VIEW FROM THE ROAD: ENVIRONMENTAL SIMULATION FOR THE FRACTAL CITY OF RHINE RUHR
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Abstract
Highway seems to be more an issue of traffic planning than of urban design. But the highway can be a very important factor for the modern city pattern. Highways shape the spatial form of the fractal city. The modern highway can define new cores outside and “interior edges” within the city. Seen as a planning tool, highways are the great neglected opportunity in city and regional design. The 1st Architecture Biennial, 1ab, taking place from May 2003 to July 2003 in Rotterdam, explores the creative potentials of modern highways worldwide. An international research team discovered the spatial functions of highways in modern agglomerations.

This lecture will give an overview of the results of the worldwide analyses and the design projects that had been undertaken. Both authors are members of the German research team. The German team examined the A 42 running through the Ruhrgebiet, a former coal and steel area in western Germany. The Ruhr Area is converting from an industrially orientated region to an agglomeration of high technology and science. But the regional image remains the same due to the fact that the changes cannot be seen, neither physically, nor from the road. Here, the highway could be used as a catalyst supporting and structuring the spatial changes to make them more legible for the people of Rhine-Ruhr. The nature becomes the most important tool of highway design. Landscape forms a linkage between the different cities of the region. Together with the A 40 and other local highways the region becomes the most important (and largest) public space of the new Rhine-Ruhr. The highway seen as a work of urban art can be designed only from the perspective of the driving car.

The Rhine Ruhr Region is a typical example of a fractal city region. Without a dominant urban centre, it sprawls over 4,400 km². The highway network is laid across the whole region and shapes its fractal spatial form. The highway network defines new cores for the region and new edges. Therefore it is necessary to regard the highway network not only as an issue of traffic planning, but also as an issue of urban design. The highway creates fractal structures, but at the same time it is the great neglected opportunity in city design. It is “one of our best means to re-establish coherence and order on the new metropolitan scale” (Appleyard, Lynch, Myer 1963: 12).

Regarding the highway as an issue of urban design means to work on a regional level. But how can the regional level be represented and handled in environmental simulation? How can movement be shown? How can the huge dimension of a ‘highway city’ be made comprehensible? In 1963 Appleyard, Lynch and Myer faced this question. In the beginning they thought about endoscopy as the classical simulation technique for movement in space. But they withdrew from this approach, as ‘these techniques suffer from disadvantages of cost or complexity, of failure to abstract the essential or of inability to communicate the sense of sequence.’ (Appleyard, Lynch, Myer, 1963: 21). Instead, they developed a graphic technique to represent the main spatial characteristics of a highway. This technique enabled them to represent space, motion and views in a single drawing.
But it was rather abstract and therefore not commonly used for other projects on metropolitan highways. And without an easy to handle technique to simulate the regional level of highway design, the idea of regarding the highway as an urban design issue itself disappeared. There is - at least - a small relation between the lack of appropriate simulation techniques and the increasing opposition on highway planning in the 60s.

And today? 40 years after Kevin Lynch the issue has come back on the agenda.

The first architecture biennial ‘1ab’ held in Rotterdam presented visions on the future design of metropolitan highways in several exhibitions worldwide. This rediscovery is closely linked to the intense debate on how to handle the fractal character of the contemporary city landscape. This rediscovery is also linked to digital simulation techniques that offer new and easier to handle possibilities to simulate movement and to represent the regional scale.

In the following the authors want to present three projects on the relationship of urban design and highways. In each of them a different solution on simulation had to be found. The solutions are quite diverse but they have in common that none of them uses high-end technology. They are all based on common and easy to handle applications.

How to present 70 km of a highway?

The Herbstakademie ‘City Scape B1 - Visions for a Metropolis’ was a joint project in cooperation with the Ministry of Urban Design, the cities of Dortmund, Bochum, Essen, Gelsenkirchen and Duisburg and the Universities of Aachen and Wuppertal. For two weeks more than 100 students from all over Europe were searching for new ways to look at the B1, the very central highway of the Ruhr Area. They were assisted by members of the cities, a group of professors and architects like Kees Christiaanse, Henri Bava and Christophe Girot.

The key question was: Can the B1 become something like the Champs-Elysées of the Ruhr area? Can the symbolic strength of this space be translated into a ‘B1 urban design’ that reintegrates the street into the surrounding urban fabric? What does a 70 km boulevard look like?

Figure 1: The View from the Road. Appleyard, D., Lynch, K., Myer, J. R. (1964), Cambridge, MIT, 1966, p. 48

Figure 2: Herbstakademie. Archive
For the design groups it was a challenge to present the highway not only as 70 km of high-speed line, but as a common linear city space of the five participating cities with highly differentiated spatial and economic structures. The first idea was to make a model in scale of 1:2000. It was to give an idea of the regional structure and then to be used as an insert model for the design schemes produced by the academy. The idea was to make an endoscopic film of a modern version of a ‘Champs Elysées of the Ruhr Area’.

