

## Managing Utility Cuts

At best utility patches are a blemish on what used to be a nice riding road; at worst they are an artificial pothole. We must face the fact of life that utility patches are inevitable on just about every street or road, even in rural areas.

Many towns, villages and cities, particularly the smaller ones, experience difficulty in getting utility repairs satisfactorily completed. This situation arises from a lack of regulations and specifications, and from not having a permitting process, on-site inspections or final approval. The resulting inconsistent construction practices produce improper surfaces and in turn many citizen complaints. This bulletin provides guidelines to help governmental units establish controls and procedures to insure safe, efficient, good quality work in cutting and repairing utility trenches.

### Controlling the cut

Public law and legal decisions hold that any unit of government with jurisdiction over public road and street systems is totally responsible for them. Utility cuts are included in this responsibility.

Many governmental units have ordinances and regulations governing utility cuts and patches. Although the form and extent of these varies widely, there are some guidelines that all governmental units should consider in developing control over utility cuts.

**Permit:** The permit form can be simple or comprehensive, depending on the structure of the governmental unit. Any organization or individual planning construction on a public road or street should have to obtain a permit in advance. Three sample permits are included in this bulletin as figures 1, 2, and 3.

**Bond:** A performance bond should be required. This bond should be of sufficient value to cover the cost for the government to complete or correct the work if the

permittee's work is deficient or incomplete. It should be in force for at least three years after the work date.

**Insurance:** The governmental unit should require the contractor to purchase a comprehensive public liability and property damage policy naming the governmental unit as additional insured. This policy could also include coverage insuring that the contractor will perform the work to specification. Such performance insurance, also in force for at least three years after the work date, would be in lieu of the performance bond. Minimum coverage limits should be specified. These vary from place to place but should not be less than \$300,000 per claim occurrence. It is important to use legal counsel to establish a bond and insurance requirement appropriate to the community's needs.

**Specifications:** Develop a drawing or sketch and specifications to issue to the permittee. Be sure these specifications cover techniques for cutting and back-filling trenches, repairing pavement, and controlling traffic as discussed below. It is important to require the permittee to observe all local, state and federal (OSHA) safety codes.

**Inspection:** By ordinance, regulation or code, require inspection of the work as it progresses. This should also indicate that any inspection by the governmental unit does not relieve the permittee of its responsibilities. Make advance notice procedures part of the permit process. These would require the contractor or utility personnel to alert the proper authorities in advance of beginning excavation. This permits the community to schedule inspections. Provide inspectors with the power to suspend work if it does not adhere to government codes, specifications or policies.

**Emergency:** In order to avoid a conflict with these established procedures, develop an emergency exception process. An emergency is defined as a repair required immediately to insure public safety and restore

\_\_\_\_\_, Wisconsin  
**PERMIT FOR STREET OPENING**

**OPTIONAL**

FOR \_\_\_\_\_ USE ONLY

No. \_\_\_\_\_ Date \_\_\_\_\_

Dept.	Date	Initials
Received	_____	_____
Street Section	_____	_____
Sanitary Sewer	_____	_____
Traffic Eng.-Street	_____	_____
Traffic Eng.-Lighting	_____	_____
Water Utility	_____	_____
Sidewalk	_____	_____

ADDRESS \_\_\_\_\_

Purpose of Opening:

- INSTALL NEW \_\_\_\_\_ MAIN
- INSTALL NEW \_\_\_\_\_ SERVICE
- CUT OFF \_\_\_\_\_ SERVICE
- \_\_\_\_\_ (MAIN, SERVICE) REPAIR
- OTHER \_\_\_\_\_

LOCATION	TYPE OF DITCHES
<input type="checkbox"/> Center Lane	<input type="checkbox"/> Concrete
<input type="checkbox"/> Curb Lane	<input type="checkbox"/> Black Top
<input type="checkbox"/> Terrace	<input type="checkbox"/> Sod
<input type="checkbox"/> Sidewalk	<input type="checkbox"/> Other _____

