

ISSN 2072-0149

The AUST

Journal of Science and Technology

Vol. 4 No. 1 January 2012 (Published in January 2013)



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of Science and Technology**

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The Process of Interactive Visualization in Architecture Practice in Bangladesh

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Abstract: Like other countries of the world the computer based three-dimensional modeling is used in the architecture practice in Bangladesh. Generally the total three dimensional visualization presentations are done through three specific steps. Different softwares are used for these three steps. AutoCAD is used to generate a raw three dimensional view of the building, 3D Studio Max is used for material, light and camera assignment for the perspective view as appropriate design and in the final step Photoshop is used for the final touch of the rendering procedure of the perspective view. Now a days it is possible to complete all of the tasks within a single platform. This paper discusses the description and comparative study of these three steps along with the all in one single platform. The study has been done over some architectural firms and visualization firms for their visual presentation techniques.

Key words: Three dimensional modeling, architectural visualization, architecture practice, CAD, architectural presentation, perspective view.

1. Introduction

The interactive visualization of architecture and buildings provides a way to see current structures as well as future tentative structures and changes to existing buildings. In the last one decade in Bangladesh, the presentation method of architecture has been turned into totally computer based technologies. Now a days the scale model is not preferred by the clients or land developers even sometimes by the architects. Due to having several reasons behind, the position of scale model has been replaced by computer generated three dimensional perspectives. Architects are now dependent on computer generated presentations. In general cases animation is not required for the architecture practice in this country. But the computer generated perspective is almost a common requirement to practicing architecture here. For marketing purpose the builders need the perspective of the building beside the needs of the architect for mass study purpose. Besides presentation, architects' design and drawing works are also practiced through the computer based visualization. And visualization generally needs high configuration computers. So why architects' offices are well equipped by high configured personal computer that is a conversion of previously used parallel bar, set-square and drafting pen.

Previously employed drafts-men have been converted into computer operators who are expert in some specific software. Even a good number of third party visualization firms are also growing out with their own business strategy.

In this country AutoCAD is the mostly used software for drawing works for the architects. After completing the drawings, the total visualization presentation are done through three specific steps. Three different softwares are used for these three steps. And this is the common practice in Bangladesh in almost every architect's office today.

2. The Process of Interactive Visualization

The visualization process starts after finalizing the design of the building. In Bangladesh the only software that is used for drawing purpose is AutoCAD by the Autodesk Inc. In AutoCAD there are two types of platform of working. One is a two dimensional (2D) platform with X and Y axis and the another is a three dimensional (3D) platform with X, Y and Z axis. When one is doing the drawing/ drafting work he/ she works on the 2D platform where the Z axis system is invisible (figure 1). It is to be mentioned that the 2D drawing is mainly for the construction works. After completed of the drawing by the architect the main design job has been finished. The same drawing (soft copy) will be used for the structural solution of the respective building by the structural engineer and the electrical and plumbing engineer for the subsequent service. After getting drawings from all the consultants in hand the client (generally the land owners or the builders) is to be provided them to make the construction work starts.

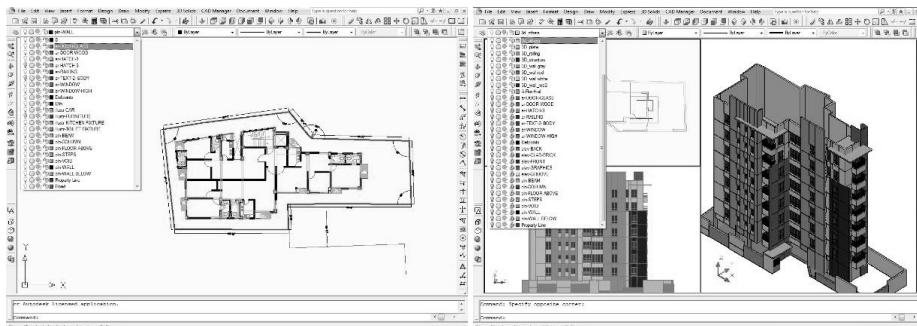


Figure 1(a)

Figure 1(b)

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Figure 1. (a) AutoCAD 2D platform and (b) AutoCAD 3D platform with layer menu.

But for visualization the Architects drawing which presents the final design (not working drawing¹) is considered. By the following graph the drawing process is expressed.

