Highway Tape Applicator (HTA)

Information Folder 5.2 **August 2008**

Replaces IF 5.2 dated May 2002.

Description

The Highway Tape Applicator (HTA) is designed for installation of longitudinal preformed markings of either foil or polymetric construction.

The applicator may be transported behind a vehicle equipped with a Class II hitch (2" [5cm] ball) or equivalent, at highway speeds (55 mph [89 kph]). The HTA weight is approximately 1300 lbs. (589 kg). The tongue weight is approximately 185 lbs. (84 kg).

For product *application* the towing vehicle should be either a 3/4 ton pickup, van, or equivalent truck; preferably a cab-over-engine type to provide good forward visibility. This vehicle should have at least one Class II (2" [5cm] ball) trailer hitch installed in back at the center. To provide more than one position for product application, install two *additional* balls, one on the left directly behind the horizontal center of the driver's seat, at a height so that the HTA will be horizontal in operation, and one equidistant to the right from the center hitch, at the same height as the left hitch.

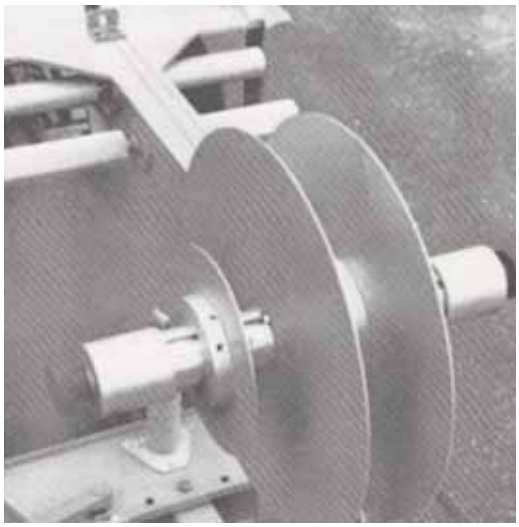


Figure 1

Product Width and Spacing

The HTA comes equipped with various flange plates, spacers, retainer cups and large handled bolts as pictured in Figure 1.

These parts enable the user to adjust to the various combinations of product width, line separation, etc. Following are the parameters for adjustment.

Maximum product width	7" (17.7cm)
Minimum line separation	4" (10.1 cm)
Maximum dimension between the outside edges of the product rolls	18" (45.7 cm)

Several combinations are possible within the parameters listed above by using the spacers and flange plates provided.

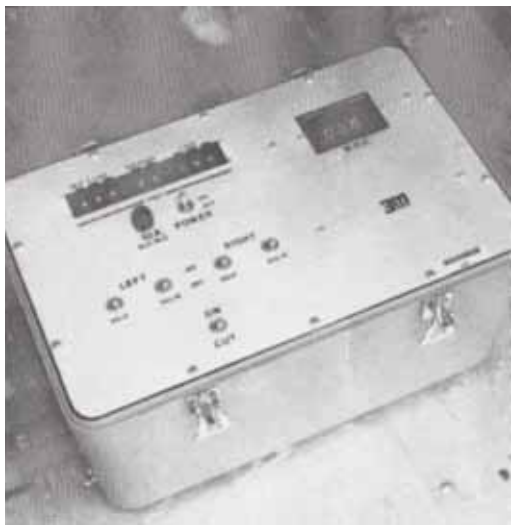


Figure 2

Control Unit

The top of the Control Unit is shown in Figure 2. The main "POWER" switch is located on the Control Unit. This switch controls all electrical power to the HTA.

The Control Unit also contains the digital lighted panels that indicate the “miles per hour” the towing vehicle is moving and the number of feet of “skip and line” distance. Switches to set up the “skip” and “solid” distances on the right and/or left sides are also included.

The “advance” distance is set by the operator and is designed to provide a built-in delay to allow the accumulator to move in such a way that it provides slack in the product as it moves from the stock roll to the applicator roller.

Once the accumulator slack is set it need not be reset unless it needs adjustment. The “advance” distance is normally preset at 2.0 feet (0.6 m).

When the HTA is in the normal operating mode, moving down the street with product being applied to the pavement in sequence, moving the “CUT” switch from the “ON” position to the “CUT” position interrupts the striping sequence, resets the sequence timer to zero and continues the interruption of the striping operation even though the HTA continues to move forward along the street. As an example, this procedure would occur when the line is interrupted as the HTA moves through an intersection. When the “CUT” switch is returned to the “ON” position at the other side of the intersection, the striping starts again, BUT AT ZERO in the striping sequence as follows:

1. The HTA moves the “advance” distance with no product applied.
2. Product is applied for the “preset line” distances and moves the “skip” distance with no tape being applied.*
3. Operation in (2) repeated as many times as necessary. *Line and skip distance as previously set up in the control unit.

New Control Unit

Several Highway Tape Applicators in use by customers have new control units and are fitted with a new timing wheel. Figure 2a shows the new control unit. The new control units will not work properly on an HTA that does not have a new timing wheel. If using an HTA with an old model control unit (Figure 2), and the control appears to be malfunctioning, contact 3M Pavement Markings Technical Service at 1-800-553-1380 for assistance. Also contact Technical Service for calibration instructions for the new control units if instructions are not included with the HTA.

