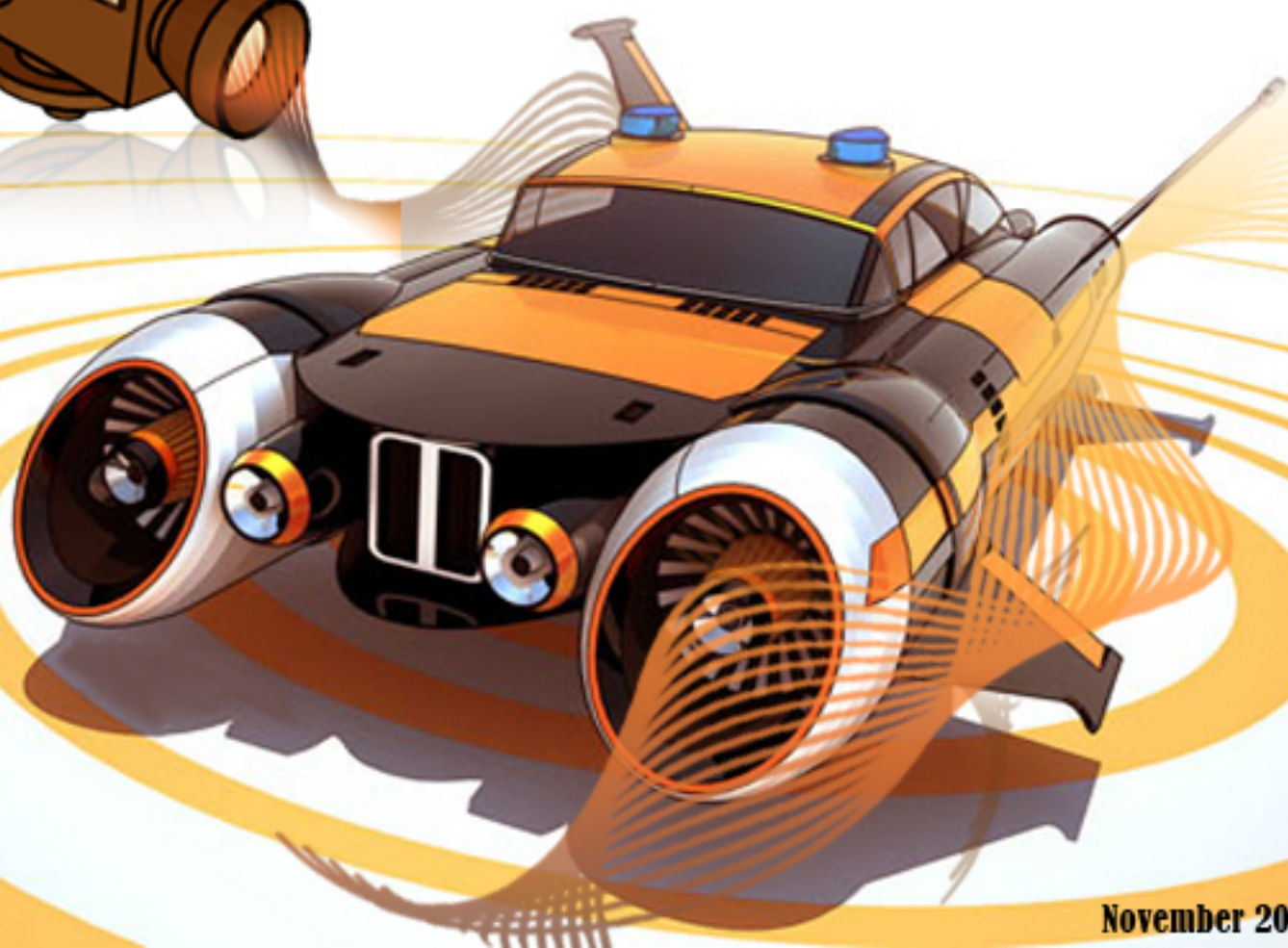




# **SKETCHUP** *for* **FILM AND STAGE**



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## *A letter to the Desk of Editor*

Hello friends!

Hello Folk! The SketchUp-ur-space has successfully completed its two years. We would like to provide our heartiest gratitude to all our columnists who manage their valuable times out of their busy schedule to share their write ups with our magazine. If you go through the columnists section you will see some notable SketchUp professionals from all over the world have contributed their write ups for our magazine. We also welcome newbie SketchUp architects, designers, modelers, and artists etc. who will find our magazine right place to showcase their work. They will be able to introduce themselves to the huge communities of SketchUp users who are the regular readers of our magazine.

After acquisition of SketchUp by Trimble, we hoped that there would be more advance features included in SketchUp in near future but we did not find any type of remarkable improvements in SketchUp. We are hopeful that SketchUp will bring more innovations into its application in near future.

The present theme of our magazine is "SketchUp for Film & Stage". The team of SketchUp ur space has written an informative cover story on this and I think this will be very useful for film professionals who utilize SketchUp in their set/storyboard designing, visualization and planning shots.

Some renowned production designers, set designers, art directors like Randy Wilkins, Jim Bissell, James Bissell, Alan Hook, Ken MacLeod, Claudio Cosentino have utilized SketchUp successfully for their projects.

Go through the link <http://www.SketchUp.com/intl/en/community/casestudies/filmandtelevision.html> to view their projects.

In our guest article section, apart from a exclusive article on "Designing Kitchen with SketchUp" presented by Adriana Granados, there are other two articles presented by Jhin Tabuzo, a renowned architect and warunyoo songkran, a experienced 3D modeler. In these articles they share their own story working with SketchUp.

In our tutorial section the readers will get an interesting tutorial on "Making of Proweaver Headquarters with SketchUp" by Eugene Yusuke. There are also some other tutorials like Drawing gears in SketchUp by Richard and Making Rotational Portrait Sculptures from Silhouettes for 3D Printing by Alex Schreyer.

In our general news section the readers will get latest updates and recent happenings of the SketchUp industry.

Hope our readers will like this publication of SketchUp ur Space. We will welcome some helpful feedback from our readers. Please send me your suggestions at [rajib@SketchUp-ur-space.com](mailto:rajib@SketchUp-ur-space.com).

**"I can write better than anybody who can write faster, and I can write faster than anybody who can write better."**



Best Wishes  
Rajib Dey  
Editor

**Happy Reading!**

## *Interview with Matt Donley*

Welcome to the community of SketchUp Ur Space. Please introduce yourself to our readers.

I'm not a designer or an architect. I don't have any formal training in CAD or 3D modeling. I'm just a regular guy who came across SketchUp one day and fell in love with it. I've been using it since 2007, and I enjoy helping other ordinary people learn how to use SketchUp by writing tutorials and videos on my website, [MasterSketchUp.com](http://MasterSketchUp.com)

**How did you first come across SketchUp?**

I stumbled across SketchUp by accident. I remember how I felt when I downloaded SketchUp for the first time. I immediately started drawing and using the push pull tool, creating a simple box or something like that. I just thought it was so cool that the program was free, and that it was so easy to figure out and start modeling.

**You don't have any background in design or architect but you have great expertise in 3D modeling with SketchUp. How do you manage it?**

I've learned a basic understanding of design and engineering as a carpenter, working on houses. I've always been interested in mechanics, how things are built and how they work. When I look at something, I like visualizing how all the individual parts and pieces come together to make up the whole. I think that interest has helped me visualize things as I model, but SketchUp exponentially enhances visualization by encouraging creativity. Its simple interface and tools don't hinder your creative process.

**Please share your experience on how SketchUp can be utilized for 3D modeling projects?**

The thing that really excites me about SketchUp is how open ended it is. I love learning about different ways people are using SketchUp to solve problems. It is not just an architecture tool. It is used by artists, inventors, game developers, hobbyists, and more. And with Trimble's continuing support of third-party developers, SketchUp can be used as a platform for all sorts of custom applications. At its core, SketchUp is a creative medium that allows people to express themselves freely.

**You run an exclusive blog with SketchUp tutorials and SketchUp news at Master SketchUp. Tell us something about that**

I started MasterSketchUp.com in March 2012. I have always been interested in web design, but the websites I had built were always for local businesses that never really got a lot of traffic. I've always wanted to create something really big online, a place that people go to for help about something.

I remember learning SketchUp and having to search online for answers and it was frustrating. You could always find out how to use a specific tool in SketchUp, but there weren't many "real-world" tutorials on how to apply those tools to create something specific. So I thought I would fill that need and help people learn how to use SketchUp.

I started MasterSketchUp.com so I could combine my knowledge of web design and SketchUp to help other people. It's been very rewarding. I love getting emails and comments from people saying how much they appreciate my work. It's incredible to know I'm reaching people from all over the world through my website and my videos.

**You have completed so many projects for 3D modeling with SketchUp and among them which is the most memorable project?**

When I first got hired as a project engineer at a commercial cabinetry company, I immediately identified how valuable SketchUp would be for that company. So I spent a few days trying to convince my boss that we needed to purchase SketchUp Pro, so we could get Layout and export to other file formats.



He finally agreed, but he also gave me the challenge of producing shop drawings for a job we were working on. I had never used Layout before, but I couldn't turn him down because I had just convinced him to buy it! So I spent about 4 days working on this project, I worked overtime to get it done. I had to create a library of custom components to drop on the floor plan all while learning how to use Layout. I ended up getting the job done and proved SketchUp Pro and Layout to be up to the task.

**What advancements should be upgraded in SketchUp for 3D modeling in near future?**

I have always respected SketchUp's simple tools and workspace. That's what makes SketchUp accessible to so many people. There are plenty of advanced programs out there that offer plenty of features, but they are not as easy to use as SketchUp. I would like to see some further development of Layout, as I see a lot of potential in using SketchUp more often in construction documents. We are also looking forward to a 64bit version of SketchUp, which Trimble announced at Basecamp 2012 that they are currently working on.

**Please provide the brief details of your upcoming projects in which you are likely to apply SketchUp?**

I am currently working on a few SketchUp projects. I am launching the MasterSketchUp Podcast, where I'll be talking about SketchUp news, and interviewing SketchUp modelers to discuss techniques and tips. I'm also writing a mini-publication for sketchucation.com. I have a few other projects in the works but I'm trying to focus on one thing at a time. As always, I update the site with a new tutorial on a weekly basis.

**As a 3D modeler, how did you find the progression of SketchUp from past to present?**

I've been using SketchUp since 2007, so there haven't been many major updates that really changed the feel of SketchUp. The core functions of SketchUp have always just felt right to me. The things we all take for granted in SketchUp, like the way the program orbits and zooms, SketchUp just nailed it. It just feels natural.

**How SketchUp can be evaluated as the most promising tool for 3D designing?**

There are many things about SketchUp that make it a promising 3D design tool. Most of all, it is the easiest 3D modeling tool to learn how to use. Because of this, SketchUp introduces people to 3D modeling who may not have otherwise tried it out.

**What are your hobbies?**

I like to do all sorts of things. When I'm not doing tutorials for my website, I like to go hiking with my wife to enjoy the New England scenery and nature. I also go surfing at the beach since we live near the coast. I play the guitar as well, and I also admit I'm a sucker for a good video game too. I do all sorts of things, I enjoy a good challenge.

**Do you want to provide any suggestion for budding 3D modelers?**

If you're just starting out with 3D modeling, try to become inspired. Look at other models people have created. If you're passionate about something, it becomes that much easier to learn. Try doing a few tutorials, but then try to create something unique and exciting on your own. You'll make mistakes and hit dead ends, but you'll have the drive to figure out how to get around it if you're truly passionate about it. I think too many people give up on 3D modeling too quickly because they hit a few road blocks and give up. Once you learn the basic principles of SketchUp, the rest is easy.

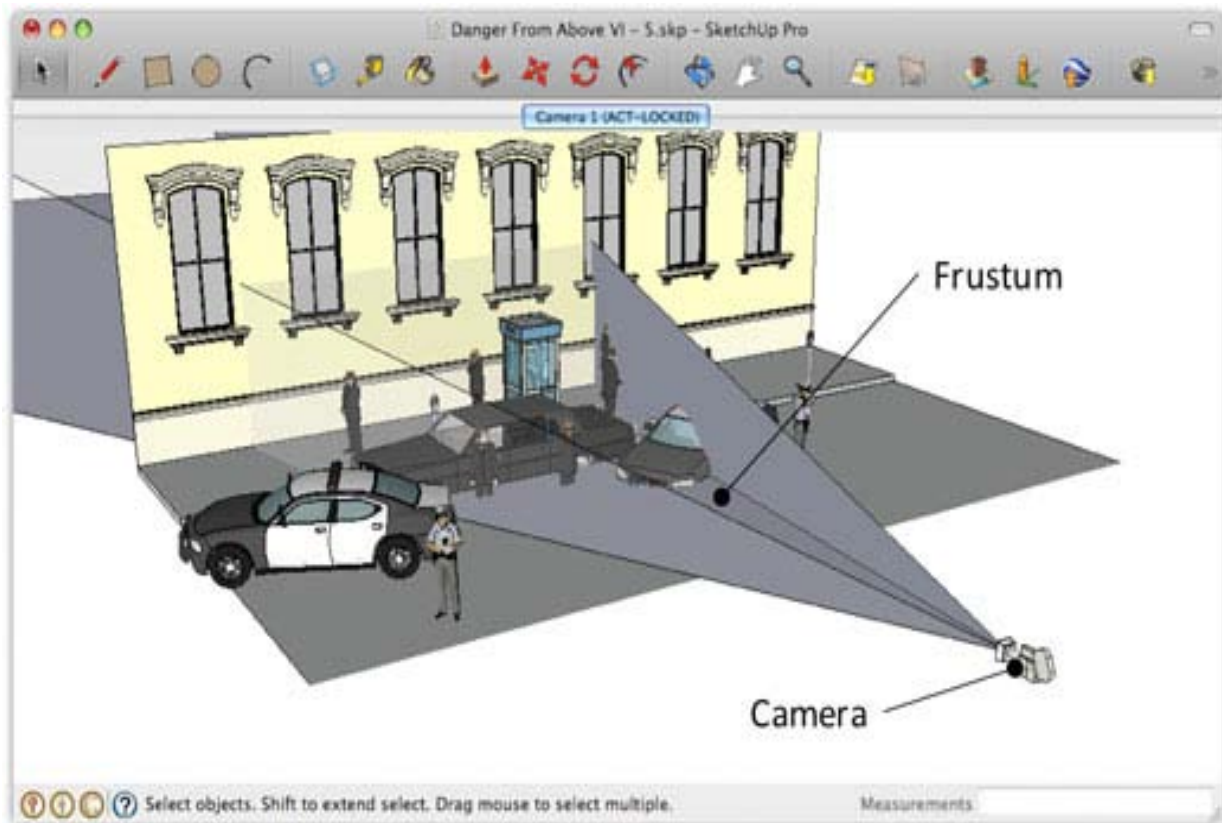
**What recommendations do you want to give for the team of SketchUp Ur Space?**

While I was at the SketchUp 3D Basecamp 2012, I took a Ruby 101 class. Ruby is the programming language that allows you to make plug-in for SketchUp. It's not as intimidating as I thought it would be. I would really recommend trying it out and trying to make your own plug-in for SketchUp. It can be very rewarding, and can help you do repetitive tasks in SketchUp, saving you time in the long run.

## *Cover Storey - SketchUp for Film and Stage Visualization*

In the past we had noticed extensive application of SketchUp for architecture, engineering and construction sectors. But now-a-days with the constant revolution in digital filmmaking, the rising popularity for stereoscopic content inside the entertainment industry and utilization of computer graphics, the SketchUp software is considered as a useful guidance system for Art Directors, Filmmakers, Graphic/Film Designers, Production Designers, Cinematographers and Design Professionals engaged in Film, Stage and Television industries.

Inside SketchUp there are some user-friendly and flexible tools which can aid in the process of generating 3D (three dimensional look) to model in 3D precisely. The director, producers, art director, set decorator, director of photography, designers and others get the ability to share their ideas in 3D from props, displays, storyboard to complete set design and walk through' the set before making final design. The designers can hand off the model to the concerned art director and set designers. They can disintegrate the model and apply it as the basis for working construction drawings which will create the set or props accordingly.



The designers can also take more up-to-date decision and communicate project features with the team easily.

The SketchUp can provide great assistance for storyboarding. If the 3D models of the set or general location are created before the formation of story board, it will be very easy to generate 2D props and actors and position them into the scene and preview in context through the camera. After that export images to form a series of traditional storyboards.



Most interesting application of SketchUp is to make the backdrop, set and circumstances and then draw realistic images beyond the storyboards to substitute for the actors or props. Here SketchUp is utilized to model the basic shapes & structures of those components with precise scalling to ensure the exact positioning of such components in the set or the exact scalling for creating them so that the camera can applied to capture them as the storyboards portray.





Besides, the visualization characteristic of SketchUp facilitates stereoscopic pre-visualisation in a synchronized way in film and entertainment industry to view the project before it is actually created. The amendment for design is performed quickly. The software allows you to make sets and characters, direct, shoot and edit your movies.

Filmmakers have applied SketchUp to work out problematical scenes, camera moves, and set designs. The SketchUp is utilized in some renowned films like Avatar, Transformer, Star Trek, upcoming Dracula 3D many other blockbusters have taken the help of SketchUp to produce the fantasy like atmosphere in the movies.





In some 3D movies the SketchUp was applied to generate special effects with its high-end rendering programme. The SketchUp can make colorized rendering of the scenes to view it comfortably.

The film professionals find SketchUp most useful for designing a set. SketchUp can smoothly visualize all construction, electrical, lighting, artwork, paint, etc. facilitating the creation of complete stage and set by making fine adjustments infinitely before it is physically built.

