3

Working with Views

In DataCAD Plus vis, you can change the way you view your project. Selecting backgrounds and foregrounds makes your setting more realistic. Raytracing shows what your project will look like in different lighting conditions. Walking through the project will let you virtually experience your design.

In this chapter:

✦ Views

✦ Background, foreground, and colors

✦ View models

✦ Raytracing

✦ Walk-through

✦ Day or night view

Working with Views

There are two basic views that you will use in the DataCAD Plus vis progam: 3D plan (using the ⬛🏭🏭🏭🏭⬛⬛ icons) and perspective (using the 🔲 icon). Before you can save a picture with these settings, the active window must be either a plan view or perspective view. You can adjust the size and appearance of your saved projects. The settings you select can have a dramatic impact on the quality of your pictures.

3D Plan Views

In the plan view, only the current floor is shown in three dimensions even if the third dimension (height) isn't directly evident. You can control the height when placing objects, with the help of the right mouse button. This type of view lets you place objects at a specific height. When you are placing an object in your drawing, you'll generally detect that its height is set incorrectly (for example, a tall object may appear under a desk if your height is incorrectly set). This means that the object's height was incorrect.

Remember that several types of 3D plan views are available because this icon has a black triangle in the lower right corner. You can see the 3D plan from above, below, front, back, left, and right.

You can also render the 3D plan view with the Raytracer.

Perspective View

The perspective view is the main view of DataCAD Plus vis. In it, you can walk through the building, place objects at will, and change the point of view freely. The perspective view lets you control the height of objects when you're placing them. You can also get a very good spatial impression of your project.

The disadvantage of the perspective view is that it is more difficult to control the depth of objects when you place them than in the 3D plan view. The perspective view is the only type of view where you can wander through your dwelling. Therefore, the walk-through 🔳 icon is available only in the perspective view. Like the plan view, you can render the perspective view for calculating shadows and reflections with the help of the Raytracer.

Setting the Background and Color

You can select a background color to use in the perspective and 3D plan views. This specification is made separately for day and night views. There are several ways for you to access the Background dialog box.

➔ To access the Background dialog box from the pull-down menu:

1. Select File from the pull-down menu.

2. Choose Project options.

3. Click on the Background . . . button in the Project options dialog box. The Background dialog box appears.

Or

1. Select Options from the pull-down menu.

2. Choose Background. The Background dialog box appears.

➔ To access the Background menu from the icon bar:
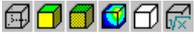
1. Right-click on the icon on the lower horizontal menu bar. The Background dialog box appears.
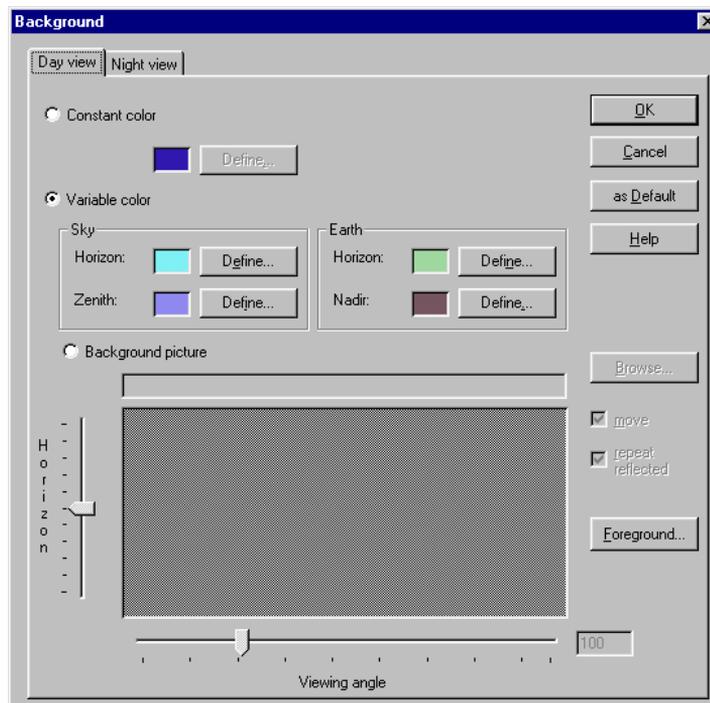
This dialog box features a tab for Day view and another for Night view. Each tab lets you set the background by using Constant color, Variable color, or a Background picture. These settings affect your printed output, so you may need to change the settings in the Print options dialog box (see these instructions in Chapter 1). Once you have selected an alternative (Constant color, Variable color, or Background picture), you must define the color(s).

Constant Color

The Constant color option (available in either the Day view or Night view tab of the Background dialog box) fills the entire window background of a 3D plan or perspective view with one color.

➔ To define Constant color:

1. Select Constant color on the Day view tab.

2. Click on the Define… button. The Color dialog box appears.

3. Select one of the basic or custom colors and click OK. The color you selected appears beside the Define… button in the Background dialog box.

If you click Define Custom Colors>>, you can further control the color.

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4. Select Constant color on the Night view tab and follow steps 2 and 3.

5. Click OK to exit from the Background dialog box. The colors you selected now take effect.

6. Use the ☀ ☽ ☾ icon to switch between the day, night, and variable views to see your background color.

Variable Color

Variable color lets you select different colors for the sky's horizon and zenith as well as the earth's horizon and nadir. To understand how these color "ramps" are created, imagine that you're standing at the center of an infinitely large sphere, whose north pole (zenith) is directly above you and whose south pole (nadir) is directly beneath you. From the sphere's zenith to the equator, the DataCAD Plus vis program interpolates between two freely-definable colors and distributes them symmetrically between these two points. Depending on your viewpoint, you'll see a part of this color ramp. The same applies from the equator to the nadir. To get realistic results, select a blue tone for the sky; for the earth, choose a horizon color of brown and a nadir color of green.

