SMALL ELEMENT PAVING IN AMSTERDAM

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SUMMARY

The Netherlands, and especially Amsterdam, have a long tradition in using small element paving materials (granite, clay bricks or concrete blocks, concrete flags) to pave our roads. This paper briefly describes the history of this type of pavement through the ages. The paper answers the questions, when did it start, why did it disappear, how did it come back again and what are the most recent developments?

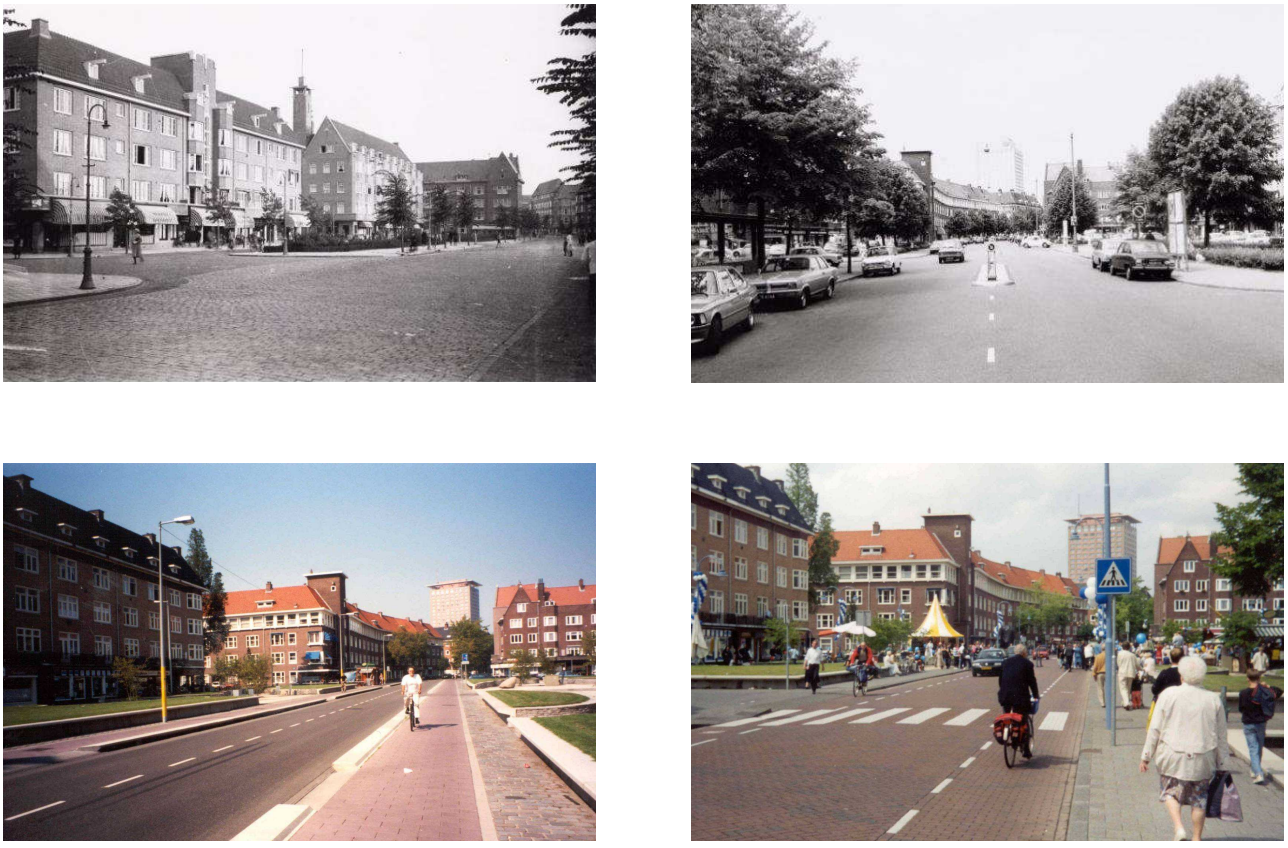


Figure 1. The history of small element paving in the Maasstraat, Amsterdam. From top to bottom and left to right: The situation in the 1930s with granite on the street, the situation in 1977 with asphalt to facilitate motorised traffic, in 1998 an attempt to redesign the street with asphalt, finally (because the 1998 design caused a lot of problems) a successful design in 2000 that illustrates the 'comeback' of small element paving in Amsterdam.