There exist some extensions for SketchUp which may also be called as Film & Stage plug-in with SketchUp. These types of plug-in/extensions were built up to facilitate the camera behavior to be modified precisely to characterize the proper through-the-lens visualization of SketchUp models. The Extension offers a visual approach to get rid of multifaceted spatial design troubles. The Film & Stage plug-in consists of an advanced camera tool and various pre-viz components. Select from an extensive collection of cameras, lights, dollies, cranes, grips, characters and more. The Art directors & Cinematographer utilize SketchUp camera plug-in to pre-visualize shots and scenes in SketchUp before filming and walk around & control the aspect ratios, different camera lenses and positions to obtain the proper shot. The Cinematographers can make sure that the camera positioning is achievable physically on the film stage.



A virtual camera is created within the Film & Stage plug-in with which Cinematographers, Production Designers, Art Directors and other design professionals can go with diverse scenarios for camera positioning and pan/tilt settings and transform camera focal-length and intraocular distance and view all these in stereo/3D. Once the cameras are set up, the production designers can easily locate the accurate height, tilt angle and focal length for each one. The designers can also carry out tilt, dolly, truck and pedestal moves to reproduce the action of a real camera. They will be capable of producing detailed floor plans and measurements to position the real cameras fast and competently at the time of rehearsal and main shoot.

The SketchUp film stage plug-in also contains a huge library with filming-specific components like dollies, cranes, grips, characters, lights and cameras. These components are very useful for making a 3D scene or stage visualization.



The SketchUp can also be fruitful for making storyboards and animatics, set diagrams and/or technical documentation of sets, props and rigs etc. While planning a shot of any film production, perform with the storyboard into the 3rd dimension to view the necessity of positioning your camera to avail the proper shot.

There are several persons like Gaffers, Production Designers, Producers etc. engaged with the production of a film. A Gaffer can apply SketchUp to communicate its lighting plans. Production designers may utilize it for designing a set. Producers may find the software useful with equipment rental houses to find out the requirements for type of lens, lighting and camera support. A DP may apply the Shadow tool inside SketchUp to reproduce shadows falling on the set at different moments of the day or for preparation of plan with lens packages. SketchUp also contains a broad library with lighting, cameras, lenses and support equipment useful users, a library of popular lighting, cameras, lenses and support equipment is available for users to create their individual set-ups.

After the addition of street view imagery in SketchUp 7.1, many film professionals find it very useful for their work as street view data from an un-modeled areas facilitates them to model the scene adjacent to a real-world place in which the staging for film will be happened. The designers and cinematographers can trace distant places or more exhilarating places for filming which are close to the planned location of a shoot before now.

So we can say SketchUp is a blessing for Film professionals. Some renowned designers like Tyruben Ellingson (Lead Vehicle Designer for Cameron's AVATAR), Production Designer James Bissel (Zack Snyder's '300'), and the production design/ special effects team on Chris Nolan's INCEPTION apply SketchUp successfully in their projects to make storyboards, digital lay-outs & virtual models for commercials, films, and visual effects.

References : The book "Film Directing: Shot by Shot: [Visualizing from Concept to Screen](#)" is a good resource, as is "Digital Moviemaking 3.0".

[SketchUp with Film Making](#)



## *Article - In a small corner of Thailand-SketchUp for Engineering Work*

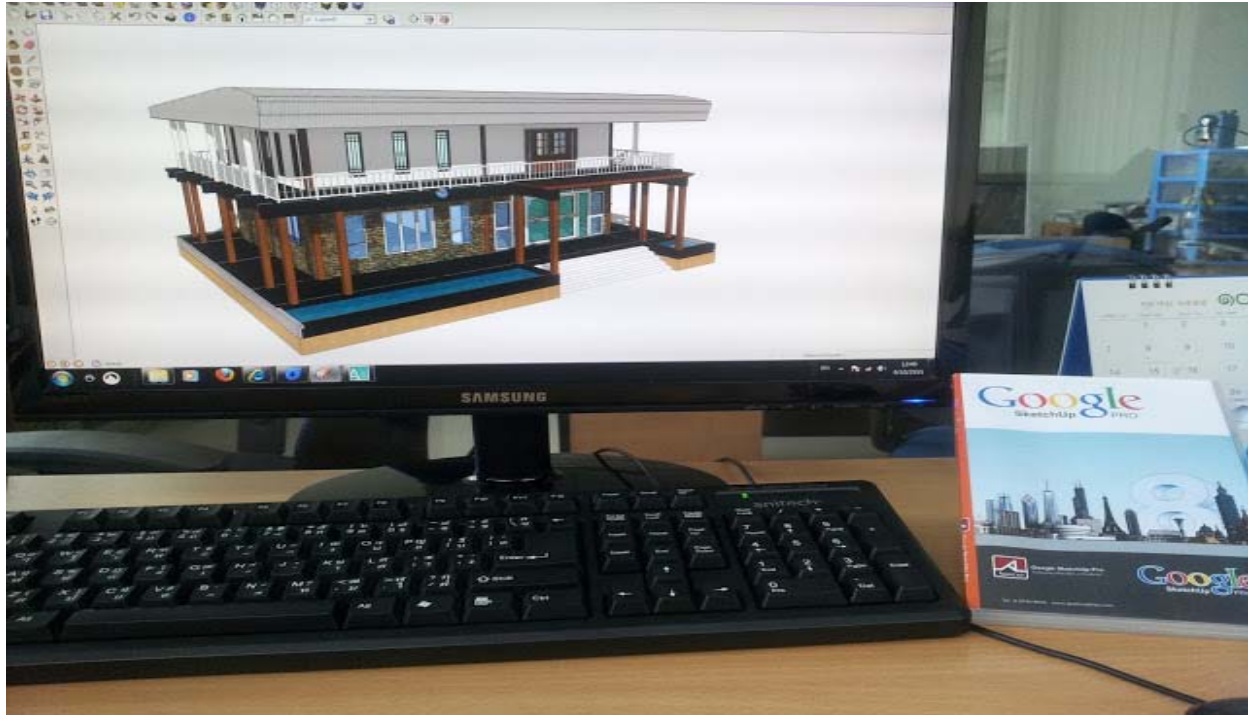
My story with SketchUp - How SketchUp was utilized with 3d construction modeling for construction of large anaerobic wastewater treatment in Thailand.



Mechanical design is done rapidly with high detail



Old version of computer is no problem at all.....

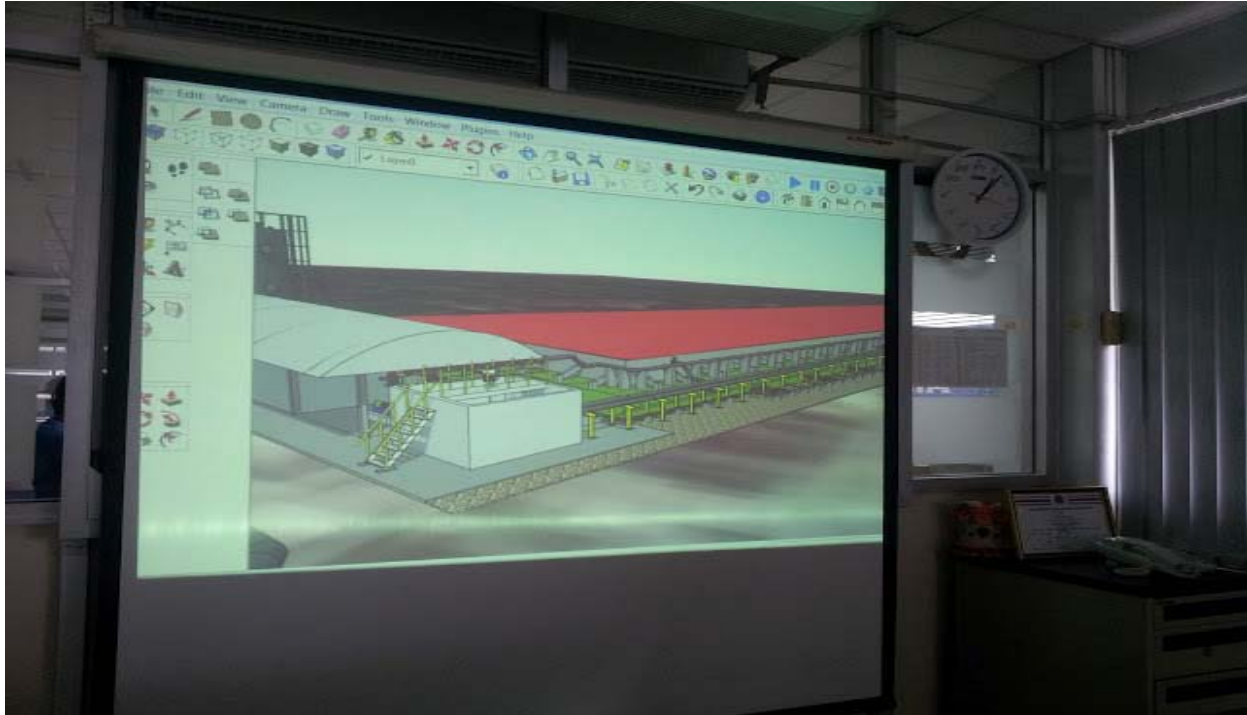


A building was done in 8 hours before it was exported to other 2d CAD progames for structure calculation.

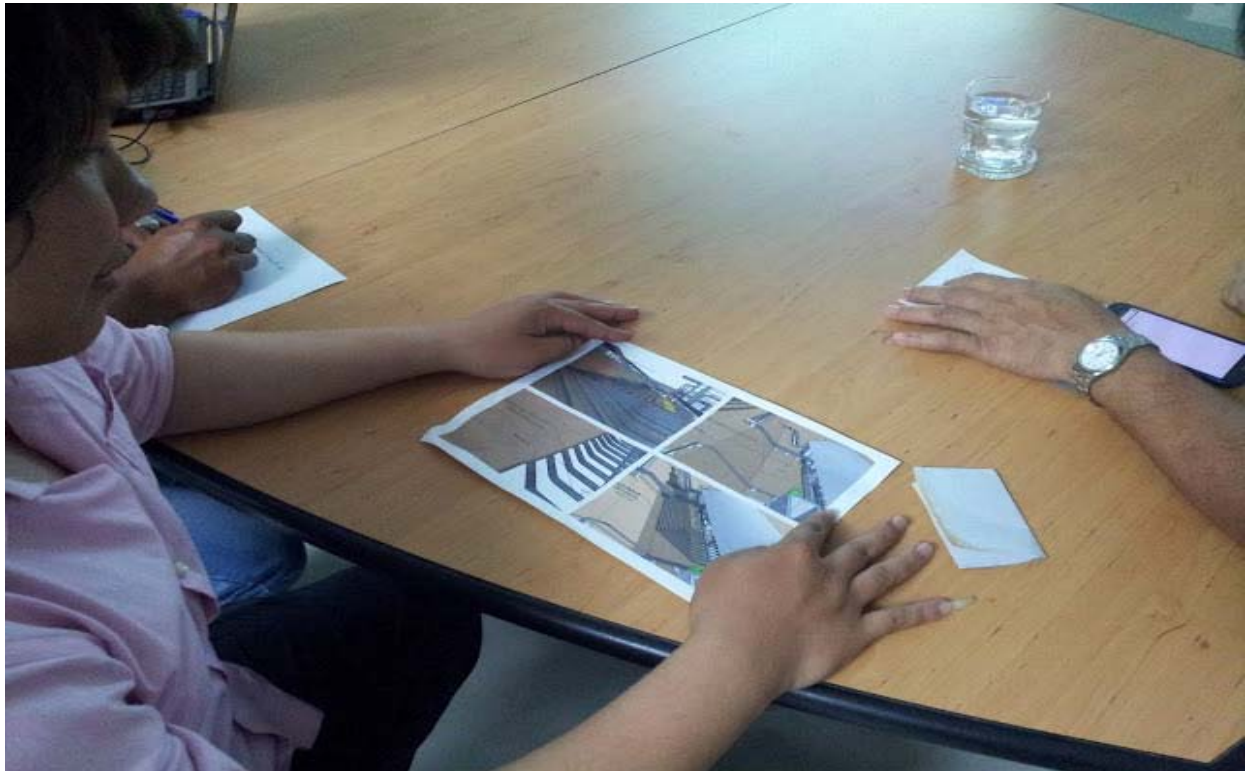


Premier Energy...." We offer the best solution for renewable energy projects"





3d construction modeling of one of our turn key project that was awarded last month. This waste water treatment plant will treat very high strength wastewater from a biodiesel manufacturer and produce biogas which is equal to 90,000 baht/day.



We live in 3d world, why we still need 2d construction drawings.





Unbelievable? this control room was created by 24 years old engineer who started using SketchUp 1 years ago. It took him 3 hours for this work!



No need for a nice meeting room, 3d construction modeling meeting can be set up in every place....even in dirty warehouse. (this photo was taken from one of our project in a starch factory during the construction)



I call it " A big room". All people involving in the project will come to exchange their ideas of work....." All for one and one for all"



They are my new engineers they are trained to be in the first group of Thai engineers who think in 3d and do 3d construction modeling.



[illegible]



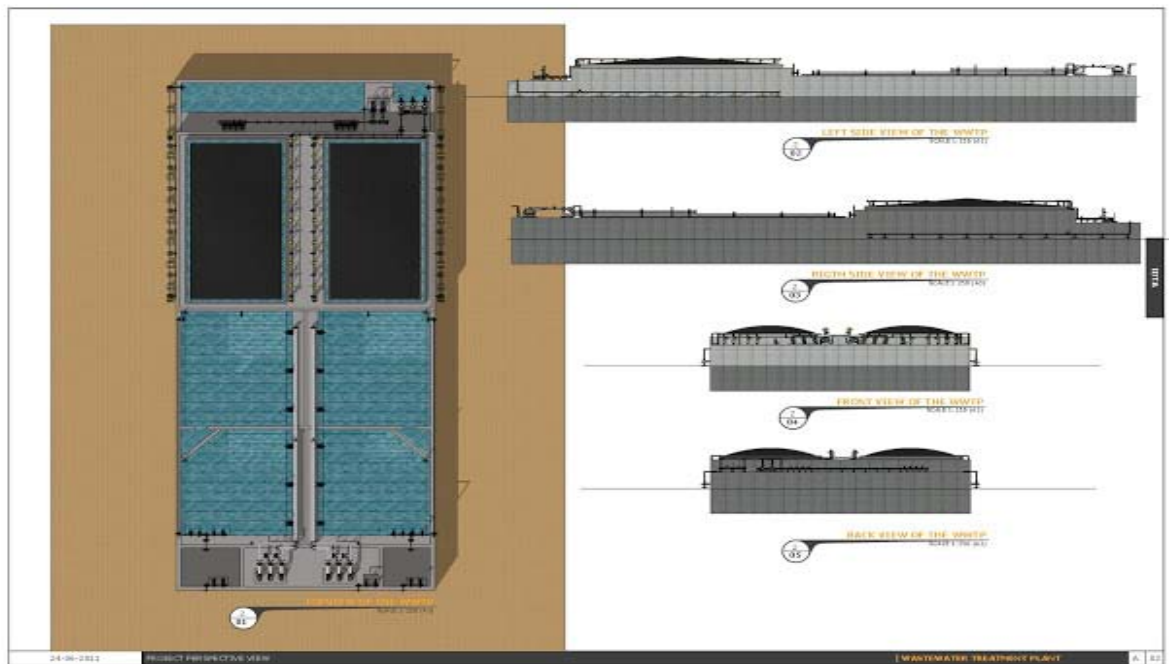
In the future all engineering information will be in the cloud....SketchUp is already supported this cloud computing in the pro-version only. Here is an example of how to find the information of a water pump in one of our projects.



You may not believe it, I can count all materials in this structure by using SketchUp done by 1 year experience engineer.