➔ To define Variable color:

1. Select Variable color on the Day view tab.

2. Click on the Define… button beside Horizon in the Sky portion. Select the color you want (from the Basic, Custom, or Define Custom options) in the Color dialog box and click OK to return to the Background dialog box.

3. Click on the Define… button beside Zenith. Select the color you want (from the Basic, Custom, or Define Custom options) in the Color dialog box and click OK to return to the Background dialog box.

4. Click on the Define… button beside Horizon in the Earth portion. Select the color you want (from the Basic, Custom, or Define Custom options) in the Color dialog box and click OK to return to the Background dialog box.

5. Click on the Define… button beside Nadir. Select the color you want (from the Basic, Custom, or Define Custom options) in the Color dialog box and click OK to return to the Background dialog box.

6. Select Variable color on the Night view tab and follow steps 2 through 5.

7. Click OK to exit from the Background dialog box. The colors you selected now take effect.

8. Use the ☀ ☽ ☾ icon to switch between the day, night, and variable views and the ✛ icon to change your viewpoint to see your background colors.

Background Picture

You can use any Windows bitmap file (such as a mountain scene or a picture of the actual building site) to give your client a realistic impression of the new building. If you select a picture as the background, you can adjust how it is displayed. This includes the position of the horizon, the viewing angle, and whether the picture moves when you move or rotate the display.

➜ To define the background picture:

1. Select Background picture on the Day view tab.

2. Click on the Browse… button, select the picture file that you want to use, and click OK. The picture you selected appears in the preview window in the Background dialog box.
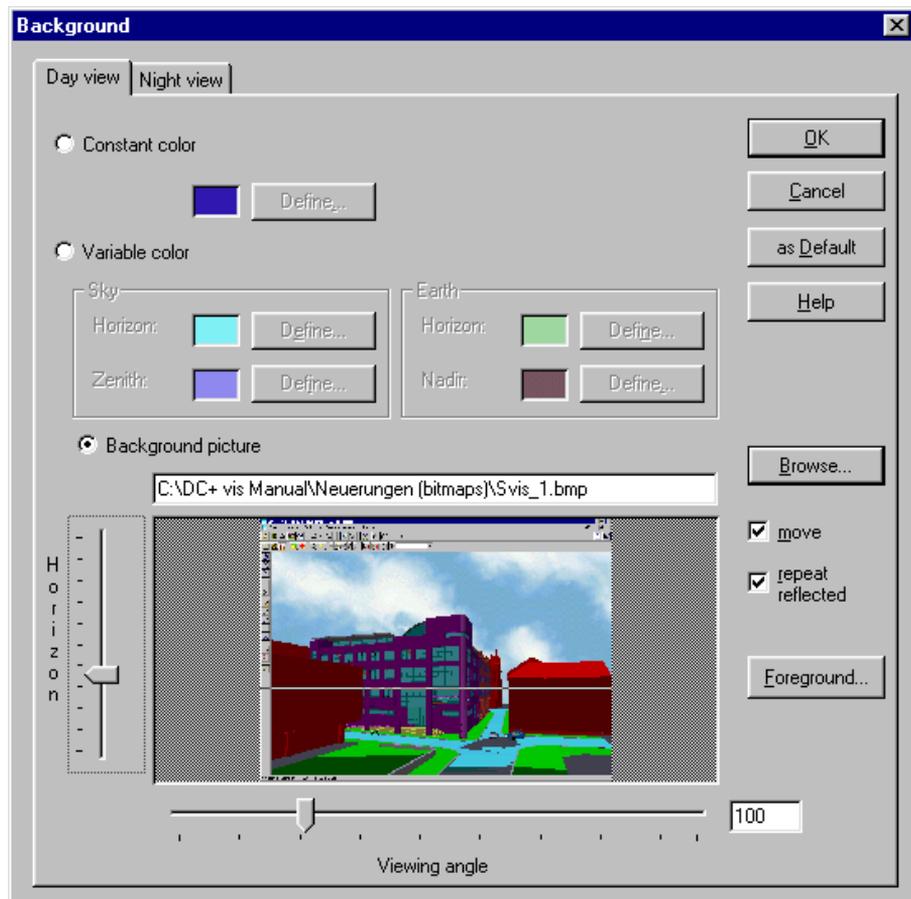
3. Click on the Foreground… button if you want to use a foreground picture for the 3D plan and perspective views. Make your selection as well as horizontal and vertical adjustments. Click on OK when you are satisfied with the picture in the preview window.

4. Adjust the horizon (represented by a moving horizontal line in the preview window) with the Horizon slider bar. Make sure the line is on the picture's horizon.

Positioning the horizon line correctly on the background picture will give you a more accurate view of your project. If you look exactly horizontally, the horizon you specified in the background picture will be exactly in the center of the view. To do this, right-click on the viewpoint 🔅 icon to open the View dialog box; type 0 in the input field for Head Inclination; and click OK to return to the ArCon+ window.

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5. Adjust the viewing angle with the slider beneath the preview window in the Background dialog box.

This is the camera angle that was used when the picture was taken. You will only be able to estimate this value. The larger the focal length of this angle, the smaller the angle from which the picture was taken. For most pictures, a setting of 60 degrees is "normal." If you used a telephoto lens, the angle will be smaller; with a wide-angle lens, the angle will be larger.

The best background pictures are taken with a wide-angle lens. A picture with 360 degrees would be ideal; however, this requires a special camera or process. This will give you the most complete and accurate view of your project from all positions when you walk through it.

The angle you specified as well as the field of view affects the current view window. For example, if you enter 30 degrees as the angle for the background picture and 60 degrees as your field of view for the view window, you'll only see half of the background picture, horizontally. If the field of view is the same as the viewing angle, you'll see exactly one background picture per view.

If you then rotate left or right in the current view, the background picture will move accordingly. Since the picture will "end" as you rotate around the view, DataCAD Plus vis repeats (tiles) the picture at the sides and mirrors it. This applies to the left and right sides as well as the top and bottom.