Figure 2a

Set-up For Product Application

A. In transit the HTA is covered with a canvas cover. Figure 3 shows the HTA after the unit is uncovered for use. The tongue jack and the tongue jack wheel are not shown. The wheel is removed after the HTA is attached to the hitch for application or transit. **Do not tow or operate the HTA with the jack wheel in place.**

B. The HTA is attached to the towing vehicle with a tongue and trailer hitch pictured in Figure 4. The tongue is pivoted at point X and (if it is not pinned in place) can be moved to the right or left so as to direct the HTA in its proper path. The path is controlled by an arm, shown at point Y.

Figure 3

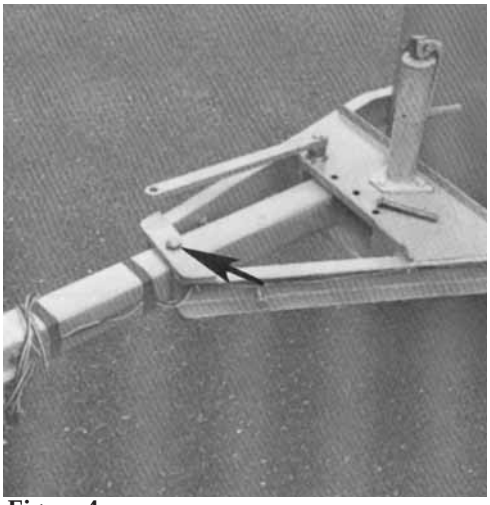


Figure 4

This causes the HTA to apply the product around a reasonable curve without wrinkling or to correct its path should the machine get off its path.

When transporting the HTA the floating end of the tongue must be fixed in place with a pin (see arrow in Figure 5) in the center hole, or it may be fixed in either of the other positions available.

After inserting the pin, the tongue will remain in that position and cannot be moved.

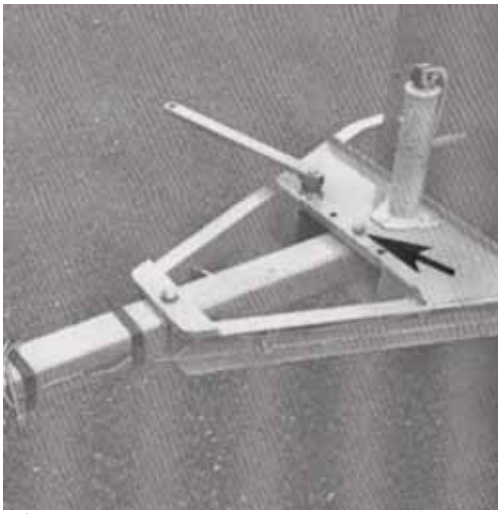


Figure 5

C. When attached to the towing vehicle the HTA should be as near to a horizontal position as possible. This will vary with the hitch height. Adjustment can be made (after supporting the frame with safety blocks) by moving the four bolts that hold the tongue to the frame. The heads of two of the bolts as well as one of the sets of the three adjustment holes provided in the frame (at each of the four locations) are shown in Figure 6.

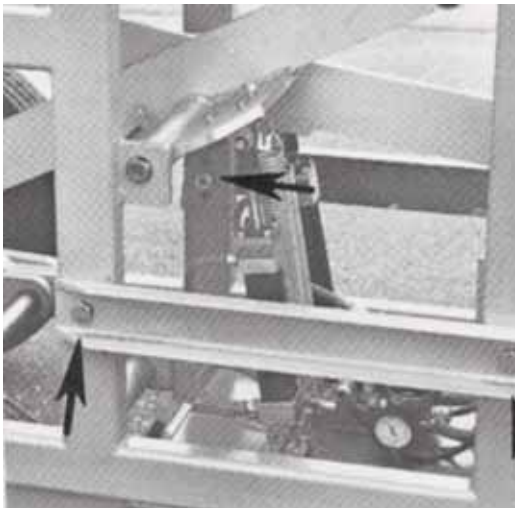


Figure 6

D. Fold the stock arm forward after loosening the lock bolts on both sides of the travel lock (Figure 7). Move the arm up and over to the front of the HTA so that it ends up on the position shown in Figure 9.

The height of the stock roll (or the position of the stock arm) should be positioned to permit loading the rolls. This can be adjusted by turning the adjusting bolt (Figure 9) in or out.

E. Figure 10 shows the Control Unit placed on the floor in the back of the towing vehicle, where one of the crewmen can operate the switches while monitoring the operation of the HTA. Four connectors are shown on the left side of the Control Unit: Figure 10 shows the hook-up (in part) of the cables connected to these four connectors. Reading from top to bottom: the top cable is connected with battery clips to a portable 12 volt car battery, or connected to the battery of the towing vehicle (red clip to positive, black clip to negative). The second cable is connected to a portable speedometer, shown (for display purposes) on the floor.