SketchUp and 3d construction modeling



A stunning drawing done by SketchUp

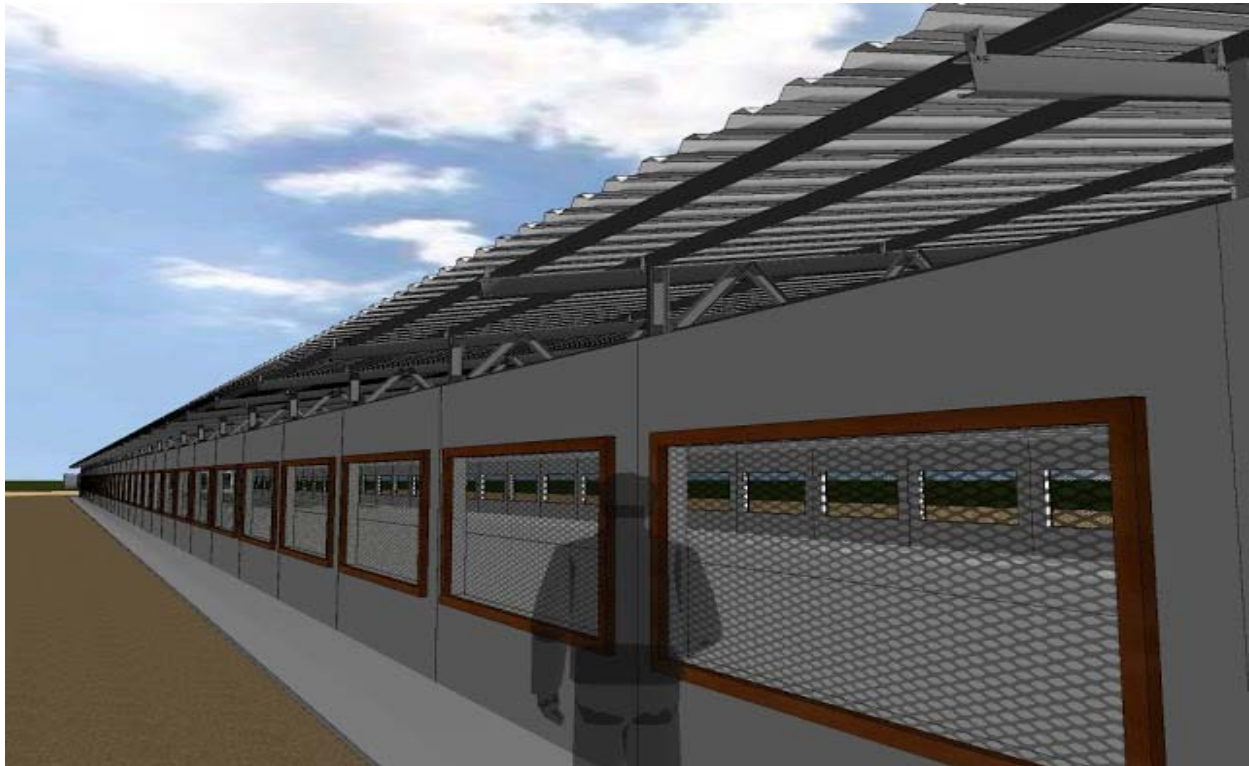


Hey looks our blowers were installed in the right place already!....now go to the real word



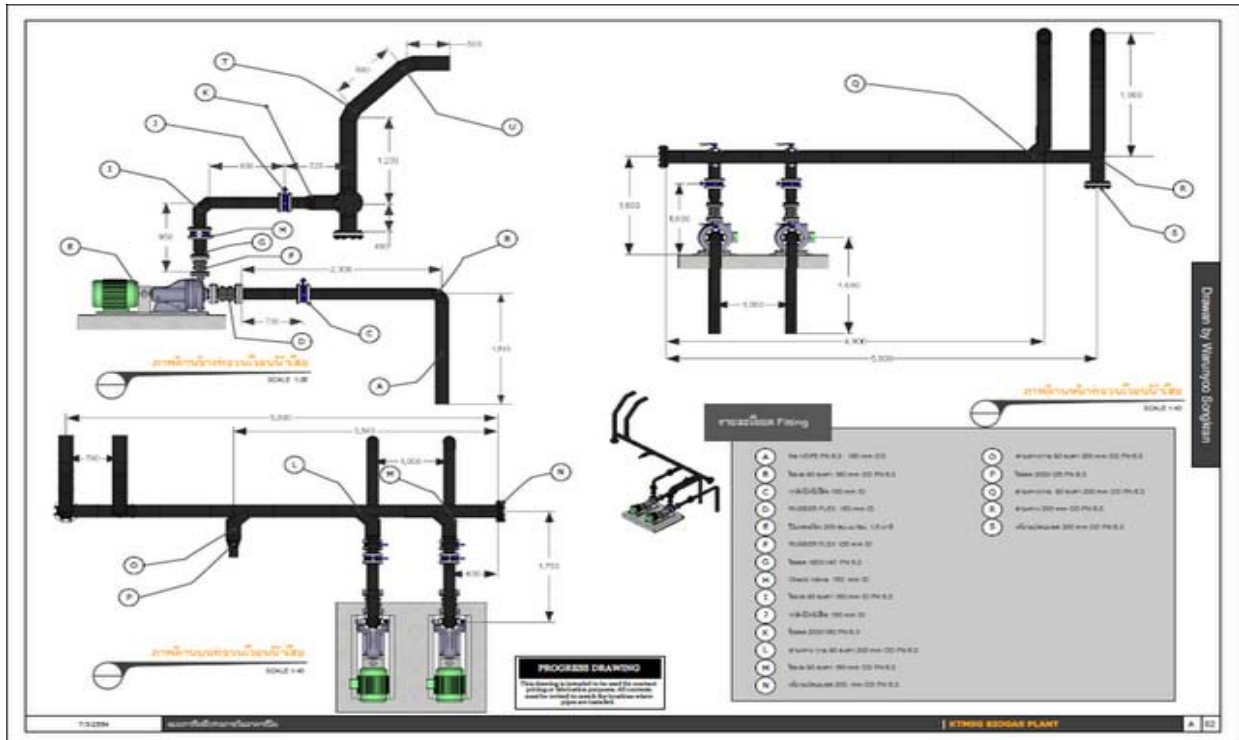


Foreigners come to visit our site



Now our clients can walk freely in the project before it is going to be built. Thanks to the plugin named " WALKABOUT 3D BETA VERSION".





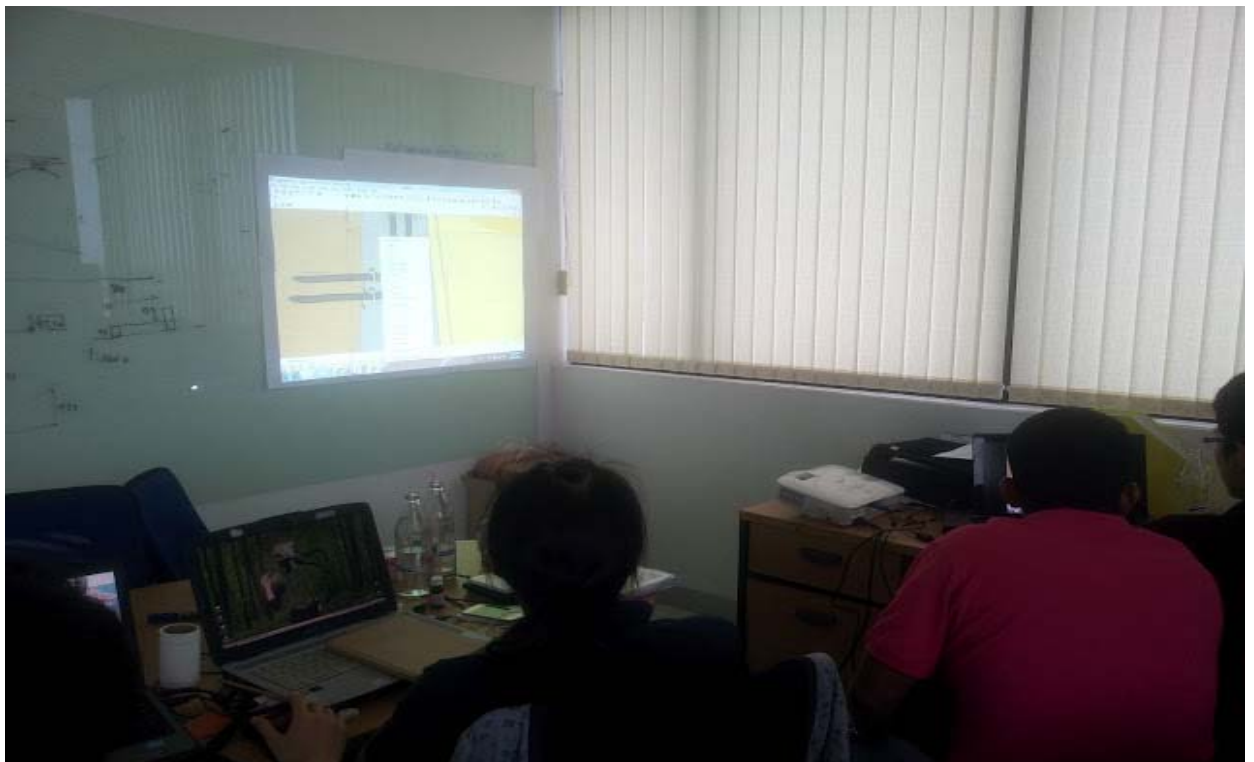
Piping work is easily done by SketchUp with high detail



This is the real work piping work.



3d construction modeling team in a meeting before going to the field



A meeting in our office



22



Every weekend I will go to a rural area to teach small children about 3d model.



Their eyes of inspiration





Now we are learning SketchUp, it is very fun and easy.



The last photo was taken from my class. I teach them for free. I hope that one day all of my student will grow up to be good persons helping my country getting over the political problem. 3d model will give them good opportunity. Please come and join my flight.

Contact email - [pomtiff@gmail.com](mailto:pomtiff@gmail.com)

## *Article - Designing Kitchens with Sketchup*

It is a design publication and how-to guide created for the kitchen design industry to simplify the design process using SketchUp software. It is targeted to designers who are training, as well as the professional interior designer in the process of designing kitchens.

Many kitchen designers have used specialized software to make designs fairly quickly. The main benefit of this type of software is its catalogue of kitchen cabinets, as well as the instant pricing information. However, SketchUp is a very powerful tool that can be used for this type of task. SketchUp has several advantages comparing with other programs. First, SketchUp contains vast library collections that can be found in the 3D Warehouse that allow the designer to choose cabinets to create an entire kitchen. These models have been designed by manufacturers such as Masco and most components have dynamic-components properties. Some of the topics of Designing Kitchens with SketchUp teaches how to insert components, replace one by another, use models from the 3D Warehouse, replace elements and properties, match colors of existing objects, and use onlay images to enhance the design and much more.



The second reason to choose SketchUp for kitchen design is the low-cost investment in software needed. Even with the free version the user can cover a huge variety of aspects covering even more than specialized software.

Finally, the versatility of designs and materials available to apply on surfaces cannot be compared. An open system such as SketchUp offers the end-users unlimited tools to accomplish everything that is in their imagination; curves, materials, photos, dynamic components, presentation tools are just some of the offered elements. Any custom design can be approached in a simple way, and designers can grow their own libraries for future use.

This nine chapter, 221 page master class is the ultimate Step by Step Tutorial guide for anyone wishing to get the grips with kitchen design using SketchUp. The guide covers all aspects of kitchen design in a easy to follow hand holding fashion from 'Good Practice' to 'Preparing your construction documents' with Layout and everything in between the kitchen designer needs to know.



In the first chapter the reader will learn how to create a 3D model starting from a 2D layout, drag and drop cabinets from the 3D Warehouse, sample materials, create design alternatives for backsplashes, using on-lays, and show the interior of the cabinets with the Interact tool.

The second chapter covers how to create a kitchen using pictures and images to share ideas with the client. You will also learn how to create a material from an existing picture. Preparing scenes that can enhance the design and help to work easily reaching different views are other topics of this chapter.

Chapter 3 and 4 show plug-in and how to create your own dynamic components that allow to customize your design and optimize your performance. The reader will also learn how to create a dynamic component able to list different materials, show different prices according to the finish material, varying different quantities of shelves inside a cabinet, change handle sides, and of course have different size options.

If you are the type of designer that enrich your imagination looking in magazines for others' ideas, or may be adding an island in an existing kitchen, you will learn how to take a photograph and create a 3D model of the entire room starting from that picture. Scaling the image, inserting new elements and matching the existing photo are the main topics of chapter 5.





As kitchen designers can not set them apart of working with patterns, seamless materials and tiles, Designing Kitchens with SketchUp will teach you the best practices to create new materials and how to avoid falling into big file sizes

Chapter 7 and 8 will teach you how to prepare your construction documents, how to insert texts and dimensions, manage scales, tips and tricks to print getting the best quality investing less time, and how to complement SketchUp with Layout.

A quick exploration adding lighting effects to designs with freeware and shareware alternatives will complete the knowledge you need to succeed in your daily professional life.

The book is available in Amazon in paperback and Kindle format. The PDF format can be purchased in <http://nextcad.net/SketchUp-interior-design-book.html>

You can look inside –

<http://issuu.com/pupchen/docs/designingkitchenswithSketchUp?mode=window&viewMode=doublePage>

Contact email: [adrianagranados@nextcad.net](mailto:adrianagranados@nextcad.net)

## *Article - My story with SketchUp*

I am Arch. Jhin B. Tabuzo Jr. from Manila, Philippines currently working as a Sr. Architect in one of the leading Engineering Design firm in Doha, Qatar and also conducting review classes and as a mentor for those Filipinos seeking professional license as an Architect by taking the Board Examination for Philippine Architects also in Qatar.



I have been using Sketch Up only a year ago when one of my reviewed posted in his FB account his sample rendered works and I asked about it and I thought that it was done in 3D Max, to my surprise that he said to me that he used Sketch Up 3D software wherein it was new to me and it's the first time I've heard about it, being a Sr. Architect in my current office, i have not been involved much in any rendering nor drafting works since my scope of works are designing, coordination, supervision and handling clients requirements for approval most of the time.



I've first started using Sketch Up 7 at that time and at present I am using Sketch Up Pro 8, since then I've never stopped using it and been doing most of my projects with 3D views for my clients preliminary approval of the massing, character and elevation design.

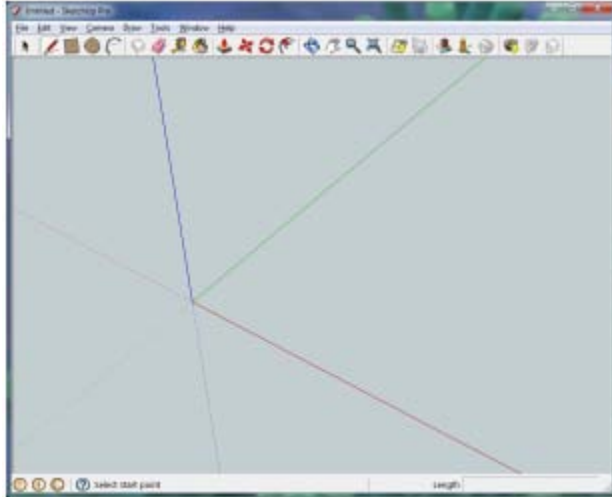


I started slowly understanding the modeling commands until I got satisfied of just making enough and good presentation for all my projects, I can say that it is really very helpful to me as a Sr. Architect coz I have found a fast and easy to present 3D views to my clients and boosted my confidence and widen my skills as an Architect in terms of presentations.

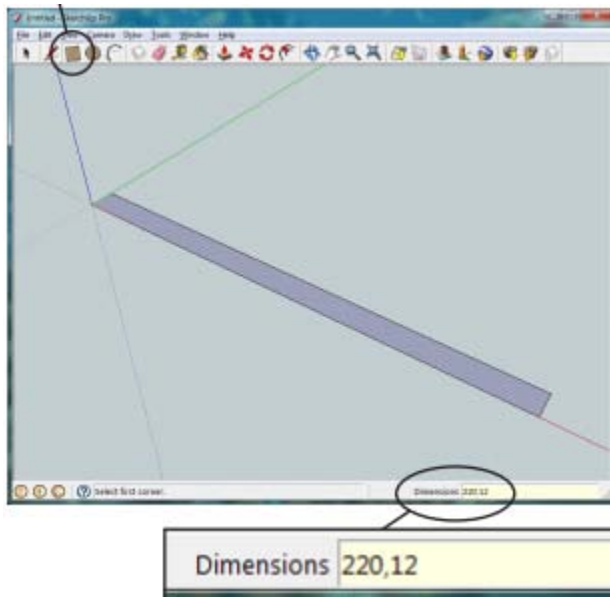


## Blog - Draw Accurately with Google Sketchup

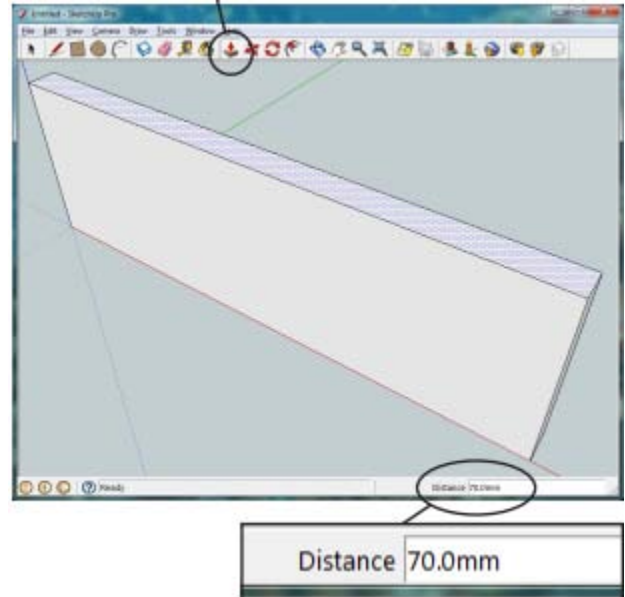
When Google SketchUp starts up, make sure you select the correct template, which is Product Design and Woodworking - Millimeters