If you select 60 degrees as the viewing angle for the background picture and you rotate once around by clicking the viewpoint icon 🔅, the background picture runs around by 360/60 = 6 times. You'll see the exact center of the background picture if you look in the X-direction.

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6. Make sure there's a checkmark in the box for "move." If this box is not checked, you will see the background picture, but it won't move if you change your line of sight during the walk-through with the ⬢ icon. You'll always look at the center of the background picture. DataCAD Plus vis increases or decreases the background picture's size so it always fits into your current view.

If the aspect ratio of your current view does not correspond to that of the background picture, sections of the background picture may be cut off to avoid distortions.

You can use a motionless background picture to position your project into a building gap. To do this, load the background picture, uncheck move, then adjust the viewing angle and the screen window of your 3D view so the building fits exactly into the window. Modifying the zoom level can change this adjustment. Correctly adapting the view to the background picture takes practice.

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7. Click OK when you are satisfied with your choices in the Background dialog box.

➔ To use the background you developed as a default for future projects:

1. Make all the changes you want in the Background dialog box.

2. Click the as Default button.

3. Click OK to exit the dialog box. The background you defined is now the default for other projects.

If you calculate a picture with Raytracing and the scene contains reflected areas, the adjusted background is also reflected on these areas.
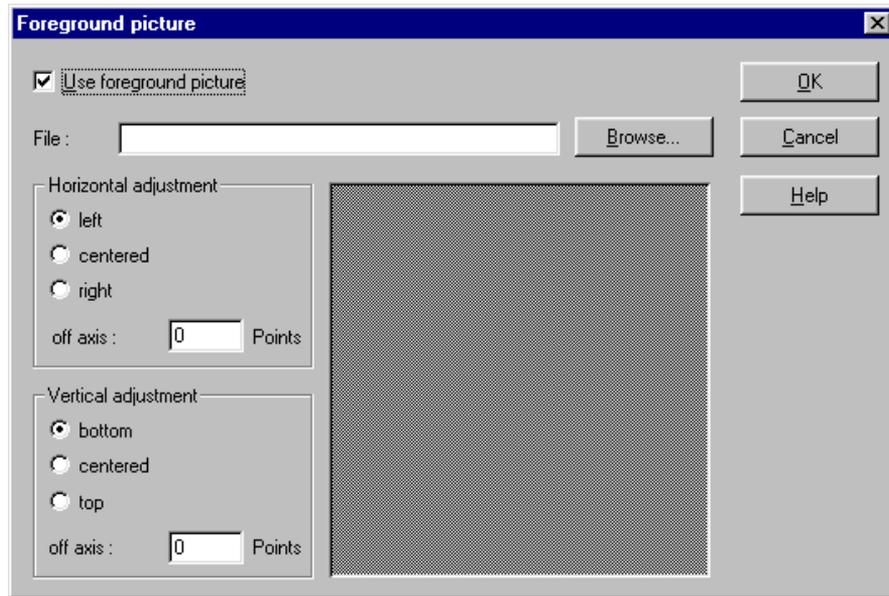

Foreground Pictures

You can select a foreground picture for perspective and 3D plan views. You can use a foreground picture to place the logo of an enterprise as a permanent nameplate on the display. Also, the foreground picture can display additional information or explanations about legends. For example, you can keep the names and designations of a prefabricated building available but out of the way (this is especially useful with multiple views).

You can use a foreground picture to display an object or group of objects. For example, you can enhance the view of a house by showing a hedge in front of it (the hedge is a foreground picture).

➜ To define the foreground picture:

1. Open the Background dialog box by right-clicking on the 🔲🔲🔲🔲🔲🔲 icon.

2. Click on the Foreground button. The Foreground picture dialog box appears.

3. Make sure there is a checkmark in the box before Use foreground picture. If there is no checkmark in this box, all other areas of the Foreground picture dialog box will be grayed out or unavailable.

4. Click on Browse… and select the picture file you want to use.

You cannot move the foreground picture. It is always visible and cannot be covered. A foreground picture is basically loaded as a bitmap file. The size of the bitmap file is transferred one to one. That is, a pixel of the bitmap file corresponds to a pixel on the screen. Even if you change the size of the window, the foreground picture's size is preserved according to the size of the bitmap file.

If you want the foreground picture to have transparent areas, you must set these areas to black. The color black is rendered transparent in the display.

5. Select the horizontal alignment you want.

   Left   Aligns foreground picture horizontally to the left

   Centered   Centers the foreground picture horizontally

Right	Aligns foreground picture horizontally to the right
Off axis	Specifies the negative or positive adjustment value

The value is specified in pixels. If you select the adjustment option left and input a negative off-axis number, the picture is shifted to the right.

6.   Select the vertical alignment you want.

Bottom	Aligns foreground picture vertically to the bottom
Centered	Centers the foreground picture vertically
Top	Aligns foreground picture vertically to the top
Off axis	Specifies the negative or positive adjustment value

The value in the Off-axis field is specified in pixels. You can enter positive or negative values. If you select the adjustment option top and input a negative off-axis number, the picture is shifted to the bottom.

Selecting a Viewing Mode

You use the ⬛🟧🟧🟦⬜🔲 icons to select a viewing mode from the six offered. When you rest your cursor on the small black triangle in the lower right corner, DataCAD Plus vis displays all your viewing options. Select the viewing mode you want from the six options. The viewing change will take effect immediately.

Each viewing mode has specific characteristics.

🔲 Wire frame mode shows only the outlines of objects, walls, windows, doors, etc. The colors of these outlines correspond to the colors of the objects. For example, if you show a blue sofa as a wire frame mode, its outlines are blue. This is the fastest viewing type to display.

