Above: Jim McColl, Public Works
Director for the town of Hooksett, NH
discusses the equipment management
system now being operated in his town.

On The Road In
New Hampshire

Hooksett played a major role in the
development of TP’s new Municipal
Equipment Management System (MEMS)

“As far as I’m concerned, a municipality
should not be heavily into equipment
repair,” says Jim McColl. “When a piece
of equipment requires extensive parts
replacement or repair, then it should no
longer be a municipal piece.” Thanks to a
new Technology Transfer Center fleet-
management software program, knowing
when to retire municipal equipment has
gotten a lot easier.

MEMS (Municipal Equipment Manage-
ment System), now available to all New
Hampshire communities, is the result of a
three-year effort between McColl and
researchers in the University’s state and
federally funded Technology Transfer
Center.

“Looking at all of our vehicles and
equipment, we had no good way of docu-
menting repair and operational costs,
downtime, and maintenance—that’s a big, big
issue. There are a million programs out in
the field, but none that we could either afford
or that were close to what we needed. So
Charlie Goodspeed (professor of civil
engineering) put a graduate student to work,
we contributed some financial support, they
got some funding from other sources, and
now it’s on line.

“We have the ability to schedule all of
our equipment, either by mileage or by
hours, for maintenance work, for oil changes
and grease jobs, filter changes, and all that
sort of thing.” The program can also
monitor fixed equipment such as large
pumps or electric motors that drive sewage
or water pumping stations.

The minute it becomes more cost-
effective to replace equipment than continue
repairing it, McColl will know and so will
the town budget committee.

The MEMS program and manual can be
purchased for $24.00 by writing to the
New Hampshire Technology Transfer
Center or calling 800-423-0060 (in state)
or 603-862-4348. A written tutorial guid-
ing the new user step-by-step through
the program is expected to be available
on August 1 of this year. The tutorial will
cost $7.00 — the above prices include
shipping and handling.

Common Sense
Rules for Maintenance and Fleet
Management

The benefits of assigning specific,
planned, and systematic maintenance
responsibilities to operators are proven.

Working on maintenance and fleet
management can be rewarding. Many
simple equipment management improve-
ments can have a significant impact on a
vehicle’s performance and reliability.
Moreover, many of the principles involved
are only good-old common sense.

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Distinguishing Soil Types in the Field

When laboratory facilities are not available, some simple field tests can help you distinguish soil types and determine gradation, plasticity and dispersion:

Gradation

To judge gradation of dry soil, spread a sample on a flat surface. Separate the larger and smaller particles with a piece of stiff paper or cardboard. Estimate the percentage of particles larger than 1/4 in. (6mm) and the percentage of fines - individual grains too small for you to see with the unaided eye. Finally, gauge whether the larger particles are uniform in size (poorly graded) or have an assortment of sizes (well graded).

Gradation Test

![Figure 1]

If the soil is wet, break a lump apart. Estimate the percentage of large particles as in the dry soil method. To find the percentage of fines, put just enough water in a clear glass to cover the bottom and fill the glass 1/4 full with soil. Then add enough water to just cover the soil and mark this level with a rubber band.

![Figure 2]

Now add water to the 3/4 mark and stir the mixture vigorously. After it settles for a minute and a half, mark the height of soil that has settled out. The difference between the two marks as a portion of the height of the upper mark approximates the percentage of fines.

![Figure 3]

Then hold the ball in one hand and tap the back of the hand with the other. If the ball becomes wet and shiny, it is mostly fine sand or silt. No reaction suggests clay.

The Toughness Test: Use the ball from the shaking test. Knead about half of it until it's dry. Then roll the soil sample into a 1/8 in. (3mm) thread or "worm". If you can't form a worm, the soil is sand or silt or fine sand (low plasticity).

Highly plastic soils take a long time to dry and become hard and waxy. You have to exert a lot of pressure to form a worm that breaks at about 1/8 in. diameter.

![Figure 4]

The Dry Strength Test: Knead the other half of the sample into a ball and let it air dry. Then break it apart and select a jagged, pointy fragment. Try to crush this fragment between your thumb and forefinger. A silt will turn to powder with little effort. A clay will be hard and almost impossible to crush.

Hand Washing: After handling silts and sands, your fingers will feel dusty. Rubbing them together will almost clean them. Gently flowing water will rinse them. If you've been handling clay, you'll find a crust on your fingers you cannot rub off. Water will not rinse it off. You have to rub your hands together under water to cleanse them.