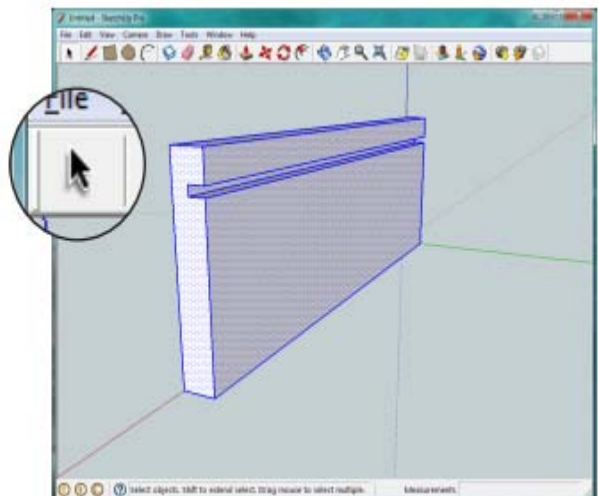
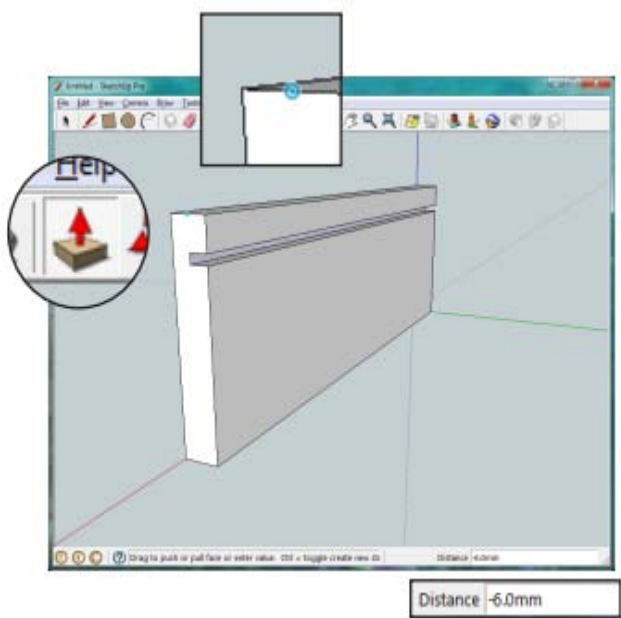
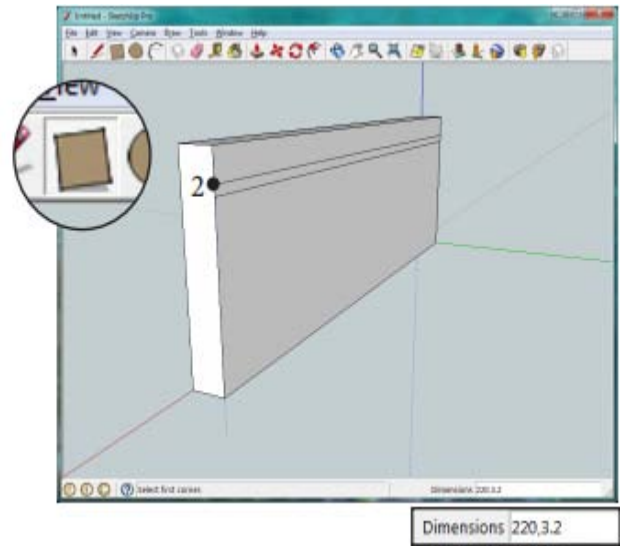
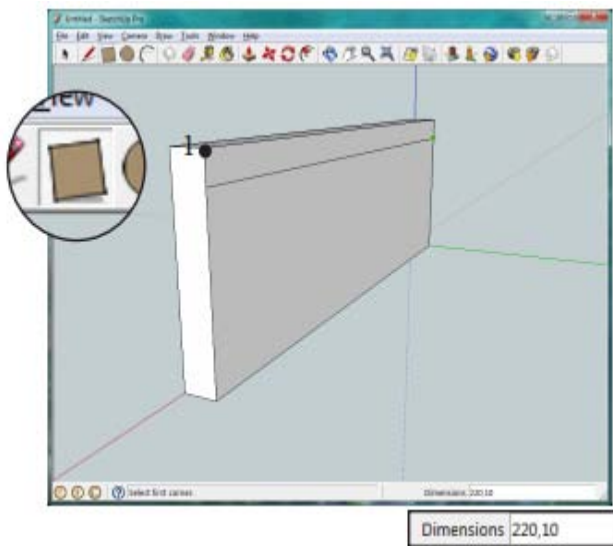
Take notice of the three lines BLUE, GREEN and RED as they are important. They indicate the true direction of a line or movement



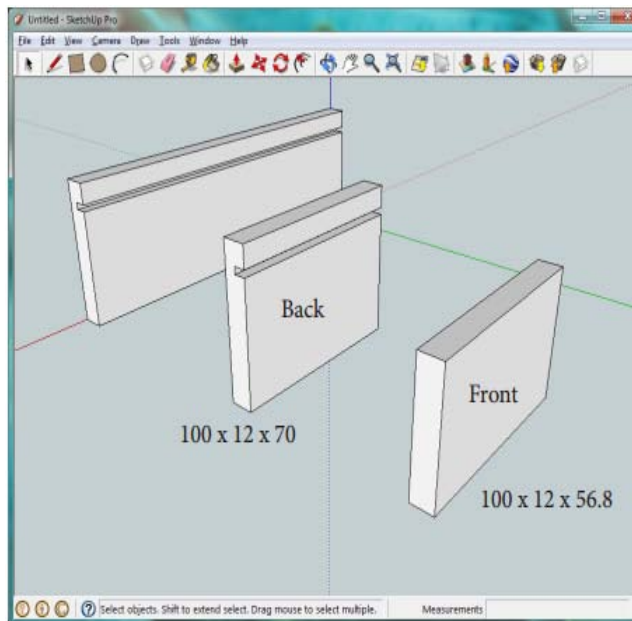
Choose the rectangle tool, click the mouse left button (LB) and release. Now type 220,12 and hit ENTER on the keyboard.



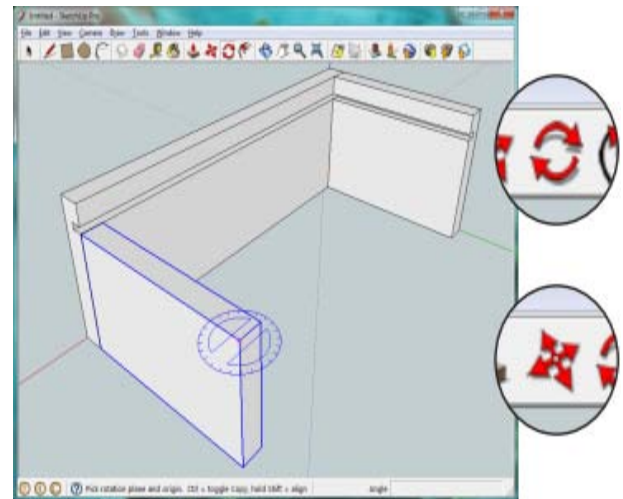
Choose the Push/Pull tool click LB once and release move the mouse up a bit and type 70, hit enter.



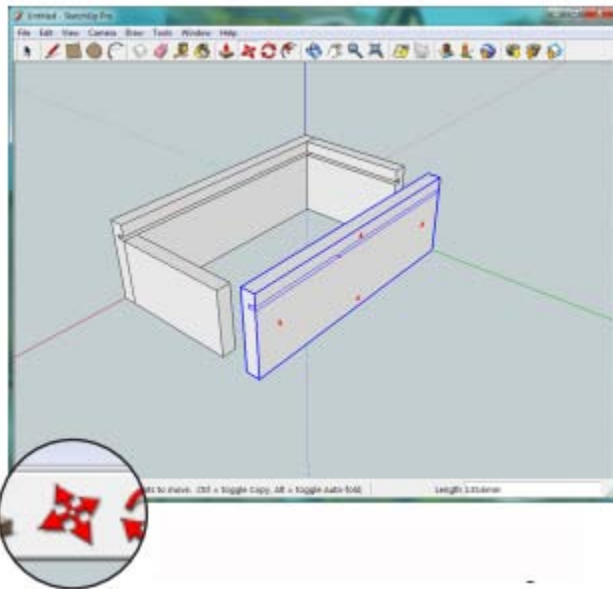
Use the Select icon (black arrow) and drag a box around the entire part. Now right click the mouse on it and select Make Component, call it 'Side'.



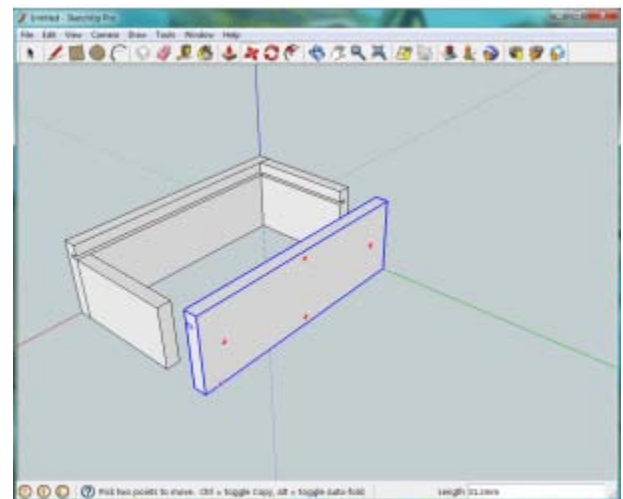
Make two more parts using the dimensions shown. Make each part a component with the names 'Front' and 'Back'.



Use the rotate tool to rotate the Back and Front component 90° make sure you use the Blue axis. Then use the move tool on a corner to link the parts together as shown.

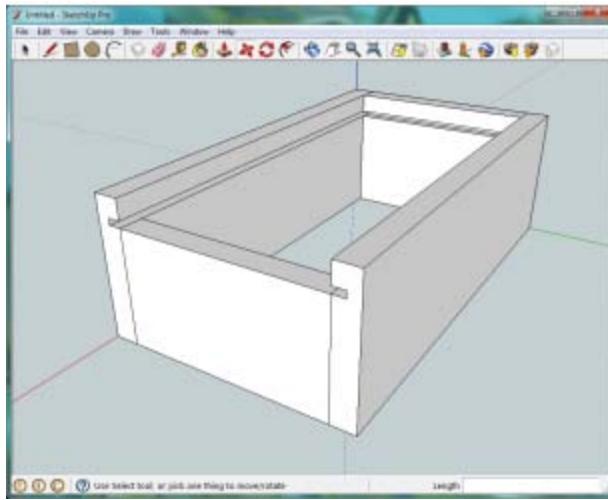


Select the side piece and use the move tool to move it to the open side, then press the CTRL key to duplicate the part.

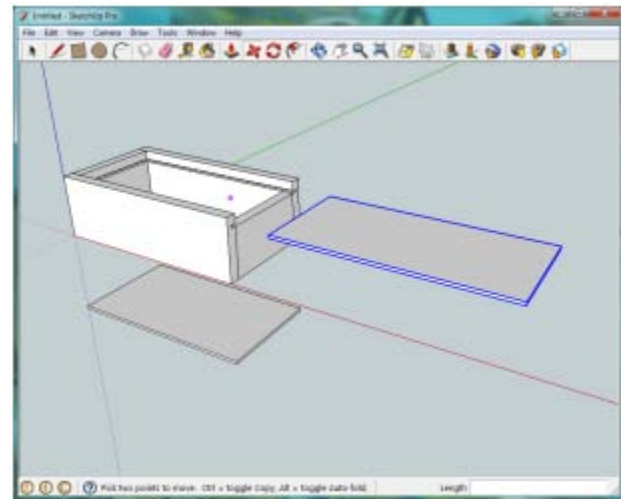


Right click the new side and select 'Flip Along' then choose the Green axis. Now move that piece into alignment.





The box should now look something like this.

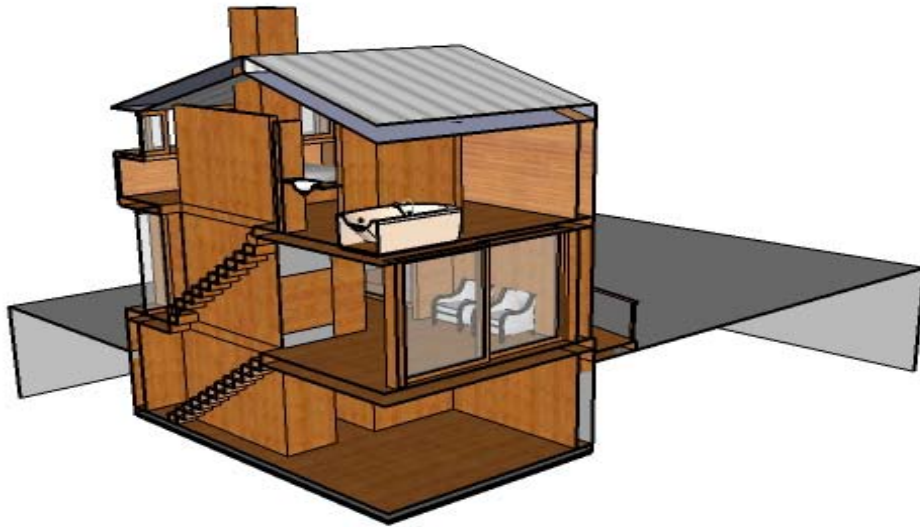


Now make a bottom with dimensions 220 x 124 x 3.2 and a lid with dimensions 234 x 112 x 3.2. Make them components and join them together.

## Blog - How to use more than one Section Plane simultaneously

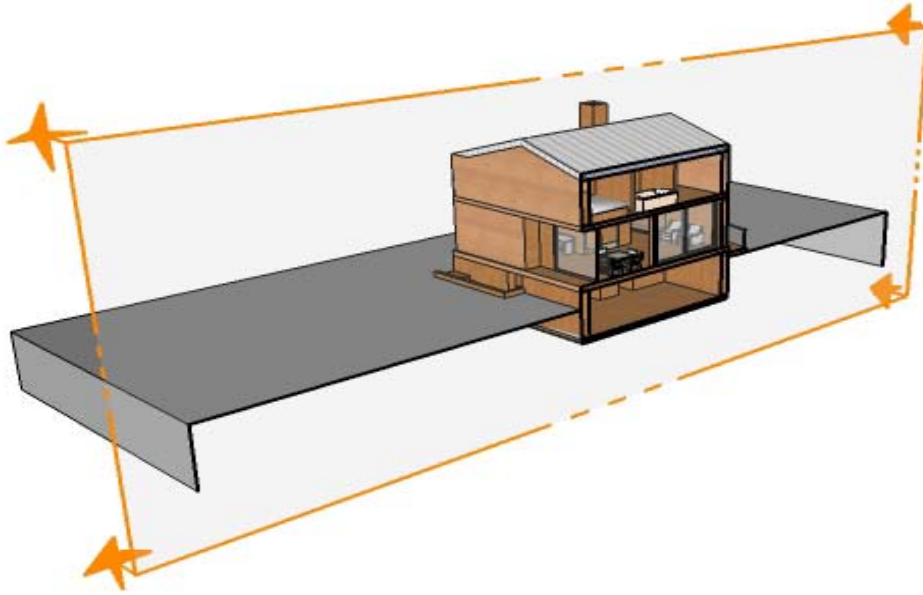
The \*Section Plane \*is a powerful SketchUp feature. You can cut your model anywhere in realtime. You can create as many section planes as you like, but SketchUp will only allow one single active section plane at a time (in the same context, as we will see). To use simultaneously active planes, the trick is to group your model with a section plane and create another one outside the group.

A model without Section Planes.



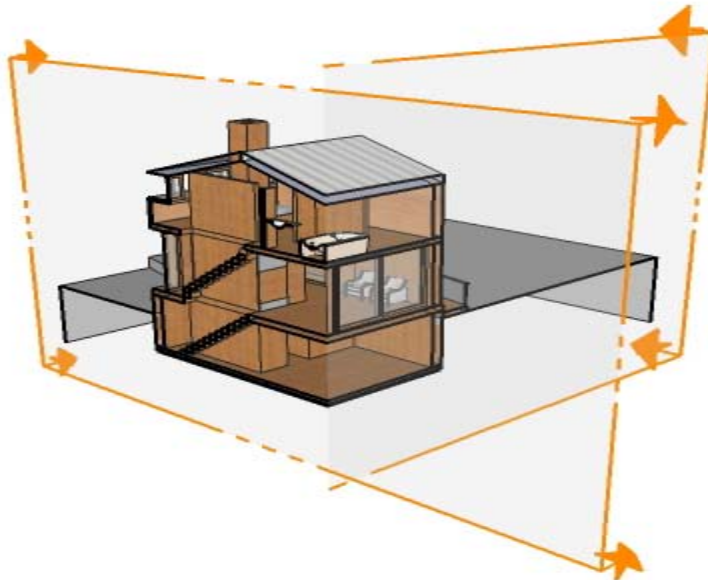
A model using two section planes simultaneously.

Create the first section plane, and place it at the desired position.



**Longitudinal Section:** To avoid letting any part of the model out, double-click the first section plane to de-activate it. Select the model parts and the section plane and create a group. Now create a new section plane. Edit the group to activate the first section plane.

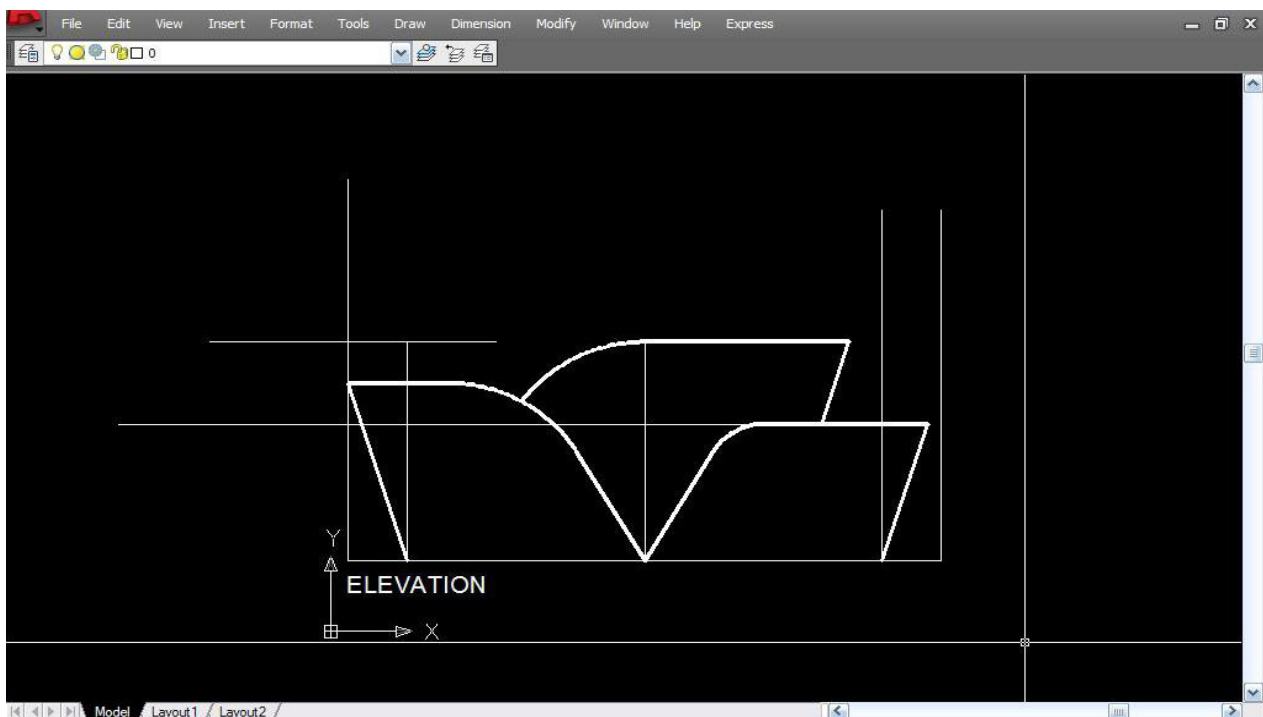
Now you have a model with two simultaneously active section planes.



