SIGNS AND MARKINGS

12.01 POLICIES AND RESPONSIBILITIES

This manual is intended for internal guidance only and is not intended to create a legal or moral duty. Supervisors have discretion, based upon their expertise and the particular circumstances, to deviate from this manual and to conduct additional research or receive input from experts in other areas, as needed.

12.01.01 POLICIES

12.01.01.01 GENERAL REGULATIONS

With the needs of motorists and the requirements of traffic control devices in mind, the West Virginia Division of Highways has approved and adopted the "Manual on Uniform Traffic Control Devices for Streets and Highways" which has been prepared by the National Joint Committee on Uniform Traffic Control Devices. The recommendations in the Manual are to govern the design, placement and maintenance of all signs and markings, unless the recommendation for a certain case has been or will be superseded by a written directive issued by the Traffic Engineering Division.

12.01.02 RESPONSIBILITIES

12.01.02.01 TRAFFIC ENGINEERING DIVISION

The Traffic Engineering Division is the official authority of the Division of Highways in regard to signs and pavement markings. This Division formulates all policies concerning the types and positions of permanent traffic signs and markings. The Traffic Engineering Division also approves all permanent installations and recommends the locations and types of the signs and markings that are to be used in case additions or changes are found to be necessary. The Traffic Engineering Division should be consulted whenever existing conditions require clarification for field personnel.

12.01.02.02 DISTRICT TRANSPORTATION SERVICES SUPERVISOR

The District Transportation Services Supervisor is responsible for following the instructions received from the District Engineer. Primary duties are to erect and maintain state traffic signs in the prescribed manner and at the designated locations, and to paint, place, and maintain the required pavement markings within the District. This work will be done in accordance with the established standards and policies.

12.01.02.03 COUNTY AND DISTRICT MAINTENANCE FORCES

12.01.02.03.01 DUTIES

With the exception of the District personnel assigned to the District Traffic Services Section, the duties and responsibilities of County and District maintenance forces in regard to permanent types of traffic-control devices are very limited. Except where repairs must be made in an emergency, a crew assigned to other maintenance work will not erect or replace any permanent sign. For instance, a maintenance crew performing a routine maintenance task will be expected to reposition a STOP sign or an important warning sign that has been knocked down or pulled up. The crew supervisor shall notify the Transportation Services Supervisor as soon as possible. Temporary traffic signs are the only ones that will be of direct interest to most maintenance personnel.

On the normal travels of maintenance personnel, any signs that are found in need of attention will be noted and properly reported to the Transportation Services Supervisor. In case of an emergency, the Transportation Services Supervisor will be contacted immediately.

When a crew assigned to pulling ditches or some other maintenance activity cannot perform its work properly without removing a permanent sign, that crew will be expected to remove the sign in such a manner that neither the sign nor its support will be damaged. If the County Maintenance Superintendent knows that a certain job will require the removal of traffic signs, he/she will notify the Transportation Services Supervisor at least two days before the job is started and will tell the Transportation Services Supervisor where the maintenance work is to be done and the approximate time the operation will be completed. The Transportation Services Supervisor will then be able to anticipate when a crew will be required to reset the signs.

As soon as the maintenance operation is completed, the County Superintendent must notify the Transportation Services Supervisor so a sign crew can erect the traffic signs which were disturbed or removed. When signs are disturbed for maintenance operations, the Transportation Services Supervisor or designee will make a detailed inspection of those signs. A sign that needs repairs must be reconditioned before it is reset and a sign that cannot be repaired must be replaced.

12.01.02.03.02 REMOVING AND REPLACING SIGNS

Several methods are used to remove posts for signs. Each crew whose work will require the removal of traffic signs will carry a post-puller to jack metal signs posts from the ground.

Only those signs which interfere with the performance of maintenance work may be removed. As each such sign is removed, it will be placed well out of the way of all equipment. Each STOP or YIELD sign that must be removed will be replaced with a temporary sign until the permanent sign can be re-erected.

