MDOT Michigan Department of Transportation

OFFICE MEMORANDUM

DATE: December 3, 2010

TO: Region Engineers
Region Delivery Engineers
Region Development Engineers
TSC Development Engineers
TSC Managers
Resident/Project Engineers
Region Construction Engineers
Region Traffic and Safety Engineers
TSC Traffic and Safety Engineers
Region Maintenance Engineers

FROM: Gregory C. Johnson
Chief Operations Officer

John C. Friend
Engineer of Delivery

SUBJECT: Bureau of Highway Instructional Memorandum 2010-10
Guidelines for Electrical Traffic Control Device Maintenance

The Engineering Operations Committee has approved the *Guidelines for Electrical Traffic Control Device Maintenance* Manual. The newly updated guidelines which include current technologies and practices are attached. Device maintenance details were moved to an Appendix listing each maintenance task to be performed and maintenance frequency. The document will also be available by electronic copy, which makes the forms more readily accessible. This guideline was last revised in 1992.

A noteworthy point is the Department of Energy, Labor, and Economic Growth's (DELEG's) requirement to have electricians on-site for any electrical work. This requirement will impact signal maintenance in the area of emergency and routine relamping maintenance agreements (Types A and B). Relamping incandescent lamps are not defined as "electrical work," however, working with Light Emitting Diode lamps does require rewiring the equipment, and is considered electrical work. This requirement will impact some agencies' ability to provide maintenance work for MDOT, since they may not have a licensed electrician on staff.

This change will become effective immediately for all MDOT maintenance and contract agencies at the next contract authorization.

Chief Operations Officer

Engineer of Delivery

BOH-DEL:T&S:PJC:nw

Subject Index: Traffic Control

Attachments

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GUIDELINE

FOR

ELECTRICAL TRAFFIC CONTROL DEVICE MAINTENANCE

Michigan Department of Transportation
Operations Division
Draft Revision, July 2010

This document supersedes all previous guidelines and procedures relative to electrical traffic control device maintenance and hereafter referred in this document as guidelines.

INTRODUCTION

Traffic control devices must be properly maintained to command respect and to obtain accurate action on the part of motorists. It is the intent of this guide to establish minimum maintenance procedures to accomplish this task.

Department maintenance has been established on a statewide basis utilizing Region Signal Electricians. Where local agencies can provide properly trained personnel and equipment, maintenance and/or installation of electrical devices can be undertaken by these agencies when authorized. All other installations are handled by the Statewide Signal Shop or by contract.

SIGNAL MAINTENANCE BY LOCAL AGENCIES

Where local agencies can provide qualified personnel, and equipment, maintenance and installation of electrical devices can be undertaken by these agencies when authorized. **Each individual Signal Cost Agreement form specifies who will be** responsible for maintenance, and at what level. Four levels of signal maintenance have been established for local agencies that wish to maintain or install electrical traffic control devices on trunk lines within their jurisdictional area. Each level of maintenance carries with it the responsibility for having *qualified personnel performing the required maintenance work in the proper manner, and at established intervals. It is the responsibility of each agency to possess all necessary licenses and certifications required to perform the work at that level. All new installations or modernizations shall be done in accordance with the MDOT Work Authorizations, Division of Operations-Traffic and Safety Standard Specifications and detailed drawings, and any applicable laws and rules governing all electrical installations including but not limited to the National Electrical Code (NEC), National Electrical Safety Code (NESC), Michigan Manual of Uniform Traffic Control Devices (MMUTCD), International Municipal Signal Association (IMSA), etc. Local agencies shall adhere to the Federal Highway Final Rule on Worker Visibility, and shall follow all appropriate MIOSHA standards and rules when conducting this work.

Responsibility levels for maintaining and installing are as follows:

Type A - **Requires emergency relamping of incandescent bulbs only.** Qualified personnel and a vehicle with aerial lift must be available on a 24-hour basis.

Type B - Requires both routine and emergency relamping of incandescent bulbs only and optical unit cleaning. Controller repairs are not authorized.

Qualified personnel and a vehicle with aerial lift must be available on a 24-hour basis.

Type C - Requires both routine and emergency relamping, optical unit cleaning, and maintenance of all signal related equipment. Qualified personnel must be properly licensed as ether a master electrician/journeyman and have a working knowledge of controllers, to the satisfaction of MDOT personnel. MDOT qualified personnel must be available on a 24-hour basis.

