

# 3D COMPUTER MODELING - LANDSCAPE DESIGN ADVANTAGES - PRACTICAL ASPECTS

## MODELAREA 3D COMPUTER, AVANTAJELE ACESTEIA ÎN PROIECTAREA PEISAGERĂ - APLICAȚII PRACTICE

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**Abstract.** *The traditional computer aided design software's are considered outcome, landscape designers being keen on 3D modeling software's. These kinds of programs permit the creation evolution factors instead of a simple drawing tool, the evolution of construction factors instead of a simple projection. The paper presents the main advantages of the 3D concept and its implications in the landscape design insisting upon different compatibility opportunities, pros and cons for different software's (Google SketchUP, Realtime Landscape Architect and CorelDraw). Practical aspects will be discussed: shadow effect study for different landscape designs, video 3D rendering for different aspects of the landscape design, creation of a green rooftop, and several possibilities for its 3D rendering.*

**Key words:** 3D, render, DWG, DXF, SKP, CDR, irrigation

**Rezumat.** *Sistemele tradiționale de proiectare asistată de calculator încep a fi considerate depășite, fiind preferate din ce în ce mai mult, soluțiile care utilizează modele 3D, datorită faptului că acestea permit peisagiștilor să creeze, mai degrabă decât să deseneze, respectiv să construiască, decât să proiecteze. Lucrarea prezintă avantajele conceptului 3D și implicațiile acestuia în proiectarea peisageră insistând pe compatibilizarea dintre programele existente, avantajele și dezavantajele diferitelor programe luate în studiu (Google SketchUP, Realtime Landscape Architect și CorelDraw). În cadrul aplicațiilor practice se va insista pe generarea studiului de umbră al unor amenajări peisagere, randarea video a diferitelor detalii 3D, exportul și importul diferitelor modele 3D în programele luate în studiu, modalitățile de generare ale unui acoperiș verde pe suprafața unui imobil precum și reprezentare 3D a acestuia.*

**Cuvinte cheie:** 3D, randare, DWG, DXF, SKP, CDR, irigare

Computer Aided Design generally knowned as CAD is considered the avangarde of 2D or 3D modeling solution for landscape design. Professional usage of a single landscape aided design software is mostly useless, many times considered insufficient; compatibility issue between different landscape software's seems the proper solution for fulfilling the general concept of CAD. The present paper resolves compatibility issues related to different landscape design software's Google SketchUP, Realtime Landscape Architect and CorelDraw. For outlining certain compatibility aspects between the studied software's we propose the projection of a 3D Building represented by Hostel XII, situated in Hasdeu Student Campus, Cluj-Napoca, for green rooftop implementation. The studied area has an area of 750 m<sup>2</sup>. The paper will insist upon vegetation generating possibilities,

animated presentation of the DripMat irrigation system. All the presented aspects assure a proper understanding of landscape design plans using 2D or 3D rendering models.

## MATERIAL AND METHOD

The present paper illustrates the importance of computer aided design techniques in landscape design concerning upon compatibility aspects between different software's. By using compatibility aspects between *Google SketchUP 6*, *Realtime Landscaping Architect* and *Corel Graphics Suite* we propose different approach techniques related to CAD aspects. Compatibility tests where carried on a medium equipped computer: CPU AMD Duron 950 MHz, internal memory 640 MB RAM, Video Board - NVIDIA FX 5500 - 256 MB.

## RESULTS AND DISCUSSIONS

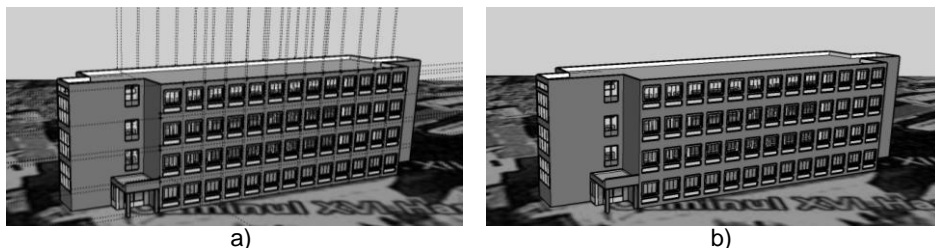
Compatibility aspects where created regarding the study of selected area. In most of the cases when a landscape designer doesn't have topography plans of the studied area (raster or vectorial), the main issue consists in obtaining such plans. In response to such requests we propose the usage of Google Earth software associated with Google SketchUP PRO. For obtaining topography information's upon the studied area, in the search box of the Google Earth will type a common address of the area. As a proper example: Cluj-Napoca, Haşdeu. The final result will be concluded as exemplified in figure 1.



