ARCHICAD 21

New Features Guide

VERSION 10

Last Updated on May 2, 2017

INTUITIVENESS .............................................................................................................. 4
Stair Tool .......................................................................................................................... 4
Railing Tool ....................................................................................................................... 11
Curtain Wall Editing Mode Renewal .............................................................................. 16
PRODUCTIVITY ............................................................................................................... 16
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMALL INTERFACE CHANGES</td>
<td>36</td>
</tr>
<tr>
<td>LIBRARY ENHANCEMENTS</td>
<td>33</td>
</tr>
<tr>
<td>PERFORMANCE</td>
<td>25</td>
</tr>
<tr>
<td>BIMx Export Improvements</td>
<td>32</td>
</tr>
<tr>
<td>BIMcloud</td>
<td>21</td>
</tr>
<tr>
<td>COLLABORATION</td>
<td>21</td>
</tr>
<tr>
<td>CLASSIFICATION MANAGEMENT</td>
<td>23</td>
</tr>
<tr>
<td>INFORMATION MANAGEMENT</td>
<td>23</td>
</tr>
<tr>
<td>IMPORTE BIM CONTENT</td>
<td>25</td>
</tr>
<tr>
<td>VISUALIZATION</td>
<td>26</td>
</tr>
<tr>
<td>INTEROPERABILITY</td>
<td>27</td>
</tr>
<tr>
<td>Hotlink IFC</td>
<td>27</td>
</tr>
<tr>
<td>Adjust Elevation of Hotlink Content to Host Story Structure</td>
<td>28</td>
</tr>
<tr>
<td>Collision Detection</td>
<td>29</td>
</tr>
<tr>
<td>Full Control of IFC Preferences (IFC Translators)</td>
<td>30</td>
</tr>
<tr>
<td>Managing Classifications in IFC Import/Export</td>
<td>30</td>
</tr>
<tr>
<td>Publishing IFC</td>
<td>31</td>
</tr>
<tr>
<td>BIMx Export Improvements</td>
<td>32</td>
</tr>
<tr>
<td>LIBRARY ENHANCEMENTS</td>
<td>33</td>
</tr>
<tr>
<td>General Library Enhancements</td>
<td>33</td>
</tr>
<tr>
<td>Door and Window Enhancements</td>
<td>33</td>
</tr>
<tr>
<td>Other Localized Library Enhancements</td>
<td>34</td>
</tr>
<tr>
<td>TOUCH BAR SUPPORT FOR THE NEW MACBOOK PRO</td>
<td>16</td>
</tr>
<tr>
<td>MULTIPLY ALONG PATH</td>
<td>16</td>
</tr>
<tr>
<td>MAGIC WAND GRAPHICAL FEEDBACK</td>
<td>17</td>
</tr>
<tr>
<td>PARAMETER TRANSFER BETWEEN LINE, ARC, POLYLINE AND SPLINE</td>
<td>17</td>
</tr>
<tr>
<td>DASHED LINE HANDLING</td>
<td>17</td>
</tr>
<tr>
<td>ASSOCIATIVE DIMENSIONS FOR WALL CENTER LINES</td>
<td>18</td>
</tr>
<tr>
<td>TEXT STYLE FAVORITES</td>
<td>18</td>
</tr>
<tr>
<td>AUTOTEXT BASED LABELS</td>
<td>18</td>
</tr>
<tr>
<td>DETAILED SECTION/ELEVATION DEPTH CONTROL</td>
<td>19</td>
</tr>
<tr>
<td>SELECTIVE PARAMETER TRANSFER</td>
<td>19</td>
</tr>
<tr>
<td>SAVE SELECTION AS PLN</td>
<td>20</td>
</tr>
<tr>
<td>INTRODUCTION OF BUILDING MATERIALS AND CUSTOM PROFILES TO GDL ELEMENTS</td>
<td>20</td>
</tr>
<tr>
<td>RESERVATION ASSISTANT IN ARCHICAD</td>
<td>21</td>
</tr>
<tr>
<td>CINETRANSFORM ENGINE UPGRADE: R1</td>
<td>26</td>
</tr>
<tr>
<td>CINETRANSFORM NEW FEATURES</td>
<td>26</td>
</tr>
<tr>
<td>INTRODUCTION OF 3D STYLES</td>
<td>26</td>
</tr>
<tr>
<td>SPEED UP LABEL DRAWING ON FLOOR PLAN/SECTION/ELEVATION/IE/3D VIEWS</td>
<td>25</td>
</tr>
</tbody>
</table>
Interactive Schedule Enhancements ................................................................. 37
Changed Management of IFC Translators.......................................................... 37
Reorganized IFC-Related Commands.................................................................... 37
Control Sun Position by Date and Time .............................................................. 37
New Pet Palette Command for Editing Curved Polyline/Edges ......................... 38
Use Renovation Status as Criterion in Graphic Override Rules ....................... 39
Cursor Snapping on Text Box ............................................................................ 39
Other Renamed or Changed Options .................................................................. 39
INTUITIVENESS

The following new features in ARCHICAD 21 enhance the intuitive use of the program for users at all levels.

