TECHNOLOGY FOR
Alaskan Transportation

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Local Technical Assistance Program

Concept Trucks Ready to Roll

Concept trucks? What are they? What do they do?

by Sharon McLeod-Everette, T2 Manager with information from George Levasseur, Joel Craft, Steve McKinstry, and Bill Mowl

If you are a snow fighter, know anyone who drives a snowplow for a living, or have to manage a fleet of heavy snow removal equipment, this article is for you.

The concept truck is the brainchild of a few people who work for Alaska Department of Transportation and Public Facilities, both in the Equipment Fleet and Maintenance and Operations. The concept truck gives more for your money by increasing efficiency and providing a higher level of service.

Alaska Department of Transpor-

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Snow and Ice Control Chemicals

by George Levasseur, AKDOT&PF Southcentral District Manager

Recent technological advancements in liquid deicer use have allowed maintenance crews to increase the level of service to the public while reducing costs. Using liquid chlorides as an anti-icer and to prewet sand is especially useful in coastal Alaskan climates.

Knowing the difference between anti-icing and deicing is important. Anti-icing is a strategy whereby a timely application of a chemical keeps the bond between pavement and snow and ice from forming. Deicing places the chemical deicer over snow and ice that is already adhered to the pavement surface.

Dale Keep, Washington State Department of Transportation (WSDOT), was funded by the Federal Highway Administration (FHWA) to promote and assist maintenance crews in using deicing and anti-icing chemicals. His extensive experience with deicing chemicals helped us develop strategies to apply the chemicals. Factors to consider were temperature, application rates, stockpile maintenance, and

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Air Foil On Snow Plows

by Vernon Monger

To improve the visibility for the snow plow operator, the North Dakota Department of Transportation (DOT) has been experimenting with an air foil mounted above the snow plow to keep the snow fog below the truck. Wayne Paulson, Minot District Maintenance Coordinator, has experimented with mounting the air foil on some of his plows. While they experimented with this a number of years ago, they feel confident that the present design is very beneficial for the operator and provides more safety on the roadway.

The air foil is mounted on a horizontal plane about six inches to a foot above the plow and extends most of the width of the plow. It consists of a sturdy canvas fabric approximately three to four feet in width and mounted on framework attached to the plow. The air movement above the plow is forced downward, keeping the snow fog that is created under the truck and away from the operator's line of sight. Caution must be used in determining the mounting height to provide sufficient air flow and yet not mount it too high to interfere with the truck lights and the operator's line of vision. The air foil does nothing in relation to the snow being removed from the roadway. According to the operators, the snow fog the operator must contend with in most instances comes from the remaining snow being stirred up by the plow.

AKDOT&PF Southcentral Region uses an air foil on its snow plows to direct the plume away from the line of view of the driver. The picture to the right shows the inside of the foil and plow.

The fabric is attached to a metal framework. This is then attached to the framework of the plow. Jerry Hanson, Minot District welder, designed and constructed the assembly. The framework is constructed and mounted on the plow so that simple adjustments to get maximum air flow through the assembly can be made easily . A very good fabric is important since the stress on the material is great.

The cost for each of these is approximately $220 for the prepared fabric, $80 for the framework, and approximately 10 hours of labor for installation on the plow. To this point, the DOT has only installed them on reversible plows, but will be installing them on one-way plows for the coming season.

The operators who have been using the equipment are very pleased with the performance. When problems have developed, the operators have insisted on getting the repair work done so that they can continue using the foil. A video taken both with and without the air foil shows very clearly how the air foil has reduced the snow fog for the driver.

For more information, contact Wayne Paulson, Minot District DOT, telephone (701) 837-7605.

Instead of retrofitting the canvas, Alaska DOT&PF Maintenance & Operations uses similar air foils on its plows. The department purchases the plow with the foil already attached.

For information on the foils used in Alaska, contact Joel Craft, Northern Region M&O Denali Area Manager at 907-451-2359; George Levasseur, Northern Region's Southcentral District M&O Manager at 907-834-1039;Bill Mowl, Anchorage District M&O Superintendent, Central Region M&O at 907-269-5700; Ralph Swarthout, Northern Region M&O Director at 907-451-2295; Chris Kepler, Central Region Maintenance Manager at 907-269-0767. •

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tation and Public Facilities (DOT&PF) does its best to stay current with the most appropriate and innovative equipment for the job. That's the case with a few prototype pieces of snow removal equipment. While DOT&PF updates its equipment fleet regularly, no one is interested in ordering fifty or so trucks with untested equipment and related attachments. What to do in the meantime? Construct a concept truck structurally capable of handling all the snowfighting equipment we wanted on it; order two; adapt a few existing trucks; and place them in geographic areas having a wide variety of weather and snow conditions. Another reason for testing snow-fighting components is that the state has to approve the attachments provided by a vendor before an order is placed. The goal is to have a supply inventory of parts that can be consistent either regionwide or statewide.

