Construction Procedures for Pavement Rehabilitation

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ABRIDGMENT

•PAVEMENTS are rehabilitated primarily by overlays and by widening. In general the procedures for constructing rehabilitated pavements are similar to those for constructing new pavements. Unique to pavement rehabilitation, however, are the procedures for the preparation of pavement surfaces for overlays and those for widening when the addition is less than a full lane wide.

OVERLAYS

Overlay construction requires that the original pavement be of uniform strength and be as smooth as possible. Weak areas in both asphalt and portland cement concrete pavements should be repaired with proper full-depth asphalt patches. If the surface is distorted, construction of leveling courses or leveling wedges is required to restore proper line and cross section. Careful and correct preparation of the existing pavement, prior to construction of either smoothing or strengthening overlays, is essential to good construction and to maximum performance of the overlay. Preparation of a portland cement concrete pavement for resurfacing may require one or more of the following procedures.

Undersealing to Provide Uniform Support

If rigid pavement has rocking or unstable slabs or if pumping occurs, slab support can be restored by undersealing with high softening-point asphalt before the overlay is placed. Undersealing is accomplished with a pressure distributor and a retort or booster heater where necessary to heat the asphalt to desired application temperature. Holes are generally drilled 3 ft on each side of transverse joints and cracks and about 3 ft from the centerline. Holes should also be spaced at intervals of about 10 ft along each traffic lane and 3 ft from the centerline of the pavement.

Removing and Replacing Faulted Joints or Blowups

Blowups or faulted joints should be removed and repaired with full-depth asphalt concrete patches. The area on each side of the joint should be cut back to where the pavement is in contact with the subgrade. Patches are generally a minimum of 6 ft in width to provide for compaction equipment.

Patching Disintegrated and Spalled Areas

All disintegrated and spalled areas should be cut out with vertical face and patched full-depth with asphalt concrete.

Reducing Slabs to Small Pieces and Seating With Heavy Rollers

A primary concern in the resurfacing of portland cement concrete is the reflection cracking caused by the vertical and horizontal movement of the pavement beneath the

Paper sponsored by Committees on Salvaging Old Pavements by Resurfacing, Maintenance of Bituminous Pavements, and Maintenance of Portland Cement Concrete Pavements and presented at the 48th Annual Meeting.

overlay. Breaking the slabs into small pieces (average dimension about 2 ft) and seating them firmly on the subgrade or subbase with heavy pneumatic rollers provide uniform support and minimize reflection cracking. If slabs are broken into small enough pieces, reflective cracking will not occur. Experience with surfacing small slabs, such as brick streets, has demonstrated this action.

In Europe, reflection cracking has been virtually eliminated by reducing slabs to near rubble and treating it as a granular base or subbase. A steel ball is used to break the slab into pieces of 12 in. or less in dimension.

Cracking and Seating Rocking Slabs With Heavy Rollers

Breaking and seating portland cement concrete involves inducing cracks and seating the pavement on a subgrade or subbase by rolling. The following methods are used:

1. Method A—The pavement is rolled with a single-axle, pneumatic-tired roller having a minimum weight of 50 tons. All slabs observed to move are marked, and a visible transverse crack is induced by a 1,000-lb drop hammer. After it is broken, the pavement is rolled until the slab segments are firmly seated on the subgrade or subbase.
2. Method B—A visible transverse crack is induced by a drop hammer at approximately 4 ft on each side of the joint. The induced crack extends from the centerline to within 3 ft of the slab's edge. After it is broken, the pavement is rolled until the slab segments are firmly seated.
3. Method C—A drop hammer is used to induce visible cracks over the entire surface of the pavement at intervals of 2 to 3 ft. The cracked pavement is rolled until segments are firmly seated.

Increasing Overlay Thickness

Increasing overlay thickness without reduction of slab length will provide good service with a minimum of crack reflection. A thickness of 7 to 10 in. provides good service, but some crack reflection should be anticipated. When asphalt and portland cement concrete pavements have been rendered as uniformly stable as possible, they must be cleaned thoroughly and tacked properly before the overlay is placed. Safe and speedy resurfacing requires careful planning for surface preparation and traffic control.

WIDENING

If full-width lanes (10 ft or more) are being added to an existing pavement, ordinary construction equipment is used. For narrow widening, however, special equipment may be needed. Trenchers often are used to excavate to the depth and width required by the pavement design. Pavement design is the full-depth asphalt concrete; granular base courses serve only to hold water.

During construction, outlet ditches should be cut to drain off water and protect prepared subgrade. A preferred technique is to plan the work so that a trench is filled in the same day and no trenches are left open to rain. This provides for better construction and increased safety.

Mixtures for narrow widening are generally placed by self-propelled spreaders that operate off the existing pavement surface. A minimum compacted lift thickness of 4 in. of asphalt concrete is recommended. The maximum lift thickness may be as much as can be laid in a single lift and compacted to the required uniform density. Special trench rollers or vibratory rollers are used for compaction of mixes in narrow widening.