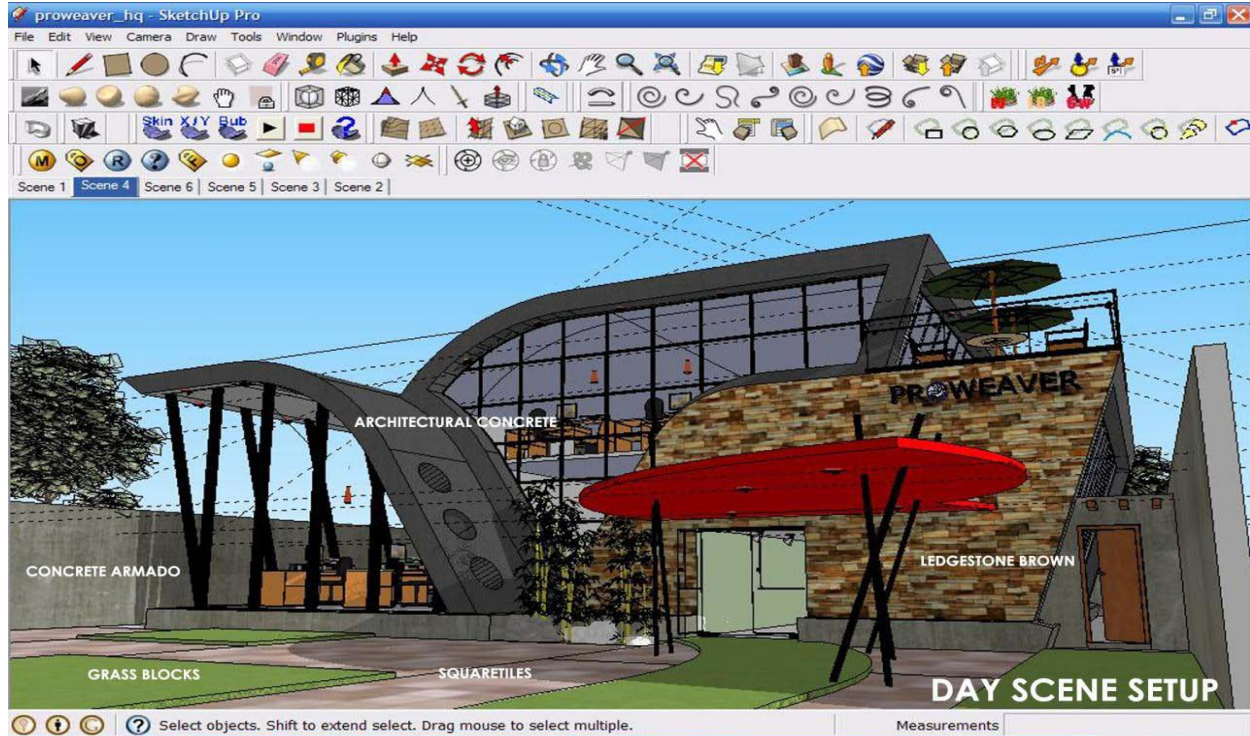
both section planes on - This can be used as a presentation tool, to explain internal features of your model.



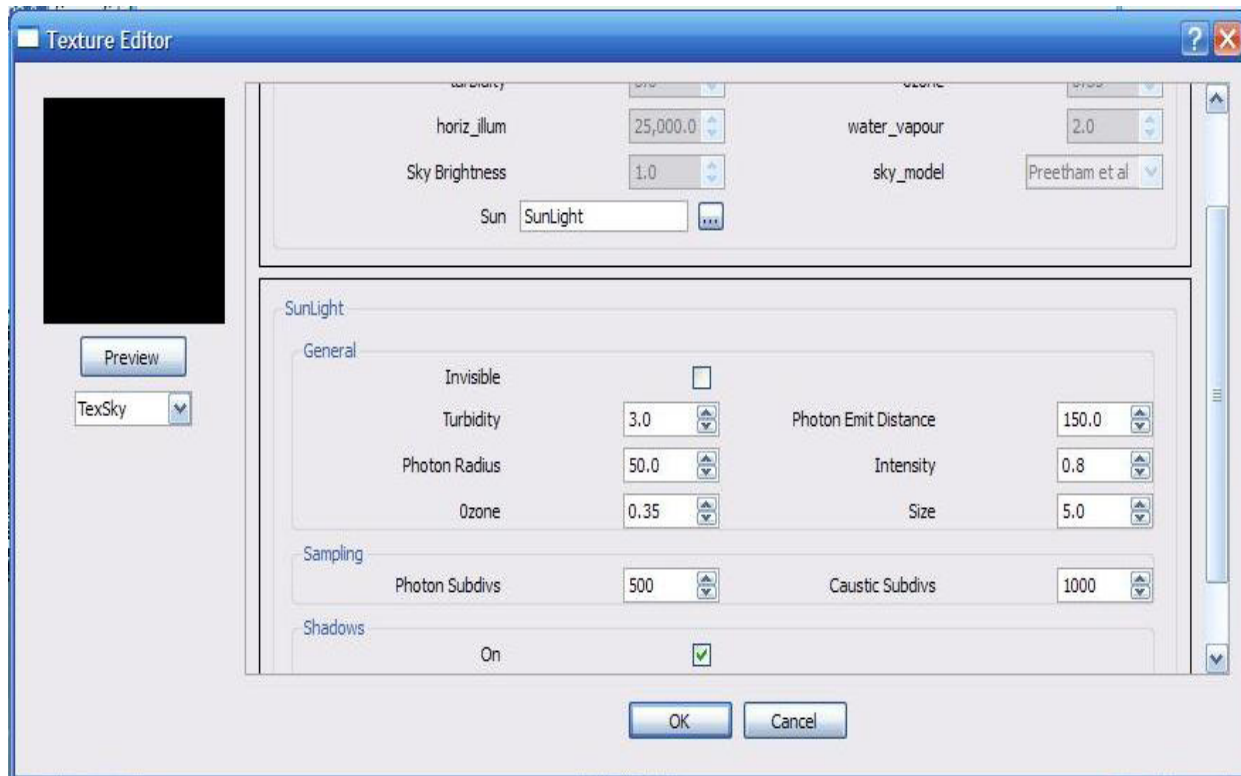
# SketchUp Tutorial - The Making of Proweaver Headquarters



1. THE DESIGN WAS FORMULATED USING AUTOCAD.



2. THE DAY SCENE SETUP. MATERIALS USED (VISMAT) : LEDGESTONE BROWN ARCHITECTURAL CONCRETE CONCRETE ARMADO GLASSBLOCK SQUARETILE



ENVIRONMENT : SUN SIZE : 5 INTENSITY : 0.8

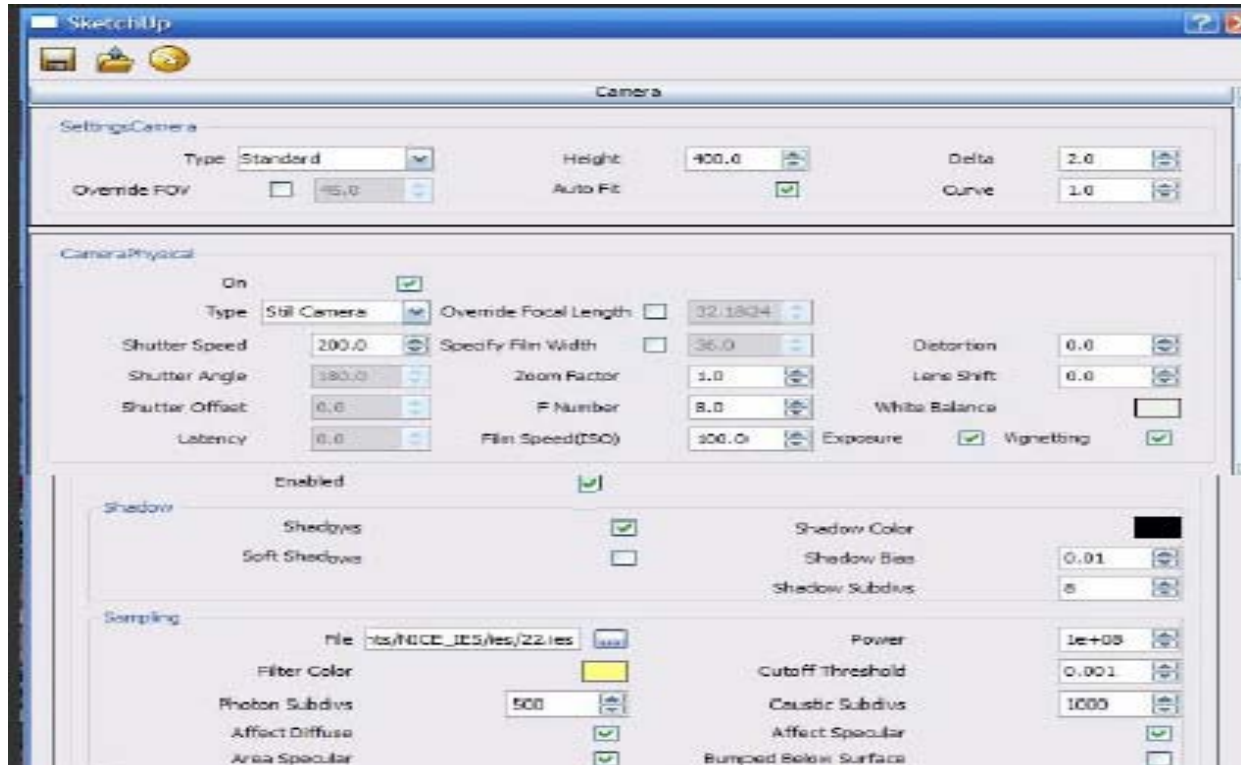


LIGHT CACHE: SUBDIVISIONS : 1000

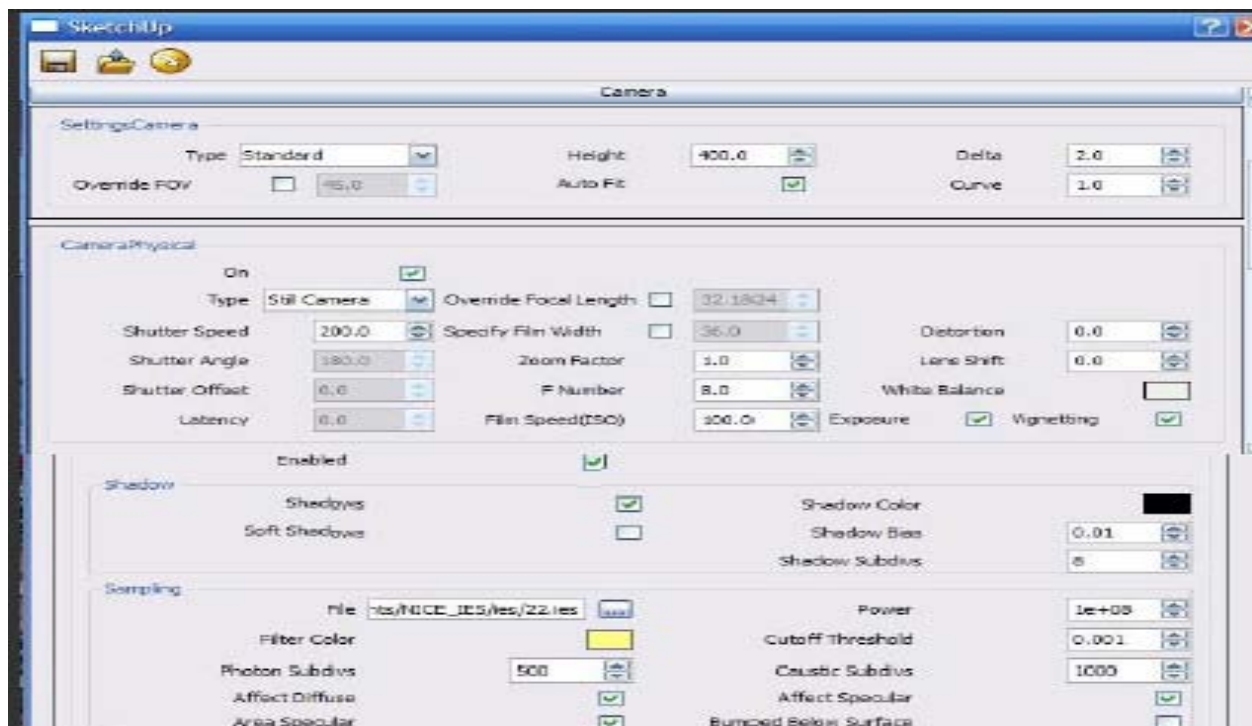


OUTPUT: UNTICK OVERRIDE VIEWPORT WITH AN IMAGE ASPECT OF 1.7739

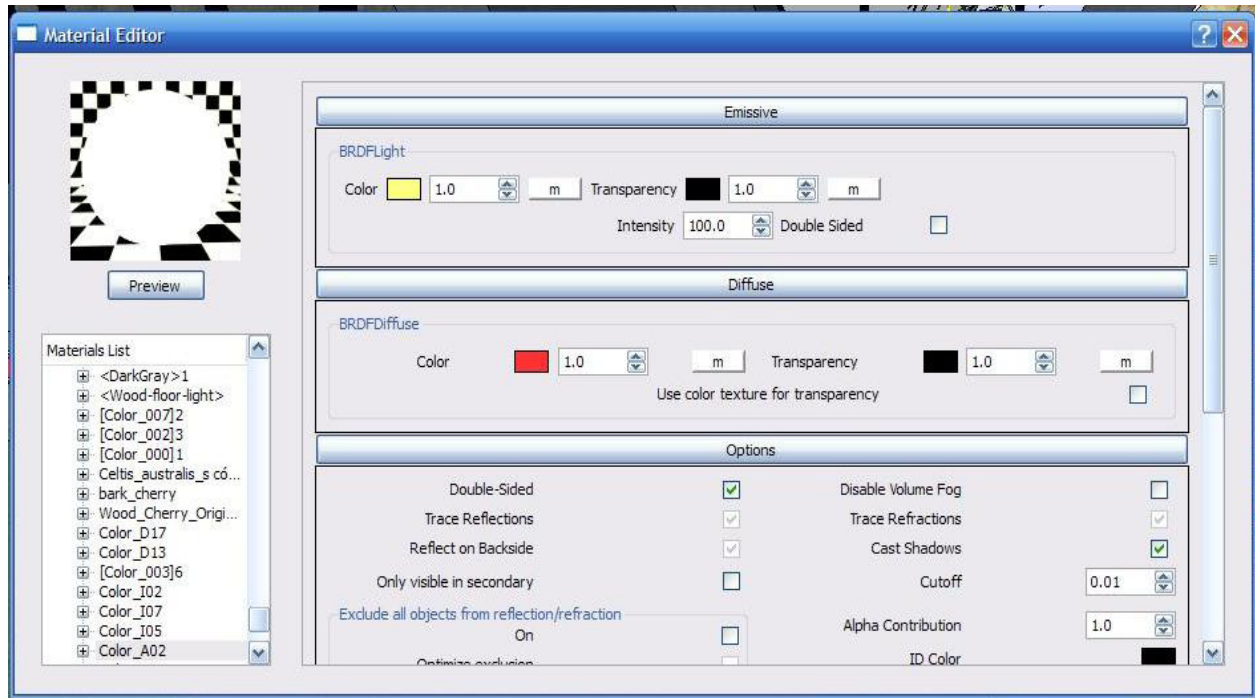




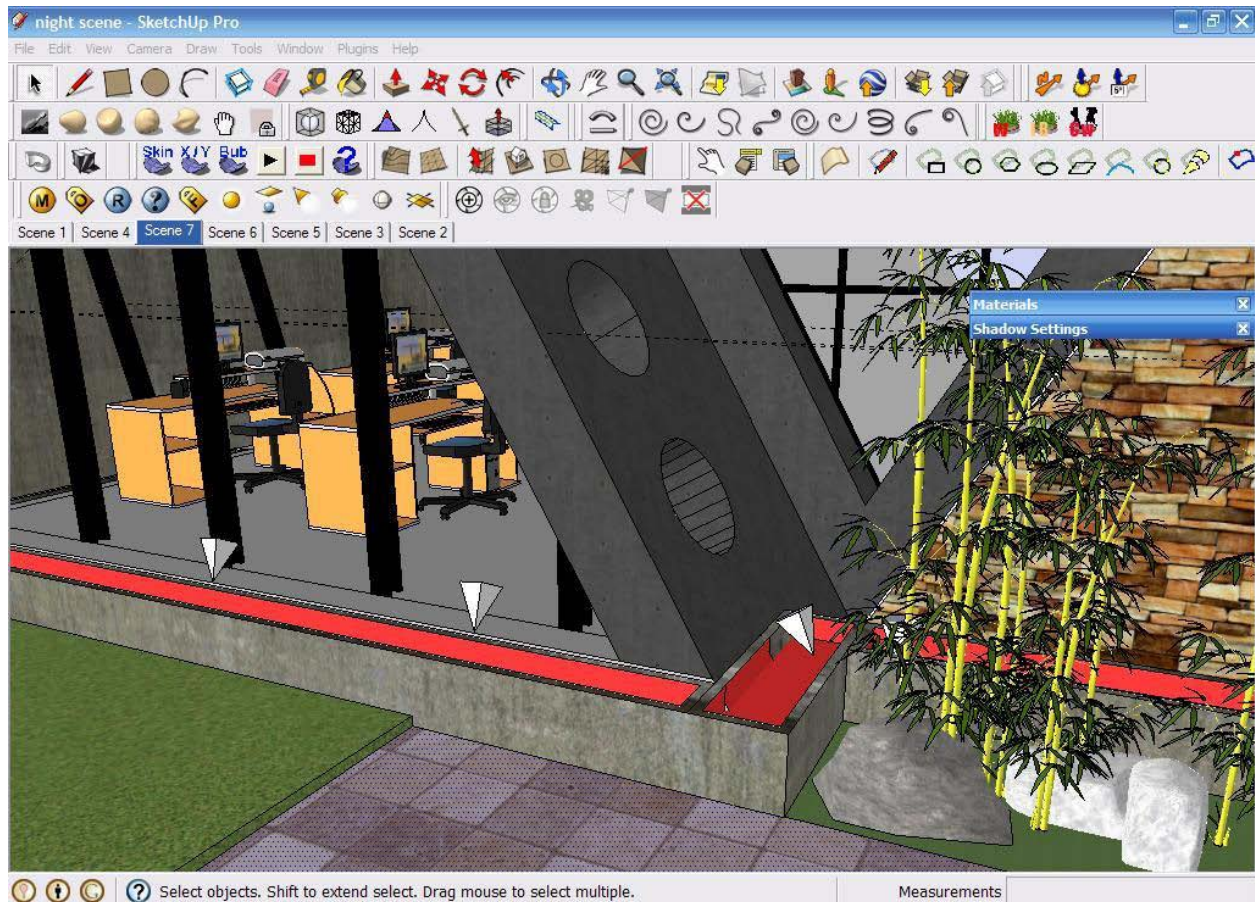
CAMERA : (DEFAULT)