The concept trucks solved a dilemma the Statewide Equipment Fleet (SEF) faced with many of its existing trucks with snowfighting equipment. All the snowfighting components, when placed on a truck, typically overload the truck beyond its structural load limits. Monroe Truck, the initial concept truck vendor, figured out what needed to be done to fit within the truck's structural load limits. SEF took the information and ran with it, retrofitting all the existing trucks. What needed to be done follows: install bigger tires on the front axles, move wing blades from front mounts to mid-truck mounts, slide the sander rearward on the truck frame, and shorten the plow hitches and shorten the push arms by 6 to 18 inches to get the plow closer to the truck.

Freightliner makes up the body of the truck while attachments come from other vendors. In the trucks currently being tested, snowfighting components are made by either Monroe or Schmidt-Wausau. New components include advanced sanders, new hydraulic systems, and a rear intrusion alarm that will alert an operator when he or she is about to back into an object. Existing technology includes polyethylene-lined front plows, large snow wings, belly blades, sanders, and in certain areas, chemical tanks for anti-icing activities. An operator can do just about anything with the concept truck. The components on the truck allow a single operator to accomplish what it used to take three trucks to do.

The new Freightliner 6x6 trucks that are the base of the concept trucks and DOT&PF's retrofitted trucks offer the capability to do things that were not possible with smaller trucks. Freightliner is larger and higher-powered than previous trucks, which allows operators to maintain 30 to 40 mph going uphill so snow continues to shoot away from the plow. At slower speeds, the snow merely rolls off the blade to form a berm on the shoulder of the road. Then the berms had to be pulled and blown, and spring thaws could cause drainage problems.

The joysticks control bed dump & hoist, plow up & down, Belly blade, and wing control.

The new hydraulic functions combine nine levers into

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News & Views

ATTSA announced the Roadway Safety Technical Assistance Center as a source for technical support and information for roadway safety professionals. For more information contact David McKee at (540) 898-5400 ext. 128, or visit the web site at www.atssa.com.

The Highway Innovative Technology Evaluation Center (HITEC) is working with FHWA to evalutate five retroreflectometers, devices to measure reflective properties of highway materials, and inform highway agencies of the outcome. For information contact Stacy Warner at (202) 842-0555.

The Bureau of Transportation Statistics(BTS) has released the *North American Transportation Atlas Data (NORTAD)* CD-ROM. It includes information about transportation facilities in Canada, Mexico, and the U.S. A free copy can be obtained from BTS at (202) 366-DATA; fax (202) 366-3640, or e-mail orders@bts.gov.

Yukon Transportation Maintenance Storage Shed for Road Salt and Calcium

by Ken Geddes, Bridge Crew Foreman, Yukon Territory Transportation Maintenance

The Transportation Maintenance branch uses a storage shed with a retractable roof for storing road salt and calcium chloride. The structure is such that an operator is able to move the roof to the open or closed position using the bucket of a rubber tire loader. The maintenance staff built the shed using a combination of new and used materials.

Above and left: *Photographs of the Yukon salt sheds already in use. The roof opens to allow easy access to the salt stored inside. The roof is on tracks that permit it to roll backward with a slight push.*

A brief description of this shed includes: three walls constructed of used bridge timbers, treated power poles, and galvanized bridge bolts. Treated power poles are used to support the rear track rails, which hold the roof in the open position. Tracks are attached to the top sill of the side walls and rails. The tracks consist of steel pipe, steel flat bar and lag bolts. The roof consists of metal roofing attached to strapped prefabricated trusses mounted on a rolling metal frame. The eight rollers that are attached to the metal frame of the roof are galvanized gate rollers. The floor of the shed has

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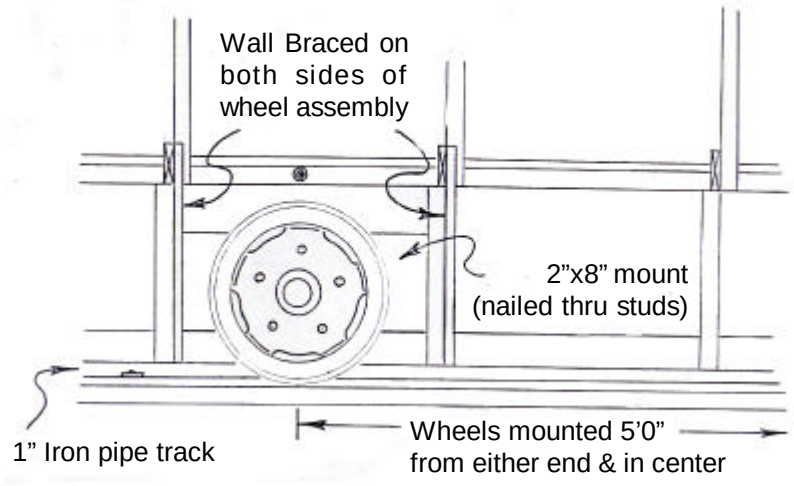