Type D - Requires complete routine and emergency maintenance of electrical devices, including controllers, by properly licensed personal. Also requires installation and modernization of all devices as required by Department Work Authorization. A master electrician/journeyman shall be available on a 24-hour basis.

*Qualified Personnel is defined as: A person or persons who have the skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training on the hazards involved, has the proper license, certification, and can perform a particular task meeting the mandates and current laws/regulations as defined by the State of Michigan.

SIGNAL MAINTENANCE

The electrical device maintenance guidelines have been developed for use by the region signal electricians and the agencies throughout the state who are responsible for maintaining electrical traffic control devices on state trunk lines. The ultimate goal is to ensure that a uniform system of maintenance is utilized with respect to all electrical devices that are department responsibility.

It shall be the responsibility of each agency performing electrical device work under a departmental agreement to perform the items described at the agreed level and in the manner as prescribed in this Signal Maintenance Guideline unless otherwise approved.

Relamping

All traffic signal incandescent and LED lamps shall be changed at the recommended intervals per the Preventive Maintenance Checklist (Appendix A). All incandescent lamps shall be standard A-21 and P-25 traffic signal lamps rated at 8000 hours or greater. All LED lamps must meet the current MDOT specifications. **Incandescent lamp size shall be according to Table 1.**

Mercury vapor lamps will be changed to current standards at the time of the next signal modernization.

Table 1: Lamp Requirements

OPTICAL DEVICE	LIGHT OUTPUT
8" Incandescent Signal	67-69 Watt Series
9" Incandescent Pedestrian Signal	67-69 Watt Series
12" Incandescent Pedestrian Signal	116 Watt Series, 130V
12" Incandescent Signal	150 Watt Series, 130V
Weigh Station and School Lamps	50 Watt Series, 12V
12" LED Signal	Current MDOT specifications
12" LED Pedestrian Signal	Current MDOT specifications
16" LED Countdown Pedestrian Signals	Current MDOT specifications

Optical Unit Cleaning

Signal lenses, reflectors, and lamps shall be thoroughly cleaned according the recommended intervals described in Appendix A.

MAINTENANCE OF CONTROLLERS

Controller Timing

Every controller shall be kept in effective operation in strict accordance with its predetermined timing permit. A copy of the permit shall be posted in the control cabinet. Timing changes should be made only by authorized persons when directed by the Engineer, using written instructions which describe details of each change.

The time settings (dial, splits, and offsets) shall be verified against the current timing permit according to the recommended interval described in Appendix A.

A Traffic Signal Timing Record Card (MDOT Form 1577) shall be completed and returned to MDOT whenever a change or modification to the signal timing has been made. A copy of this pre-addressed postal card is provided in Appendix B.

Electro-mechanical Controllers

Electrical mechanical devices shall be maintained according to the recommendations listed in Appendix A.

Solid-State Controllers

On site maintenance and troubleshooting should be limited to the tasks described in Appendix A. Any malfunctioning controller must be replaced and the malfunctioning unit shall be sent to the manufacturer for repair. Be sure to provide adequate safety at the intersection during troubleshooting.

MAINTENANCE RECORDS

Detailed maintenance records shall be kept for all work using MDOT Forms 499, 489, 443, and 1531. Copies of these forms are provided in Appendix B. All applicable forms shall be completed and submitted to MDOT for payment of services. Notify Transportation Service Center coordinator of any repairs that are needed beyond routine maintenance activities. Maintenance records shall be kept for at least seven years.

When doing installations and modernization work authorizations issued by MDOT Division of Operations-Traffic and Safety, an Installation Completion pre-addressed postal card (Figure 5) should be completed and returned to MDOT Traffic Signals Unit.

HANDLING OF TROUBLE CALLS

All trouble calls concerning traffic signal operations are to be investigated. It is necessary to undertake any indicated repairs immediately. If for some reason personnel cannot be immediately dispatched to the signal, or travel time is great, it is recommended that the maintaining agency contact law enforcement officials to control traffic until maintenance personnel can resolve the problem. An investigation determining that a general power failure is the cause of a problem

requires no further action (see Appendix C for Bureau of Highways Informational Memorandum- BOHIM-2004-24). Placement of portable generators as a temporary power source should not be undertaken.

