Construction Practices for Placing, Finishing and Curing Concrete Pavement

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●THE QUALITY OF the riding surface is the element of construction which the traveling public generally uses to judge the quality of any pavement. However, those who are in the highway construction field, want more than a good-riding pavement. The finished pavement must not only be smooth-riding but must also be durable and structurally sound.

A portland cement concrete pavement, therefore, must be so constructed that it will (a) provide a smooth-riding surface satisfactory to the traveling public; (b) be durable when subjected to natural weathering and to chemicals used for snow and ice control; and (c) be capable of sustaining the traffic which it is intended to carry.

The final construction is the culmination of all previous efforts involving many ideas covering research, traffic study, safety, construction materials (including soils), design and finance. This entire procedure, however, is finally judged by how well the construction work is done. This responsibility falls directly on the contractor and his forces and on the project engineer and his assistants.

Every step of construction, starting with the grading operations and continuing through curing and opening of the pavement to traffic, has a definite effect on the rideability, durability and structural integrity strength of the finished pavement. Special attention must be directed to preparation of the grade and subbase, where required, setting of forms, placing and finishing of the concrete and curing if a well constructed pavement is to be obtained.

The subgrade must be thoroughly and uniformly compacted in such a manner that a firm foundation will be obtained which will provide a uniform support for the concrete pavement. The surface of the finished grade should be rolled smooth to the required crown so that it will drain readily.

Observation of equipment used to construct the grade will often indicate soft spots which should be removed. An even better method is to test roll the finished grade with a 50-ton roller (Fig. 1). Test rolling will give positive indications of soft spots. All soft material should be removed, replaced with satisfactory material, and the subgrade recompacted. It is seldom necessary to undercut more than 3 ft to provide a subgrade of adequate, uniform support.

Special subbase treatment is often required. Maximum field density of special subbase material is extremely important to the pavement structure and can only be obtained by continuous control of material grading, moisture content and compactive effort. Sufficient equipment must be provided to insure that uniform density is obtained and that the subbase course in place does not contain segregated areas which may be due to poor material handling.

Special subbase material should be placed a reasonable distance ahead of the paving operation to facilitate "in place" density tests and insure uniform required density. Positive provision for drainage must be made so that the subgrade will not become softened or the foundation saturated. Prevention of damage to subgrade and subbase is always preferable to corrective work.

Tests of both subgrade and subbase should be made frequently to determine that the minimum specification requirements are being met. An effort should be made to obtain uniform density throughout the entire area to be paved in order that the support for the pavement will be as uniform as possible.

Subbases should be brought to fine-grade elevation or slightly above so that fine

grading for forms or the area to be occupied by the pavement will involve a cutting and slight removal of previously compacted material. During the operation of the subgrader is a good time to observe the stability of the forms. Whenever there is any deflection of the forms, corrective measures should be taken. If this situation is not corrected, a pavement of variable thickness difficult to finish to proper grade will result.

Figure 1.

Forms are a potential source of trouble because they serve as tracks for all paving equipment, except mixers, in addition to serving as forms for the concrete. As new developments in paving equipment provide more and heavier equipment, the forms play an increasingly important roll in the construction of smooth pavements.

Forms should be set true to line and grade on a thoroughly compacted subbase with uniform bearing throughout their entire length and width. The building of pedestals of earth or other shimming to bring forms to the required grade should not be permitted. Whenever adequate and uniform form support is not obtained, the forms should be removed, the base corrected and recompacted, and the forms reset.

All forms should be checked before setting to determine if they comply with specification requirements for strength, height, base width, straightness, etc. Rejected forms should not be used until they are repaired so that they will comply with requirements. Pin keys should be straight and free-moving in the pockets and capable of holding the forms tight against the pins. The joint locks should not be bent or worn and should be capable of holding the ends of the forms in true alignment.

The pins and locks should be checked just prior to placing concrete and tightened if necessary. At the same time a final visual check should be made to insure that the forms are at a proper line and grade. Smooth-riding pavement with good surface finish is extremely difficult to obtain with poorly aligned and set forms. Form inspection must be continuous for best results.