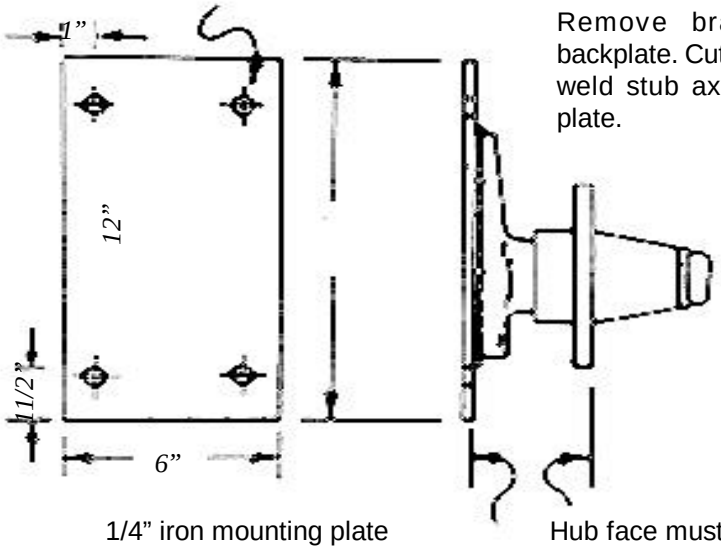

Above and right: *Manitoba's salt shed plans show the axle mount detail and how the rollers are mounted to promote easy movement. The plans are not signed by an engineer, but do provide a basis for constructing a usable shed.*

Watching the Mountains

by Brian Canaiy, Alaska DOT&PF, Southcentral Region, and Terry Onslow, Alaska DOT&PF, Maintenance & Operations

I'm driving through one of the worst snowstorms of the winter. It must be snowing two inches an hour, and blowing 20 to 30 mph straight down the highway. Suddenly, just in front of the truck, it looks like a huge gust of wind is blowing the snow across the highway. Before I can get the truck stopped I'm stuck in a drift. No, in reality I've driven into an avalanche!

The winter storms that bring such joy to the snow machiners and skiers complicate the lives of Maintenance & Operations folks. In addition to the obvious task of removing snow and ice from the roads, many of the crews have to deal with avalanches. The darn white stuff just doesn't want to stay up on the mountains.

Avalanches are common along most transportation corridors that pass through mountainous terrain. Alaska has several highways that have a high number of avalanches cross them each winter. The highways that have the highest avalanche potential also have an active avalanche program to keep track of conditions on a day to day basis.

The mountains of southcentral Alaska are known for avalanches.

Avalanche paths have three areas. The top is the starting zone, the middle is called the track, and the bottom is the runout zone. The problem is that very few avalanche paths have only one starting zone. Just because some avalanche debris is on the road, don't think the area is safe. What about the other five starting zones that share this runout zone? Do your best to get out of the runout zone and to a safe area as quickly as possible.

Weather is one of the contributing factors in an avalanche. One inch of snow per hour for twelve hours would produce a high avalanche potential. Snow is only one weather factor. The temperature trend during that twelve hours is also important. Most storms on southcentral Alaska start out cold and warm up toward the end. This puts heavy wet snow on top of dry, loose snow. This would be like trying to stack bricks on top of a cardboard box. Wind speed and direction at the starting zone elevation are very important, too. Winds blowing at the right speed and direction can turn twelve inched of snow into three feet or more in a starting zone.

Many of us need to travel through mountainous areas during winter storms. Plan your stops so they are not in the middle of a runout zone. If it has been snowing heavily and you see small avalanches or snowballs along the cut banks it is an indication that larger avalanches are possible due to unstable snow pack.

At Thompson Pass, DOT personnel keep track of the snowfall, temperature, and wind on an hourly basis. With this information they can know when a time of high hazard is approaching.

To mitigate the risk to the travelling public and its own personnel, the department has an aggressive avalanche program. The theory is that creating many small slides that do not reach the road will reduce the chance of one reaching the road. Another goal of the avalanche program is to minimize the overall time the road is closed, reducing the impacts to emergency services and commerce.

To implement the program crews shoot surplus military weapons leased from the U.S. Army. The primary weapon is a 105mm recoilless rifle. Over the next couple of years, when the supply of recoilless ammunition is gone, it will be replaced with a 105mm howitzer. Shooting is very effective, but it must occur at the correct time. Systematic observations of weather and snow conditions coupled with accurate weather forecasts help identify those critical times.