"CALL 3 WORK DAYS BEFORE YOU DIG"



**DIGGERS HOTLINE**  
 TOLL FREE 1-800-242-8511  
 Milwaukee Area: 344-5111

DATE STARTED \_\_\_\_\_ TIME \_\_\_\_\_

DATE COMPLETED \_\_\_\_\_ TIME \_\_\_\_\_

In consideration of being permitted to make such excavation, I hereby agree that I will faithfully comply with the terms of this permit, including the Special Provisions; that I will comply with all applicable statutes, ordinances, rules, and regulations of the State of Wisconsin and the \_\_\_\_\_ of \_\_\_\_\_; that I will indemnify, defend and hold the \_\_\_\_\_ of \_\_\_\_\_ harmless from any and all claims, liability, loss, damage or expense incurred by the \_\_\_\_\_ of \_\_\_\_\_ on account of any injury to or death of any person or any damage to property caused by or resulting from activity or work performed under this permit, whether caused by or contributed to by the \_\_\_\_\_ of \_\_\_\_\_, its officials, agents or employees, and that I hereby agree to purchase comprehensive public liability, contractual and property damage insurance, with the \_\_\_\_\_ of \_\_\_\_\_ as a named additional insured for a period of \_\_\_\_\_ from the date of completion of work hereunder, in an amount not less than \_\_\_\_\_ per claim occurrence from a company or companies authorized to do business in the State of Wisconsin and licensed by the Wisconsin Insurance Commissioner, such insurance shall be evidenced by a certificate of insurance showing the \_\_\_\_\_ of \_\_\_\_\_ as a named additional insured and shall provide thirty (30) days written notice to the \_\_\_\_\_ upon cancellation or material change in the policy with renewal certificates provided to the \_\_\_\_\_ for three (3) years from the date of completion of work hereunder; that I will at all times keep the place where such excavation is made properly guarded by day and lighted by night; that I will leave the street, sidewalk, alley or terrace in as good or better condition than existed when the work was commenced; that I will have all finished concrete and asphalt work within the right-of-way performed by a qualified contractor; that all restoration of the street, sidewalk, alley or terrace affected by my acting upon this permit shall be completed within twenty (20) calendar days of the closing of the excavation; that all such restoration work shall be guaranteed for a period of \_\_\_\_\_ from the date of completion; that if this project requires a detour, I will provide the \_\_\_\_\_ seventy-two (72) hours notice prior to commencement of the work; that I agree this permit may be voided by the City Engineer if the work is not started within a reasonable length of time after the above stated starting date; and that I will comply with \_\_\_\_\_ General Ordinances, Erosion and Stormwater Runoff Control.

Special Provisions \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**APPROVED**

\_\_\_\_\_

BY \_\_\_\_\_

CONTRACTOR DOING WORK

Requested by \_\_\_\_\_

\_\_\_\_\_

SIGNATURE

Phone No. \_\_\_\_\_

Figure 1: Sample utility cut permit A.

\_\_\_\_\_, Wisconsin

## PERMIT TO OPEN AND EXCAVATE STREET

GOOD FOR \_\_\_\_\_ DAYS FROM DATE

DATE \_\_\_\_\_

INVOICE # \_\_\_\_\_

\_\_\_\_\_ has permission, subject to the conditions in Section  
No. \_\_\_\_\_ of Municipal Code of Ordinances, to open and excavate in the street named below.

\_\_\_\_\_ for the purpose of \_\_\_\_\_

Signed \_\_\_\_\_  
Board of Public Works

Insurance ( )	FEE
Bond ( )	
	\$

*This permit is valid only when properly receipted by the \_\_\_\_\_ Office.*

Figure 2: Sample utility cut permit B.

**PERMIT FOR STREET OPENING**

\_\_\_\_\_ of \_\_\_\_\_

ADDRESS

LOCATION

Opening to be \_\_\_\_\_ feet  
\_\_\_\_\_ of \_\_\_\_\_ R/W  
Line. Proposed opening to be  
\_\_\_\_\_ Long (Measured at 90° to  
street centerline) and \_\_\_\_\_  
wide.