Response to trouble calls concerning other electrical devices shall be undertaken as soon as work schedules permit, but not later than the next working day unless it is determined that immediate attention is required for public safety. Devices such as flashing beacons, keep right signs, school speed limit signs, warning signs with beacons, sign illuminations, and illuminated case signs are normally of a supplemental nature and can be repaired the next regular working day and as schedules allow.

RESPONSE TIME

The initial response time to investigate a reported problem intersection and verify and identify the problem immediately and should not exceed two hours. This initial verification can be performed by the police in emergency situations. Following verification, either a final repair or emergency repair – depending on the nature of the equipment problem – should be performed as follows:

- ★ Emergency repair temporarily restores safe operation within a 24-hour period. Overtime may be required to perform emergency repairs.
- ★ Final repair to bring the equipment into conformance with the permit specifications should be completed within 30 days unless prohibited by weather conditions or unavailability of equipment. Overtime should be avoided whenever possible when completing final repairs.
- ★ Routine maintenance described in Appendix A should be completed during regularly scheduled hours (non overtime hours).

GENERAL INFORMATION

All materials used for maintenance or completion of Departmental work authorizations must meet MDOT specifications unless approval for alternates is obtained from the Department. Specifications are available from the Division of Operations- Traffic and Safety in Lansing. No work shall be subcontracted without prior approval of the Department. All traffic control devices as required by the Michigan Manual of Uniform Traffic Control Devices shall be utilized during any installation or maintenance activities.

Be sure to use adequate safety precautions at the intersection during all maintenance activities.

Local agencies shall adhere to the Federal Highway Final Rule on Worker Visibility, and shall follow all appropriate MIOSHA standards and rules when conducting this work.

Appendix A: Preventive Maintenance Checklist

TASK	Minimum Recommended Interval*				Min. Level of Maintenance Required			
	Months			Years				
	3	6	12	2-5	A	B	C	D
CABINETS								
• Lubricate hinges and locks			X				X	X
• Vacuum cabinet			X				X	X
• Replace filters		X					X	X
• Check weatherproof seals (gaskets)			X				X	X
• Check anchor bolts			X				X	X
• Check for water accumulation and check duct sealant			X				X	X
• Check ground rod clamp and wire			X				X	X
• Check wiring schematics and records			X				X	X
• Check operation of fan and heater		X					X	X
• Check radio interference filter and lightning arrestor			X				X	X
• Check circuit breaker and fuses			X				X	X
• Check ground fault receptacle			X				X	X
• Measure voltages at service inputs in cabinet	As required						X	X
• Check and record current being drawn	As required						X	X
• Remove any snow or brush	As required					X	X	X
SIGNAL HEADS								
• Clean lenses, signs, reflectors			X			X	X	X
• Replace lamps (incandescents)			X		X	X	X	X
• Check gasket for water infiltration and deterioration			X				X	X
• Check alignment		X					X	X
• Check for wear on the span wire, signal wire, and mechanical hardware (clevis pins, clamps)			X				X	X
• Check mast arms, free-swinging signals; check clevis and chain		X					X	X
• Check for cracks or rust in the hardware		X					X	X
• Check hoods, wing nuts, and hinges			X				X	X

• Replace substandard hardware	As required						X	X
• Replace defective lenses and reflectors or lamps	As required						X	X
• Check locking rings (surface); install proper locking devices as required			X				X	X
• Check condition of back plates (if used)		X					X	X
• Perform a nighttime check for visibility from each approach			X				X	X
MAST ARMS AND POLES								
• Check alignment of mast arms			X				X	X
• Inspect poles, transformer bases and arms for damage caused by impact with vehicles			X				X	X
• Inspect for rust; spot paint as required			X				X	X
• Inspect joints for rust and cracks at arm/upright location and at base plate			X				X	X
• Inspect anchor bolts for rust and tightness			X				X	X
SPAN WIRE AND POLES								
• Inspect for rust			X				X	X
• Inspect joints for rust, grout, and tightness			X				X	X
• Inspect condition of span and tether wires			X				X	X
• Verify span and tether wire vertical clearance at low spot of sag			X				X	X
• Check clamps and hardware			X				X	X
• Check guy wire, anchors, and guards, wood poles			X				X	X
PUSH BUTTONS								
• Check push buttons on each end of actuated crosswalks and visually verify pedestrian signal operation; verify timing		X					X	X
• Check push button indicator lamp (if one exists) for operation		X					X	X
• Check push button signs; clean or replace if necessary		X					X	X
• Check push button sign alignment			X				X	X
ELECTROMECHANICAL CONTROL EQUIPMENT								
Dial Assemblies								
• Check for wear on key follower			X				X	X
• Check for burned, pitted, or discolored contacts			X				X	X
• Check key positions			X				X	X