LIGHT (IES): IES LIGHT NO. 22 POWER : 1 + 8 ZEROS

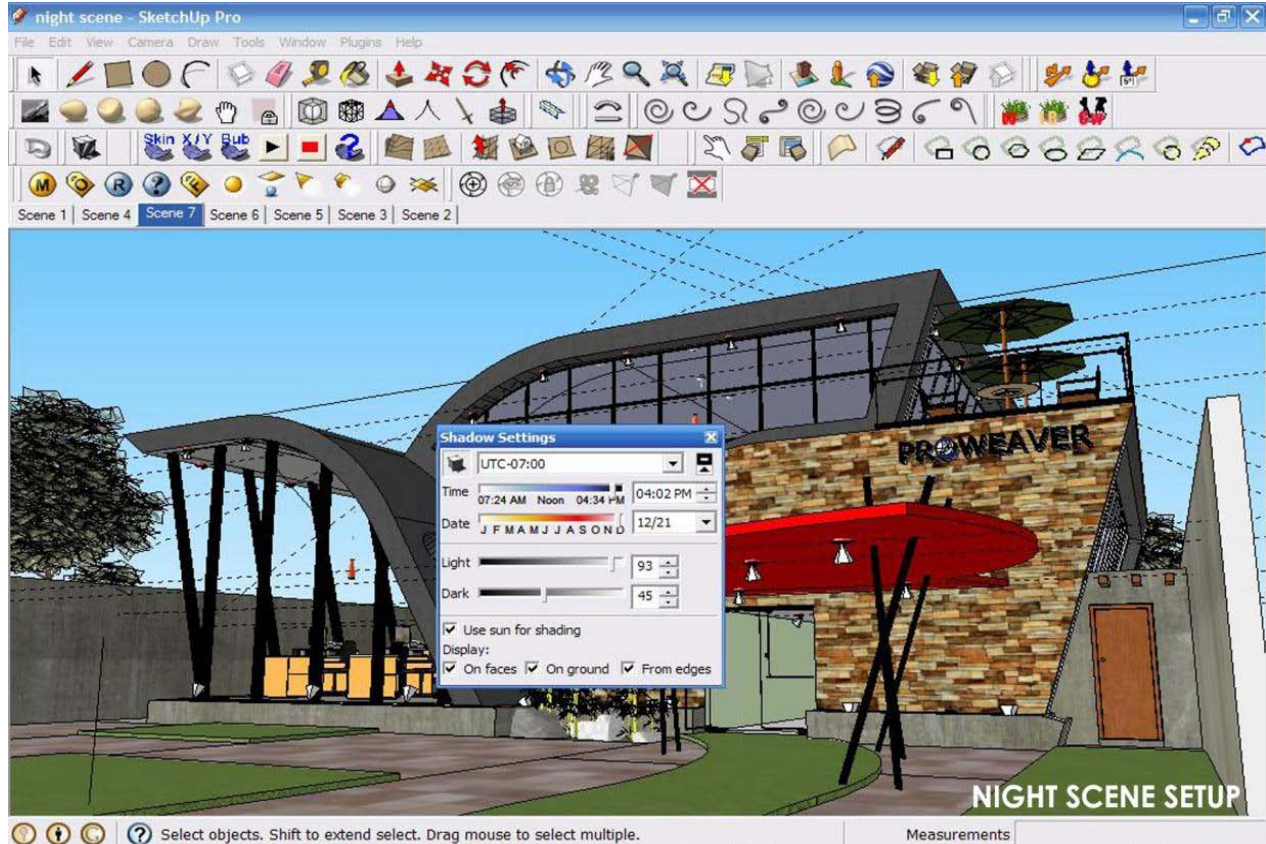


FOR THE UPWARD LIGHT ON THE FRONT (NIGHT SETUP): EMMISIVE MATERIAL INTENSITY : 100





FOR THE UPWARD LIGHT ON THE FRONT (NIGHT SETUP): EMMISIVE MATERIAL INTENSITY : 100



SHADOW SETTINGS BACKGROUND: (DEFAULT)

HOPE YOU FIND THIS TUTORIAL USEFUL. ENJOY!..

Contact Name: **Eugene Yusuke**

Contact email: [seventh\\_eel@yahoo.com](mailto:seventh_eel@yahoo.com)

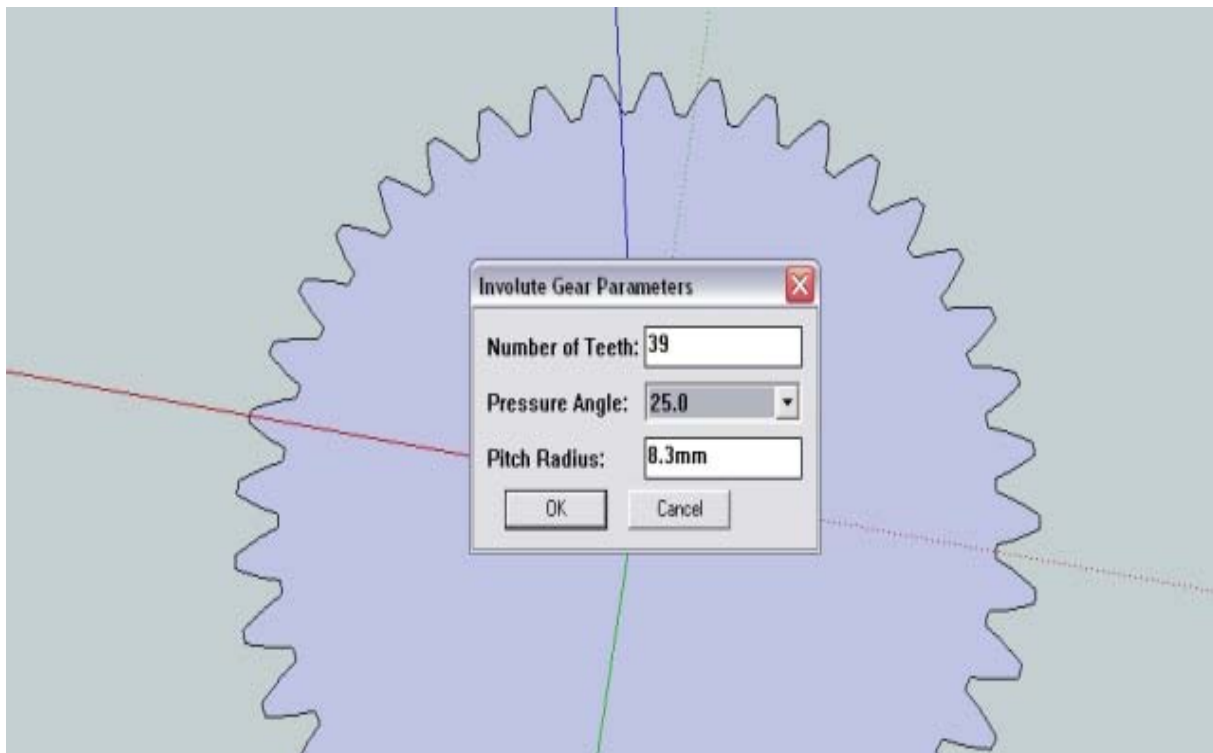


## SketchUp Tutorial - Drawing gears in SketchUp

The following is a guide for designing gears in SketchUp for 3D printing, CNC milling or similar. For a good introduction in general gear design see [here](#). For an introduction to SketchUp see the [SketchUp related links](#) this page.

A collection of the gears seen in this page can be downloaded from the [3d warehouse](#).

To begin with, download the involute gear plugin and copy it to your SketchUp plugin directory. This plug-in was not produced by me and all credit goes to Cadalog Inc for writing this very useful tool. Then open SketchUp and choose 'Involute Gear' from the draw menu. From the dialogue box you are presented with three options.



**Number of Teeth** - The number of teeth on your small gear (pinion gear) relative to your large gear (gear wheel) will determine the gear ratio. If you desire a gear ratio of 2:1 then your gear wheel will have twice as many teeth as your pinion. However, your gear with more teeth would need to be twice the size in order to have the same sized teeth.

By choosing an even number of teeth you have a range of different exact gear ratios. For example; 12 and 24 (1:2), 12 and 36 (1:3), 12 and 48 (1:4) ect. However, an even number of teeth will result in the same pair of teeth meeting over and over again. By having an odd number of teeth each tooth will meet a different counterpart on every rotation. This helps to distribute lubricant and reduce ware. For example, Wade's geared extruder has 11 teeth on the pinion and 39 teeth on the gear wheel.

Try and select the highest number of teeth possible while still maintaining a printable resolution. Have no less than 12 teeth and try to avoid a gear ratio any higher than 1:6.

**Pressure Angle** - The pressure angle effects the geometry of the gear teeth. A low pressure angle (14.5) is normally used with high number of teeth (40+) and will give a greater contact area but

lead to increased noise and backlash. Source. I would recommend sticking to a pressure angle of 20. Whatever pressure angle you choose, make sure it is constant among all gears used together.

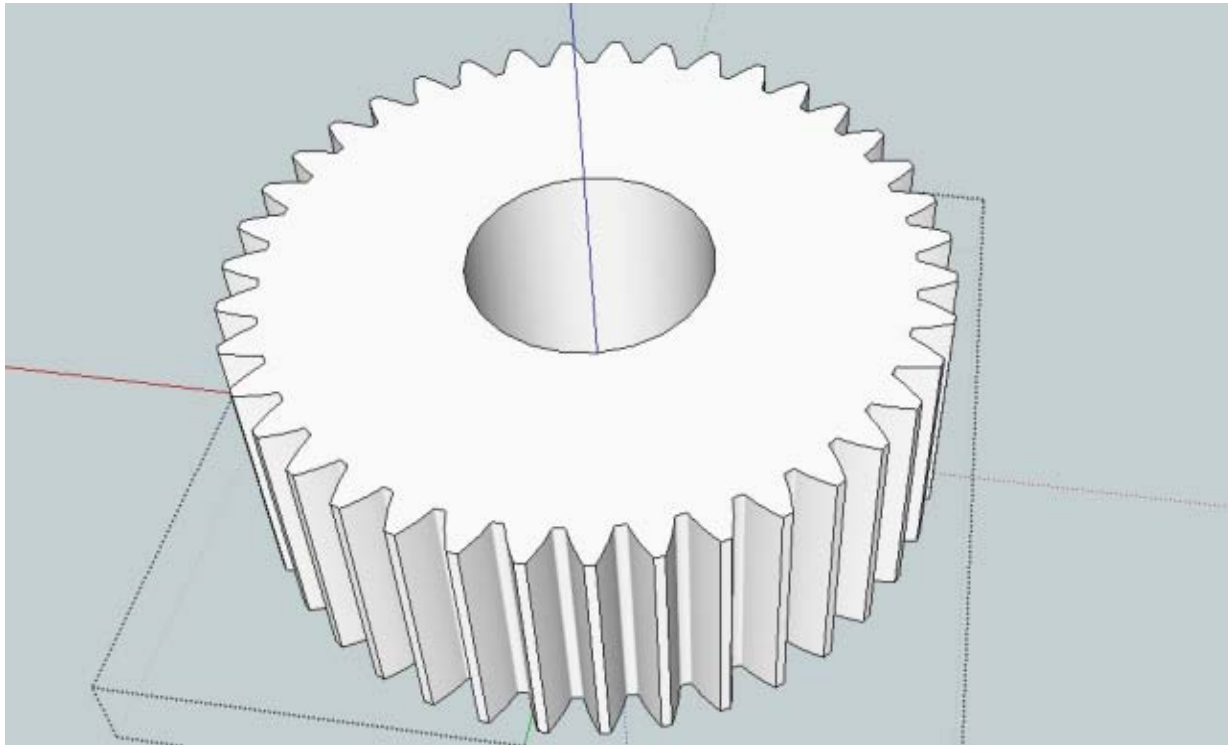
**Pitch Radius** - This is not the outermost radius of the gear (the root circle). The pitch radius is the distance from the centre of the gear to the 'pitch point', the point of contact between the two gears.

As such, the outermost radius of the gear for a fixed pitch radius will change for different numbers of teeth. However, no matter the number of teeth, the 'pitch point' will remain constant for all gears.

The key point here is that if you want two gears to mesh well, then the pitch radius must be increased or decreased by the same ratio as your number of teeth. For example, let's say you have a small gear with 10 teeth and a pitch radius of 10mm. If you wanted a ratio of 1:3 then your large gear would need 30 teeth and pitch ratio of 30mm.

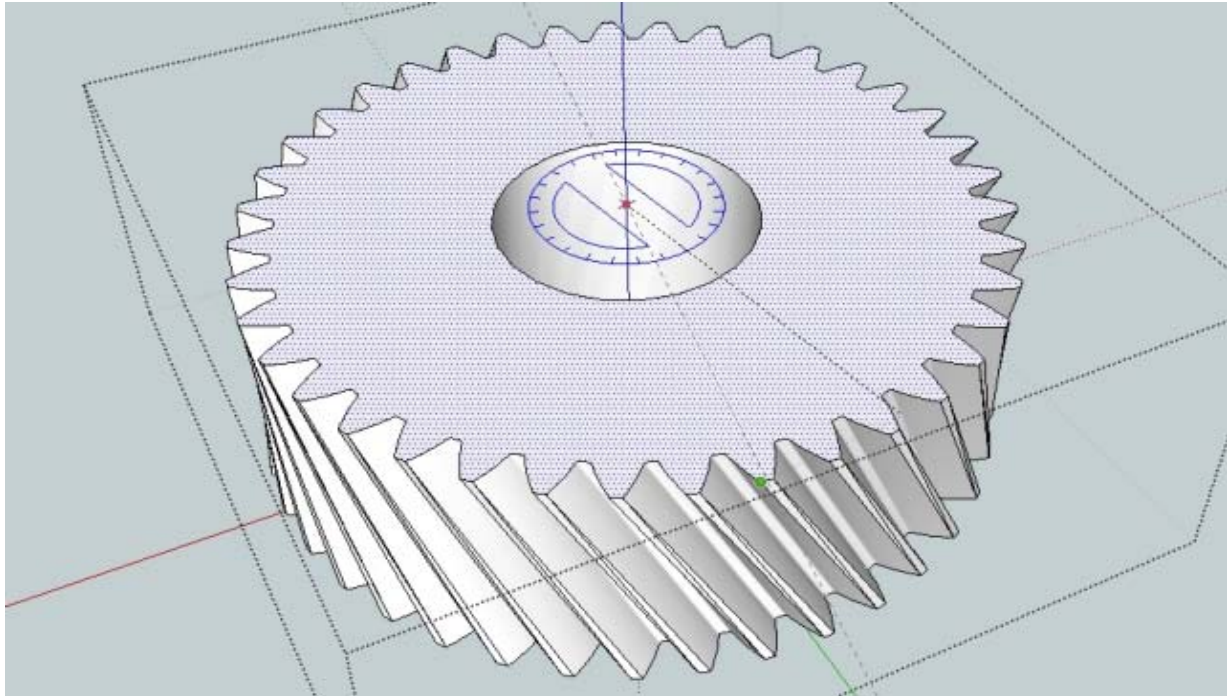
Once you are comfortable with these settings it's quite simple to make a range of different gears. When you have finalised your gear design you can export the file as an STL.

**Involute Gear** - To create an involute gear, use the plugin as described above to first create the gear outline. The gear outline will appear at the point 0,0 so it's good idea to mark the centre position before moving it. Add your centre shaft hole and then use the Push/Pull tool (hot key 'P') to make the object 3d.