LOCATION	TYPE OF DITCHES	
<input type="checkbox"/> CENTER LANE	<input type="checkbox"/> CONCRETE	<input type="checkbox"/> DIRT
<input type="checkbox"/> CURB LANE	<input type="checkbox"/> BLACK TOP	<input type="checkbox"/> SOD
<input type="checkbox"/> TERRACE	<input type="checkbox"/> BLK. TP & CONC.	<input type="checkbox"/> OTHER
<input type="checkbox"/> SIDEWALK	<input type="checkbox"/> GRAVEL	

DATE OPENED

DATE TO BE COMPLETED

PURPOSE OF OPENING \_\_\_\_\_

REQUESTED BY: \_\_\_\_\_ BY: \_\_\_\_\_  
NAME AND TITLE

Permission is hereby granted, pursuant to the application of this date, on file in the \_\_\_\_\_ office, to make an excavation at the above location provided that the Permittee abide by all rules and regulations set forth in \_\_\_\_\_ of the \_\_\_\_\_ of \_\_\_\_\_, and to at all times keep the place where the excavation is made properly guarded by day and lighted by night and will abide with the \_\_\_\_\_ of \_\_\_\_\_ Ordinances and any special request or provisions that may be made by the Street Superintendent or his representative or herein stated.

Excavations made in streets, driveways or other hard surfaced locations shall be done by first air-spading or saw-cutting the outside edges of the excavation in straight segments to a minimum depth of one (1) inch.

All utility trenches shall be backfilled with pit-run sand, mechanically compacted, unless otherwise specified. After completion of compaction of the sand backfill, a concrete patch seven (7) inches deep shall be poured to an elevation one (1) inch from the top of the existing pavement. High early strength concrete shall be used for all utility patches. The one (1) inch hot bituminous wearing course patch shall be compacted with a steel wheeled roller, or an approved mechanical tamper.

Seventy-two (72) hour notice is required if this project will require a detour.

This permit is void if work is not completed by the above stated completion date.

Special provisions \_\_\_\_\_

**NOTE**

Applicant shall notify Traffic Engineering Dept. 48 hrs. prior to starting work and upon completion of project at \_\_\_\_\_.

Approved by \_\_\_\_\_  
NAME AND TITLE

Figure 3: Sample utility cut permit C.

disrupted services, such as a broken water main, a gas line leak, or a damaged power cable. The emergency permit process would allow a contractor or utility employee to notify an identified individual, such as a clerk, police officer, or fire chief, by telephone or note. The permit would then be obtained on the next regular day of business.

**Penalties:** Be careful in establishing and invoking penalties. They should be reasonable. Unreasonable penalties can result in hardship on utility customers. Penalties could be:

- Denying the contractor any future permits until the current problem is resolved.
- Fines against utilities which can be increased incrementally after the due date expires.
- Notifying the bonding or insurance carrier of the problem.

All costs for permits, insurance, bonding, and inspection should be the responsibility of the permittee. Fees for the permit vary widely. Some communities charge a flat fee while others charge by length of street or road affected. Separation of permit fee and inspection fee is recommended.

### Utility cut procedures

The trenches should be as narrow as possible to minimize the size of the patch when the work is complete. However, they should be wide enough that workers can safely repair the utility and backfill the trench in proper steps and with proper compaction. This will minimize subsequent settling and damage to the street.

For streets paved with concrete, require sawcutting to remove the concrete. Also, the concrete area removed should be wider and longer than the trench. This allows the new patch to be supported on undisturbed soil. It also allows for proper backfilling in the event that some of the sidewalls of the trench fall in.

Bituminous pavement can be removed by saw or by a four inch air spade, depending on the desired final results for the patch. The objective is to insure a straight sided cut which can be firmly patched. Utility cuts made by ripping open the pavement with a backhoe bucket create jagged edges which weaken surrounding pavement and form a poor seal with the repair patch.