• Check for cycle gear size and mesh			X				X	X
• Check dial motor operation			X				X	X
• Check all dials according to manufacturer's recommendations			X				X	X
• If controller is part of a system, check offset			X				X	X
• Check duration of the advance pulse			X				X	X
Cam Assemblies								
• Check for end play			X				X	X
• Clean and lubricate as required by manufacturer			X				X	X
• Visually inspect for abnormal wear and/or cracks			X				X	X
• Check for burned, pitted, or discolored contacts			X				X	X
• Check for spring tension on contacts			X				X	X
• Check for loose wiring to contacts			X				X	X
• Check that operations of advancing mechanism conforms with manufacturer's requirements			X				X	X
• Check whether all connections are secure and tight			X				X	X
• Visually inspect wires for wear, rubbing, or deterioration of insulation			X				X	X
• Install dust cover as required			X				X	X
Relays								
• Check for burned, pitted, or discolored contacts			X				X	X
• Check for tight and secure fit into sockets			X				X	X
• For latch-type relays, check for latch operation per manufacturer's recommendations			X				X	X
Flashers								
• Check flash rate			X				X	X
• Check operation			X				X	X
• Check for burned, pitted, or discolored contacts			X				X	X
• Check for tight and secure fit into sockets			X				X	X
Switches								
• Verify operation of each switch position			X				X	X
• Check for loose wires			X				X	X
Terminal Connections								

• Check visually for signs of corrosion or any abnormal condition			X				X	X
• Tighten all terminal connections			X				X	X
DETECTORS								
Sensors								
• Visually inspect roadway along loop detector saw cut for exposed wires, cracks, potholes, rutting, etc.			X				X	X
• Check alignment for sonic, magnetic, video, and radar-type detectors; verify call inputs to controller phases			X				X	X
• Verify special functions, e.g., delay, extension			X				X	X
Amplifiers								
• Check whether the detector is detecting vehicles within its design zone of detection			X				X	X
• Tune the detector if necessary			X				X	X
• Check whether the connectors are tight and secure			X				X	X
JUNCTION BOXES AND HANDHOLES								
• Check integrity of the splices			X				X	X
• Check the ground rod, clamp connection, and bonding of conduits			X				X	X
• Check the insulation			X				X	X
• Check for abnormal amounts of water			X				X	X
• Check lid for abnormal condition and fit			X				X	X
SOLID STATE, ANALOG, AND MICRO PROCESSOR-BASED CONTROL EQUIPMENT								
General								
• Check whether the time settings match the current timing permit			X				X	X
• Check whether indicator lamps on the modules are working; replace failed lamps			X				X	X
• Check for extension by detector actuation			X				X	X
• Check whether modules fit tightly and securely into the frame			X				X	X
• Check whether connectors are tight and secure			X				X	X

• Wipe dust off controller, detectors, and auxiliary equipments			X				X	X
Conflict Monitors								
• Replace with bench-tested unit and take to repair shop for testing			X				X	X
Load Switches								
• Check load switch packs			X				X	X
Relays								
• Check mercury relays (if used) for excessive splash			X				X	X
Flashers								
• Check whether firm in socket; check on/off ratio and flash rate			X				X	X
Switches								
• Verify operation of each switch position			X				X	X
• Check for loose wires			X				X	X
Terminal Connections								
• Check for discoloration and tightness			X				X	X
INTERCONECTED EQUIPMENT								
• Verify communication is in tact within the system			X				X	X
• Check whether controller operates in the mode selected by the supervisory master (i.e., time-based coordinator) and verify TBC of local matches TBC in master			X				X	X
• Disconnect from the master supervisory system and check for "free" or backup operations			X				X	X
• Check any special equipment per manufacturer's recommendation			X				X	X
MISCELLANEOUS								
• Record all changes in timing, wiring, or any function		As required					X	X
• Record current flow at un-metered installations		As required					X	X

* or earlier if required

Michigan Department
of Transportation
1577 (10/04)

TRAFFIC SIGNAL TIMING RECORD

Information required by Act 51 of 1951,
as documentation for potential litigation.