Stair Tool

The brand-new Stair Tool in ARCHICAD 21 is the first of its kind. It is a next-gen design tool that extends architects design creativity with automatic design validation against human ergonomics — on the fly. In concrete terms this means ARCHICAD’s artificial intelligence (AI) algorithms validate thousands of design options in the background and offer architects the most optimal stair designs in the particular building context to choose from.

The Stair Tool lets you create, design and efficiently document any typical or unique Stair that can be devised by an architect, at any design scale. The Stair Tool focuses on an intuitive and flexible design process, with graphical input and editing, as opposed to one-click input followed by time-consuming parameter settings.

The Stair tool supports compliance with general architectural regulations and individual (e.g. structural or documentation) requirements. Stair structure and finish options reflect construction technology logic.

Input is available on the Floor Plan and in the 3D window, using methods similar to polyline or wall input.

Like the Curtain Wall, the Stair is a hierarchical element. The main Stair element consists of multiple sub-elements, including treads, risers and support elements such as beams, stringers monolithic or cantilevered structures.

The Edit Mode, familiar from Curtain Wall, has been expanded and made available for the Stair Tool, to enable easy configuration of sub-elements.
Older-version Stairmaker Stairs and Stair Objects are migrated to ARCHICAD 21 as objects, with limited editability.

**The New Stair Tool Logic**

Stair sub-elements (GDL elements) are controlled by a common scheme. The GDL components allow for versatile geometry. As of ARCHICAD 21, GDL components can also include Building Materials and/or Custom profiles.

A Stair consists of Segments (polyline), with Turnings (nodes) between them. Turning Types: Automatic Landing Turn, Winder Turn and Divided Landing Turn. Segment types: Run Segment, Landing Segment, Winder Segment and Divided Landing Segment.

**Stair Input and “Solver” Technology**

Stair design and construction in architecture is limited by regulations that differ by country. These rules usually control the height or length ranges of a stair steps, provide limits for the stair pitch, drive minimum widths and lengths of landings and provide detailed construction instructions for winding stairs for example.

To help users design stairs that meet local regulations, the ARCHICAD 21 Stair tool includes three innovative approaches:

- a set of customizable construction rules
- an automatic stair construction algorithm
- a graphical interface with automatic solutions to resolve conflicts.

Customizable construction rules provide the constraints, and describe local regulations. The user can choose the rules that apply to his/her project, and set the allowed ranges.

An automatic stair construction algorithm starts from user input regarding required properties and the Stair’s polyline path. Based on these inputs and the set of Rules, it constructs a stair.
During the polyline path input, instant graphical feedback shows what the resulting Stair will look like. To perfectly follow the polyline path, the algorithm automatically adjusts certain geometric values of the stair, within the user-provided ranges in the rules.

In some cases, the input values and the polyline path cannot result in an adequate Stair, yet certain geometric modifications would produce a Stair that does meet regulations. If a conflict or error occurs during input, the ‘Solver’ appears to help resolve it.

The Solver presents solutions in a graphical interface, showing the proposed changes. They are presented in order of how far they deviate from the originally created Stair - from least to most.
The user can select any solution to see instant graphical feedback on the plan of how the modified Stair would look like in context, before accepting. The Solver can appear not only when drawing a new Stair, but also when an existing Stair is modified (even via a dialog box).

Like Walls, Stairs can be linked to Stories, and so can follow changes in floor height. If floor height changes only by a small amount, the Stairs will follow automatically (the number of risers will remain fixed, only the height of the risers will increase – within the set Rules). If Story heights change by a significant amount, then ARCHICAD highlights the affected Stairs in the whole project until the user changes any of the given data (e.g. number of steps or Riser heights).

### Stair Tool Components

The main Stair component is its structure. Four structure types are available:

- Monolithic Structure
- Beam Structure
- Cantilevered Structure
- Stringer Structure

Each structure can then be customized: size, building material, used profile, 2D appearance. Structure for flights and landings can be defined individually.
Other 3D Stair components are the Finishes: Treads and Risers. The user can select types from a Component list, whose contents are not limited to pre-defined elements. For example, the user can define custom components and save them using one of the predefined Stair subtypes.
As of ARCHICAD 21, GDL components use a Custom Profile attribute (selected from the Profile Manager) or their own Building Material attributes.

Stairs use a symbolic 2D display only, which are completely independent from the Stair’s 3D parts. The 2D GDL sub-elements are:

- Grid
- Break Mark
- Walking Line
- Numbering
- Up-down Text

Description.