Once the pavement has been removed, the workers excavate and pile the base course, and any subbase and subgrade materials to the side of the trench. If special materials are required for filling the trench, then this excavated spoils material must be removed from the site. It is best to remove it when it is excavated. When

the utility work is complete, backfilling should begin immediately with the required materials.

### Backfilling procedures

Whatever materials are used to backfill the street opening, the contractor or utility personnel must use good backfilling methods. Compaction should meet all the requirements for normal street construction and should progress upward to the completion of the backfill.

Several satisfactory compaction tools can compact subgrade materials to the required density — power driven hand tampers or power driven trench hoe tampers, for example. Figure 4 is a typical standard for trench compaction.

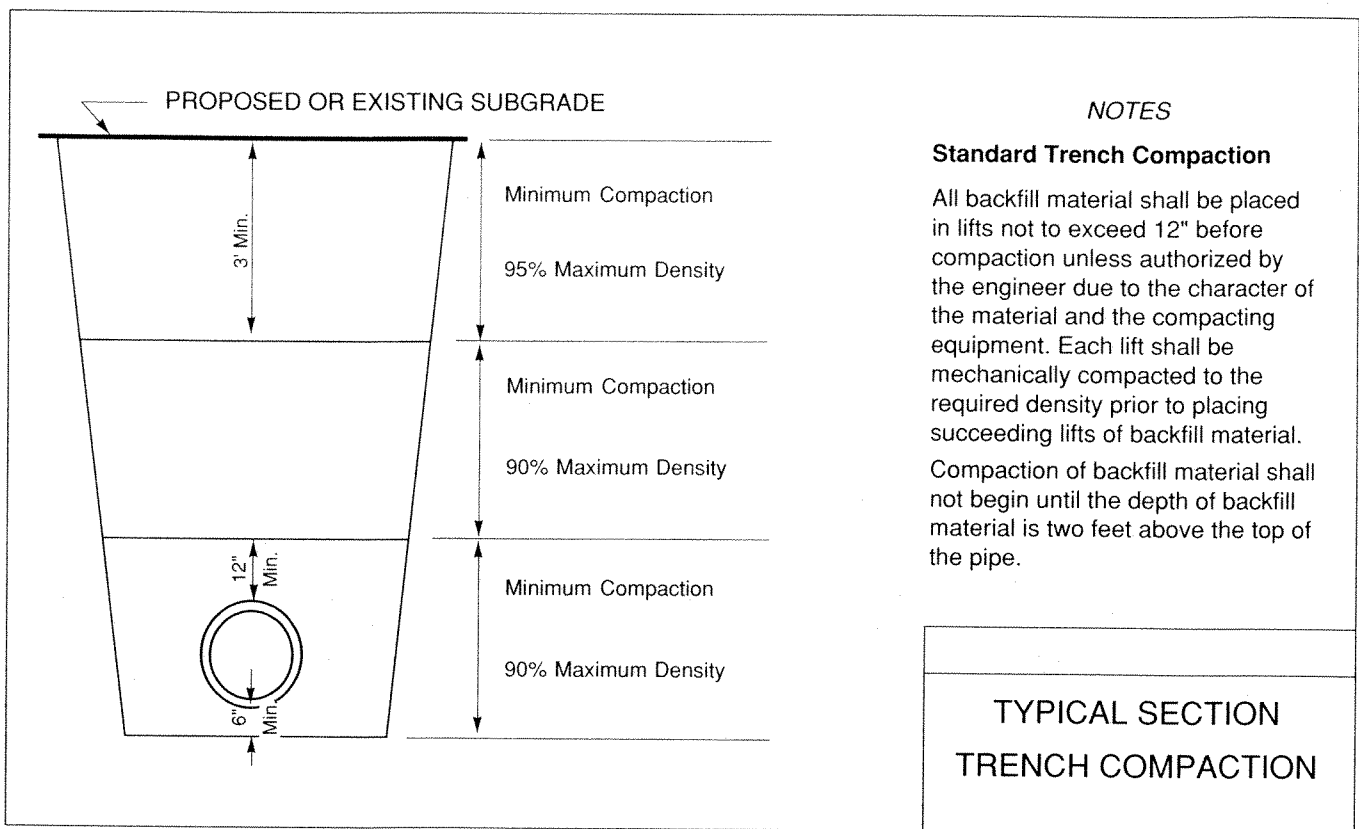
Beside native materials being returned to the excavation, backfill may be sand or a granular material, or a mixture of sand and cement, sand and lime, or sand and bitumen. If native soil materials are organic, silty, or of other poor types, they should be removed from the site and replaced with a better backfill material.

