

TO:		ENGINEERING INSTRUCTION	
SUPERSEDED BY <u>EI 07-006</u> EFFECTIVE <u>9/06/07</u>		NEW YORK STATE DEPARTMENT OF TRANSPORTATION SUBJECT: REVISION TO SECTION 619 OF THE STANDARD SPECIFICATIONS AND CONSTRUCTION SUPERVISION MANUAL SECTION ON FLAGGING Subject Code: 7.30	
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Attached is a shelf note that will be added to all contracts beginning with the letting of July 8, 1993. This shelf note establishes STOP/SLOW signal paddles as the standard signaling device for most types of flagging operations. Designers are advised that any special notes referencing flaggers should consider that the flaggers will probably be using signal paddles rather than flags.

Also attached is a new section for the Construction Supervision Manual dealing with flagging operations and procedures. This material is intended to supplement material already in Section 619 of the CSM. It should be inserted in existing manuals after page 619-14.

Proper flagging procedures are critical to the safety of the travelling public and workers on Department construction projects. The guidelines and principles discussed in the attached CSM section are important to ensuring acceptable flagging operations. This material is, therefore, established as Official Policy of the Construction Division.

STOP/SLOW SIGNAL PADDLE

Page 6-53

Under §619-1.02, *G. Flagmen*, *delete* this paragraph in its entirety and *replace* it with the following:

"G. Flagger. Provide the necessary traffic control equipment and flagger for adequate traffic control on the traveled way."

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Under §619-3.01 *D. Traffic Control*, *delete* the last sentence of the second paragraph and *replace* it with the following:

"Signal Paddles meeting the requirements of Section 293.2 of the MUTCD shall be used as the standard signaling device for flagging operations where one or more flaggers are controlling a single stream of traffic, or two alternating streams of traffic proceeding in opposite directions. Signal flags may be substituted where display of the STOP and SLOW faces in opposite directions may be inappropriate or misleading, or in other situations, when approval is granted by the Engineer."

CONSTRUCTION SUPERVISION MANUAL
619-1.02 G. - FLAGMEN

I. INTRODUCTION

The safe control and direction of traffic in highway work zones often relies on use of hand signaling devices, commonly referred to as "flagging". Specific requirements for signaling procedures and equipment are provided in the New York State Manual of Uniform Traffic Control Devices, with virtually parallel requirements provided in the Federal MUTCD. Additional requirements on use of flaggers are provided in the Standard Specifications, Section 619, Maintenance and Protection of Traffic.

The important role of flaggers in ensuring safe travel through work zones, both for the traveling public and for workers, is generally well recognized. Considerable emphasis is placed on flaggers both by the Department's inspection staff and by contractors. This emphasis includes concern for adequate training and appearance of flaggers, number of flaggers used and their location within the work zone, and the proper equipment and procedures to be used. However, the absence of detailed guidelines or standards for flagging operations has resulted in wide variation and inconsistent effectiveness of contractors' flaggers.

II. FLAGGING GUIDELINES

A clear, consistent, rational message by the flagger is essential to gain driver compliance. Based on experience with flagger accidents on Department projects, and with flagging deficiencies noted during Annual Work Zone Safety Program inspections, as well as continued expressions of concern from Regional staff, guidelines are needed to improve driver compliance with flagger signals on construction projects. The following guidelines are provided to improve the effectiveness of flagging operations. (A discussion of each guideline and basic principles important for good flagging operations are presented in Section III.)

1. Signal devices:

Requirements of the NYSMUTCD for hand-signaling devices shall be met at all times. Because they are more easily understood by drivers, STOP/SLOW paddles are required rather than flags for most long-term flagger operations, as discussed in Section III-1.

2. Flagging Procedure:

Correct signaling procedures using either the flag or paddle (or signal light at night) must be employed at all times to ensure driver comprehension. Signalling procedures are shown in the NYS and Federal MUTCD, and in numerous handbooks and manuals, and are attached to this CSM section.

3. Flagger Appearance and Visibility:

Flaggers must present a neat, authoritative appearance to command motorist respect. Clean, well-fitting orange vests and hardhats are required, as well as suitable work attire.

