

## DIGITAL RECORDING AND RECONSTRUCTION OF NEOCLASSICAL BUILDINGS IN KILKIS AND THESSALONIKI

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### ABSTRACT:

Multiple digital recording methods are appropriate for imprinting historical architecture. Neoclassical building has several architectural details following in its style. Typically neoclassical building includes ordered façade like ancient Greek and Roman temples. It is necessary to imprint these decorative parts for historical analysis. Digital recording method enables instead fast acquisition and processing of the data. Combination of digital photogrammetry and non-reflector measurement makes it easy for imprinting the ordered façade with different layers. The authors focused on neoclassical buildings in Kilkis and Thessaloniki.

## 1. INTRODUCTION

### 1.1 Target of this study

In present days, it is interested not only in classical monuments but also in neoclassical building in Greece. Local architects and historians have been concentrated in their fieldworks of the monuments. In architectural survey of historical monuments, measurements and documentations are important not only to record endangered monuments, but also to file in visually. Indeed, difficulty of this kind of study is mainly from complex shape of the historical monuments. Digital recording method makes it easy for architectural fieldwork. Otherwise, high cost laser scanner needs time and high level operator. In this study, the low-cost applications for the digital recording for modern historical monuments are described.

In this study, two historical monuments of Macedonia will be discussed: Museum of Dimotiki Pinakothiki (Gallery of Municipality) of Thessaloniki and Normarxio (Prefectural Office) of Kilkis. Kilkis and Thessaloniki are located in Macedonia, northern Greece (Fig. 1, 2).

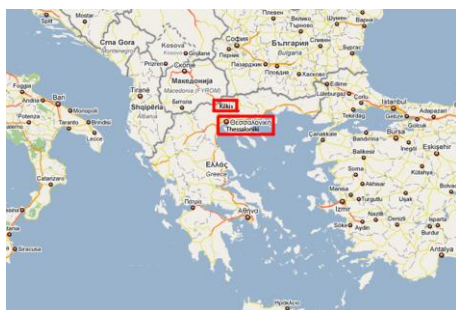


Figure 1 Location of Thessaloniki and Kilkis

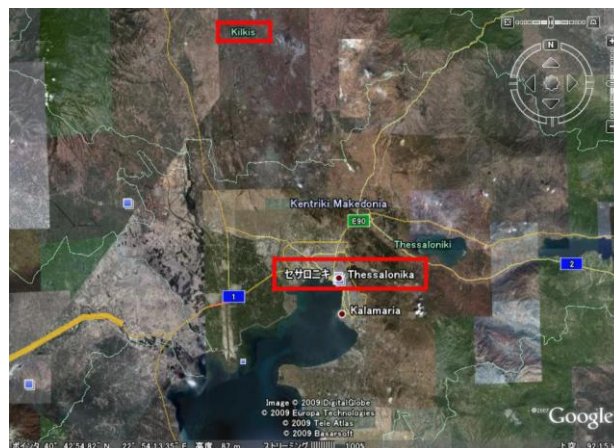


Figure 2 Location of Thessaloniki and Kilkis (Google Map)

### 1.2 Purpose of this study

The purpose of this study is to develop low cost recording method for architectural survey. The second chapter contains the historic background of the neoclassical building of Macedonia, as well as the blueprints and views, and the photographic documentation. In chapter 3, the planning and execution of the procedure are described, as well as the method used to design the model in Autocad and apply textures on the model using 3D studio MAX. Finally, the author will discuss how these techniques help for studying neoclassical architecture.

## 2. NEOCLASSICAL BUILDINGS IN MACEDONIA

### 2.1 Dimotiki Pinakothiki of Thessaloniki

In the end of 19 century, it began to construct villas between Lefkos Pyrgos (White Tower) and Villa Allantinim. This area is called as “Area of Tower” or “Area of Excellence.” These villas are consisting of permanent or countryside houses. Today some of their houses are remained as excellent monuments when comprise impressive example of architectural heritage of Thessaloniki.

