Van de Velde's Projects Virtual

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Abstract. At the 50th anniversary of Henry VAN DE VELDE's death the Faculty of Architecture and some institutions in Weimar developed an exhibition concept to recall VAN DE VELDE's work which the world-famous Belgian Arts- and Craftsman had designed in the period when he lived in Weimar. The most interesting aspect of the exhibition was, to give people an impression about VAN DE VELDE's never built architectural projects of his Weimar-period. The most prominent projects are the *Arts- and Craftsmuseum* on Weimar's Karlsplatz (now Goetheplatz), the *restaurant in Webicht* (a little wood nearby Weimar), the *Dumont-Theater* at the Falkenburg and the *Nietzsche-Forum* at Weimar's southern town-border.

The professorial chair "Presentation Methodology" carried out a reconstruction project to virtualize VAN DE VELDE's ideas. This was open for students of the master courses *MediaArchitecture* and *Architecture*. The projects where presented in three forms: as printed media on the walls, as beamed interactive CubicVR walk-through and in *Secondlife* at *"European University Island"*. This paper brings insight into this project and presents some of its results. Especially the geometry-based reconstruction of VAN DE VELDE's compositions was nessecary to rebuild his ideas succesfully with the 3D-tools of *Cinema4D*. With the cubicVR-tools the students generated a virtual walk through the projects, which were implemented within a topographical and urban model.

Key Words: van de Velde, virtual reconstruction, cubicVR, Cinema4D

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1. Introduction

October 11, 2007 was the 50th anniversary of Henry VAN DE VELDE's death. Henry VAN DE VELDE was the architect of the wellknown *Art-school buildings*, now home of the Bauhaus-University Weimar. For this reason the Faculty of Architecture and some institutions of Weimar developed an exhibition concept to recall VAN DE VELDE's work which the world-famous Belgian Arts- and Craftsman had done in the periode when he lived in Weimar. In this exhibition we presented some planmaterials of the *Arts- and Crafts Schoolbuildings* the very first time.

The most interesting aspect of the exhibition was to give people an impression of VAN DE VELDE's never built architectural projects of his Weimar-periode. The professorial chair "Presentation Methodology" carried out a reconstruction project to virtualize VAN DE VELDE's ideas. Powerful geometry-generating softwaretools enabled to walk virtually through the projects. This project was open for students of the master courses *MediaArchitecture* and *Architecture*.

The participants of the visualization project had not only to analyze VAN DE VELDE's compositions. They also had to take part in a seminar on VAN DE VELDE's texts to learn as much as they can about his contributions to the art renewings movement at his time. At least by studying VAN DE VELDE's existing buildings, the students were able to make analogue decisions, when informations on material or colour were incomplete.

The aim of our reconstruction was the visual appearance of the projects, their outer and inner space structures and their integration within their sourrounding buildings or landscape as far as the materials were available. The information on constructive structures were mostly not very detailed.

The following projects have been visualized:

Table: Visualized projects

Project	Place
Arts and Crafts Museum	Weimar
Nietzsche-Forum	Weimar
Dumont-Theater	Weimar
Excursion Restaurant	Weimar
Thuringia Central Museum	Erfurt
Theater at Champs Elyseés	Paris
Secessionsbuilding	Berlin

2. Working with historical plan materials

When reconstructing never realized architecture projects, planmaterials and models or modelphotos are needed. Though we contacted nearby all sources and archives in Germany and Belgium, the amounts of project material were very different. We found the complete materials of Erfurt's museum-project within the city archives. Other projects were shown only in some relatively small plans.

Often there was a lack of information on colour, material and architectural details. In this case, studying VAN DE VELDE's existing architectures was very useful to make relatively plausible suggestions. We made an excursion to visit and explore some of VAN DE VELDE's realized projects in Jena and Chemnitz.

Like in present time, most of VAN DE VELDE's projects were contributions to competitions and had to be designed very quickly. Maybe, this was the reason that not all plansheets of a project did reflect the same quality of detail. We found differences and had to compare and discuss, which solution we should build. The project *Nietzsche-Forum* exists in about three or four variants what reflects the lengthy colaboration VAN DE VELDE's with Harry GRAF KESSLER, the initiator of this project.