This business of dealing with avalanches is complicated. The person you see driving the grader or snowplow is not only a skilled operator, but is also a gunner and weather observer. He not only watches the road, but the mountains above.•

Alaska Department of Transportation & Public Facilities Snow Policy

by Gerald Reed, AKDOT&PF Central Region Maintenance & Operations

The Anchorage Maintenance & Operations station maintains all the major highways and most large urban routes within the Municipality of Anchorage, including Eagle River and most of the major routes on the Anchorage hillside. Our methods and policies differ from our counterparts in Anchorage Municipal Public Works. As contact with the public is an important part of our work, we invite requests or inquiries, which are answered by our office at 907-269-5700 from 8:00am to 5:00pm during the week. All emergency and after hours calls are directed to the Alaska State Troopers dispatch at 907-428-7200.

SNOW PLOWING

Snow removal usually begins when 2" or more snow has accumulated. Roadways are usually plowed in priority order, depending on their relative condition. The major highways are plowed first followed by the lesser priority roads and then local roads. During snow events our snow removal is done with mostly high speed truck-mounted front plows and belly-blade trucks. We plow everything to the side of the road and do not block any driveways. We generally plow all of our routes once through within 24 hours of the end of a snow event.

Homeowners and business owners are responsible for clearing snow from their own driveways. During snow events we advise homeowners and businessmen to plow *after* our plows come through so that their work does not need to be redone. During large snow events it may take several passes with our equipment to complete snow plowing operations. During these large snow events, homeowners and business owners may have to plow their driveways more than once. In Alaska, state law (Alaska Administrative Code 13 AAC 02.530) and municipal ordinance (AMC 24.80.090) prohibit homeowners and businesses from placing any snow from private property onto public property. This includes snow in driveways that has come off the street. Driveway snow berms should be plowed on to the private property.

SNOW HAULING/CLEAN UP

Snow plowing operations normally includes sidewalks and other pedestrian facilities. Only after snowplowing operations are completed do we begin to haul snow away. We prioritize which routes to haul first based on the nearness of schools and the volume of pedestrian traffic utilizing the walking areas. The rest of the snow haul routes we alternate hauling so that no one area gets priority service over another. We generally complete our snow hauling operations in about 10 days. During snow hauling and other clean up activities it is our policy to not leave excessive berms in driveways. If this occurs, we ask who are affected to call please call the Anchorage Maintenance & Operations office.

SANDING/ANTI-ICING

Our policy is to sand hills, curves, bridges, major intersections, school zones, railroad crossings, and shaded spots. State DOT&PF uses clean, washed traction sand with very little fine particulate matter. We pre-wet our traction sand with liquid magnesium chloride to cause the sand to stick better to the road. Pre-wetting the traction sand enables us to use less sand overall. We use liquid magnesium chloride for anti-icing intersections on the major urban streets. Anti-icing is a procedure where liquid magnesium chloride is applied to the road in advance of precipitation to prevent ice build-up by lowering the freezing point of the solution. It should be noted that the magnesium chloride we use significantly less corrosive than salt. Anti-icing helps keep the snow mushy, which provides better traction during the beginning of a snow event. Anti-icing also causes the snow to pack less and makes it easier to plow off.•

2% PLANNING

by Marie Messing, T2 Board member and BIA Area Road Engineer, Juneau, Alaska

During the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) deliberations, Congress recognized the need for Indian tribal transportation planning. As a result, the ISTEA authorized a 2 percent set-aside from the Federal Lands Highway Office Indian Reservation Roads (IRR) program exclusively for " those Indian tribal governments applying for transportation planning pursuant to the provisions of the Indian Self-Determination and Education Assistance Act." This language continues in the present Transportation Equity Act for the 21st Century (TEA21) recently signed by President Clinton.

Activities eligible for transportation planning funding under the IRR program include, but are not limited to, the following:

* IRR Road & Bridge Inventory - gathering, maintaining, and distribution of all road information as required in the IRR inventory database.

* Measurement of Traffic - counting the movement of people and/or vehicles who are using a transportation facility.

* Analysis of Transportation Need Based on Current and Proposed Land Use - studying the relationship of potential uses of property to the overall traffic demand, preparing a conceptual land use map showing proposed land use and the needed transportation facilities to accommodate the projected land use.

* Trip Generation Studies - gathering data on the number and type of trips in an area, including movements of vehicles, passengers, or goods and services from origin to destination.

* Financial Planning - studying how to finance the construction and maintenance of transportation facilities.

* Development/Updating of Tribal Long Range Transportation Plans - studying current and projected traffic generators and/or land uses and how they affect the current and future capacity of a transportation network in your area.

* Coordination with states and other transportation planning organizations - coordinating proposed transportation facility needs through meetings.

* Public Involvement - providing the public the opportunity to provide input on the transportation planning activities.

* Mapping - developing and maintaining maps including atlases, accident studies, traffic flow, etc.

* Tribal Representation - representing tribal interests at transportation planning meetings, conferences and seminars.

* Application Preparation - completing applications for funds from transportation funding sources including BIA.

* Other Activities - for further information please see the Final Draft of "Indian Reservation Roads Program Transportation Planning Procedures and Guidelines" (IRR TPP&G) which was sent to all tribes for comments on June 17, 1998.