4. Location of Flagger Station:

Flagger stations must be located to ensure adequate sight distance and visibility, taking care that flaggers are not masked by construction operations, other workers, or traffic control devices. Adequate recovery space should be provided to the extent possible for the safety of the flagger, and to allow safe recovery for drivers who fail to respond to flagger directions.

5. Performance of Flaggers:

Contractors are required to provide competent flaggers capable of performing acceptably at all times. Any flagger deficiencies must be corrected at once. In extreme cases, the contractor shall be required to discharge flaggers who do not perform acceptably.

III. BASIC PRINCIPLES FOR SAFE, EFFECTIVE FLAGGING

1. SIGNAL DEVICES

Experience and research have shown that, for certain situations, STOP/SLOW paddles are more easily understood by motorists than flags. Part 293 of the NYSMUTCD provides for the use of either device, with no preference expressed. However, Section 6E-4 of the 1993 version of Part VI of the Federal MUTCD provides a clear preference for the paddle: "The STOP/SLOW paddle, which gives drivers more positive guidance than flags, should be the primary hand-signaling device" The Department's Standard Specifications previously denoted no preference for either device, but in 619-1.02G and 619-3.01D, the Engineer was empowered to require paddles in lieu of flags. §619-1.02G and 3.01D were amended effective 7/8/93 to establish the paddle as the standard signaling device on Department projects.

Based on continued problems with the use of flags, and on considerable evidence that paddles are more easily understood by motorists, it is Construction Division policy

that STOP/SLOW paddles shall be required and used rather than flags for situations where they offer an advantage. This shall be interpreted to require paddles for long-duration flagging operations where one or more flaggers are controlling a single stream of traffic, or two alternating streams of traffic proceeding in opposite directions. Typical examples include paving and ditch cleaning operations on two-lane roadways controlled by flaggers at each end of the operation. Most operations on one-way roadways are also appropriate for paddle use. However, paddles shall not be used at locations where display of the STOP and SLOW faces in opposite directions would be inappropriate or misleading.

Paddles are not suitable for all types of operations, and the added versatility of flags in certain situations outweighs any loss of comprehension. Typical applications for flags include use of one flagger to simultaneously stop two opposing traffic streams. Short-term intermittent flagging operations, especially on two-way roadways, can be handled adequately using a flag. Finally, flags may be acceptable for flaggers used primarily as traffic spotters, but who rarely must stop traffic.

Signaling equipment is described in detail in Part 293 of the NYSMUTCD:

- Flags must be red in color, 24 in. square minimum size, with the free edge weighted to resist wind. Orange or red-orange flags and smaller sizes are not permitted for signaling (although they can be used as warning devices).
- Paddles must be octagonal in shape, at least 18 in. across, and must be displayed on a staff at least 5 ft. high.
- At night, flagger stations must be floodlighted if flags or paddles are used. Under absolutely no circumstances shall flags or paddles be permitted to signal traffic during darkness except at floodlighted flagger stations. For nighttime signaling operations at other than floodlighted locations, a signal light as described in Part 293 of the MUTCD shall be used.

It is critical that the proper signaling device is selected according to the above principles, and that the device itself meets the requirements of the MUTCD. The sections which follow provide additional principles to enhance the effectiveness of flagging operations through proper appearance, location, and procedures. While they

will enhance effectiveness, they cannot compensate for use of an improper device.

2. FLAGGING PROCEDURES

Correct flagging procedures using both the paddle and the flag are shown in Figure 293.1 of the NYSMUTCD, and Figure VI-4 of the Federal MUTCD (Revised Chapter VI). Descriptive narratives are provided in the accompanying text and are attached to this CSM section. A number of handbooks and manuals are also available describing these procedures. Studies have shown that motorist comprehension of these signals is critically dependent upon the procedure used to signal, regardless of the device used. Although alert drivers may comprehend sloppy signaling procedures, many drivers - especially inexperienced or elderly drivers - are confused or mislead by signal procedures that vary even slightly from the depicted standards. This is especially true when the flag is used, because it does not provide the redundancy afforded by the STOP/SLOW paddle. Of primary importance in providing clear signals is the establishment of eye contact with the driver. Use of hand signals to complement the signal device is also helpful, and it is important that the flagger's free hand is used for this purpose. It is essential, both to maintain driver respect and to protect themselves, that flaggers not turn their back on approaching traffic.