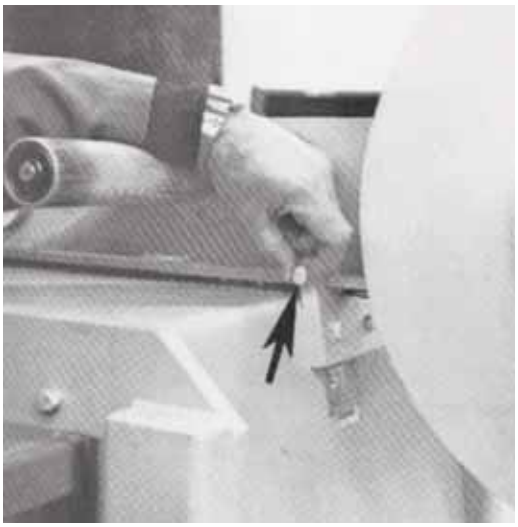


Figure 7

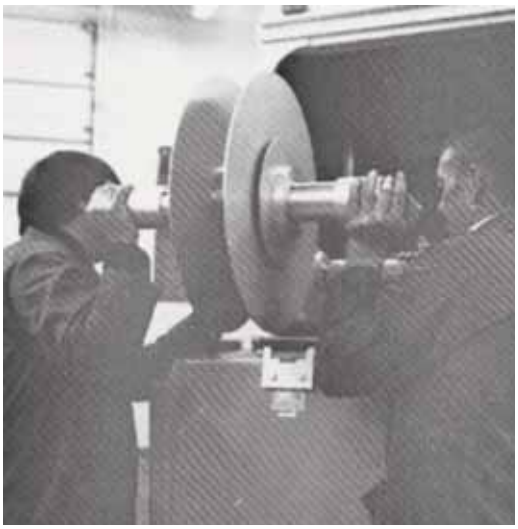


Figure 8

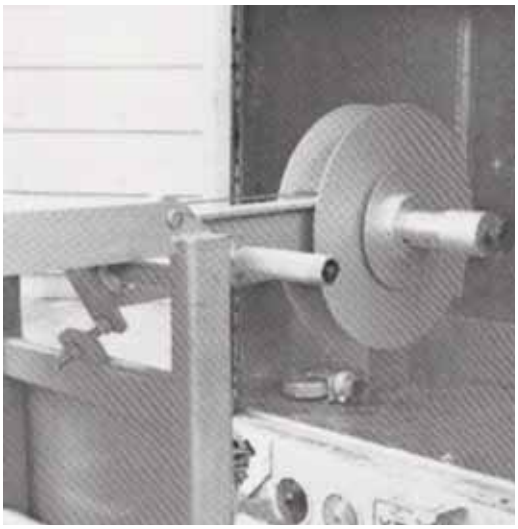


Figure 9

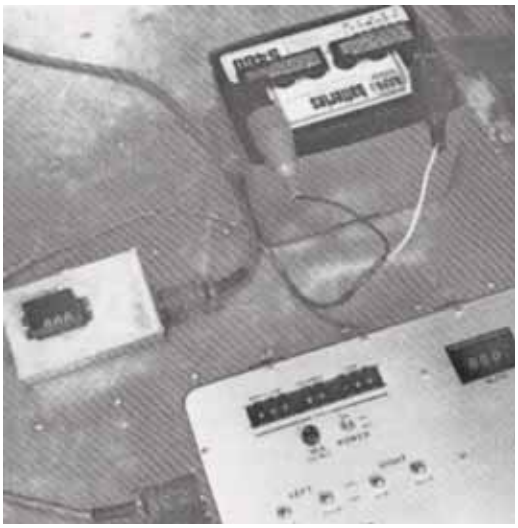


Figure 10

The portable speedometer is also shown in Figure 11, in place, in front of the towing vehicle driver, ready for operation. The bottom two cables are connected to the HTA through the opening in the tongue. (Figure 12).

Figure 11

Figure 12 shows the female MS plug connections with their chain connected covers. It is possible to reach underneath the tongue (which is open on the bottom) to connect the MS plugs and snap on the nitrogen hose.

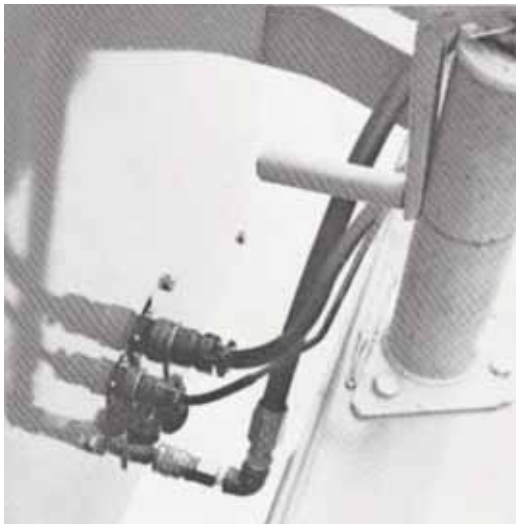


Figure 12

F. Connect the nitrogen tank (used for pneumatic pressure) to the HTA Figure 13, 14, 15.

G. Open main valve at nitrogen tank and adjust line pressure to 100-120 psi (690 kPa-727 kPa).

H. Set pressure at applicator roller (Figure 16) for product being applied. Typical settings are:

1. Stamark™ Tape - approximately 70-80 psi (483 kPa-553 kPa).
2. Scotch-Lane™ Tape - approximately 50-60 psi (345 kPa-415 kPa).