Clay is acceptable if it is properly backfilled and compacted. Clay can be compacted to its maximum density under very controlled conditions. This involves adding enough moisture to ensure that proper compaction will bring it to its maximum density. Unfortunately, it is difficult to control this in such a small area, and operators often lack the necessary personnel and equipment. The usual result is saturating the material while compacting it. Subsequent settling is inevitable, causing pavement depressions and failure.

Clean sand or a clear pit run material may be substituted for unsuitable native soils. It is common practice to use such materials and they are very helpful in achieving good compaction. An objection to using such a granular backfilling material is that it eventually becomes a drainage canal for all subsurface drainage. This is true in areas with high water table or flowing ditches, or with improperly drained road and shoulder surfaces where the water can enter the subsurface materials and get into the utility trenches.

The contractor or utility may choose a sand/cement, sand/lime, or sand/bitumen fill. These are considerably more expensive than native soils or granular materials, and therefore may be considered only for small trench openings. The benefit is that once in place, the material can be consolidated properly with no residual settling. Some communities may require such fill in small openings on heavily used roads. Contractors may also choose to use this type of fill to insure that the trench will not settle.





**Figure 4: Trench compaction standard.**

If such a cement mix is selected for backfilling, it should be mixed 2%-8% by weight with other materials. This produces a good compacted material which can easily be removed later, if necessary. The cement/sand mix can be obtained from any redi-mix plant. One sack of cement mixed with one ton of sand would be slightly less than a 5% mix. Add sufficient water to insure that the mix will flow into all of the openings and around the pipes or other structures in the trench opening, eliminating future settling. This method has been used successfully in many applications.

To close the trench and replace the pavement, the contractor or utility personnel must bring in proper base course material equal to or better than that which was existing. It must be properly installed and compacted to the maximum density using mechanical equipment and adding moisture. The new pavement (surface) material should be the same as the adjacent pavement material. It should be blended in and sealed to the edges of the saw cut to minimize the potential for water infiltrating into the subgrade. Figure 5 shows four types of trench openings and utility patches established by ordinance and regulations in some cities. A sheet like this can be handed out with the permit or application. Some communities use one or two, others use all of those shown.

### Traffic control

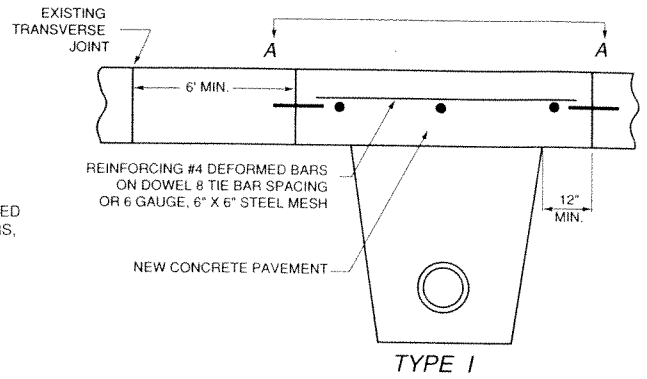
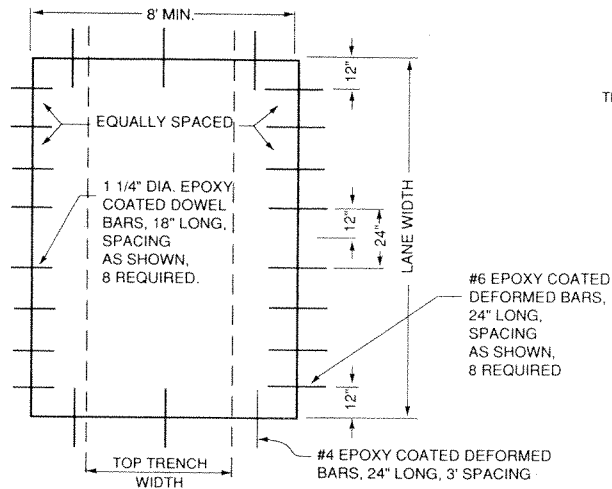
Controlling traffic is very important in any utility repair work. Many cities and counties have extensive requirements for work zone safety that must be followed by the utility or contractor. The *Manual of Uniform Traffic Control Devices*, has a chapter devoted to work zone signing and marking. It is a good policy for all responsible authorities to become familiar with this information.