**Fig. 1.** Selection of the studied area in Google Earth and its importing protocol in Google SketchUP using *Get current view* function

Once with the studied area importing protocol, using *Get current view* function from Google SketchUP the following steps are described in chronological order. Redrawing of the studied area is made using powerful drawing tools such as: line, circle, arc and rectangle. Before we consider the 3D Modeling System of the studied area we must calculate the landscape design area. In most of the cases for a proper 3D Modeling System we must be keen on using the Push/Pull tool. Anyhow for certain measurement accuracy we must take proper measurements in the real situation. For a proper graphical representation of the existent

elements we must use the help of generated guide lines (fig. 2). At the end of the 3D Modeling System the guide lines can be deleted using the „Eraser tool” or can be hide by de-activating View-Guides. In most of the cases when a certain repetition of elements accurse (doors, windows, terraces) its better to group them into components and multiply them, simplifying the drawing technique. When these kind of elements are grouped as components any kind of modifications are related to their copies, without the further need of supplementary settings.



**Fig. 2.** Visualization of the 3D Model with the specific guide lines (a) without them (b)

Once created a 3D Model in Google SketchUP its compatibility issues can be quickly resolved. For underlining the extended possibilities of CAD techniques we suggest the compatibility aspects between Realtime Landscape Architect and Corel Draw.

Regarding the first compatibility aspect when the SketchUP model is related to the Realtime Landscaping Software, we must delete the existing map in Google SketchUP, remaining only as 3D Model. The Realtime Landscaping Software recognizes SketchUP created models (skp extension) and 3D Studio Max (3ds extension). For a proper 3D Model importing solution in Realtime software we must follow some essential steps:

- Realtime software start;
- Tools menu access followed by selection of Model Import Wizard;
- saving the 3D Model in a specific library of the software;
- insertion of the 3D Model in the Realtime Landscaping Architect work-file.

The importing of a 3D model in Realtime Landscaping Software is made due to extended landscape possibilities offered by this software: extended plant library, photo rendering system and video rendering system. Figure 3 illustrates the 3D Model import capacity in Realtime Landscaping Architect.



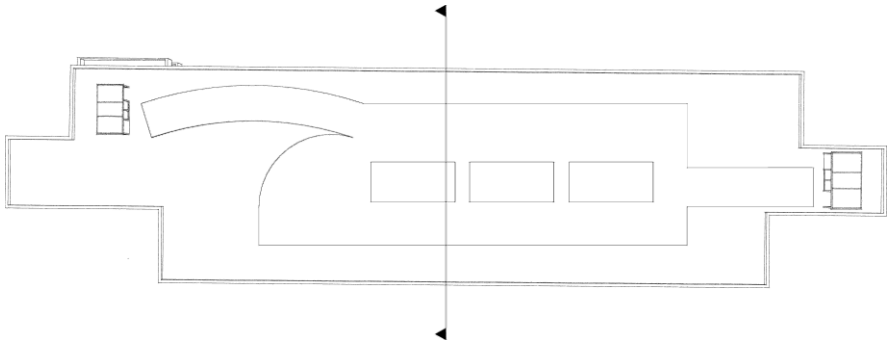
**Fig. 3.** Theoretical emplacement of vegetation on the green rooftop in Realtime software (photo rendering)

Once imported in Realtime Landscaping Architect, the 3D Model keeps its initial shape size and generated texture, without the need for further settings. Also from this software we can made realistically video rendering exports, with high quality images.

