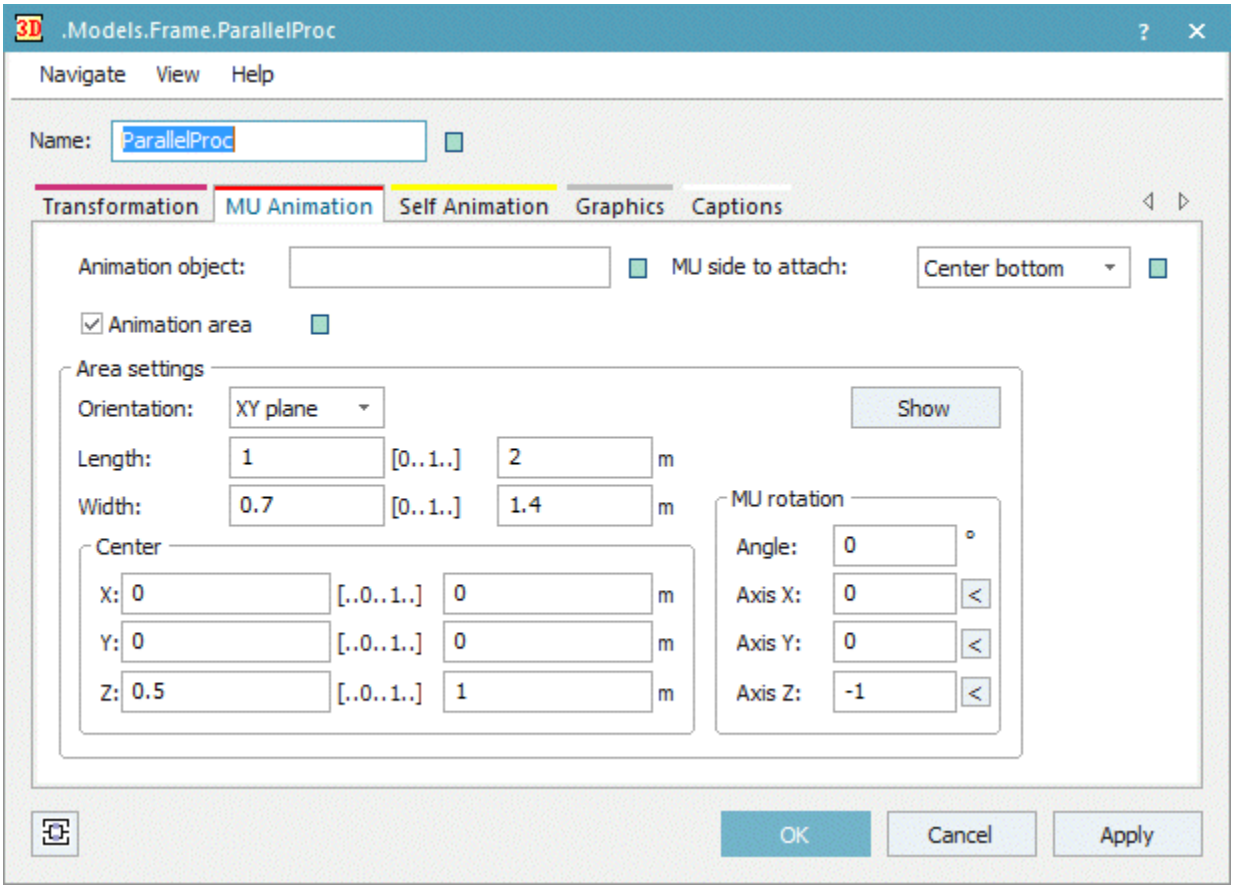
- With *Active Workspace* in the **Teamcenter** *Interface* you can select *Teamcenter objects* via *Active Workspace* and to further process these objects in *Plant Simulation*.
  You can:

  - Select an **application interface object** in the dialog of the *Teamcenter Interface* via *Active Workspace*.

  - Select the **target folder** of the **Report** in the dialog of the *Teamcenter Interface* via *Active Workspace*.

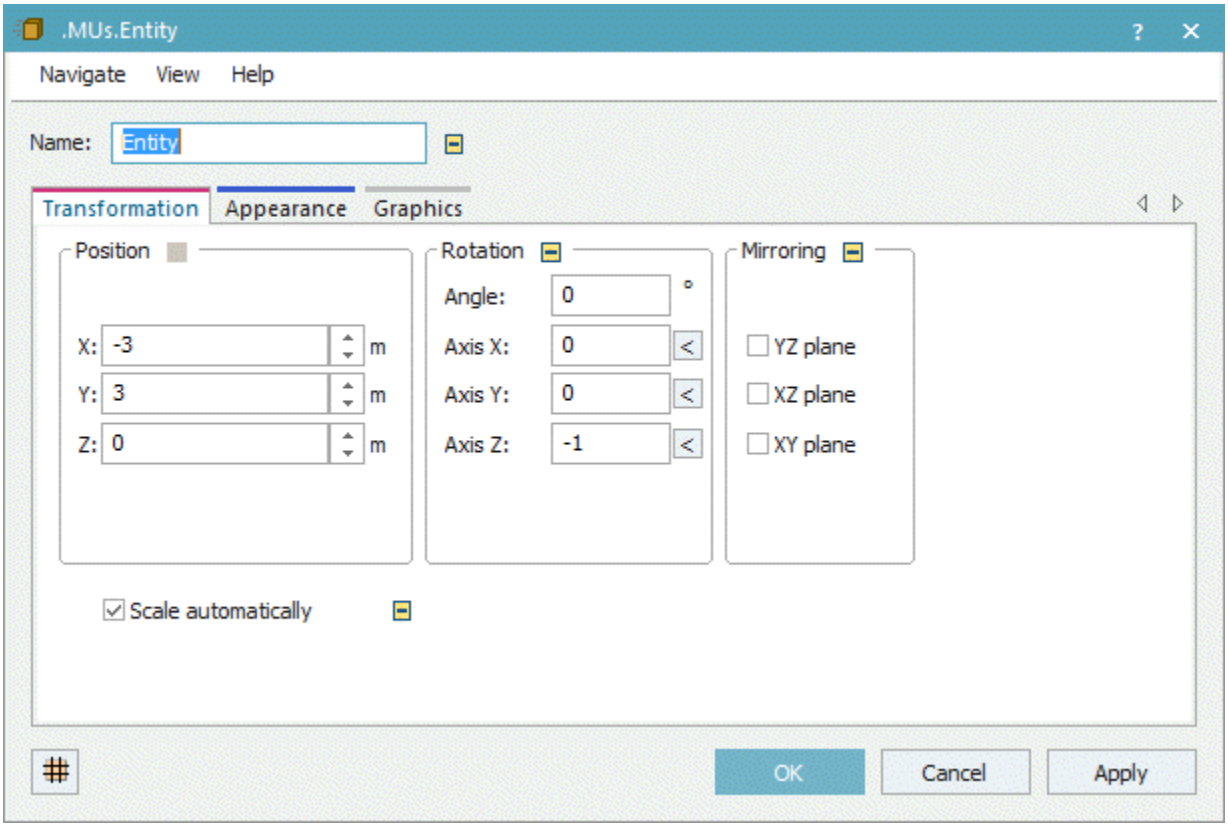
Animation Area for Parts

We added settings for the **animation area** to the tab **MU Animation** of the objects with matrix loading space. The animation area replaces the function **Create Paths > Create Locations** of previous versions *of Plant Simulation*.



Scale Parts Automatically

We replaced the setting **Auto graphics active** for the MUs with the setting **Scale automatically**. It adjusts the size and the position of the graphic of the MUs to the dimension and the booking point of the MU in 2D.



Simulation- and Animation-Relevant Changes

We made changes that are relevant for the simulation and the animation in *Tecnomatix Plant Simulation* 14. For this reason you have to adapt simulation models which you created in previous versions of *Tecnomatix Plant Simulation*, when you open them in *Tecnomatix Plant Simulation* 14.

Simulation- and Animation-Relevant Changes in Plant Simulation 14.0

- We changed the behavior of the feature **setup after n parts** with the setting **After last part**. If you entered a formula for the setup time, the anonymous identifier @ was void in previous versions when the machine was set up after the n-th part. Now you can access the n-th part with @.

- We changed the behavior of the *Store* when it delivers mounting parts for an *AssemblyStation* and when several parts in the *Store* are simultaneously unblocked for a main part. From this version on the parts arrive in reversed order at the *AssemblyStation*.

- We changed the behavior of the read-only attribute **CurrentSpeed** of MUs on *Conveyors*. *CurrentSpeed* now always has the sign (+ or -) of the respective direction of movement of the *Line*. In previous versions the sign of the *CurrentSpeed* could differ from the direction of movement of the *Conveyor* when the MU was conveyed by a *Converter* beforehand.

- We changed the behavior of method **initialize** of the *TableFile*. If you tried to initialize the column index, for example with `TableFileFile.initialize({0,*}, "AA"))`, *Plant Simulation* did not execute this and retained the previous values. Now *Plant Simulation* assigns the passed initial value.

- We changed the behavior of the attribute **Coordinate3D**: It now returns an *array* of data type *length* instead of data type *real* as in previous versions.

Simulation- and Animation-Relevant Changes in Plant Simulation 13.2

- We changed the behavior of the **SQLite** Interface: When you open a file-based *SQLite database*, *Plant Simulation* applies the following default settings, which deactivate transaction support:
  PRAGMA locking_mode=EXCLUSIVE
  PRAGMA journal_mode=NORMAL
  PRAGMA synchronous=OFF
  These settings considerably accelerate access to the database.
  To get the *SQLite* default settings, which support transactions, you can use the following instructions:

```
SQLite.exec("PRAGMA locking_mode=NORMAL");
SQLite.exec("PRAGMA journal_mode=DELETE");
SQLite.exec("PRAGMA synchronous=FULL");
```

- We fixed non-expected behavior that occurred in the method **find** of lists and tables. When you searched a table and then started a second search, for which you entered a range, which did not contain the cell of the first search, the search was only started after the first cell of the new range, as the search was continued.
  Now we reset the search and the search then starts in the first cell of the range as if a call of the method **setCursor** had been executed.

Simulation- and Animation-Relevant Changes in Plant Simulation 13.1

- When **resetting** the simulation model, *Plant Simulation* now does not call the **Request control**, the **Receive control**, and the **Release control** of the *Importer* any more.
  This is because the MUs are deleted when resetting the simulation model. This then triggered the **release control** for example. Normally you can access the active MU with the anonymous identifier **@**. As the active MU was deleted while resetting the model, the *Debugger* opened. For this reason you had to program source code in your model that handled a case that never occurred during the simulation.

- The new settings of the *3D-function* **MU side to attach** caused the state of the setting to convert the animation path to the new setting. A model, that relies on a certain inheritance state of the **MU Animation** and then changes the state with *SimTalk* commands, might lead to a changed animation for the object *Pick-and-Place-Robot*.

Back to What's New in Tecnomatix Plant Simulation 14

New Features of the Material Flow Objects

Tecnomatix Plant Simulation 14 provides a number of new features.

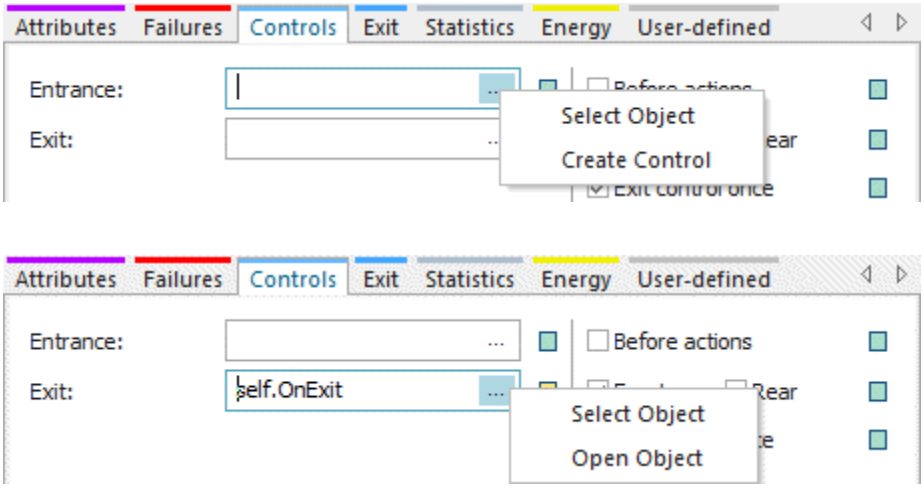
New Features in Plant Simulation 14.0

- We added the setting **MU conveying direction** to the tab **Attributes** of the *Pick-And-Place-Robot*.
- We added the **Tab Importer** to the *Pick-And-Place-Robot*. This way you can order a *Worker* for repairing the services to remove the failure.
- We added the setting **Off** to the dropdown list **Set-up depends on**. It deactivates setting the object up after changing the type to another MU. This means that the station will only be set-up **after the number of parts** that you selected.
- We added the **Z-dimension** to the *Store*, the *Container*, and to the *Transporter*. This allows you to stack parts on these objects.
- We added the attribute **MUHeightWithContent** to the MUs. You can use it when stacking parts.
- We added the setting **Throughput per Minute** to the tab **Tab Type-dependent Statistics** of the *Drain*.
- We added a setting to the object **Interface** to show the number of the next aimed at exit on the tab **Exit** when you already determined that exit.

New Features in Plant Simulation 13.2

- We added the setting **Only for empty blocking list** to the tab **Attributes** of the *Pick-And-Place-Robot*.
- We added the setting **Target selection** to the tab **Exit** of the *Pick-And-Place-Robot*.
- We added the **Loading time** and the **Unloading time** to the tab **Attributes** of the *Pick-And-Place-Robot*.
- We added the method **findFreePlace** to the *Store*.
- We added the read-only attribute **LocationInFrame** to the MUs.
- We added the attribute **TargetDistance** to the *Transporter*.
- We added the command **Delete Sensor** to the context menu of length-oriented objects in the *Frame*. To delete a sensor in 3D, press the **Del** key on the keyboard.
- We added the method **getHTMLCode** for all objects which can create a statistics table in the *HtmlReport*.

- The button ... in the text box of the control on the tab **Controls** now provides these commands:



New Features in Plant Simulation 13.1

- We enhanced the functionality of the *Source*. For the setting **Time of creation > Interval Adjustable** you can now also set the **Amount** of parts to be produced. When you do not set the **Stop time**, *Plant Simulation* produces the amount of parts you entered at most.

- We added the setting **Assembly table > Depends on Main MU** to the *AssemblyStation*.

- We added the menu command **Calculate Dimensions from 3D** to the **Tools** menu of the MUs.

- We added the method **getStoragePlace** to the MUs. You can use it to find out on which storage place within a *Store* the MU is located.

- We increased the number of **Parameters** which *observer methods* accept. You can declare *observer methods* with one, two, or three parameters.

- We added the optional parameters *Destination* and *Name* to the methods **derive** and **duplicate** to enable these methods to replace the method *createObject*. To create the object at a certain position in the *Frame* as with the method *createObject*, use the attribute **Coordinate3D**.

- We replaced the method *setUp* with the method **resSetUp**.

Back to What's New in Tecnomatix Plant Simulation 14

Changed Features of the Material Flow Objects

Tecnomatix Plant Simulation 14 provides a number of changed and improved features.

Changed Features in Plant Simulation 14.0

- We changed how the function **Fast Forward Simulation** of the *Eventcontroller* works. It now automatically deactivates **Realtime mode**. When you terminate **Fast Forward Simulation**, **Realtime mode** will be activated again, provided it was activated before.
  You can now quick and easy switch between **Fast Forward Simulation** and normal simulation by clicking the respective button while the simulation is running.

