SPATIAL EXPERIENCE IN REAL & VIRTUAL ENVIRONMENT AS AN URBAN DESIGN TOOL

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The editorial note: You can look video fragments resulted in the text, having made click on a word Video.

Abstract

The innovations of information technologies and the new possibilities of multimedia exploitation in the realm of architectural design and education are supporting the development of image communication methods on the basis of interactivity. The creative process of searching and decision-making in the urban design studio of our Faculty is supported by spatial modeling methods. The draft is sketched in modeling material on a working model. From the didactic point of view, relevant are mainly those phases, in which is possible, in the imaginative way, to support the searching and decision making process with the aim to test, compare and continuously evaluate the fulfillment of the hypothetic intentions of the solution responsibilities.

The model becomes an interactive medium of cooperation between teacher and the working group of students. From the view of design crystallization, the dominant phases, in the creative process, are examining, verification, and simulation. The alternatives of material-compositional content and the spatial performance charts of modeled physical structure are verifying and the visual experience of the anticipated urban environment is simulated by the author, but also through the future client's eyes. The alternation of the composition's spatial configurations is generally appreciated by the static visual verification in the endoscopic horizon like the architectural spatial studies. The effective method of the progress generates a creative atmosphere for the generative thinking and design. The laboratory simulation of spatial experiences and their evaluation is performed following the perception psychology relations. The simulation of digestion of the new spatial reality intervenes the customer's identification and guides to subjective approaches towards the quality and complexity of the formed environment. The simulation is performed in motion in order to be able to anticipate the dynamic continuity of subjective spatial imagination. The induced atmosphere will direct the evaluational attitudes of authors on comparison and selection of the successful alternatives.

In our fee, we will present the demonstrations of selected static and dynamic notations of image sequences prepared in our laboratory. The presentations have been created in order to analyze, verify and offer imaginative support to creative findings in result of fulfilling the studio design tasks in the educational process. The main one is the design of urban spatial structures. The laboratory methodology is in the first place oriented on the analogue-digital procedures of "endoscope" model simulation. At the same time it also explores and looks for new unconventional forms of visual communication or archiving as imagination support to specialist and laymen participants in creative, valorization and approval processes.

Keywords: imagination and interactivity in the design process of urban-generated structures, generative modeling, working model, analogue modeling method, spatial studies digitalization, iconic simulation, semantic evaluation

ПРОСТРАНСТВЕННЫЙ ОПЫТ В РЕАЛЬНОЙ И ВИРТУАЛЬНОЙ ОКРУЖАЮЩЕЙ СРЕДЕ КАК ИНСТРУМЕНТ ГРАДОСТРОИТЕЛЬНОГО ПРОЕКТИРОВАНИЯ

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От редакции: приводимые в тексте видеофрагменты Вы можете посмотреть, сделав щелчок на слове Video.

Аннотация

Новшества информационных технологий и возможностей мультимедийной работы в сфере архитектурного проектирования и образования поддерживают развитие методов коммуникации образов на основе интерактивности. Творческий процесс поиска и принятия решений в студии градостроительного проектирования на нашем факультете поддерживается методами пространственного моделирования. Проект эскизируется в моделирующем материале на рабочей модели. С дидактической точки зрения уместны, главным образом, те фазы, в которых возможно образно поддерживать процесс поиска и принятия решения с целью проверки, сравнения и непрерывной оценки выполнения гипотетических целей решения.

Модель становится диалоговой средой сотрудничества между преподавателем и группой студентов. С точки зрения «кристаллизации» проекта доминирующими фазами в творческом процессе являются исследование, проверка, и моделирование. Альтернативами для материально-композиционного содержания и пространственных характеристик смоделированной физической структуры являются проверка и визуальный опыт ожидаемой городской окружающей среды, моделируемой автором, а также и зрительное восприятие будущего клиента. Чередование пространственных композиционных конфигураций вообще оценивается статической визуальной проверкой на эндоскопическом горизонте как архитектурные пространственные исследования. Эффективный метод движения вперед производит творческую атмосферу для порождающего размышления и проектирования. Лабораторное моделирование пространственных событий и их оценки выполнено с учетом психологии восприятия. Моделирование усвоения новой пространственной реальности мешает идентификации клиента и ведет к субъективным подходам к качеству и сложности сформированной окружающей среды. Моделирование выполнено в движении, чтобы быть в состоянии предвидеть динамическую непрерывность субъективного пространственного воображения. Стимулированная атмосфера нацелит оценочные позиции авторов на сравнение и выбор успешных альтернатив.