I. Set pressure at accumulator (Figure 17) for type of product to be used.

1. Stamark™ Tape - approximately 15-30 psi (103 kPa-207 kPa).
2. Scotch-Lane™ Tape - approximately 10-20 psi (69 kPa-138 kPa).

J. When the HTA is in the travel mode with wheels on the road, the tamper roll assembly is locked off the road with the control lever extended to the rear as shown in Figure 19. The control lever is locked in place with a 1/2 inch (1.3 cm) chained pin. To lower the tamper roll assembly and raise the travel wheels off the road, grasp the handle, remove the pin, Figure 19, and with your foot on the frame as shown in Figure 20, 21 carefully raise the control lever up and over to the operating mode as shown in Figure 21. Replace the pin to lock the lever in place.

Figure 13

Figure 14

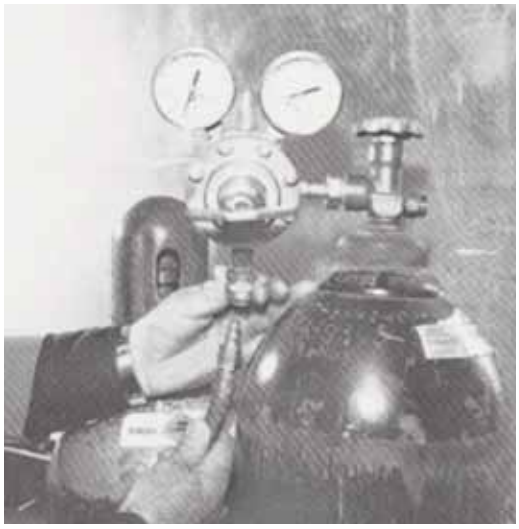


Figure 15

Figure 16

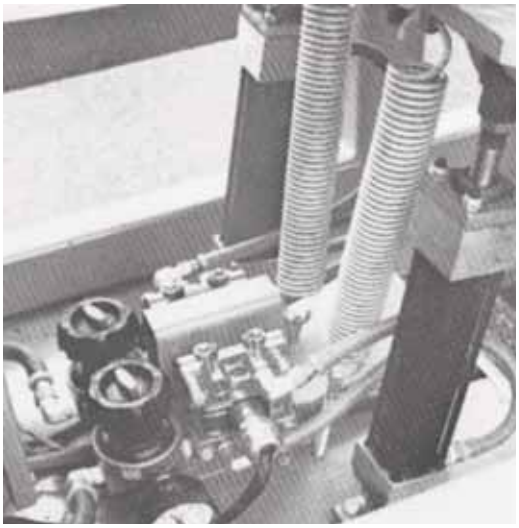


Figure 17

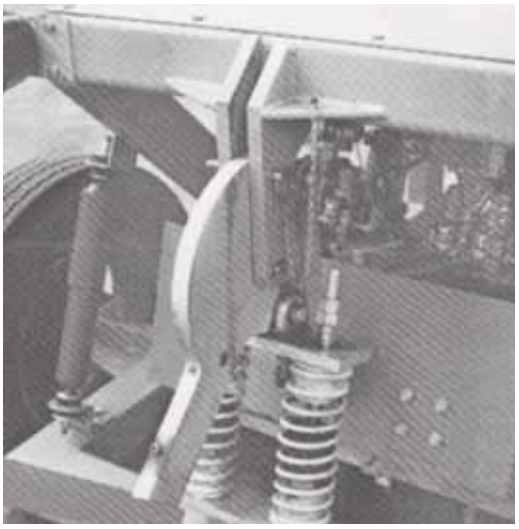


Figure 18

Figure 19

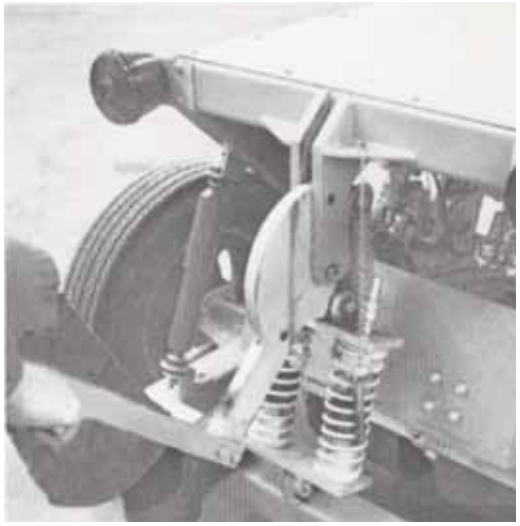


Figure 20

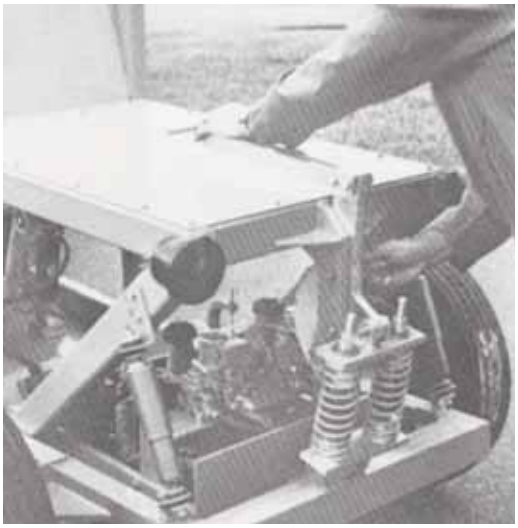


Figure 21

K. Turn the “POWER” switch to “ON”.

L. A toggle switch is located on both sides of the junction box inside the front end of the HTA. Figure 22 shows the right hand switch and there is a similar switch on the left hand side. These switches control the position of the applicator rollers.

Move the switch pictured to the “UP” position. This will cause the *right* side application roller to move to the pavement, *away* from stop bar (Figure 23), and release the accumulator arm (Shown at about 45º) in Figure 24 prior to threading the product through the HTA. At this point the accumulator arm (which pivots in the middle) can easily be rotated around its center by hand to place it (roughly) into a horizontal position.

With the accumulator in the horizontal position the stock roll brake is released, and this will allow the unrolling of the product for thread up.

M. At this point the stock roll arm and mandrel should be in the position shown in Figure 25. Remove the knurled bolt from the stock mandrel.

Note: Instructions for one side of the mandrel are equally valid for the other side of the mandrel.

