THE IMPROVEMENT OF THE WORKING CONDITIONS OF PAVIOURS BY MEANS OF MECHANISATION

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SUMMARY

The organisation for the improvement of working conditions in the construction industry in the Netherlands, ARBOUW, chairs a committee in which all relevant organisations in the field of small element paving have a seat. This committee conducts the program of activities which aims at the prevention of occupational health injuries and safety hazards. The predominant hazards are lumbar injuries caused by the combination of heavy loads which are handled, and the postures which have to be applied. After several years of research, we have recently made the first steps towards practical solutions.

Principally there are two ways of improvement: less heavy paving materials which are easier to handle, respectively handling mechanisation. The first line will be presented in the paper by Koningsveld, Houben, Huppes and Poll in session 1: "General considerations on the choice of Concrete Block Paving".

In the past few years there have been a lot of developments in mechanical paving. The possibilities and bottlenecks have been mapped out by Poll and Huppes (1985). In this paper I shall describe the organisational conditions under which developments are promoted. Various mechanical equipment will be briefly described. Mr. Vievermans, who presents his paper "Continued application of mechanical paving in Rotterdam" in this session, will describe more in detail the organizational and quality aspects.

ARBOUW

Arbouw is an organisation which was founded by both employers' organisations and unions in the construction industry in the Netherlands. The objectives are the protect ion and promotion of workers' health, the prevention of occupational accidents and the minimizing of absenteeism.

Arbouw has no formal power to decree directives or to dictate work to be better organised. We have to try to convince em ployers and workers that better working conditions are not only a question of social awareness, but that those will benefit the quality of the organisation, of the con struction and will also result in better revenues.

Main activities of ARBOUW are research and development; information about and promotion of solutions for health and safety hazards; consultancy; education, especially integrated in apprenticeship; negotiations with manufacturers, principals and legal authorities.

COMMITTEE ON WORKING CONDITIONS WHEN PAVING

This committee was founded in 1981 to support ARBOUW's activities for paviours. The first success was that all invited organisat ions accepted their membership. Those were:

* the Ministry of Social Affairs
* two unions
* two employers' organisations
* the organisation of directors of public works of all Dutch municipalities
* several organisations of manufacturers of paving materials
* a professor in road construction
* some very experienced retired paviours.

The committee has no formal authority. However, all members play their role in carrying out the work to be done. Owing to this, the activities became broadly based, which among others resulted in substantial financial support by the Ministry of Social Affairs.

RESEARCH RESULTS

The first results were presented at the 2nd International Congress on Concrete Block Paving (Koningsveld, 1984).

The main conclusion was that the health injuries of paviours were predominantly the result of the manual handling of heavy paving materials in connection to the postures applied. Especially kerbs, large slabs and gullies were qualified as heavy materials.

Since the Delft congress, several new investigations were carried out. These resulted in some more conclusions, e.g.:

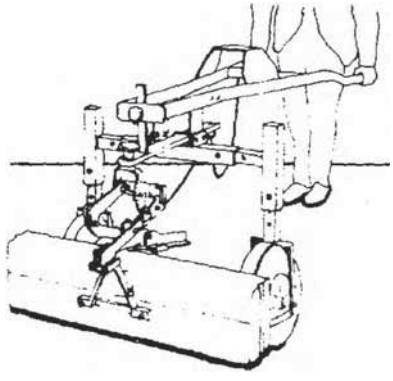
* when paving a straight surface with blocks (± 100x200 mm) in a high pace mechanical paving should seriously be considered;
  kerbs cannot be of less weight, so these have to be handled mechanically;
  large slabs are always far too heavy for manual handling; mechanical handling can be considered, but the application of other materials is preferred.
* the development of equipment for mechanical repaving of blocks should be very useful.

WAYS OF MECHANISATION

In Delft Mr. Van der Heijden and Mr. Van Leeuwen showed the first attempts that were made in the fifties: an enormous machine was developed for the laying of blocks in Amsterdam (CBP proceedings 1984, p. 231).

At that time various factors hampered a successful introduction: labour was yet relatively cheap, hydraulic mechanisation was still in its infancy, concrete blocks may have had a greater tolerance than nowadays, and so on.

The next attempts were less revolutionary. Simple hand operated tools on two wheels were cheap, but dit not .attract the employers nor the workers. Their higher efficiency effect was at best doubtfull.



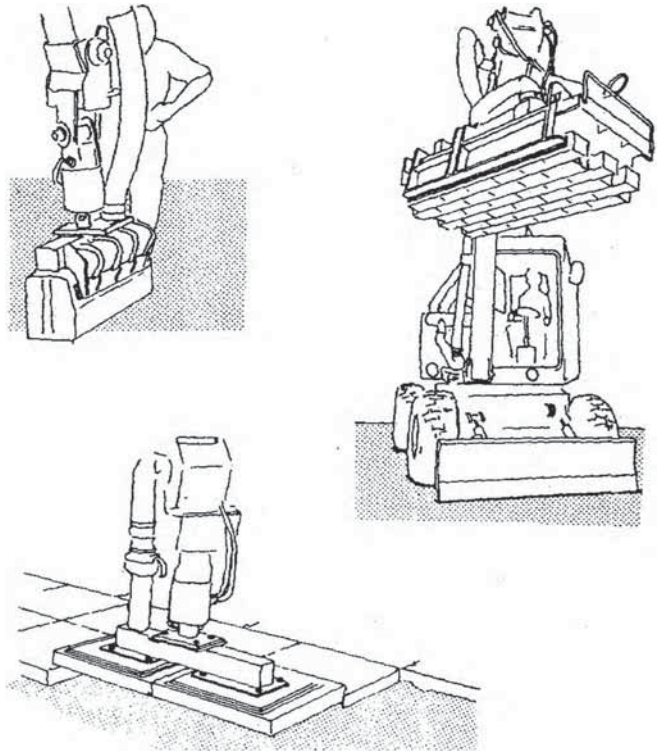
From Germany two self propelled block laying machines were introduced. In the Netherlands only a few of them were sold. However the application was not successful enough; the positioning of the packet of blocks took too much time.



The paving of a container terminal of 80 hectares in the Rotterdam harbour with 12 cm heigh blocks was the motive for the development of a clamping equipment that was fixed to a hydraulic excavator. The publicity around this gigantic pavement inspired the way of thinking about mechanical paving in the whole country.



The most promising system, in my opinion, seems to be vacuum hoisting. Various devices can be connected to the hoisting arm of a hydraulic excavator, so that a packet of 1 m* of blocks can be laid at the same time, but also kerbs, two or four medium size slabs, etc. The efficiency of these machines seems high enough for a broader introduction.



Important points are the change in work organisation and the adapted delivery of paving materials. Mr. Vievermans will tel] more about these aspects.

IMPLEMENTATION

Above it was stated that several ways for mechanisation are now on the market. A wide publicity supported the implementation.

However, most paving firms are small and are not very accustomed to investments of more than a few thousand dollars.

In order to help mechanistion to be more common the Committee arranged financial support from the Ministry of Social Affairs. In 1986 each purchase by a paving firm of an ergonomically designed mechanical device was subsidised by 50%! Originially 1 million guilders was available ($ 500,000); at the end of the year 2.3 million guilders had been supplied.

CONCLUSIONS

After four hundred years in which the work of the paviour has hardly changed, we are now at the start of the age of innovation in paving. This leads to the real introduction of mechanised paving. This development will have great impact in the field of small element paving and it will confer a benefit on the health of paviours.

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