1. PRE-MIDDLE AGES: THE FIRST 'ROADS' COME INTO EXISTANCE

The Dutch cities developed at intersections of rivers. They were connected by dikes. In many respects these were the first 'roads'. Transport of commodities and people took place by water. Figures 2 and 3 show these intersections. The canal boats were pulled along by horses on the towing path on the dike as shown in Figure 4.



Figure 2. The Netherlands in Roman times

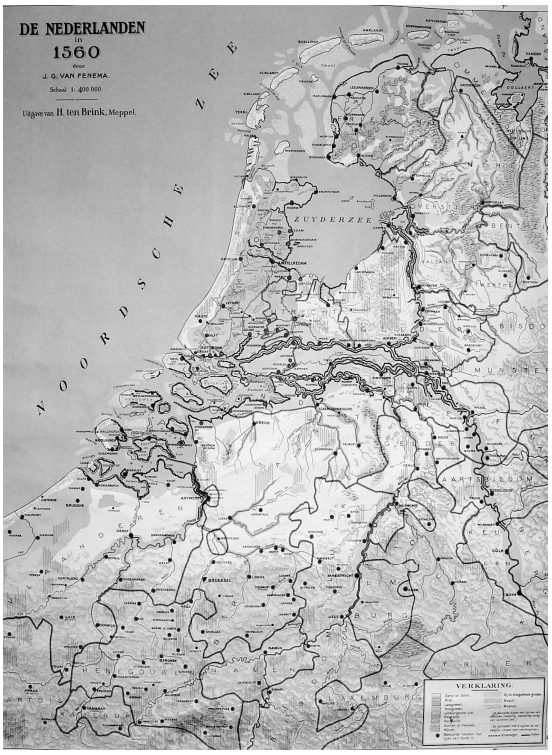
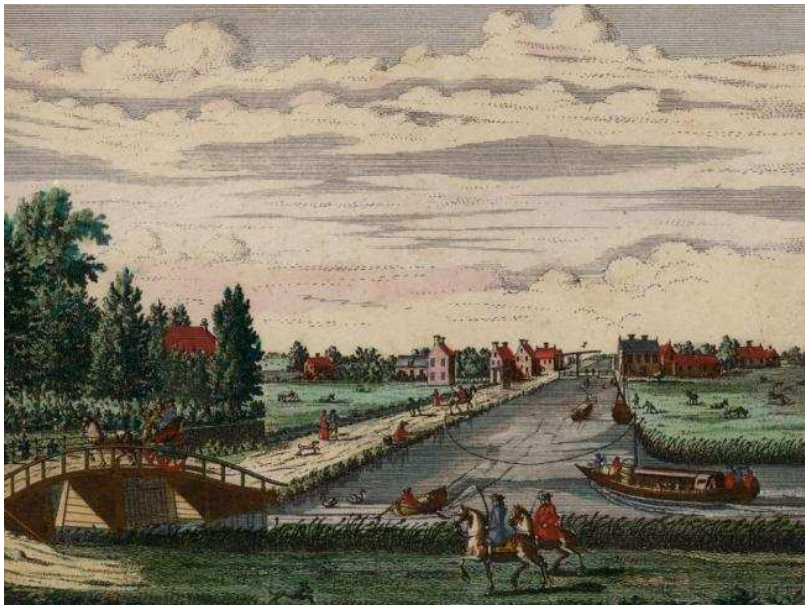


Figure 3. The Netherlands in 1560. Cities develop near river crossings.

Figure 4. 1725. The first 'roads' between the cities. Transport is by water, a horse on the towing path pulls along the canal boat.



2. END OF MIDDLE AGES: GRANITE AND CLAY BRICK PAVEMENT

At the end of the middle ages trading between the Netherlands and Scandinavia increased. A by-product of this trade were granite stones; they were used as ballast by trading ships coming back. With this material the characteristic quays of the canals (grachten) were paved. During this period the wooden houses were replaced by (clay) brick houses. Clay bricks and granite stones were used as pavement. The bricks were often used as strips in the granite because they were more comfortable for walking.



Figure 5. 1886. View of the Lijnbaansgracht, Amsterdam. Granite, originally used as ballast for ships, is used to pave the quay.