The user can define which 2D sub-elements should appear and how to display them. The user can produce a single 2D Symbol and use that as a floor plan view.

The display of Stairs

Model View Options affect the on-screen and output display of Stairs in 2D and 3D. They set the detail level of Stairs in Sections, Elevations and 3D views and set the plan-type specific display on Floor Plan views.

The two Model View Option for the Stair Detail Level (Full and Schematic) affect the display and output of Stairs in Sections/Elevations, the 3D and 3D Document windows (including Stair Edit mode). In Full mode, the complete Stair appears: all used 3D sub-elements can be seen in full details; in a Schematic mode, a continuous membrane surface is shown to indicate the top surface of the steps.
The floor plan display of a Stair can be modified by the Model View Option settings by configuring the displayed type (Floor Plan or Reflected Ceiling Plan) and its components. These settings will control the 2D appearance of the Stairs by the detailed level of symbols, which can be set to:

- None
- Visible Parts Only
- Hidden Parts Only
- Visible & Hidden Parts.

**Stair Tool Edit Mode**

Any placed Stair instance is defined by Stair Settings. However, you can use Edit mode and its dedicated sub-element specific tools to access and change the individual members of a selected Stair, or to add new custom sub-elements to it.

Edit mode for Stairs is similar to Curtain Wall’s. In ARCHICAD 21, you can enter Edit mode from Floor Plan, Elevation, Section and 3D Window, and you can edit Stair components in all of them. You can remain inside Edit mode even when switching between views. The undo queue also contains the entire history from Editing mode.

In Edit mode, each sub-element (Treads, Risers and Structures) has its own Settings dialog box, enabling you to change settings individually. You cannot create a new Stair in Edit mode however; the purpose of Edit mode is to provide a deeper level access to the components of an existing, selected Stair.

Once you change the parameters of any selected Stair member in Edit mode, that member is no longer tied to the Stair Settings; it is a Custom member, and its parameters are locally defined, in its individual tool settings dialog box (e.g. Tread, Riser or Structure). Custom parameters are set in Edit mode only. Changing the settings of any selected Stair sub-element in Edit mode will NOT affect the Stair’s Settings.

**Stair Tool Edit mode has two options to display the Stair:**

- Schematic View
- Full View.
Schematic view shows the Stair as a simplified 3D transparent surface, while Full View includes full details of the Stair element as specified by the User.

**Railing Tool**

The Railing Tool lets you create any typical or unique Railing in ARCHICAD. This is a 3D building element Tool in ARCHICAD that can be associative to other 3D elements, like Stairs, Slabs, Walls, Roofs or Meshes.

Input methods are almost identical in the Floor Plan or 3D windows. A Railing consists of Nodes and Segments: elements of a polyline. Nodes are linked by position. Segments are the lines between Nodes, and can follow the host element during node insertion, moving, deletion or segment curving.

A configurable Railing Pattern makes using the Railing Tool very easy and flexible. The Pattern Editor helps you assemble a unique Railing pattern specific to each segment.

Like the Stair, the Railing Tool is a hierarchical element, which includes sub-elements. These can include posts, rails and/or panels. These are GDL components allowing for versatile geometry types that also use Building Materials and/or Custom profiles. For any Railing, you can edit the entire element as a whole, or any of its sub-elements separately, or in combination, in Edit mode.

Older-version Stairmaker Rails and Rail Objects are migrated to ARCHICAD 21 as objects, with limited editability.

**Railing Tool Pattern Editor**

The Pattern Editor helps you assemble a unique Railing pattern specific to each segment. The Pattern Editor is available at the top of the Railing Settings dialogue. It is a symbolic representation of the segment pattern, containing toprail, handrails, rails, inner posts, balusters.
and panels. The length of the pattern is set by the inner post on the right. The grayed out area on the right reflects the repetition of the pattern.

The Pattern Editor is interactive; the tree and Pattern Editor selection actions are connected. Once you specify a pattern, you can set up how ARCHICAD should repeat it within the segment. We offer three options for pattern distribution: by Fixed Pattern Length; Divide Segment into Divisions; and Distribute Pattern Equally. It is possible to unify segment patterns.

**Railing Input**

The Railing Tool input is based on how Polylines work in ARCHICAD, so it will always aim for the highest level of associativity possible. During input, a wireframe preview shows the expected railing layout.

Railings on Stairs follow the Stair Boundary, so clicking on one end and then the other end of a Stair will result in an associative Railing on one side.

