TECHNICAL NOTE #21

Accessible clay brick paving for people with disabilities

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TECHNICAL CONTRIBUTOR

The Brick Industry Association

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ACCESSIBLE CLAY BRICK PAVING FOR PEOPLE WITH DISABILITIES

This Technical Note includes guidance related to the design, construction and maintenance of pavements constructed of brick pavers that will serve all users, including those with disabilities and improve general accessibility.

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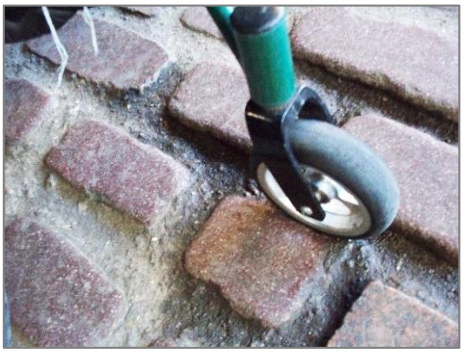
Accessibility is particularly important for people with limited mobility whether they are in wheelchairs or using crutches or walking aids as well as those with poor vision. It is also important that social infrastructure allows for people pushing prams, trolleys, large waste bins or wheeled pallet hand-trucks.

Research and prolonged use has proven that segmental clay paving complies with various accessibility guidelines.

SEGMENTED SMALL PAVERS VS LARGE SLABS



Pavements using segmental pavers behave differently from monolithic concrete slabs. It is often assumed that large slabs are superior to segmental paver pavements because they have fewer joints. In fact, the amount of work required for wheelchair users to cross segmental pavements may be less than for other pavement types.

A frequent criticism of segmental pavements is that they have too many joints, which result in more vibrations to wheelchair users. However, vibration measurements conclude that the narrow joints in segmental pavements result in less severe vibrations than control joints in concrete slabs.

Limiting bevel or joint size results in improved performance for all wheeled vehicles.

There is also a misconception that pavers normally become loose or misaligned over time, creating a tripping hazard.

Pavers around street trees can become uneven over time due to growing roots forcing the pavers upward. In fact, a segmental pavement will provide smoother surface transitions than the more abrupt changes in level that occur in monolithic concrete because the frequency of joints results in smaller incremental changes between pavers.

Pavements constructed with segmental pavers are much easier to repair than poured concrete, resulting in simpler and less costly maintenance.

Design

- Select a paving system that is durable and is easy to maintain and repair
- Ensure that the base is designed and constructed properly to avoid differential settlement
- Minimize joint and chamfer widths to control vibration experienced by wheeled devices
- Select appropriate trees and plants for locations near brick pavements, and employ root barriers or other best management practices to accommodate them
- Consider permeable pavements that allow more rapid water runoff and allow air and water to reach tree roots
- Minimize curb cuts in accessible paths to provide more level surfaces
- Use truncated dome pavers/detectable warning surfaces where applicable
- Select bond pattern and orientation that minimizes wheelchair vibration

Paver Selection

- Select pavers that have top surfaces and edges that are planar
- Pavers having chamfers not greater than 6 mm wide allow the front wheel (126 mm diameter or larger) of a wheelchair to span the distance between the top surfaces of the pavers without creating undue stress on the wheelchair user. The joints created by pavers with chamfers larger than this may cause discomfort.

BOND PATTERN

- A 90 degree herringbone pattern is preferred over the 45 degree pattern
- A running bond pattern is recommended where the longitudinal joints are aligned with the direction of travel
- A 90 degree herringbone pattern will maintain safe levels of vibration even with 6mm chamfered pavers.
- Select pavers with a surface that will provide adequate slip resistance when wet

CONSTRUCTION

Accessible surfaces must be firm, stable and slip resistant. Changes in level (surface discontinuity) can be up to 6.4mm.