Once the appropriation is received, typically during the fall, the Bureau of Indian Affairs notifies tribal officials of the amount of 2% Planning funds available. Unless designated otherwise by tribal resolution, the tribal official will be the current Tribal Leader. Tribes can utilize the funds through two mechanisms: by Public Law 93-638 contract or by Government Travel Authorization. Any funds not contracted or used by the first-round deadline usually the beginning of the year will be redistributed to existing 2% planning contractors who are able to modify their current contracts to include the additional work and subsequent funding.

One hundred sixteen Alaska Tribes received these funds in fiscal year 1997, either directly or through a tribal organization on their behalf by an authorizing tribal resolution. In the past, funds have been initially distributed based on a per tribe basis, which amounts to about $1,300.00 per tribe per year. •

Risk Managers Join the Snowfighting T-E-A-M

A public agency risk manager recently told me that he measures winters by how much his agency has to pay out on accident claims involving poor winter maintenance of streets, sidewalks and roadways. Snowfighters measure winter's severity by their salt usage or budget-busting expenditures. Every year highway agencies and risk managers share a concern for effective winter maintenance, hopefully as partners. This partnership is as simple and direct as a mathmatical equation: **Snowfighters + Risk Managers = Effective Winter Maintenance.**

Using the same approach:

Benefits of Winter Maintenance

Costs of Winter Maintenance Should be >1

Where:

Benefits of Winter Maintenance = reduced property damage + reduced personal injury + improved emergency response + improved public security + improved public mobility + sustained economic activity + public perception of competent public administration.

Most relevant for this discussion of the partnership between snowfighters and risk managers:

Costs of Winter Maintenance = snowfighting costs (materials, equipment and labor) + liability claims (property damage + personal injury + environmental).

It all adds up to :

Effective Winter Maintenance = Serving the public interest for safety and mobility.

In an informal survey of snowbelt municipalities conducted by the Salt Institute, risk managers reported their highway agencies spend from $745,000 for winter maintenance of 832 miles of roadway ($895/mile), up to $25 million for servicing 3,300 miles ($7,575/mile). They also provide between 2.5 hours and 8.0 hours of training time per snowfighter annually. Up to 13 vehicle accidents (1 accident per 64 miles of roadway) were reported by one risk manager for the winter of 1995-96. Two-thirds of the risk managers say they consider highway winter maintenance important to the success of their risk management program.

As winter seasons approach, municipalities in the snowbelt invest heavily in preparation, like squirrels storing up food for the cold season. Even though the majority of risk managers see the importance of highway winter maintenance, most highway agencies have not focused on the fact that they play an important role in shaping their public risk strategy in the war against wintertime traffic crashes. But how does your state, city, county, township, or district prepare for the potential effects of hazardous driving conditions? Will this winter season be a good year or a bad year based on the sums of money needed to settle claims and lawsuits due to poor highway winter maintenance? Are you and your team of snowfighters going to be ready for the winter of 1998-99? Questions like these can keep you awake as the nights grow longer in the coming winter.

Marginal snow and ice states may receive only a few days of true winter, but unprepared snowfighters reduce traffic to a standstill due to lack of equipment, deicing materials, and training. Few investments pay off as well, and as quickly, as prepared snowfighters.

The Real "Bottom Line"

Seminal research by David Kuemmel, Director of the Center for Highway & Traffic Engineering at Marquette University has documented that:

- Deicing pays for itself within the first 25 minutes
- During the first four hours after the hour of salt application, the direct road user benefits were $6.50 for every $1.00 spent on direct maintenance costs for the operation
- 88.3% of all injury accidents during winter storms can be avoided simply by deicing roadways.

And these impacts fall directly to the "bottom line." On February 18, 1997, Jury Verdict Research reported that in three short years, from 1992 to 1995, the average traffic fatality award has increased 121%, from $283,000 to $628,000. The National Safety Council calculates the average liability of cost for a fatality on the highway on 1995 was $810,000. As reported in the Spring 1994 *Salt*

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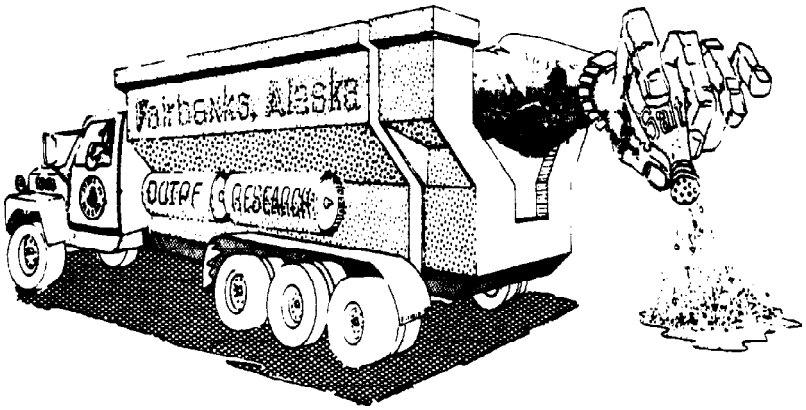
& Highway Deicing newsletter (Vol. 30, No. 1), the calculated benefits to the State of Michigan for its snow fighting investment have paid dividends of $2.5 billion in the cost of lives and injuries during the 1991-92 winter season, excluding vehicle and other property damage. In fact, *USA Today* reported in December 1996, using the National Highway Traffic Safety Administration as a source, that the annual U.S. costs from motor vehicle crashes exceed $150.5 billion (about $580 for every citizen). Having heard from risk managers that a majority of these accidents occur during the winter season, just a small reduction in such vehicle crashes means significant savings to insurers, crash victims, and local, state, and federal agencies.