After the subgrade or subbase has been cut to the desired elevation, it should be recompacted by rolling (Fig. 2) and checked with a pin templet, which has been set to proper crown. Any deviations revealed by the pin templet should, of course, be corrected. This operation must precede that of setting dowel assemblies. Any loose material adjacent to the forms should be compacted or removed.

Prior to paving the subbase should be thoroughly moistened (Fig. 3) to avoid absorption of mixing water from the concrete. Sprinkling, to moisten the subbase, should be done in such a manner that the grade is uniformly moist but not to the extent that the subgrade will become soft or muddy or that pools of water will be formed thereon. With granular bases, it is generally desirable to wet the subbase thoroughly well in advance of paving and then to wet again just prior to placing concrete.

Where dowels are required they must be in place before concrete is deposited (Fig. 4). Where mixers operate on the grade this is extremely difficult and, therefore, it is desirable that pavers operate outside the forms wherever possible.

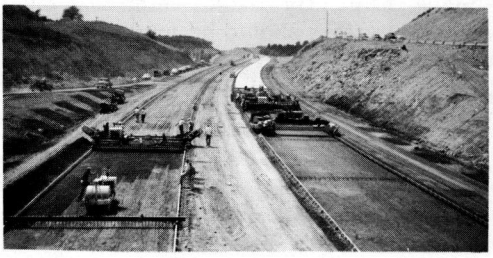

Figure 2.

To function properly dowels must be parallel both to the surface of the pavement and to the centerline of the pavement. To insure this alignment dowels must be securely held in position during the placing and finishing operations. Metal cages used to hold the dowels in place must be sufficiently strong to keep them in proper position.

The subgrade on which the dowel assembly is set must be true to elevation, smooth and properly compacted if the assembly is to set properly. When properly in place the assembly should be anchored in place with steel pins. These pins must be driven at an angle so that they will brace the assembly from lateral and vertical displacement during the placing of the concrete.

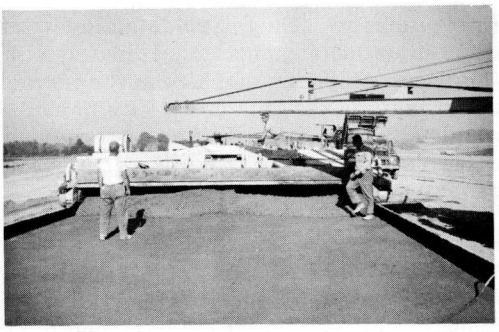

Figure 3.

In the event the dowel assembly is to be placed on granular material which might permit settlement or distortion of the assembly, steel bearing plates should be placed under the assembly. Shimming with loose earth, pebbles, broken tile, etc., must not be permitted. If this type of shimming is contemplated or attempted, it is obvious that either the subbase is not properly prepared or that the dowel assembly is bent or misaligned.

For dowels to function properly they must be greased for at least one-half their length to prevent bonding with the concrete. In dowel assemblies having one end welded to the basket, the free end of the dowel should be coated. The coating should be done in such a manner that the free end has a thin uniform coating, including the underside, and free of large lumps of coating material. Dowel assemblies are often delivered to the job assembled and held together with clips or shipping ties. As soon as the assembly is staked in place, the clips should be removed and the ties removed or cut so that the dowels will be free to function without any restraint. The expansion cap used on dowels placed in expansion joints must always be placed on the free, greased end of the dowel.

Immediately prior to placing, all dowels should be checked to determine if they are properly positioned. Those out of position should be corrected.

It is not within the scope of this paper to cover concrete production. In Ohio paver mixed concrete, central mixed concrete (Fig. 5), and transit mixed concrete, are used and good results have been obtained with all methods. However, good riding qualities depend on uniformity of construction and uniformity begins at the batch plant. If the batch plant produces non-uniform batches no amount of "first aid" or "emergency" actions at the paving operation will produce satisfactory, uniform pavement.