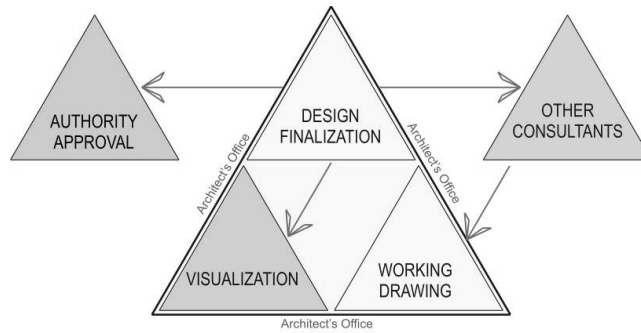


Figure 2. Graphical presentation of the design and drawing for the architecture practice in Bangladesh.

After finalizing the design the 2D drawing is considered ready for the 3DV².

2.1. Step 01- The Pre Rendering Stage

This step is considered as the pre-rendering stage. The drawing of 2D platform is converted here into the 3D platform. In the same AutoCAD drawing with the same software the 'Z' axis is introduced. The plan is X-Y elongated in an isometric view. Sometimes several views within one platform are required to get a clear view of the design (figure 1-b).

Generally the main 3D of the building is made by some simple extrusions of the plan. Sometimes it needs extrusions from the elevation and after that they are coordinated for a complete 3D. One thing which is very important is the 'Layer Management'. Every type of objects is organized with a specific layer. In maximum times they are organized by the typology of the material which would be considered for their real-time construction. For example, all the glasses might be in a same layer named "3D_glass" (figure 3).

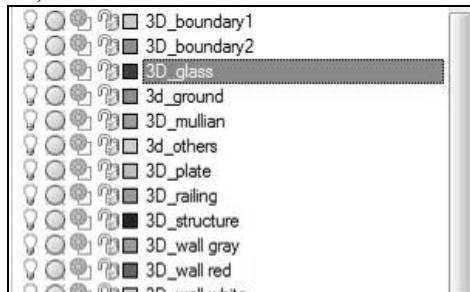


Figure 3. Created layers in AutoCAD 3D platform.

This type of layer management is very helpful for the forthcoming steps of 3DV. Different colors are used to identify clearly on the screen but they actually just for identification purpose not for carrying any real-time information. At the end of this step the raw 3D of the building is produced as the output.

2.2. Step 02- The Rendering Stage

In this stage, a new software is introduced. That is 3D Studio Max³ of the Autodesk Incorporation. This is a software for 3D modeling, animation, and rendering solution. The raw 3D that generated in the previous step is imported here. The layer system also imported as it was in the AutoCAD to the new platform. Four main jobs are in this step.

¹ Working Drawings are prepared after finalizing the total design of the building, sometimes after the computer generated three dimensional view of the building and the others consultant's drawings.

² 3DV (Three Dimensional Visualization).

³ At release 2009, the product name has been changed to "Autodesk 3ds Max" by the Autodesk Inc.

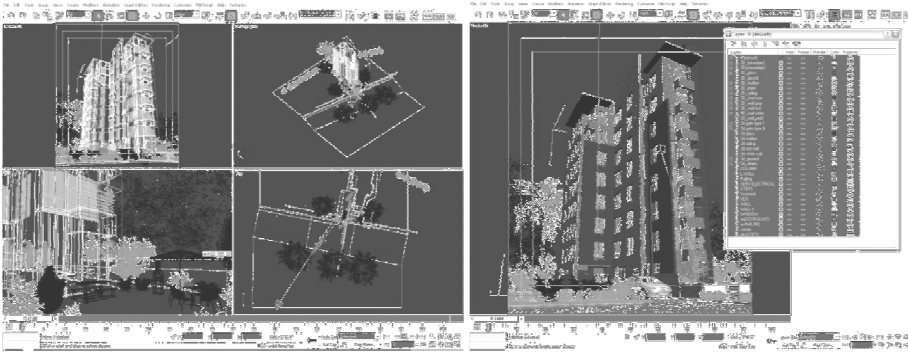


Figure 4(a)

Figure 4(b)

Figure 4. (a) Max platform and (b) material assignment to the model according to its layers and development of the rendering environment.

- Material assignment to the specific layers as the design. Each layer is dedicated for a specific material. For example, the “3D_glass” is assigned with glass typed material with certain color and reflection quality (figure 4).
- Fixing camera with an appropriate angle for better view for the presentation purpose. Sometimes multiple cameras are used for multiple shots.
- Introducing light at an appropriate distance with proper angle is necessary to get the proper shade and shadow of the building and the reliefs within this. A good quality lighting sense can make the 3DV more acceptable to the client groups.
- An environment for the perspective is created within the max platform. Sometimes they are in abstract form or sometimes in realistic form whatever the designers’ choice. This software comes with some rendering elements (e.g. foliage, cars, human figures etc.) for this purpose. Some rendering elements are provided by some third party companies. Details for a real time perspective may includes road and footpath, human figures, foliage, lampposts, vehicles etc. and after all a suitable sky to give the model a real time effect (figure 4-b).