12.02 PERMANENT SIGNS

12.02.01 INSPECTION

The Transportation Services Supervisor, or designee representative, should inspect all permanent signs at least once per year under night or simulated night driving conditions. This inspection can be conducted in hours of darkness, or by using a 200,000 candle power (minimum)spot light during daylight hours to give a reliable indication of sign reflectivity. The method is at the discretion of the District Engineer. The inspection will include reflectivity, position, damage, legibility and general condition. A standard form for sign inspection shall be obtained from Traffic Engineering Division and shall be completed with the pertinent information to document the inspections. A copy of the completed form shall be returned to the Traffic Engineering Division. The form will be used to identify damaged or inadequate signs to be replaced in a timely manner. Each inspection should also include a condition report of the visibility and general condition of all roadway markings.

The Expressway Section Crew Supervisors will be responsible for the inspection of permanent signs on their assigned sections of roadway and will follow the procedures detailed above.

All signs, barricades, drums, cones, lights and flashers for maintenance use will be given detailed monthly inspections by the County Superintendent or the Transportation Services Supervisor.

Sign inspection is a continuing function of all personnel in the maintenance organization. In the normal performance of duties, all maintenance employees should look for sign irregularities and report them to the proper District office.

12.02.02 TYPES OF MAINTENANCE OPERATIONS

Repairs to permanent signs are normally made in the field, or "in place". Maintenance includes straightening posts and sign assemblies to restore signs to their proper positions, cleaning the sign face, tightening bolts and lag screws, removing obstructions to visibility, and replacing severely damaged elements or, occasionally, the entire sign assembly.

A severely damaged sign must be removed and replaced immediately. Damaged signs will be returned to the Division's Central Sign Shop in Charleston.

12.02.03 FIELD REPAIRS AND STRAIGHTENING

The Transportation Services Supervisor will determine what field repairs and straightening will be done. This decision must be based on good judgment and sound economics. Field repairs must not be made unless economical and effective. In case of minor damage to a sign, such as a slight deformation which does not impair legibility, repairs will normally be made without removing the sign from its support.

In many instances the sign support is bent or knocked out of position without damage to the sign itself. Metal posts which are deformed to a minor degree can be bent into proper shape. Occasionally, a sign becomes loosened from its support as a result of wind vibration or because the original installation was not properly made. Each sign crew will carry a supply of materials and suitable tools for making field repairs.

12.02.04 REMOVAL OF VISIBILITY OBSTRUCTIONS

Removal of obstructions to visibility around signs is an extremely important task of the transportation service and maintenance field crews. Visibility of regulatory and warning signs is of particular importance. Special attention must be given to all STOP and YIELD signs to make sure that they will be visible at all times. Where normal right of way mowing and trimming operations are not adequate, special mowing and trimming to make signs visible will be necessary. The Transportation Services Supervisor should coordinate with the Assistant District Engineer - Maintenance and the County Maintenance Superintendent for removal of obstructions.

Where sign visibility is restricted or entirely prevented by snow banks, the removal of snow may require hand shoveling.

If a maintenance crew notices any obstruction to the visibility of an important sign, that crew will take immediate measures to remove the obstruction.

A maintenance crew must take care not to park a vehicle on the right of way at a place where the visibility of a traffic sign will be obstructed.

12.02.05 REPLACEMENT OF SIGNS

A major responsibility of the District Transportation Services forces is the replacement of signs. A sign must be replaced when it has been badly damaged or when its legibility is impaired by fading, loss of reflectivity, or vandalism.

All sign inspection reports will be analyzed carefully by the Transportation Services Supervisor. The information obtained, added to the knowledge gained by observing the performance of various sign materials under normal wear conditions, will be helpful in preparing the schedule for replacing signs. Such a schedule will permit replacement on a project basis at a total cost much lower than would be needed to make individual replacement.