The concrete plant inspector's job is to proportion the materials according to specification and maintain, as closely as possible, a constant condition of workability and quality in the resulting concrete. The two principal sources of difficulty in maintaining uniform concrete appear to be segregated aggregates and varying moisture content of the aggregates.

Prior to starting concreting operations all mechanical equipment and hand tools should be on the project in first class working conditions, checked for conformance to the requirements as set forth in the governing specifications and approved by the engineer. Adjustments of equipment are a function of the contractor's forces. Highway personnel are not expected to adjust or advise the contractor how to adjust and main-

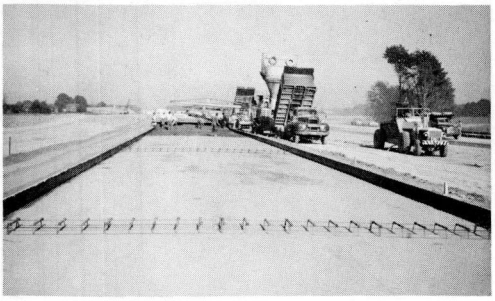

Figure 4.

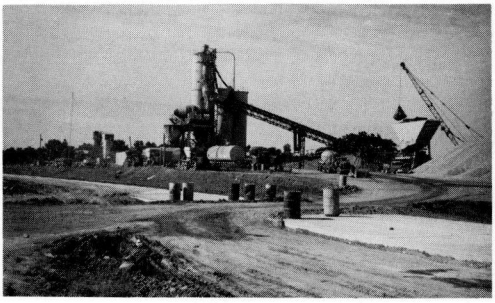

Figure 5.

tain equipment. They should, however, be able to recognize when such equipment is out of adjustment or not co-ordinated with the balance of the paving train.

Reinforcement, generally in the form of welded wire fabric or mesh, is often required in concrete pavement. Its principal function is to hold tightly together the fractured faces of slabs after cracks have formed. Adequate load transmission across cracks is thus assured and the infiltration of incompressible material into the cracks prevented.

Mesh delivered to the work ahead of paving operations should be carefully stacked and kept clean. Prior to use all mesh should be inspected for objectionable scale. Tarnish or sound rust on reinforcing is not objectionable, but scale or excessive rust will flake-off preventing good bond between the steel and concrete. Such reinforcement should not be used unless it has been thoroughly cleaned.

Mesh is generally placed along the rough grade or the shoulder so as to be convenient to the paving operation. When this practice is followed, the mesh should not be placed so far ahead that serious rusting will occur or that dust and mud will accumulate and cake on the reinforcement. All reinforcement incorporated in the pavement should be clean and straight. Many contractors are now using heavy bridges (Fig. 6) attached to and pulled by the first spreader to carry mesh. The mesh is loaded by cranes onto the bridge from trucks. This permits workmen to remain within the forms and minimizes the chance of the mesh becoming badly bent or dirty.

The concrete below the reinforcement should be uniformly distributed on the subbase and then struck-off by means of a mechanical templet to the proper depth. The strike-off should leave a level table without voids or high spots on which to place the mesh. Providing the concrete has been properly struck-off and the mats are reasonably flat it will not be necessary to tramp the mats into place. Furthermore, if they are properly tied the steel will not move laterally or work up into the finishing operations.

Concrete should be deposited on the subbase in such a manner that it requires a minimum of redistribution. Even distribution of concrete on the grade, or, on each course being placed, is the first step towards a smooth-riding job. The most even distribution in initial placing will result in minimum variation in final settlement of the surface. If concrete is deposited in piles or windrows, unequal consolidation may take place. This may never be overcome throughout the finishing procedure and can be the cause of unequal settlement and rough surfaces developing after finishing has been completed. Concrete spreaders are powerful pieces of equipment and will handle heavy accumulations of concrete. This is no reason, however, to permit improper distribution. Where an excessive amount of concrete is pushed and rolled along by the spreader segregation will probably occur.