We had some ground plans and perspective views of the *Nietzsche-Forum* but not enough facts for the heights of most of the building parts. So we had to reconstruct the point of view from VAN DE VELDE's perspective to bring a camera in this position. As expected, VAN DE VELDE preferred a view to the tempel's corner (40° resp. 50° fassade-angle). Our hypothesis was proved by a second half circle through the vanishing points of the tempel's diagonals which intersect in our expected point of view (see Fig. 1).
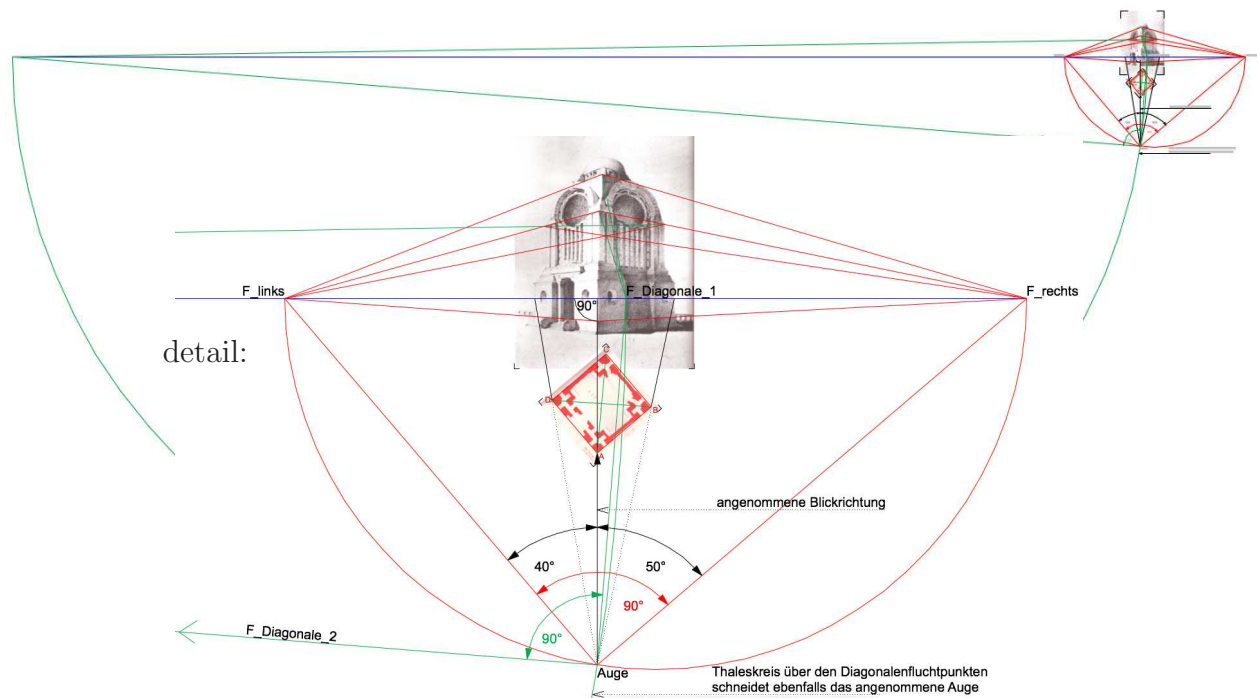

Figure 1: Point of view in front of the corner

Looking through this camera to VAN DE VELDE's perspective as background, we could control the height of all building parts we generated in *Cinema* (Fig. 2). The rendering on the right hand side fits very close to VAN DE VELDE's perspective on the left hand side.

We often faced contradictions or impossible solutions especially within the design of the stairways. The very subtle perspective of the *Dumont-Theater* contains a main stairway to the entrance and two ramps from the left and right side. Looking to the ground plan the ramps should have a widthness of zero at their end (Fig. 3).

In order to comprehend VAN DE VELDE's architecture not as a decorated surface of a fassade but as a three-dimensional geometrical composition, it was necessary to analyze the proportions and relations between the different parts and forms of the fassades and ground figures before the modelling could start (cf. Fig. 4). The aim was to make these invisible relations visible for the exhibition visitors. The materials for carrying out the reconstruction should be collected and contain all this, too.

Figure 2: Fitting virtual model

In present time many architects prefer a reduced graphical style to present their work. In VAN DE VELDE's working periode most of the presentation drawings contain colour and shadows. Often this aspect was a very helpful source for us to interprete building forms and the depth position of building parts.