It is essential to ensure that flaggers are adequately trained in proper signaling procedures, and that they use the procedures consistently. Flagging is a tedious and tiring task, and it must be expected that performance will deteriorate after several hours of work. It is essential to ensure that flaggers are provided adequate work breaks, and that relief flaggers are available when needed.

3. FLAGGER APPEARANCE AND VISIBILITY

To effectively control traffic, flaggers must be highly visible, and must command respect. All flaggers must wear an orange vest and hardhat. For night work, reflective material must be added to the vest and hardhat, as required by the MUTCD. To command respect, the flagger must present a neat appearance. It is especially important that the vest is clean, fits properly, and is closed in the front and back. Vests that are faded, dirty, that fit poorly, or that are unfastened shall not be permitted. Flaggers may not wear any apparel or provide an appearance that is distracting to drivers. Drivers' attention should be on the flagger's signals and instructions rather than appearance or attire. Specifically, unusual clothing, shorts, or other apparel unsuitable for general construction work is

unsuitable for flaggers, and shall not be permitted. It is important that the flagger's appearance is highly visible, and commands driver respect. Anything that may detract from this shall not be permitted.

4. LOCATION OF FLAGGER STATIONS

Proper location of flagger stations is important from several standpoints. The flagger must be visible sufficiently far in advance of the construction operation that the driver can perceive the flagger and stop safely. The flagger must be separated from other workers and from the work operation to the greatest extent practical to ensure that the flagger is recognized. Whenever possible, this means locating the flagger upstream from the operation. For any flagger operation other than short-term intermittent flagging, a Flagger Ahead sign must be posted ahead of the flagger. This sign must be posted several hundred feet in advance, but it must be kept close to the flagger to be credible. For moving operations, the sign must be repositioned periodically during the day as the operation advances. Because drivers have short attention spans, it is important to keep the sign close - - a maximum travel time of 30 to 60 seconds from the sign to the flagger is recommended as an absolute maximum, with closer location appropriate for most situations. Removing this sign when the flagger is not present - - even for short periods such as lunch break - - is important to maintain driver respect and credibility.

Roadway geometry is an important parameter in determining flagger location. To the greatest extent possible, flaggers must be located where drivers have adequate advance sight distance. Stationing flaggers beyond sharp curves or over hill crests should be avoided whenever possible. If operations require locating flaggers at locations with less than desirable sight distance, proper location of the Flagger Ahead sign is especially important.

Provision of recovery space is another important parameter - - for the flagger, other workers, and the driver. Because the flagger is on foot, and is exposed to approaching traffic with no advance protection, it is important to station the flagger where an escape path is available if a driver fails to respond to signals. It is especially important to avoid situations exposing the flagger to opposing high-speed traffic streams. It is preferable, for example, for the flagger to work from the shoulder side of the lane, rather than on the centerline. Stationing a flagger very close to construction equipment may result in the flagger being trapped between approaching vehicles and equipment. In addition, construction equipment

close to the flagger represents an additional hazard which may divert flagger attention from approaching traffic.

By leaving space between the flagger and the operation, recovery distance is provided if an approaching driver doesn't notice the flagger in time to stop. If sufficient space is available, a vehicle can stop past the flagger before encountering the operation. Likewise, this space may permit time for a warning to workers that a vehicle is approaching.

To enhance flagger visibility, it is important to locate flaggers away from other traffic control devices -- signs, drums, barricades, etc. -- to the greatest extent practicable, so the competing orange materials don't mask the flagger. However, supplemental devices such as flag trees, or a few strategically placed cones (on the centerline, for example) may sometimes be helpful in attracting motorist attention to flaggers (in addition to the flagger ahead sign). Such devices may be especially helpful in congested urban situations, where the added burst of orange color will help to attract attention to the flagger location, or on open rural highways with little activity apparent to an approaching driver.