Care must be taken to insure that batches are not dumped directly on or against dowel assemblies. In the case of expansion joints or formed contraction joints using

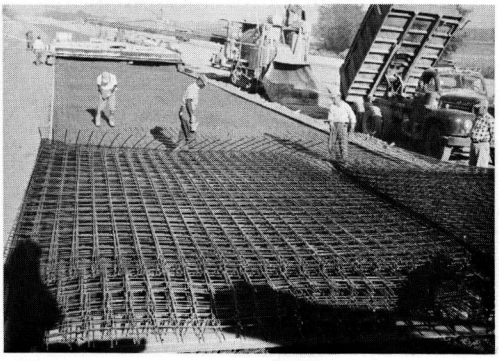

Figure 6.

Figure 7.

separation plates, the concrete should be shoveled around the assembly. This precaution is not as critical where open dowel baskets for sawed transverse joints are to be used because the spreader will force the concrete through the assembly without disturbance if proper staking procedures are followed.

On all but small paving projects (10, 000 sq yd or less) an approved spreader should be used. If the pavement is reinforced, two spreaders are needed for a high-speed paving operation, one to strike-off for the steel and one for the second layer. Three types of spreaders are in general use: the screw type, the paddle type and the hopper type (Fig. 7). The latter is designed for use with central or transit mixed concrete.

The initial placing of the concrete should be such that it will be fairly uniform on the grade and in such quantity that a slight excess is carried ahead of the spreader as it levels the concrete to a relatively uniform surface. The spreader strike-off should be set so that it leaves sufficient concrete to provide a uniform roll (4 to 10 in.) of concrete ahead of the following screed.

Concrete should be vibrated (spading may be used) along the forms and dowel assemblies. At transverse joints the vibrator should be inserted vertically at regularly spaced intervals, not just dragged over the surface. The vibration should be just enough to thoroughly settle the concrete around dowel and forms so that voids or honeycomb will be eliminated. All vibrators should be checked for compliance with specifications. Form vibrators, generally mounted on the first spreader, should not operate except when the spreader is moving forward.

In addition to the spreading equipment, other equipment used will generally include either one or two transverse finishing machines followed by a longitudinal float, or a combination float finisher (Fig. 5). Sometimes a transverse finishing machine is used ahead of the combination float finisher, the number of pieces of equipment used generally being dependent on the contractor's rate of placing.

The work of the transverse finishing machine is generally an intermediate step in the process between placing and spreading the concrete and the final mechanical finishing. This machine should consolidate the concrete and leave the surface with a uniform texture screeded to a reasonably correct elevation for final finishing.

The transverse finishing machine should be checked prior to use to determine if it is in satisfactory working condition. End plates should be inspected for wear and reversed or replaced if necessary. The screeds should be checked for straightness or crown if one is required. The amount of tilt for each screed cannot be determined until construction begins. However, for air-entraining concrete, at the start of paving operations, set the front screed for about $\frac{3}{16}$-in. tilt and the rear for 0- to $\frac{1}{16}$-in. tilt.

Normally, 4 to 10 in. of concrete are carried on the front screed and about 2 to 3 in. on the rear screed. This should be continuous across the width being placed. The amount of concrete carried on the screeds (both forward and rear) controls the amount of surge past the screeds for any given mix. If the concrete is too high, an excess will pass and an overload will be left for the following equipment. If there is a deficiency at any point in the width of lane, a low spot will develop at that point. If the head varies continually, the surge will vary continually and a wavy or rough surface will be left. At the start of a day's work, there should be a small initial accumulation in front of the forward screed to provide a working supply for filling in low areas. As the work progresses, this accumulation should not be allowed to build up; but should be maintained almost constant. The work of distribution and of transverse screeding must be co-ordinated to give uniform, acceptable results.

As work progresses, the height and tilt of the screeds must be adjusted to compact the particular mix being used and to permit (and control) the amount of surge required. Screeds should always work with the screed wearing plates working directly on the forms. With extremely stiff mixes, there is likely to be an absence of surge, which with combined tearing, screeds the surface below the top of forms. The center of the screed should then be raised slightly, leaving the end plates to work on the forms with the remainder of the screeds raised. This will permit the required amount of concrete to pass the forward screed. The rear screed should always be at correct crown along the rear edge and work directly on the forms.