Dispersion

Use a dispersion test to support your gradation estimates. It will also give you an idea of how difficult the soil will be to compact. First fill a glass 1/4 to 1/3 full with soil and then add water to within 1/2 in. (13mm) of the top. Stir the mixture well and set it aside.

The mixture will settle in three layers: sand at the bottom, silt in the middle and clay at the top. Beside showing the relative amounts of the three soils, the results will indicate whether the soil is well or poorly graded.

![Figure 5]

Although silt and clay particles are smaller than the eye can see, gradation difference will show up as color differences. Also, the longer it takes a layer to settle, the smaller the particles. Usually, a single particle size (poor gradation) and a small particle size mean more difficult compaction than a mix with good gradation.

Summary of Identifying Clues

To summarize how various soil types react to the field tests:

- Clay - No reaction to the shaking test; a tough worm that dries out slowly; a crusty dry residue that is hard to remove form the hands.

- Silts - Rapid reaction to the shaking test; a weak or crumbly worm; powdery residue that is easily wiped or washed off the hands.

- Silt and Clay Mixtures - Intermediate or conflicting reactions to hand tests.

continued on p. 3
Working with a Hand-Me-Down

In most cases a "low-end" computer can do everything you want

Most public works departments acquire their first computer because another department no longer has use for a "low-end" machine. The question that arises is what do you need to really make that "low-end" machine help you out? ...or has it lived past all usefulness?

The point is that most people never begin to harness all the power of a computer. This means that you probably have a gem of a machine in your hands. If it is an IBM compatible or MS-DOS computer, you will be able to do a lot more than you ever thought (the same is true for an Apple but we will keep this article geared to the IBM or DOS machine).

In this article I'm going to talk about software that is currently available, inexpensive, and perfect for running on most low-end machines. The majority of programs mentioned below are very fast, very powerful, and take up little room.

Due to the wide variety of used computers out there I'm not going to talk specifically about hardware specifications. However, if you have any doubts about what you may have just inherited give us a call at 800-423-0060. I'm sure that we can help you out on the spot. Ten minutes can go a long way in the computer business.

Although there are three types of software that every computer user should know about I'll mention a few others that are truly ideal for public works type jobs. Listed below are some of these different kinds of software, a description, a helpful hint or two, basic ball-park costs, and where to get your hands on the goods.

Must Have Software: Word Processing
Description: This is just a high-tech word for a fancy typewriter.

What to buy: Don't look too far or too long for the right word processing package. The rule of thumb is to use whatever your town uses. First, this will keep you compatible with them and, second, the office employees are often willing to help you out with quick but essential questions.

Cost/Where to buy: Because there are so many to choose from give us a call after you find out what your town is using. We can then give you some suggestions.

Must Have Software: Spreadsheet
Description: This is a fancy name for an electronic ledger. Anything you can do on a ledger you can do on a spreadsheet.

What to Buy: There are two dynamite packages on the market today that are very low cost and take up very little room on your machine (space on an older machine is a premium). The first is AS-EASY-AS®. In the industry it is known as a LOTUS clone. It does the job for most of our engineers and we think it will do the same for you. The second package you may wish to think about is Lucid 3-D®. It is not a LOTUS clone but it has a very good conversion program built in. The real advantage of this package is that it has excellent three-dimensional capabilities. This means that you can link your spreadsheets together with ease (give us a call and we'll explain more). We use both programs at T′ Center. Lucid is superior when it comes to accounting.
Computer Hand-Me-Down...
continued from p.3

Cost: Both programs run between $50.00 and $70.00.

Where to Buy: AS-EASY-AS® is shareware. That means that you can try it out for a few days at no cost just to see if you like it. If you plan to use it you are then obligated to register your copy. To try out this program give us a call. To acquire a registered copy contact TRIUS Inc., 231 Sutton Street, Suite 2D-3, P.O. Box 249, North Andover, MA 01845-1639, Phone. (508) 794-9377.

Lucid 3-D® is a product of DacEasy, Inc., 17950 Preston Road, Suite 800, Dallas, TX 75252, Phone. (214) 248-0205.

Must Have Software: DataBase
Description: This is computer lingo for an electronic filing cabinet. It's great for keeping track of purchase orders, cemeteries, roads, pieces of equipment, supplies, addresses, and any other kinds information that you would like to track and access quickly.