В нашей статье, мы представим демонстрации отобранных статических и динамических последовательностей изображений, подготовленных в нашей лаборатории. Презентации были созданы, чтобы проанализировать, проверить и предложить образную поддержку творческим полученным данным в результате выполнения проектных задач в образовательном процессе. Главная из них - проектирование городских пространственных структур. Лабораторная методология во первую очередь ориентируется на аналогово-цифровые процедуры моделирования с применением "эндоскопа". В то же самое время она также исследует и ищет новые нетрадиционные формы визуальной коммуникации или архивирования как поддержки воображения специалиста и участников непрофессионалов в процессах творчества, валоризации и рассмотрения.

Ключевые слова: воображение и интерактивность в процессе проектирования городских порожденных структур, порождающее моделирование, рабочая модель, метод аналогового моделирования, оцифровывание пространственных исследований, изобразительное моделирование, семантическая оценка

Introduction to a Specific Problem

The Institute of Urban Design and Spatial Planning at Faculty of Architecture, SUT in Bratislava provides general education for Students within their urban studies which concern building of cities: their planning and regulation. The Institute and its teaching program is closely related to architectural education provided by the Faculty. It prepares architects to specialize and design city-making structures. The Institute's concepts are based on the assumption that building and forming a city, its further development and assessment are more than just a composition of its spatial features or architectural components. We perceive a city as a structure, which is a complex expression of an organic system of urban environment. A city, as an organic structure, is based on functional, operational and spatial relations which are daily perceived or digested through complexity of their informative sense. Thus, a city as an expression of humane inhabitation's structure creates conditions for living activities of the inhabitants.

Theoretical and practical program for the subject of Urban Composition belong to basic academic preparation of a student to achieve professional qualification of an Architect. This subject is mainly focused to studies of esthetical relations at designing the city forming structures. It applies creative and exact theoretic principles at different positions of a spatial city structure in flow of their dynamic changes. Didactic aim of the subject is support of students' imagination, creativity and sense of sustainable urban environment during the analyses, perception and evaluation of an urban structure [2]. A general aim of the subject is also to analyze urban and architectural design in more detail and to point out designing and redesigning of urban spaces and atmosphere inside of urban environment (Fig. 1, Fig. 2).