🟧 Colored without texture uses a solid color for each area or object in your project. If these areas or objects have a texture, the vis program averages the colors used in the texture to display a suitable solid color. For example, if you show a blue sofa with a light-to-dark blue texture, DataCAD Plus vis computes a medium shade of blue for the solid color. Although not as fast to display as the wire frame mode, it is faster than the colored with texture mode.

🟧 Colored with texture (medium quality) and 🟦 colored with texture (high quality) show items with their assigned textures. With these two viewing modes, you can choose how textures appear. In the medium quality colored view, a texture's colors and shading may not be drawn symmetrically. You may notice little difference except in night view. Both these viewing modes are slower than the previous ones to display. However, an MMX computer can handle the higher resolution easily, so you can use the high quality textures all the time.

🔲 Hidden line mode with opaque surfaces displays the outlines of objects as well as walls, windows, and doors. However, the black outlines are filled with white. If you set the background color to white, it will look just like the wire frame viewing mode with opaque edges. This happens because all areas are filled and outlined with black borders.

🔲 Hidden line mode with opaque edges has areas that are calculated, filled out (they are not transparent), and outlined with black borders. This precise viewing mode takes more time to compute, so it is not very fast.

Raytracing

Using raytracing involves clicking on the icon and waiting for the results. It lets you simulate the lighting conditions of a scene, including shadows, reflections, and refractions. The disadvantage is that raytracing demands more computing time. For example, if the normal display lets you walk through your project in a "real-time" manner, calculating a raytraced picture will require several minutes or even hours. However, the realistic view makes up for the time disadvantage.

If you have a Pentium-based computer with two or four processors (Pentium II or PentiumPro system) with Windows NT as your operating system, DataCAD Plus vis uses all available processors when raytracing. The raytracing speed depends on the number of processors in your computer. Four processors give you almost four times faster raytracing than does a single processor.

Since the raytracer simulates lighting effects very precisely, you must be extremely careful about the placement and brightness of the light. You can create special effects by the way you position light sources. You can over- or underexpose your project by using too many/few or too bright/dark light sources. You will quickly learn how to adjust the lighting to get the effect you want. Don't worry about using too many lamps (even in places where they're not required) because the amount of light has a great impact on photographic quality.

If you place a slab under your building to serve as the ground, you will be able to see the shadows cast by the sun when you use raytracing. Landscaping objects (such as trees, fences, and gates) or outdoor items (such as lamps, fountains, and benches) will also cast shadows on the ground slab and/or the building.

Use a separate layer in DataCAD Plus for the slab that will function as your ground in vis. The slab will not be an integral part of your project; however, it is useful for shadow studies in vis.

Overexposure and Underexposure

Much like normal photography, you may over- or underexpose a scene. You can avoid this effect if you remember that DataCAD Plus vis never shows textured areas brighter than the original texture.

If you used a medium-gray texture, it will never appear brighter than its original color, no matter how many light sources there are in your scene. Then, if you place a chair in front of this medium-gray area, the chair's shadow may appear to be overexposed despite light source and shadow calculations. (In effect, you do not see the chair's shadow because the area that falls in the shadow is still overexposed.)

→ To avoid overexposure:

1. Right-click on the [icon] icon or select Options from the pull-down menu and choose Brightness. The Brightness dialog box appears.
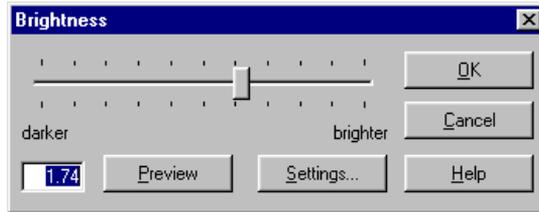
2. Move the slider back and forth to make the scene darker or brighter. Notice that the value in the numerical field changes as you move the slider.

3. Click on the Preview button to see the effect on your project.

4. Click OK when you are satisfied with the brightness of your picture.

5. Click on the [icon] icon to begin the raytracer and see the shadow.

Using the Raytracer

Click on the [icon] icon to start the raytracer. The vis program calculates the scene with raytracing (starting with rough increments and working through ever-finer ones) until the picture is complete. If you are dissatisfied with what you see, you can abort the process at any time. You can interrupt the raytracing to make lighting changes or move objects. If you are content with the result, wait until the picture is completely calculated. The time required depends on the scene's resolution and complexity (the number of light sources and objects you have and how many objects are transparent or reflect light). Areas that are lit by multiple lamps and are not affected by shadows take longer to compute.
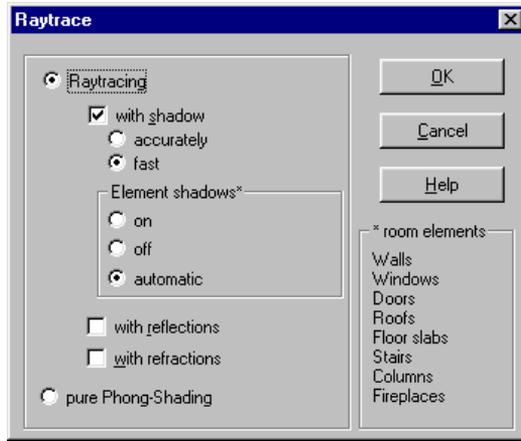
To stop raytracing (for example, if it's taking too long to produce an image or you want to make changes), press Esc.

Adjusting the Raytracer

You can make many adjustments in the Raytracer dialog box.

→ To adjust the raytracer:

1. Right-click on the [icon] icon. The Raytrace dialog box appears.

2. Select Raytracing (which gives you other options for controlling shadows, reflections, and refractions to achieve special effects or shorten computing time) or pure Phong-Shading.

Phong Shading is a computer graphics process developed by Bui Tuong Phong. In principle, it corresponds to raytracing since it computes realistic lighting patterns and characteristics. However, Phong Shading calculates the lighting for each pixel on the screen.

