

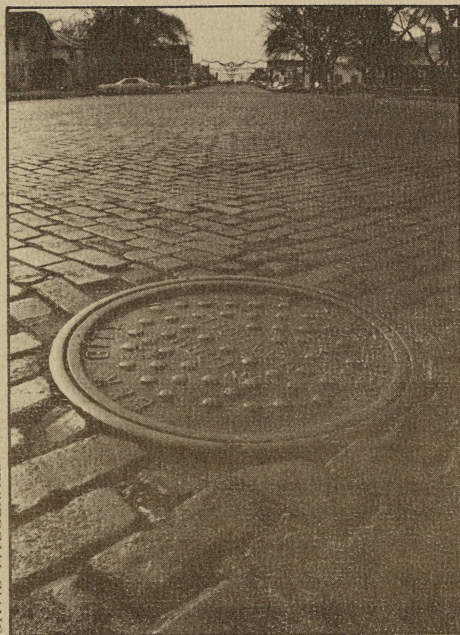
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# Preservation and Maintenance of **BRICK STREETS**

By Harry B. Kelso with Joy Dunn





Street of Broadway Historic District, protected by a city ordinance. Elk City, Okla.



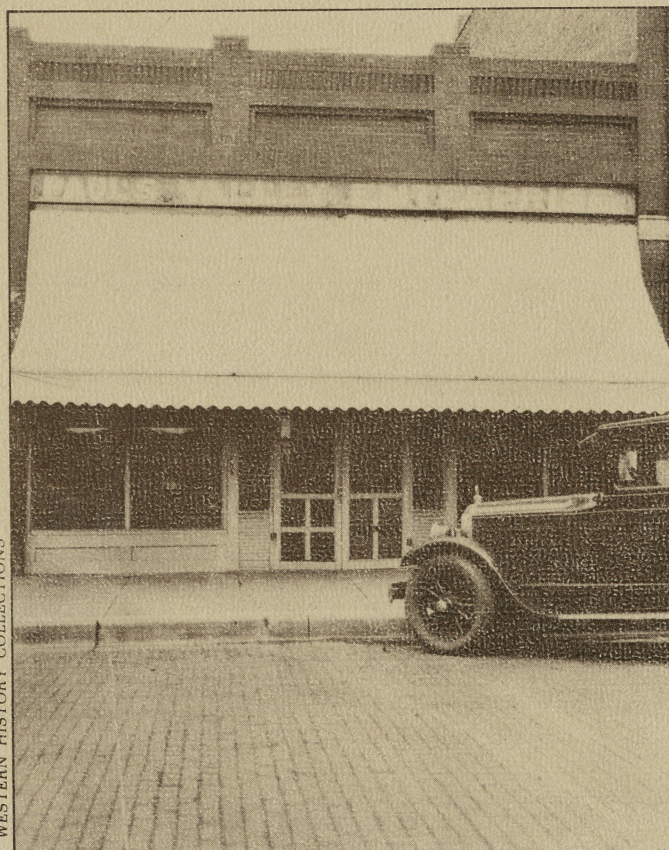
# Preservation and Maintenance of BRICK STREETS

By Harry B. Kelso with Joy Dunn

Brick street paving came into favor prior to the beginning of the twentieth century in the United States after suitable raw materials and methods of mass production of brick were developed. Mechanical devices and methods of vitification of the prepared clay blocks combined to reduce the brick cost and increase the production volume significantly. The cleanliness, supportive strength and durability of brick streets were a vast improvement over the clay, clay-sand and gravel streets previously used. Maintenance costs were low and the appearance was an improvement as well. The finished brick surface was a great advance over previously used materials for existing traffic. Many thousands of miles of brick paved streets were constructed, particularly on the main and downtown thoroughfares, to the extent that on many occasions paving brick was in short supply. The use of brick for street paving reached its peak in the early twenties when the use of portland cement concrete in street paving made its debut. Prior to that time the plants that produced portland cement were minimal and many times were located far from the scene of the proposed street improvement. However, during this period many cement plants were built throughout the country, thus lowering the cost of the material and making it more available to the location of the proposed paving. Further research and technology led to the development of mechanical concrete mixers and pavers which in turn led to the possibility of construction of the system of concrete highways and streets in present use. As a result of these developments in concrete construction, there have been few brick streets made since the third decade of the twentieth century.