A compatibility aspect of the 3D Model with CorelDraw software follows some chronological protocols:

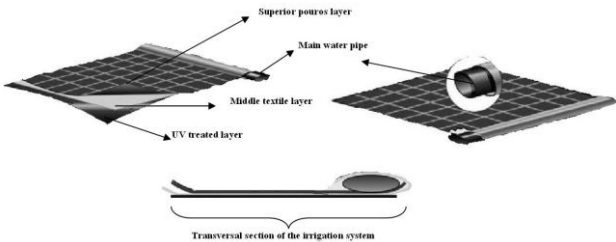
- GoogleSketchUp software start;
- positioning the 3D Model in the visualization mode named Top;
- exporting the 3D Model as dwg extension, compatible with ArhiCAD software;
- importing the dwg extension into CorelDraw work-file.

The imported dwg model in CorelDraw software will look similar to figure 4.



**Fig. 4.** 2D Model generation in CorelDraw software of the Hostel XII Haşdeu, Cluj-Napoca

Once imported as 2D Model in CorelDraw, its projection becomes technical, being able to create technical details, sections, perspectives. In order to illustrate the technical principle of the irrigation system, creation of a transversal section was imperative. The propose irrigation system is conceived by NetaFim, especially designed for green roof applications, closed irrigation system. DripMat is presented by its producer as a revolutionary irrigation system composed by three distinct layers regarding their functionality and structure (fig. 5).



**Fig. 5.** Constructive elements of DripMat irrigation system generated by CorelDraw software

The three distinct layers of DripMat irrigation system supply the following functions:

- superior porous layer - resistant to mechanical actions;
- middle textile layer - assures better water distribution and drainage;
- polyethylene UV treated layer – preventing roof top water loses.

Overall the system presents important advantages that must be mentioned:

- different plants with different water needs can coexist on the same irrigation system, processes like capillarity effect assuring an optimum distribution of water to any kind of plants, offering an optimum balance between different soil fractions;

- all plants develop with the same intensity, the irrigation system assures an optimum water distribution to any kind of root system;

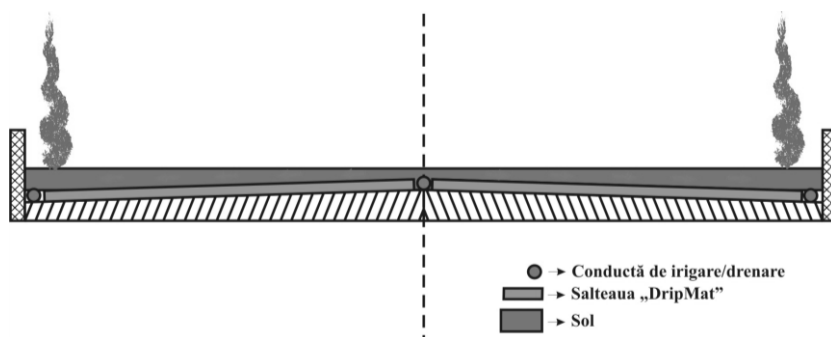
- labor cost reduction - fully automatic irrigation system;

- in case of fertirrigation nutrients losses are reduced;

- the irrigation system can be installed on a maximum slope of 6°.

The irrigation system is highly efficient for water distribution and water drainage. The middle textile layer has double valences for water distribution and drainage.

For a detailed presentation of the irrigation system we propose creation of a transversal section, where all the constructive elements can be specifically represented (fig. 6.).



**Fig. 6.** – Transversal section generated by CorelDraw software

The 3D model compatibility with the studied software offer better visual and understanding capacities to any kind of users (experts or beginners). In order to make a dynamic presentation of the transversal section we can import the model in Corel R.A.V.E. software. Using dynamic effects we can suggest the general principle of the DripMat system (used as irrigation and drainage).

## CONCLUSIONS

Compatibility aspects of the 3D Modeling System with 2D Modeling involve optimum capacities for using multiple software's that are related to a

certain optimum relationship. Landscape Computer Aided Design combines multiple software usage by their strong and weak points. When a Landscape Computer Aided Design solution doesn't exist we can always rely on compatibility aspects.

Further research can be implemented by using specialized rendering software's like V-Ray.

The compatibility aspects between CorelDraw, GoogleSketchUP and Realtime Landscaping Architect represent a milestone for further CAD techniques that can be fully perfected.

Animated section using Corel R.A.V.E. software represents further works for the education system, assuring a comprehensive teaching and learning system.

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