What to Buy: The best low-cost easy to use program on the market is PC-File. Like AS-EASY-AS®, PC-File version 5.0 and earlier is a shareware program. Its biggest advantage is that it is easy to use. However, it is very flexible and powerful. In the industry it is known as dBase compatible (for you experts it is compatible in that it creates .DBF files)

Costs: The program runs just under the $100.00 mark -- around the $80.00 range.

Where to Buy: For a trial of this program call the T2 Center. For a registered copy contact ButtonWare, Inc., P.O. Box 5786, Bellevue, WA 98006, Phone. (800)J-BUTTON.

Should Have Software: Road Surface Management
Description: Handles road inventories, condition assessments, road repairs, and budgeting reports

What to Buy: RSMS (Road Surface Management System) was developed by our T2 Center with the help of the FHWA, NHDOT, UNH, Planning Commissions, Private Consultants, and town highway employees.

Costs/Where to Buy: RSMS and the manual can be purchased for $16.00 directly from the T2 Center, UNH, Civil Engineering Dept., Durham, NH 03824, Phone. (603) 862-2826 or (800)423-0060 (NH only).

Should Have Software: Sign Management
Description: Handles sign inventories, condition assessments, work orders, complaint information and insufficiency notifications, budgeting reports, and historical records

What to Buy: SIMS (Sign Inventory Management System) was developed by our T2 Center with the help of the FHWA, NHDOT, UNH, and town highway employees. [NOTE: this program is in testing stage and therefore you may wish to delay its purchase -- please call us for more information]

Costs/Where to Buy: SIMS and the manual can be purchased for $20.00 directly from the T2 Center, UNH, Civil Engineering Dept., Durham, NH 03824, Phone. (603) 862-2826 or (800)423-0060 (NH only).

May Want Software: Equipment Management
Description: Tracks fleet and/or equipment maintenance and management

What to Buy: MEMS (Municipal Equipment Management System) was developed by our T2 Center with the help of the FHWA, NHDOT, UNH, and town highway employees.

Costs/Where to Buy: MEMS and the manual can be purchased for $24.00 directly from the T2 Center, UNH, Civil Engineering Dept., Durham, NH 03824, Phone. (603) 862-2826 or (800)423-0060 (NH only).

May Want Software: CAD
Description: CAD stands for Computer Aided Design. It is like an electronic drafting table. It can be used for designing mechanical devices or structures such as roads, bridges, buildings, plows, pipes, and so on.

Costs/Where to Buy: AutoSketch® is a great program that can be used on a low-end machine. It generates files that are upgradable to AutoCad® (a very powerful industry standard CAD program). For most towns and cities in New Hampshire AutoSketch® will be all you'll ever need.

Costs/Where to Buy: You can buy this package in just about any software store. It will run near the $100.00 mark. A student version is also available from the T2 Center for $44.00 while supplies last (we have just a few unopened copies left over from a class -- $44.00 was our cost)
A common misconception is that maintenance activities should be left solely to mechanics or those with mechanical expertise. A mechanical background helps, but it is not necessary to manage and participate in the maintenance function. The benefits of assigning specific, planned, and systematic maintenance responsibilities to operators are proven. Several studies show that when operators are trained to make simple, qualitative maintenance inspections before and after their operation, maintenance costs fall and vehicle reliability improves. Vehicle managers who are not concerned with maintenance planning must cope with chance failures and the potential liability for maintenance-related accidents.

Developing a Maintenance Plan

Maintenance and fleet management, like any management function, must have a plan. The manager must first define objectives or goals. The following goals are usually part of a successful maintenance organization:

- Improve equipment availability;
- Reduce mechanic man-hours needed to repair equipment;
- Reduce repair costs;
- Improve record keeping;
- Increase equipment trade-in value when replacing units;
- Collect and evaluate equipment history by forming equipment files;
- Reduce tire costs;
- Improve track life;
- Reduce oil and fuel costs;
- Extend engine and gear box life;
- Be able to schedule repairs instead of breakdowns.

Next, the manager must develop the standards necessary to achieve the goals. Standards include intervals between preventive maintenance (mileages between inspections), maintenance procedures (driver and mechanic inspection check-offs), fleet-management programs (vehicle-replacement programs), and maintenance policies.

Corrective or Preventive

Most important is the development of policies to govern the choice between corrective or preventive maintenance. Corrective maintenance occurs after a mechanical failure or a loss of mechanical serviceability. Preventive maintenance occurs at predetermined inspection intervals, typically scheduled by accumulated mileage, time or condition of a part.