But then, a 30-meter long model in 3D is simply not fundable with a normal budget. Therefore a more abstract solution had to be found, a light-model, scale 1:5000 only 14 meters long. This compromise had certain advantages, as it could combine three different levels of information:

- aerial pictures for the spatial information
- a roughly categorized land use for the structural information
- pictures and quotations as theoretical hints

This solution was working very well, as the model represented 70 km of new urban space and helped to discuss the design schemes in their regional context.

**How to present landscape design?**

‘The Hidden Metropolis’ was part of the exhibition ‘World Avenue’ at the Rotterdam Architectural biennial ‘1ab’, developed in cooperation with the Universities of Aachen, Berlin and Wuppertal.

The project examined the A 42 running through the northern part of the Ruhr Area. The IBA Emscher Park, running parallel to the A42, was a first step towards restructuring the former coal-mining region to an agglomeration of high technology and science clusters. But the regional image remains the same, due to the fact that the changes cannot be seen, neither physically, nor from the road. Here, the highway could be used as a catalyst supporting and structuring the spatial changes to make them more legible for the people of Rhine Ruhr. The nature becomes the most important tool of highway design. Landscape forms a linkage between the different cities of the region.

All 10 teams invited to participate in the exhibition were asked to work with endoscopy techniques. The problem was that of scale. All participants were asked to work on a 10 km long sequence of highway in detail with a model scale of 1:5000, which is rather tiny. As the project focused on the topic of landscape and came up with a design scheme of small landscape interventions, these could not be shown in an endoscopic film within the given scale. Another solution had to be found which in the end turned out a rather simple one - ‘before’ and ‘after’ pictures done in PhotoShop. They illustrate for example how existing coal tips, now hidden behind strips of greenery, can become part of the driving experiences by small landscape interventions.

Figure 3a – 3b: Biennale before / after.
Arbeitsgruppe A42. Dominique Bückers, Andre
**How to present highway buildings?**

Cartopia dealt with the whole highway network of the Rhine Ruhr Region and was part of the exhibition ‘Rhein Ruhr City - the undiscovered metropolis’ by the NRW Forum Kultur und Wirtschaft in cooperation with MVRDV and several Dutch and German universities.

The highway boosted the size of cities to the regional scale. Instead of living in different cities the people of Rhine Ruhr nowadays live and work in a middle landscape. The highway is not only a connection, but also the main backbone of the fractal city structure of Rhine-Ruhr. It creates new spatial as well as social patterns. Cartopia describes the urban and architectural possibilities that are emerging from the daily flow of people and their needs. Within three design-schemes aiming for small or medium-sized interventions it was shown how the urban future of the highway might lie within a wide range of different small programmes. Only a sequence of diverse little places can make the highway throughout its whole length a lively place to live.

Students of the BU Wuppertal did the design work. Due to their skills, the availability of hard- and software and the need for the students to work in different groups and rooms, the first idea of endoscopic animations was soon withdrawn. In the end their exhibited film was a synthesis of real sequences filmed with a normal video camera and digitally animated urban design schemes, added in Adobe Premiere.

**The door to regional design**

All three projects dealt with the highway on a regional level. And all three projects intended to use endoscopic techniques, but ended up with other, easier to handle solutions. Three aspects were essential for these decisions:

- **Size matters.** It is not possible to make a model representing the dimensions of a highway in a scale you can use for endoscopic films.
- **Hierarchy vs. networking.** In networking structures of decision making the final decision is hard to reach - and digital applications are a little more flexible.
- **Lab working vs. mobile working.** Networking is mobile working with changing meeting places while endoscopy needs permanent lab working.

It is a kind of reflex to think that highways are perfectly suitable for endoscopy simulation as endoscopy can show movement and the cone vision of the driver’s perception. But as the experiences show, and there they are corresponding with those of Kevin Lynch, it is not an appropriate technique to approach the regional level of a highway. Only digital techniques that can combine different levels of information and different kinds of film material seem to be making the regional relationships comprehensible.

*Figure 4: Cartopia. BU Wuppertal. M. Dreyer, M. Elfezazi, A. Pinca, A.*
Maybe it isn't such a big surprise that the topic of highways reappears in the discussion on the urban future at a moment where digital techniques are becoming more and more accessible. Perhaps the planners of the 80s and 90s chose not to work on the topic of highways not only for its unpopularity but because they didn't feel they had the appropriate tools for it. Only today, with film techniques more and more spreading, regional scale is getting better and better represented and due to this, mobile spaces can be designed. Digital simulation is the door to regional design. This door should be used now, as we have to shape the fractal cities now.

References