- We changed the behavior when querying the **contents list** of a length-oriented object or of the **position list** of an MU on a length-oriented object with the methods **contentsList** and **positionList**. The values for the positions are not rounded any more.

Changed Features in Plant Simulation 13.2

- We extended the functionality of the method **outIn**. You can now also specify `outIn(-1, true)` for fully processed parts.

- We changed the behavior when an object, on which a blocked MU is located, is failed/paused/stopped: Now the MU is no longer removed from the blocking list when the MU you unsuccessfully attempted to move it with one of the methods **insert**, **move**, or **transfer** before an **Out** event was processed for this MU.

- We changed **product statistics** of the MUs: MUs, which are located in a blocking list, are now always counted as **waiting**, no matter which state the material flow resource is in. MUs, which are loaded or unloaded from a resource by a *Pick-and-Place Robot*, are always counted as **working**.

Changed Features in Plant Simulation 13.1

- We now enter **root.Broker** into the text box **Broker** by default into the sub-tabs of the **Tab Importer**. For this reason *Plant Simulation* now does not show an error message any more when you click on **Apply**. When *Plant Simulation* detects an invalid *Broker* during the simulation, it opens the dialog of the object with the respective sub-tab.

- We changed the behavior of *Plant Simulation*. Now no events are calculated any more when **resetting** your model. This now happens when **initializing** the model.
  You can now also initialize attributes, which affect event generation, for example the **availability**, in the **Init Control**. For this the **init controls** are now executed before the events are calculated. The normal *init methods*, on the other hand, are executed after calculating the initial events.
  Based on this enhancement the **Init Control** of the *Transporter* will now also be executed before the events are calculated. In previous version the **init control** was executed after the events were calculated.

- We changed the behavior of the **Exit strategy > Carry part away**. It is not allowed any more for objects which are part of a balanced line. For models, which you created in previous versions, *Plant Simulation* deactivates the object *Cycle* when you had activated **Carry part away** for one of the objects it controls.

- We changed the behavior of the *AssemblyStation*. When it has objects of type *Store* as predecessors, it requests the required mounting parts from the *Store*. If the required parts are not available in the *Store* at the moment, the *Store* records the request and delivers the parts to the *AssemblyStation* when they are available again.
  The parts can also be carried from the *Store* to the *AssemblyStation* by a *Worker*. The *Store* can only provide mounting parts, but no main parts and has to be connected with a *Connector*, even when the *Worker* carries the part away.

- We changed the behavior of the method **mu** of the *Container*, the *Transporter* with a loading space, and of the *Store*. You can now call it with the parameter -1. Then the method returns the last MU on the object or VOID when the object is empty. You can, for example, use the method to unload a *Container* in reverse order.

- We changed the behavior of *Plant Simulation*. The method **finishedTime** of the MUs is now observable.

- We changed the behavior *Plant Simulation*. The attribute **RemainingSetupTime** is now observable.

- We do not support the method *createObject* any more. Use the methods **derive** or **duplicate** instead. To create the object at a certain position in the *Frame*, use the attribute **Coordinate3D**.

- We do not support the method *ShowStandardMenus* any more.

Back to What's New in Tecnomatix Plant Simulation 14

New and Changed Features of the Fluid Objects

Tecnomatix Plant Simulation 14 provides a number of new and improved features.

New Features in Plant Simulation 13.2

We added the observable attribute **currentMaterial** to the *Portioner*.

New and Changed Features in Plant Simulation 13.1

- We added the **Tab Controls** and the **Ingredient complete control** to the *Mixer*.

- We replaced the method *setUp* with the method **resSetUp**.

Back to What's New in Tecnomatix Plant Simulation 14

New and Changed Features of the Resource Objects

Tecnomatix Plant Simulation 14 provides a number of new and improved features.

New and Changed Features in Plant Simulation 14.0

We added an optional parameter to the method **getRouteLength** which sets if the *Worker* gets to the *Workplace* by walking freely within the area or not

New and Changed Features in Plant Simulation 13.1

We changed the behavior of the *Workplace* when you create a new model. Now **Worker stays here after completing the job** is activated by default.

Back to What's New in Tecnomatix Plant Simulation 14

New Features of the Information Flow Objects

Tecnomatix Plant Simulation 14 provides a number of new features.

New Features in Plant Simulation 14.0

- We added the method **deleteContent** to the *TableFile*.
- We added a message when you try to change the source code of a read-only *Method*.
- We added an optional parameter to the method **open** of the *FileInterface*.
- We added an optional parameter to the method **open** of the *SQLite Interface*.

New Features in Plant Simulation 13.2

- We added the **PLCSIM** Interface.
- We added the feature **Statements** to the **SQLite** Interface.
- We added the method **executeStatement** to the **SQLite** Interface.
- We added a feature allowing you to set a *class breakpoint* and/or an *instance breakpoint* for an encrypted method. The *Method* then stops at, respectively during, method execution in the *Debugger*.
  When you did set a breakpoint, this *Method* shows the breakpoint with the respective icon within the *Method editor* or the *Method debugger* before the message **Source code is encrypted**.

New Features in Plant Simulation 13.1

- We added the **OPCUA Interface**.
- We added the **PLCSIM Interface**.

- We added a function which shows the elapsed time in the status bar of the *Method Debugger* when you execute one or several instructions in a *Method* with the commands **Step Over** (**F10**), **Step Into** (**F11**), **Step Out** (**Shift+F11**) or **Run to Cursor** (**Shift+F10**) and when executing the instructions takes 10 milliseconds or longer.

- We added the tab **Anonymous Identifiers** to the **watch window** of the *Method*. *Plant Simulation* now shows the anonymous identifiers **@** and **?** on this tab instead of the **Tab Variables** as in previous versions of the program.

- We now mark temporary breakpoints and bookmarks in the source code of a *Method* in a brighter color than saved breakpoints and bookmarks. This might, for example, be the case when you changed the source code of a *Method* and set a breakpoint or a bookmark after the original end of the source code. These breakpoints or bookmarks are lost when you do not apply the source code.

- We added the method **getHTMLCode** to *lists* and *tables*.

- We added the method **copyContentTo** to the *lists* and *tables*.

Back to What's New in Tecnomatix Plant Simulation 14

Changed Features of the Information Flow Objects

Tecnomatix Plant Simulation 14 provides a number of changed features.

Changed Features in Plant Simulation 14.0

- We changed the behavior of the **column width** of *lists* and *tables*. It is now limited to 180.

- We removed support for the method *selectSyncFromDialog* of the *Teamcenter Interface*.

Changed Features in Plant Simulation 13.2

- We fixed non-expected behavior that occurred in the method **find** of lists and tables. When you searched a table and then started a second search, for which you entered a range, which did not contain the cell of the first search, the search was only started after the first cell of the new range, as the search was continued.
  Now we reset the search and the search then starts in the first cell of the range as if a call of the method **setCursor** had been executed.

- We added the columns **Description** and **Creation Date** to the tables in the dialog **Select Teamcenter Sync** (**Import**). In addition, you can now sort the columns in the tables.

- We changed the names of the following interface objects:

Old Name	New Name
OPCUAInterface	OPCUA
OPCClassicInterface	OPCClassic
SIMITInterface	SIMIT

Changed Features in Plant Simulation 13.1

- We renamed the *OPCInterface* to **OPCClassicInterface** and we added the **OPCUAInterface**.
- We activated the setting **Decimal places** for the *Variable* for variables of data type *time*.
- We replaced the methods *indexXDim* and *indexYDim* of the *TableFile* with the read-only attributes **XDimIndex** and **YDimIndex**.
- We changed how *Plant Simulation* exports data from tables with the command **Export Excel File** to the Excel format: Until now *Plant Simulation* always used the proprietary SI units and not the unit that you had selected. Now *Plant Simulation* exports the data with the settings that you selected for the units. Suppose that you selected **Foot** as the length unit for a column of data type Length. Then *Plant Simulation* exports the values in **Feet** to Excel and interprets the values as **Feet** when you import them back to *Plant Simulation*.
- We added an optional parameter to the method **openDialogBox**. You can use it to set that the column widths will be calculated automatically.
- We do not support the attributes *ShowToolbar* and *ShowStandardMenus* any more.

Back to What's New in Tecnomatix Plant Simulation 14

New and Changed Features of the User Interface Objects

Tecnomatix Plant Simulation 14 provides a number of new and improved features.

New and Changed Features in Plant Simulation 14.0

- We added the object **WorkerSankeyDiagram** to the **User Interface** objects.
- We added a message that asks if you want to cancel your changes when you click **Cancel** or press the **Esc** key in the dialog of the object **HtmlReport**.

New and Changed Features in Plant Simulation 13.2

- We added **access to cells of lists and tables** in the object *HtmlReport*.
- We changed the syntax of the method **getHtmlCode** of the *Chart*.

New and Changed Features in Plant Simulation 13.1

- We added the method **setEditType** to the object *Dialog*.

- We enhanced the functionality of the object *HtmlReport*. You can set the table columns for objects which show statistics tables in the report, compare **Display Statistics Values of an Object as a table in the Report**.

- We changed the unit with which *Plant Simulation* shows the **width** and the **height** of the objects *DropDownList* and *Button*. In previous versions these were displayed in pixels, now they are shown in meters.
  To facilitate this, we introduced the attributes **ObjectWidth** and **ObjectHeight** and we removed support for the attributes *Width* and *Height*.

- We moved the setting **Data** in the dialog of the object *Chart* from the tab *Display* to the **Tab Data**.
  The setting **Display in Frame** on the tab *Display* now also affects 3D.
  When **Display in Frame** is activated, you can now enter the **Width** and the **Height** of the chart in length units, for example in meters. You can also set the dimensions with the attribute **SizeInFrame**.

- We replaced the methods *getValue* and *setValue* of the object *Display* with the attribute **Value**.

Back to What's New in Tecnomatix Plant Simulation 14

New and Changed SimTalk Features

Tecnomatix Plant Simulation 14 provides a number of new and improved features.

New and Changed Features in Plant Simulation 14.0

- We added the keyword **waitExpired**. This way you can specify a time limit for **waituntil- and stopuntil-statements**.

- We made these changes in connection with the internal web server of *Plant Simulation*:

  - The internal web server will now only be started when you entered the **start option** `-WebServer` or `-WebServer:Portnumber`.

  - The function **portNumber** now returns 0 when the web server has not been started.

  - For the function **openHTMLBrowser** URLs that begin with `L/` only work when the web server has been started.

New and Changed Features in Plant Simulation 13.2

- We added the method **appendArray** to the arrays.

- We changed the behavior of the **wait instruction**: When it is executed with a negative time, *Plant Simulation* opens the *Method Debugger* and shows an error message. In previous versions a negative wait time was implicitly changed to 0.

- We added the method **_3D.activateMaterialWithColor** for the MUs.

New and Changed Features in Plant Simulation 13.1

- We enhanced the functionality of the *modulo operator*, compare **Arithmetic Operators**. They now also work for floating point values.

- We enhanced the functionality of the *arrays*. You can now **add and subtract arrays of numerical data types**.

- We added the function **getErrorStop**.

- We enhanced the fuctionality of **SimTalk** 2.0. You can now enter *time literals*:

```
wait 1:30  -- wait 1 Minute and 30 seconds
&Method.methCall(1:0:0:0.5) -- call the Method in 1 and half a second
```

- We changed the behavior of *Plant Simulation*. When the *SimTalk* functions for arrays **min** and **max** are called with two values, which have the same physical unit, the return value now also has this value. Compare these examples

```
min(time, time)         -> time
min(length, length)     -> length
min(length, speed)      -> real
min(length, real)       -> real
min(integer, integer)   -> integer
min(integer, real)      -> integer
min(real, integer)      -> integer
min(integer, weight)    -> real
```

- We changed which objects the method **numOfLimitedObjects** does not count as well, namely objects of type *Interface* and *EventController*.

Back to What's New in Tecnomatix Plant Simulation 14

Miscellany

Tecnomatix Plant Simulation 14 provides a number of new and improved features.

New and Changed Features in Plant Simulation 14.0

- We do not start the internal webserver automatically any more. If you want to use it, you have to start it explicitly with the start option `/WebServer`.

- We do not show the **TransferStation** by default on the tab *Tools* any more when creating a new model. You can always add it to your model via **Start > Manage Class Library**. The new functions of the **pick-and-place robot** can now also emulate most of the functions of the *TransferStation*.

- We moved the settings for *Connectors*, namely **Connect objects automatically** and **Connector positioning** from the tab **User Interface** to the tab **General** in the dialog **Preferences**.

- We added the settings for *Connectors* to the tab **General** in the dialog **Model Settings**.

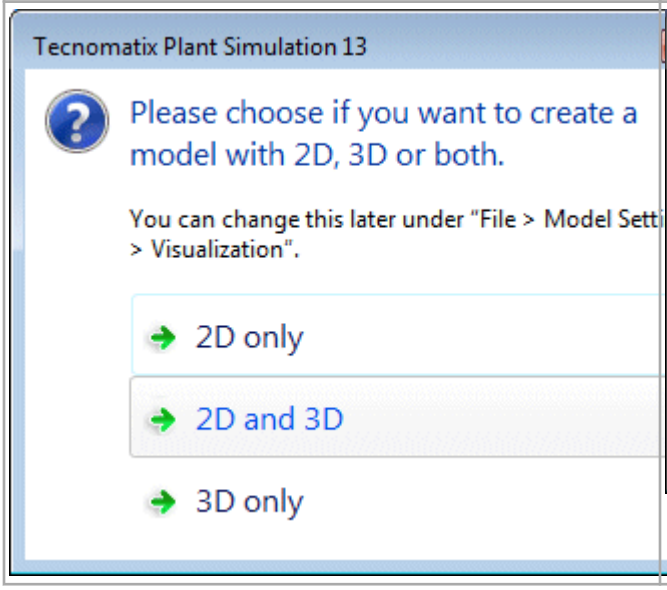
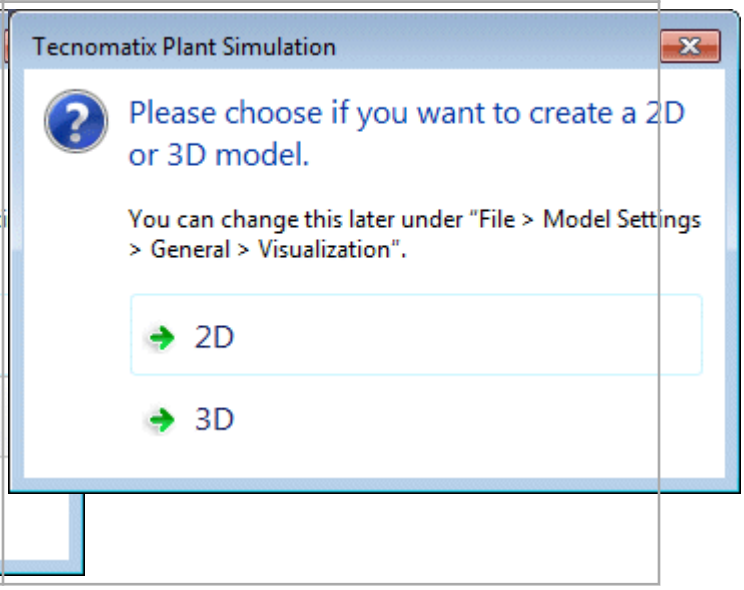
- We matched the categorization of the attributes and methods in the *Online Help* in the *Online Help* with the categories in the dialog **Show Attributes and Methods** in *Plant Simulation* itself. We now list the **Methods of the Material Flow Objects**, the **Read-Only Attributes of the Material Flow Objects**, and the **Attributes of the Material Flow Objects**.