Some cities have taken segments out of this manual and prepared their own work zone traffic control manuals. There is also a manual from the American Traffic Safety Services Association (ATSSA) which is a very useful guide in establishing work area traffic control.

Sometimes utility repair or installation work cannot be completed within the same work period that it was started and a portion of road has to be opened to traffic. Steel plates  $\frac{5}{8}$ " to 1" thick have been used successfully to temporarily cover open areas. These can cover areas up to four feet wide—big enough for most utility trenches.

Plates should overlap soil no less than one foot on each side. Plates should be blocked in with bituminous concrete wedges around their edges.





**TYPE I UTILITY TRENCH PATCH**

The pavement shall be removed in two stages. The initial pavement removal shall be limited to the area of the proposed trench. Full-depth sawcutting will not be required for this phase of the pavement removal. After the trench has been backfilled and compacted, and after the base has been restored in the area of the trench, and after sawcutting the new joints the full depth of the existing pavement, the remaining pavement to be removed shall be removed without disturbing the existing base.

The size of the patch shall be determined by the top width of the trench, the location and skew of the existing transverse joints, the condition of the existing pavement, and the condition of the base. New transverse joints shall be parallel to the existing transverse joints, and shall be a minimum of one (1) foot from the trench. The distance between new and existing transverse joints shall be a minimum of six (6) feet, measured perpendicular to the joints. The patch shall be a minimum of eight (8) feet in length, and shall have the same width as the pavement lane.

The patch shall be nine (9) inches in thickness, of high early strength concrete, doweled and tied with epoxy coated bars, and reinforced, all in accordance with the typical section.

The transverse edges of the finished patch shall be flush with the edges of the existing concrete pavement. The longitudinal surface shall form a straight line from edge to edge within a tolerance of 1/8".

**TYPE II UTILITY TRENCH PATCH**

The patch shall be 7" high early strength concrete base with the same reinforcement as the existing concrete base, overlaid with bituminous surface course. Where specified, or directed by the engineer, the base shall be constructed of bituminous base course material, shall be the same thickness as the existing base, and shall be laid in two or more compacted lifts of not more than 3" in thickness each.

The pavement along the patch shall be sawcut, minimum 3" deep. The edges of the patch shall be vertical, free of loose stones or concrete pieces, and shall be thoroughly wetted just prior to pouring the new concrete base.

The top of the new concrete or bituminous base shall be flush with the top of the existing concrete base.

Prior to placing the bituminous surface course, the edges of the patch and the surface of the new concrete base shall be thoroughly tacked with liquid asphalt.

The bituminous surface course shall be of the same thickness as the existing bituminous overlay and shall be laid in one or more courses as directed by the engineer. The bituminous surface course shall be machine laid where directed by the engineer. Where the bituminous surface course is machine laid, and is not more than 3" in thickness, the bituminous surface course may be laid in one lift.

**TYPE III UTILITY TRENCH PATCH**

The patch shall be 8" crushed stone base course, gradation No. 2, overlaid with bituminous surface course equal in thickness to the existing bituminous pavement, 3" minimum thickness.