Unlike Stairs, Slabs, Roofs and Meshes are polygonal elements, so any Railing between two Nodes can run either clockwise or counter-clockwise around them. During input, after clicking both start and end Nodes, the user can decide which direction to create the Railing.
Railing Components

- The **Toprail** sits on top of the segment, so it always moves along with the Railing scheme.
- The pattern can contain two **Handrails**, each of which can be doubled to the two sides of the Railing.
- **Rails** are general horizontal elements. You can offset them perpendicular to the Railing segment or set them at any height. Rail cross sections can also be different for each. There is no limit to how many rails you can add to the pattern.
- You can add multiple **inner posts** to the pattern, where the one on the far right defines its length.
- **Balusters** are a pattern within the pattern: selecting one baluster selects all its instance copies in the Pattern Editor. First you can set the offsets around the baluster pattern. Then you must choose a distribution option, which is very similar to those in segment pattern settings.
- **Panels** can fill the area between the toprail, rails, inner posts or segment boundaries.
- All horizontal elements (Toprail, Handrails, Rails) can have **Connections** and **Endings**. There are three different Connection types available: disconnected, gooseneck or direct connection. Endings can be added to any of the horizontal elements ends; they can be even custom components as well.

![Railing Default Settings](image)

For any of these components, you can choose not just built-in GDL components, but custom ones, saving them from 3D view using a predefined Railing subtype.

Railings use a symbolic 2D display only. These are individual GDL sub-elements, completely independent from the Railing’s 3D parts.
The display of Railings

Model View Options affect the on-screen and output display of Railings in 2D and 3D. They set the detail level of Railings in Sections, Elevations and 3D views and set the plan-type specific display on Floor Plan views.

The three Model View Option for the Railing Detail Level (Full, Simplified and Schematic) effect the display and output of Stairs in Sections/Elevations, the 3D and 3D Document windows (including Stair Edit mode). In Full mode, the complete Railing appears: all used 3D elements can be seen in full details; in Simplified mode, the complete Railing appears: all used 3D elements can be seen, but in a simplified view: bounding box of sub-elements shown. In Schematic mode, a continuous membrane surface is shown to indicate the path of the Railing.

The floor plan display of a Railing can be modified by the Model View Option settings by configuring its components. This setting will control the 2D appearance of the Railings by the detailed level of symbols, which can be set to:

- None
- Visible Parts Only
- Hidden Parts Only
- Visible & Hidden Parts.
The Railing Tool Edit Mode

Use Edit mode and its dedicated sub-element tools to access and change the individual members of a selected Rail (Posts, Inner Posts, Balusters, Top Rail, Handrails, Rails and Panels).

Once you select a sub-element (like inner post, baluster, etc.) all its pattern instances are selected, too. When opening its settings, only the relevant geometry is highlighted and you can edit all instances at once.

As for the Stair, the Railing’s Edit mode can be set to either Schematic or Full View. Railing elements in Schematic View are a simplified geometry: Nodes as vertical spatial lines and Segments as 3D transparent surfaces.
Curtain Wall Editing Mode Renewal

Curtain Wall’s Edit Mode offers the same flexibility and options as the New Stair and Railing Tools’. The changes make easier to create and edit Curtain Walls in any view, not just in 3D. The settings dialog’s interactions, functionality and terms were also updated to ensure consistency with the new Stair and Railing Tool.

Areas improved during the development:
- Edit Mode now available in Floor Plan and Section/Elevation
- Sub-selection and editing of components in Floor Plan/Section
- Edit scheme grid lines and boundary in Floor Plan/Section
- Change view while in Edit Mode
- Library part UI of CW components redesigned
- and lots of other small usability enhancements.

PRODUCTIVITY

Touch Bar support for the new MacBook Pro

With the new Touch Bar, quickly and easily access common ARCHICAD commands based on current window and selection. Such as:
- Switch between Floor Plan and 3D windows
- Show All vs Show Selection 3D based on selection anywhere in the model
- Open active Tool Settings and selection Settings
- Enter and exit Edit Mode for Stairs, Railings and Curtain Wall
- Edit Composite or Profile of the selected element
- Common GDL shortcuts when editing scripts

Multiply Along Path

The multiply dialogue and functionality has been enhanced and expanded with additional options.
• New option to multiply copies of any element to a clicked path

• Options to rotate copies to path, none or randomize, useful for landscaping
• Modify spacing and copies during input when multiplying along path, directly from the Tracker
• Updated Multiply dialogue ensures easier understanding
• New multiply option “Increment and Spread”, to determine spacing and number of copies both graphically and parametrically

Magic Wand Graphical Feedback
During magic wand, graphical feedback now provided to see how elements will appear before clicking. Available in all views.

Parameter transfer between Line, Arc, Polyline and Spline
Inject (Parameter Transfer) between Line, Arc, Polyline and Spline is available now. For example, pickup from a Line and Inject directly into a Polyline.