New and Changed Features in Plant Simulation 13.2

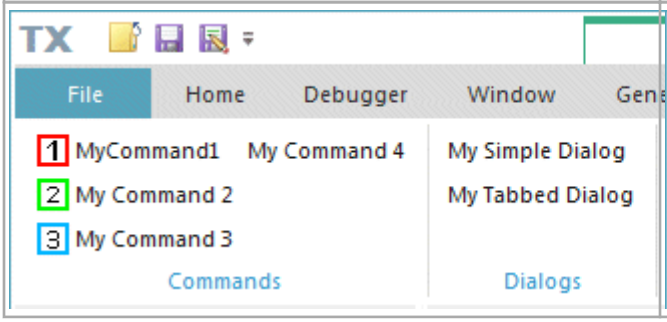
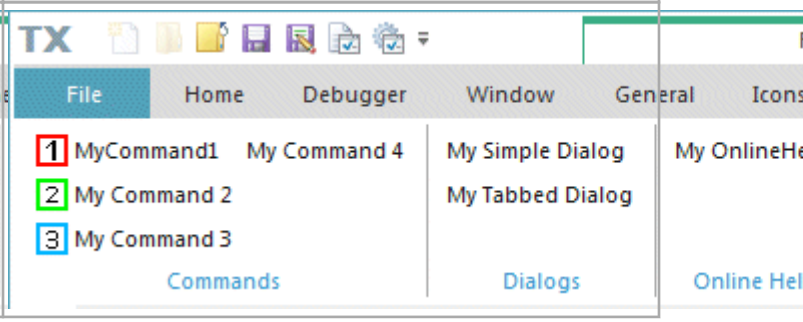
- We matched the description of the syntax of *Methods* and *Attributes* in the *Online Help* with the signature in the dialog **Show Attributes and Methods** in *Plant Simulation*.

- We matched the categorization of the attributes and methods in the *Online Help* in the *Online Help* with the categories in the dialog **Show Attributes and Methods** in *Plant Simulation* itself. We now list the **Methods of the Material Flow Objects**, the **Read-Only Attributes of the Material Flow Objects**, and the **Attributes of the Material Flow Objects**.

- We changed the selection that *Plant Simulation* offers when creating a new simulation model. *Plant Simulation* now only asks if you want to create 2D model or a 3D model. The setting 2D and 3D is not required any more as you can activate 3D any time for an existing 2D model by clicking **Activate 3D** on the tab **Windows** of the ribbon bar.

Previous Versions	From Version 13.2 on
	

- We changed how *Plant Simulation* shows a user-defined ribbon tab. In previous versions *Plant Simulation* showed it under the ribbon tab/category **Frame** or **3D**. Now *Plant Simulation* shows it as a ribbon tab/category of its own named **User**.

Previous Versions	From Version 13.2 on
	

- We renamed the tab **Modeling** to **2D**. This allows us to hide the tab **2D** when you are only working with a 3D model.

- We moved the **Connector settings** **Connect objects automatically** and **Connector positioning** from the tab **2D** to the tab **User Interface** in the **Preferences** dialog.

- We changed the behavior of the **View Options**, such as **Show Object Names**, in the *Frame*. When you change one of these settings *Plant Simulation* changes it in the class from which this setting is inherited. If you only want to change the setting in the local instance, you have to **deactivate inheritance** first. We changed this because, as a rule, you will want to change the setting for all instances of the *Frame*.

- We added the check box **Requires 3D** to the dialog **Edit Library Information**. When you load a library for which this setting is selected, and when *3D* is not activated, you will be asked if you would like to activate *3D*. When you click **No**, the library will not be loaded.

- We moved the command **Edit 3D Properties** in the **context menu of the selected object** in the *Class Library* up to the commands for opening the object.

- We added an error message that Plant Simulation shows when you created a new object with the command **Derive** and when the new name, that you entered, could not be assigned.

- We enhanced the visualization of the **BottleneckAnalyzer** in 3D. We replaced the transparent box with transparent sides with lid and we adjusted the width to the number of columns.

New and Changed Features in Plant Simulation 13.1

- We renamed the settings under **Model Settings** > **General** > **Visualization**. We added the setting **Ask Each Time** to **Preferences** > **General** > **Visualization**.

- We added the folder **User Objects** to the **Class Library** and to the *Toolbox*. Create and store the objects, which you yourself develop, in this folder.

- We added the folder **Objects** to the folder into which *Plant Simulation* is installed. By default it contains sub-folders with object files for *Containers* and *Transporters*. You can also save object files for re-usable objects which you and your colleagues created.

- We added the button **Update All Libraries** to the dialog **Manage Class Library**. You can use it to update all libraries to the newest version.

- We changed the behavior of when selecting objects in the **Toolbox**: When you select an object in the *Toolbox* while holding down the **Ctrl** key, the object remains selected in the *Toolbox* after inserting it. Thus you can insert several instances of the selected object one after the other. You can terminate this mode with the right mouse button or with the **Esc** key.

Back to What's New in Tecnomatix Plant Simulation 14

New 3D Features

Tecnomatix Plant Simulation 14 provides a number of new features.

New Features in Plant Simulation 14.0

- We added settings for the **animation area** to the tab **MU Animation** of the objects with matrix loading space. The animation area replaces the function **Create Paths > Create Locations** of previous versions *of Plant Simulation*.

- We replaced the setting **Auto graphics active** for the MUs with the setting **Scale automatically**. It adjusts the size and the position of the graphic of the MUs to the dimension and the booking point of the MU in 2D.
- We added settings for **mirroring** to the tab **Transformation**.
- We added **settings for the rotation** to the tab **point cloud**. This allows you to set a rotation with a rotation angle and a rotation axis. In previous versions you could only set the rotation angle and the point cloud used the pre-defined axis (0,0,-1).
- We added the command **Insert Factory Walls**.
- We added the setting **Obstacle for the worker > Sides** to the command **Insert Stairs**.
- We added the button **Obstacles** to the tab **View** of the *3D window*.
- We added the button **Adjust Graphics to MU Size** to the tab **Graphics** of the MUs in the dialog **Edit 3D Properties**.
- We replaced the command **Create Cone** with the command **Create Cone Frustum**.
- We added buttons for moving **camera marks** up or down in the list of camera marks.

New Features in Plant Simulation 13.2

- We added the attributes **_3D.ShowConnections**, **_3D.ShowExternalGraphics**, **_3D.ShowGrid**, **_3D.ShowPointClouds**, and **_3D.ShowShadows**.
- We added the attribute **_3D.getPositionOfObject**.
- We added the methods **_3D.SelfAnimations.Animation.play**, **_3D.SelfAnimations.playRotation**, and **_3D.SelfAnimations.playTranslation**.
- We added the tab **Captions** to the dialog **Edit 3D Properties** of the objects.
- We added the command **Show Statistics Report** to the context menu of the animatable objects in 3D.
- We added the command **Help on Dialog** to the dialog **Edit 3D Properties**. It opens the help topic for the dialog. You can then navigate to the help for the different tabs that the dialog provides.
- We added alternative graphics for Euro pallets of type EUR 2/ISO2, EUR 3, and EUR 6/ISO0 to the **Plant Simulation installation folder > s3d-graphics > Containers**. We use the Euro pallet of type EUR 1/ ISO1 as the standard graphic.

- We added a message that *Plant Simulation* shows when you exchange the 3D graphic of an object with matrix loading space, such as the *ParallelStation*, the *Container*, the *Workerpool*, etc. *Plant Simulation* now asks if you want to use the number of places from the 3D **MU Animations** of the new graphic as the new capacity. This applies when the number of loading spaces differs between the original graphic and the new graphic.

New Features in Plant Simulation 13.1

- We added the tab **Robot Arm Animation** to the dialog **Edit 3D Properties** of the *PickAndPlace Robot*. On it you can set if it will be animated with one, three, or with four axes.

- We added the objects *Dropdownlist*, *CheckBox*, and *Button* to the objects which *3D* shows. When you set scaling on the tab **Transformation** in the dialog **Edit 3D Properties**, this does not affect the **width** and the **height** in the dialog of the object in 2D. *3D* only distorts the graphic of the object and does not change its dimensions.

- We added the **edddison** interface.

- We added the sub-command **Export Bitmap** to the command **Export Scene**.

- We added the setting **Optimize for** to the command **Insert Rack**.

- We added the setting **Show sensors** to the dialog **Edit 3D Properties > Tab Graphics**.

- We added the command **Show Corner Points** to the context menu of the *Connector*. You can use it to attach the *Connector* to another object.

- We added **SolidEdge files** (*.asm, *.par, *.psm) to the data types that *Plant Simulation* can **import as graphics**.

- We added the method **_3D.exportAsBitmap**. It exports the designated 3D scene as a .PNG file.

- We added the methods **_3D.addObject** and **_3D.delete**.

- We added the method **_3D.SelfAnimations.scheduleTranslation**.

Back to What's New in Tecnomatix Plant Simulation 14

Changed 3D Features

Tecnomatix Plant Simulation 14 provides a number of changed features.

Changed Features in Plant Simulation 14.0

- We changed how to **create rotation paths**. You can now select the setting **Rotation path (Lines)** instead of clicking the button **Create Paths > Create Rotation Path**.

- We changed the functions of the command **Insert Cylinder**. You can now select the individual parts of the cylinder that you want to create.

- We changed how *3D* searches for applicable MU animation paths for showing *Workers*. This no longer works based on animation path names, for example **Default** for the *FootPath* or **#0#1**, etc. for the *WorkerPool*, but based on the consecutive number in the MU animation attribute as already implemented for MUs on the *PickAndPlace robot* or on a *Worker*. When *3D* does not find the path with the required number, for example the second path to show the second *Worker* on the *WorkerPool*, it uses the path named **Default** if that path exists.

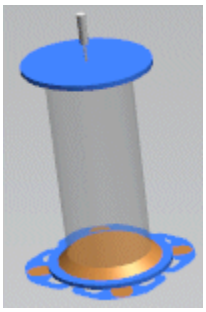
- We removed the commands **Show/Hide Camera Icons** and **Toggle Camera** from the tab **View** of the *3D window*.

- We separated inheritance of the state graphics from inheritance of the object graphics on the tab **Graphics**. You can now activate or deactivate them separately with the toggle buttons next to **Object graphics** and **State group**.

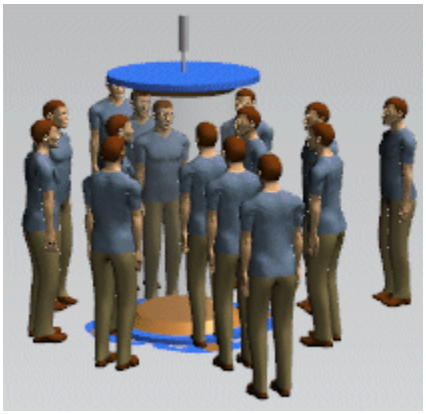
- We changed the behavior when modifying the orientation of a **State group**. The last transformation of the vertical or horizontal state group now does not get lost any more.

- We changed how *3D* scales. In previous versions you could also enter a negative scaling factor. From version 14 on we split this into settings for unsigned scaling (**settings for scaling**) and **settings for mirroring**.

- We changed how the *WorkerPool* in 3D looks. It now looks like this:



  As opposed to 2D it only shows a single *Worker* in 3D. If you would like to see how many *Workers* are staying in the *WorkerPool*, open it in a new 3D window.



- We changed how the command **Lock Structure** works. It now also prevents you from inserting graphics.

- We changed the data type of the 3D attributes and the parameters of 3D methods, which refer to a position or to dimensions. In previous versions the data type was *real*. From this version on the data type is *length* or an array of data type *length*.

- We changed the behavior for the first anchor point of an extrusion polycurve. For the first anchor point you cannot open the dialog **Edit 3D Properties**.

- We changed the behavior when selecting something in a 3D window. From this version on this selection is only visible in this 3D window except the selection is an MU instance.
  In previous versions this selection was visible in all open 3D windows. If, for example, you selected a graphic in an open *Station*, this graphic was marked as selected in all 3D windows for all *Stations* which inherit their graphics from this *Station* or from the *Station* from which this graphic inherits. When you selected an object this object was shown as selected in all windows, for example in an inserted *Frame* instance as well as in the *Frame* class and in all windows which were opened for that object. Now this is only the case when you select an MU instance, namely the object and not its graphic.

- We activated the buttons for controlling the simulation on the mini toolbar in the 3D window of an animatable object.

- In **Full Screen** mode you can now also show the frame rate by pressing the **F** key and use the multimedia buttons on multimedia keyboards.

- We changed the behavior when rolling the mouse wheel in the window of a 3D scene. *Plant Simulation* now zooms the 3D scene in when rolling the mouse wheel forward. In previous versions it zoomed the scene out. To facilitate this, we changed the standard setting under **Preferences > 3D > Mouse wheel behavior** to **Move camera**. In previous versions it was **Move scene**. The new standard setting is the same as in *NX* and on *Web sites*.

- We added a second optional parameter to the method **_3D.exchangeGraphic**.

Changed Features in Plant Simulation 13.2

- We enhanced the behavior of *3D*. You can now combine the functions **Align to Grid** and **Snap to Grid**.
- We enhanced the behavior of the function **Align to Grid**. It now also applies to graphics.
- We changed the behavior of the feature **Show Shadows**. You can now only activate it for objects of type *Frame*.
- We changed the behavior of the extrusion configuration of the length-oriented objects on the tab **Appearance** in the dialog **Edit 3D Properties**. We renamed the **conveyor type** setting **Not defined** to **User-defined**.
  We moved the settings for defining a **user-defined conveyor** from a series of sub-dialogs to the tab **Appearance** itself.
  We limited the values for **graphic group IDs** in the extrusion configuration to values between 0 and 10.
- We renamed the following methods: *_3D.pauseAnimation* to **_3D.pause**, *_3D.playAnimation* to **_3D.play**, and *_3D.resetAnimation* to **_3D.reset**.
- We removed the button **Show Preview** from the dialog **Edit 3D Properties**. The program now shows changed values immediately after changing them.

Changed Features in Plant Simulation 13.1

- We renamed the tab **Extrusion** for length-oriented objects in 3D to **Tab Appearance**.
- We enhanced the behavior of *3D* for displaying objects of type *Display*, *Comment*, and *Variable* in 3D windows. *3D* now shows them with the font size that you selected in the dialog of the object in 2D.
- We enhanced the behavior of *3D* for displaying angle-dependent *Connectors*. They are now displayed as in 2D, namely depending on the angle between the objects.
- We changed the coordinates with which we define the **bounding box** of an **obstacle for the Worker**:
  - From this version on we use the object coordinates. Previous versions used the coordinates of the graphic nodes.
  - The bounding box of the methods *_3D.BoundingBoxSize*, *_3D.BoundingBoxMax*, *_3D.BoundingBoxMin*, and *_3D.BoundingBoxCenter* as well as some interactive functions now excludes **all** hidden graphics.
- We changed the behavior when calculating the bounding box of the objects in 3D: Displayed path nodes and objects, which are located on the object, are now excluded from the calculation.
- We changed what the command **Export Graphics** exports:

  - If you selected an object or a graphic in the active 3D window, *3D* exports the selected object or the selected graphic.

  - If you did not select anything, *3D* exports all graphics that are visible in the 3D window.