12.02.06 SIGN DAMAGE BY MAINTENANCE OPERATIONS

Because of carelessness in the operation of equipment, a considerable number of signs are damaged by our own workforce, particularly mower and grader operators. The County Maintenance Superintendent is expected to provide training to operators and to emphasize the importance of minimizing sign damage.

Each maintenance crew must be cautioned to use extra care when operating near a road sign. If a sign is accidentally damaged in the performance of work, the crew must do what they can to repair the damage, and the Crew Supervisor must report the matter to the Transportation Services Supervisor.

12.03 BREAKAWAY SIGN SUPPORTS

12.03.01 INSPECTION AND MAINTENANCE

Breakaway sign supports shall be inspected on an annual basis by the Transportation Services Supervisor, or designated representative. The Expressway Section Crew Supervisor, or designated representative, will be responsible for the inspection of breakaway sign supports on Interstate/APD routes.

The inspection shall be a visual inspection to ensure:

1. **That the foundations and stubs are not exposed more than 4"/102 mm**
2. **That the support is not obstructed by debris that will impede the breakaway action**
3. **All bolts are present in the base**
4. **The support or sign is not noticeably loose**

Inspections of breakaway sign supports need not be conducted independently of other tasks and should be noted on the daily time report by charging the applicable activity code.

12.03.02 INSTALLATION

Breakaway sign supports shall be installed to the specifications of the most current standards given in WVDOT DOH Standard Details Book Vol. II and WVDOT DOH Standard Specifications, Roads and Bridges.

12.04 TEMPORARY SIGNS

12.04.01 CLASSES

Temporary signs fall into two categories: (1) signs which warn motorists of temporary conditions such as dips, bumps, slides, detours, etc., and (2) maintenance work area signs warning motorists of road maintenance or construction operations.

The temporary condition signs may be mounted on posts or standards of a semi-permanent type, while the work area signs are normally mounted on portable standards so that they can be moved easily and quickly from one location to another.

12.04.02 TEMPORARY ROAD CONDITION SIGNS

12.04.02.01 TYPE AND LOCATION OF SIGN

Temporary road condition signs are erected to warn motorists when there are unusual conditions ahead. Common reason for these conditions are maintenance operations, slides, washouts and detours necessitated by reconstruction of, or temporary damage to the highway. A complete installation will usually include not only appropriate signs, but also barricades, drums, lights, flags, and other warning devices. The signs must be of the design required by the "Manual on Uniform Traffic Control Devices" and will be erected in accordance with the instructions in that manual.

Work area signs should be erected in accordance with the current manual "Traffic Control for Street and Highway Construction and Maintenance Operations". Copies of this manual are available from the Traffic Engineering Division.

Temporary road condition signs must be promptly removed after the road has been repaired and normal traffic conditions restored.

12.04.02.02 INSPECTION

All erected temporary road condition signs will be inspected in accordance with the policies described in detail in Section 12.02.01 of this manual.

12.04.02.03 MAINTENANCE

Temporary road condition signs will be maintained in accordance with the procedures described in Sections 12.02 of this manual.

12.04.03 WORK AREA SIGNS

12.04.03.01 INFORMATION GIVEN BY SIGNS

All highway maintenance operations will be planned and executed to provide a minimum of delay and inconvenience to the public and a maximum of safety, to both the highway user and division employees. One of the most important aspects of safety is the use of proper signs at work areas. All signing will be in accordance with the "Traffic Control for Street and Highway Construction and Maintenance Operations" manual.

12.04.03.02 RESPONSIBILITY FOR SIGN SECTION

The proper installation of work area signs is of the utmost importance to all maintenance personnel.

The maintenance crew using work area signs is responsible for using, placing, removing, inspecting and maintaining the proper signs. The Maintenance Crew Supervisor in charge of a maintenance crew must check before the crew leaves headquarters to be sure that all necessary signs and other traffic control devices

required for the assigned job are included in the equipment. Signs must be checked for condition. If a sign is not in good condition, it should be turned in to the County Maintenance Superintendent or the Transportation Services Supervisor and a replacement obtained.