In the normal display (which uses Gouraud Shading), lighting conditions are calculated only at the corner points of individual areas and are symmetrically distributed within an area. The technical process used in the normal display is bilinear interpolation. The disadvantage of symmetrical distribution with Gouraud Shading is that lighting effects within an area are not correctly calculated or displayed. For example, if you place a lamp on a relatively large floor that consists of only one area, lighting conditions are calculated only at the four corners of the area. Therefore, the bright spot you would expect under the lamp in the center of the area is not shown. However, Phong Shading calculates the lighting conditions for each pixel, so you will see the bright spot under the lamp.

Phong Shading allows better calculation of light distribution. The disadvantage compared to raytracing is that shadows, reflections, and refractions are not considered or calculated. Pure Phong Shading requires less computing time than raytracing, but more than the normal display using Gouraud Shading.

When you select the Raytracing option in the Raytrace dialog box, you can further control the way your project looks. You can put a checkmark in the boxes to indicate if you want raytracing with shadows, reflections, or refractions.

➔ To control shadows in raytracing:

1. Select Raytracing in the Raytrace dialog box.

2. Check the with shadow box.

3. Select a shadow calculation method: accurately or fast.

Although not quite as accurate, the fast option doesn't determine if the room's walls throw shadows into the room. Under most conditions, this is effective. For example, you never see shadows of the walls in a square room. However, this can cause errors in an L-shaped room. If a lamp is in one leg of the L, a wall in the L's other leg can throw a shadow. If you select fast, you will not see this shadow; but if you select accurate, you will.

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4. Select an option in the Element shadows* area. The room elements affected are listed in the box on the right side of the dialog box. For example, you can specify that walls cast a shadow outside (but not inside) a building. This would create dark lighting conditions inside the building that could otherwise interfere with your work, especially if you're not considering the sun's position.

On	Room elements should cast shadows
Off	Room elements should not cast shadows
Automatic	Room elements cast shadows only in the night view

In either the day or time-dependent view, shadows are only cast outside the building, so they are visible only if you are outside of the room and building when you look at the building from the outside. If you are within a room, the room elements do not cast shadows.

If you select the time-dependent view, during the change from day to night, the shadows are adjusted (and calculated) automatically based on these settings. This applies only to the automatic selection. This means that as soon as the time turns to night and the lamps are switched on, the elements within the room cast shadows internally.

Raytracing With Lights Switched On and Off

You can turn lights on and off individually.

The 🔆 icon is active only if you selected an object that projects light. If no lights are selected or if you have no lights in your project, this icon is inactive and grayed out. You can turn individual lights on and off by clicking on 🔆 or by selecting Turn lamps on/off from the pull-down Edit menu.

In the night view, these lamps light all rooms and the objects in them. In the day view, the 🔆 icon has no effect since the lights in the room do not affect the lighting of your project. You set the brightness of each light in the dialog boxes for Object settings or Group settings.


Daytime lighting corresponds to sunlight. In the real world, light would come into a room through the windows during the day. You don't see just the sharp contours of the sun's shadows on the windows; instead, the entire room is bright.

This indirect lighting results from the light coming through the windows. Although it affects individual areas of a room, the indirect lighting ultimately brightens the entire scene. Unfortunately, this effect is poorly simulated with raytracing. There are techniques (such as radiosity) to accurately calculate such lighting, but they place heavy demands on computer hardware and memory. DataCAD Plus vis does not yet support these techniques.

Saving and Printing Raytraced Pictures

➜ To save a raytraced picture:

1. Right-click on the 🖼 icon. The Save picture dialog box appears.
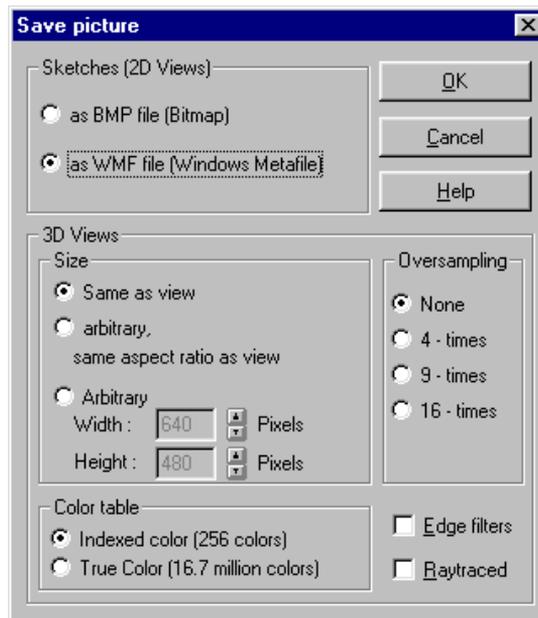
2. Select the appropriate 3D Views size, color table, and oversampling options.

3. Put a checkmark in the Raytraced box. This automatically starts raytracer and calculates the rendered picture.

4. Click on OK to save the picture.

Depending on the other Save specifications (size, color table, and oversampling), it can take a long time to raytrace and save the final picture. For example, if you select an arbitrary size of 2000 x 1500 pixels, set an oversampling frequency of 16-times, and check raytracing, you can wait hours for your computer to save your picture. To save time, disable unnecessary options.

If you need a high-resolution picture for a high-quality printout, DataCAD Plus vis recommends you use the following settings in the Save picture dialog box:

Arbitrary size of 1500 x 1500 (depending on the picture's aspect ratio)
Oversampling of 4-times
Edge filters
Raytraced

These settings deliver good results without taking much time.

These setting will take a substantial amount of time for rendering on a 100 MHz Pentium computer. Newer and faster processors can produce a picture in much less time. But start with these settings as good compromise.

Walking Through a Project

In the perspective view, you can walk through a project by clicking on the ☙ icon. Depending on its position, this changes your cursor:

☞ to let you move in different directions

↺ to let you rotate your position

The arrows point where you will move when you press the left mouse button. Depending on the cursor's position, you can move in these directions:

Forward and back

Left and right

Forward + left and forward + right

Rotate to the left and rotate to the right

If you press the left mouse button with the cursor in the ArCon+ window, you'll begin to walk through your project. Your rate of movement depends on the cursor's position in the view window. The nearer the cursor is to the center of the window, the slower you'll move in the respective direction.