However, many of these old and historic brick streets are still in use and are adequately serving their purpose despite the increased wheel loads and

traffic imposed on them. Some, for one reason or another, have been topped with tar or asphalt, but others continue to provide adequate service with the original brick surface intact. Many of these streets are approaching a service life of one hundred years and show little wear or evidence of the need for repair. It is for these reasons that many communities having good brick streets wish to establish a means of performing maintenance and repairs to



Pauls Valley, Oklahoma retains its brick streets as an important element in its downtown revitalization.





Existing residential brick streets in Ponca City, Oklahoma remain in use with nominal maintenance costs.

preserve the integrity, quality, and aesthetics of these long serving thoroughfares.

Should a community desire to preserve its brick streets into the future, there are basic factors bearing on economics and law that should be considered. One economic factor is the cost of repair to the particular streets involved. If the streets have deteriorated to the degree that repairs would be extensive it is possible that preservation would be remote. However, if the streets are in moderately good condition the cost factor may not be as vital. One of the factors of law that would enter into the matter would bear on whether or not the street is also a state or federal highway. In some cases the state and federal governments contribute to the maintenance of the highways and by law have a voice in construction and traffic control. This factor should be examined by the people of the community before entering a program of brick street preservation. One of the factors of maintenance and preservation of the existing brick streets will be the examination of the streets from the standpoint of type, condition, location, wheel loads, and volume of traffic to be expected.

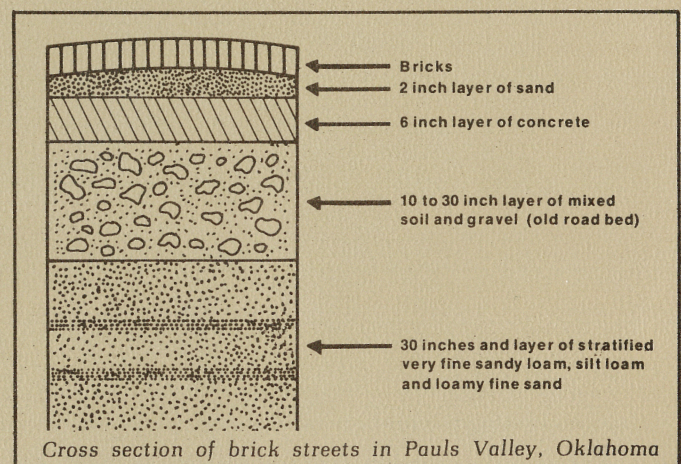
The following will point out some of these significant factors in detail:

The life and maintenance of any well designed street or roadway are greatly dependant upon the subgrade, which is that part of the structure immediately beneath the pavement. The subgrade is usually earthen and is prepared in such a manner as to allow it to properly support the design wheel loads and volume of traffic anticipated.

The life and maintenance of a street or roadway are also dependent upon weather factors such as rainfall, snow, freezing

temperatures usually imposed upon them. Of these weather conditions rainfall and freezing usually cause the most damage. Freezing causes deterioration by forcing the roadway to "heave," thus causing displacement of the subgrade and cracks in the pavement. Rainfall causes damage by finding its way into the subgrade, thus reducing its supportive ability which in turn contributes to pavement damage. There is little that can be done to prevent damages caused by freezing of the subgrade. Expansion joints can be placed in the pavement to reduce damage caused by high temperatures. Problems caused by rainfall and flooding can be reduced by adequate drainage, which is intended to maintain the subgrade in as dry a condition as possible.