When the maintenance operation is of a type that covers a number of miles each day, the Supervisor in charge of the operation must make sure that only a reasonable distance is included in the work area protected by the signs at any particular time. Some of the operations requiring work area signing are blading shoulders, mowing the roadside, and patching potholes.

The Maintenance Crew Supervisor must make arrangements for advancing work area signs throughout the day so there will be as little interference with the maintenance work as possible. Even though some time and manpower will be needed to change the positions of the signs, the distance between two successive work area signs must never be allowed to exceed 1 mile/1.6 kilometer. If a motorist drives for more than that distance without seeing the operation warned about, the motorist is likely to forget the warning and resume normal speed allowing attention to be diverted. When such conditions exist, a serious and costly accident may occur.

12.04.03.03 INSPECTION

Inspection of work area signs and other traffic control devices is the responsibility of the County Maintenance Superintendent or the Maintenance Crew Supervisor to whom the devices and signs are charged. Since these signs and devices are constantly being handled and hauled in trucks from place to place, the life of a work area sign is short. Constant attention must be given to the condition of this equipment and routine monthly inspections will be made by the County Maintenance Superintendent, or designee. From time to time the Transportation Services Supervisor will visit a county headquarters to check the condition and number of signs and traffic-control devices.

12.04.03.04 MAINTENANCE

Work area signs will be maintained in accordance with the procedures for permanent signs described in Section 12.02. Battery powered lights must be checked to be sure the battery is in good condition, the lens must be clean and the flashing mechanism is in working order.

12.04.04 REMOVAL OF UNNECESSARY SIGNS

One of the most common detractors from the effectiveness of temporary signs is the failure to remove them after the need is past. For a maintenance operation of more than one day duration, the last thing the Crew Supervisor will do before leaving the job location at the end of the day is to be sure that the crew has removed or covered all signs and other traffic control devices which are not needed and which might tend to confuse drivers. At the completion of the maintenance operation, the

Maintenance Crew Supervisor will make a complete check to see that all temporary signs, cones, and barricades have been picked up.

If it was necessary to erect temporary signs at a hazard, such as a bump or a dip, the signs must be removed as soon as the necessary repairs are completed. This removal work will be done by the crew completing the repairs in such a manner that the sign or sign support will not be damaged (see section 12.01.02.03.02). The signs will

then be taken to the crew's headquarters and the Transportation Services Supervisor will be notified.

12.05 PAINTED PAVEMENT MARKINGS

12.05.01 FACTORS AFFECTING PAINTING

Prevailing moisture and temperature conditions have an important effect on the durability of traffic paint. Paint applied during a dry, warm period will be much more durable than the same paint applied at a temperature near the freezing point or under other adverse conditions. Traffic paint must never be applied to a wet pavement or when the humidity in the air is excessively high.

Traffic paint will be applied only when the air temperature is 50°F/10°C or higher. The Transportation Services Supervisor must learn by experience when paint may be applied with satisfactory results and must exercise good judgment when deciding if painting should be done at a certain time. In the late fall or early spring, the determining temperature will be that of the pavement, rather than that of the air, because a pavement confines frost and its temperature remains near the freezing point long after the air temperature has moderated.

Before the first traffic lines are painted in the spring, at least 30 days will be allowed for the dissipation of the de-icing chemicals last applied during the winter.

Even when the most effective guards are used for shielding the painting operation, strong or gusty winds will interfere with the application of the paint. On a very windy day, other phases of sign and marking work should be assigned.

12.05.02 SCHEDULING PAVEMENT PAINTING

12.05.02.01 REQUIRED INFORMATION

Since the season for painting traffic lines is limited to no more than six months out of the year, good planning is needed to complete this work. This planning must be done by the Transportation Services Supervisor. In the early spring, he/she must obtain a list of contracts and proposed contracts for widening and resurfacing roads in the district. Also, he/she must find out from each County Maintenance Superintendent if a substantial amount of bituminous patching or crack-sealing is planned on certain routes.