COMPLETE AND RETURN

FILE REF.	LOCATION
☐ Timing installed as authorized by permit dated.	DATE INSTALLED
☐ Timing NOT installed as authorized. Copy of corrected permit enclosed. Explanation:	
TIMING PERMIT IN CONTROLLER	INSTALLED BY

Michigan Department
of Transportation
1577 (10/04)

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Information required by Act 51 of 1951,
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1577 (10/04)

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NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO. 1312 LANSING, MI

POSTAGE WILL BE PAID BY ADDRESSEE

MICHIGAN DEPARTMENT OF TRANSPORTATION
TRAFFIC & SAFETY DIVISION
TRAFFIC SIGNALS UNIT
PO BOX 30050
LANSING MI 48909-9791

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO. 1312 LANSING, MI

POSTAGE WILL BE PAID BY ADDRESSEE

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TRAFFIC & SAFETY DIVISION
TRAFFIC SIGNALS UNIT
PO BOX 30050
LANSING MI 48909-9791

Michigan Department
of Transportation
0499 (10/00)

ELECTRICAL DEVICES
TROUBLE REPORT

PRINT LEGIBLY. This form does not need to be typewritten.
Use reverse for additional REMARKS/DESCRIPTION if necessary.

JOB REPORT NO.

LOCATION

REFERENCE NO.

REPORTED BY:

TIME CALL RECEIVED ☐ A.M. ☐ PM.

DATE

TIME ELECTRICIAN NOTIFIED ☐ A.M. ☐ PM.	TIME ARRIVED ☐ A.M. ☐ PM.	TIME COMPLETED ☐ A.M. ☐ PM.	TOTAL TRAVEL TIME	TRUCK NO.	ACCIDENT INVOLVED ☐ YES ☐ NO

TYPE (✓ One)	TROUBLE	RED OUT	YELLOW OUT	GREEN OUT	NO COLOR	DON'T WALK OUT	WALK OUT	SIGNAL in FLASH	POWER FAILURE	TIMING PROBLEM	SIGNAL LOW	OTHER (NOTE IN REMARKS)
☐ SIGNAL ☐ FLASHER ☐ KEEP RIGHT ☐ O'HEAD LUMIN. ☐ OTHER	REPORTED											
	FOUND											

REMARKS

DESCRIPTION OF WORK PERFORMED

ELECTRICIAN(S) (SIGNATURE) — DATE

CALL RECEIVED BY: — REPORT APPROVED BY (SIGNATURE) — DATE

Michigan Department
of Transportation
0499 (10/00)

ELECTRICAL DEVICES
TROUBLE REPORT

PRINT LEGIBLY. This form does not need to be typewritten.
Use reverse for additional REMARKS/DESCRIPTION if necessary.

JOB REPORT NO.

LOCATION

REFERENCE NO.

REPORTED BY:

TIME CALL RECEIVED ☐ A.M. ☐ PM.

DATE

TIME ELECTRICIAN NOTIFIED ☐ A.M. ☐ PM.	TIME ARRIVED ☐ A.M. ☐ PM.	TIME COMPLETED ☐ A.M. ☐ PM.	TOTAL TRAVEL TIME	TRUCK NO.	ACCIDENT INVOLVED ☐ YES ☐ NO

TYPE (✓ One)	TROUBLE	RED OUT	YELLOW OUT	GREEN OUT	NO COLOR	DON'T WALK OUT	WALK OUT	SIGNAL in FLASH	POWER FAILURE	TIMING PROBLEM	SIGNAL LOW	OTHER (NOTE IN REMARKS)
☐ SIGNAL ☐ FLASHER ☐ KEEP RIGHT ☐ O'HEAD LUMIN. ☐ OTHER	REPORTED											
	FOUND											

REMARKS

DESCRIPTION OF WORK PERFORMED

ELECTRICIAN(S) (SIGNATURE) — DATE

CALL RECEIVED BY: — REPORT APPROVED BY (SIGNATURE) — DATE

Michigan Department
of Transportation
0489 (10/00)

SIGN SIGNAL OR
PAVEMENT MARKING JOB REPORT

DIVISION	WORK ORDER NO.	REFERENCE NO.	REGION	COUNTY

MUNICIPALITY	REQUESTED BY:	INTERSECTION OF:

DATE JOB STARTED	DATE JOB FINISHED	IN SERVICE	APPLICATION

DESCRIPTION OF
ARTICLES OR
SERVICES RENDERED

MATERIALS	QUANTITY	UNIT COST	AMOUNT
TRAVEL EXPENSE:			
MATERIAL TOTAL			

LABOR COSTS			
EMPLOYEE	HOURS	RATE	AMOUNT
LABOR TOTAL			

EQUIPMENT COSTS			
EQUIPMENT NO.	HOURS	RATE	AMOUNT
EQUIPMENT TOTAL			
GRAND TOTAL			

SIGN AND SIGNAL SUPERVISOR APPROVAL

DATE

AGY	AY	INDEX NO.	PCA NO.	AGENCY OBJ.	GRANT	PH	PROJ.	PH	AG1	AG2	AG3	AMOUNT

Michigan Department of Transportation
0443 (02/08)

REPORT OF DEPARTMENT PROPERTY DAMAGE

Information required by Act 17, P.A. of 1925.

DISTRIBUTION:
REGION MAINT. ENGR.
YOUR FILES

ACCIDENT/INCIDENT REPORT NUMBER	OWNER/DRIVER	ACCIDENT DATE
TRUNKLINE NUMBER	POLICING AGENCY	
AGENCY MAKING REPAIRS (List all agencies involved)	CONTACT PERSON	AGENCY PHONE NO.

WORK COMPLETED, CHECK APPROPRIATE BOX:

☐ Repair guardrail, Total guardrail length _____ ft ☐ Repair sign ☐ Other repair _____

☐ Replacement of entire guardrail system ☐ Total sign replacement ☐ Other total replacement _____

CHECK APPROPRIATE BOX: ☐ Repairs/replacement to damage caused by the above accident have been completed. The cost is itemized below. ☐ Below is an estimated cost of damage caused by the accident above. ☐ Estimate previously reported.

Labor

INSTALLER BY SHOP IDENTIFIER NUMBER	DATES WORKED	HOURS	RATE	DIRECT LABOR CHARGES
			DIRECT LABOR COST TOTAL	

Equipment

NUMBER OR DESCRIPTION	DATES WORKED	HOURS	RATE	DIRECT EQUIP. CHARGES
			DIRECT EQUIPMENT COST TOTAL	

Materials

ITEM DESCRIPTION	UNIT	COST/UNIT	DIRECT MATERIAL CHARGES
		DIRECT MATERIAL COST TOTAL	
		TOTAL DIRECT COSTS	

INDIRECT COSTS

LABOR ADDITIVE (fringe) %	% x	DIRECT LABOR COST TOTAL	=	
MATERIAL HANDLING %	% x	DIRECT MATERIAL COST TOTAL	=	
OVERHEAD %	% x	TOTAL DIRECT COSTS	=	
			TOTAL INDIRECT COSTS	
			TOTAL COST (TOTAL DIRECT COSTS + TOTAL INDIRECT COSTS)	

SIGNATURE

TITLE

DATE

TO BE FILLED OUT BY ARU ONLY

LESS DEPRECIATION (On Replacement Cost Only)	$
MAIN OFFICE CHARGE	$
GRAND TOTAL	$

MDOT 0443 (02/08)

ADDITIONAL PAGE MAY BE USED IF NEEDED

ACCIDENT/INCIDENT REPORT NUMBER	OWNER/DRIVER	ACCIDENT DATE

DESCRIPTION OF ARTICLES OR SERVICE RENDERED

Labor

INSTALLER BY SHOP IDENTIFIER NUMBER	DATES WORKED	HOURS	RATE	DIRECT LABOR CHARGES
			ENTER TOTAL ON PAGE ONE	

Equipment

NUMBER OR DESCRIPTION	DATES WORKED	HOURS	RATE	DIRECT EQUIP. CHARGES
			ENTER TOTAL ON PAGE ONE	

MDOT 0443 (02/08)

ADDITIONAL PAGE MAY BE USED IF NEEDED

ACCIDENT/INCIDENT REPORT NUMBER	OWNER/DRIVER	ACCIDENT DATE

	ITEM DESCRIPTION	UNIT	COST/UNIT	DIRECT MATERIAL CHARGES
Materials				
	ENTER TOTAL ON PAGE ONE			

Reference Guide for completing Michigan Department of Transportation Report of Department Property Damage Form 443

- The calculations are automatic when the form is completed on line.
- Make sure you sign the form and include your title and the date.
- A new section has been added which is to be completed by MDOT's Accounts Receivable Unit.

ACCIDENT/INCIDENT REPORT NUMBER - Can be found in the upper right corner of the Traffic Crash Report.