Every unit (component or part) within a vehicle can be maintained either preventively or correctively, so the manager must determine complete policy guidelines. Sometimes the choice is clear. For example, it is obviously better to allow an interior light bulb to fail rather than to preventively replace it before failure; its failure does not affect the safety performance of the vehicle. However, determining the best maintenance policy usually requires careful thought, planning, and an understanding of procedure for wise preventive maintenance design.

Blending Two Preventive Maintenance Approaches

There are two types of preventive maintenance: condition-based and fixed-mileage. Both are powerful approaches that must be blended in a good preventive maintenance program.

With condition-based maintenance, approaching failures are predicted when a monitored condition exceeds a tolerable limit.

There are three types of condition-based monitoring:

1. Qualitative inspections are usually made by operators and servers/ fuelers and are dependent on a regular familiarity with the vehicle’s performance and condition;
2. Quantitative inspections are usually made by trained mechanics during a preventive maintenance inspection;
3. Trend monitoring: for example, fuel and oil consumption trends can be used to identify engine problems.

The primary purposes of preventive inspections are to inspect for unusual wear or fatigue; to test the vehicle’s condition and recommend repairs; and, if necessary, to adjust, tighten, add fluids, and replace filters.

Fixed-mileage maintenance activities are carried out at regular mileage intervals. This is most useful when a known relationship exists between the mileage traveled and the mechanism failure. For example, oil and oil filters are changed at specific intervals because they are known to deteriorate with use at a fairly well-defined rate.

In general, condition-based maintenance is preferable to fixed-milage maintenance because it permits the maximum use of each unit before failure. However, if necessary, fixed-mileage maintenance is usually preferred over operation-unit-failure.

Determining a Preventive Maintenance Policy

Below are some simple rules to use when determining preventive-maintenance policies. The rules, however, are developed for light-duty vehicles (e.g., vans, pick-up trucks, body-on-chassis buses) and not for heavy-duty vehicles (construction equipment, over-the-road trucks, integrated buses). Most types of heavy-duty equipment have very different life-cycles than light-duty equipment.

First, some terminology. Components can be divided into two categories: assemblies and simple parts. An assembly is anything that can be disassembled into two or more components without disrupting a permanent physical bond. For example, a starter motor is an assembly since it can be dismantled into component parts. However, when a starter motor fails, the entire assembly is replaced, not just the failed components within the starter. A simple part is anything that cannot be dismantled without disrupting a physical bond. Examples of simple parts include spark plugs, radiator caps, batteries and fan belts.

The simple rules-of-thumb for maintenance policy development are:

1. In general, condition checks for simple parts and assemblies should be included in qualitative (daily driver) inspection and quantitative (periodic mechanic) inspections.
2. For simple parts (for which condition checks are uneconomical or impossible), develop mileage or time-based replacement intervals. Manufacturer’s and third-party maintenance manuals can be used to help develop intervals.
3. Use mileage-based replacement of assemblies only if the mileage between failures is consistent or if a failure may jeopardize safety.

Review Maintenance Programs

Once a maintenance plan is developed, the manager should constantly review program performance to make sure it is achieving the objectives and to make necessary improvements. He or she could also develop a quality assurance program to make certain that the maintenance program actually complies with the management plan. This should include the development of a training program for operators, mechanic, and other staff personnel that come into contact with the vehicle, and random spot checks of maintenance actions.

Developing a fleet management plan largely boils down to good-old common sense. Maintenance planning is largely recognizing that there are two types of maintenance, studying each situation to reach a planning policy, and implementing the necessary maintenance standards and procedures.

The above article was reprinted from KUTC Newsletter, Vol.12, No.2, May 1990, UK Transportation Center.
RSAs, Regulations, and Signing

Simplifying the quagmire around signing in New Hampshire

A recent meeting designed to clear up some of the ambiguities surrounding a new RSA seemed to raise more questions than answers. Hopefully the following information will help to better define what town officials' and employees' responsibilities are under New Hampshire law. But maybe more importantly (yes there are more important things in this world than the minimum letter of the law -- there is also the good intent which so often is less focused) the following information suggests that towns follow good safe engineering practices. Practices that are designed to secure the safety of you, your crew, and the public. Remember, town highway personnel and officials are in a service profession serving the public. It is sometimes hard to appreciate this when looking at liability issues.

