

Illumination of St. John the Baptist cathedral in Trnava

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1 Introduction

St. John the Baptist cathedral in Trnava is the first monumentally sacral building of early baroque in Slovakia and in the former Austrian - Hungarian Empire. It is situated on the University square and is a part of university buildings. Famous artists of many nations have taken part in realisation of this cathedral. For example Italians, Austrians and domestic sculptors, wood carvers and stone carvers. At the beginning of 2005 representatives of Trnava city decided to illuminate the cathedral. The project of illumination was trusted to the Slovak Technical University designers. It was a big challenge for them. The main aim of this project was to increase importance of the monument. The realisation of the project was provided by SIEMENS company.

2 Design of illumination

A festive illumination helps to create the picture of the city and country by sunset. It enables to focus attention of city visitors to important architectural or historical monuments and therefore it is necessary to solve illumination of particular objects with respect of architecture of the whole city. Night illumination should not copy dailly illumination but its role is to induce nocturne feeling, create perceiving of night city which differs from dailly perceiving. The suitable technique of illumination utilising a contrast of luminances or colours enables to stress chosen architectural elements and to reach more catchy depict of building than during a day.



Fig. 1 St. John the Baptist cathedral in Trnava

Measures of lighting

For objective determination of light parameters it has been necessary to perform measure of luminance, illuminance and reflectance of materials. Results of measure are showed in the next table.

Tab. 1: Measured values of reflectance

	Plaster in lower part	Plaster in top part and pillars	Stone base
colour	brown	white	brown
Illuminance E (lx)	11300	11300	11300
Luminance L (cd.m ⁻²)	1189	2220	1615
Reflectance (ρ)	0,330	0,617	0,449

On the basis of measured value of surrounding objects it was selected **luminance of facade between values from 5 to 10 cd/m²**.

From initiate value of luminance and reflectance we have determined required illuminance and afterwards a required luminous flux and numbers of luminaires.

Colour temperature and colour rendering

For this project it has been used WDL colour temperature (3000-3300 K) of lamps.

Types of lamps

For all luminaires have been designed the halide discharge lamps with ceramic arc tube and WDL colour temperature. The reason is evident, the halide discharge lamp has a colour stability, long life and good colour rendering.

Tab. 2: The type of luminaires and lamps

Number	Luminaire	Lamp		
		recommended	potential	cap
31	ES System URAN 20, 3302	HCI-T 70/WDL	HQI-T 70/WDL	G12
18	THORN SONPAK 70W	HCI-TS 70/WDL	HQI-TS 70/WDL	RX7s
2	THORN 7941/015/2-11	HCI-T 150/WDL	HQI-T 150/WDL	G12
1	THORN 7951/007/2-11	HCI-T 70/WDL	HQI-T 70/WDL	G12
19	THORN 7962/025/2-11	HCI-T 250/WDL	-	E40

Types of luminaires

In the first point it was necessary to determine the most advantageous light position. Secondly it was necessary to obtain an approval from owner of buildings for building them up. As this is a usual problem, we would like to appreciate that the official representatives of Trnava city were very helpful to designers it was possible to create a light position anywhere it was necessary.

The basis for selection of luminaires was the ideal curve of luminous intensity. The curve of luminous intensity have been calculated from geometric dimensions and location light position. The luminaires for this project were designed for products of two manufacturers. For lower part of cathedral it have been designed luminaires ES SYSTEM company. These luminaires are installed in sidewalk. The glass of luminaire is weight - proof of 4500 by protection IP 67. The symmetrical and asymmetrical luminaires were designed for products of Thorn company.



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a
kg

Fig. 2 Luminaire for installation in a sidewalk

The face, nave, roof and towers are illuminated from buildings placed in surroundings. These buildings are possessed by the city and University of Trnava. The towers are illuminated from inside. Location of light position was selected with respect to direction of light. It was necessary to prevent dazzling from usual directions of look. And it was necessary to guarantee that during the day illuminating system will not have any disturbing affect to visitors.