In summation, flagger stations must provide adequate advance sight distance for drivers, and must not camouflage the flagger by other activities or traffic control devices. The location must be selected with adequate consideration for personal safety of the flagger, and to allow recovery space if a driver fails to respond to flagger signals.

5. FLAGGER PERFORMANCE

The contractor is required to provide adequately trained, competent flaggers. If a flagger is not performing acceptably, in terms of appearance, general demeanor or in terms of signaling procedure, the contractor must be directed to correct the situation at once. In cases of grossly inadequate signaling procedure, or extreme cases of inappropriate appearance or demeanor, a change must be made immediately. If the deficiency is so serious as to present an immediate danger to traffic, to the construction operation, or to the flagger, the operation must be shut down until a competent flagger can be assigned by the contractor.

The contractor is responsible for training flaggers, including remedial training for any flagger not performing as required. While it is Department policy for inspection staff not to provide instructions directly to the contractor's flagger, the Department will cooperate to

ensure that flaggers are provided a clear understanding of flagging procedures. In cooperation with the contractor, instructions to flaggers by the Engineer or by the Regional Construction Safety Coordinator or other appropriate staff are considered consistent with Department goals, provided this activity is limited to assisting a contractor as a training exercise. Likewise, Department staff should periodically observe flagger performance when new flaggers are assigned, to ensure that acceptable procedures are followed.

It is recognized that flagging is a difficult, tedious, and tiring task. Even the most skilled and dedicated flaggers may not perform at their peak after several hours on the job, and both Department personnel and the contractor must be alert to the need to relieve flaggers periodically. During hot weather, it is especially important that drinking water is available, and that rest breaks and rest room facilities are available periodically.

Under no circumstance shall incompetent flaggers be permitted to remain on Department projects. Any unsatisfactory performance must be corrected by the contractor, or the flagger must be replaced. Section 105-08 of the Standard Specifications provides "All workmen must have sufficient skill and experience to properly perform the work assigned them - - - Any person employed by the Contractor whom the Engineer shall deem incompetent or unfit to perform the work shall be at once discharged, and shall not again be employed." In extreme cases, this provision shall be invoked, and incompetent flaggers shall not be permitted to continue working in that capacity. As in any other situation related to contractor performance, appropriate procedures must be followed to put the contractor on notice, monitor corrective actions, discuss progress, and initiate other follow-up actions as warranted.

IV. REVIEW OF PAST FLAGGING PRACTICES

A review of traffic accidents on Department Construction projects provides considerable evidence that flagging operations need to be improved.

Of 912 traffic accidents involving or related to maintenance and protection of traffic operations reported on Department construction projects from 1989 through 1992, 144 of these accidents - - 16 percent of the total - - included a flagging operation. In 47 of these accidents, injuries were sufficiently severe to require hospitalization of one or more persons, and 38 other accidents resulted in less severe injuries. Eleven of these accidents involved contractors' employees, and in five of them, injured

employees required hospitalization. The causes of these accidents varied widely, and while no single causative factor stands out, poor driver comprehension of flagger signals was clearly a factor in a substantial number of accidents. Drivers who may be expected to experience the most difficulty in receiving and reacting to signals - - young and old drivers - - appear to be over-represented in these accidents. Teenage drivers were involved in 7 accidents and drivers age 62 or older were involved in 24 accidents. Thus, nearly one-quarter of these accidents involved young or old drivers. In some cases, a clear determination could not be made as to the type of flagging device used. However, it is clear that signal flags were used in most, with STOP/SLOW paddles specifically mentioned in only a few cases.

The 1990 Inspection Program Report noted poor flagging technique on 15 percent of all projects inspected, and misuse or absence of the "Flagger Ahead" sign on 16 percent of all projects. Although a count was not made, that inspection revealed that flags were by far the predominant hand-signaling device on construction projects, with STOP/SLOW paddles encountered only rarely. For many of the flagging operations observed, paddles would clearly have provided improved driver understanding.