12.05.02.02 SCHEDULE PREPARATION

The frequency with which a painted pavement marking must be renewed will depend on the amount and type of traffic and on the width of the pavement. The useful life of a painted center line will usually vary from about 4 months to 1 year, whereas edge lines on a wide pavement may remain effective for 2 years. The schedule for painting the centerlines and edge lines will be scheduled to meet the requirements of the particular District. Generally, striping on Local Service roads will not be started until all the required work on the Expressway, Trunkline and Feeder system has been done.

Where bituminous paving is placed or bituminous patching or sealing is necessary, paint will not be applied for at least 10 days. Paint will not be applied to portland cement concrete until curing has been completed. The length of the curing period will depend on the weather conditions.

The Transportation Services Supervisor will be notified by the Assistant District Engineer - Maintenance as soon as a paving or resurfacing project is completed. Upon receipt of this notice, the Supervisor will schedule the spotting and striping of this particular section of road.

Spotting consists of placing closely spaced dots of paint to guide the centerline machine. The centerline should be marked by spotting as soon as possible after the paving is completed. The standard line will be painted when the centerline crew arrives at the location in accordance with the Transportation Services Supervisor's schedule.

12.05.03 GENERAL METHODS OF APPLYING PAINT

The method and procedure to be employed for painting a pavement marking is controlled to a large extent by the character of the marking. From the standpoint of choice of method, lines painted on a pavement may be either longitudinal and continuous or transverse and intermittent.

Paint for a longitudinal and continuous line is usually applied by a relatively fast mechanized method. Lines in this group are:

1) **Centerline**
2) **Lane line**
3) **Line at no-passing**
4) **Line at change in width of pavement**
5) **Line at edge of pavement**

Transverse and intermittent lines, because of their very nature, are not normally painted but rather are placed using Type V Plastic Markings. In this group are lines at the following places:

1) **Approach to an obstruction**
2) **Turn**
3) **Stop**
4) **Approach to a railroad crossing**

Words should also be placed using Type V material.

Regardless of what method is used, the work must be done in a safe and efficient manner.

12.05.04 PAINTING LONGITUDINAL LINES

12.05.04.01 TYPES OF OPERATIONS

Maintenance of painted longitudinal pavement markings includes the following operations: renewing deteriorated lines which are in their correct locations; putting preliminary or guide markings on new and resurfaced black-top pavements, and putting original markings on new pavements of all types and removing obsolete markings.

12.05.04.02 LOCATING CENTERLINES AND LANELINES

Before a longitudinal line can be painted, its correct position must be marked in some way. Sometimes the position of a centerline or a lane line is marked by a visible longitudinal construction joint. Another method of locating a centerline or lane line is to use a marking machine that is equipped with a sighting device for obtaining the position at the proper distance from an edge of the pavement. In most cases, a longitudinal joint in a concrete pavement will be exactly on the centerline or a lane-line. Poor results will be obtained if the painted line is located over such a joint. Therefore, the painted centerline or lane line will be offset just enough to avoid the joint.

When there is no other way of locating the correct position of a longitudinal line, a preliminary marking is required. Guide marks for centerlines and lane lines are usually made in one of the following ways: oval-shaped spots of paint are sprayed on the pavement at intervals of 15–20'/4.5 - 6 meters by a marking wheel or stick. One person walks along the edge of the pavement and keeps a second person pushing the marking wheel at the proper distance from the edge by means of a measuring tape or a piece of rope.

12.05.04.03 PAINTING CENTERLINE AND LANE LINES

The usual practice in painting centerlines and lane lines is to begin the operation in the late spring, as soon as weather conditions are favorable for drying of the paint. The painting operation will be continued as rapidly as possible so it will be completed before the fall weather becomes too cold or wet.