- We changed the behavior when *Plant Simulation* automatically inserts *Connectors*. *3D* now uses the *Interface*, when you insert an *Interface* into *3D Frames* with visible contents and move it with the mouse or with keyboard keys.

- We renamed the command **Insert Facet** to **Insert Plate**.

- We added four additional settings to the function **MU side to attach** and we changed the functioning of the existing settings.

Back to **What's New in Tecnomatix Plant Simulation 14**

What's New in Tecnomatix Plant Simulation 13

What's New in Tecnomatix Plant Simulation 13

Tecnomatix Plant Simulation 13 provides a number of new and improved features.

As the program changed at a number of places, you might have to adapt simulation models you created in previous versions of *Tecnomatix Plant Simulation*, when you open them in *Tecnomatix Plant Simulation* 13.

Back to What's New

Important Changes in Plant Simulation 13

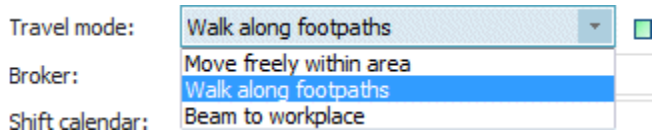
Tecnomatix Plant Simulation 13 provides a number of new and improved features.

Important Changes in Plant Simulation 13.0

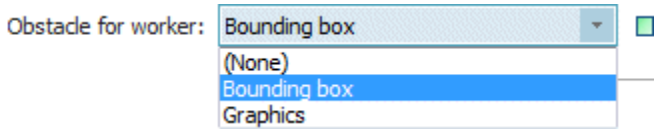
The most important new function in *Tecnomatix Plant Simulation* 13 is the **Worker** **who moves freely within the area of the model**. This way he is not bound to *Footpaths* any more which you insert into your model.

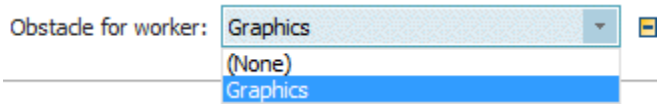
To enable free movement within the area, we added the following functions:

- We replaced the text box **Workers can beam to the Workplace** with the dropdown list **travel mode** in the *WorkerPool*.

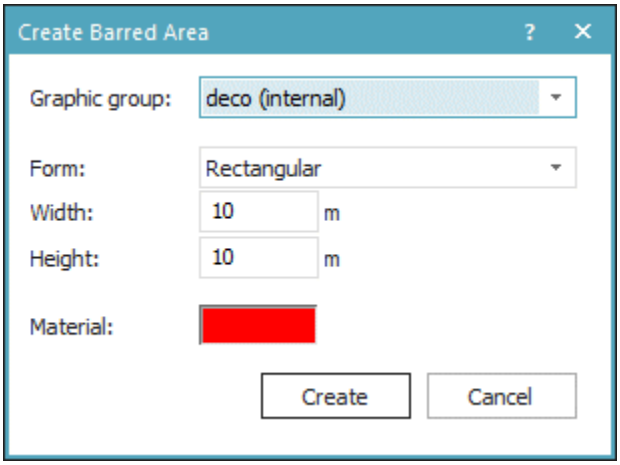


- We enhanced the functionality of most of the 3D objects to allow you to set if these are an obstacle for the *Worker* moving freely within the area. You find the setting **Obstacle for the Worker** on the **Tab Graphics** or on the **Tab Graphic Settings**. For most of the material flow objects the **bounding box** is an **obstacle for the worker** by default.





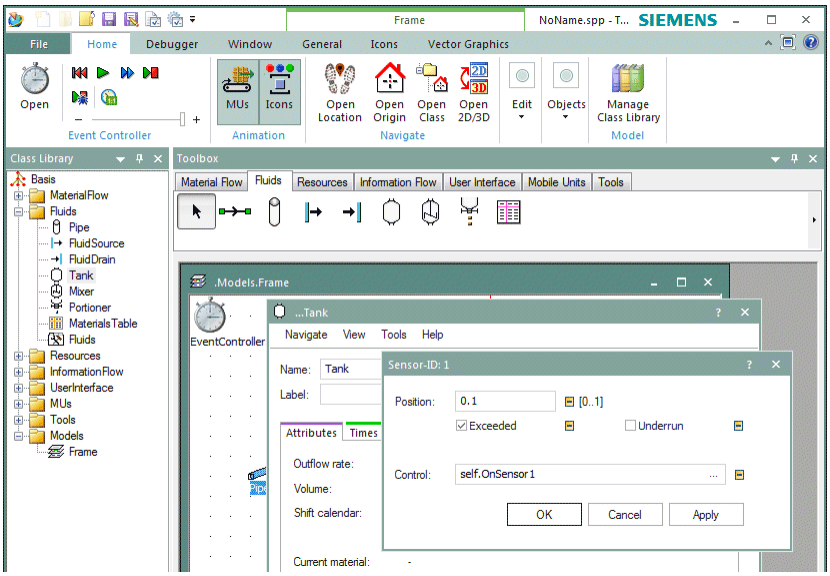
- We added the function **Insert Barred Area** to *3D* to create areas which the *Worker* can enter but should not be, for example the pivoting range of a crane.



Important Changes in Plant Simulation 12.1

Tecnomatix Plant Simulation 12.1 provides a number of new and improved features.

- We changed the *user interface theme* of *Plant Simulation* 12.1 to match the standard Siemens PLM theme. This affects the look-and-feel of the entire application, i.e., of the main program window, of the docking windows, of the object windows, and of the dialog windows.
  Note that we have not replaced all screenshots of dialogs and windows in the *Online Help* yet.



- We introduced **SimTalk** 2.0. It's features make programming methods in *Plant Simulation* faster, easier, and less error-prone. You can activate it by clicking **New Syntax** 

on the **Tools** ribbon tab of the *Method*. If you want to use *SimTalk* 2.0 syntax for all new *Methods* which you are going to program, activate **New Syntax** in the *Method class* in the *Class Library*. Changes caused by *SimTalk*

2.0 also affect how the dialog **Show Attributes and Methods** displays the signature of attributes and methods. There turn value of a method is now displayed to the right of the keyword -> instead of to the right of the colon (:).

> Note:
>
> You can select if you want to use the **SimTalk 2.0** or **SimTalk 1.0 notation** for each and every of your *Methods*. You can also freely mix **SimTalk 2.0** or **SimTalk 1.0 notation** in your simulation models. There is no need to reprogram your existing source code.

> Note:
>
> Clicking 
>
> for an existing *Method*, which you created in **SimTalk 1.0 notation**, automatically converts the source code to the correct **SimTalk 2.0 notation**.

> Note:
>
> To convert the source code of all existing *Methods* in a simulation model to the new syntax, hold down the **Shift** key, click the object **Basis** in the *Class Library* with the right mouse button, and click **Convert All Methods to New Syntax**

- We only deliver the 64-bit version of *Plant Simulation*. We do not provide a 32-bit version any longer.

- We added support for the following 3D graphics formats to the command **Import Graphics**: **Parasolid Text**, **Parasolid Binary**, **PLMXML**, **STEP**, **IGES**, and **Catia V4**.
  These formats require a **Professional**, an **Educational**, a **Research**, an **Application**, or a **Standard License**.

Back to What's New in Tecnomatix Plant Simulation 13

New Features of the Material Flow Objects

Tecnomatix Plant Simulation 13 provides a number of new features.

New Features in Plant Simulation 13.0

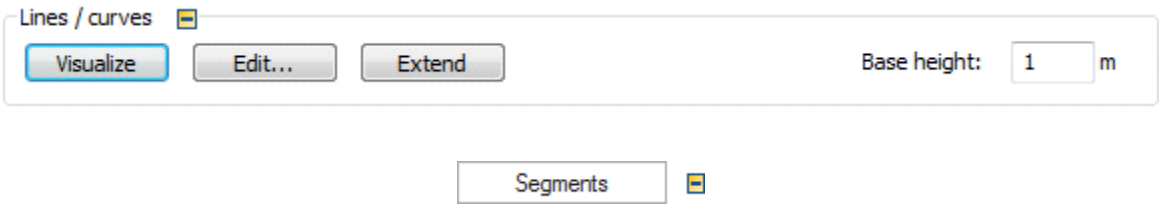
- We extended the functionality of most of the 3D objects to enable you to set if these objects are an obstacle for the *Worker* who moves freely within the area. You find the setting **Obstacle for the Worker** on the **Tab Graphics** or on the **Tab Graphic Settings**.

- We added the method **isUp** to the *AngularConverter*.

- We added the methods **statTspUnplannedCount**, **statTspUnplannedDelta**, **statTspUnplannedMu**, and **statTspUnplannedTime** to the *Transporter*.

New Features in Plant Simulation 12.2

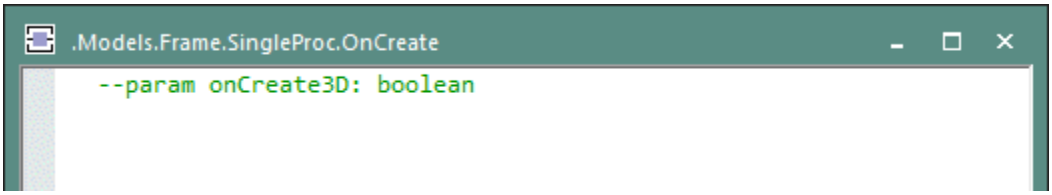
- We added the setting **Base height** to the **Tab Curve** of the length-oriented objects. As opposed to previous versions of the program, the **Base height** can now be inherited, meaning that you can define it once in the class instead of having to define it for each instance individually. It is mainly used in *3D*. Here the **Z-coordinate** defines the floor of the installation and the **Base height** defines the distance of the legs of the conveyor from the floor. By changing the setting **ΔZ** in the **Segments** table, you can add an additional offset. The setting **ΔZ** also affects the simulation time in *Plant Simulation* 2D.
  To facilitate these changes, we also changed the **Segments** table, the **Context Menu of Curved Objects**, and we added the methods **getCurveSegments** and **getCurveSegments**. The methods replace the attribute *SegmentsTable*.
  The changes above also affect *3D*. We replaced the settings **Visualize**, **Edit**, and **Extend** in the group box **Curve** with the button **Segments**. It opens the segments table of the object in 3D, which now is the same as in 2D.



  We removed support for the 3D attribute *_3D.ExtPolycurve*. We added the methods **3D.getExtSegments** and **3D.setExtSegments** instead.

New Features in Plant Simulation 12.1

- We added the text box **Exit control** to the **Tab Controls** of the *Store*.
- We added the text box **Capacity** to the *Converter*.
- We added the **Exit strategy** > **Carry part away** to the *Store*. This enables a *Worker* to pick a part up at the *Store* and carry it to another station.
- We added the setting **Width** to the *length-oriented objects*.
- We added the attributes **ObjectAngle** and **ObjectMirrored** to the *curved objects*.
- We added the method **getObservers** to objects which can have observers.
- We added an optional parameter to the method **setUpFor**.
- We added an optional parameter to the **Constructor control**.



- We added the methods **getCurrentAngle**, **getLastDestination**, and **isRotating** to the *PickAndPlaceRobot*.
- We added the method **findPart** to the *ParallelStation*, the *Store*, and the *Container*.
- We added optional parameters to the method **createFailure**.
- We added a number of statistics methods to the MUs, for example **statProdFailTime**, etc., **statStoreFailTime**, etc., and **statTranspFailPortion**, etc.

Back to What's New in Tecnomatix Plant Simulation 13

Changed Features of the Material Flow Objects

Tecnomatix Plant Simulation 13 provides a number of changed and improved features.

Changed Features in Plant Simulation 13.0

- We changed and extended the following functions for setting curved objects:
  - After clicking on an existing object, *Plant Simulation* now also uses the angle from the previous object as start tangential angle of the new object when the predecessor object was displayed with its icon.
  - When setting a straight segment by clicking on an existing object, *Plant Simulation* uses, depending on the mouse position, either the angle of the object or +- 90 degrees to this angle as the start tangential angle of the new object.
  - When setting a curve segment without clicking an existing object, *Plant Simulation* now proceeds as follows: When you enter an angle for straight segments, *Plant Simulation* uses this angle as start tangential angle of the new object. When you hold down the **Ctrl** key, *Plant Simulation* uses, depending on the mouse position, 0, +-90 degrees or 180 degrees as start tangential angle.
- We changed when the **processing time** is evaluated. From now on no *Workers* are requested when you entered a **processing time** of `0`. For this reason the **processing time** will now be calculated when the MU enters the object or when setting-up is finished, not when the *Worker* is requested or when he arrives as in previous versions.
  If you would like to request a *Worker* in spite of a **processing time** of `0` enter a processing time that is slightly greater than 0, for example `0.001`.

- We changed the user interface color of *Plant Simulation* from a dark teal to a dark cyan.
- We changed the behavior of the **user-defined ribbon**. The *3D window* now also shows and activates it when you click on a *Frame* for which a **user-defined ribbon tab** is defined in *Plant Simulation* 2D.
- We changed the layout of the **Tab Attributes** of the MUs. In addition it now also shows the absolute position of the booking point.
- We changed the behavior when manually inserting MUs on *Line*, *Track*, and *TwoLaneTrack*. In previous versions *Plant Simulation* always inserted the MU at the end of the object. Now it inserts the MU at the position of the mouse pointer on the object.
- We changed the behavior when moving an MU with the method **transfer**. The MU is now moved with the command *transfer* after unblocking it, not with the command **move**.
- We renamed the method *movingAcceleration* of the MUs to **currentAcceleration**.
- We added the attribute **CurrentSpeed** to the *Line*. For the *Line*, the attribute is not observable.
- We renamed the method *movingSpeed* of the MUs to **currentSpeed**. The method now also applies to the *Transporter* as opposed to previous versions which provided the attribute *CurrentSpeed*. For the *Transporter* you can also set the **current speed**.
- We changed the behavior of the object **Cycle**. From now on you cannot drag two objects at the same time onto the object *Cycle* with the mouse anymore and drop it there.

Changed Features in Plant Simulation 12.2

- We changed the **Segments** table so that it does not contain rotation or mirroring after a rotation or mirroring any more. The rotation is stored in the attribute **ObjectAngle** and mirroring is stored in the attribute **ObjectMirrored**. This allows to keep inheritance of the definition of the segments even when one or more segments are rotated or mirrored.
- We changed the behavior of the method **setRoute** of the *Transporter*. It now also accepts material flow objects other than objects of type *Track*. In previous versions these objects were allowed as destination of the route, but not as objects along the way. When assigning a route, which contains such objects with *setRoute*, then the *Transporter* passes these objects on its way to the destination. While automatically computing a route, *Plant Simulation* only takes *Tracks* and *TwoLaneTracks* into consideration.
- We changed the behavior of the methods **insert**, **move**, and **transfer** of an MU that is located on a *Converter*. These cannot be called with an index for the successor any longer. In previous versions the index was ignored when you passed one and *Plant Simulation* showed a warning in the *Console*. From this version on the *Method Debugger* will be opened with an error message instead.

Changed Features in Plant Simulation 12.1

- We changed the behavior of *Transporters* that were stopped by *Plant Simulation*, for example in an **Exit control**. When you change the direction of movement by changing the setting **Backwards** of a *Transporter*, now the *Transporter* immediately starts moving. In previous versions you had to make the *Transporter* start moving again by entering `Stopped := false`. As a result of this change you may have to adjust your model by **Stopping** the *Transporter* before changing the state of **Backwards**. Otherwise the *Transporter* starts moving in the previous direction in order to reduce its **Speed** to 0 before being able to turn around.

