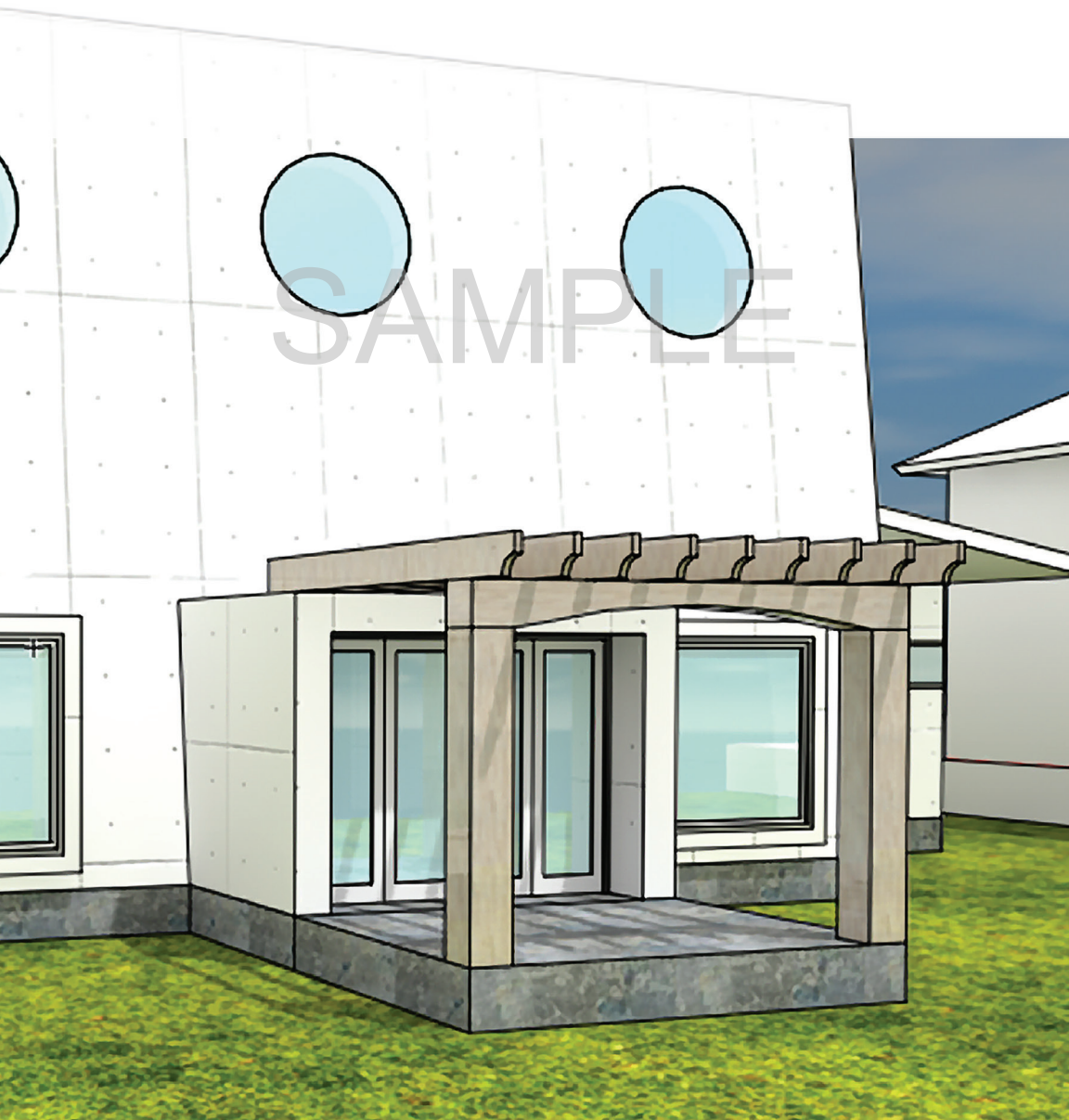
**by Jonathan Pickup** | fifth edition
written with version 2013