The recent confusion was brought about as interpretations were provided concerning RSA 231:90-93 which became effective on January 1, 1992. This is the RSA that addresses the potential liability of municipalities for "insufficient" municipal roadways and sidewalks. The area that seemed to cause most of the confusion was traffic control devices. This includes all of your signing and pavement markings.

Signing and markings is an area of concern that can probably be cleared up without too much difficulty. The bottom line is that you MUST follow the MUTCD (Manual on Uniform Traffic Control Devices).

A State of New Hampshire Department of Transportation regulation made on October 19, 1989 states: "In accordance with the authority in RSA 236:1, RSA 265:22, RSA 41:11 and RSA 47:17, the 1988 U.S. Department of Transportation Federal Highway Administration Manual on Uniform Traffic Control Devices for Streets and Highways as modified by the Department of Transportation publication, "Traffic Control Standards, Statutes and Policies" and/or current amendments is hereby adopted as establishing the standards for traffic control devices upon all highways in New Hampshire."

There are three things worth noting in this regulation. First, the definition of "highways" includes ALL roads in our state. Second, the "Traffic Control Standards, Statutes and Policies" manual no longer exists so that the MUTCD is the only manual to be used in our state. Third, RSA 47:17 speaks to this issue even more directly.

On July 12, 1991 an Amendment to RSA 47:17 went into effect. This Amendment (Chapter 75; VIII. Traffic Devices and Signals) reads as follows: "(a) To make special regulation as to the use of vehicles upon particular highways, except as to speed, and to exclude such vehicles altogether from certain ways; to regulate the use of class IV highways within the compact limits and class V highways by erecting stop intersections, by erecting stop signs, yield right of way signs, traffic signals and all other traffic control devices on those highways over which the city council has jurisdiction. The erection, removal and maintenance of all such devices shall conform to applicable state statutes and the latest edition of the Manual on Uniform Traffic Control Devices.

(B) The commissioner of transportation shall only approve the installation and modification of traffic signals as to type, size, installation, and method of operation.

Two very important points are made in this Amendment. First is that the state is no longer responsible for approving stop and yield right of way signs. This responsibility has been placed back on the towns. Second is that the RSA specifically states, "The erection, removal and maintenance of all such devices shall conform to applicable state statutes and the latest edition of the Manual on Uniform Traffic Control Devices."

So what does all of this mean? It means that you will have to become very familiar with the MUTCD. In particular pay attention to the words Shall, Should, and May. These words are explained in detail in the manual under 1A-5. However, they can be roughly interpreted as follows:

Shall - you must do it, it is mandatory
Should - you better have a darn good reason (preferably in writing) for going against the MUTCD recommendations, it is an advisory condition
May - you can do it if you want

Note that RSA 47:17 also states that not just erection of traffic control devices but the maintenance of traffic control devices SHALL conform to the MUTCD. With regard to maintenance the manual states under section 2A-30 Maintenance, "All traffic signs should be kept in proper position, clean and legible at all times. Damaged signs should be replaced without undue delay.

To assure adequate maintenance, a suitable schedule for inspection, cleaning and replacement of signs should be established. Employees of street and highway organizations, police and other governmental employees whose duties require that they travel on the highways should be encouraged to report any damaged or obscured signs at the first opportunity.

Special attention and necessary action should be taken to see that weeds, trees, shrubbery and construction materials do not obscure the face of any sign.

A regular schedule of replacement of lighting elements for illuminated signs should be maintained."

This is not unlike parts of RSA 231:90-93 where it states that you are required to IMMEDIATELY respond to an insufficiency in your roadway or sidewalk by erecting proper ("proper" means MUTCD standards) danger signals to warn persons "by day or night" of such insufficiency. Also, WITHIN 72 HOURS AFTER RECEIPT OF NOTICE you must develop a PLAN for repairing the area in question (any interpretation is that 72 hours means 72 hours -- how do you see it?).

There is also a section on maintenance in the manual under 1A-2 Requirements of Traffic Control Devices. We suggest that you read this section along with other applicable sections of the MUTCD.

What this all means to you is that you can't just act like an ostrich with your head in the sand ignoring problems on the road. You should be actively using a sign management program that is designed to maintain a continuous planning process, allows you to record and track potential insufficiencies, and will record maintenance activities as they occur. It also means that you MUST follow the MUTCD. Please, no black and white square stop signs!