Dashed Line Handling
There is a new algorithm that handles the dashed line presentation of polygonal elements. For 2D polygons there is an option to visualize dashed lines with the existing algorithm that is more suitable for splines, collinear edges and tangential curves in polylines. The new dashed line representation is more natural and the new algorithm reduces the possibility missing corners.
Associative Dimensions for Wall Center Lines
New options provided to place dimensions on the individual skin of the composite including reference line, core only and all skin’s mode in floor plan and section/elevations.

Text Style Favorites
Uniform Rich Text Formatting is introduced in all text related tools. It is available in Texts, Labels, Dimensions and IS, with updated and consistent UI. Text Favorites are available directly from Text Style Settings within any Dimension tool and from Interactive Scheduler.

Autotext based Labels
Auto-text is able to access element specific parameters and properties beyond the existing project specific information. It enables users to create their own custom, associative labels - without GDL knowledge - that can list element specific information.
Detailed Section/Elevation Depth Control

More freedom in editing Sections/Elevations, with section lines now being editable directly in section view without switching back to floor plan.

New and improved options available include:

- break Section/Elevation Limit Line and Marked Distance Area Line, previously only available for the Main Section/Elevation Line
- graphically edit Section Line boundary extents directly in Section, when Section/Elevation Range is turned on
- graphically edit any Main Line, Limit Line, and Marked Distant Area Line breakpoints directly in Section
- improved editing of Section Marker in Floor Plan

Selective Parameter Transfer

New Element Transfer Settings replaces the previous Favorites only Parameter Settings. These transfer settings can be saved into sets and are now used, not just by Favorites, but also by Parameter Transfer (Inject) to allow modification of only certain element parameters, available on-the-fly directly during inject or when applying favorites.

The list of available settings has been greatly expanded and the „excluded“ option reversed so users can now select what parameters they want to include in transfer from the given list. The element transfer settings and their sets are now stored directly in the Project and available also for Teamwork members.

With this new feature, productivity is increased since a transfer or change the selected parameter onto another already existing element without resetting the parameters in the element settings dialogue.
Save Selection as PLN

User can select part of the model and save as a separate .pln project file, while saving a module, that contains all the 2D reference information. There is an option to automatically crosslink the two resulting files. This makes organization of the project easy by allowing splitting of a large project into crosslinked modules.

Introduction of Building Materials and Custom Profiles to GDL elements

Building Material and Profile (created in Profile Manager) attributes now can be used in the GDL elements. So, in those library parts where these parameters are available, users can assign Building Material and/or Profile attributes instead of just a combination of Surfaces, Fills and predefined geometry. Also, Building Material quantities or used Profile types can be labelled and scheduled from such library parts. Building Materials used in GDL library parts will not be automatically adjusted in junctions with construction elements; the principles of priority-based connections are not working in such cases.
Building Materials and Profiles are used in all GDL components of the new Stair and Railing tool wherever it is required. For other objects in the ARCHICAD 21 library, using Building Materials and Profiles see the chapter about ARCHICAD 21 library improvements below.

COLLABORATION

Reservation Assistant in ARCHICAD

In Teamwork, ARCHICAD will automatically reserve the element you start to edit in any of the windows. It does not matter if you have forgotten to reserve the element when opening its settings dialog, because ARCHICAD will reserve it in the background. In case it is not possible – because it is reserved by someone else – then a warning will appear asking you to resolve the reservation conflict first.

BIMcloud

Personalize BIMcloud’s login page with a company logo

Add your company’s logo to BIMcloud’s login page to personalize it for your employees.
Monitor BIMcloud’s resources through the browser based BIMcloud Manager interface

BIMcloud’s activity stream has been extended with resource monitoring capabilities. Easily readable charts and filters show the current load level of the different components. Use the historical data to investigate past events and figure out what caused a slowdown at a given time. Filter the activities based on the selected chart areas to figure out the connections between the user events and the resource peaks.

Use a single BIMcloud Server for all ARCHICAD versions

A single BIMcloud Server v21 will be able to work together with v19, v20 and v21 ARCHICAD versions. This will allow you to host all projects on a single server and completely uninstall earlier BIMcloud Server versions. It will save you time and money by reducing the required hardware resources and simplify the server management tasks. Future BIMcloud versions will be able to update this server in place without the need of further migration steps.

Automated BIMcloud backups based on a schedule

Along with the already existing project and library snapshots it is now possible to create a complete backup of the server. This backup can be triggered manually or per a pre-defined schedule. The server can be used even while the backup is in progress. It will contain all the data
and configuration of the server so it can be easily restored even to a different hardware in case of an emergency.

**Notify Users by Email from BIMcloud Manager**

Now the Server Administrator can send any message to any or all users from BIMcloud Manager. For example, to notify users of a planned server maintenance activity.

Just go to the Users page, select any or all users, and click Send email.