OWNER/DRIVER – Can be found in the center of the Traffic Crash Report.

ACCIDENT DATE - Can be found in the upper left corner of the Traffic Crash Report.

TRUNKLINE NUMBER - Can be found in the center of the Traffic Crash Report.

POLICING AGENCY - Can be found in the top middle of the Traffic Crash Report.

AGENCY MAKING REPAIRS - The garage or the County Road Commission making the repairs.

CONTACT PERSON - Supervisor overseeing trunkline repairs that can answer any questions regarding the items that were filled out on form 443.

AGENCY PHONE NUMBER - The garage phone number or county road commission phone number where the contact person can be reached.

WORK COMPLETED, CHECK APPROPRIATE BOX

-**Repair Guardrail** – a guardrail is repaired when less than the whole guardrail is being replaced. (Example: Only one tri-beam rail used)

- If this is a guardrail repair, what is the total length of the entire guardrail from end to end, including, the part that was repaired.

-**Replacement of entire Guardrail** – a guardrail is replaced when the whole guardrail is taken down from end to end and replaced with all new guardrail.

-**Repair Sign** – a sign is repaired when only a portion has to be replaced (Example: The post is replaced but the original sign is reinstalled).

-**Total sign Replacement** – a sign is replaced when the sign itself is taken down and replaced with a new sign (Example: The post(s), sign, nuts and bolts are totally replaced).

-**Other Repair** – Would include repairs to traffic signals, bridges, driveways, traffic control, clean-up cost, etc., but would not include signs or guardrails.

-**Other total Replacement** – Would include total replacement of traffic signals, bridges, etc., but would not include signs or guardrails.

Check Appropriate Box: Check only one box.

Repairs/replacement to damage caused by the above accident have been *completed.* The cost is itemized below.

Or

Below is an *estimated* cost of damage caused by the accident above.

Or

Estimate previously reported.

Labor

INSTALLER BY SHOP INDENTIFIER - Employee number, Installers initials, or TMW number as long as the information on the 443 form can be identified to a specific individual. This will reduce the number of harassing phone calls to these individuals.
DATES WORKED - These would be all the dates you were at this site.
HOURS - This would be the hours you were at the site.
RATE - This is the hourly rate including benefits.
DIRECT LABOR CHARGES - Hours worked multiplied by rate equals direct labor charges.
DIRECT LABOR COST TOTAL – Total of all direct labor charges.

Equipment

NUMBER OR DESCRIPTION - Equipment number or description.
DATES WORKED - The date the equipment was at the job site.
HOURS - Hours worked on site.
RATE - Equipment rental rate which is recalculated annually.
DIRECT EQUIPMENT CHARGE - Hours multiplied by rate equals direct equipment charges.
DIRECT EQUIPMENT COST TOTAL – Total of all direct equipment charges.

Materials

ITEM DESCRIPTION - Description if the item(s) used for the repair or replacement.
UNIT - The number of units used on this particular job.
COST/UNIT - Cost of one unit.
DIRECT MATERIAL CHARGES - Units multiplied by cost per unit equals direct material charges.
DIRECT MATERIAL COST TOTAL – Total of all direct material charges.

TOTAL DIRECT COST- Add direct labor charges plus direct equipment charges plus direct material charges equals total direct cost.

Indirect Costs

LABOR ADDITIVE - Multiply Labor Additive rate by direct labor charges.
* County Road Commission - refer to State Trunkline Maintenance Contract.

MATERIAL HANDLING - Multiply material handling charge percentage times total direct material charges to equal the indirect material charges.
*MDOT repair facilities do not charge a handling fee. Only County Road Commissions have handling charges as established in contract agreement.

OVERHEAD – Multiply overhead rate by the direct costs.
*For County Road Commission, the overhead rate is set by the county according to a formula in the State Trunkline Maintenance Contact.

TOTAL INDIRECT COST - Total of indirect labor charges plus indirect material charges plus indirect cost for overhead

TOTAL COST TO REPAIR/REPLACE -Total of the direct charges plus the total indirect charges.

**Additional pages can be added to include more space for Labor, Equipment and Materials and a description of articles or service rendered. See additional pages online.

SIGNATURE – Individual completing form.
TITLE – Job title of individual completing form.