At a minimum you should follow the guidelines set out by the NHMA PLIT's loss prevention coordinators:

- Develop procedures for regularly identifying and correcting hazards;
- Document reported defects and hazards on a standard form;
- Document inspections and actions on a standard form;
- Insist that all employees know and understand their responsibility to report hazards;
- Insist that all employees and work crews follow the laws and guidelines for reporting hazards and follow traffic laws during maintenance and construction of roads, sidewalks, and bridges;

Of course, one more thing should be added to the list: BUY A MUTCD AND USE IT! So, where do you get a MUTCD? Chances are your town already has one. Check with the town office. Should you run into a dead end or if you have any questions at all please give us a call toll free at 800-423-0060.
Sign Maintenance
A Major Problem In
U.S.

Traffic signs are the major form of informing and regulating the motoring public.

United States motorists spend an average of two years of their lives driving on public roads. That amounts to over 17,500 hours in the car, covering approximately 800,000 miles of road. When you multiply this by the 157 million motorists in the U.S., a truly significant number of man hours are spent on public land. Land that you are responsible to maintain and keep safe.

Understandably, many hours of work are spent each year by road and street agencies repairing the road system. But what about the road signs? Traffic signs are the major form of informing and regulating the motoring public. FHWA estimates that there are over 58 million traffic signs, worth $6 billion, on the nation’s roads.

With this many traffic signs, the periodic review and maintenance of these safety devices is a monumental task. Unfortunately, it is often a task that gets put on the “back burner” due to budget constraints and public pressure to fix the streets. In 1988, the Pennsylvania DOT inventoried over 37,000 signs on 1,600 miles of road, and found that 60% had problems and needed some type of maintenance.

The problem of managing the maintenance of signs was studied in a recent report by the National Cooperative Highway Research Program (NCHRP). This synthesis study is an excellent tutorial in sign inventory, maintenance and management. The report covers principles of retro-reflectivity, organization of a sign maintenance program, field inventory procedures, maintenance personnel activities, facilities, materials, costs, and funding.

Copies of NCHRP report 157 “Maintenance Management of Street and Highway Signs” can be obtained at a cost of $12 from the Transportation Research Board, 2101 Constitution Avenue, NW, Washington, DC 20418.

Sign Maintenance
Report Conclusions

The conclusions of the NCHRP report discussed in the accompanying article are significant for all agencies responsible for signing roads.

- Improvements in traffic signing have the highest benefit/cost ratio of any highway safety improvement.
- A large portion of agencies signing systems are in need of some form of maintenance.
- 29% of tort liability lawsuits against highway departments are related to traffic signing.
- The implementation of a risk management program is recommended by transportation and law experts to minimize tort liability losses.
- Starting a sign inventory is one of the most beneficial actions an agency can take to reduce liability exposure.
- Timely detection of maintenance needs requires the reporting of such needs from a number of different sources, both from within and outside the agency.
- Systematic nighttime inspection is an important part of a maintenance management program.
- Sign substrate reclamation results in significant savings in material costs.
- By projecting materials needs so that the purchase of signs and materials can be made on a yearly basis or by combining purchases with other agencies, significant cost savings can be obtained.
- Additional cost-saving strategies include sign vandalism programs, better scheduling of field workers, better control of overtime and better selection of sign materials.

If your agency doesn’t have a sign maintenance management program, you could be endangering the motoring public and your ability to protect the agency from liability suits.

For more information please call the New Hampshire Technology Transfer center at 800-423-0060.
Latest Draft of Revised Part VI Now Available

Work Zone Traffic Control

Part VI of the Manual on Uniform Traffic Control Devices, which covers standards for work zone traffic control, has been under revision for nearly four years. FHWA has now published a third draft of a revised Part VI in the form of an ‘Advance Notice of Proposed Amendments’ and has solicited comments from interested organizations and individuals. The complete notice as well as the third draft of Part VI is available from ATSSA headquarters.

In 1988, FHWA enlisted the services of an engineering consultant to propose revisions to Part VI. The first draft was released in June of 1989 and the second in April 1990. ATSSA, NCUTCD and other organizations have submitted numerous recommendations, most of which have been incorporated into the latest draft.

Coincident with the update of Part VI, the FHWA has been considering a recommendation by NCUTCD that the entire manual be restructured and structured to be a succinct book of standards. FHWA’s latest proposal is to delay the publication of a separate Part VI until the entire manual is republished, which would be 1995 at the earliest.