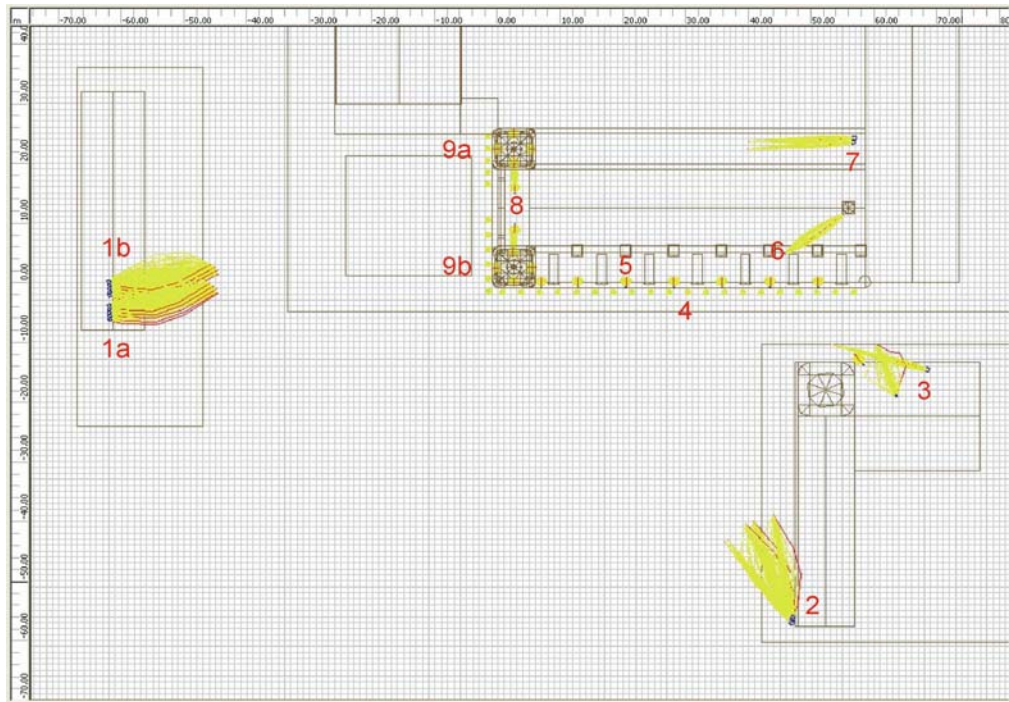


Fig. 3 Location of light position and direction of luminaires

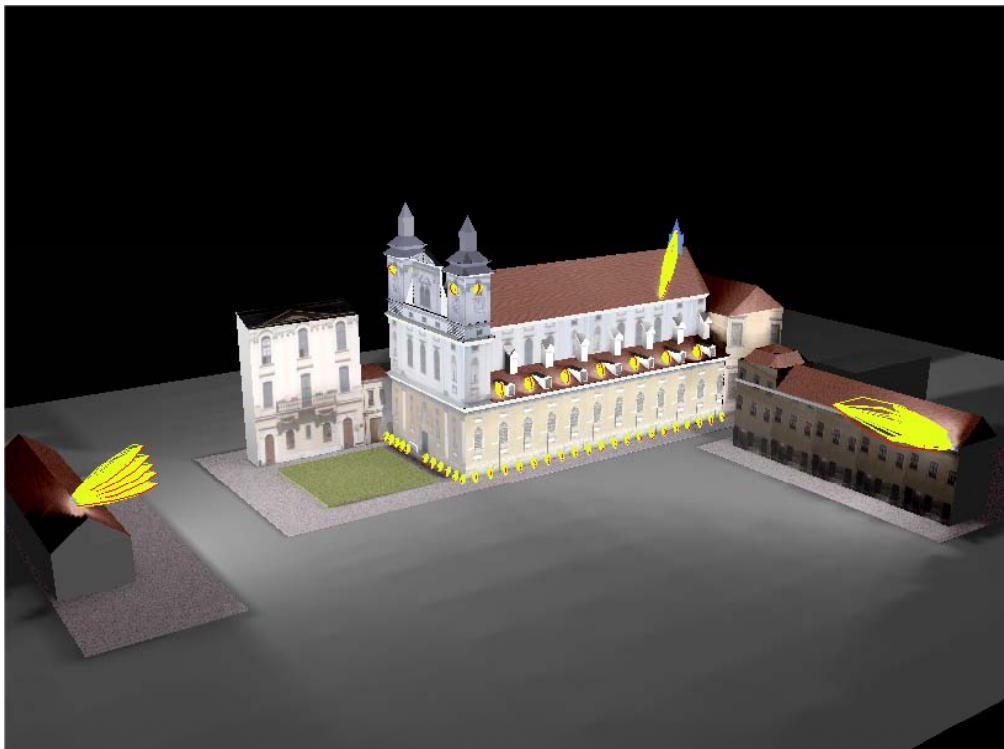











Fig. 4: Location of luminaires for illumination of cathedral

Tab. 3: Type of luminaires and lamps

Location	Type of luminaires	Number	Type of lamps	Power (W)
1a	THORN 7962/025/2-11 + 095 657-01(H) 	5 pcs	HCI-T 250/WDL	5 x 284 W
1b	THORN 7962/025/2-11 + 095 657-01(H) 	5 pcs	HCI-T 250/WDL	5 x 284 W
2	THORN 7962/025/2-11 + 095 657-01(H)  , 	2 pcs  - on the tower 2 pcs  - on the roof 1 pc  - under the ledge	HCI-T 250/WDL	5 x 284 W
3	THORN 7962/025/2-11 + 095 657-02(H) 	1 pc direction to the tower	HCI-T 250/WDL	2 x 284 W 1 x 88 W
	THORN 7962/025/2-11 + 095 657-01(H) 	1 pc direction to the tower	HCI-T 250/WDL	
	THORN SONPAK	1 pc direction to the ledge	HCI-TS 70/WDL	
4	ES System URAN 3302	31 pcs to cobblestones- 2m	HCI-T 70/WDL	31 x 88 W
5	THORN SONPAK	7 pcs dir. to the facade	HCI-TS 70/WDL	7 x 88 W
6	THORN 7951/007/2-11	1 pc  - to cross	HCI-T 70/WDL	1 x 88 W
7	THORN 7962/025/2-11 + 095 657-01(H) 	2 pcs direction to the tower	HCI-T 250/WDL	2 x 284 W
8	THORN SONPAK	2 pcs from roof to the tower	HCI-TS 70/WDL	2 x 88 W
9a	THORN SONPAK	4 pcs illum. to windows	HCI-TS 70/WDL	4 x 88W
	THORN 7941/015/2-11 + 095 611-03(H) 	1 pc – dir. to the opposite tower	HCI-T 150/WDL	1 x 170W
9b	THORN SONPAK	4 pcs illum. to windows	HCI-TS 70/WDL	4 x 88W
	THORN 7941/015/2-11 + 095 611-03(H) 	1 pc - dir. to the opposite tower	HCI-T 150/WDL	1 x 170W