**INFORMATION MANAGEMENT**

**Classification Management**

An ARCHICAD model can be described as a central BIM database that stores all project data and makes it accessible to any project stakeholder. Previous ARCHICAD versions have provided a fixed set of Element Classifications, but ARCHICAD 21 introduces a flexible way to classify elements according to any national or company standard classification system and makes available ARCHICAD Properties that can be connected to any construction element or zone, based on any Element Classification.

Classifications for construction elements or zones can be handled on a centralized way within the scope of the project using the new Classification Manager function where a classification can be defined, its related properties can be set and transferred between projects via XML file format.
You can assign a Classification value per Classification System in the Elements’ Settings dialogs and the Interactive Schedule. Classifications (together with their Properties) can be shown on any output, enabling exchange of element-related BIM data among stakeholders. For example:

- Add to Labels and Zone Stamps
- Use as criteria in searching and scheduling
- Add as Fields in Element Schedules
- Map as IFC properties for IFC model exports, using Translator for Export
Import BIM Content

ARCHICAD’s new **Import BIM Content** command is an easy way to import predefined BIM data to your project. Browse for a preconfigured ARCHICAD project, then import the following data to your own project:

- A Classification System
- Any Properties belonging to that Classification System
- The IFC Translator “Mapping” presets referring to that Classification System:
  - Type Mapping for IFC Import
  - Type Mapping for IFC Export
  - Property Mapping for IFC Export

Use GRAPHISOFT’s website to browse for predefined ARCHICAD projects whose BIM content conforms to specific local BIM standard; or else configure and import your own.

**PERFORMANCE**

Better 3D Navigation experience

Enjoy more continuous navigation experience even after 3D navigation, without blockage or waiting. This is true even with 3D editing or switching between views (including navigation under feedback).

We have also improved the selection speed: user don’t have to wait, even after selecting the whole model.

**Speed up Label drawing on Floor plan/Section/Elevation/IE/3D views**

We have speeded up the drawing of labels significantly compared to ARCHICAD 20, if the label or the connected element or the GDL globals have not changed since the last redraw.

Also, we support the fast evaluation of quantity based properties.
VISUALIZATION

CineRender Engine Upgrade: R18
ARCHICAD now runs the latest CineRender version, based on the Cinema 4D R18 engine.

CineRender new features
- Reflectance channel:
  - Unlimited number of layers.
  - New Reflection types.
- The new Light Mapping is a Secondary GI method, for the fastest rendering. (render settings)
- The new Variation shader can be used to vary surface color/shaders randomly across several elements.
- The new Parallax shader effect inside Bump channel is similar to Displacement but requires less render time.
- Uniform Surfaces:
  - Render the model using custom RGB color (extended mode of the white model effect).
  - Ability to preserve channels of the original surfaces e.g. bump.

Other CineRender enhancements
- The new Thin Film shader can render soap bubble and oil film effects. (Surface settings)
- Lens distortion function for determining and compensating for lens distortion. A distortion post effect as part of the Lens Distortion functionality. (Photorendering settings)
- New Refraction Preset setting for the Transparency channel. (Surface settings)
- Ambient Occlusion can be used to create interesting effects when inverted. (Photorendering settings)

Introduction of 3D Styles
New View Option: Switch display style of any 3D view with one click
Define preset 3D modes in 3D Styles dialog (formerly 3D Window Settings)
New shading mode: monochrome that retains transparency information.

New contour options in OpenGL and Vectorial engine - refined adjustment settings for thickness and color. Options for Vectorial Engine:

- Normal contour
- Silhouette
- Line settings for Vectorial Hatching
- Shadow contour Options for OpenGL Engine:

- Contours on/off, a Draft/Best options, and uniform setting for contour thickness
- Active preview icon
- New Background option - two color (Artificial Horizon) option.
- Extended options for shadow settings both in OpenGL and Vectorial Engine.
- New options to turn off headlights and highlights in OpenGL mode that results in a more graphical flat shaded view.

INTEROPERABILITY
Hotlink IFC

Link IFC files as hotlinks directly into the currently open Project as protected reference content. Use the Model Filter to narrow the placed IFC reference content - for example, by categories (structural or MEP), stories, layers, element types or element selection.
Elements of a linked IFC module are included in the host Project: even if the linked IFC source file is not currently available, the module is still present and visible.

Inserted IFC model content can be updated easily from the linked source file. If the link is broken, elements of the inserted IFC modules can be edited as regular ARCHICAD elements. Collision detection works for linked IFC module elements too.

Adjust Elevation of Hotlink Content to Host Story Structure

New import option for both PLN and IFC Hotlinks: choose whether elevation of imported elements should follow the Story Structure of the Host project.
Collision Detection

Previously exclusive to the MEP Modeller add-on, the function has now been integrated into ARCHICAD and its functionality greatly expanded.