Before modelling we had to scan the plan materials and to bring them in a useful and comparable scale. Only in this exact scale we could use the planmaterials within *Cinema4D* as backgrounds to build on them. Many of the plans had their own scales with the size of 20 m in metrical steps. This was very useful to adjust the backgrounds size in *Cinema* correctly.
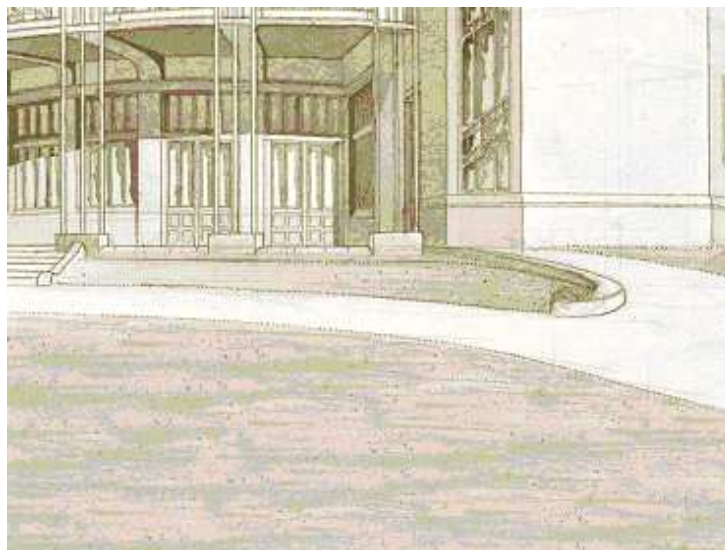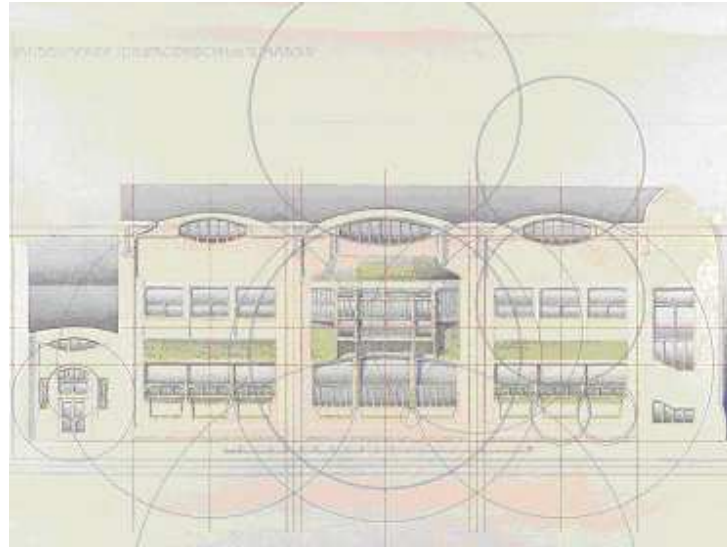

Figure 3: Impossible ramps

Figure 4: Decomposition

3. Modelling, texturing, rendering

Depending on the projects' complexity we had a team of two up to four students from the master courses MediaArchitecture and Architecture. They had to cut their project into reasonable parts and collaborate closely. A lot of feedback between the group members was necessary as well as between the different groups. All projects should use the same materials light and staffage. We met each week to discuss all open questions.
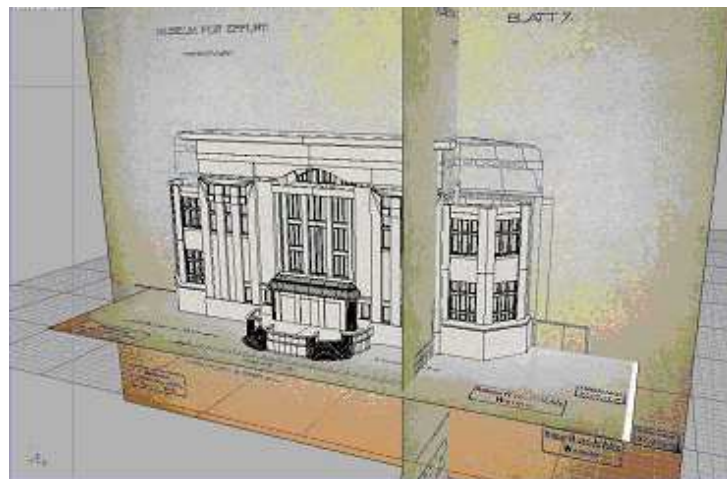

Figure 5: Using templates

It was very helpful to use the historical plans as backgrounds and templates (Fig. 5) while modelling. Especially a connection of one groundplan with two differently orientated sections gave control about the three-dimensional structure, that was to generate.

When modelling historical architecture, one of the challenges is the complex geometry and the frequently used curved surfaces (Fig. 6). Each generated standard element needs several steps of manipulation and a certain strategy to get the required solution. Using instances, symmetrical objects, boolean operations and a virtuos handling of meshes is necessary to generate these complex models successfully.