Dimotiki Pinakothiki is one of the most impressive monuments of “Area of Tower.” Dimotiki Pinakothiki is located on the west part of Thessaloniki. The house is situated in the Villa Mordox, which standing on the cross-road of Basslis Olgas St. and Martiou St. It is constructed in 1905 for Turkish Seulah Pasa and designed by architect Peonidi (who is known as the architect of the school for the blind, house of Siaga, old post office, Stoa of Plasof, etc...). In 1923, Srulach sold it for his brother Salon, and he assigned for estate of Samuil Mortn in 1930. During the occupation, German army occupied the house. After the occupation, it was used temporarily for the office of ELAS, and assigned to Hellenistic Royal Air Force (H.E.B.A.). H.E.B.A. contributed to Γ area of Greek army until December 1947. In 1952, the building and its land was sold to IKA (Society of Civil Service), but was used as the office of NATO in parallel. From 1955 up to 1972, the building had been used as the office of IKA constantly. During this period, the building had got to the hideout of mode of different «collector» of arts or to the safe house of offender. At that time, many architectural materials had lost including wooden sculpture, irons members, major part of marble fireplace, wooden doors, handles, etc.



Figure 3 Main facade of Dimotiki Pinakothiki of Thessaloniki (view from Vasilissis Olgas St.)

The Villa Mordox is the representative example of impressive architecture which characterize tower of Vasilissis Olgas St. The building is consisted of two floors, half-underground floor and attic. Two main façades, facing to the crossroad makes “tower” like impression, and gives special character for this building. On the top of gable, there is Arabic inscription «masyala», which means what a beautiful is.

Now the building and surrounding land belongs to municipality of Thessaloniki. In the half underground floor, there is the office of E housing area of Thessaloniki. The elevated ground floor is used as the room of city Mayer, the room of second Mayer, and reception and symposium hall, the secretary room, and the room of cultural section of Thessaloniki and so on. The second floor is the gallery of Thessaloniki city.

There was no architectural drawing existed, so it was necessary to make new measurement. In 2005, Psirakis Ioannis made topographical survey at place. Total Station TCR307 of Leica Geosystems was used for topographical survey. Total number of points reached more than 4000.

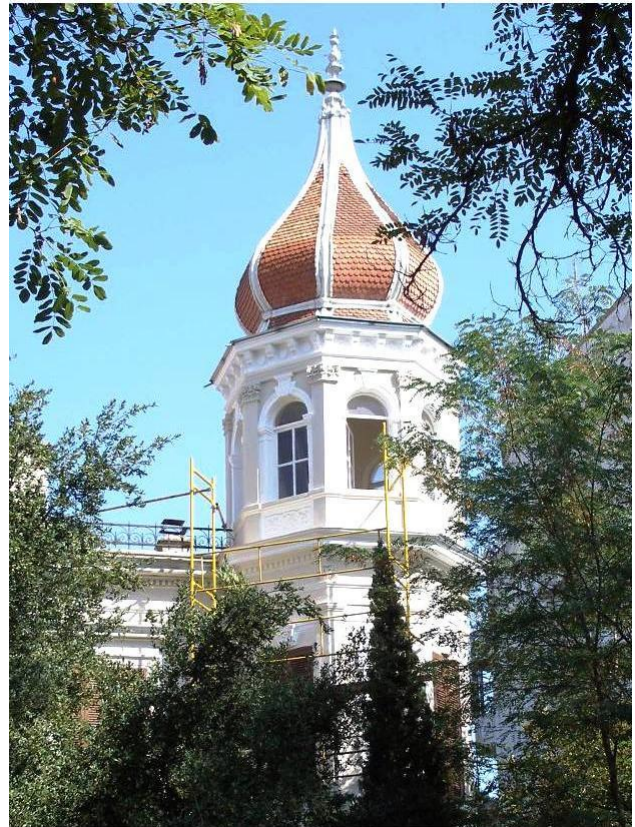


Figure 4 Corner tower with spire of Dimotiki Pinakothiki

### 2.2 Old Prefecture of Kilis

Kilis is a small town of Macedonia. It is located at 60 km north from Thessaloniki. It is not clear when constructed the old prefecture of Kilis, but from its architectural style, it built in the beginning of 20 century. The building had been used as prefectural office until the new prefecture built. After that, it was abandoned for long time.