Public service isn't just about budget numbers and tax savings. Effective snowfighting keeps a lot of real-world headlines from happening.

- the family of four that drowned when their vehicle slid off the icy street into a river
- a church basketball team perished when the van they were riding in slid into the path of an oncoming vehicle
- a fifteen car pileup immobilized an icy highway, stranding thousands



- an entire urban interstate closed due to ice on the overpass

The bottom line isn't just making tax dollars work harder. It's preserving life and mobility. It's preventing avoidable tragedies through effective snowfighting.

A TEAM Effort

So what is the answer to this potential loss? From the maintenance engineer's perspective, the three components of the TEAM approach save time and money. Training, Equipment, And Materials (TEAM) all play a critical part in having a successful winter season even when the public's demand for wintertime safety and mobility is becoming stronger for highway departments and risk management departments.

Training of highway agency personnel responsible for winter maintenance includes efficient application and implementation of local agency strategies to provide the best deicing service. There are videotapes available from various sources to help with such training. Some are all-encompassing, and some target specific techniques to improve efficiency. One Salt Institute tape, *The Snowfighters*, is a component of the Institute's Sensible Salting program. This twenty-one minute video covers everything from correct storage of deicing materials to preventing environmental concerns and minimizing agency liability exposure, to deicing material application rates, calibrating equipment, and other state of the art techniques used in today's snowfighting efforts.(The video is available through the Alaska T2 library, ID #305.) Training can be the most effective, preventative way to help reduce your exposure of a large number of claims associated with poor roadway maintenance.

Equipment must be maintained and ready to roll when Mother Nature decides to unload. Automatic spreader controls can reduce quantities of deicing materials used, while reducing chances that over application will cause environmental concerns or runoff problems. Some cities are investing in another new technology: Road Weather Information Systems (RWIS). In a metropolitan area, several RWIS may be installed to measure the temperature of the roadway surface and moisture levels. There is a new infrared sensor mirror-mounted instrument manufactured by Sprague Controls (phone (503) 263-0526), which measures the roadway surface temperature. This new moblie RWIS costs only $400 to $500, and can provide the operators/snowfighters with up-to-the-minute/mile temperatures for application decisions. These help highway agencies to be completely up to speed on conditions over a large metropolitan area, or right were they are. Only when roadway surface temperatures fall below the freezing level should deicing materials be applied. Again, this saves on the winter roadway deicing bill while providing the safety demanded by the driving public.

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Exercise Break

Exercise can perk you up better than a second cup of coffee. Exercise can also help prevent on-the-job injuries, particularly back problems and other Cumulative Trauma Injuries.

It makes sense to do some flexibility exercises to warm up before you start work. Many companies have a program of workstation warmup exercises. Some also have on-site fitness programs run by staff or volunteers. Take advantage of these opportunities to work more comfortably and safely.

Stick to your break schedule rather than working straight through the day. Use your breaks to stretch your muscles, relax your eyes or get a few moments to yourself. Walk away from your work for a few minutes.

Take mini-breaks frequently throughout the day, just long enough to give your muscles a chance to recover from the stress and fatigue of work. Mini-breaks can include any short break from your normal routine. Examples are answering the phone, going to the rest room, taking parcels to the mail room or changing your work task. If your job requires long periods of sitting or standing, be sure to change your position frequently and take stretch breaks to keep your muscles from becoming too tight.

Maintaining physical fitness, warming up before work and taking breaks to rest and stretch can help prevent musculoskeletal injuries. They can also reduce the severity of injuries and increase the body's abilities to keep up with the workload.•

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Winter Survival Skills

With winter approaching, many of us are exposed to severe cold weather on the job and through recreational activities such as hunting, fishing, snowmobiling and skiing. In 1994, 2,500 deaths were attributed to winter conditions.