Construct pavements with smooth and level surfaces within the specified tolerances:

- Aim for a slope of 10 mm every 3 m
- 6.4 mm maximum vertical lippage for straight edged pavers;
- 13 mm maximum vertical lippage for bevelled pavers
- Maximum width of sand-filled joints: 4.8 mm
- Maximum width of mortar-filled joints: 13 mm
- Joints between pavers in a mortar setting bed are generally 9 -13 mm wide but are filled with mortar and thus are not generally considered openings.

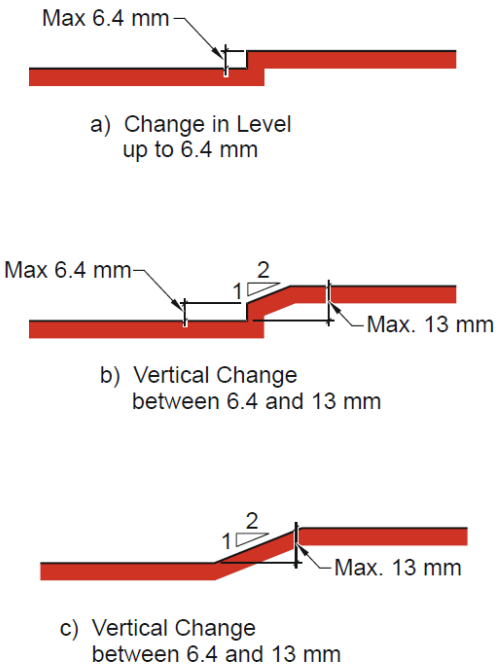


Figure 1: Changes in Elevation

Curb ramps and blended transitions should have detectable warning surfaces to extend 610 mm in the direction of travel for their full width. Clay pavers can be made with truncated domes in a variety of colours that conform to these requirements.

Paving constructed with a sand bed is easier and less expensive to maintain. Those laid with mortar joints will require more maintenance due to the mortar having a shorter life span than the pavers. Since the base of the pavement affects the stability of the pavement, it must be strong enough to resist occasional overloading and saturation.

Clay pavers commonly have slightly roughened surfaces which provide slip resistance without detrimentally affecting the accessibility. Pavers that are heavily textured may not be suitable due to the increase in vibration for wheelchair users. Surfaces with higher coefficients of friction and slip resistance are desirable - a static slip resistance value of 0.6 on horizontal surfaces and 0.8 on ramps is recommended.

CHAMFERS, BEVELS AND LUGS

Many clay pavers have chamfers (bevels) on their top edges. Some clay pavers also have lugs (spacers) on their sides to create uniform joint widths. The main purpose of chamfers is to reduce chipping on pavers and avoid direct contact between the top edges of adjacent pavers.

Chamfers also create an interesting visual pattern and may help channel water off of the pavement surface. While chamfers and lugs can be desirable features on clay pavers, as their size increases, there is often an increase in the vibration experienced by wheelchair users as they roll across them. If the chamfer on each paver is equal to or less than 6 mm, then the resulting vibration should fall within the guidelines determined by the research mentioned previously. Similarly, the width of lugs should be considered so that recommended joint widths for various paving systems are not exceeded.

MAINTENANCE

Differences in elevation of the top surfaces of adjacent pavers) should be kept to a minimum through careful design and installation and should be maintained as part of a regular maintenance program.

Changes in level can result from heaving or settling of the pavement base and more frequently occur at features that penetrate the paver layer, such as metal manhole covers.

Trees roots are a common problem. Root barriers are recommended as these force the roots to grow down rather than spreading underneath the pavement. They also strengthen the tree by causing the roots to extend deeper into the soil. Larger soil areas allow the proper amount of water and air to reach the roots and allow for future tree growth.

- Inspect and maintain paving on a regular basis
- Refill sand in the joints in sand-set brick paving assemblies when necessary
- Remove water, loose sand and stone chips as quickly as possible
- Regularly remove mould, moss and algae that might make the surface slippery.

For further information:
The Clay Brick Association of South Africa
Website: www.claybrick.org