NEMETSCHEK Vectorworks

# 3D Modeling
## with Vectorworks



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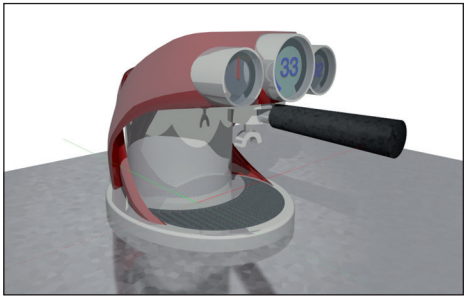
# Introduction

This manual covers one of the best parts of Vectorworks, creating 3D models. It is really fun and rewarding to create the forms you want and be able to move around them to view your work from different angles.

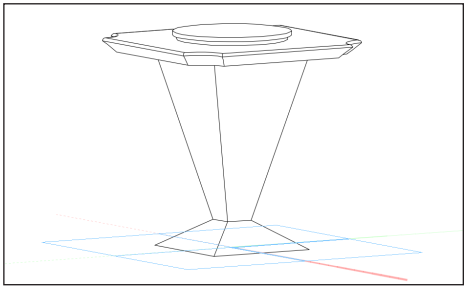
Here is an example from a first-time user of Vectorworks. The project was a high school graphics project and the user had not used Vectorworks before. The user was given an earlier edition of this manual and they worked though the exercises. Then with only a little guidance from an experienced trainer, the user was able to produce this model.



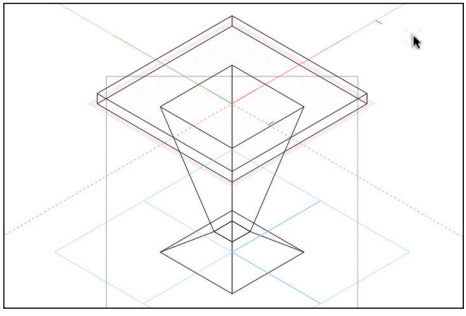
When you first look at this model, it seems so complex, you may wonder how it was made. There is a saying, "How do you eat an elephant? One bite at a time..." This can be applied to your models. How can you create this coffee machine? One part at a time. This coffee machine is mainly made from simple extruded objects with a couple of complex curves. When you bring them all together and the result is magic.



If you look at the top of this table, it looks like a complex form, but if you were to make this from a timber slab, how would you build it?



You would probably start with a solid slab of timber.



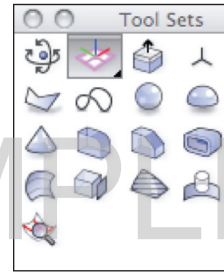
# 1.0 Simple 3D Modeling

## 1.1 Working Planes

When you create extrusions and primitive shapes, they always start at zero on the working plane, when you want to create more complex shapes, working planes help you to change the active working plane to a position that suits. When you create planar objects, they are created on the working plane, so it is really important to learn how to create and manage working planes.

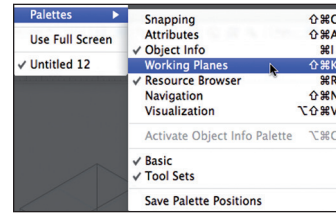
movie
movie001.mov

- Open the file **3D Model 1.sta** from the exercises folder.
- Go to the **3D Modeling** tool set.
- Select the **Set Working Plane** tool.
- Go to the **Tool bar**. Select the second mode.

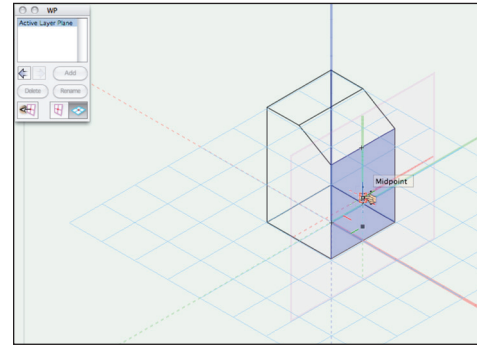





- Go to the **Menu bar**.
- Choose **Window > Palettes > Working Planes**. This opens a palette where you can save, edit, and recall working planes.




- Move the cursor to the face of the object. I've moved to the right side. Notice how the side of object highlights.