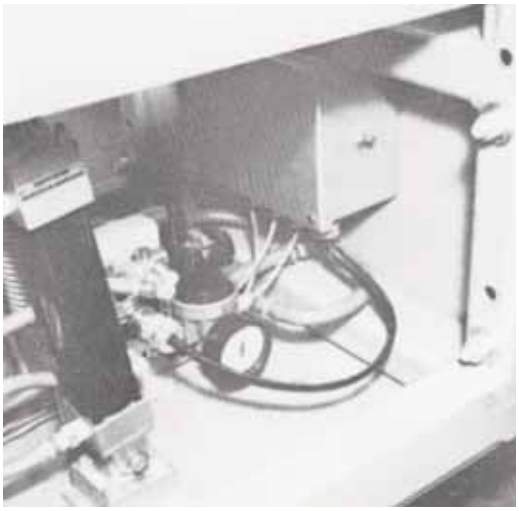


Figure 22

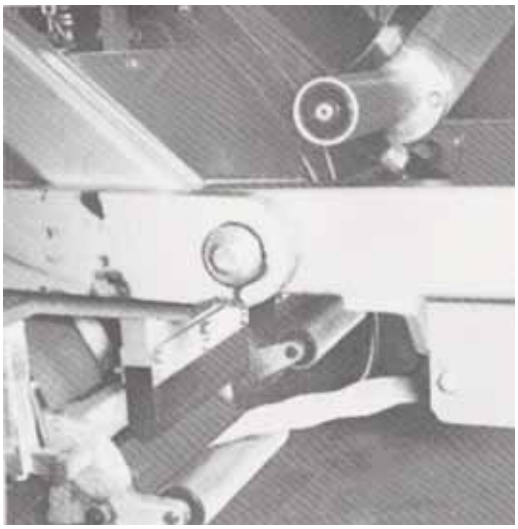


Figure 23

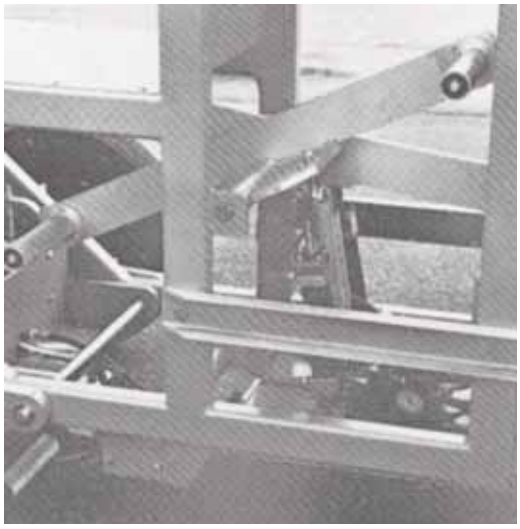


Figure 24

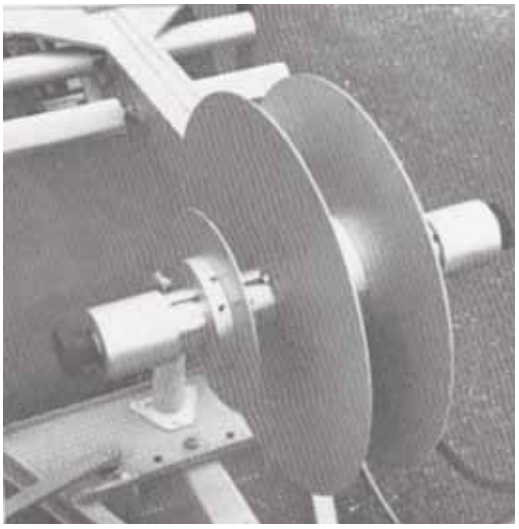


Figure 26

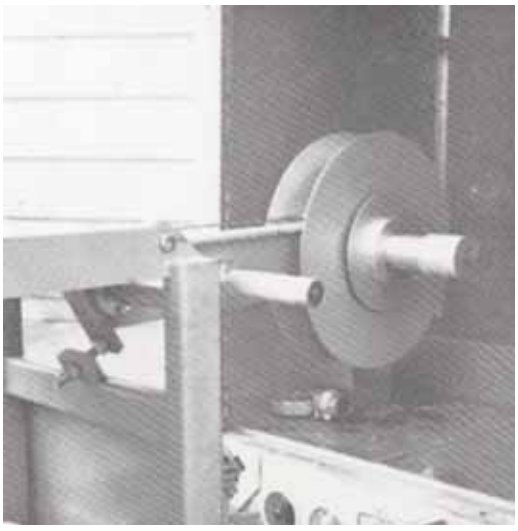


Figure 25

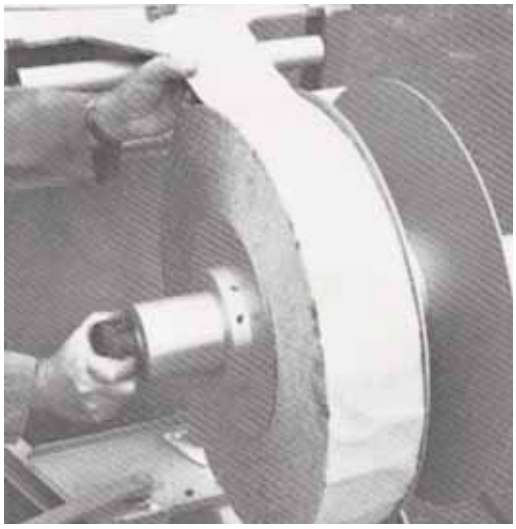
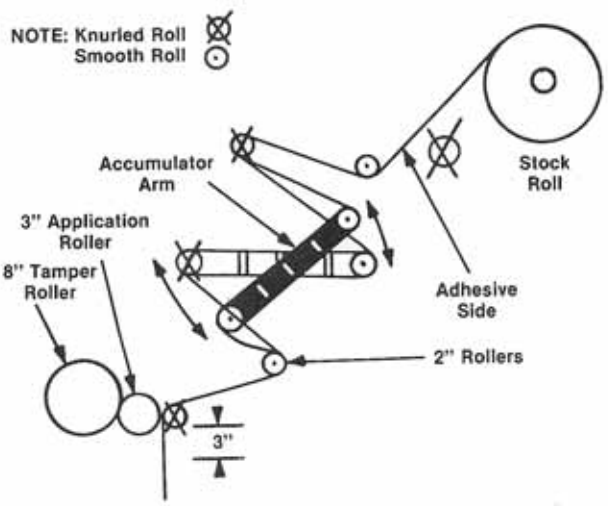


Figure 27

The cup retainer and small flange plate (Figure 26) should be removed next. Place the stock roll on the mandrel with the leading edge towards the HTA, adhesive side down as shown in Figure 27.

N. Thread the tape through the HTA (as shown) with the adhesive side touching the knurled rollers and top of the product (beaded) touching smooth rollers. Extend the leading edge approximately 3 inches (7.6 cm) past the last roller.

Note: Application roller was moved away from stop bar (Figure 23) when toggle switch was moved to "UP" position in Step L.