The combinations of traction, speed and screed motion to be selected depend on the

concrete mix and consistency, and on the grade and super-elevation of the pavement. With stiff mixes, the screed speed should be rapid and lengthy and the traction speed relatively slow. This will provide extra working of the concrete and aid in compaction and in providing mortar on the surface for finishing. With more fluid mixes, the screed action should be decreased, both in speed and length; and the traction increased. This will prevent over manipulation of the concrete which might cause flowing to the low side of the forms, excessive surge past the screeds, or pooling of excessive mortar on the surface.

The relation of traction and screed speeds is important. In most machines, the speed controls are independent and the proper combination can be determined by trial without difficulty inasmuch as a change in speed of either screeds or traction can be made simply by shifting a lever. The change of length of screed stroke requires work be stopped and the screed drive readjusted. However, once adjusted, further changes in screed length should not be necessary unless control of the concrete mix is poor. Poor control of the concrete mix should not be tolerated.

The wheel scrapers should be tight so that they will keep the wheels clean. It is essential that the tops of forms and the wheels of all finishing equipment be free of concrete and mortar.

Care must be used when crossing transverse joints which include either a metal plate or expansion joint material. A good method is to remove concrete from the front screed, move the screed forward and set it down on the joint assembly and then continue screeding. Care must be taken to eliminate the possiblity of bumping the joint or of catching the cap over a joint where caps are used.

When the longitudinal finishing machine is used, the operation of longitudinal finishing or floating is the last mechanically controlled operation in the paving process. The work which follows consists only of the smoothing by the scraping straightedge and of texturing the surface. Good work by the longitudinal finishing machine will produce a surface that is practically satisfactory without further smoothing. Under these conditions, the work of the scraping straightedge is largely one of checking, and of correcting occasional, minor high and low spots.

The wheel and form scrapers should be adjusted squeaking tight to insure that all concrtete is removed from both the wheels and forms. The float should not rock or jump at the end of each stroke or where reversal of transverse motion occurs. The primary purpose of the longitudinal finishing machine is to float the top surface and to remove minor irregularities. It is not a heavy duty screed; and the preceding operations must be controlled so that it is not forced to become a heavy duty screed.

When properly adjusted and operated, the screed should carry a small roll of concrete along all but about the rear 2 ft of its length (Fig. 8). The mortar should roll, not flow. The forward speed should be such that the screed will make two complete passes over each area or 2 machines may be used each making one pass. The operator must continuously observe the amount of mortar carried on the screed, keep it distributed along the length of the screed, and prevent the mortar from falling off the rear end to form a ridge.

Whenever the size of the roll begins to decrease at a given point, a low spot is evident. If there is insufficient mortar in front of the screed to fill the low spot the machine should be stopped, fresh concrete added, and the floating continued. Whenever excessive filling or cutting are required the paving operation should be reviewed and any equipment out of adjustment or being improperly operated should be corrected. Precise control and attention to varying conditions are necessary if acceptable riding surfaces are to be obtained.

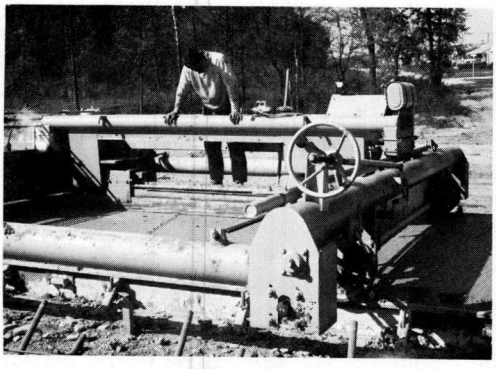

Figure 8.

Proper timing is of prime importance in the operation of the longitudinal finishing machine. For best results, it is desirable that initial settlement of the concrete be largely or entirely completed before the longitudinal finishing begins. If the concrete has not been properly compacted and is still in the early stages of shrinking when the longitudinal finisher passes, the final surface may eventually be rough. Finishing too soon is probably the reason why pavements acceptable for straightness at the time of straightedging are rougher than expected the following day.