## 1.16 Auto Hybrid

I think this is going to be a huge benefit when you are creating your library. It has always been a lot of work to trace over the 3D objects to create the 2D parts of the symbol, the **Auto Hybrid** command will create an automatic 2D portion of your symbol from the 3D model.

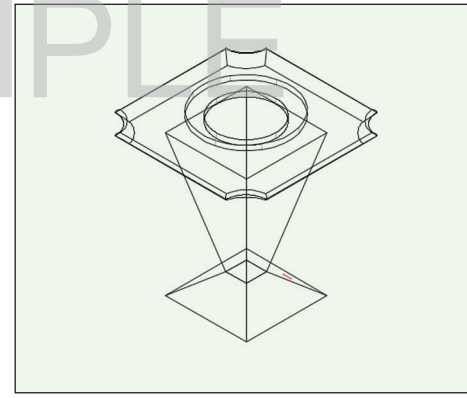
For example, if you are creating a 3D object for a garden or for a stage show, you do not want to see the 3D portion when you present your plans to the clients. The **Auto Hybrid** command will turn your 3D-only object into a 2D portion when you are in Top/Plan view, and a 3D portion when you are in any other view. The **Auto Hybrid** command also allows you to choose the height of the cut plane, allowing you to choose the look of your 2D portion.

This command is only available if you have Architect, Landmark, Spotlight or Designer.
If you have one of those, change to the appropriate workspace for that version.

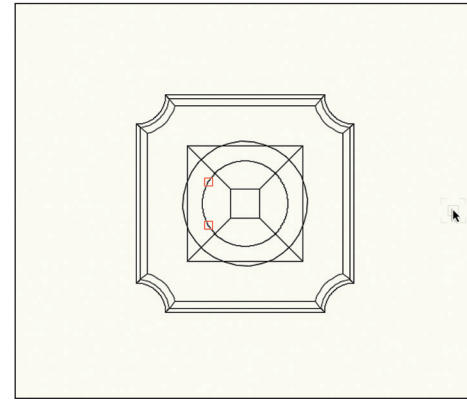
movie
**movie031.mov**



- Open the cafe table exercise that you should have completed successfully in chapter 1.4. If you were unsuccessful, you can open the exercise file 3D Model 18.sta from the exercise folder.



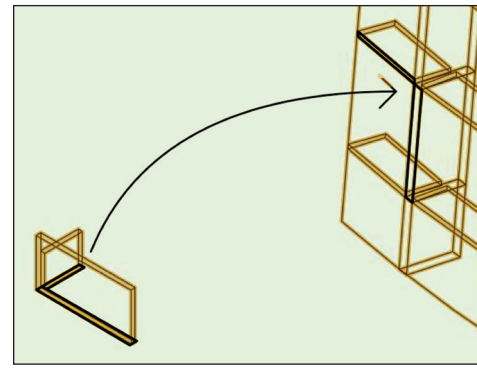
- Change to a top/plan view.



## 1.17 Create Surface Array

The **Create Surface Array** command is really powerful for creating complex 3D geometry. It creates a repeating array of 3D objects over a NURBS surface. The repetitions can easily be changed on the Object Info palette.

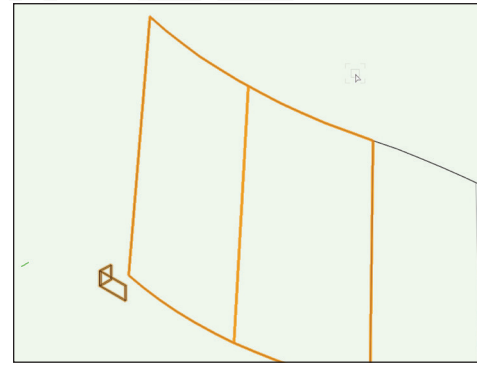
In conceptual terms, the surface array takes 3D data and duplicates it across a NURBS surface.



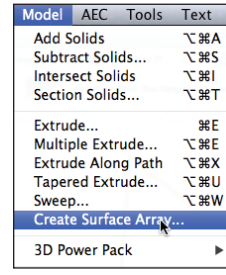


movie
movie032.mov

- Open the file **3D Model 19.sta** from the exercise folder. This file has all the parts you need to create a surface array.
- Select the NURBS curve and the objects to array.