Figure 5 Old prefecture of Kilis (view from old main street)



The building is consisted of two floors and half-underground floor. The main façade is facing to the old main street. It is characteristic that there is main staircase in front. The building is design functionally as prefectural office rather than luxuriously like villa of Thessaloniki. That why, each floor divided into small rooms with big windows in order to take sun light for the offices. Elevations are designed simply.

About 10 years ago, the prefecture restored and reinforced the building. Otherwise, it was damaged seriously by weather. In 2008, the prefecture of Kilkis decide to restore the building again, and to protect it as historical heritage of Kilkis city. In 2009, Kostas Tokmakidis and Panagiotis Tokmakidis joined this restoration project and made topographical survey at place. Total Station TCR807 of Leica Geosystems was used for topographical survey. Total number of points reached more than 3000.



Figure 6 Old prefecture of Kilkis (view from west)

### 3. MODELING AND 3D IMAGES

After the topographical survey in place, the authors made 3D images and video from DWG data. There is 4steps of this operation. 1) Modelling in AutoCAD for DWG data. 2) Creation of texture by using Adobe Photoshop. 3) Creation of 3D images by 3DStudioMax. 4) Images and video editing.

#### 3.1 Modelling in AutoCAD

Topographical and architectural information are prepared as DWG archive, which including topographical maps, plan, elevation and sections (Figure 7, 8). As AutoCAD data, each architectural element belongs to different layers with different colors. Photogrammetric method was used to make elevation of decorative architectural members, like windows, doors, wooden sculptures and so on.

At first, unnecessary information of these drawing removed from its data base. After that, all elements converted to three dimensional objects before making model. This means all line data converted to polyline in order to make 3D model. All the elements should be designed as surface model, not as solid model in AutoCAD. This three dimensional model presented as wire-flame model (Figure 9).

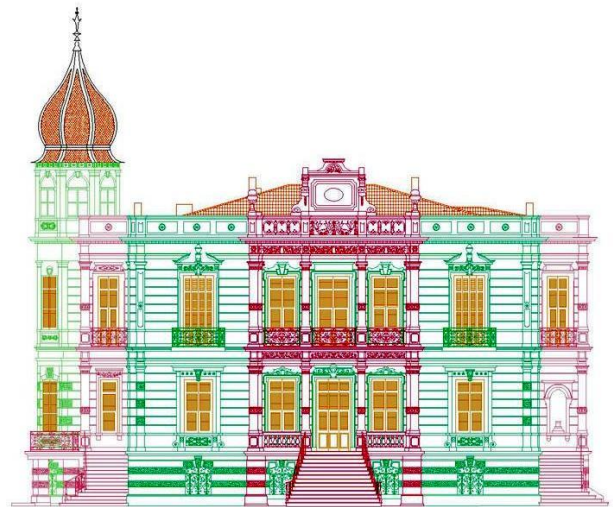


Figure 7 Elevation of Dimotiki Pinakothiki (DWG data)

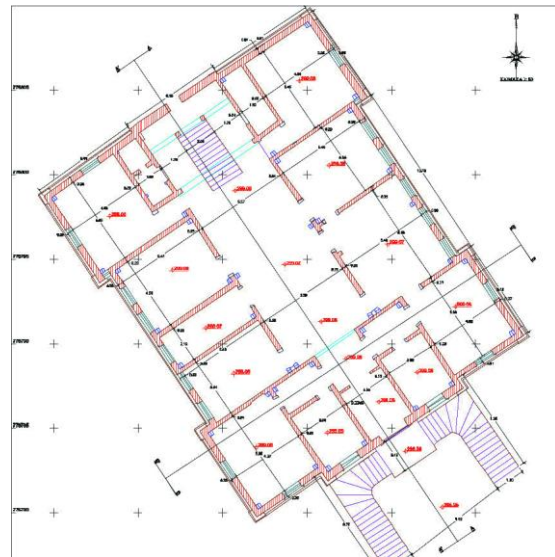


Figure 8 Plan of Old prefecture of Kilkis (DWG data)