- We changed the behavior when opening the **Blocked exit** of a material flow object. In previous versions the *Line* or the *Transporter* started accelerating again with the **Speed** that these objects had before. Now they accelerate starting a speed of 0.

- We limited the **Capacity** of *MUs* to 1 million storage places per MU and we limited the **Capacity** of *Stores* and *ParallelStations* to 10 million places per object to prevent slowing down the computer by using up too much RAM.

- We enhanced the behavior of the *AssemblyStation*. For the setting **Attributes** > **Assembly table** > **MU Types** the *Worker* can now deliver mounting parts to the *AssemblyStation* without you necessarily having to connect the *AssemblyStation* with the station which provides the mounting parts.

- We changed the behavior of the method **getDestination** of the *PickAndPlaceRobot*. It now also returns a destination object when it rotates to the destination without transporting a part.

- We removed the view option **Enlarge Objects** from the **General** ribbon tab of the *Frame*.

- We enhanced the behavior of the method **removeObserver**. You can now also enter `void` as second parameter. This deletes all *observers* which point to nonexisting methods.

- We changed the behavior of the **Exit strategy** > **Carry part away**. The **Exit strategy** will be executed once only when the part is moved onto the *Worker* and when **Exit control once** is activated.

Back to What's New in Tecnomatix Plant Simulation 13

New Features of the Fluid Objects

Tecnomatix Plant Simulation 13 provides a number of new features.

New Features in Plant Simulation 13.0

- We added a function allowing you to add the *MaterialsTable* to the objects **DePortioner** and **Mixer** with drag and drop.

- We added the method **contentsList** to the fluid objects.

New Features in Plant Simulation 12.2

- We added the object **DePortioner**.
- We added the fluid objects to the objects which the **LockoutZone** can control.

New Features in Plant Simulation 12.1

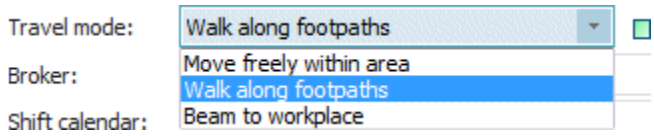
- We added **Sensors** to the *Tank*. You can select if the amount of material in the *Tank* has **Exceeded** or **Underrun** the sensor level.
- We added the setting **Outflow rate** to the *Pipe*.
- We added the methods **entranceOpen** and **timeUntilEntranceOpen** to the *Mixer*.

Back to What's New in Tecnomatix Plant Simulation 13.

New and Changed Features of the Resource Objects

In *Tecnomatix Plant Simulation* 13 we provide these new and changed features:

- We added the text box **Average traveled distance** and the method **statAverageTraveledDistance** to the *WorkerPool*.
- We replaced the text box **Workers can beam to the Workplace** with the dropdown list **travel mode** in the *WorkerPool*.



Back to What's New in Tecnomatix Plant Simulation 13

New Features of the Information Flow Objects

Tecnomatix Plant Simulation 13 provides a number of new features.

New Features in Plant Simulation 13.0

- We added a new function to open the *Method* from which the current *Method* inherits its source code. To do so, hold down the **Shift** key and click the button **Open Origin** in the current *Method* or in the *Method Debugger*.

New Features in Plant Simulation 12.2

- We removed the **Font** selection from the settings of the *Method Editor*. The *Method Editor* and the *Method Debugger* now use the font **Consolas** in different fixed sizes between **6** and **72** points.
  You can increase or decrease the font size by holding down the **Ctrl** key and by rolling the mouse wheel forward and backward in the *Method Editor* or the *Method Debugger* window. When you change the font size with the mouse wheel, *Plant Simulation* saves this as the new preference and uses it when you start the program the next time. *Plant Simulation* uses the changed font size in all open *Method* windows, not just in the one in which you rolled the mouse wheel.
  Instead of rolling the mouse wheel, you can also use these key combinations:
  Ctrl plus + increases the font size
  Ctrl plus 0 resets the font size to the standard size of 10 points
  Ctrl plus - decreases the font size

- We added horizontal scrolling in the *Method Editor* by holding down the **Shift** key and by rolling the mouse wheel.

- We added the command **Show Object** to the context menu of the selected object in the source code in the *Method Editor* and in the *Method Debugger*. The command opens the *Frame* in which the object is inserted and selects the object in the *Frame*.
  If the selected object references another object, for example with a *Variable*, the command shows the referenced object, not the referencing object! The context menu of the *Variable* in the *Method Debugger* also provides the command **Show Object**.

- You can now add an *integer* value to a *string*. This applies to *SimTalk* 1.0 as well as to *SimTalk* 2.0.
  Example

```
param obj : object ->  string
return obj.Name + obj.XPos
```

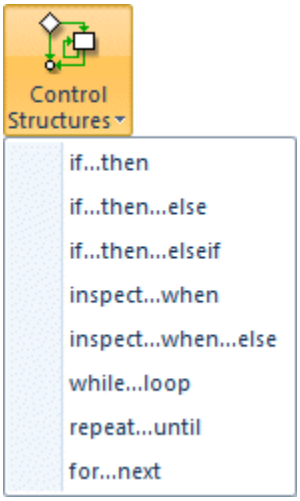
- We added the method **appendRow** to the *DataTable*.

- We added an optional parameter to the method **createNestedList** of the *CardFile*, **createNestedList** of the *StackFile* and *QueueFile*, and **createNestedList** of the *DataTable*. It allows you to enter the name of the list/table to be created in the designated row/cell.

New Features in Plant Simulation 12.1

- We added the method **readXMLString** to the *DataTable*.

- We added renamed the control structures, compare **Insert Control Structure**. Note that they create **SimTalk** source code.



Back to What's New in Tecnomatix Plant Simulation 13

Changed Features of the Information Flow Objects

Tecnomatix Plant Simulation 13 provides a number of changed and improved features.

Changed Features in Plant Simulation 13.0

- We extended the function **Auto Complete** of the *Method*. When you insert a function or a *Method* with parameters into a *Method*, *Plant Simulation* now shows the status bar. The status bar shows the signature of the *function*/*Method* and thus makes entering the required parameters easier. *Plant Simulation* hides the status bar again when you type in the closing parenthesis or when you press the **Esc** key.

- We replaced the methods *getFormatData* and *setFormatData* of lists and tables with the method **copyFormatTo**.

- We changed the behavior of the **Options** (**Syntax-controlled Indentation**, **Show Line Numbers**, **View**) on the **Tools** ribbon tab in the *Method Editor*: When you change one of these settings, this change now applies to the entire *Plant Simulation* session for all newly opened *Methods*.
  When you deactivate **Toggle Outline** in the *Method Editor* for example, it now remains deactivated when opening an additional *Method* or when reopening this *Method* in the current *Plant Simulation* session. These changes do not affect the preferences.

- We changed the behavior when changing the **font size** in the *Method Editor*. When changing the **font size** with the mouse wheel, this now does not affect the **Preferences** any more. The *Method* only uses the changed **font size** until you change it the next time or until the end of the current session for all *Methods* which you open afterwards. Changing the **font size** does not affect any opened *Methods* at all.

Changed Features in Plant Simulation 12.2

- We changed the behavior when a *Method* accesses outdated, i.e., no longer officially supported *attributes*, *methods*, and *functions*. As opposed to previous versions *Plant Simulation* no longer shows a message in the *Console*. Instead, you can use the command **Find Outdated Functions** on the **Debugger Ribbon Tab** to find outdated *attributes*, *methods*, and *functions*.

- We changed the behavior of the *TableFile*. When you accessed a cell via a **column or row index** of data type *string*, *Plant Simulation* only matched the case when the **Fast index access** was activated. From now on *Plant Simulation* ignores case sensitivity.

- We changed/enhanced the behavior of the **SQLite***Interface*. If you do not enter a **File Name** for the database, *Plant Simulation* creates it in memory. This then is the same as if you had entered `:memory:`.

Changed Features in Plant Simulation 12.1

- We removed the LED for *Methods* that are suspended by a *wait-instruction* or by a *sleep-instruction*. The *Methods* now shows the same LED as for suspended *Methods*.

- We changed the behavior of the method **createNestedList** of the *CardFile*. In methods, which use *SimTalk* 2.0 syntax, the method *createNesteList* does not insert the new sublist between already existing sublists, but overwrites the sublist without moving existing sublists one row downwards.

Back to What's New in Tecnomatix Plant Simulation 13

New and Changed Features of the User Interface Objects

Tecnomatix Plant Simulation 13 provides a number of new and improved features.

New Features in Plant Simulation 13.0

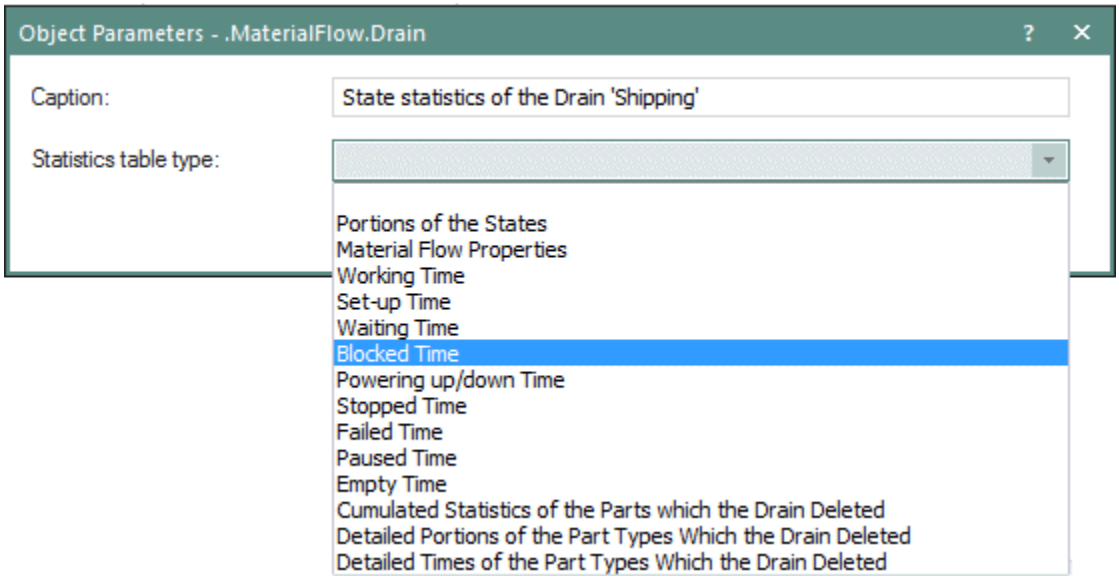
We added the attribute **TocLevels** to the **HtmlReport**. You can use it to set the number of levels for the table of contents.

New Features in Plant Simulation 12.1

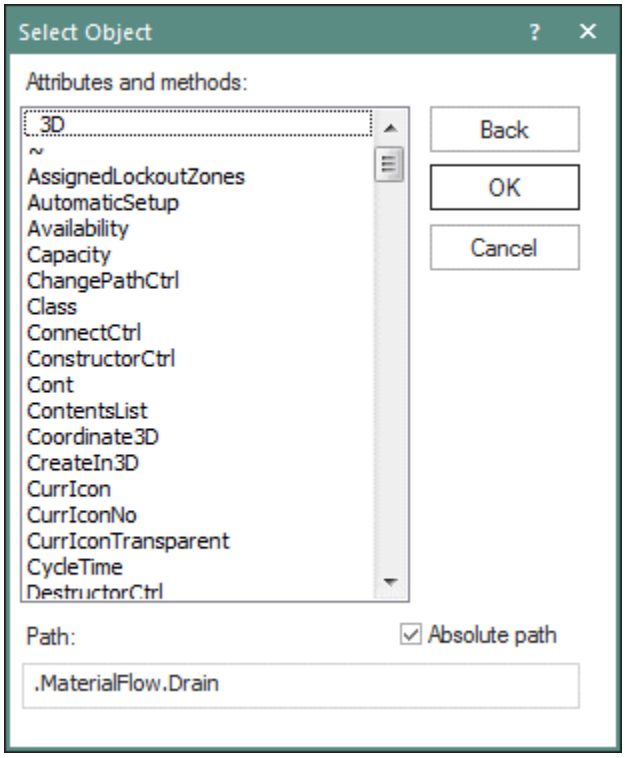
In *Tecnomatix Plant Simulation* 12.1 we added or modified these features of the user interface objects.

- We added a function to **Display a Picture of a 3D Scene** to the **HtmlReport**.

- We changed a number of functions of the **HtmlReport** when you add objects on the **Tab Content**:
  - When the text cursor is located within an object reference (`[...]`), *Plant Simulation* opens the dialog **Object Parameters** for entering the object parameters of the object within the square brackets, when you click **Add Object**  .



  - When the text cursor is located within an object reference (`[...]`), *Plant Simulation* opens the dialog **Select Object** preset to the path detected within square brackets, when you hold down the Shift key while clicking **Add Object** 
  - When the text cursor is located within a picture reference (`[!...]`), *Plant Simulation* first opens the dialog **Open File** and then the dialog **Object Parameters** for the path within square brackets when you click **Add Image** 



- When the text cursor is located within a picture reference (`[!...]`), *Plant Simulation* first opens the dialog **Open File Object** and then the dialog **Object Parameters** preset to the path detected within square brackets when you hold down the **Shift** key while clicking **Add Image**

- When you select a *Frame* to be inserted, which provides the user-defined attribute *StatisticsObject*, the dialog **Object Parameters** shows the available statistics functions.

Back to What's New in Tecnomatix Plant Simulationn 13

New and Changed SimTalk Features

Tecnomatix Plant Simulation 13 provides a number of new and improved features.

New and Changed Features in Plant Simulation 13.0

- We added the function **computeSHA3Hash**.

- We added the function **strHash**.

- We added the function **_3D.ShowSensors.**

- We changed what the function **closeAllWindows** does. As opposed to previous versions it now also closes 3D windows.

New and Changed Features in Plant Simulation 12.2

- We changed the behavior for accessing tables. These now behave in *SimTalk 2.0* as they did in *SimTalk 1.0*: When reading an empty table cell, *Plant Simulation* now does not return VOID any more but the zero value of the data type of the column, i.e., the value 0 for numerical data types or the value false for the data type *boolean*.

- We added the function **setRandomSeedCounter**.

- We added the functions **regex_replace** and **regex_search** to search and replace regular expressions.

- We added a function to define **Default Arguments** in *SimTalk* 2.0.

- We added the attributes **X**, **Y**, and **Z** to the one-dimensional arrays which are of data type *integer*, *real*, or *length* and which have a fixed dimension of two or three elements.

- We changed the behavior of the method **str_to_method** and we added a second, optional parameter.

New and Changed Features in Plant Simulation 12.1

- We introduced **SimTalk** 2.0. It's features make programming methods in *Plant Simulation* faster, easier, and less error-prone.

- We added the function **splitStringToNum** to the functions for manipulating strings.

- We added the function **atan2** to the trigonometric functions.

- We added the function **deleteValue** to the one-dimensional arrays.

- We enhanced the function **setMUTraceRouteMethod**. You can now set several *MU-Trace-Route-Callback-Methods*. Up until version 12 you could only set a single *Method*. To do so, you can enter an array of objects.
  When you save a *Frame* or a *folder* as an .obj file *Plant Simulation* now also saves the list of the assigned *MU-Trace-Route-Callback-Methods* to the .obj file. This only applies to those **callback methods** whose *Method* objects are also written to the .obj file. If you load the .obj file into another simulation model, *Plant Simulation* adds the *MU-Trace-Route-Callback-Methods* in the .obj file to the **callback methods** contained in the model.