Fig. 1. Models of Urban Composition subject

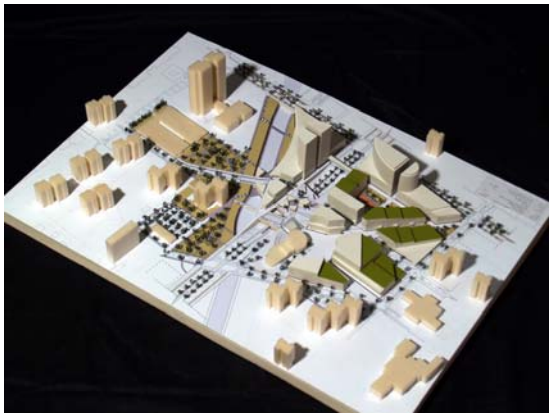


Fig. 2. Model as presentation medium of urban spatial structure

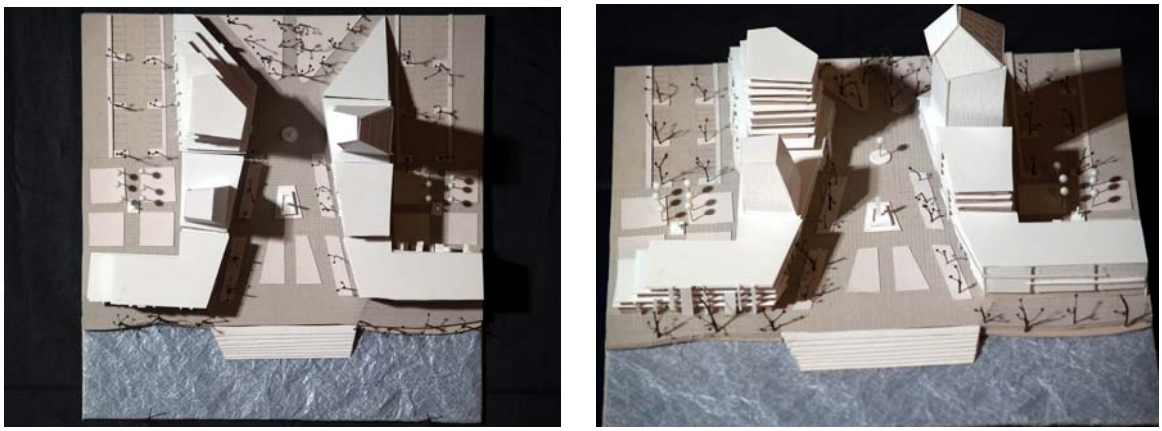
Importance of Spatial Experience

Beside the hand-made drawings of various examples of creative and compositional categories in their urban spatial expression, during the seminars which are part of Urban Composition, students make model studies of nodal and linear spaces (models of Streets and Squares) in which they articulate various compositional elements by different modeling materials (Fig. 3(a,b), Fig. 4(a,b)). Consequently, students make esthetical and compositional analyses of the structure in a real stylized model with main focus to urban marks, spatial tectonics, sceneries and atmosphere inside of model. Analog-digital endoscopic technology with a data projector, which is installed inside the laboratory, will enable visual verification on pedestrian horizon. Cinematographic matrixes are important outcomes of this verification and after postproduction processing of these sequences, students can make video-clips or other multimedia presentations or they can just store materials for their further work (Fig. 5(a,b), Video 1 (UK-M-Holesa-16), Video 2 (Namestie-a)).

The main advantage of the above mentioned method is real imaginativeness for all other members of the student group, spatial and temporal dynamic of visual perception, which activate

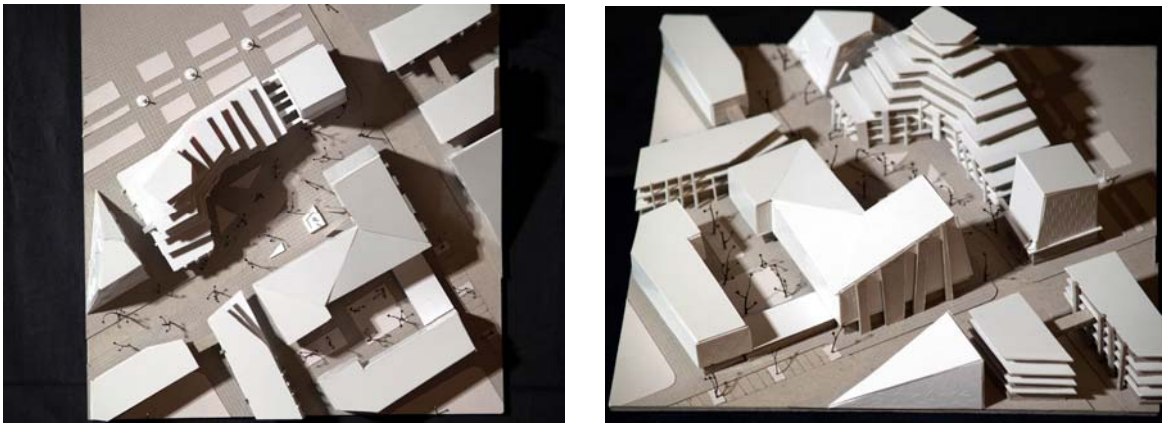
creative interactivity of students. In this way, generative spatial experience of the anticipated environment is preferred, which is a requirement to esthetic managing of the informative and character complexity. In this way, the thought of Albert Einstein: “Imagination is more important than knowledge” becomes a true. (Video 3 (Video-Wafa-short), Video 4 (Trasa-Jakubisin-16), Video 5 (Ulica-uzavreta-1), Video 6 (KollarNam-PhSt), Video 7 (Bolco-S-V-PhSt), Video 8 (MT-RUZ-1-short))