Figure 6. 1796. View from the Grimburgwal. Granite is used as roadpavement, pedestrians walk on the side on clay bricks.



Figure 7. 1767. View from the Grimburgwal. Granite is used as roadpavement, pedestrians walk on the side on clay bricks.

3. BEGINNING 20TH CENTURY: THE FIRST CLASSIC STREET

At the end of the 19th century Amsterdam developed new housing areas outside the original city walls. (See Figures 8 and 9.) In the design of this new infrastructure the first classic streets occured. A street was divided in road for motorised traffic in the middle and elevated sidewalks on each side to accomodate pedestrians. Paving of road and sidewalk was still made by small materials as granite or (clay) brick.



Figure 8. Amsterdam after1663. The city still develops within its original city walls.



Figure 9. Amsterdam end of the 19th century. The city develops outside its original city walls. In these new housing areas the first real streets occur.

Figure 10. End of 19th century shows a view of a street in a new housing area. Note the introduction of the elevated sidewalk for pedestrians.



4. MID 20TH CENTURY: THE INTRODUCTION OF ASPHALT ON MAIN ROADS

In America asphalt was already used on a large scale. The increasing motorised traffic demanded different caracteristics from the pavement and asphalt seemed the ideal solution. Whith motorised traffic numbers also going up all around Europe, asphalt was introduced in Amsterdam. It was used to pave the main traffic roads. Besides asphalt another new material was invented; concrete. The famous concrete flag, 30 x 30 cm, is a good example and is up to this day the most common sidewalk paving material in Amsterdam.



Figure 11. 1950. View of the Vrijheidslaan, Amsterdam. Motorised traffic increased, demanding a different pavement for the main roads. Asphalt, already used on a large scale in America was introduced in Europe and Amsterdam.



Figure 12. 1960. View of the Ferdinand Bolstraat (main road) with asphalt on the street. Concrete flags, 30 x 30 cm were used on the sidewalk.

5. MID 20TH CENTURY: NEIGHBOURHOOD STREETS GET ASPHALT

In this period the car became increasingly popular and symbolised wealth. Asphalt was associated with quality and modernity. As a result, after World War II, not only the main roads were asphalted but asphalt in neighbourhood streets became 'fashionable' as well. The use of bricks, granite stones and other small element materials was abandoned.



Figure 13. 1959. View of the Maasstraat (neighbourhood street). Situation before renovation with asphalt showing granite on the street.



Figure 14. 1977. View of the Maasstraat with granite replaced by asphalt. Cars start to dominate street and public space.

6. MID 20TH CENTURY: MOTORISED TRAFFIC STARTS TO DOMINATE CITY AND PUBLIC SPACE

Heavy traffic increased and started to conflict with the quality of life: traffic jams, accidents, pollution, noise and less room for other functions in public space. A new way of thinking was needed.



Figure 15. 1970. View of the Amsteldijk. Cars dominate the street. More and more traffic jams occur.



Figure 16. 1972. View of the Amstelveld. More and more parking space is required to facilitate the growing number of cars. Other uses of public space get marginalised.

6. END 20TH CENTURY: THE CAR GETS TAMED

The car had to be tamed. A large part of the inner city of Amsterdam was made traffic-free. The profile of the main road was devided in different traffic functions. Mass and velocity were seperated to increase traffic safety and control. Tram, buss, car, cycle and pedestrian received their own space.
In the neighbourhood street, vehicle speed limits were reduced to 30 km / hour. Road paving changed as well. It became evident that aphalt roads, after a period of time, started to look shabby.
Maintainance and continuing works on the streets (pipes for electricity, drainage, sewerage) turned the asphalt into 'patchwork'. This worsened with the soft peat-soil. Small element materials followed the settling of the soil better then asphalt ánd maintainance was easier.

Also, research pointed out that small element paving had a significant effect on lowering the average traffic speed and thereby increasing safety. See Figure 18. Car drivers associated small element paving with neighbourhood streets (living area, children playing etc.) and the rough surface was noisy and less comfortable to drive on. As a result only the main roads were asphalted. The neighbourhood streets were paved with small element materials again: bricks, preferably clay because of it's authentic and luxurious look, and concrete blocks or flags. Even granite stones were being used again.