SUMMARY

The use of hand-signaling devices - - flagging - - to direct traffic through construction projects will continue to play a major role on Department projects. Accident experience, inspection of work zone traffic control, and field input all indicate that flagging operations are not uniformly acceptable. The policy guidelines and engineering principles presented herein will enhance the effectiveness of flagging operations.

These points are important for the safety of the travelling public, and for all of the workers on the project. This material is intended to focus attention on the main points necessary to ensure a safe, effective flagging operation. Exceptions to these principles are not permitted on Department construction projects, except after adequate consideration by the Regional Construction Group. Input should be obtained from the Regional Traffic Engineering and Safety Group and the Main Office if appropriate. The decision process for any deviations from these guidelines must be adequately documented in the project records.

JEB:FLAGGING.CSM

293.3 Signaling procedures.

(a) **General.** Subdivisions (b) through (e) of this section provide guidance on how to direct traffic. The text and illustrations are directly applicable to situations where only one direction of approaching traffic is controlled. When controlling traffic approaching in both directions, the flagger may adapt the guidelines, as necessary, to effectively control traffic in each direction. When controlling traffic at an intersection, the flagger may adapt the guidelines, as necessary, to effectively control traffic from the various approaches.

(b) Signaling traffic to stop.

(1) The flagger should face traffic being directed to stop, holding the signaling device in the hand closer to the traffic flow path.

(i) When an F1-1 red flag is used, it should be extended horizontally and then held in a stationary position over the affected travel path so that the full flag area is visible below the staff.

(ii) When an F2-1 red light is used, it should be extended horizontally and then held in a stationary position so the red light is visible to approaching traffic.

(iii) When an F3 paddle is used, it should be turned to display the F3-1 "stop" paddle face toward traffic being directed to stop, and then held in a stationary position with the paddle staff resting on the ground.

(2) For emphasis, the flagger's free arm may be raised with the open palm of the hand facing traffic being directed to stop.

(3) When traffic has complied with the stop signal, the flagger may display other signals to other traffic approaches before directing the stopped traffic to proceed.

(c) Signaling traffic to proceed.

(1) When an F1-1 red flag or F2-1 red light is used, the flagger should lower the flag, or light, to a rest position by his or her side, turn his or her body parallel to traffic flow, and direct traffic to proceed with a horizontal motion of the free hand along the traffic flow direction.

(2) When an F3 paddle is used, it should be turned to display the F3-2 "slow" paddle face toward traffic being directed to proceed, and then held in a stationary position with the paddle staff resting on the ground. For emphasis, the flagger may also direct traffic to proceed with a horizontal motion of the free hand along the traffic flow direction. When traffic in both directions is controlled with an F3 paddle, the flagger should turn to face traffic being directed to stop when the paddle is rotated. When that traffic has complied with the stop signal, the flagger should turn to make the optional "proceed" motion to traffic viewing the F3-2 "slow" paddle face.

(d) Signaling traffic to reduce speed.

(1) The flagger should face approaching traffic being directed to reduce speed, holding the signalling device in the hand closer to the traffic flow path.

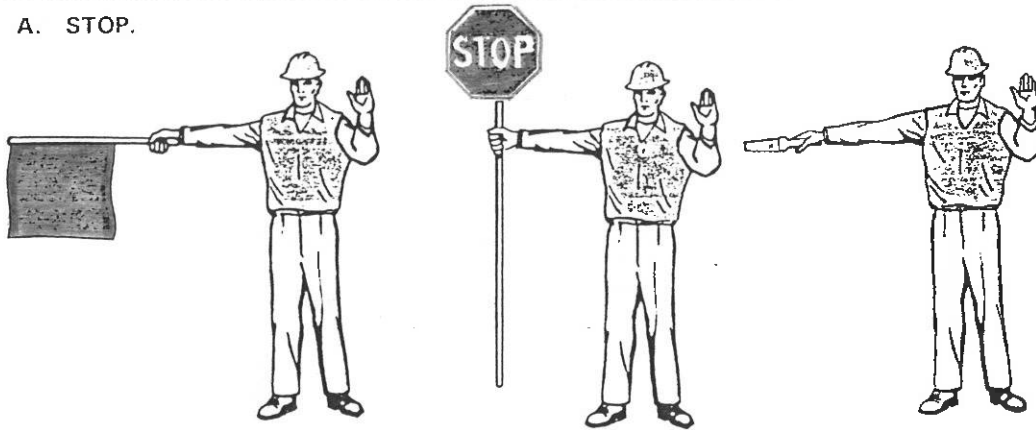
(i) When an F1-1 red flag or F2-1 red light is used, it should be moved slowly back and forth in an arc between a vertical downward position and a horizontal extended position. The arm should not be raised above shoulder height.