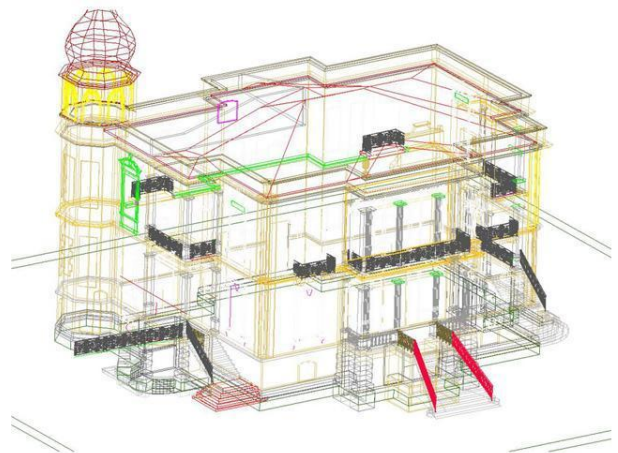


Figure 9 3D wire-flame model (DWG data)

#### 3.2 Creation of Texture from photo

In order to make real and high quality texture, we used digital photo data. The authors generate texture data by photographic

manipulation software (Adobe Photoshop). Photo data edit for small architectural elements like window frame, door frame, handrail, wall painting, and so on (Fig. 10). It is not necessary to keep big image file to show reality in 3D model. Finally, these textures were imported to 3DStudio together with polyline elements of AutoCAD.



Figure 10 Painting of the ceiling, Dimotiki Pinakothiki

### 3.3 3D Images and Animations by 3DStudioMAX

Now digital elements of AutoCAD are imported to 3DStudio. Each layer of AutoCAD is imported to 3DStudio directly, so the layers are corresponding between them. Usually, the library will be created together with materials from model, map, texture photos, but in our case, it was much easier to make material from CAD and photo data than to use library achieves. They will be applied to each 3D object. There are various effects in order to achieve realism in 3D images; lighting, fog, water reflection, etc. 3DStudio is good at to manage these different tools.



Figure 11 3D Image of whole building, Dimotiki Pinakothiki



Figure 12 3D Image of interior, Dimotiki Pinakothiki



Figure 13 3D image of balcony

There is also animation tool, which has camera positioning and lens effect. At first, camera position should be decided. After that, each frame should be closed, but it is possible to use auto key to create all frames in automatically (Figure14). After all, 3D images and animations are created from 3DStudio.

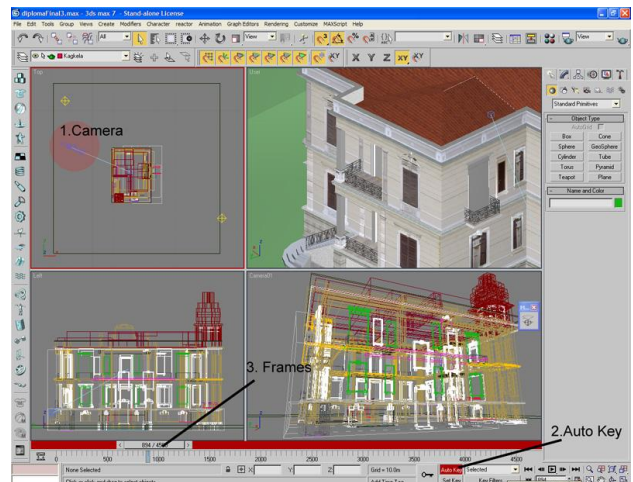


Figure 14 Animation tool of 3DStudio

#### 4. SUMMARY

In this study, the cheap and easy digital recording and modelling system was applied to neoclassical monument. The authors showed economic and simple method by using Digital Total Station, AutoCAD and 3DStudio. 3D digital recording and modelling method will create visual archive for all architects.

Typically, neoclassical building consists from decorated façade like ancient Greek and Roman temples. It is necessary to imprint these decorative parts for historical analysis. Digital recording method enables instead fast acquisition and processing of the data. Combination of digital photogrammetry and non-reflector total station makes it easy for imprinting the ordered façade with different layers.

In this article, the authors focused on neoclassical buildings in Kiliks and Thessaloniki. It is possible to use these 3D images and animations for digital archive in any chance. The complete 3D model makes it possible to access endangered architectural heritage. In the future, these kinds of work must be developed and preceded in any kind of historical heritage.

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