Michigan Department of Transportation
1531 (11/02)

ELECTRICAL DEVICES INSTALLATION COMPLETION DATE

Information required by MDOT to complete billing process

COMPLETE AND RETURN

REGION: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

FILE REF.	W.O. NO
LOCATION	
WORK TO BE PERFORMED BY	
COMPLETION DATE	**CIRCUIT NO.**
CABLE NO.	PAIR NO.
WATTAGE CHANGE ☐ Yes ☐ No	UTILITY ☐ Detroit Edition ☐ Consumer Energy ☐ Other

SIGNATURE	TITLE	DATE

Michigan Department of Transportation
1531 (11/02)

ELECTRICAL DEVICES INSTALLATION COMPLETION DATE

Information required by MDOT to complete billing process

COMPLETE AND RETURN

REGION: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

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SIGNATURE	TITLE	DATE

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MDOT
Michigan Department of Transportation

OFFICE MEMORANDUM

DATE: October 7, 2004

TO: Region Engineers
Region Delivery Engineers
Region Development Engineers
TSC Managers
Resident/Project Engineers
Region Construction Engineers
Region Traffic and Safety Engineers
Region Maintenance Engineers

FROM: Larry E. Tibbits
Chief Operations Engineer

John C. Friend
Engineer of Delivery

SUBJECT: Bureau of Highway Instructional Memorandum 2004-24
Dark Signals Due to Power Outage

To ensure consistent treatment of dark signalized intersections (signal not operating due to local area power outage), the following is a clarification of MDOT policy.

Current maintenance guidelines on dark signals (last revised in 1993) states "An investigation determining that a general power failure is the cause of a problem requires no further action. Placement of portable generators as a temporary power source should not be undertaken. Possible damage to signal equipment may occur. Temporary stop signs may be placed at the intersection and the controller switched to flash operation. After power is restored, the intersection should be switched back to normal operation."

Upon notification of a dark signal, the appropriate region's electrician (or authorized equivalent) should contact the power company to determine if the dark signal is because of a local power outage. If it is determined the power outage is the cause of the dark signal, the following options are available and listed in their preferred order:

1. No action taken - traffic shall proceed as per the Michigan Vehicle Code, Section 257.649, Right-of-Way; Rules; Violations as Civil Infraction.
2. Traffic control is provided by uniformed police officers at the sole discretion and responsibility of the police enforcement agency in a manner determined solely by the police enforcement agency.

3. At signalized intersections under MDOT's jurisdiction (which includes local streets which intersect with trunkline routes), placement of temporary stop signs must be approved by authorized MDOT region/TSC operations staff or by authorized staff of direct maintenance garages or special crews facilities. Reimbursement for work activity by a contract agency would be made.

If a temporary stop sign is placed, the signal must be switched to flash operation with care given to which approaches will be stopping and that they match the colors of the flashing signal once power is restored. Usually under flash operation, the major approaches will flash yellow and the minor approaches flash red. Activating the flash operation requires the electrician maintaining the intersection (or authorized personnel as approved by the appropriate region's electrician) to switch the traffic signal. Without this change in operation, the traffic signal will return to stop and go operation within seconds after power is restored, which could cause conflicts between the signal and any temporary signage (conflicting green or yellow indications with a stop sign for the same approach). If temporary stop signs are placed, they shall be continuously monitored by the local agency to insure removal upon restoration of power. At that time, the signal must be switched back to the normal stop and go mode of operation by MDOT forces or authorized personnel. If it cannot be ensured that the signal will come back in the appropriate flash mode in conjunction with the temporary traffic control, stop signs shall not be placed at the intersection.

As was stated earlier, placement of a portable generator as a temporary power source should not be undertaken. However, contract maintaining agencies that have extensive knowledge and experience with traffic signals can request prior written approval from MDOT to use generators. As part of the request, the maintaining agency will need to identify how they will prioritize generator placement during area wide power outages. The request will then need to be reviewed by appropriate MDOT personnel before authorization is given.

Chief Operations Officer

Engineer of Delivery

BOH-DEL:T&S:PJC:nw
Subject Index: Traffic Control
cc: J. Culp, Traffic and Safety Support Area
C & T Support Area Staff
M. DeLong, Real Estate Support Area
M. VanPortfleet, Design Support Area
C. Roberts, Maintenance Support Area
B. O'Brien, C & T Support Area
J. Polasek
S. El Ahmad
C. Rademacher
P. Sebenick
G. Moore

T. Fudaly, FHWA
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K. Reincke
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