After completing the four specific jobs a rendered image is come out. Some times for better result rendering engine software (e.g. VRay renderer) are used. Minor corrections in the model are made within the max platform.

2.3. Step 03- Post Rendering Stage

This is the last step of the 3DV process. After getting a three dimensional view of desired angle with proper shade and shadow the perspective is finally rendered in this step. The software that is used for this step is Photoshop. Photoshop is a graphics editing program developed and published by Adobe System.



Figure 5(a)

Figure 5(b)

Figure 5. (a) Raw perspective in Photoshop platform after max rendering and (b) the same image after imposing rendering elements in Photoshop.

Building surroundings obtained by the photographs of the project location are sometimes used to create a real time environment for the building. Rendering elements may also be imposed for the perspective which is also possible to do in the max platform mentioned in the previous step (figure 4-b). A reason might be that the rendering elements in maximum cases are subject to purchase. So in many case the perspective is rendered with the elements like human figures, foliage, lamp-posts, vehicles etc. in Photoshop (figure 5) which are collected by photographs or purchased by a comparatively lesser cost.

Besides rendering final color balance or contrast control of image is done within Photoshop platform.

2.4. Comparison of the Above Steps

All the steps of the method do not require same time and efforts. In the first step the maximum labour and effort is required due to the detail extrusion of each and every element for the perspective of the building. On the other hand the maximum time is required in the max platform because of its auto generating consumption of time for the perspective. The more input of the detail and real-time effects of the building are required more time to auto-generate the output depending on the performance of the machine.

3. The Single Platforms

In very few architects' offices of Bangladesh used the single platform method of visualization for their architectural presentation to avoid multiple software management and time lag. Sketchup⁴ is one of the most popular software that used for this purpose. The material and rendering plugins are easily accessible and free to get in maximum case. Studio Max, Revit and some other software is also used to complete the total job within a single platform.

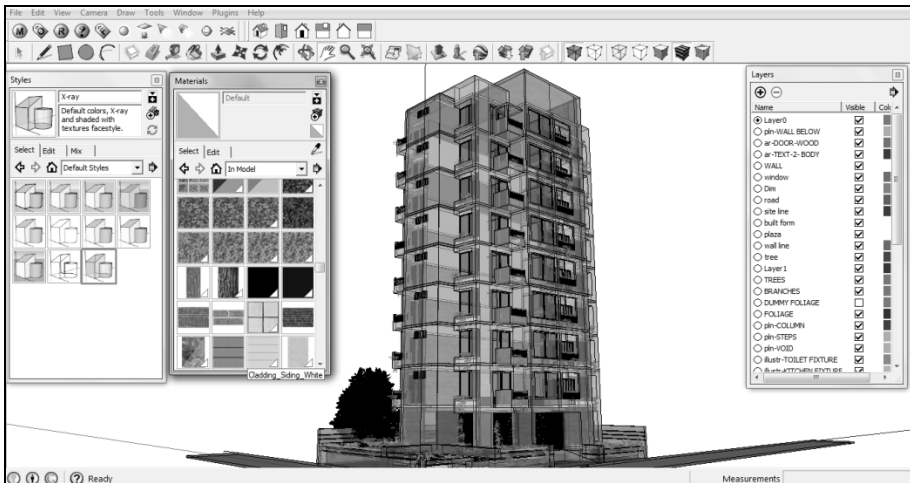


Figure 6. Modeling in Sketchup platform with necessary rendering elements and plugins.

4. Conclusion

It is the technology which always grabs the elements of the civilization. Practicing architecture is also completely dependent on the technologies. Fine end rendering is more acceptable to the clients of the architects. That is why computer technology is used through the Three Steps Method of 3DV. Beside this, the total process of 3DV plays wide role over the business world. Many supporting firms are established to do only the 3DV jobs of the architects' firm. Rendering elements (both of the three dimensional mesh of Max platform and the two dimensional images in Photoshop platform) are prepared to trade for the 3DV purpose. The procedure that is used in Bangladesh is very simple and less time consuming but has very wide effects over the total scenario of architecture practice in Bangladesh.

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⁴ Sketchup is a software developed by Google Inc. in the market since 2000.

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