(ii) When an F3 paddle is used, the F3-2 "slow" face should be turned toward approaching traffic.

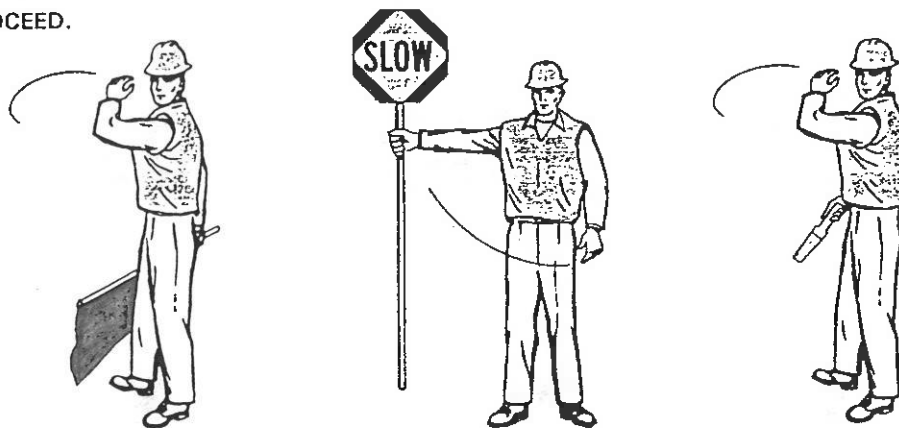
(2) For emphasis, the flagger may slowly raise and lower the free hand, with the palm down.

FIGURE 293-1
HAND SIGNALING PROCEDURES

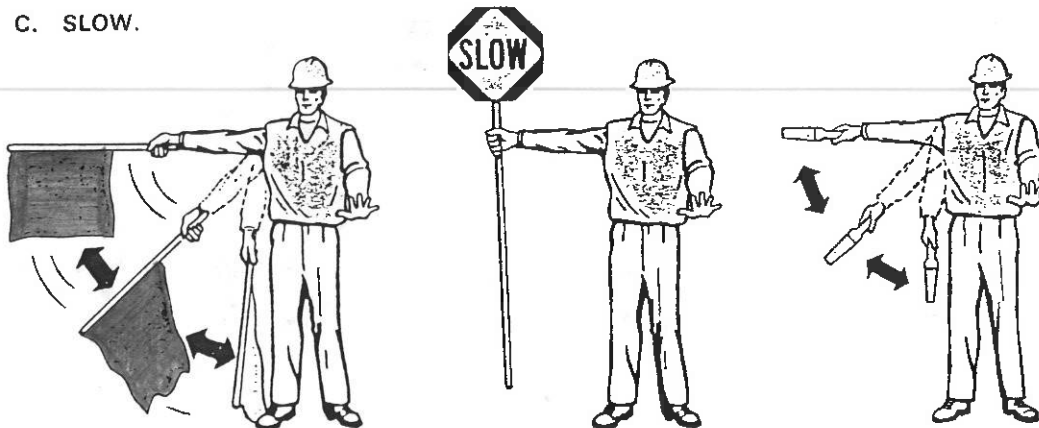
A. STOP.



B. PROCEED.



C. SLOW.



- Notes:
1. See section 238.7 for flagger sign.
 2. See sections 293.2 and 293.3 for signaling devices and procedures.
 3. See section 301.9 for safety vest and other flagging station requirements.