The combination float finisher is often used to provide the final mechanical finish on concrete pavement. Several types are now used to finish 24-ft pavement, the most common being equipped with 2 screeds and a float. It is generally used following a combination spreader and finisher, however, it has been used following either a spreader only and in some cases a conventional transverse finishing machine. The front screed of this machine is a conventional reciprocating screed which rides on the forms.

The rear screed and float, however, are suspended from a long wheel-base platform and do not receive any support from the forms. The elevation of both the rear screed and the float is determined by adjustment of the hangers which connect them to the platform. As a result, minor variations in forms do not significantly affect the plane of operation of either the rear screed or the float. The key to smooth finishing with this machine is probably the rear screed because it is the final cutting tool and operates from long straightedge essentially free from influence of deviations in the forms.

Concrete must be accurately metered to this machine. Better results are obtained when spreaders and auxiliary screeds (when used) operating ahead of the machine leave just enough concrete so that a uniform roll of approximately 4 in. is carried on the front screed (Fig. 9). When this condition does not exist, the equipment operating ahead of the float finisher should be adjusted so that such a roll is obtained.

Both screeds and float must be accurately set. The front screed should have just enough tilt so that it will pass sufficient concrete to form not over a 2- to 3-in. roll on the rear screed. When this roll reduces in size, fresh material should be carried back and so placed that a uniform roll is obtained. It is essential that the roll in front of the rear screed be kept uniform for optimum results. The rear screed cuts off any excess concrete and leaves the pavement surface of the desired crown and grade. The float, when set to proper crown and almost flat longitudinally, just makes contact with the surface which it trowels to a smooth surface free of screed marks (Fig. 10).

Another type of float finisher in common use has only one screed plus a float and is attached to and moved by a transverse finishing machine (Fig. 11). The operations of the screed and float of this machine are similar to the rear screed and float of the previously described machine. Several other machines operating on the long wheel-base princple are in use. Some have trailing diagonal floats. Regardless of design all will provide a good finish when in proper adjustment and operated in accordance with good practice. As is the case with the longitudinal finisher, proper timing of operation is of prime importance with better results being obtained after initial shrinkage has taken place (Fig. 12).

The combination float finisher is primarily designed for a one pass operation. If all operations prior to the pass of this machine are as they should be, it will rarely be necessary to make more than one finishing pass. More than one pass will not generally improve the surface but only bring an excess of fine material to the slab surface. If the forward speed is properly adjusted, the machine will move forward at a uniform rate and stops will be eliminated. It is true with the machine, as it is with other types of finishing equipment, that continuous operation (without stopping) provides smoother pavement.

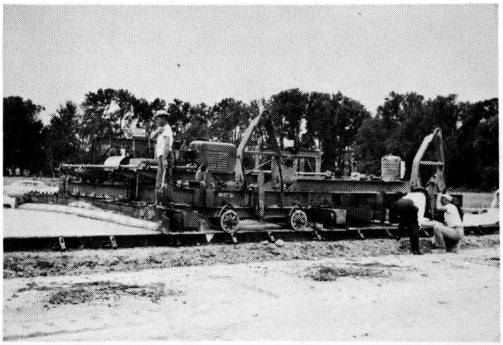

Figure 9.

All mechanical paving and finishing

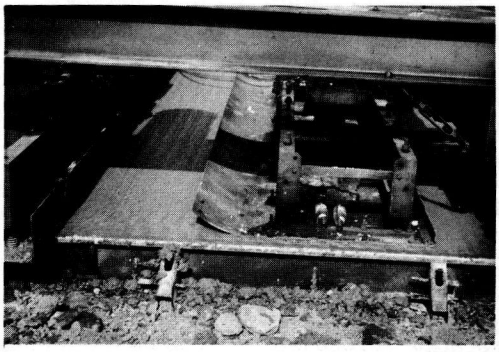

Figure 10.