Nevada T2 Center has offered a winter survival class the last two years and is again offering it on December 2 and December 3. The class is taught by Steve Jenkins, the director of the Montana T2 Center, and self-descibed pyrotechnic. He demonstrates the different ways to start a fire under adverse conditions. So far he hasn't caused fire damage to any classrooms or set off any sprinkler systems. In the class you are taught how to prepare mentally and physically if you are caught in a life-threatening winter situation. You learn what attitude and equipment is needed to survive the cold. You also learn how to recognize and treat symptoms of frostbite, hypothermia and carbon monoxide poisoning. Winter survival skills can save your life and that of others. Here's a brief overview of symptoms and treatments for frostbite and hypothermia.

Frostbite

Frostbite is the result of frozen tissues. Light frostbite causes the skin to turn red initially. Later it turns a pale gray or waxy white. On dark-skinned people the waxy white area is surrounded by a blackish color.

Treatment for light frostbite:

Face Apply warm hands over the face until pain returns.

Hands Place uncovered hands or fingers next to your skin against your armpits, stomach or crotch.

Feet Place bare feet under clothing and next to your skin.

Treatment for deep frostbite

If deep frostbite is suspected, do *not* treat or attempt to thaw the victim. Transport the victim to the nearest medical facility.

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Materials are the final ingredient of a successful winter highway maintenance effort. The key is to have enough of the right deicing material on hand to take care of estimated needs, lessening the risk of interrupted supply, chaos, and accidents on the roads. Agencies should have 100% of their estimated full-winter needs on-site before the first snowfall. The estimate is usually calculated by taking a five year average. The most cost effective way to receive deicing materials is to order early so shipments can be made during the normal shipping season, e.g. spring through late summer. As days get shorter, deliveries are more likely to be uncertain. Rail and trucking shipments are more costly. You may recall that in the winter of 1993-94, several agencies ran out of deicing materials and were forced to settle for lower levels of roadway maintenance, increasing liability exposure to municipalities. Deicing salt was available, but only at the salt production facility and not where it needed to be to meet the public's demand to maintain highways for safe travel and mobility.

Keeping it Clean

From a risk management standpoint, environmentally safe storage also is a must. There have been cases where agencies did not store deicing materials correctly and leaching into the surrounding water table ultimately contaminated drinking water, which led to adverse publicity and liability claims (estimated by Maine DOT to cost taxpayers and average of $10,000 to $20,000 per claim). Two simple techniques of storage should always be adhered to: storage on an impermeable surface, like high quality concrete or asphalt, is critical, and storage under a shed or roof. These two steps can prevent a lot of headaches down the road, not to mention the risks involved without them. Yes, storage facilities require capital investments running anywhere from $50,000 to $500,000, depending on the size and type. (See article on Yukon's sand shed.) But it takes only a few contamination suits to justify this long term (20-25 years) investment in safe storage. And as regulatory entities continue to push for tougher environmental laws, the issue of proper deicing material storage is a "when", not and "if".

In addition to proper storage of deicing materials, attention should be paid to potential environmental hazards posed by the type of materials used. Air pollution and quality standards are becoming more and more of an issue for municipalities striving to comply with the Environmental Protection Agency's (EPA) Air Quality Standards. The EPA considers PM-10 (particulate matter in the air smaller than 10 microns) a growing issue concerning respiratory diseases. One of the sources for PM-10 is the use of abrasives, such as sand or gravel, for winter highway maintenance. In Utah, agencies stopped using abrasives sand because of PM-10 dust problems.

The city of Denver replaced sand with soluble deicing materials due to its so-called "brown cloud." A 1995 study showed up to 89% (an average of 59%) of the total particulate loading came from road sanding. A study is currently underway in the state of Washington to determine the respiratory effects of PM-10. As the EPA continues to pursue this concern, highway agencies must become more aware of the PM-10 issue and how it influences their choice of deicing materials.

Risk management and wintertime roadway performance is tied together through the common link of good highway winter maintenance. Recognizing this connection can save public entities and taxpayers billions of dollars while providing increased safety and mobility for the driving public. As a highway agency representative covering the snowbelt, you can work with the risk manager who represents your agency and embrace the TEAM concept for efficiency and reduced liability exposure. A unified effort will tell the public that the governmental guardians of the road are driving toward the same goal: safe winter roads for the demanding driving public and instant mobility during or after every snow and ice storm.•

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New Staff

Christel Kennedy joined the T2 staff in May as the Administrative Clerk. When you call T2, you will likely hear her on the other end of the phone. She also works with the library. Christel is ready to answer any questions about the program.•

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A box and conveyor are mounted on the left side of the truck so the driver's lane and the opposing lane can be sanded simultaniously. A sander is still mounted on the rear of the plows.

four joysticks, with selectors for different functions and several functions for each device, often with a four-way rocker switch: front plow, wing plow, belly plow, dump box, and sander. For example, the front plow goes up, down, right, or left. The wing plow goes up and down both front and rear as well as in to and away from the truck. The belly blade has blade curl, turn right or left, and raise right or left; and, finally, the dump box goes up and down. All of the hydraulics on all the functions can be adjusted to control the rate of hydraulic flow so that components move at a predetermined, appropriate rate of speed.