The pavement along the patch shall be sawcut, minimum 3" deep. The edges of the existing bituminous pavement shall be free of loose stones or pavement material.

The crushed stone base course shall be installed in two lifts. The lower lift shall be thoroughly mechanically compacted prior to placing the upper lift.

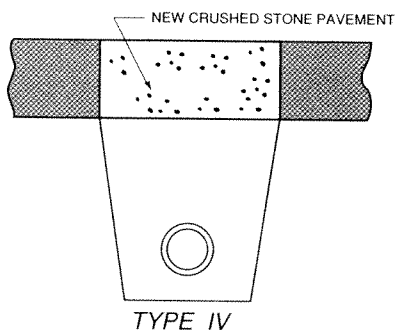
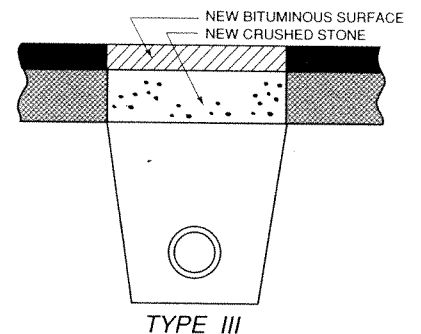
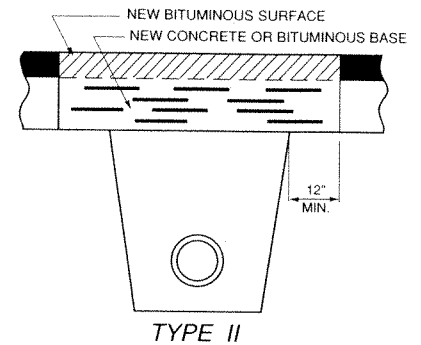
The bituminous surface course shall be laid in two lifts. The bituminous surface course shall be machine laid where directed by the engineer. Where the bituminous surface course is machine laid and is not more than 3" in thickness, the bituminous surface course may be in one lift.

Prior to placing the bituminous surface course, the edges of the patch and the surface of the crushed stone base shall be tacked and primed with liquid asphalt.

**TYPE IV UTILITY TRENCH PATCH**

The patch shall be 9" crushed stone base course, gradation No. 2.

The crushed stone base course shall be installed in three lifts. Each lift shall be thoroughly mechanically compacted prior to placing succeeding lifts.



**TYPICAL SECTIONS  
PAVEMENT PATCHES**

Figure 5: Four types of trench openings and utility patches established by ordinance or regulation in some cities.

Plates should be installed carefully so that all edges are firmly supported. This prevents them from rocking and projecting above the surrounding surface, creating a hazard to vehicle tires or bicycles. It also keeps traffic from displacing them.

Many agencies, particularly in rural areas, require tunneling, jacking or boring in lieu of open trenching when a utility must cross a road in their jurisdictions. The purpose is to maintain traffic flow in high traffic density areas, and to minimize damage to an existing road. This type of work generally requires specialists. In choosing one of these methods, weigh costs against all factors, including safety, traffic control, and concern for the integrity of the roadway surface.

## Summary

Maintaining a safe and efficient street and road system requires monitoring all activities involving the systems. Utility work is one item of great concern.

This factsheet provides guidelines to help a governmental unit establish controls and procedures to insure safe, efficient, good quality work in utility cuts and patching.

Whatever procedure, regulation, ordinances, or codes are adopted by a governmental unit to control utility work on the roads and streets, they should be reasonable, practical and enforceable. Some form of the seven items discussed in **Controlling the cut** in this bulletin should be included in preparing a policy on utility cuts and patching.

## References

*Pavement Cuts for Utilities: A Guide for their Management*, J.M. Iddins and C.F. Scholer, Purdue University, W. Lafayette, Indiana

*Better Restoration of Utility Cuts*, Norman Dykes, P.E., Director of Public Works, City of Baytown, Texas

Herb Helen, P.E. Assistant City Engineer, City of Madison

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Dean Stitlan, P.E., Director of Public Roads, Village of Waunakee

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