3 Calculation of illumination

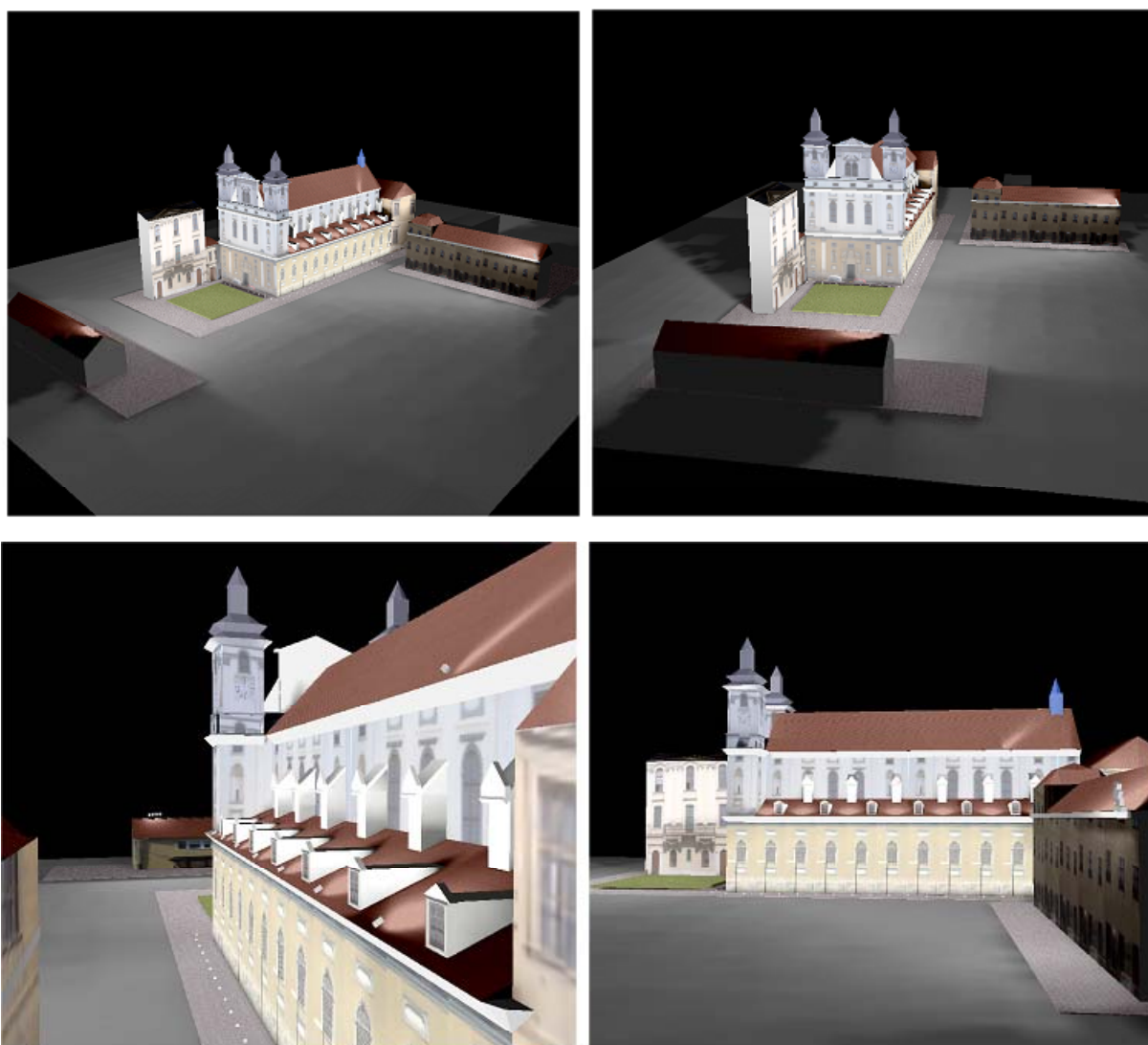


Fig. 5,6,7,8: Visualisation of illumination in computer – various views

Tab. 4: Schedule of luminaires used in project

Number	Type of luminaires	Type of lamps		
		recommended	potential	cap
31 pcs	ES System URAN 20, 3302	HCI-T 70/WDL	HQI-T 70/WDL	G12
18 pcs	Thorn Sonpak	HCI-TS 70/WDL	HQI-TS 70/WDL	RX7s
2 pcs	THORN 7941/015/2-11 + 095 611-03(H)	HCI-T 150/WDL	HQI-T 150/WDL	G12
1 pc	THORN 7951/007/2-11 + 095 625-02(H)	HCI-T 70/WDL	HQI-T 70/WDL	G12
18 pcs	THORN 7962/025/2-11 + 095 657-01(H)	HCI-T 250/WDL	-	E40
1 pc	THORN 7962/025/2-11 + 095 657-02(H)	HCI-T 250/WDL	-	E40