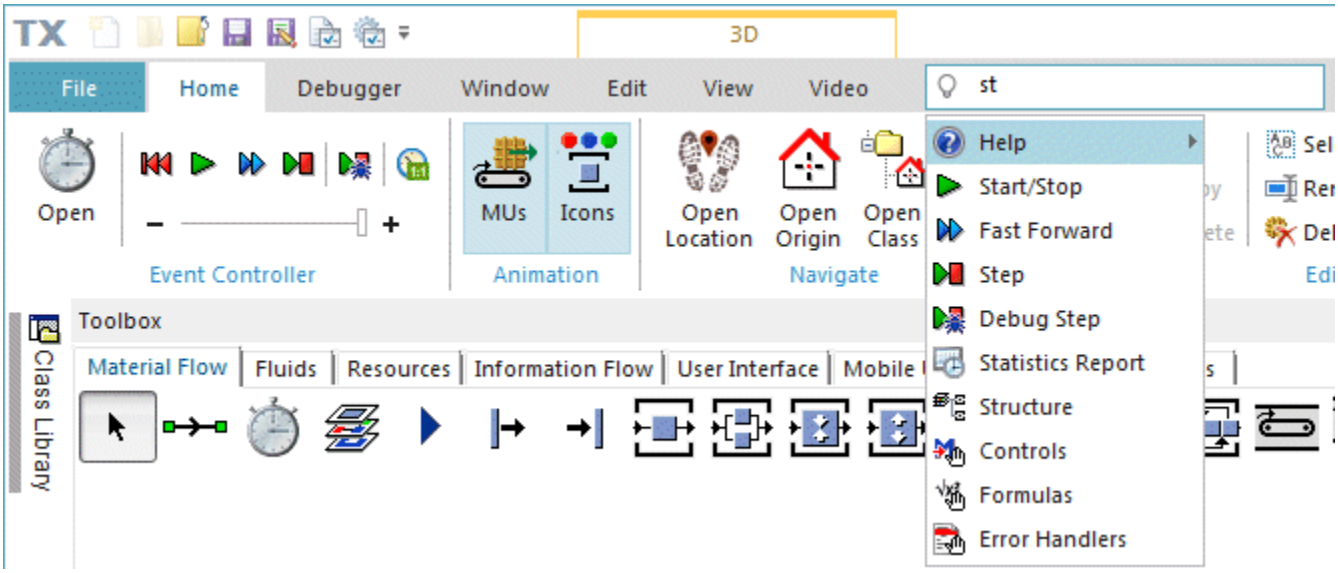
Back to What's New in Tecnomatix Plant Simulation 13

Miscellany

Tecnomatix Plant Simulation 13 provides a number of new and improved features.

New and Changed Features in Plant Simulation 13.0

- We added the function **Find a Command**. Enter words and phrases about what you want to do next and quickly get to features you want to use or actions you want to perform into the text box **Find a Command**.



- *Plant Simulation* now uses the SPLM license mechanism version 8.0.1. For this reason *Plant Simulation* now requires the license server version 8.0 or higher.

- We removed support for the start option **-StartPage**.

- We removed the **View Option > Show Animation Points** of the *Frame*.

- We removed the **Preference/Model Setting > Modeling > Show Animation Points**.

New and Changed Features in Plant Simulation 12.2

- We added the function **setVisible** to the *COM Interface*. When *Plant Simulation* is created as a COM server it is invisible by default. You can use *setVisible* to make it visible.

- We enhanced the behavior of the feature **Find Outdated Functions** on the **Debugger** ribbon tab: In addition to finding outdated *attributes*, *methods*, and *functions* in the source code of *Methods*, it also finds *observers of outdated attributes*, for example observers of the attribute *ChannelID*. For such observers *Plant Simulation* opens a window containing a list of all outdated attributes for the observers. When you double-click an entry in the list, *Plant Simulation* opens the dialog **Edit Observers** for the observed object, as long as only a single observed object exists. If several observed objects exist, *Plant Simulation* opens a window with a list of all observed objects. To open the observer window for the respective object, double-click the respective entry in the list.

- We changed the behavior when you modify the **Axes origin X** and the **Axes origin Y** of the *Frame*. When you change the **axes origin**, *Plant Simulation* now keeps the 3D coordinates and changes the pixel coordinates. *Plant Simulation* checks if your changes create allowed pixel coordinates. It only changes them if that is the case.

- We changed the behavior when you modify the **Scaling Factor** of the *Frame*. When you change the **scaling factor**, *Plant Simulation* now keeps the 3D coordinates and changes the pixel coordinates. *Plant Simulation* moves the axes origin if your change would create negative pixel coordinates.

- We changed the behavior when **zooming the contents** of a *Frame*: In previous versions you could hold down the right mouse button and drag a marquee over the objects of interest. Now you have to hold down **Ctrl + Shift** and drag a marquee with the left mouse button.

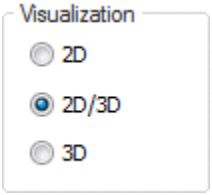
- We changed the behavior of *user-defined attribute methods*, which are deleted while they are being executed. Method execution is now terminated immediately, it will not be continued. Compare the following examples:

  - Suppose that an MU has a *user-defined attribute method*, which was suspended via a *waituntil instruction*. Then, the MU is deleted in the *Drain*, which naturally also deletes its *user-defined attributes*. Thereupon the *Method* is deleted from the list of suspended methods and method execution is terminated, i.e., the instructions after the *waituntil instruction* will not be executed. If the *attribute method* was called from another *Method*, execution of this *Method* will be continued. When the *attribute method* had a return value, the value, which the implicitly existing local variable *result* had at this point in time, will be returned to the calling *Method*.

  - Suppose that an MU has a *user-defined attribute method*, which is called by the **entrance control** of a *Station*. The *attribute method* in turn calls a *Method* that is inserted in the *Frame*. This *Method* deletes the MU with the statement *Station.cont.delete*. Both the execution of the *attribute method* and of the *Method* called by it are terminated immediately. The return value of the *attribute method* (or VOID if no return value was declared) will be returned to the **entrance control**, whose execution is continued.

New and Changed Features in Plant Simulation 12.1

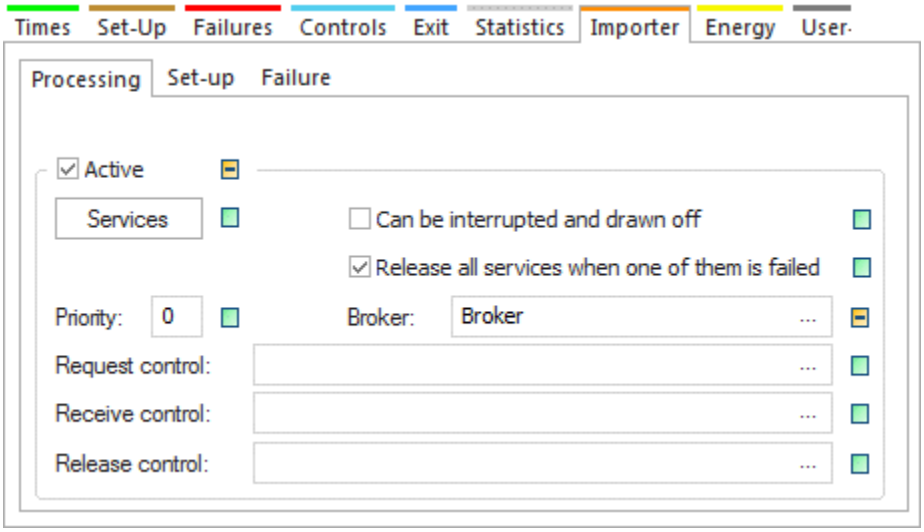
- We added the setting **Visualization** to the tab **General** of the **Model Settings**. It sets how *Plant Simulation* creates the new simulation model.



- We added the setting **OpenGL Version** to the tab **3D** of the **Preferences**.

- We added the method **unshare** to the *user-defined attributes* and to the object **Variable**.

- We changed the layout of the **Tab Importer** and integrated the *failure importer* into it. It now shows the **Sub-tab Processing**, the **Sub-tab Set-up**, and the **Sub-tab Failure**.



- We replaced the attributes *ImporterActive* and *FailImporterActive* with the attribute *imp.***Active***/ failImp.Active*. We added the attribute *setupImp.Active* for the *set-up importer*.

- We changed the notation for the **Tolerance for about equal (~=) comparison**. Instead of using == for the operator, we now use ~=.

- We enhanced the functions **Open Origin** and **Open Class**. When you hold down the **Shift** key while clicking the buttons, *Plant Simulation* shows the location of the origin of the object or the location of the class of the object respectively.

- We removed the setting **User interface concept**. We do not provide the setting **Menus and Toolbars** any more.

- We removed the button **Hide All Dialogs** from the **Window** ribbon tab.

- We removed the tab **Communication** from the dialog **User-defined Attributes** of the objects.

- We removed support of the graphics formats .ppm and .ppm_raw for the command **Import Bitmap File**.

- We moved the *user-defined attributes* of the object *GaOptimization* from the **Tools** menu to the **Tab User-defined Attributes**.

- We replaced the attribute *IconAngle* with the attribute **ObjectAngle**.

- We replaced the attribute *IconRotation* with the attribute **ObjectMirrored**.

- We added the **Tab 3D** to the **MultiPortalCrane**.

- We added the methods **synchronize** and **unsync** to the **MultiPortalCrane**.
- We added the attribute **Load by capacity** to the **CrossSlidingCar**.
- We extended the functionality of the **Student License**. You now can also load models, which you created with a **Student License** in any of the commercial licenses.

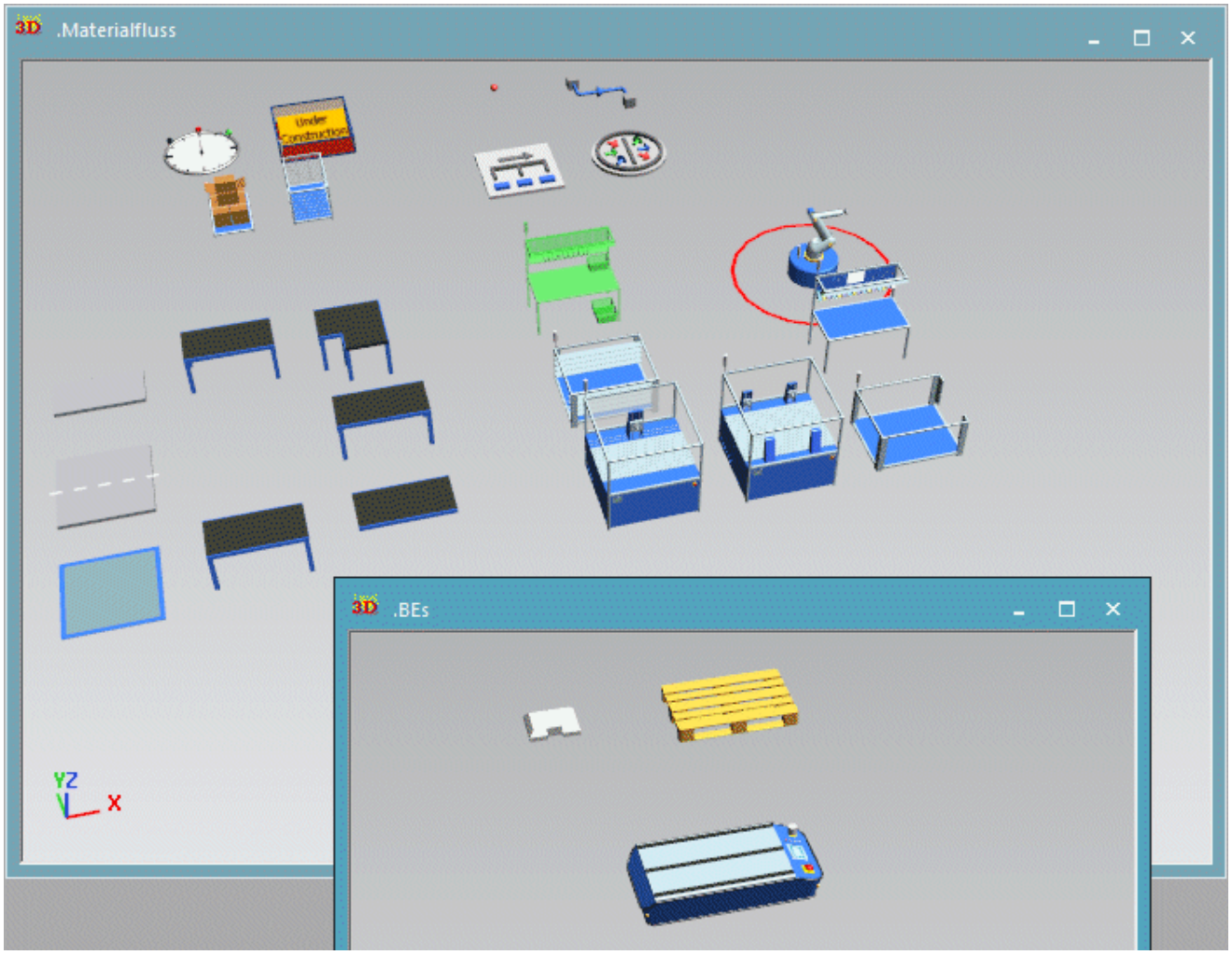
Back to What's New in Tecnomatix Plant Simulation 13

New 3D Features

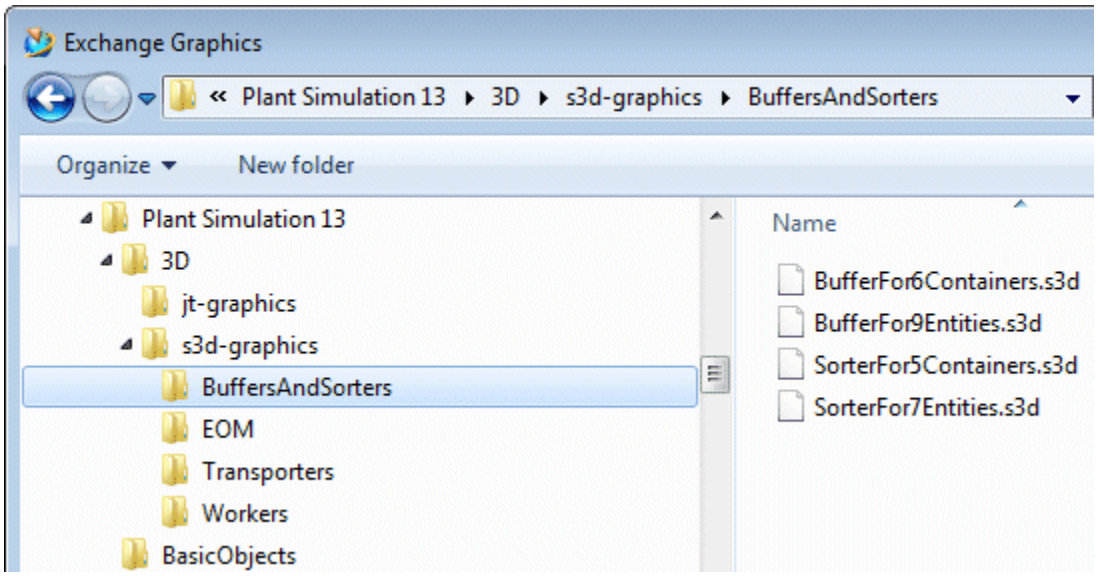
Tecnomatix Plant Simulation 13 provides a number of new features.

New Features in Plant Simulation 13.0

- We added new 3D graphics for a number of material flow objects, which represent these objects more realistically in your installation.