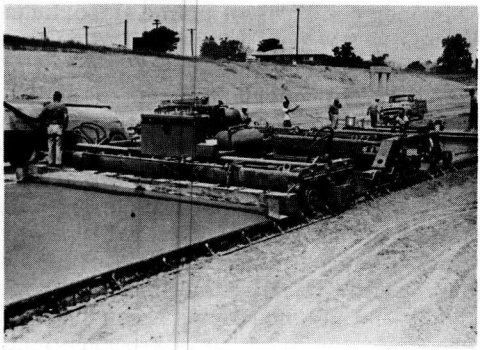

Figure 11.

equipment must be kept clean. The bottoms of screeds, floats and pans must be absolutely smooth. Accumulations of hardened conctete (or of oil and grease) which might drop on the pavement must be continuously cleaned off. All machines should be thoroughly cleaned at the close of each day's operation.

A crown check should always be made at the start of paving operations to determine that all equipment is properly set and functioning as it should. Whenever deviations in crown from that specified are found, immediate steps should be taken to correct the situation. Checking crown and adjusting equipment and operations should continue until the proper crown is being obtained. Periodic checks of crown should be made throughout construction and equipment adjusted as necessary.

After the mechanical finishing is completed, but while the concrete is still plastic, minor irregularities and score marks in the surface should be removed with a scraping straightedge (Fig. 12). Where necessary, excess water and laitance should be removed from the surface transversely by a scraping straightedge and wasted over the forms. A number of different types of straightedges have been used satisfactorily, all must be strong enough to maintain a true straightedge and yet light enough to handle. Straightedges should be checked periodically to make sure they are straight.

Long-handled floats are sometimes used to smooth and fill in open-textured areas in the surface (Fig. 13). This should be done prior to straightedge finishings. If open-textured areas persist, it is well to check the aggregate grading, mix design and method of placing the concrete, because a properly proportioned mix should not require hand floating if the preceding mechanized equipment is in proper adjustment.

The slab and formed joints should be edged as soon as the concrete becomes stiff enough to remain firm without running back in the groove. The edge should first be

Figure 12.

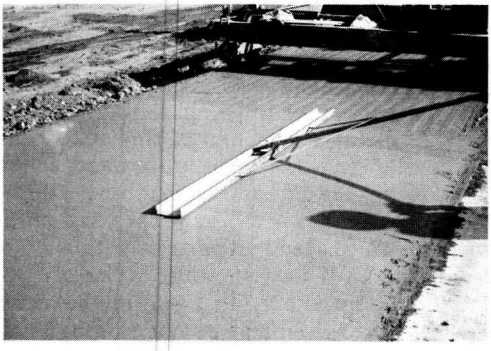

Figure 13.

cut with a small trowel and then followed by the edger held flat with the pavement surface. Because texturing follows edging, this operation must not be permitted to lag. Mortar should never be dragged into the joint when texturing the pavement surfaces.

When most of the water sheen has disappeared, but before the concrete becomes non-plastic, the final surface texture should be applied. This final finish is generally developed by brooming or by use of a burlap drag which leaves the surface with a gritty non-skid texture. If the texturing is done while the concrete is too plastic or after it has started to harden, the resulting texture will not have the desired gritty uniformity.

Where burlap is used it should be at least 3 ft in width and of sufficient length to cover the slab so that the entire slab can be textured in one operation. The burlap must be kept clean and moist, and free of ravelled edges. The leading edge of the burlap may be fastened to a traveling bridge leaving at least 1 ft in contact with the surface (Fig. 14). If the drag is to be pulled by hand it should be attached to a rigid bar. It can than be lifted clear of the pavement and rolled around the bar where it will remain moist and pliable.

No tool marks or other disfiguring blemishes should be present on the surface after final finishing, and texturing should be uniform over the entire pavement surface.

Proper curing is essential if the potential strength and durability of the concrete is to be realized. Curing must keep the concrete moist and warm to insure adequate hydration of the cement and protect the concrete from early shrinkage due to changes in temperature and/or loss of moisture before it has developed sufficient strength to resist the resulting tensile stresses.

Any of several methods of curing will give satisfactory results if correctly accomplished. Regardless of the method used, the curing material should be applied as soon as it can be placed without marring the surface. This normally is about the time the water sheen disappears from the concrete surface. During windy, hot, dry weather, it is important that the finishing be completed rapidly and curing placed before the surface dries out to the extent that shrinkage cracks may develop. If curing is delayed, fog spray the surface with water.