CAUTION: Do not wear gloves when threading the HTA. Be careful and keep hand clear of blades and rollers.

O. Move the toggle switch on the junction box to the "DOWN" position, which brings the application roller up to the stop bar as shown in Figure 28. Fold the 3" (7.6 cm) leading edge backwards around the applicator roller (Figure 29). Adjust the 3/8 (0.9 cm) copper tubing shown in Figure 28 and 29. These toggle switches are not used again except when it is necessary to re-thread.

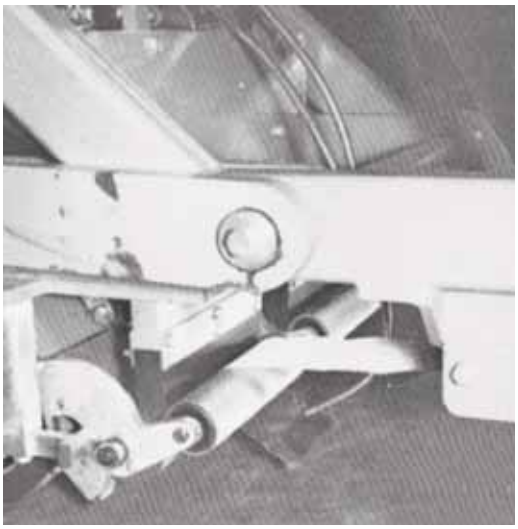


Figure 28

P. Sequence Variation

1. Turn on desired switches for "SKIP" and/or "SOLID" lines on left and right sides.

2. Push the buttons above the digital panels labeled "SKIP" and "LINE", "ADVANCE", "LINE" until the desired numbers appear. The M.P.H. numbers will indicate speed when the HTA moves forward. All numbers read in feet and tenths of feet.