The actual painting of the longitudinal markings will be done by trained and experienced personnel in accordance with the schedule prepared by the Transportation Services Supervisor. Painting operations for continuous marking will be accomplished by a paint train of the required equipment.

Suitable warning signs and flashing lights will be mounted on all equipment during actual painting operations. The work area will be properly signed to give ample advance warning to motorists. See "Traffic Control for Street and Highway Construction and Maintenance Operations" manual for proper signing.

The pavement surface must be dry and clean when the paint is applied, so that good adhesion of the paint will be obtained. The cleaning will be done by a sweeper-blower unit.

12.05.04.04 LIMITS OF NO-PASSING ZONES

The positions of the beginning and end of each no-passing zone, as approved by the Division and issued to the District Engineer, must be pre-marked and referenced so that they can be readily identified by the painting crew. The location of such a control point is frequently indicated by a marking on the pavement near the centerline. Reference marks consisting of a painted marking shall be placed as described in the Maintenance Performance Standard for Coding and Spotting.

12.05.04.05 PAINTING AND RENEWAL OF EDGELINES

An edge line must be an even line without abrupt crooks. Where the edge of the pavement is uneven, the distance from the edge to the line will vary slightly. In some places the line will have to be at the edge of the pavement while in other places it will be as much as 6”/152 mm from the edge. Care and judgment are to be exercised to assure edge lines are not painted on paved shoulders.

Edge lines must be renewed as often as necessary. They will require frequent inspection for the following reasons. Many primary pavements are so narrow that the outside dual on a truck will often travel on the edge line and at times will drop off the pavement onto the shoulder. Shoulder material that is blown onto the pavement edge or is picked up by tires and brought onto the pavement edge then acts as an abrasive under vehicle wheels, and the life of the line is shortened. Also, graders blading the shoulders cause damage to edge lines by blading loose shoulder material onto the outer 8–12”/203-305 mm of the pavement and then dragging it off.

12.05.04.06 REMOVAL OF ERRONEOUS OR OBSOLETE TRAFFIC LINES

When it is necessary to remove a traffic line, the line must be obliterated completely. The most satisfactory and economical method of removing an extensive length of traffic line from a surface of any type is by hydroblasting or grinding. If line removal is required, contact the District's Regional Traffic Engineering Division representative to schedule this work. Under no circumstances are traffic lines to be

obliterated with black traffic paint or by the use of a light coat of asphalt and sand. In either case the covering would be worn off in a very short time and the old line would show through.

Quite frequently, lines are not visible during the daytime but become quite prominent at night because of glass beads embedded in the pavement voids; therefore, it is necessary to check obliterated traffic lines under night-driving conditions.

12.05.05 PLACING OF TRANSVERSE MARKINGS

When a transverse plastic marking is to be installed, a preliminary guide of some type is required. A chalk line layout will usually suffice for a transverse pavement marking, an approach to a railroad crossing or for a word marking. All dirt and other loose particles will be removed from the pavement before primer is applied. Markings will not be placed when the temperature is below 50°F/10°C or when the pavement is wet.

12.06 MARKING FOR OBJECTS

12.06.01 TYPES OF MARKINGS

Markings for objects are patterns and devices used to emphasize the presence of physical obstructions which are in or near the roadway and which constitute hazards to traffic.

A marking for an object is mounted in front of or adjacent to the obstruction.

All mounted markings will comply with the standards set forth by the Traffic Engineering Division.

Typical roadway obstructions marked are culvert headwalls and underpasses with restricted overhead clearance. If a bridge on an Expressway, Trunkline, Feeder or a paved Local Service road has a roadway width less than the adjacent pavement, the ends of the bridges must be marked with the appropriate signs.

12.06.02 MAINTENANCE OF MOUNTED OBSTRUCTION MARKERS

Mounted obstruction markers are fabricated from signing materials, and for all practical purposes a mounted marker is a form of traffic sign. The methods and procedures for erection and maintenance of permanent signs therefore apply also to mounted obstruction markers.