Since the thrust of these observations is directed toward the preservation of brick streets, it appears pertinent that a general explanation of types of construction used in the recent past be reviewed:



Cross section of brick streets in Pauls Valley, Oklahoma



1. One method is that after providing a good subgrade and adequate drainage a cushion of sand in the range of one and one-half inch thick is placed upon this and rolled to the contoured finished surface of the subgrade. The brick is placed upon the sand cushion and rolled to a uniform finish grade. When the brick is placed upon the sand cushion usually a space of one-quarter to three-eighths inch is provided between each brick. After an appreciable area of brick has been placed and rolled a sand-cement grout or other filling is poured into the space surrounding each brick. After grout has been set and cured the pavement is ready for use. This is the lowest cost method of brick paving.

2. Another method of construction of brick roads is to provide a good sub-grade and drainage. Then a reinforced concrete slab is poured upon the subgrade. The slab was usually in the range of six to ten inches thick depending upon design conditions. The sand cushion and brick were then placed on top of the slab, as in the first method.

3. Other methods are similar, except some use tar as the joint filler in place of cement grout. Another uses cement mortar as a bedding course in place of the sand cushion. In some cases, in Oklahoma particularly, no joint filler was used.

Previously it was mentioned that many cities are becoming interested in the preservation of their historic brick streets. Some have gone to the extent of having studies made of these problems related to continued service of their streets. Pauls Valley, Oklahoma, is one such city. The interested citizens of Pauls Valley have made an in-depth study of their problems of maintenance and developed the following findings.

The present brick streets in Pauls Valley have an excellent sub-grade with a six inch concrete slab on top and a sand cushion with the bricks placed upon that. This is the most serviceable type of construction for the existing environment, climate, and traffic demands.

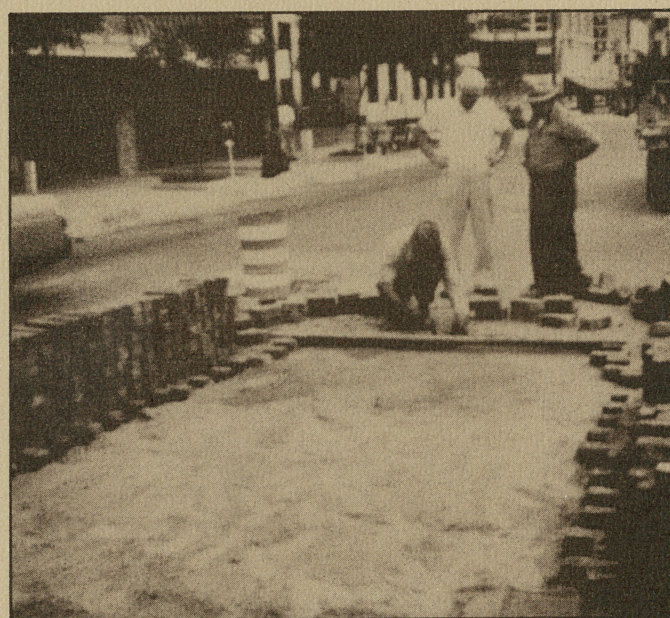
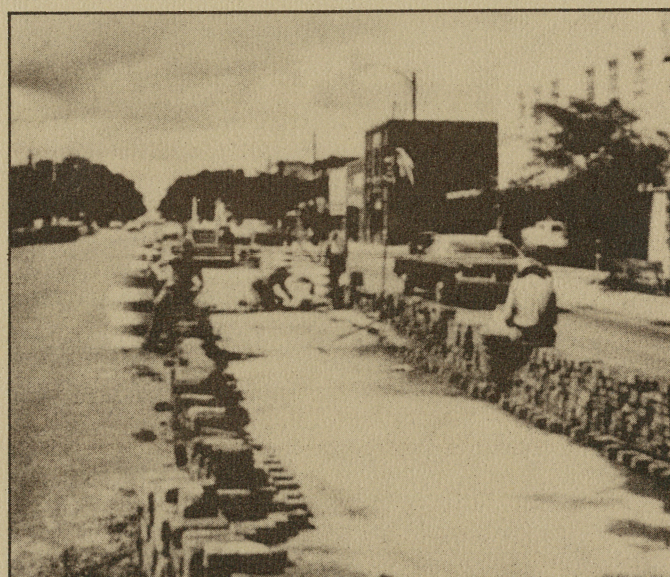
In some areas the street joint filler has deteriorated to the extent that there are obvious voids in the joints, primarily between the brick surface and the curbing. In some places, the brick has been removed and has been replaced with patches of cement and asphalt. The central segments of the streets are sound condition, with most of the deterioration existing in the area of the curbs and gutters, which are in worse shape than the streets themselves.