Following are typical sequence settings.

a. Skip and Line - normally 40.0 ft. (12.2m).

b. Advance - normally 2.0 ft. (0.61m).

c. Line - normally 10.0 ft. (3.25m).

3. Move "CUT" switch to "ON". The HTA is now ready so that when the HTA is pulled forward it will move 2.0 feet (advance), apply 10.0 feet of the product (line), skip 30.0 feet (skip) and then repeat the application of 10.0 feet of line, 30.0 feet of skips, etc.

The sequence can be changed from that shown above. After the operator becomes comfortable with the ADVANCE distance he wants (whatever it is), he can mark the frame of the HTA so as to be able to judge the spot on the road to turn the "CUT" switch to "ON". This will start the tape application at the correct spot as the HTA moves forward.

After several sequences of application, the spacing and line should be checked with a measuring tape. Skip line application-speed should not exceed 6 mph (9.6 kph), solid line application should not exceed 8.0 mph (12.8 kph).

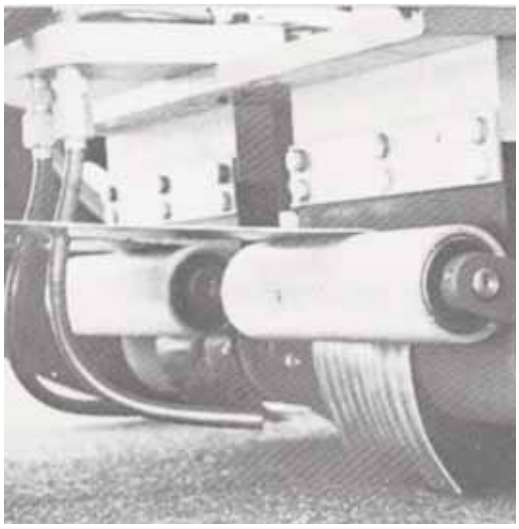


Figure 29

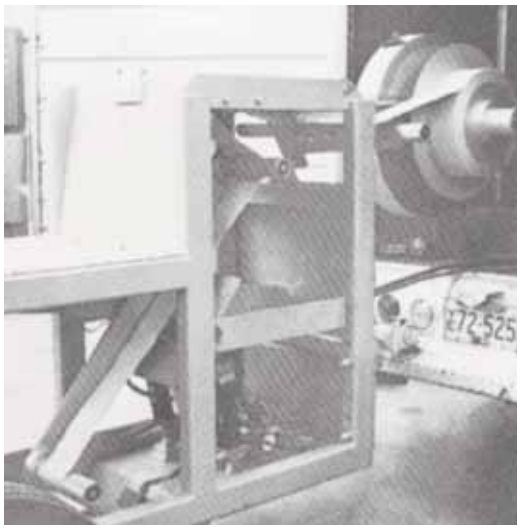


Figure 30

Q. Application Conditions - See specific Product Bulletins for product being applied.

R. Attach the pointer assembly to the front bumper as shown in Figure 31. First, attach the pointer bracket to the bumper with "C" clamps as shown in Figure 32. Place the pointer arms into the bracket as shown, run the rod through the holes provided. Secure the ends with cotter pins. The pointer can be removed at any time by pulling the cotter pins and rod. The pointer shown in Figure 33 has horizontal and vertical adjustments available to line up the HTA properly.

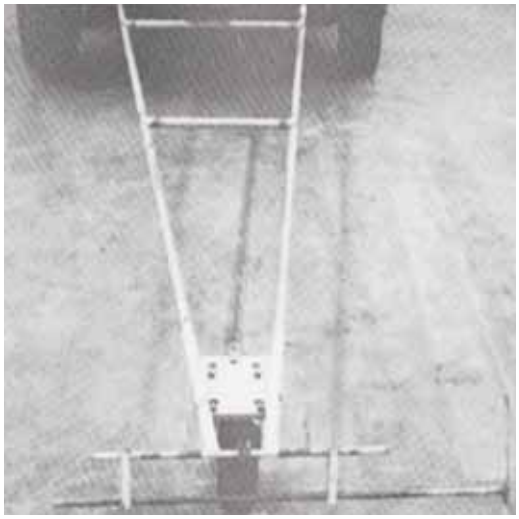


Figure 31

Figure 33

Product Application

Refer to page 2 for details.

A. Hook HTA to towing vehicle.
B. Connect cables and a hose.
C. Lower application unit and lift travel wheels off the pavement.
D. Move “POWER” switch to “ON”.
E. Adjust air pressures at accumulator and applicator rolls.
F. Move toggle switch to “UP”

Figure 32

G. Load stock roll and thread tape.
H. Move toggle switch to “DOWN”.
I. Select “Skip”, “Line” and “Advance” distances.
J. Move “CUT” switch to “ON” so that when the advance distance has passed, the “line and skip” sequence will start.
K. Tow HTA forward.
L. Figure 34 shows typical operating situation.
M. Move the “CUT” switch to “CUT” whenever the sequence of striping must be interrupted.
N. Watch stock rolls. Stop operation when tape roll gets down close to core. Splice in new stock roll (see Section IV).