- Go to the **Menu** bar.
- Select **Model > Create Surface Array...**



# 2.0 Architectural Modeling

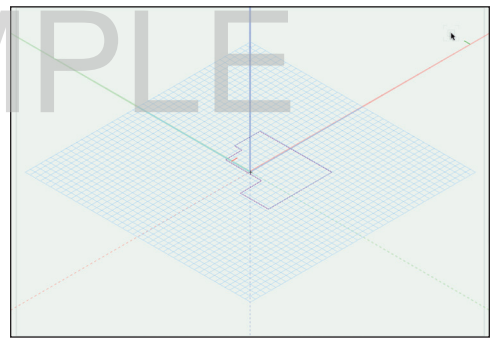
We can apply the tools we have learned to create an architectural model. We can model a building without using walls, roofs, doors, or windows; we can use the tools we've learned like extrude, protrusion, shell solid, add solid, and so on.

This exercise will show you how to use modeling tools to quickly create a building.

## 2.1 Getting Started

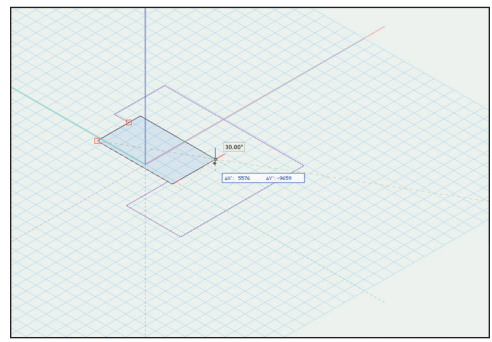
movie
movie033.mov

- Open the file **3D model 18.sta** from the exercise folder. The gray area is the approximate area for the building. If you keep close to this guide, the building will fit onto a site I have prepared.



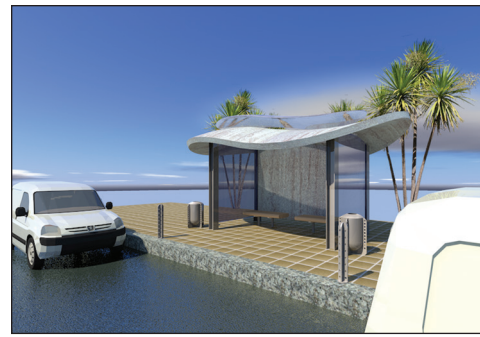


- Draw a rectangle for the main (center) part of the building.



# 3.0 Bus Stop Project

The aim of this exercise is to create a bus stop. I have chosen the bus stop because it is partly architecture, partly urban design. Because of the nature of this project, we will have to break the design into parts that are easy to manage. We will be using several modeling tools and techniques, but we will be working though the project in a step-wise fashion.



We will not be adding the rendering and the people; that is in another manual.

## 3.1 Project Setup



When you are starting a project in Vectorworks, it is worth your time to set up the file with the layers and classes that you will need to make the project. It usually works out that as the design evolves, you need to add layers or classes to the file. Don't worry if this happens to you. But if you can make some layers and classes at the beginning, that can make it easier.

I have a file for you to start with. It has a few points that we can use to center our project.

- Open the file **Start.sta** from the exercise folder. This file has been set up with two layers, the roof layer and the layer for the bus stop. We will make some more layers and classes for this project. If you don't know how to make layers and classes, go back to the Essential Tutorial Manual and do the layer and classes exercises there.
- Create the following layers:
  **Mod-3D Model**, scale 1:25
  **Mod-Bollard**, scale 1:10
  **Mod-Trash Can**, scale 1:10

movie
movie042.mov

- Create the following classes:
  **Material-Concrete**
  **Material-Glass**
  **Material-Glass Roof**
  **Material-Stainless Steel**
  **Material-Wood**

We can use these classes to help break up the file into useful chunks based on materials. The classes for materials become much more useful for rendering. Using classes for materials allows you to make global changes to the textures in the file.