When the cursor is in the center of the view window, it changes to:

If you move toward an edge of your window while you press the mouse button, you'll walk through your project faster. The closer you are to the window's edge, the faster you'll move in the respective direction.

You can increase the movement rate by pressing Ctrl or Shift along with the mouse button; pressing both Ctrl and Shift while holding down the left mouse button will make you go even faster. When you release the mouse button, movement stops. Pressing the mouse button again resumes your walk; clicking on any icon ends it.

Using the walk through function requires practice. Try walking through a simple room to experiment with the function.

You can select the type of viewing mode (such as wire frame, colored without texture, etc.) you want to walk through in the General settings dialog box. To do this, select Options from the pull-down menu, then Program, and General.

➔ To control the walk through function:

1. Right-click on the ☙ icon. The Walk through dialog box appears.
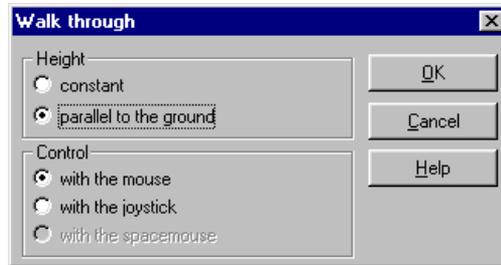
2. Select the appropriate height.

    Constant   Height remains the same throughout the walk

    Parallel   Height varies, depending on the project environment; this lets you go
                    up and down hills or walk over uneven ground

3. Select the control device (mouse or joystick).

4. Click on OK to activate your walk-through options.

Going Up or Down a Floor

What if you want to continue your walk-through on another floor? You can take the
DataCAD Plus vis program's "elevator" up or down instead of using the stairs.
Even if your completed building will only have stairs, you can use the DataCAD
Plus vis elevator.

To do this, click on ⬆ or ⬇ in the lower horizontal icon bar. In the perspective
view, you can even animate the move from one floor to another by holding down
the Ctrl key while clicking on the appropriate icon.

Increasing Speed of Walk-Through

When you have a fully furnished building project on your screen, the walk-through
rate may be fairly slow. There are several things you can do to increase speed:

*   Reduce the number of polygons. From the Options pull-down menu, select
    Program and General … to display the General settings dialog box. Activate
    (checkmark) limit to and enter a value below 2000 in the Polygons field.

*   Shrink the picture on your screen. The smaller the picture, the quicker the
   screen will refresh itself.

- Use high color mode. From the Options pull-down menu, select Program and Program settings, and activate High Color. Make sure your computer's graphic card is also running in high color mode. Remember that changes you make in the Program settings dialog box don't take effect until you exit from DataCAD Plus vis and restart it.

- Reduce the quality of the model. For example, you may switch to wire frame view.

- Purchase a faster computer with an MMX processor.

Adjusting the Perspective View

In the perspective view, there are two ways to change the viewer's position and what the viewer faces. You can either use the walk through icon ⬚ to interactively change your position or you can adjust the settings in the View dialog box.

➔ To adjust view settings:

1. Right-click on the view icon ⬚ or select View from the Options pull-down menu. The View dialog box appears.
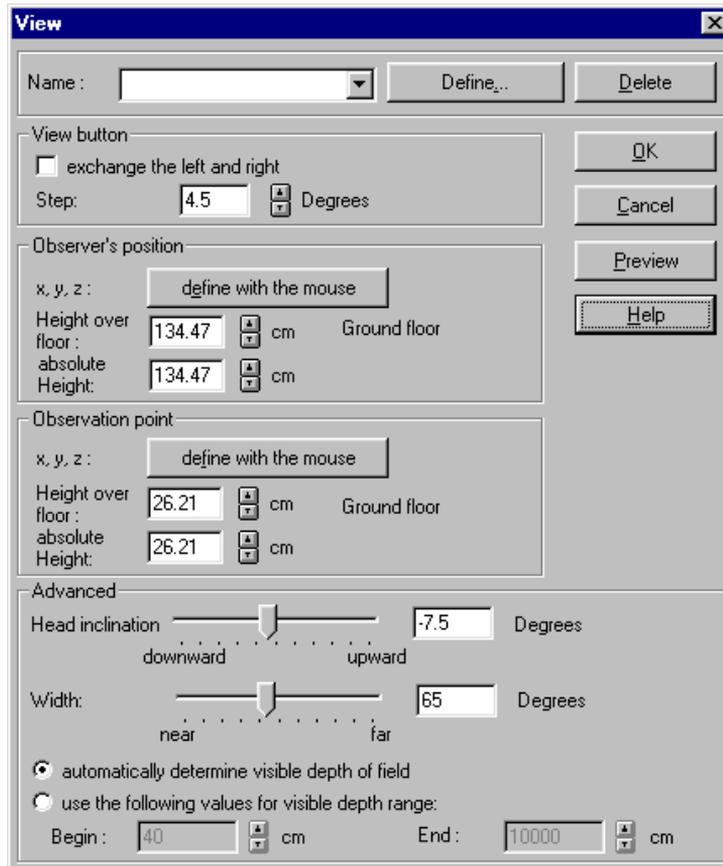
2. Click on the Define button. The Define view point dialog box appears.

Define view point

Name this predefined view point :

[   ]

OK

Cancel
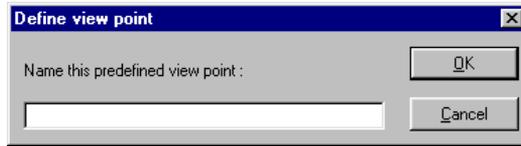
3. Supply a name for the view and click OK or press ⌈Enter⌉ to return to the View dialog box. After you make other decisions in the View dialog box and click OK, this name will appear on the lower horizontal icon bar. For example:

Position 1

You can define and save multiple viewer positions so you can shift between different viewpoints. Working with defined viewpoints is helpful when you're recording movements with the video recorder since you can place yourself exactly at defined viewpoints and continue your walk through from there. Defined viewpoints are listed by name in the pull-down selection list in the lower horizontal icon bar. Just select the named viewpoint from the list and continue your walk from there.