Many organizations, including ATSSA, feel that the latest version of Part VI is a much improved document that needs to be published so it can be used in the field. The National Committee and ATSSA have both approved resolutions encouraging FHWA to publish Part VI as a separate document as soon as possible, regardless of when the entire manual is published. “It is anticipated that other organizations will also encourage FHWA to take this action,” according to Robert Garrett, ATSSA Executive Director.

Significant Changes: Part VI

Some of the significant changes in the latest draft of Part VI include:

* The title is changed to “Traffic Controls for Street and Highway Construction, Maintenance, Utility and Emergency Operations” with more information included on urban, utility and emergency operations.

* Expanded information on pedestrian and worker safety.

* New standards for portable changeable message signs.

* Some clarification on drum dimensions, including an 18-inch width requirement and the top stripe required to be orange.

* Some expanded information on “short-term” work zones.

* Some additional guidance concerning the use of tubular markers, drums, temporary raised islands, impact attenuators, rumble strips and glare screens.

* A substantially larger number of new and improved typical application figures. The current Part VI has eight typical applications; the proposed draft contains 44.

ATSSA committees are reviewing this draft and will be submitting comments by the July 31 deadline. Anyone else wishing to submit written comments should reply to:

FHWA Docket #89-1, Notice #5
Federal Highway Administration
Room 4232, HCC-10
400 7th Street, S.W.
Washington, DC 20590

For further information, contact James Weaver, FHWA, at (202)366-2189.

The above article was reprinted from ATSSA Signal, March 1992.

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What Makes A Good Gravel Road

by Harvey Melstad

What makes a good gravel road? While we do not normally think of gravel as paving, I would like you to consider gravel as a surfacing material.

A good gravel surface requires the same basic materials needed to make a good concrete road or a good asphalt road. The basic materials are rock, or coarse material; sand, or fine material; and a binder. In Portland cement concrete, the binder is Portland cement; in asphaltic concrete roads, the binder is asphalt; and in gravel roads, the binder is clay.

Portland cement combines with water to form a paste which hardens to bind the particles of rock and sand together. This becomes a very rigid type of surface, capable of resisting significant loads.

With an asphalt mix, the same principle applies; however, the binder is the asphalt or oil. This binder acts to tie the small particles (sand), together with the larger aggregate particles (rock), forming a matrix called asphaltic concrete.

A good gravel surfacing material needs a similar composition to hold it together. In this case the binder is clay. The correct amount of clay will stabilize a gravel; however, too much clay will make the surface slippery after a rain.

Many people believe clay is merely fine material. Silts are fine enough to pass a #200 sieve or 200 openings per square inch. Silts, however, have no cohesive strength, and are still coarser in size than clay. Clay is so fine that it hangs in suspension in water, and thus, is called colloidal material. Clay has cohesive strength and forms the matrix that binds the fine sand and coarse material together.

The clay must have moisture in it to be cohesive. This accounts for the poor condition of some gravel roads during dry conditions. When the moisture is gone, the clay is easily blown away as dusts. This makes it extremely difficult to hold a road in proper condition, no matter how much maintenance it receives.

I think most blade operators have had the experience of being blamed for poor performance when a road has loose gravel. Adding clean gravel does no good and may worsen the situation. The only solution is to add some binder or clay, mix it with the existing material, and relay it.

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Our Dangerous Sun & What You Can Do About It

Do you stand a high risk of contracting skin cancer?

You are on the road every day. You're constantly exposed to the rays of the sun. Road maintenance and construction is hot hard work. You're tempted to take your shirt off and throw your hat in the back of the truck. Beware: Experts warn that today's rays can develop into life-threatening skin cancer.

In fact, of all malignancies in the United States, one-third are skin cancers, says dermatologist Darrell S. Rigel, M.D., New York University Medical Center. The American Cancer Society estimates that more than 630,000 new cases of skin cancer - most caused by too much sun - will be diagnosed during 1991.

People don't realize that tans and burns don't turn into cancer overnight, Dr. Rigel says. There's generally a 10 to 20 year delay. Today's statistics show what people were doing in the '60s, '70s and early '80s, he explains.

Says Derek Cripps, M.D., a University of Wisconsin Medical School professor of dermatology: “Your skin is like a bank account with a memory - it never forgets sunlight to which it's been exposed. Unless you protect your skin, there will come a time when it can no longer accept any more sun damage, leading to wrinkling, cracking and probably cancer.”