A new dialogue allows two groups of elements to be compared through user defined criteria sets, similar to that of Find & Select. When defining criteria, use Find & Criteria saved sets to populate the groups for easy comparing. When run, see how many elements were compared, and new Mark-Up entries are created.

Compare examples could include:

• Collision detection between construction and MEP elements. MEP elements can either come from hotlinked or merged external MEP IFC files, or else modelled inside ARCHICAD. Collision detection between concrete and steel construction elements.
• Collision detection between elements classified as different product/element types (by Uniclass, OmniClass, UniFormat or any other classification system).
• Checking the clearance for escape routes or access for the disabled.
**Full Control of IFC Preferences (IFC Translators)**

New central management of IFC import/export settings at project level: IFC Translators combine geometry conversion settings, model filters, property schemes (with mappings), classification system mappings and IFC standard requirements (such as Coordination View, Design Transfer View, Reference View, Basic FM Handover View, COBie, etc.).

IFC Translators are stored and shared within ARCHICAD Project Template (.tpl), Project (.pln) and Archive Project (.pla) files.

Compatibility with earlier versions: Translators can be built up from XML-type Translators and property Schemes defined in earlier ARCHICAD versions (Legacy XML Import).

Managing Classifications in IFC Import/Export

Any ARCHICAD Classification system - whether it is a custom or national standard – can be paired with IFC Types (e.g. IfcCovering) and IFC Type Products (e.g. IfcCoveringType). Classification - IFC Type mapping tables can be customized for each IFC Translator. ARCHICAD Classifications can be exported as dedicated data in IFC models called IFC Classification Reference.
Publishing IFC

When defining IFC model content as a Publisher item, the expanded IFC Translator settings, each saved Publisher item can use the exact settings needed to output the desired content:

- Vary the element content and visibility settings (Layer Combination, Structure Display and Graphic Override),
- Fine-tune the property schemes and classification system mappings as well as geometry conversion settings.

For example:
- export one view (containing construction elements) with standard IFC 2x3 property sets;
- another view (containing distribution elements) using COBie data;
- another view (containing Zones) using properties relevant to a Room manager company.
BIMx Export Improvements

Better Element Data Definition from ARCHICAD Model
When you publish an ARCHICAD project in BIMx Hyper-model format, you can use the Info Set option in Publisher to define exactly which element information (e.g. dimensions, properties) should be displayed in the BIMx model.

As of ARCHICAD 21, the Info Set options have been expanded: instead of choosing a single Element Schedule as the basis for exported data, you can now select as many Schedules as needed.

This way, you can divide the exported custom data into several schedules (for example, by element type). This speeds up the update and publishing process, and makes it easier to manage data.

Display Architect Credits in BIMx
Optionally add a company logo and website info when publishing an ARCHICAD project as a BIMx Hyper-model. (Define the logo and website URL in Project Info.)
The logo will appear as part of an animation when the Hyper-model is opened in the BIMx application. A user click on the logo will open the corresponding company web page.
LIBRARY ENHANCEMENTS

Please note: Some new Library Part developments are available in certain localized libraries only (where applicable, this is indicated in the descriptions below).

General Library Enhancements
The following improvements are available in all local libraries.

Library Element UI Images Adapt to Display Resolution
Images in the Object Settings dialogs were replaced by vector images, for enhanced and polished user interface.

Introducing the Profile parameter type
The Profile parameter type has been introduced to Library Elements. Data of the Profile can now be retrieved in GDL scripts (except Parameter scripts).

Improvements in the Skin List Label object
Thickness values can now be aligned to the decimal point.

- Values, units, extra accuracy units and the name of the skin can now be aligned in separate columns.
- Option to place the skin names in the first column followed by the thickness data.
- The length of the main leader can now be adjusted by a hotspot.
- The position of the skin names can now be adjusted by a hotspot.
- The “flag” part of the label can now be rotated.

Door and Window Enhancements

Improved Glass-to-Glass Corner Connection
If the opening type in all sashes on the left or right side of a window is set to Fixed Glass, you can now choose “Glass” as the Corner Connection Type on the Custom Corner tab page.
If this option is selected in both windows connected at a corner, there will be no frame between the adjacent glazings.

**Improvement of Door and Window markers**

- DW Stamp and D/W/S Markers can now display the Location parameter.
- Door Stamp can now display the Sill Height parameter
- Dimension texts can now be placed perpendicular to the leader line
- Fire Rating and Acoustic Rating texts can now be placed perpendicular to the leader line

**Other Localized Library Enhancements**

New developments in selected local libraries only.

