Figure 11.6
Building the bamboo structure: the opening dragon ceremony. (*Source*: Hulshof Architects.)

This programme is planned over a period of 10 years, but it will be very hard to implement. Dealing with residents and existing infrastructure is already causing big delays. Of the existing houses built after the war, around 50% are outdated, which means that there are at least 2 million houses in need of improvement. This is far in excess of the number cited in VROM's policy.

The practice has argued for a transformation programme and the addition of space by developing on top of existing buildings and connecting buildings together 'in the air'. This would offer a significant opportunity, even if only the roofs of the social housing built after the Second World War are considered. This leads to another calculation showing the possibilities of developing on top of the existing buildings with three and four storeys:

	Number of houses	**Floor space (m^2)**
Existing	400,000	32,000,000
New	100,000	10,000,000
	Additional dwellings from roof development 20,000	Total area, with roof development added 42,000,000

The increased area of each existing house was calculated to be an average of 100 m^2, to be found within the existing footprint of the housing. This means a real addition of 20,000 houses to

the existing stock. Keeping the buildings allows the profit from the new houses to be reinvested in the existing building, so the existing stock can be upgraded and the interiors refurbished. With rising land prices, part of the profit could be invested in the exterior environment of these mostly prefabricated housing blocks.

The city of Rotterdam and Delta Metropolis

Delta Metropolis incorporates the four big cities in the 'Randstad' (Amsterdam, The Hague, Rotterdam and Utrecht) and the towns of Almere and Amersfoort (Deltametropool, 1998; VROM, 2001b). This metropolitan region is economically powerful and the port of Rotterdam is its main gateway, and is crucial for the distribution of goods entering and leaving Europe. However, because of high land and development costs, few houses have been built and there is a small out-migration of population from Rotterdam's city centre. From 1995 to 2002 only 1000 new houses were built in the centre, and the number of inhabitants decreased by 500 persons. To revitalize the centre and encourage more people to live there, density needs to be increased in order to offer a safe and comfortable living environment.

The building programme for the city of Rotterdam planned for the addition of 2250 houses (2000–2004), and a further 3750 between 2005 and 2009 (Figure 11.7). The practice investigated the space offered by the existing buildings, the planning possibilities in open areas, and the replacement of old buildings. Seen in this traditional way, the study showed there was some 300 ha of space available for development in the city centre. However, the study extended to a consideration of the space available if the roof structures were used. It was found that the flat roofs in the centre offered space to develop, in addition to the Rotterdam plan, another 3000–6000 houses depending on their size and, of course, the practicality of gaining access to them.

Precursors for Upper City ideas

Zwarte Madonna in the Hague, a design proposal by Eric Vreedenburgh, is a prominent example of the concept. It envisages a structure with steel frames to make a new complex including a new 'ground' floor with open green playing fields