To replace existing graphics in a model, which you created in a previous version of the program, with the new graphics, select the respective graphic and select **Exchange Graphics**. Navigate to the folder **3D > BasicObjects** and select the new graphic of the object.
In addition we offer alternative graphics for special applications for the *Buffer*, the *Sorter*, and the *Transporter*. To use one of it, select one of these objects in the 3D window, click **Exchange Graphics**, and select an alternative graphic.



- We extended the functionality of most of the 3D objects to enable you to set if these objects are an obstacle for the *Worker* who moves freely within the area. You find the setting **Obstacle for Worker** on the **Tab Graphics** or on the **Tab Graphic Settings**.

- We added the **Tab Graphic Settings** for graphics. Here you can set if the graphic is an **Obstacle for the Worker** or not.

- We added the functions **Insert Barred Area** and **Insert Stairs**.

- We added the **Tab Appearance of the Store**. Here you can set its configuration for its appearance in 3D.

- We added the **Tab Material** to the *Worker*. You can now add a material to them, just as you can do for the MUs, which applies to all graphics for which no other material applies. As opposed to the MUs you cannot use a 2D material for the Worker, when no material is defined, as the 2D vector graphics material that is required for does exist.

- We added the **Tools Menu** to the dialog **Edit 3D Properties** of the *Frame*.

- We added the attribute **_3D.TransformationMatrix**.

New Features in Plant Simulation 12.2

- We added the button **Add Camera** to the **View** ribbon tab. This button replaces the button **Capture Current View** in the dialog **Path Anchor Points**.
- We added new mouse button combinations to move or zoom the scene with the mouse:
- To zoom the scene in **Planning View**, hold down the **Shift** key and the right mouse button and drag the mouse.
- To move the camera backwards and forwards in normal 3D view, hold down the **Shift** key and the right mouse button and drag the mouse.
- We added key combinations for moving the camera in the scene:

To do this	Do this
Move the camera backwards and forwards in normal 3D view	Hold down the middle and the right mouse buttons and drag the mouse
Move the camera up by 10 cm	Press **Shift+Z** on the keyboard
Move the camera down by 10 cm	Press **Z** on the keyboard
Move the camera left by 10 cm	Press **Q** on the keyboard
Move the camera right by 10 cm	Press **E** on the keyboard

- We added a function for showing information about the open scene. To do so, press the **F** key on the keyboard.
- We added **CAD Layout Files (*.dgn, *.dwg, *.dxf)** to the files types which the command **Import Graphics** can import.
- We added the commands **Controls** and **Edit User-defined Attributes** to the **Context Menu of the Selected Animatable Object in the 3D Scene**.

New Features in Plant Simulation 12.1

- We added the command **Insert Rack** to the command **Edit** > **Insert Shape**.
- We added the text box **Width** to the settings of the *conveyors*.
- We added the function **_3D.createBox** to create a box via *SimTalk*.

- We added the command **Planning View** to the **View** ribbon tab.
  We removed the command **Projection** from the **View** ribbon tab.

- We added the command **Generate SimTalk Code and Copy to Clipboard** to the command **View** > **Camera Marks**.

- The command also copies the corresponding *SimTalk* code to the clipboard. You can then paste this code into a *Method* object to set the material of another graphic.

- We added the buttons **Copy the Current Material Settings**  and **Paste a Previously Copied Material**  to the tab **Material**.

  The command  also copies the corresponding *SimTalk* code to the clipboard. You can then paste this code into a *Method* object to set the material of another graphic.

- We added the function **Locked** to graphic groups.

- We added the command **Calculate Angles** to the context menu of the objects *PickAndPlace Robot* and *Turntable* in *3D*.

- We added the methods **F3DRecordVideo**, **F3DFinishVideo**, and **F3DPauseVideo** for recording videos in *3D*.

- We added the function **_3D.setGraphicTransformationMatrix**.

- We added key shortcuts to **Manipulate Objects** in the 3D scene.

- We added the command **Find Object** to the **Context Menu of the Opened 3D Object**.

Back to What's New in Tecnomatix Plant Simulation 13

Changed 3D Features

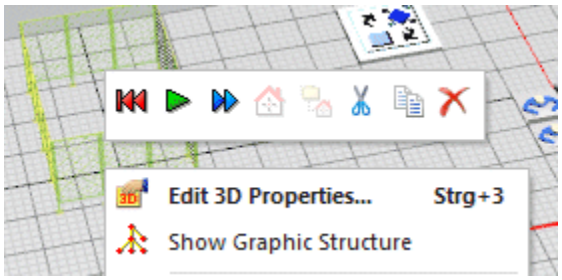
Tecnomatix Plant Simulation 13 provides a number of changed and improved features.

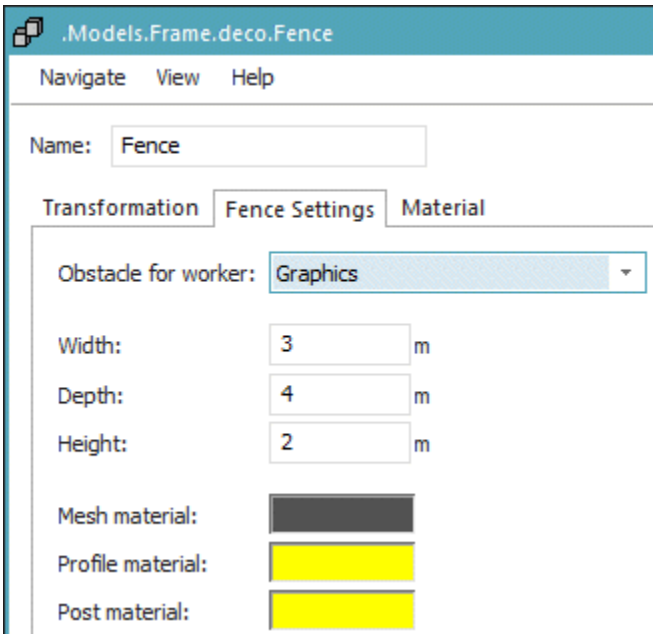
Changed Features in Plant Simulation 13.0

- We changed how *3D* inserts materials. You can now also insert a material from the *Clipboard* into the **Tab Material** when the material is not active. Then *3D* automatically activates a material that was deactivated before.

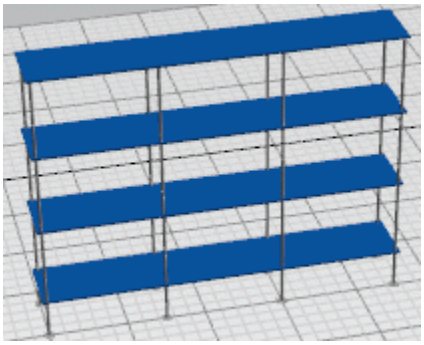
- We changed the behavior of the **MU Animation** of *Container* and *Transporter* with **matrix loading space** and with **automatically generated graphics**. *3D* distributes the MUs on these objects now automatically and ignores existing MU animation paths.
  For the *Store 3D* also distributes the MUs automatically and ignores existing **MU animation** paths.
  You can activate and deactivate the automatically generated animation graphics jointly with the automatically generated graphics with the check box **Auto graphics active** on the **Tab Appearance of the MUs** or **Auto graphics active** on the **Tab Appearance of the Store**.

- You can now subsequently change the settings of a *Box*, a *Shelf*, a *Barred Area* and a *Fence* which you insert into your simulation model in version 13. To do so, click the shape with the right mouse button and select **Edit 3D Properties**.





- We changed the behavior of the command **Insert Rack**. The topmost shelf is now included in the amount of shelves (**board count**). In the example below the rack has four shelves.



- We changed the behavior of *3D* when it could not import a Jt file because that Jt file originated in a not supported Jt version. Now the error message points this out. If you imported the file with a *Method* it still returns -1.

- We changed the behavior of a model which you created in **3D Only** mode: Now *Plant Simulation* moves the axes origin, if this is possible, when inserting or moving an object would create invalid pixel coordinates. In previous versions *Plant Simulation* moved the object in such a way that the pixel coordinate was located within the valid area and thus changed the 3D coordinate if an invalid pixel coordinate would have resulted.

- We changed the behavior of a model which you created in **3D Only** mode. Then the dialog **Show Attributes and Methods** does not show these attributes and methods of the objects any more:

Method/Attribute
All objects
maximizeWindow
XPos
YPos
setPosition
setXYWH
getXYWH
Icons
setCurrIconFromClipboard
putIconToClipboard
setIconFromFile
saveIconToFile
createIcon
deleteIcon
CurrIcon
CurrIconNo
existsIcon
turnIcon
resetIcon
mirrorY
mirrorX
inheritSizeAndOrientation
setPixel
getPixel
CurrIconTransparent
redraw
openImg
openImg
getIconSize

Method/Attribute
setIconSize
ObjectAngle
ObjectMirrored
getRefPoint
setRefPoint
getBoundingBox
StatusWithIcons
RotateAroundRefPoint
RotateMUs
NumAnimationEvents
getAniPoints
setAniPoint
setAniLine
moveAniPoint
delAniPoint
delAniPoints
linkAniPoint
unlinkAniPoint
DisplayPanel
Frame
AxesOrigin
drawLine
drawRectangle
drawEllipse
drawText
eraseLayer
eraseAllLayers
redraw
setXYOrigin
rearrange
setBackgroundImage
copyBitmapToClipboard
selectContents
BackgroundColor
ScalingFactor
ZoomFactor
ShowObjectNames

Method/Attribute
ShowObjectLabels
ShowDisplayPanels
RepresentationMode
ShowObjectLabels
setRepresentationArea

- We changed the behavior when inserting a new graphic. When you select an invisible graphic group as the insertion target, *Plant Simulation* now makes this graphic group visible. When the visibility of the respective object was inherited, *Plant Simulation* asks if you want to cut inheritance of the graphics.

- We changed the label of the check box **Hide this object in the representation of the location** on the **Tab Graphics** to **Exclude from Show content of the location**.
  We renamed the attribute *_3D.HideInRepresentationOfLocation* to **_3D.ExcludeFromShowContentOfLocation**on.

Changed Features in Plant Simulation 12.2

- We renamed the tab **Auto Graphics** of the dialog **Edit 3D Properties** to **Tab Appearance** and changed some of its functions:

  - You can now define materials for all MUs, not only for MUs with an automatically generated graphic.

  - We changed the group labels **Override 2D vector graphic color** and **Assign a material** to **Material active**.

  - We changed the names of the attributes starting with *_3D.Autographic...* to **3D.MaterialActive**, **3D.MaterialAmbientColor**, **3D.MaterialDiffuseColor**, **_3D.MaterialEmissiveColor**, **3D.MaterialActive**, **3D.MaterialShininess**, **_3D.MaterialSpecularColor**, and **3D.MaterialTransparency**.

- We changed the behavior of *3D*. The dialog **Edit 3D Properties** can only be open for an object or for a graphic once, not several times simultaneously.

- We changed the behavior of *3D*. When you click**Edit** and **Apply** on the tabs **MU Animation**, **Self Animation**, or **Camera Animation**, paths now remain displayed.

- We changed the behavior of *3D*. The tabs **MU Animation**, **Self Animation**, or **Camera Animation** now show the path type **Generated** in the column **Type** instead of the column **Generated** for animation paths which *3D* created and which you cannot edit.

- We changed the behavior of *3D*. To confirm the current changes to an animation path in the dialog **Edit Path Anchor Points**, you now click the new button **Apply** in the dialog. In case the path is displayed at the moment, this also updates the visualization of the path.

- We changed the definition of the **Reduction level** when you optimize a graphic.

New name	Old name	Results in
Low	**Super**	a low reduction level, a high level of detail
Super	**Low**	a great reduction level, a low level of detail

- We changed the behavior *3D*. You now enter the setting **Screen coverage threshold** in pixels instead of one-hundred-thousandth of the window area.

- We simplified the layout and the settings in the dialog **Optimize Selected Graphic**. You can now use all of the provided optimization strategies at the same time instead of one setting only as in previous versions.

- We simplified the layout and the settings in the dialog **Create Rotation Path**. You can now define the path via the **r** instead of the **start position**. *3D* now automatically computes the number of steps for the path.

- We simplified the layout and the settings in the dialog **Create Locations**.

- We changed the behavior of *3D*. When playing a camera animation in the dialog **Fly on Path**, the tab **Camera Animation** of the dialog **Edit 3D Properties**, or via *SimTalk* commands, *3D* automatically terminates the camera animation when reaching the end position. You can then edit the camera setting again with the mouse.

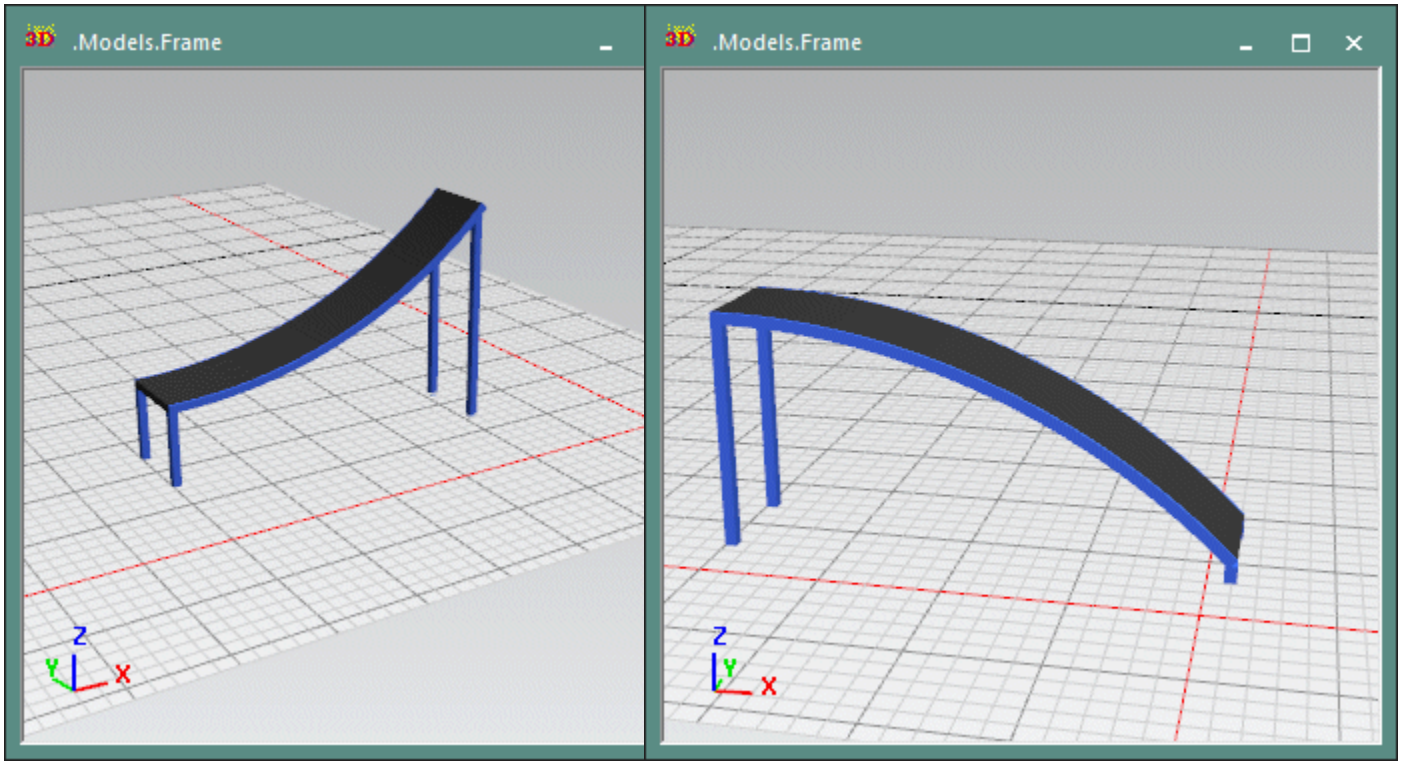
- We changed the behavior of *3D*. You can now define vertical curve segments for a length-oriented object. This only works when the tangential angle is 0° for arriving and departing segments in all directions.