Where membrane curing is used the mechanical equipment should be so adjusted that uniform and complete coverage is obtained (Fig. 15). Timing of the application and pressure of the spray should be so that the texture of the pavement is not harmed. All membrane must be thoroughly agitated so that when applied it will provide a uniform water-impermeable film. Nozzles must be examined periodically for wear and, when found unsuitable, replaced. This is especially true with pigmented membrane.

Prior to application or use of curing materials, they should be inspected to insure that all specification requirements are being met.

Sawed construction joints are now used extensively. The joints should be sawed in a progressive manner and as soon as possible without excessive ravelling of the con-

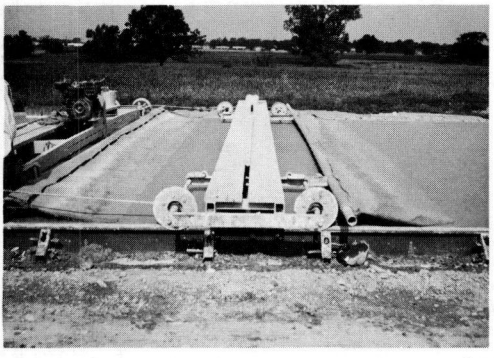

Figure 14.

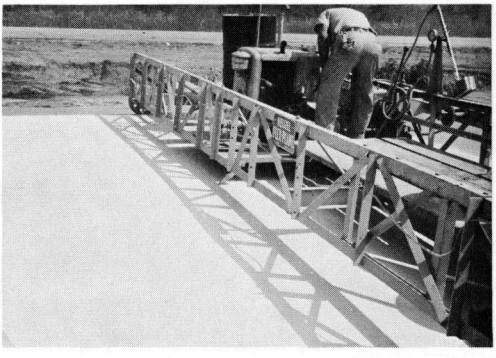

Figure 15.

crete. Slight ravelling is not objectionable and actually is a good indication that sawing is being done at the proper time. Pavement placed in the morning should generally be sawed the same day—possibly 6 to 8 hr after placing—and sawing continued until all joints are cut. Concrete slabs tied to a previously placed slab may be sawed without difficulty providing sufficient equipment is available so that sawing may be done at the proper time.

Whenever a crack occurs ahead of the saw cut, sawing on the joint should be immediately stopped and the saw moved ahead several joints. There, cut a joint or several joints, then return and cut the intervening joints. Whenever a crack occurs sawing is not being performed soon enough and sawing operations should be immediately modified so that such cracking does not reoccur. Sawed joints should be flushed immediately after sawing. Longitudinal joints may be sawed up to 7 to 10 days after placing.

During warm weather, forms are generally removed approximately 24 hr after the concrete is placed. During cold weather the time at which forms may be removed is usually based on whether the concrete has attained sufficient strength to prevent damage to the pavement surface or edges. As soon as the forms have been removed, the edges should be checked and all honeycombed areas filled flush to the surface of the pavement edge with good quality concrete.

Joints should be checked to make sure the ends are cut through to the edges and all concrete at expansion joints is removed. Curing should be applied to the pavement edges as soon as the forms have been removed and patching and cleaning of joint ends has been completed.

Joints are sealed to prevent infiltration of incompressible matter and surface water. All joints should be sealed before the pavement is opened to traffic or in event of a temporary fall close down. Sealing may be done at any time after curing is complete. Sawed joints are generally sealed immediately after sawing. Joints should be thoroughly clean and dry when filled.

Prior to final acceptance of the pavement, any unsatisfactory joint seal should be removed and replaced and all low spots brought up to the desired level. Also any high spots should be cut off and the excess material removed.

The quality of a concrete pavement is a direct reflection of the quality of workmanship that produces it. A pavement that is durable and has a good riding surface is produced only by the constant practice of good construction methods. Any deviation from good practice at any time or at any place will have an adverse effect on the final pavement quality.