Figure 34

Tape Splicing

A. Remove bolt, retainer cup and small flange plate.
B. Cut tape close to core. Leave tape threaded through machine.
C. Remove core containing last round of tape.
D. Mount new stock roll.

E. Make splice on adhesive side with 2" (5.1cm) wide Scotch™ DCX, Double Coated Splicing Tape (Figure 35). **Be sure to remove paper liner of tape after splice.**

F. Take slack out of tape by turning stock roll.

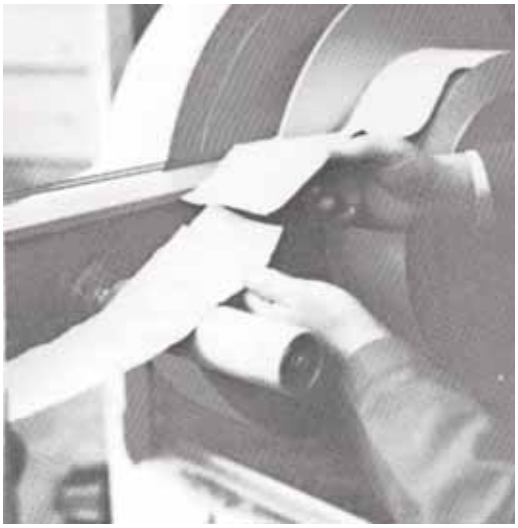


Figure 35

Shut Down For Towing

A. Cut tape at applicator roller (Figure 29). Wind tape in machine back into stock roll.

B. Move main "POWER" switch to "OFF".

C. Close main valve at nitrogen tank.

D. Disconnect connector cables and air hose.

E. Remove remaining stock roll and replace retainers and flange plates.

F. Fold stock arm backwards and tighten lock bolts on both sides of the travel lock (Figure 8).

G. Lift tamper roll assembly control lever to travel position (Figure 18, 19, 20) and lower travel wheels to the pavement.

H. Lower tongue jack wheel to pavement.

I. Disconnect trailer hitch and remove pointer assembly.

J. Roll HTA back from towing vehicle.

K. Attach HTA to Class II hitch on transporting vehicle. Remove tongue jack wheel.

L. Connect safety chain.

M. Connect electrical signal wires. Check for proper signal on taillights.

N. Put canvas cover in place.

Maintenance Suggestions

Keep the HTA clean and dry. Dirt buildup on the timing wheel will affect timing distance. Protect the control unit from moisture and heat.

Do not move or transport HTA with tamper rolls down except in very short moves to position for striping. Do not exceed the application speeds with tamper rolls down.

Close valve at nitrogen tank and turn "POWER" switch "OFF" whenever HTA is unattended or is being transported to ca new site.

Do not store HTA outside without the cover in place.

Keep safety cap on nitrogen cylinder when transporting HTA.

Check for gas leaks.

Twelve volt battery should be recharged after approximately two days of operation. Control unit can also be connected to truck battery. Correct polarity must be maintained.

Oil pivot points and linkages frequently.

Check and tighten bolts.

Check cutting blades and springs frequently during operations.

Troubleshooting

Trouble	Possible Cause
A. Product fold over at leading edge.	Application speed too high. Rubber stop bar damaged or worn. Air nozzle not properly aligned. (STAMARK™ tape only - Dull, dirty or broken knife. Low pressure).
B. Failure to start or cut.	Right tamper roller not in contact with pavement. Low battery voltage. Bad contact battery cables. Low air tank pressure (100 lbs. minimum). It is good practice not to use the last 100 lbs. of gas in tank.
C. Stock roll over runs.	Tighten brake cable. Slow down operating speed.
D. Tape breaks after 3-5 inches. (7.6-12.7 cm).	Application speed too high. Air pressure too high at application roller.
E. Uneven cut	Broken knife. Adhesive buildup at knife tips. Dull knife. Rubber stop bar damaged or worn. Air pressure too low at application roller. **Note:** Knife can be easily replaced. Remove four Allen screws as shown in Figure 36, replace knife and reinstall four Allen screws.

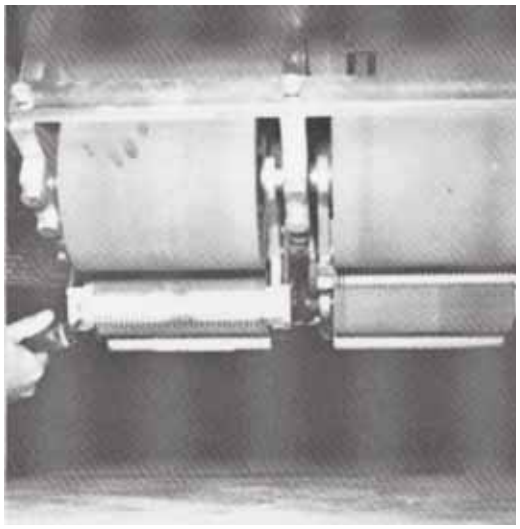


Figure 36

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