You can name a viewpoint without opening the View dialog box. Simply click on ⯈ in the lower horizontal icon bar, supply a name in the Define view point dialog box, and click OK.

You can eliminate a viewpoint from the list by selecting it in the View dialog box and clicking on the Delete button. You cannot delete a defined viewpoint directly from the lower horizontal icon bar.

4. Modify the View button if necessary. (See View Button, 3D Input in Chapter 2.)

5. Make changes in the Observer's position and the Observation point sections of the View dialog box if necessary.

X, Y, Z	Click to define with the mouse; cursor becomes . This lets you interactively determine the height over floor and absolute height. Release the mouse button to place these values automatically into the next two fields. To abort this process and return to the View dialog box, press ⌈Esc⌉.
Height over floor	Input value manually or use arrows
Absolute height	Input value manually or use arrows

Height over floor is only available if the observer's position or the observation point is situated in a room; otherwise, this input field is grayed out and inactive.

6. Make changes in the Advanced section of the View dialog box if necessary.

Head inclination	Use the slider bar to indicate degrees downward or upward; enter the value manually if necessary
Width	Use the slider bar to indicate degrees near or far; enter the value manually if necessary
Automatically…	Let DataCAD Plus vis determine the visible depth of field; this lets you see your complete project
Use following…	Input values in Begin and End fields to set the visible depth range manually; this extends from the starting point in front of you to the end point in the distance

Head inclination corresponds to the viewer nodding his/her head. As you modify the head inclination, the focus height also changes.

Modifying the Width corresponds to changing the depth of field setting on a camera. This lets you input values between wide angle (far) and telephoto (near) lenses.

For a more practical display, you can adjust the visible depth range. In principle, the vis program can limit the range in the perspective view to display only those things that are appropriate and pertinent. Thus, you can cut your project into slices; everything in front of it and everything behind it are not visible.

7. Click the Preview button to see if you are satisfied with the settings.

8. Click OK to exit the View dialog box and make your settings permanent.

Changing the View Point

With the ⬖ icon, it is possible to view your project from all sides. This icon works differently from the others. Clicking on any of its arrows moves you incrementally in that particular direction. Holding any of the arrows down moves you faster in that direction. As you click or hold down an arrow, it changes colors from black to red; the other three arrows remain black.

In the perspective view, the picture changes as if you're rotating around the project. This has the same effect as pressing the arrow keys on your keyboard. In the plan views, clicking on the ⬖ arrows is the same as scrolling the project in the view window.

You can change the observation point (the point in your project you want to focus on) at any time with the View dialog box.

If you saved viewpoints, you can use ⬖ ▶ Position 1 ▼ to select the one you want from the pull-down list.

Controlling Day, Night, and Time-dependent Views

This function is active only in the 3D colored plan and perspective views.

By clicking on the [icon] icon to switch between day, night, and time-dependent views. Right-clicking this icon opens the Brightness dialog box, where you can set detailed lighting conditions.

In the day view, your project is shown with a pre-defined brightness level. All lights in the project do not affect the brightness of the day view. In the night view, only the currently lit lamps light your project. All rooms that contain no light sources appear dark.

The time-dependent view gives you a more realistic image of your project. The lamps affect the view automatically as the sun gradually sets and the view changes from day to night. Shadows can be more accurately rendered by the raytracer, too. With the Daylight dialog box, you can consider the sun's position when setting the lighting conditions in the view. You can use this effect with animations recorded on the video during different time periods.

Controlling Brightness

You can control the intensity of brightness in your DataCAD Plus vis project. For example, you may have lamps that do not cast a bright enough beam. The Brightness slider and Preview window let you control the light's intensity.

→ To control brightness:

1. Right-click on the [icon] icon or select Brightness from the pull-down Options menu. The Brightness dialog box appears.
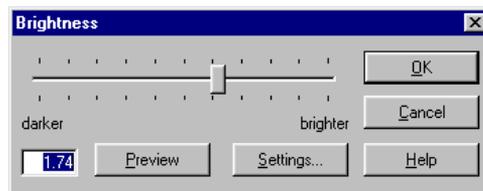
2. Move the slider bar left and right to set the numerical value of the brightness. This makes the light's intensity in your project darker (<1.0) or brighter (>1.0).

The current brightness value is shown in an input field at the lower left corner of the dialog box. You can input the brightness value directly into this box. If the numerical value is less than 1, your project will appear increasingly darker at increasing lower brightness levels.

3. Click on the Preview button to see how the current brightness setting affects your project. This temporarily transfers the input values to the project; however, the preview version only becomes permanent when you click on OK.

4. Click on Settings… to open the Daylight dialog box, where you can make further adjustments used in the time-dependent view. (See below for instructions for the Daylight dialog box.)

5. Click on OK when you are finished adjusting the brightness variables.

The Daylight dialog box lets you control variables that affect the time-dependent view. These variables include viewer location, local time, sun position, and other lighting conditions. For example, you can specify whether the sun should be visible, or only its light.

You can control lighting conditions in the time-dependent view by animating the sun and moon based on the viewer's location (latitude and longitude) and the local time (exact date and time of day). On the basis of this sun-moon constellation, you can create accurate lighting effects over a colored background, providing the most realistic view of brightness or darkness.

You can use these lighting effects to record time changes with the video recorder.