Figure 17. 1980 and 2000. View of a street in de Pijp. The car is tamed. Asphalt in neighbourhood streets is being replaced by concrete blocks again. Space for the cars is clearly defined, the small element paving (and often speed humps) control speed.

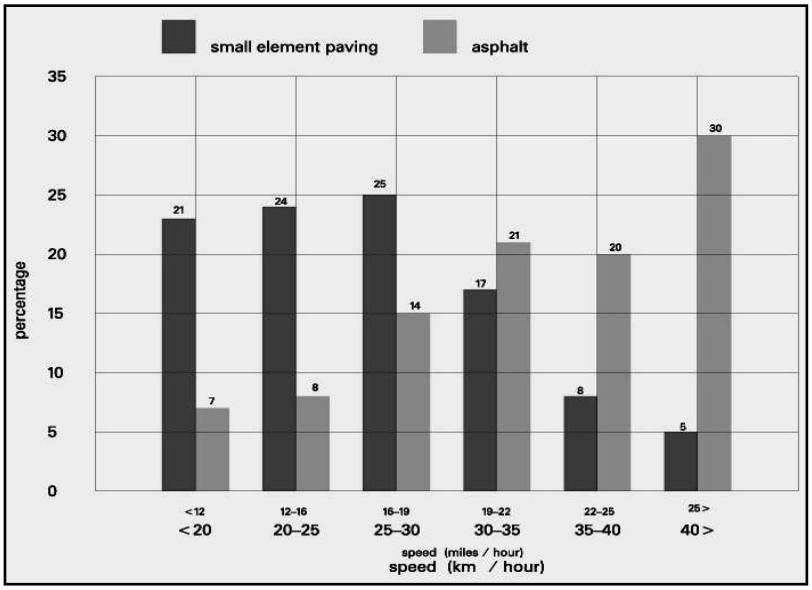


Figure 18. Average speed of motor vehicles by speed catagory during all days of the week, in the Javastraat, Amsterdam (source: "Evaluatie wegprofiel, 30 km / uur gebieden IJburg", VIA bv). The Javastraat was asphalt. The asphalt was changed to small element paving,-in this case granite. This resulted in a significant speed reduction (without the use of speed humps). Other research has shown that clay bricks or concrete blocks have the same effect.

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7. 21ST CENTURY: SMALL ELEMENT MATERIALS WILL BECOME MORE DOMINANT AGAIN

Amsterdam is being divided in 50 km/hour main streets and 30 km/hour neighbourhood streets. On the main roads each type of traffic has it's own space. Asphalt is the main material for the roadpavement. Special noise reducing asphalt is used to improve livability in these streets. The sidewalks are paved with small element materials, in general the 30 x 30 cm concrete flags. With sufficient finance clay bricks are used (clay bricks are more expensive). The neighbourhood streets are paved completely with small element materials. The road is made of clay or concrete blocks (depending on finance), the sidewalk with 30 x 30 cm concrete flags or clay bricks. Squares and other specific public spaces are paved with bricks of clay or granite. This type of material is now considered to have the highest quality for living areas.



Figure 19. 2006: View of the Stadshouderskade. Main road is asphalt. All traffic participants have their own space. Sidewalks are made of 30 x 30 cm concrete flags.

Figure 20. 2000: View of the Eastern Harbour Area. In new housing areas bricks are used to pave the road. Here the sidewalks are also made out of clay bricks. Being a neighbour-hood street, bikes are allowed on the road.





Figure 21. 2006: View of the Dam. Being one of the most important squares of Amsterdam the paving is made of granite.

8. CONCLUSIONS

In historic times Amsterdam streets were paved with small element paving. With the taming of the automobile and asphalt by segmental paving, the old way is now the new and normal way to pave Amsterdam neighborhood streets and sidewalks and city sidewalks and squares. History has proven to be right by showing us that segmental paving – stone, clay and concrete – contribute more character, visual appeal, safety and lower maintenance than asphalt.



Figure 22. 2006. On IJburg, in the neighbourhood streets, granite has been reintroduced. The rough stones reduce traffic speed and give the street a classy image. Cars park on a part of the sidewalk; the parking places are situated behind the kerbstones and the same brickpavement is used as for the sidewalk.



Figure 23. 2006: View of the Maasstraat under construction. The succes of the design of the first section of the street in 2000 (see Figure 1) resulted in the recent decision to construct the other sections of the street the same way.