**New label for fire rating, insulation, self-closing, smoke stop (GER/AUT/CHE only)**

Use the new label to display the fire rating, smoke stop, self-closing, smoke stops items in the plan according to the AUT standards.
NCS Wall Label
(USA only)
A Wall label tool that complies with the NCS USA standard with the ability to display several types of wall ID's:

- ID coded in the name of the Composite or Profile assigned to the wall
- regular ARCHICAD Wall ID
- custom text
- any property values assigned to the wall

Countertop element
(USA only)
This element can be used to place a continuous counter surface over cabinets and appliances. It can also contain sinks and taps of many varieties. Splashes can be used on edges. Multiple countertop elements can be combined into a single continuous counter surface.

NCS GFCI object
(USA only)
New ground fault circuit interrupter element complies with the NCS USA standard. Its primary function is the 2D symbol, but the element provides 3D model also. The parameter values of the element instances can be included in Interactive Schedule.
Improved Parallel Chords 1 Object
Now in USA Library too.

- "Seat" element can now be moved horizontally by a hotspot from the end of the top chord to the connection of the first bar.

- Element can be slanted up to 30 degrees.

SMALL INTERFACE CHANGES
Apart from thematic feature developments and performance improvements, ARCHICAD 21 contains a number of fixes, UI changes and renamed controls, all aimed at improving your user experience in small but useful ways. These include the following.
Interactive Schedule Enhancements
Several smaller interface and usability enhancements in the Interactive Schedule:

- Formatting options rearranged and cleaned up into panels
- New zoom factors available (up to 500% zoom)
- New selection highlight to improve clarity
- In Scheme Settings dialog: Multi-select is available for Criteria (previously available for only Schemes and Fields)
- New Information panel: gathers all relevant warnings and information of a selected item (previously showed only limited information in the header). Appears only when relevant.

Changed Management of IFC Translators
IFC Translator settings (previously saved in XML files) are now part of the template file used to open IFC files in ARCHICAD.

Reorganized IFC-Related Commands
With the new Translator and property mapping logic for IFC, command names have changed as follows in ARCHICAD 21:

<table>
<thead>
<tr>
<th>ARCHICAD 20</th>
<th>ARCHICAD 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFC Translator Setup</td>
<td>IFC Translators</td>
</tr>
<tr>
<td>IFC Manager</td>
<td>IFC Project Manager</td>
</tr>
<tr>
<td>IFC Scheme Setup</td>
<td>Property Mapping for IFC Export</td>
</tr>
<tr>
<td></td>
<td>(Translator Setting)</td>
</tr>
<tr>
<td>IFC Options</td>
<td>IFC Local Preferences</td>
</tr>
</tbody>
</table>

Control Sun Position by Date and Time
Set the Date and Time for Cameras and in the 3D Projection Settings directly, and save it to views. Previously, setting the date and time in the Sun Settings would only update the Sun Altitude and Azimuth, without storing the corresponding date and time settings. Now, the Date and Time settings are stored and remembered. If you update Project Location, the sun will...
• Automatically update to show the correct sun position for that date and time.
• Saved 3D views indicate the stored date and time or the custom sun position.
• Sun Settings dialog has been greatly simplified and renamed to Sunlight Settings.

New Pet Palette Command for Editing Curved Polyline/Edges

Use the **Insert New Node to Arc** command from the pet palette.
Use Renovation Status as Criterion in Graphic Override Rules

When you define Graphic Override Rules, you can now include the elements’ Renovation Status as a criterion.

Built-in Renovation rules remain unchanged, with a fixed set of criteria. However, the new Reno Status criterion in Graphic Override Rules allows you to further distinguish overrides for certain subsets of Existing/New/To be Demolished elements.

For example, define a rule to override only existing walls, but not the existing windows they contain.

Cursor Snapping on Text Box

Text Box (used with Text, Label or Dimension) now provides cursor snapping to the edge and to edge centerpoint.

Other Renamed or Changed Options

- Updated **Hotlink Module** commands and Settings dialogs
- Favorites Parameters are now stored in **Element Transfer Settings**
- Due to expanded Curtain Wall editing possibilities, the **Design > Modify Curtain Wall > Boundary Editing in Section** command has been removed from the default Work Environment. (You can add this command to the menu by customizing your Work Environment.)
- The (formerly Internal) Rendering Engine is now called **Basic Rendering Engine**
- The Work Environment Autosave option is now called **Saving to Recovery File**
- The **Fog** control (formerly in the Sun dialog box) is now a PhotoRendering effect, available in PhotoRendering Settings for the Basic Rendering Engine
- **Edit Selected Composites/Profile**: combined command, with an icon added (can be put into a customized Tool Bar)
- Commands for choosing **3D Engine** (Vectorial vs. OpenGL) now available from **3D Styles** dialog only (Engine is saved with 3D Style)
- **Filter and Cut Elements in 3D**: command now also available from View Settings
- Improved wording of **Work Environment** customization dialogs and **Tab Bar** view menu items, for better consistency
- Updated interface for **Grids and Background** dialog box