(Video 3, Video 4, Video 5, Video 6, Video 7, Video 8)



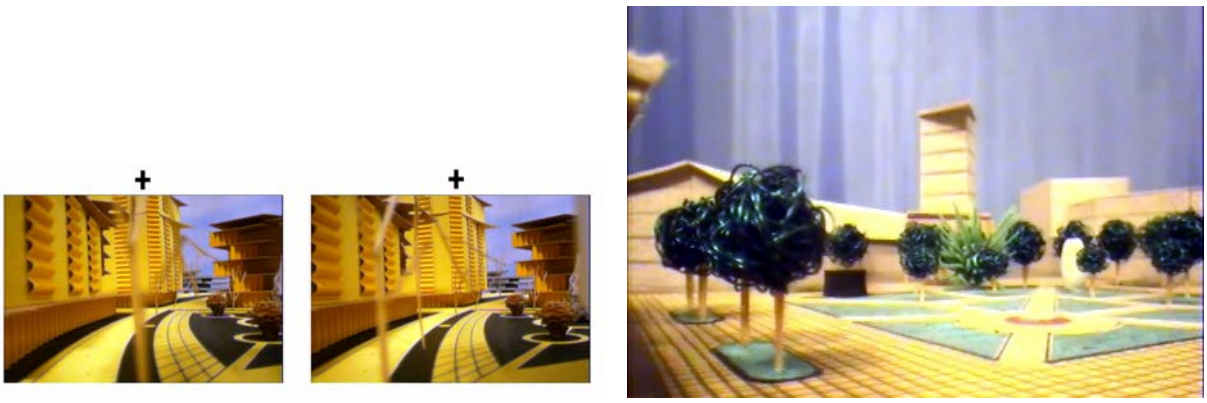
a) b)

Fig. 3(a,b). Model of Linear Structure – Waterfront



a) b)

Fig. 4(a,b). Model of Nodal Structure – Square



a) b)

Fig. 5(a,b). Outputs from analog-digital endoscopic technology for further postproduction process of sequences to video-clips or other image modes for multimedia presentation or archive (Video 1, Video 2)

Utilization of Spatial Modeling within Urban Designing

Media, which enable the compositional interactivity, play a great role in the creative process of forming the city spatial structures. Mostly, there are used physical-analog-artifact models or virtual-digital 3D displays. The differences are between conditions of spatial perception: physical are perceived as three-dimensional; digital (for now) only as a 3D simulation. Spatial or space-making composition is imaginative in every respect and significantly contributes to quality of harmonic complexity of the architect's creativity (Fig. 6). Artificial model is first material modification of creative idea or draught [2]. Three-dimensional physical model provokes spontaneous spatial imagination and communication of space creating compositional parameters. By hand we observe articulation of formal perception, on which can all coauthors participate. In this way, a model becomes the first medial presentation of interactive process of compositional forming and evaluation of objectives (Fig. 7).

Fig. 6. Spatial composition is imaginative and meaningfully contributes to harmonic complexity of creative architect's statement

Fig. 7. Interactive “verification” of composition aims on studio work-model

The manual spatial modeling is considered, from more than one aspect, as interactive “sketching” which is the most effective tool of promotion (Fig. 8).