Figure 6: Complex forms

4. Presenting architecture

A very important fact was the rendering quality and lighting. Most of the time in a final production phase was needed for rendering, so we tested especially all lighting variants very carefully.

Most of the projects were illuminated using a light dome with a large amount of diffuse ambient light, smooth shadows and effects like ambient occlusion, to get a global illumination-like quality in an acceptable rendertime. However, 8 hours rendertime for a resolution of 4096×3076 using a standard PC were regular (Fig. 7).

The integration of VAN DE VELDE's projects into the sourrounding buildings was possible by using a citymodel of Weimar, that many of our students had generated during the last years (Fig. 8).

We had a workshop in panoramic and normal photographing backgrounds to learn, how

Figure 7: Perfect rendering

Figure 8: Single photo implementation

Figure 9: Panoramic implementation

to implement the project into their contexts using the *alphachannel*. To create the panorama (Fig. 9) we used a 10.5 mm fullframe fisheye and *PTMac* as stitching software. For a walk through a historical view the colour was reduced.

There is no better way to explore never built architecture as to simulate its geometry and material within virtual space. We did it in a common technique as imagebased walk-through with the CubicVR tools *Cubicconverter* and *Cubicconnector*.

Each inner perspective was generated from six square renderings using the same point of view and looking into 6 directions (angel of view 90°). With the help of a storyboard the students tried to tell a story of VAN DE VELDE's projects.

Presenting architecture within *Secondlife*

As three-dimensional environment and available worldwide via internet *Secondlife* seems to be a perfect solution to present architecture (Fig. 10). But the number of *prims* you can build on your *land* has a limit. Our master course *MediaArchitecture* owns 4096 sqm at *European*

Figure 10: Bauhaus fragment in *SL*

University Island in *Secondlife*. We can build there about 1000 *prims*.

This number seems relatively large but is nothing if we think of the very detailed language of shape in Henry VAN DE VELDE's Modern Style architecture. The fragment of the world-famous stairway of VAN DE VELDE's *School of Arts and Crafts* main building alone consists of about 300 *prims*. This is the center of our presence within *Secondlife*, where we present several projects each semester.

Thinking about this limitation at first we preferred to show our results as a virtual exhibition using the same material as in realworld (Fig. 11). With textured cubes we generated a landscape near the virtual foyer of our main building. Textures in *Secondlife* have a maximum size of 1024×1024 pixel. This resolution allowes to read all texts and to recognize all architectural details within the images. The exhibition visitor has to be familiar with the use of his camera to adjust the images in a frontal and undistorted view.

Figure 11: Virtual exhibition

Figure 12: *CubicVR* installation 1

Figure 13: *CubicVR* installation 2

However, we also followed the idea to use an imagebased virtual reality solution to present our results as an immersive expirience. When presenting an architectural design, an interactive walk-through is a widespread feature in CAD solutions. So why not using this within *Secondlife*? Usual media formats in *Secondlife* are text, images, sound, streamed video or sound but not the interactive *CubicVR* movie. So we had to find a solution between a *QuicktimeVR* movie and a real panorama.

An imagebased boxed virtual space within a virtual world was an exciting challenge for the students. Analog to the cubic VR technology we designed a walkable cube that contains a way an *avatar* can follow to reach the cubes middle point. This is the point where six perfectly edgefitting single pictures connect, which are to be seen as a single sourrounding

picture. Reaching this point, the *avatar* only has to toggle to its first person view to explore the situation with its own eyes.

The six sides of the cube were textured with six exactly fitting renderings that were made with a camera within the *Cinema4D* model, each with an angle of 90°.

When textured in this way, the edges of the cube are almost vanishing. Only the change of light during a *Secondlife's* day lets the edges sometimes be slightly apparent.

The only objects that connect the visitor with the outer "real" virtual world are the way he came into the box and an information where to go out. Image-based virtual scenes have many advantages. The geometric complexity of the scene is unlimited. The scene can contain the architecture and its sourrounding context till horizon with all necessary attributes like sky, moutains and others (Figs. 12 and 13).

For presenting different situation very much space is needed and the visitor often has to navigate its AVATAR from one panoramacube to the next. That's why in future we will install a so called *holodeck suite*, a common technology within *Secondlife*. Then we can install a menu to toggle between different situations and environments with one mouseclick. The different situations are invisibly stored within the *holodeck's* base and only the number of *prims* of the actually shown scene will be counted.

One of our next projects will be a multimedial presentation of all the contents of VAN DE VELDE's never built projects on a CD or DVD using the same source material.

Acknowledgments