All of these facets of the deterioration of the streets are repairable as follows:

1. Where the brick surface has subsided, the brick will have to be removed and the sand cushion be replaced and brick relaid.

2. Where the joint filler has deteriorated to the extent that there are voids existing, sand filler should be placed in conformity to the contiguous portions of the street.

3. Where the asphalt and cement patches are



Conservation of brick streets in downtown commercial district of Pratt, Kansas. The sand cushion is replaced and the bricks turned in.



evident, these should be removed and replaced with bricks.

4. Where the curbs and gutters show cracks and/or settlement--these cracks should be chipped and grouted, with the gutters leveled with the grout.

Ultimately, a project cost estimate will have to be prepared. Before such an estimate can be made, it will be necessary to establish the scope of the project. In order to establish the specific work to be done, the following questions will have to be answered:

1. How many blocks, or total length or area of brick paving is to be considered?

2. What are the maximum wheel loads that may be placed upon the streets?

3. Should asphalt be removed from brick streets to come into conformity with the remainder of the brick streets in the historic district?

The removal of asphalt or other bitumen topping is one where a variety of methods are being developed. The primary concern in removal is possible surface damage. The problem is not as complex when removing the asphalt topping from brick surfaces as it is with concrete. The utmost care has to be used where mechanical scrapers, grinders, and pneumatic hand tools have been used for the removal of the topping material. Water blasting and refined use of solvent solutions are the means which hold the most promise for the future.

Another community that is beginning to deal with the importance of preserving their original brick streets is the city of Pittsburg, Kansas. At one time all the streets surfaces were brick, but about half the streets have been covered over with asphalt. In order to preserve the remainder, the City Commission has ruled that when a utility cut is necessary, that the work be done and brick surface replaced. In order to carry this out, the City has contracted with brick masons to educate the city and utility company crews in the methods of retamping and replacement of brick. In Pratt, Kansas, the downtown commercial area streets are still largely brick surfaced. The downtown merchants fought against asphalt covering until the City has undertaken the turning of the brick streets to bring the streets back to excellent condition. The bricks were taken up, the sand cushion was replaced, the bricks were then turned over and replaced. In the reconstruction project, the concrete base has proved to be satisfactory. Darrell Shumway, the Street Superintendent noted that: "The actual cost per yard of replacing bricks and sand is approximately \$7.50 per square yard."

Removal of the asphalt overlay is the more difficult effort. In the fall of 1976, the Dahlgren Construction Company received a contract from the City of Guthrie, Oklahoma, for the removal of the asphalt from a downtown street, but with the purpose to replace the asphalt. But from that

experience, using the Galion road planner, Jim Dahlgren felt that the original brick surface was left in such a condition as to be usable by current standards. In his opinion, both the Galion and CMI equipment, if used with proper care and sensitive supervision, could be used to restore the original brick surfaces. In Galveston, Texas, removal of asphalt through the use of water under high pressure from the alleyways is being investigated. The Strand Historic Landmark District, as noted by Peter Brink, will better utilize its building stock by making the alleys more attractive and opening up the back of the extremely long buildings for commercial use.

This brief paper is meant as an introduction to the preservation and maintenance of brick streets. In a period when petroleum products are being purchased at increasingly premium prices, the conservation of existing brick surfaced streets, which require a minimum of maintenance and repair, will become increasingly important as an alternative for historic districts and downtown revitalization projects.

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# **HISTORIC CONSERVATION PROGRAMS**

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