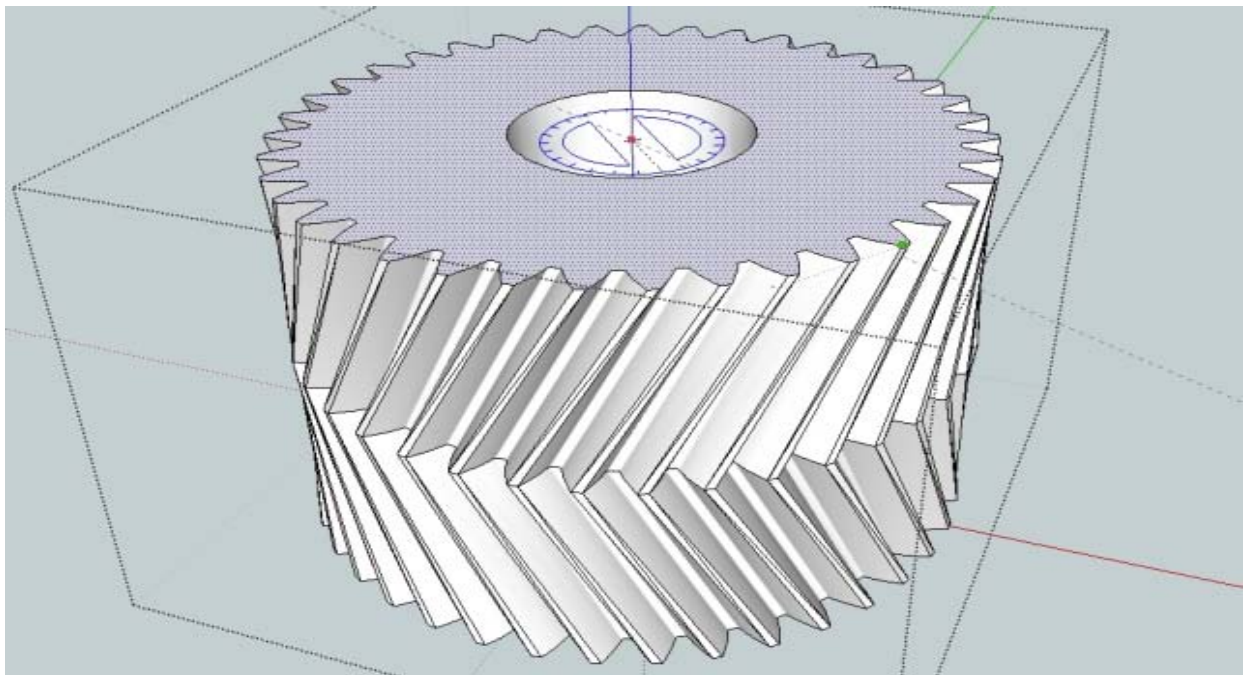
**Helical Gear** - Make sure the centre of your gear is still positioned at the point 0.0. To create a helical gear simply follow the same process as for the involute gear but with one extra step.

After you have 'pulled' your gear surface up to make it 3d, select only the top face of the gear and choose the rotate tool (hot key 'Q'). With the top face still selected position the protractor over at the centre of the gear and right click. If you have an empty space for a shaft in the centre then just hold down shift while hovering the protractor over a horizontal area to lock it in that orientation. Then it's just a matter of choosing your desired angle. For a single helical gear the angle used is normally 6,8,10,12,15,20 degrees. Be aware that a greater angle will result in a greater axial load (see below).



Why would you use a helical gear? They can reduce backlash, wear and noise as opposed to an involute gear. This is due to the gears meshing slowly over their length rather than all at once. However a single helical gear will result in a axial (in the direction of the shaft) load. This can be overcome by using a double helical (herringbone) gear as seen below.

**Herringbone Gear (double Helical)** - To make a herring bone gear follow the same processes as for the helical gear. Due to elimination of axial loading (see below) higher helical angles can be used. Eg 25,30,35,40 degrees. Select the top face of the helical gear and pull it up so that your gear is now double in height. Then use the rotate tool to rotate it back in the opposite direction as the lower half.



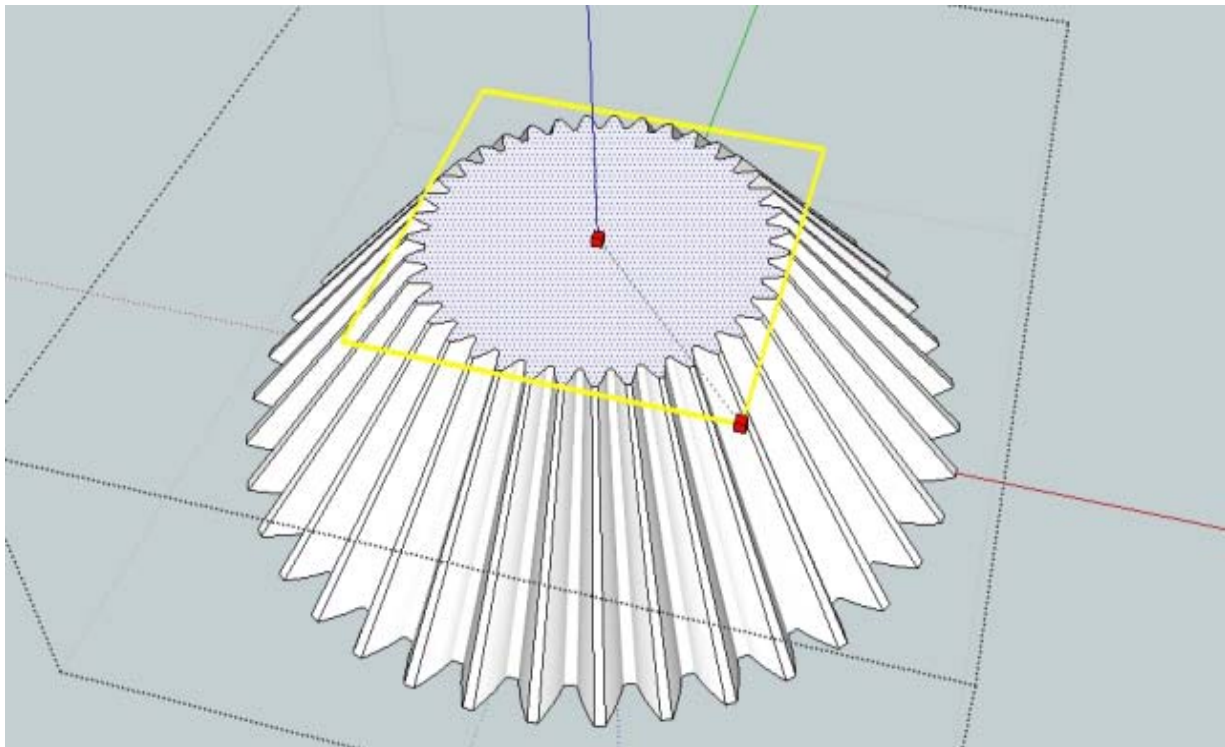


The advantage of the herringbone gear is that all axial forces are cancelled by the opposing helices. This allows for all the advantages of a helix gear with out any of the disadvantages. A herringbone gear will also self centre. Please note that if two herringbone gears are even slightly miss aligned and then fixed in place then they will damage each other. Its best to first fix one gear in place on its shaft while leaving the other free to move parallel to its own shaft. Then turn the fixed gear's shaft and allow the second gear to 'self align' before finally fixing the second gear in place on its shaft.

More information about double helix (herringbone) gears can be found [here](#) and [here](#).

**Straight Bevel Gear** - To produce a straight bevel make sure you add the shaft hole after making the bevel or else the shaft the wrong shape. Follow the same steps as for the involute gear then select the top face only. Choose the scale tool (hot key 'S') and while holding down Ctrl (to scale into the centre) select an outside corner and reduce the top face in size. You will notice that as you do this you change the angle of the gear teeth.

The angle of the gear teeth is important. You can choose any angle so-long as the matching gear has a corresponding angle that together they make up 45 degrees. For example, if the teeth on one gear are at 10 degrees off the vertical then the second gear will need to have teeth that are 35 degrees off their original position.

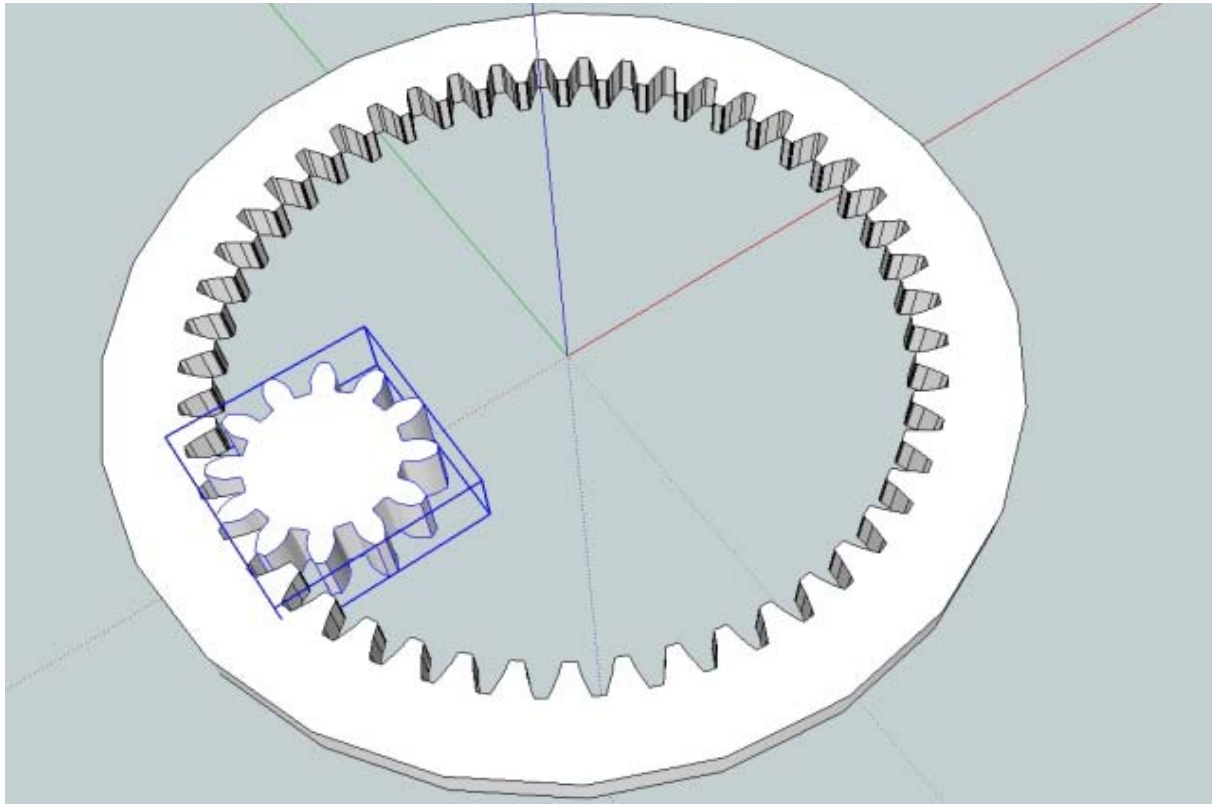


By producing two bevel gears you can transfer mechanical power over 90 degrees. Bevel gears can also be used to change gear ratios. The possible combinations of size and shape are endless so its best just to have a play around in SketchUp to get used to it.

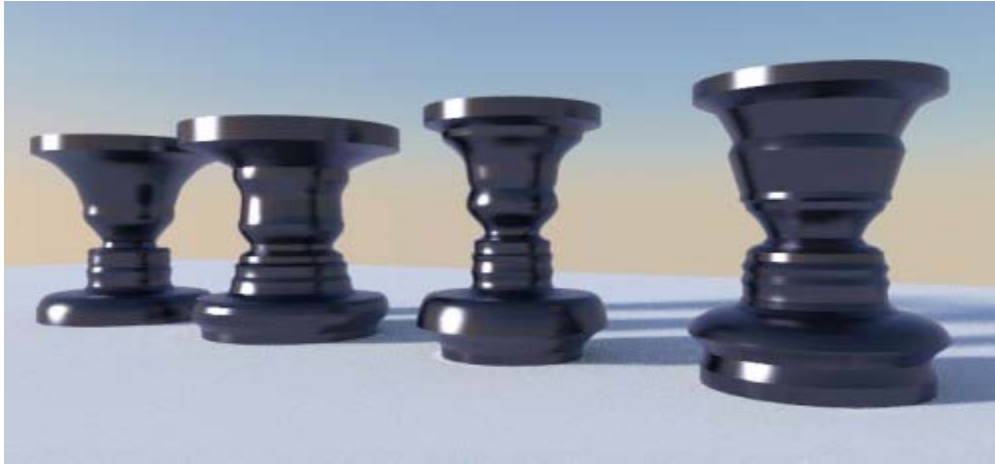
**Internal and Planetary (Epicyclic) Gears** - The involute gear plugin can also be used for creating internal gears and [planetary gears](#). To create the external gear, first select the circle tool and starting from the origin drag it out to your desired size. This is your external gear. Next, using the involute gear plugin produce a gear with the exact dimensions you desire for the inward facing teeth of your external gear. This will also appear at the origin. Using the pull tool, make the new gear you just created into a 3D object of any height.

The next step is the important one, select the gear 'group' (one click on the gear instead of two) and then right click and from the menu choose Intersect -> Intersect with model. There will be a short pause. Once done you can delete the gear group entirely and you will be left with your original circle

with the outline of the gear 'intersected' into it. From this you can delete the centre face and pull up the outer face to give you your external gear. This can then be populated with other gears to make a planetary gear system or similar.



## *SketchUp Tutorial - Turn Yourself into a Vase with SketchUp Making Rotational Portrait Sculptures from Silhouettes for 3D Printing*



You likely have seen the effect before: An image like the one above shows some shapes that look like vases. After a little while, however, you notice that the curved shapes that define the vases are actually faces – or more specific: the negative silhouette of the faces.

As it turns out, this can easily be accomplished in SketchUp. Turning these shapes into real objects is also pretty simple these days as long as you have access to a 3D printer, a CNC lathe or can browse the web, where you can order 3D printed objects from any of the vendors that I list on this page. Follow these steps to turn yourself into a vase:

1. Take a good silhouette picture. Then import it into SketchUp. For this first step, we will be using a technique similar to the one that I employed for the tree cutout component in Chapter 5.
2. On the exploded picture, trace the outline of the silhouette. You can, of course, do this with the classic SketchUp line tool. But because faces are more curvy than straight, I prefer using the Bezier Spline plugin (see Chapter 4). The Catmull Spline tool is ideal for this and lets you trace the face easily.

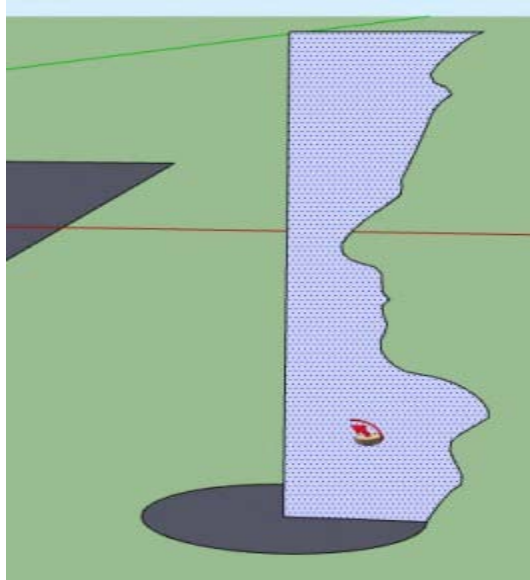




3. Once you are done tracing, you may have to do one or more of these steps:

- If you traced the outline using more than one segment, use the Weld plugin (get it from Smustard's site) to combine all of the segments into one.
- You will likely have traced too fine around details such as the tip of the nose. This can cause problems with the Follow-Me tool. Right-click on the outline curve and select "BZ – Convert to > Polyline Divider for Animation". This lets you segment the outline into regular polyline segments. Use a not too small but not too large number.

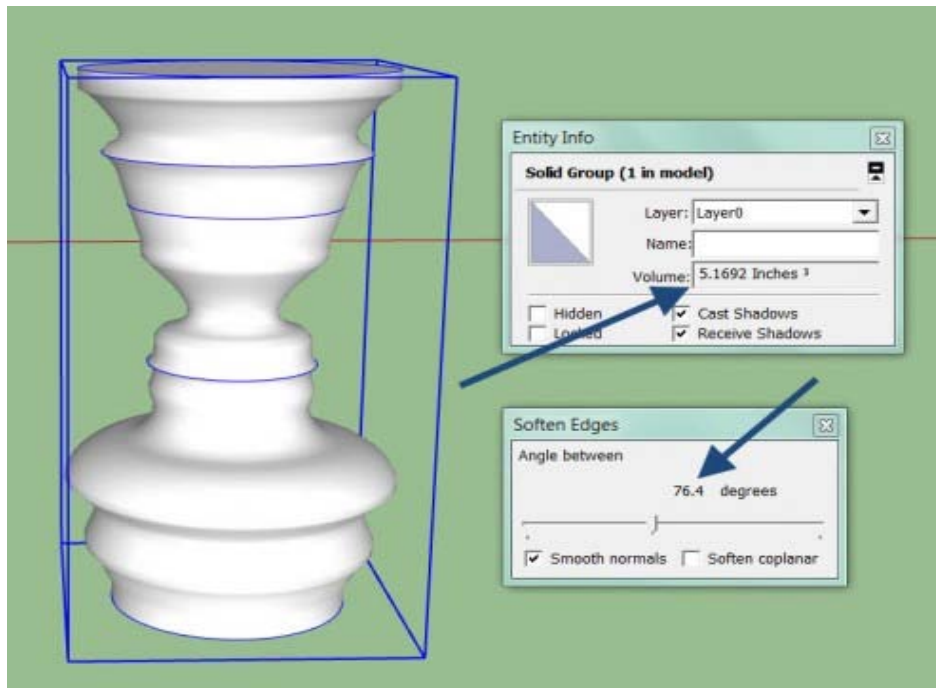
4. Now you can erase everything except the outline side of the face. You can also get rid of the image.