12.07 MAINTENANCE OF DELINEATORS AND OBJECT MARKERS

Details of maintenance methods and procedures for delineators and object markers are the same as those described for permanent signs. Object markers and delineators shall be inspected annually as detailed in Section 12.02.01.

The Expressway Section Crew Supervisors will be responsible for the maintenance of object markers and delineators on their assigned sections of roadway and will follow the same procedures for annual inspections as detailed in Section 12.02.01.

The more important maintenance tasks are to keep the reflectors and reflective coating in good repair and in good condition for maximum visibility. This shall be accomplished by replacement and/or cleaning when necessary. It is equally important to keep the individual reflector supports in the installed position, especially when reflector markers are used in a series to indicate the alignment of a road.

12.08 MATERIALS

12.08.01 OBSERVING MATERIAL PERFORMANCE

When the Transportation Services Supervisor finds that a certain material is not performing satisfactorily, he/she will report the situation to the Assistant District Engineer - Maintenance. If further investigation is required, he/she will assist in any manner requested. The same procedure will be followed when unusually good performance of a material is noted.

12.08.02 REQUISITIONING MATERIALS

The Division's Central Sign Shop is the sole unit in the Division authorized to manufacture signs, secure signs from outside sources, or to perform major reconditioning or repair of signs.

The District's Traffic Services repair work is limited to minor work as described in Sections 12.02.02 and 12.02.03.

Each District Traffic Services Shop should establish "minimum/maximum" inventory of the various types of signs, delineators, and sign accessories required. When current inventory of any particular sign falls below the "minimum" level, a

requisition for additional signs to bring the inventory to the "maximum" level should be submitted on the proper form to the Central Sign Shop. Directives have been

issued outlining the procedure to be followed. Inquiries concerning the requisitioning of signs should be directed to the Traffic Engineering Division.

Materials other than signs, delineators, and sign accessories will be requisitioned in accordance with the approved standard procedures.

To prevent improper requisitioning, an accurate detailed perpetual inventory must be in effect. Use of a system of this type will eliminate the problem of running out of material and it will not be necessary to throw schedules off and increase the amount of time wasted because plans must be changed at the last minute.

12.08.03 STORING AND TRANSPORTING MATERIALS

12.08.03.01 SIGNS AND POSTS

Traffic signs should be stored under cover in a dry place and in such positions that warping or disfigurement will not take place. Shelves and vertical compartments will be constructed in such a manner that the paint coating and symbols on one sign will not come in contact with an adjoining sign. Although it is preferable to have air spaces between all stored signs, metal signs may be placed in vertical stacks if a sheet of wax paper is inserted between each sign. The wax paper will not be put in place until the paint is thoroughly dry.

Care must be exercised when the signs are being transported from the storage place to the field locations. The general practice is to have the sign-replacement crew use a special truck which contains crating or racks for protecting the signs. The compartment grooves for carrying metal signs will be lined with felt or other bedding material to prevent marring of the sign edges.

Posts should be stored under cover and in such a manner that they will not warp or spring. Normally, they are stacked horizontally with the bottom raised off the ground or floor so that an air space is maintained between the posts and the ground or floor. When posts are being stored or removed from storage, care must be taken not to damage the protective finish. The same care is necessary when posts are being transported from the storage place to the field locations.

12.08.03.02 TRAFFIC PAINT

A six-month period is generally considered the maximum time for which traffic paints will remain in a homogeneous condition while in storage. It follows, therefore, that purchases of traffic paint will be limited to seasonal needs. The initial delivery of newly mixed paint will be scheduled for the beginning of painting season and succeeding deliveries of fresh paint may be spread over the season. Sometimes the first delivery may be delayed; therefore, it is advisable for each district to stock and carry a reasonable quantity of traffic paint from one season to the next, to be sure that critical sections of heavily traveled routes can be repainted at the earliest possible time in the following spring. The paint containers will be upended once a month to prevent settlement and hardening of the pigment.