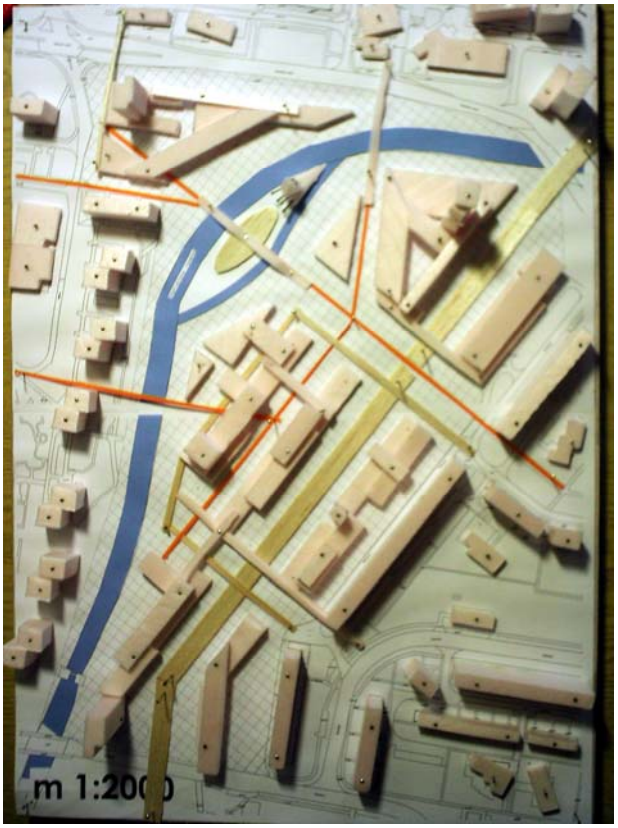


Fig. 8. Interactive “sketching” on studio work-model

The students at advanced level are recommended to continuously use the potential of this composition at their design of models at studios on subjects (Fig. 9).

Fig. 9. Composition of organic urban operative structure on studio work-model

For certain aspects, we are trying to avoid imagination, which untimely cause composition in virtual area of computer graphics (definitive expression, color and graphic perfection …) (Fig. 10(a,b)).

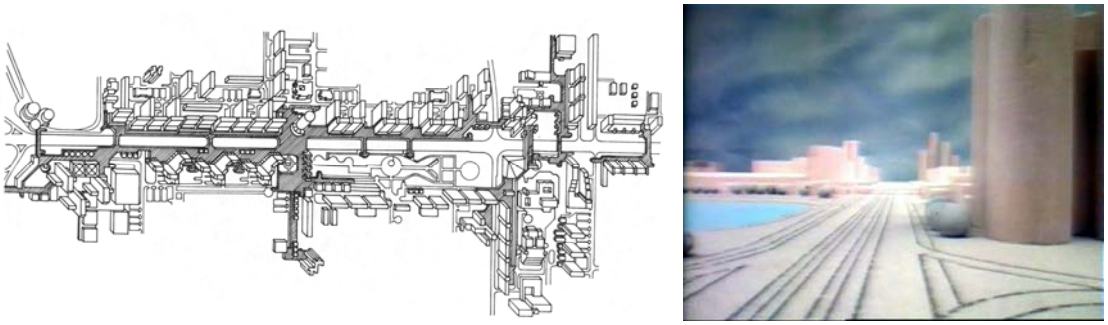
a) b)

Fig. 10(a,b). Composition and Presentation of proposition by software's of PC graphic

The purpose of a work-model is to document creative-compositional principle of creating spatial structures by visual demonstration. Their uniqueness is that they enable mental interaction of basic senses of humane creativeness: eyesight and touch. In this way, modeling gives us active and three-dimensional perception by optic sensors in real time and space. It provides production of experiences that are close to reality and based on theoretical principle of aesthetic composition. Spontaneous student's reactions are depending on individual creative reactions and impulses. Physical modeling is in term of the mentioned aspects imaginative and creative and provides application of creative ideas, single person or whole team [2].