- We changed the behavior of *3D*. You can now insert vertical curve segments into polycurves with the mouse. To do so, proceed as follows while inserting curved object, compare **Edit a Curved Path with the Mouse**:

  - Press and hold down the **Up arrow** on the keyboard to insert a curve pointing upwards in the **Z dimension**. Press and hold down the **Down arrow** to insert a curve pointing downwards in the **Z dimension**.

  - Enter the **radius** and the **angle** of the segment into the dialog **Edit Parameter of Curve**.

  - Click the mouse in the scene to insert the segment.

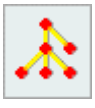


- We changed the behavior of *3D*. Scaling of a 3D object now only applies to its own graphics, not to the simulation objects contained within. Contained animatable objects, on the other hand, are scaled as they are part of the graphic. This way neither the visible contents of a scaled *Frame* nor MUs located on scaled objects are scaled. The graphics of an object are now shown on each hierarchy level according to its scaling, ensuring that the proportions which you selected are visible everywhere.

- We changed the behavior of *3D*. When you load graphics, except in the format s3d, into your simulation model, *3D* now removes suffixes in the format .<extension>;<no>;<no> from the imported node names. This matches the naming conventions which *TcVis* shows when loading the same files. In addition *3D* now automatically removes empty group nodes.

- We changed the behavior of *3D*. You can now also activate the **Planning View** for objects other than *Frames* and *folders*.

- We changed the behavior of *3D*. The setting if a 3D window shows **shadows** or not is now saved to the model file.

- We replaced the button  on the tab **Graphics** of the dialog **Edit 3D Properties** with the button Graphic Structure.

- We replaced the methods *_3D.connectPositions*/*_3D.disconnectPositions* and *_3D.connectRotations*/*_3D.disconnectRotations* with the attributes **_3D.PositionsConnected** and **_3D.RotationsConnected**.

- We removed the setting for activating **inheritance of the position** for the class of an object in the dialog **Edit 3D Properties**.

- We removed support for the method *_3D.disconnectPositionsAndRotations*.

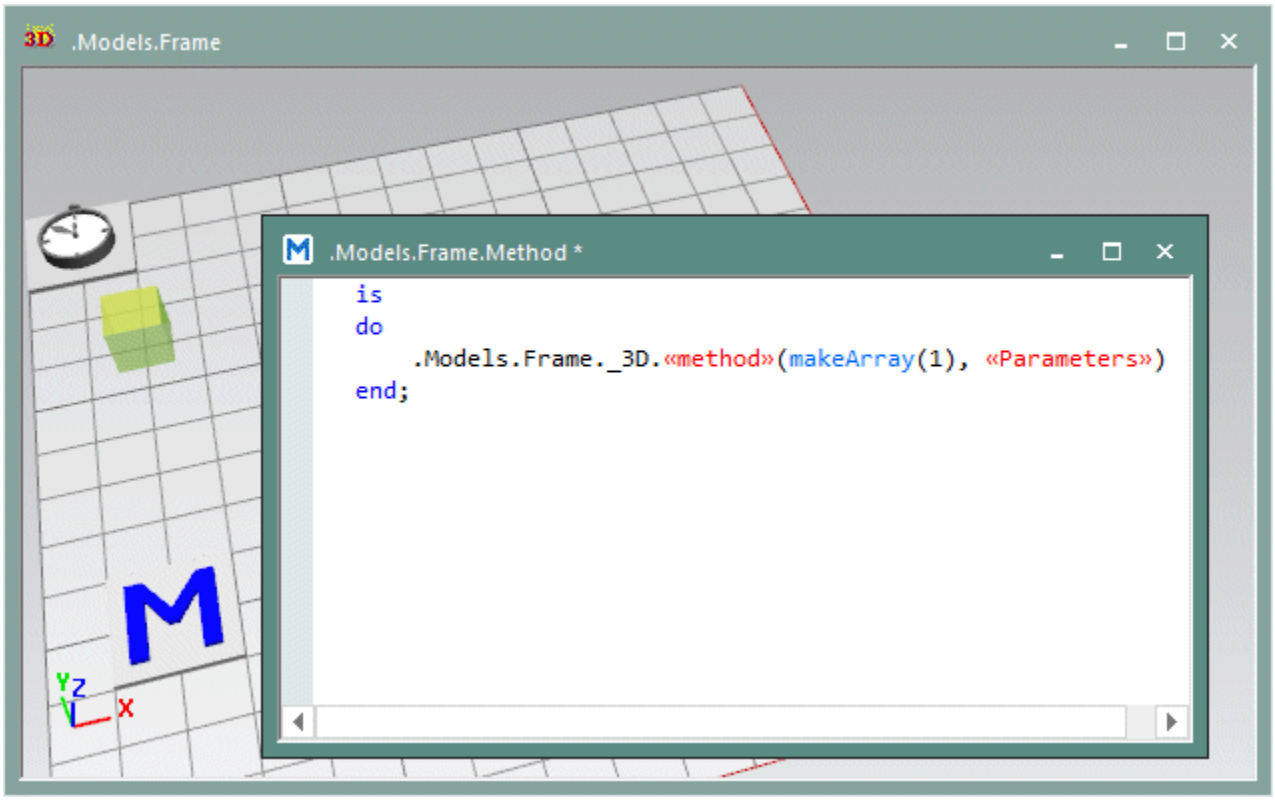
Changed Features in Plant Simulation 12.1

In *Tecnomatix Plant Simulation* 12.1 we changed or improved these features of *3D*:

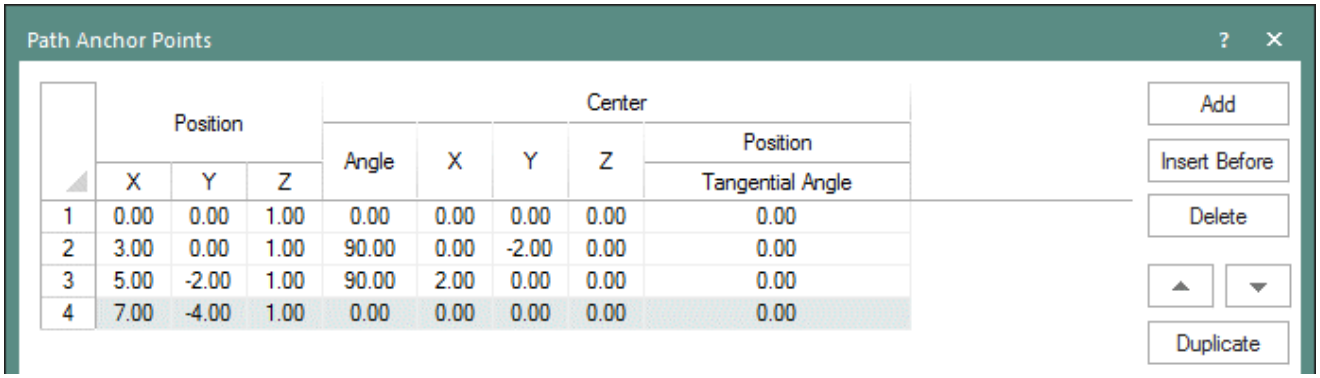
- We enhanced the functionality of the length-oriented objects in *3D*: You can now activate or deactivate the connection of the rotations in 2D and 3D independent of the connection of the positions.

- We enhanced the *Drag-and-Drop* function in *3D*: You can now duplicate 3D objects and graphics in 3D windows with *Drag-and-Drop*. When you drag a graphic from one 3D window to another or when you want to duplicate generated graphics, *3D* allows you to select the graphics group to which it adds the new graphic. If you do not select a graphics group, *3D* adds it to the graphics groups of its original object.

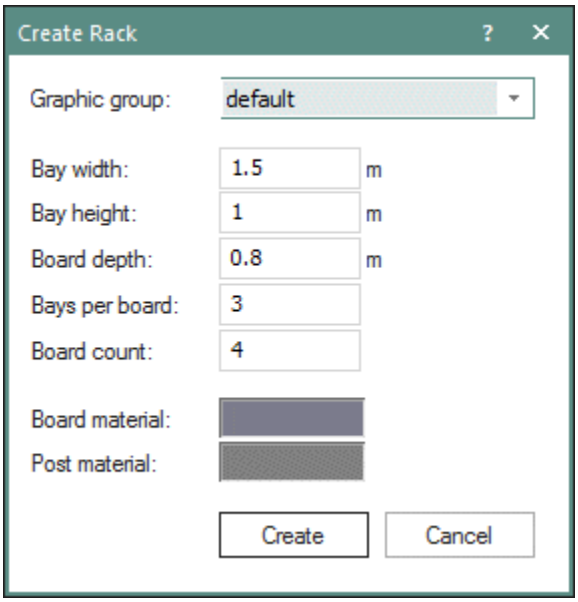
- We enhanced the *Drag-and-Drop* function in *3D*: You can drag a 3D object or a 3D graphic into the *Method editor* and drop it there to insert the path to this 3D object or 3D graphic.



- We enhanced **Editing** path anchor points in the dialog **Path Anchor Points**. You can now also double-click the row of the anchor point, whose values you want to change in the list in the dialog.



- We integrated the setting for selecting the Graphic group into the dialogs for creating shapes.



- We changed what the attribute **_3D.Position** does. It now shows the local positions for MU instances which are calculated by the animation. It now also is available for MU classes.

- We changed how you define an **extrusion profile** with the attribute **_3D.ExtConfiguration**.

- We added the attributes **_3D.AniRotationAxis** and **_3D.AniRotationCenter**. They now define the rotation axis and the rotation center used in the method **_3D.TypeAnimations.scheduleRotation**. In previous versions you used the attribute **_3D.Rotation** to set the rotation axis and the rotation center. This resulted in the following changes:

  - The attribute **_3D.Rotation** now only returns an array of four values, excluding the rotation center.

  - The **Tab Transformation** in the dialog **Edit 3D Properties** does not contain settings for the rotation center any more.

- The **Tab Self Animation** now has settings for the rotation axis and for the rotation center of the object.

- The *Turntable* now uses the rotation center you set on the tab **Self Animation**. In previous versions it used the center you set in the attribute *_3D.Rotation*.

- An anchor point of an animation path of type **Lines**, compare **Edit Path Anchor Points**, now only contains 8 instead of 11 values. You can still set paths with 11 anchor points in the methods **_3D.TypeAnimations.setTable** and **_3D.TypeAnimations.AnimationPathName.setTable**, they will ignore the three values for the rotation center though. The methods **_3D.TypeAnimations.getTable** and **_3D.TypeAnimations.AnimationPathName.getTable** now only return 8 instead of 11 values.

- An anchor point of an animation path of type **Polycurve**, compare **Edit Path Anchor Points**, now only contains 9 instead of 12 values. You can still set paths with 12 anchor points in the methods **_3D.TypeAnimations.setTable** and **_3D.TypeAnimations.AnimationPathName.setTable**, they will ignore the three values for the rotation center though. The methods **_3D.TypeAnimations.getTable** and **_3D.TypeAnimations.AnimationPathName.getTable** now only return 9 instead of 12 values.

- We changed how *3D* handles the background color of 3D *Frames*. As long as you do not set a model-wide background color, *3D* does not save a background color in the model but uses the predefined color our programmers set. When loading models which were created in previous versions of the program, *3D* interprets these background colors as the predefined background color.

- We replaced the icons of the state graphics in the dialog **Show 3D Graphic Structure**. They now are spheres with the color matching the color of the respective state in 2D.

- We replaced the attribute *_3D.StatesVertical* with the attribute **_3D.StatesOrientation**.

- We removed the tab **Visibility** from the dialog **Edit 3D Properties**.

  - We removed the setting **External graphic groups**. Now external graphics groups always represent their owning 3D object except those which are not marked visible.

  - We renamed the setting **Contained objects and internal graphic groups** to **Show content** and moved it to the **Tab Graphics**.

  - The removed the check box **Hide this object temporarily in all 3D windows**. You can still click **Hide Object**/**Unhide Objects** on the View ribbon tab.

  - We removed support for the attribute *_3D.Representation*.

- We removed the function **Show Coarse Grid** and renamed the function **Show Fine Grid** to **Show Grid**.

- We removed support of the attribute *_3D.ExtSpline*.

Back to What's New in Tecnomatix Plant Simulation 13

What's New in the Object Libraries

New and Changed Features of the Object Libraries

The object libraries in *Tecnomatix Plant Simulation* 15 provide a number of new and enhanced functions.

- New and Changed Features of the Object Libraries in Plant Simulation 15
- New and Changed Features of the Object Libraries in Plant Simulation 14

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New and Changed Features of the Object Libraries in Plant Simulation 15

The object libraries in *Plant Simulation* 15 provide a number of new and enhanced functions.

New Features and Changed Features in Plant Simulation 15.0

We added the tool **Timeline** to the **Value Stream Mapping** library.

Back to New and Changed Features of the Object Libraries

New Features and Changed Features in Plant Simulation 14.2

- We removed the localization of the libraries **CranesAndMore**, **CrossSlidingCar**, **EOM**, and **HBW**. These only provide these libraries with an English user interface from now on.
- We changed the functions that the **tab 3D** of the **GantryLoader** provides.
- We moved the library **CrossSlidingCar** from the *Tools* to the library **CranesAndMore**.
- We added the object **Lift** to the library **CranesAndMore**
- We renamed the method *moveMUFromTo* of the *portal* of the *MultiPortalCrane* to **transferMU**.

Back to New and Changed Features of the Object Libraries

New Features and Changed Features in Plant Simulation 14.1

- You can delete the folder for the *distributed simulation* if the *ExperimentManager* and the *GAWizard* are of version 14.1 or higher.

- The user-defined methods of the *ExperimentManager* for configuring, for setting the input values of the random number streams, and for the evaluation now have to be realized as objects of type *Method*. The configuration method and the method for calculating the fitness of the *GAWizard* are also realized like this. This way the controls of the material flow objects and these configuration methods behave the same. As these user-defined methods of these two *Tools* were realized with *Methods* in previous versions, which were loaded in the *Frames* of these *Tools*, you have to save the source code of these methods in new *Method* objects.

- Note that the source codes of these user-defined methods have a different name space. The method for evaluating the *ExperimentManager* is only called at the end of an experiment study in version 14.1 and thus has only a single parameter for the calling *ExperimentManager*. In this method you can, for example, transmit statistical evaluations of the table *DetailedResults* of the *ExperimentManager* to another application.

- We removed the *StorageCrane* from the library *Cranes* as we do not support the *StorageCrane* any more. The objects **MultiPortalCrane** and **StorageArea** replace it.

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New and Changed Features of the Object Libraries in Plant Simulation 14.0

The object libraries in *Plant Simulation* 14.0 provide a number of new and enhanced functions.

- We added the **GantryLoader** to the **Cranes Library**.

- We adjusted the position and the dimension of the racks and the conveyors in the library **High Bay Warehouse (HBW)** so that no gaps appear when you insert them into your model.

- We enhanced the functions of the object **Warehouse Management System (WMS)** in the library **High Bay Warehouse (HBW)**.

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