Gambling With Melanoma

Melanoma is the nightmare of all skin cancers. The New York University Medical Center has uncovered six factors that increase the odds of developing melanoma.

Determine Your Risk: Circle the factors that apply to you:

■ Blond or red hair
■ Marked freckling on your upper back.
■ Small, rough, red bumps on your skin from sun exposure.
■ Family history of melanoma.
■ Three blistering sunburns during your teenage years.
■ Three or more summers of outdoor work as a teenager.

Understand Your Risk: If you circled one or two factors, your risk of melanoma is 3.5 times greater than your risk if you hadn't circled any. If you circled three or more, your risk is 20 to 25 times greater.

Tire Size And Design Affects Equipment Productivity

Tire size and design can mean the difference between spinning in place in muddy terrain or getting the job done, even in sloppy conditions. If spinning wheels sound familiar to you, before you blame your equipment or weather conditions, check the tires:

■ Make sure your tire size matches the equipment manufacturer's spec.
■ Check the air pressure to ensure you're not over- or under-inflated.
■ Examine the tire aspect ration.
■ Soft road conditions require a tire with a low aspect ratio - about 65%. (A 65% aspect ratio means that the height of the tire is 65% of its width.) The lower the aspect ration, the wider the tire and the more ground contact it has.

If You Must Be In The Sun, Take Extreme Precautions

There's no such thing as a safe tan, according to the American Academy of Dermatology. Never seek a tan by sunbathing or using tanning lamps, the Skin Cancer Foundation warns. But sometimes you just have to be in the sun. When you do, experts advise:

■ Avoid tanning binges. Melanoma tends to hit people who try to tan quickly.
■ Choose a sunscreen with a sun protection factor (SPF) of at least 15. People with light complexions should choose at least SPF 20. Blonds and redheads, at least a 30.
■ Block UVA and UVB (two types of ultraviolet light linked to cancer).
Broad-spectrum sunscreens, such as those containing benzophenes (oxybenzone), cinnamates and salicylates, can provide protection against both UVA and UVB.
■ Apply sunscreen liberally, at least 15 minutes before you go out. For continued protection reapply every two hours if you're perspiring. Also reapply sunscreen immediately after swimming.

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Sun Cancer... continued from p.9

- Protect lips and eyes. Use a lip balm that contains sunscreen. Wear sunglasses that filter out both UVA and UVB radiation.

**Best Cure: Prevention**
If you take a few precautions there's no reason to hide inside.

- Always use sunblock with an SPF (sun protection factor) of at least 15 to protect your skin.
- Avoid long exposure. Don't expose your skin to the sun any longer than necessary. Wear long-sleeved shirts, pants and a brimmed hat. Sit in the shade for the greatest natural protection.
- Check with your doctor or pharmacist to make sure you're not taking a medication that could make your skin more sensitive.

- Stay out of the midday sun. To reduce your skin's UV exposure by 50 percent, avoid direct sunshine during the two hours around high noon, according to the U.S. Department of Public Health.
- Examine your skin monthly. Pay particular attention to changes in size, color, shape or thickness of moles, birthmarks or other irregularities. Report these and any unusual symptoms to your physician: a growth that begins to itch, hurt, crust, scab, erode or bleed.

**The Real Experts: "Sun-Belt" Road Crews**

In 1988, $390 million went for lotions and oils. In 1992, analysts predict $560 million in sales. With hundreds of lotions on the market how do you decide what is the best for a road worker out in the sun for hours every day?

Duane Collins, of the Texas Department of Transportation, District 14 in Austin, purchases sun screen for all of his crews. "I buy about 96 bottles at a time. We've had a tremendous problem with sunburn and the lotion really helps." When asked how the crews like it Collins simply replied, "I haven't heard any complaints!"

One of the concerns that Collins had was allergic reactions to synthetic lotions. "That's why I got a product that is made with natural ingredients. We haven't had a single skin problem."

Texas DOT District 14 uses an Arizona Naturals' SPF 25 sun protection product. "We started off with a 15 and then decided to move up to a 25." Anyone interested in trying out this product can call Arizona Naturals at 602-569-6900 and ask for the sales department. If you want to talk to Duane Collins you can reach him at 512-832-7167.

Information for parts of the above article was provided courtesy of Coffey Communications and HCA Portsmouth Regional Hospital, NH.