By verification of models through an endoscope, creative and presentational interactivity is generated. Higher levels of semi-finished working models are evaluated by an endoscope (set on eye level): by static views and formations, or by digestion of dynamic continual perspective according to principles of urban composition. This allows us to obtain and store the so called static/dynamic space visualization, which is after the postproduction process presented with the final project documentation. Projection of dynamic perspective/experience like dynamic continuum is ultimately cinematoscopic sequence as on a movie projecting screen, but it is not absolutely interactive (Fig. 11(a,b)).

After an overall evaluation of this method we can point out, that creative interactivity in real model displaying and adjusting expressly supports creativity of architectural and urban design.



a) b)

Fig. 11(a,b). Composition of dominant complexes of spatial conception. Verification of spatial structure's expressions at composition of dominant spatial complex

Spatial Experience in Real Environment as an Urban Design Tool

The spatial - dynamic experience is modeled/stimulated in real time and real in a real model which is created smaller than in reality. The dynamic experience as dynamic perspective in biological horizon enables to evaluate and revise our draught from different points of urban composition [2] [5] (Fig. 12, Video 9 (Meszaros-stafaz), Video 10 (Meszaros-SAHY-PhSt-2), Video 11 (Meszaros-SAHY-PhSt-3), Video 12 (Hlav-nam-SAHY), Video 13 (Pano-Borecka-1), Video 14 (Pano-Strkovec)).

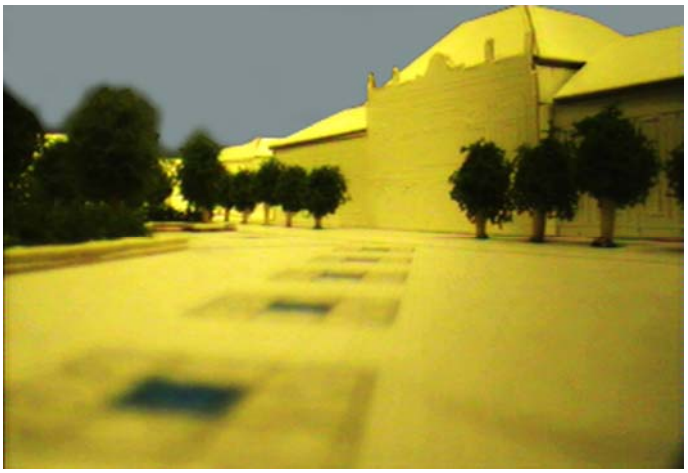


Fig. 12. Regeneration of main square in city center of Šahy – visual verification on model M1:500 (Author: Bc. Marcel Mészáros)
(Video 9, Video 10, Video 11, Video 12, Video 13, Video 14)

Spatial Experience in Virtual Environment as an Urban Design Tool

Dynamic experience achieved by visualization of PC graphic software uses spatial imagination through simulated move of the perceiver. It is similar to standard cinematography (Fig. 13). Usually, students present the so called "flights" over their digital models (Video 15 (prelet14)). Rarely, they present expected experiences of the future perceiver of urban scenario in pedestrian horizon. Orientation of pedestrians is regulated by principles of urban composition and its retention

positively influences the further required identification (Fig. 14, Video 16 (CENTROPEA-Walkthrough 5), Video 17 (Petrzalka-Karaffa-Marcinkova)).