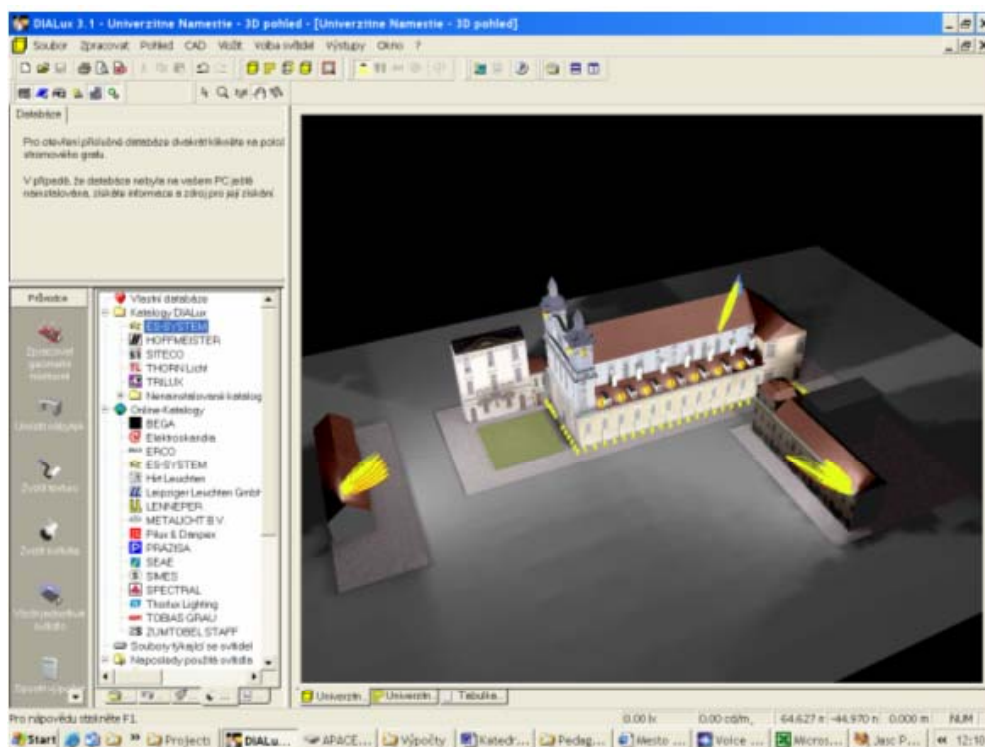


Fig. 9: Illustration of software for calculation of illumination (Dialux)

4 Photos after realisation of the project

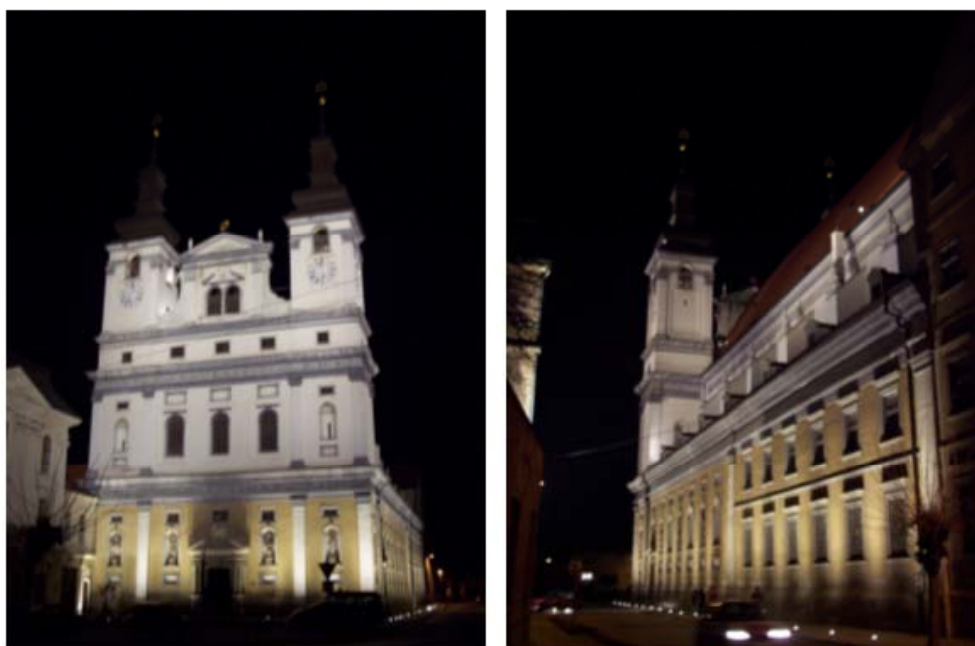


Fig. 10,11: St. John the Baptist cathedral in Trnava in night – front view and side view



Fif. 12: Illumination of John Paul II statue in front of the cathedral



Fig .13: Right side view on the cathedral

5 Conclusion

The illumination of St. John the Baptist cathedral in Trnava has been completed in autumn 2005 and today it serves to its purpose. You are cordially welcomed for a visit of this notable architectural dominant of Trnava city also in night hours.



Fig.14: Illumination of the cathedral from right side

This paper has arisen under the solution of project VEGA 1/3114/06 Research of psychological and disability glare.

6 References

- [1] KRASŇAN, F., SMOLA, A.: Katedrála sv. Jána Krstiteľa v Trnave - Návrh iluminácie. STU FEI, 2005.