Traffic paint is normally purchased in 55 gal./208 L drums. These containers are transported to the job in a serving vehicle and the painting machine is filled from them. The time required for mixing or agitating paint by the marking and centerline crew or equipment will be greatly reduced if the containers are shaken mechanically before they are taken from the storage place and are inverted while being transported to the job.

No matter how much the paint containers have been shaken and no matter how many times they have been inverted, traffic paint must be strained and further

agitated by being stirred while it is still in the container immediately before it is transferred to the pressure tank. Each container must be completely emptied into the pressure tank and not wasted in the process of transferring paint from the container to the tank.

12.09 EQUIPMENT

12.09.01 EQUIPMENT FOR ERECTING SIGNS

12.09.01.01 POWER DRIVEN TOOLS

Each sign truck will carry the normal tools for mounting and tightening signs on metal supports and also the tools required to set or drive the supports.

Where all the signs on an entire roadway or an extensive section of a highway are to be replaced or where a new set of signs is to be installed, the use of a pneumatic hammer fitted with a driving shank and operated from a portable air compressor mounted in a truck greatly increases the number of posts driven per day by one crew member. When this power tool is used for sign erection on a job requiring a large number of signs at one location or within a small area, the cost per sign will be greatly reduced.

12.09.01.02 HAND TOOLS

The use of hand tools is adequate for routine maintenance where it is necessary only to replace a sign that has been knocked down or one whose support was damaged too badly to permit field repairs. A sledge hammer is frequently used to drive a metal sign post. The person using a sledge hammer should use a driving cap on the top of the post. Sleeve-type post drivers are used by many sign crews so that they do not have to find something to stand on when driving posts that are more than 8'/2.4 m long.

12.09.01.03 SIGN TRUCKS

The use of specially designed sign trucks will greatly assist in improving field maintenance of signs. Such a truck can carry, under cover, all necessary equipment, tools and supplies for performing practically all tasks connected with field maintenance of signs. The types and quantity of vehicles needed depends primarily on the size of the District and on the work load of the Signs and Markings Section.

12.09.02 EQUIPMENT FOR MAINTAINING PAVEMENT MARKINGS

Fewer hand tools are required for the maintenance of pavement markings than for the maintenance of signs, and greater mechanization is needed to complete the maintenance operations in the available time. It is necessary to use a centerline machine of the type that can simultaneously paint three lines which are two colors. Another very valuable unit of equipment is a small portable air compressor, which can

be used with a unit for spraying paint or to operate pneumatic tools such as the powered post-driver. A power broom will be required.

All equipment that is under the jurisdiction of the Equipment Division will be operated and maintained at all times in accordance with the instructions and directives of that Division.

12.10 RECORDS AND COST DATA

In order that unit costs and total costs may be determined and various administrative controls may be applied, daily field reports of operations pertaining to the maintenance of signs and pavement markings must be kept by the Crew Supervisor in charge of each crew. To obtain sufficient uniformity in field reporting, so that it will be possible to compile reliable representative costs and to show the relative merits of the many types of equipment and the materials used in applying traffic paint, the following requirements must be met:

1) **All crews must adopt the same standards of measurement**
2) **Off-the-job time in preparing and servicing the equipment must be included**
3) **The cost of the warning, field-servicing, and protector-recovery items must be included**
4) **Equipment charges must be reported accurately**

All material used for signs is to be charged to a crew when it is taken out of inventory and this information will be reported to the Transportation Services Supervisor each day.

When a sign is erected, the date of erection will be applied to the back of the sign with the appropriate sticker. This information will be useful in making an appraisal of the wearing properties of the basic sign material, the paint coatings and other sign elements under exposure to intense sunlight, shade, moisture, wind, and road film.

FOOTNOTE

As more fully set forth in Section 01.01.01, nothing in this manual is intended to create a legal or moral duty and has been created for internal guidance only.