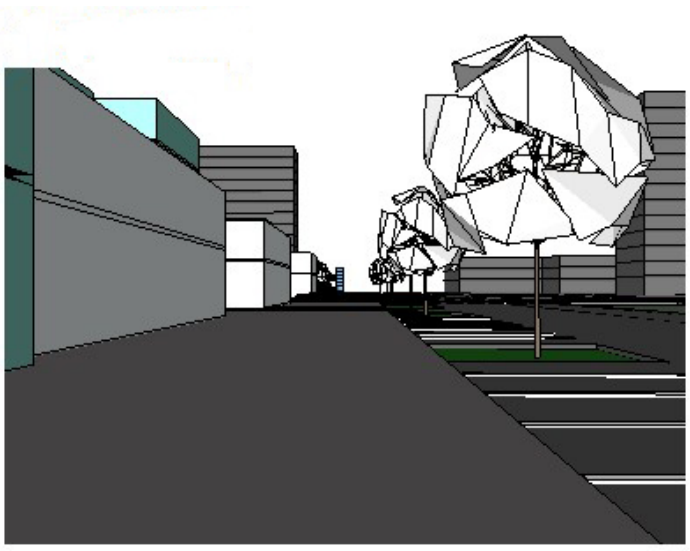


Fig. 13. Dynamic experience by AutoCAD. Digital endoscopic simulation of Spatial Experience in eye level horizon – CENTROPEA (Video 15)
Authors: Bc. P. Oravcová - Bc. M. Otrísal - Bc. N. Petrenková

Fig. 14. Complex visual CAD urban study presentation of Petrzalka's city centre.
Authors: Bc. J. Karaffa - Bc. J. Marcinková (Video 16, Video 17)

Conclusion

The application experience of the method indicates that spatial modeling as an Urban-architectural Design Tool has several specific advantages compared to contemporary potential of visual media:

- The method has become a creative and interactive medium for quality aesthetic and compositional analyses of the alternative solutions.

- It increases the quality of spatial visual demonstration and has didactic meaning at repeated search and decision making within the individual stages of designing process.

- Presence of the working model represents real aspect of the creative, evaluative and simulative process.

- The method creates convenient conditions for collective creative work, production of new ideas which can be revised by compositional reactions.

- In final stages of the design process, the method enables anticipation of custom perception of the environs atmosphere in real time and real place.

- Thanks to ICT compatibility, inter-medial processing of graphic outputs is guaranteed, as well as is their postproduction or storing.

Summary of video viles

Video 1	UK-M-Holesa-16.	.wmv	3 451 kB	http://www.youtube.com/watch?v=zYC9zvx2dy8
Video 2	Namestie-a	.wmv	1 358 kB	http://www.youtube.com/watch?v=SrfqvuxqGeg
Video 3	Video-Wafa-short	.wmv	12 491 kB	http://www.youtube.com/watch?v=wg3gv8tcXDQ
Video 4	Trasa-Jakubisin-16	.wmv	1 166 kB	http://www.youtube.com/watch?v=zxZRuq368zg
Video 5	Ulica-uzavreta-1	.wmv	424 kB	http://www.youtube.com/watch?v=zkrNiV1YyyE
Video 6	KollarNam-PhSt	.wmv	523 kB	http://www.youtube.com/watch?v=NTdyEGFL6qY
Video 7	Bolco-S-V-PhSt	.wmv	539 kB	http://www.youtube.com/watch?v=1s_ANgGTUOk
Video 8	MT-RUZ-1-short	.wmv	2 261 kB	http://www.youtube.com/watch?v=imOG1dAZ0Ao
Video 9	Meszaros-stafaz	.wmv	210 kB	http://www.youtube.com/watch?v=jY1rd7F2s6A
Video 10	Meszaros-SAHY-PhSt-2	.wmv	188 kB	http://www.youtube.com/watch?v=ygS48qSyr_c
Video 11	Meszaros-SAHY-PhSt-3	.wmv	183 kB	http://www.youtube.com/watch?v=kEC_b6O8PmU
Video 12	Hlav-nam-SAHY	.wmv	9 233 kB	http://www.youtube.com/watch?v=crjSX5R8-98
Video 13	Pano-Borecka-1	.wmv	637 kB	http://www.youtube.com/watch?v=HffbtsOK4n4
Video 14	Pano-Strkovec	.wmv	261 kB	http://www.youtube.com/watch?v=miamviyDWOc
Video 15	prelet14	.avi	1 958 kB	http://www.youtube.com/watch?v=RaU2CV-76eA
Video 16	CENTROPEA-Walkthrough 5	.wmv	7 569 kB	http://www.youtube.com/watch?v=ToSWrU9JSyg
Video 17	Petrzalka-Karaffa-Marcinkova	.wmv	7 388 kB	http://www.youtube.com/watch?v=SO6jRdyt1eA

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