➔ To control time-dependent lighting conditions:

1. Open the Daylight dialog box by clicking on Settings… in the Brightness dialog box. The Daylight dialog box appears.
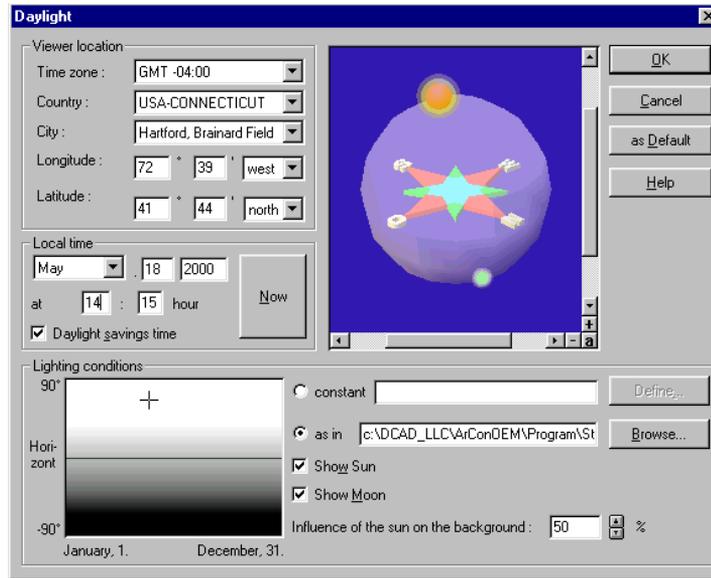
2. Set the Viewer location options using the input fields and pull-down selections, generally beginning with the country.

Time zone   Automatically set, based on Greenwich Mean Time (GMT)

Country   Select from the pull-down list

City   Some major cities are predefined

Longitude   May be set automatically or manually

Latitude   May be set automatically or manually

If the location is not available in the City selection list, you can input the appropriate latitude and longitude. When you specify a location this way, only longitude and latitude are displayed; no other information can be deduced. Thus, the country and city fields are grayed out.

The time zone is automatically calculated and displayed. Changing country, city, latitude, or longitude is not possible from this field. Since the time zone of a place cannot be accurately determined from longitude and latitude alone, you can select the time zone from a list.

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3. Set the date and time in the Local time section of the Daylight dialog box.

Daylight savings Adjusts everything forward one hour

Now   Uses the current date and time, based on your computer's clock

The values in the Local time section refer to the viewer's position.

4. Set options in the Lighting conditions section if necessary.

Constant

Select a solid color for sunlight by clicking on the Define button. This affects the background, so lighting effects create the most realistic view of brightness or darkness. If you activate this option, the As in field is grayed. For example, if you define the color as yellow, the input field shows yellow indicating that the sun will shine yellow light. The background would be yellow, and the individual items and objects will be colored (lit up) with a yellow light.

As in

Select a bitmap image (with Browse…) for the color of sunlight based on climate conditions at the viewer's location.. The selected bitmap (displayed in the view window) is the basis of the sun's color in the time-dependent view.

Usually if a cloudless, radiating sky exists at the specified location, the color tone shown in the bitmap should reflect this, over the course of the whole year. In this case, load a bitmap with white, clear colors. If skies are mostly cloudy, load a bitmap with symmetrical gray colors. You can create the bitmap images with Windows Paintbrush or another pixel-based painting program. The color scale in each picture should approximate actual lighting conditions.

Show Sun

Check to display the sun; if the box is not checked, only the light created by the sun will be shown. Suppress the view of the sun if it is in front of the clouds in a background picture. This preserves the light, but lets the sun disappear behind the clouds as it does in nature.

Show Moon

Check to display the moon; if the box is not checked, only the light created by the moon will be shown.

The sun and moon are not the only sources of environmental light. DataCAD Plus vis also has a second unchangeable light source which lightens the view altogether. This environmental light is required for night views.

Influence of sun

Specify the percentage of the sun's color (defined by the constant color or the cross hair's position over the bitmap image) that is to influence the background color. For example, if you've loaded a bitmap with a reddish-toned sun at dawn and dusk, entering a value of 50% would make the clouds in the background picture appear orange. This lets you simulate the effect of dawn or dusk redness in the sunlight.

The sun's color should generally affect the background to some degree. Otherwise, you'll have a blue sky at night, although the sun's color should become black after sunset according to the bitmap.

Always check this setting when you have a loaded bitmap image as the background picture. This is also appropriate if the background is set up to use variable color (between two colors).

Lighting Conditions View Window

If you've loaded a bitmap image file as a background picture, you can detect the sun's position over the horizon using the cross hair. This position depends on the viewer's location and the local time. If you change the month (for example, from January to May), you'll see the sun (represented by the cross) move from left to right.

The axes indicate coordinates. The X-axis marks the season from January 1 through December 31. The Y-axis shows the position of the sun over or under the horizon (indicated by the center line) from 0:00 (midnight) to 24:00 o'clock.

The cross hair on the bitmap file's colored background shows which color is used for the sun in the time-dependent view. If the cross hair is on a reddish area, the sun assumes this color. This is used to create dawn or dusk redness in the lighting. The color of the sun also affects a background picture; for example, a picture of clouds can be illuminated. The bitmap is a sort of diagram that specifies the color of the sun as a function of the season and time of day.

Constellation Preview Window

This window shows the constellation of earth, sun, and moon based on information in the Viewer location and Local time fields. All modifications you make in these two areas immediately affect the view in the preview window.

The focal point of the cross is the viewer's location. To a certain extent, the viewer is at this focal point, looking in different directions to see sun and moon.

➔ To modify the point of view (to look in another direction):

1. Move the cursor over the preview window. The cursor changes to .

2. Press the mouse button to change the point of view. The viewing position in the preview window is like a satellite that flies around the viewer, so the constellation can be seen from all sides.

You can use this preview window to freely animate the sun and moon. For example, if you modify only the date and not the time of day, you can change the moon's position relative to the earth without changing the sun's position. With this animation of the sun and moon, you can also determine when the next solar eclipse will occur.