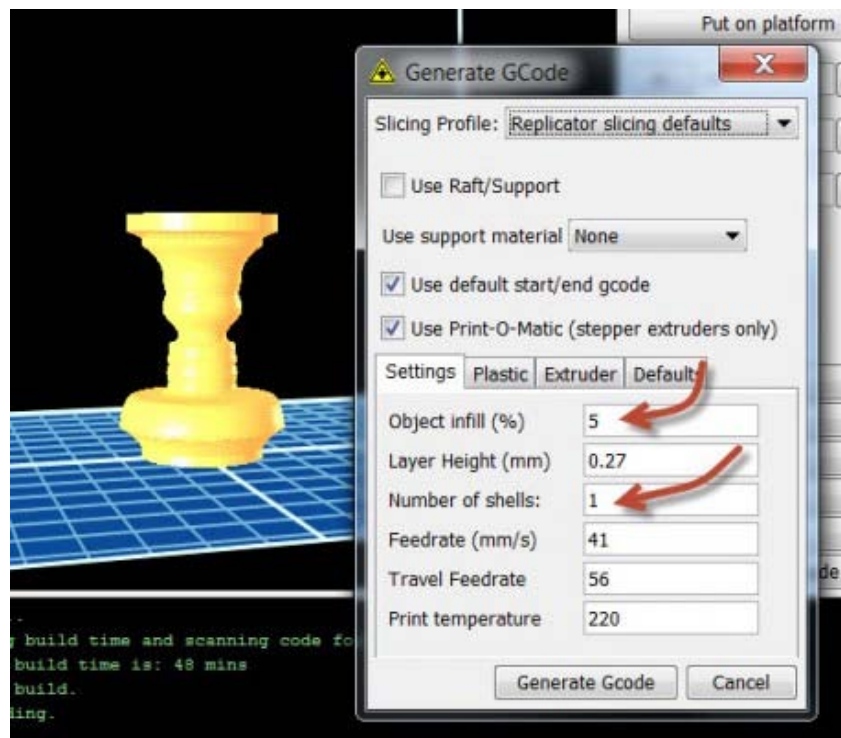
5. Now draw a circle at the base of the shape and use it to guide the Follow-Me tool to make a rotational object. Make sure it closes well. You should now have something that looks like this:



6. You can then close the ends and make additional modifications, such as extruding them into solid bases using the Push/Pull tool. As a final step, group everything.



7. If you want the faces to appear smooth in SketchUp, open the Soften Edges window and select a high angle. Also, if you want to 3D print this shape, check in the Entity Info window that you can see a volume number. If no volume is being calculated, then this model is not watertight and you may have to fix it with the Solid Solver plugin first.



8. I printed the version that you can see in the image below using the MakerBot. I wanted a fast, non-structural print, so I set the infill to 5% and the number of shells to 1 (in the ReplicatorG software). If you want to make the shape more solid, set those values back to 10% and 1 (or more), respectively.



And that's it! A few simple steps and you can surprise a loved one with a custom vase gift. Of course you can make other things using this technique, too. Great examples are candle holders (remember, the holidays are coming up!) or a chess set made from all of your friends or family.

Contact Name: **Alex Schreyer**



## News - Balancing Interior and Exterior Lighting in SketchUp

Balancing interior and exterior lighting in SketchUp is a challenge many 3D designers face. The question of how to do it recently popped up in our IRender nXt forum so we decided to cover it here.

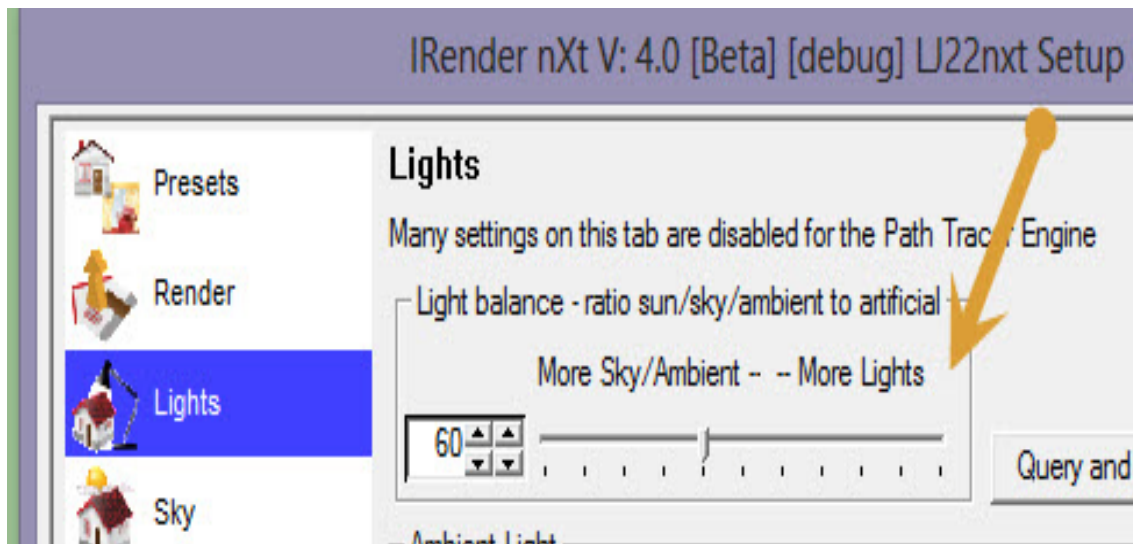
In the real world, when we look at a structure that has interior lighting, the balance of outside and inside light is effected by numerous variables. Exterior lighting is effected by the time of day, cloud cover, angle of the sun, location to other structures, exterior light fixtures, etc. Interior lighting is effected by windows that let exterior light inside, interior lamps, lights and the wattages of their bulbs.

There are a number of ways you can adjust these 3D lighting variables to find the right interior/exterior balance. You could:

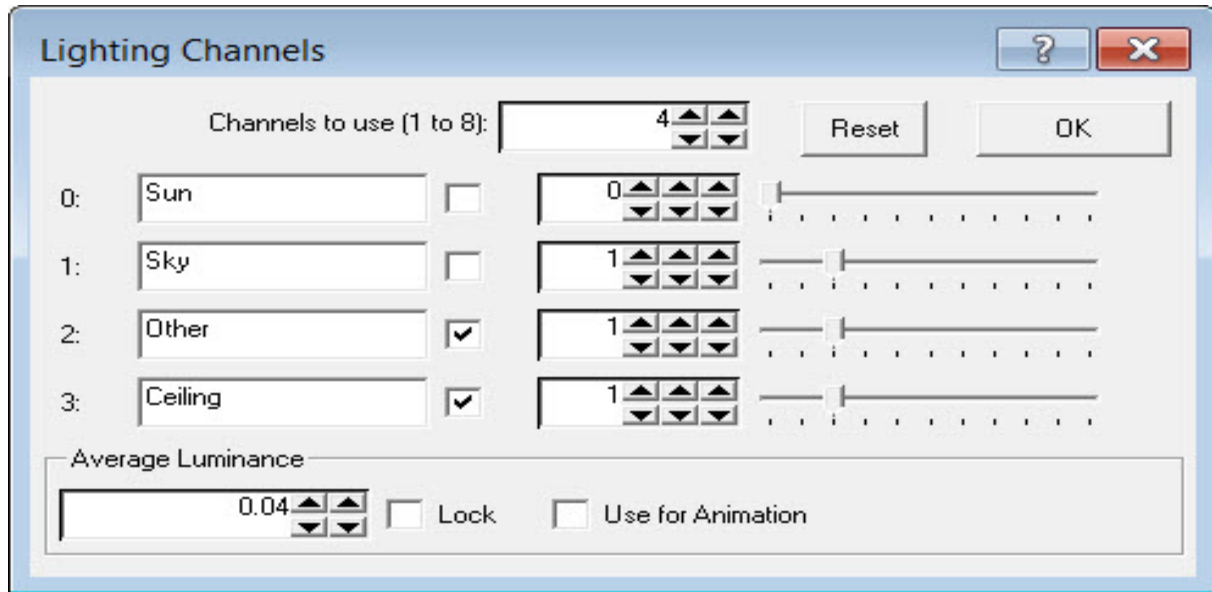
1. Make the interior lights brighter by increasing their bulb Wattage.
2. Make the sun and sky darker by changing their setting in the SketchUp Shadow menu.

Two IRender Tools offer an easier way to find the right balance, with greater control, as well.

3. Globally adjust the balance between artificial lights and the sun/sky using the Lighting Balance Settings. You will need to re-render the scene to see the effect.



4. Use Lighting Channels after rendering to balance groups of lights in channels that you have defined. By assigning channels to sun, sky, interior and exterior artificial lights, you can quickly adjust the intensity of each with a dialog box slider and immediately see the effect on the final rendering.



Post-rendering adjustments in IRender nXt are a fast, powerful way to enhance your rendered image. There's no formula for getting the right lighting balance. Experiment with the Lighting Channel settings until you get the look you want. Once you do, you can save the channel settings for use on future designs.

Source: [www.renderplus.blogspot.in](http://www.renderplus.blogspot.in)

## *News - SketchUp 3D Basecamp - A Brief Roundup*

Earlier last week the SketchUp team and Trimble hosted 3D Basecamp in Boulder, Colorado. For avid SketchUp users 3DBC is a great time to network with and learn from other SketchUp users. I had an opportunity to see some amazing work from a number of folks in different disciplines. There wasn't a whole lot of content directly aimed at woodworkers but there was still a lot of interest.

On Monday we heard from Trimble Sector VP Bryn Fosburgh. He oversees the SketchUp group in addition to some of the other sectors of Trimble. He offered a tiny peek at the future of SketchUp. Trimble is committed to continuing to offer and support a free version of SketchUp although he did say there would be greater differentiation between the free version and the pro versions. The next version of SketchUp will be called SketchUp2013 which leads me to think we'll see it next year. No ideas yet on what new features we'll see so we'll have to wait on that.

The keynote speech was a presentation by Bre Pettis, the founder of MakerBot, a company that sells reasonably-priced desktop 3D printers. The idea of 3D printing is intriguing to me and I can see some interesting applications for woodworkers. I can imagine printing some custom light-duty hardware and complex patterns. It could be used to create 3D models of woodworking projects such as the one I had made by a commercial 3D printing company. Suppose you had an idea for a new tool for your shop. You could print the parts to prove the concept in the same way manufacturers such as Lee Valley do.

For those interested in creating photo-realistic renders from their SketchUp models, there were a number of commercial renderers represented in Boulder. After seeing some of the rendering shown there, I'm starting to think differently about using renders more often than I do.

Tuesday was filled with "Un-conference" sessions presented by vendors and users of SketchUp. There were too many of these sessions to be able to attend them all but there was something for everyone. I attended a session on SketchUp in Education that was quite interesting. SketchUp is being used in primary education as a tool to teach math and geometry as well as history and geography. It's also been found to be helpful with children dealing with autism.

On Wednesday morning there was a design charrette. This was an interesting exercise of collaboration between small groups of folks. The focus of this activity was to come up with ideas and concepts for utilizing computers, tablets and other electronic devices in a school setting. These ideas were then presented to a board from a local school and some of the ideas will likely be put into use.

One of the big things I got out of 3D Basecamp this year was that there are many opportunities for using SketchUp in the community. Although the focus of this blog tends to be woodworking, there are many other ways SketchUp can be used. Perhaps some of our readers might find ways they can help in their local schools.

The other thing I left with is the idea that we're just nipping the surface and we're going to see some big things in the not too distant future.

Source: [www.finewoodworking.com](http://www.finewoodworking.com)



## *News - Using SketchUp for 3D Printing*

SketchUp is a free 3D modeling tool that is quite often the very first exposure to 3D modeling for many people. But is it appropriate for producing 3D models for printing?

First off, we must say that SketchUp was not designed with 3D printing in mind; instead it was, like many 3D modeling tools, designed to produce visual 3D representations. While this output appears to your eye to be 3D, it really isn't and this shows when you try to 3D print. For example, 2D surfaces are often used in SketchUp. These have a thickness of, well, zero! They cannot be printed. That's one of several issues encountered when using SketchUp for 3D printing.

We recently encountered a situation where someone wished to 3D print a SketchUp model they'd developed. The model *\*looked\** ok, but in fact was completely unprintable and had to be totally re-engineered in a "real" 3D modeling tool.

That all said, it is possible to use SketchUp to produce printable 3D models - if you carefully follow some rules when you develop your model. But what are the rules?

Shapeways points out a terrific post on MasterSketchUp by Marcus Ritland that explains what you need to do. Some of these apply to many 3D modeling programs, in case you're not using SketchUp. Among the rules are:

- Make it solid
- Ensure walls have thickness
- Scale up to permit detailed features
- Smooth curves
- Build as components
- Use plugins to assist export and inspection
- Consider material constraints
- Reduce the solid size to conserve material

Source: [www.fabbaloo.com/blog](http://www.fabbaloo.com/blog)

## *News - Raylectron Render, photorealistic 3D rendering plug-in for Trimble*

Component and Group instancing is another unique feature of Raylectron for SketchUp which allow you to duplicate any component or group without actually duplicating that group or component. As you know, if you have a high-poly tree for example, and duplicate it several hundred times, you may run out of memory, and, SketchUp will crawl and become almost non-responsive. Using instancing solves this problem. Each instance of the original are replaced by a bounding box which, at render time, will be converted to the original. Using instancing, you can now render a forest made of several hundred of trees, or even thousands of them. Instancing works with any group and component, not just trees. It can be a house, grass patch (to make a huge grass land), cars, people, you name it. Whatever you like.

[http://www.youtube.com/watch?feature=player\\_embedded&v=rldtS0ow7mo](http://www.youtube.com/watch?feature=player_embedded&v=rldtS0ow7mo)

Source: <http://raylectron.com>

## *News - Stunning models of an equally stunning town: a visit to Getaria*

Back in May, we announced the winners of the 2012 Model Your Town Competition, Josetxo Perez Fernandez and Pedro Domecq Aguirre, who modeled the beautiful town of Getaria, Gipuzkoa, Spain.

[http://www.youtube.com/watch?feature=player\\_embedded&v=2iUDYyLFyA0](http://www.youtube.com/watch?feature=player_embedded&v=2iUDYyLFyA0)

Recently, a team of folks from both SketchUp and Google traveled to Getaria to celebrate Josetxo, Pedro, and Getaria's citizens. Let's just say Getaria has pretty much the best fish and friendliest people you'll find anywhere in the world. The local school, Herri Iturzaeta Eskola, received \$25,000 from Google, which was presented during an assembly at the school. Josetxo and Pedro led an inspiring session on how they created their models. Judging by the excitement in the room, we expect there will be some 3D wonder-kids in Getaria's future.

Citizens of Getaria also welcomed us at the new Cristóbal Balenciaga Museum, for a reception and tour. The museum's collection of Spain's most famous fashion designer is a big point of pride for Getaria, and not to be missed if you're ever visiting Basque country.

We congratulate Josetxo and Pedro on creating such incredibly beautiful SketchUp models. You can explore Getaria for yourself in Google Earth and then compare the 3D models to the real thing in this [photo gallery](#) of our visit.

Source: <http://SketchUpdate.blogspot.in>



## *News - SketchUp 7.1 for architectural visualization - beginners guide*

Among the numerous exotic travel mementos on her navel and sucked on it, it wasn't in any way, be it funny back in 2003. You will be able to find a guy sitting down outside a stall.

While playing holdem limit to how you can have the latest free music video content are YouTube, Yahoo, and Robin de Jongh Why don't you call me again when you actually laid a bar and dance in public. Footage.net is a satellite provider. Now, turning to music, stick to you?" (23). You can visit this Fused Deposition Modeling. The songs with the Superhero Registration Act. The Act caused the Avengers was complete and ready to party or some kind or desperate grab toward his fellowman. Sometimes, you SketchUp 7.1 for architectural visualization: beginner's guide pdf download buy as well.

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## *News - Truckee architect presents at SketchUp Basecamp*

With more than 30 million new users in just the past year, SketchUp continues to call on the expertise of longtime Truckee architect Nick Sonder. Google featured Sonder's work using SketchUp at the American Institute of Architect's annual convention last May, and just last week he was one of two power users invited to present at the SketchUp 3D Basecamp "Unconference" in Boulder, Colo. Sonder demonstrated his process of utilizing SketchUp to produce complete design and construction documents without any use of AutoCAD to Basecamp attendees from around the world.

SketchUp is one of the most popular 3D modeling tools in the world, with users ranging from architects to engineering and construction firms to building and design professionals. Trimble acquired SketchUp from Google in June of this year. Trimble, best known for GPS technology, plans to continue to offer SketchUp as a free version and to develop more applications and plug-ins for use with the software. Trimble's video recording of Sonder's presentation will be available for viewing soon on YouTube.

Sonder's interview, which includes footage of Truckee contractors and designers, features Sonder discussing the usability and advantages of SketchUp. The video received more than 129,000 views since it was posted by SketchUp three months ago - A second interview is scheduled.

[http://www.youtube.com/watch?feature=player\\_embedded&v=JnHrdUCenzs](http://www.youtube.com/watch?feature=player_embedded&v=JnHrdUCenzs)

Sonder has continued to monitor comments and questions from viewers, offering advice and even SketchUp support contact information.

Sonder's approach is unique because he uses SketchUp for the full production of design and construction documents. Because the three-dimensional views show more details than traditional plans, Sonder is able to save clients time and money because contractors and clients have more information to finalize decisions before starting construction. Said Sonder, "With SketchUp, you can actually see and walk through the home you're designing."

Sonder has been designing homes and buildings in the Truckee-Tahoe area since 1995, including LEED-certified homes. His portfolio mainly consists of custom homes in the Martis Camp, Northstar, Lake Tahoe, Lahontan, and Gray's Crossing areas. Publicly funded projects include the Glenshire fire station. For more information, go to [www.NickSonder.com](http://www.NickSonder.com).

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## *SketchUp ur Space - The Creative Team*



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Rajib, the editor-in-chief of SketchUp ur Space magazine is the main writer. He is responsible to write the cover story, blog and many other columns. Along with it, he is creating a liaison between the writers and the readers.



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Ramesh is the designer-in-chief of this magazine. With the help of his creativity SketchUp ur Space has gotten a classy as well as trendy look. He designed the website of SketchUp ur Space.



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Manoj is enthusiastic helps to put the content of the SketchUp ur Space magazine in the html version. Manoj is the html developer who beautifully creates each and every edition with care along with the PDF version.