There are also computerized sander controls. The sander offers the capability of adjusting the sanding rate at pounds per lane mile. This is done by sensing the ground speed via a device located on the tail shaft of the transmission. In the past, the sander had to be preset for anticipated truck speed.

In Fairbanks, Statewide Equipment Fleet installed a new hydraulic system in a year-old Freightliner 6x6. It is electronic over hydraulic, which means that electronics tell the hydraulics when and how to operate. There is only one joystick with several switches to operate the components.

Another significant addition to the Fairbanks Freightliner 6x6 is a new hydraulic cylinder that raises the rear of the wing to bring the entire plow up and close to the truck body. The new hydraulic cylinder has an adjustable, variable displacement so it initially brings the wing blade up fast, then slows when the blade retracts into the side of the truck. That capability keeps the blade from slamming into the truck and damaging both it and the truck. Another advantage of the variable displacement is that the blade can be popped up to avoid obstructions on the roadway, such as a concrete curb or a planter box at a driveway.

In the standard V-Box sander, a conveyor in the bottom pulls sand that drops from the dump box, dumping the sand onto the spinner, which spins it onto the road. V-Boxes have a 20-inch-wide funnel at the bottom, matching up with a 20-inch-wide conveyor. This is narrow enough to allow sand to bridge, or hang up, in the sidewalls of the sander box. Bridges happen for a variety of reasons, usually due to the gradation of the sand and its moisture content. Silty sands are particularly prone to bridging. When a bridge forms, or if the conveyor belt breaks, the sand has to be hosed out, a major winter difficulty. A common method to keep bridging from occurring is placing a vibrator on the side of V-Box to shake it so the sand stays loose. But that's not the best answer, since vibration shakes the welds on the V-box loose.

The Monroe Radius Dump Sander (MRDS) is a dump box and has a U-shaped box instead of a V-Box, which allows it to sit lower on the truck chassis. That means the center of gravity is about a foot and a half lower, making the truck more stable. The funnel at the bottom of the dump box and the conveyor in the MRDS are 30 inches wide, which should reduce the chances of sand forming a bridge as it drops from the bottom of the box onto the conveyor. The sander can be tucked under the rear of the truck, allowing the materials to be dumped in

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order to reach a bridge that may have formed, or to easily access a broken conveyor. In non-snow seasons, the truck can be used as a dump, thus extending its functionality.

Sanders are typically placed on the rear of the truck, and all sanding activity takes place from the rear as the operator drives forward. On the concept trucks, there is a spinner on the back as well as on the left front. That makes it possible to sand in front of the truck and the opposing lane, in addition to sanding from the rear. The truck also dumps like a dump truck. It has a cylinder and a rear gate, so the operator can dump the load of sand, if necessary.

DOT&PF plans to place the trucks with snowfighting equipment from different vendors in certain locations, then swap among the locations part way through the winter. The idea is to have the vendor's attachments tested in a variety of weather and snow conditions. By placing the trucks in different geographic areas with snows of varying moisture content and depth, DOT&PF will be able to assess which snowfighting components are most effective for the different conditions. Moving the trucks to different areas assures that both the trucks and components are tested in a broad spectrum of conditions by a variety of operators.

Cantwell, a maintenance station in Northern Region, will be receiving a Freightliner that isn't one of the two concept trucks, but it will be outfitted with snowfighting equipment from Schmidt-Wausau. It will have either three or four joysticks to control a front plow, wing blade, a belly blade, and a sander. The sander, however, will be the old-style V-Box sander. Fairbanks has the Freightliner that was retrofitted with the hydraulics discussed earlier in this article.

Girdwood and Silvertip, just outside of Anchorage in Central Region, and Thompson Pass in Northern Region's Southcentral (Valdez) District, are receiving the two concept trucks. Those will have Monroe snowfighting components, including the front plow, wing blade, and belly blade. They will also be outfitted with the new Monroe Radius Dump Sanders. The Central Region truck will eventually move to Soldotna on the Kenai Peninsula, while the Northern Region truck is likely to move from Thompson Pass to Fairbanks while the retooled 6x6 would go to Thompson Pass.

The concept trucks have arrived in Alaska and have gone through a thorough debugging process before being sent to their respective locations.

To learn more about the concept trucks, contact Steve McKinstry, Northern Region SEF Manager at 907-451-2265; Joel Craft, Northern Region M&O Denali Area Manager at 907-451-2359; George Levasseur, Northern Region's Southcentral District M&O Manager at 907-834-1039; Lanny Palmer, Central Region SEF Manager at 907-269-5966; Bill Mowl, Anchorage District M&O Superintendent, Central Region M&O at 907-269-5700; or Larry Bushnell, Girdwood Foreman, Central Region M&O.•

The polyethylene lining on the front plow allows snow to slide off better. It accelerates the speed of the snow in the chute and sends it out farther, so berms don't develop as quickly. The lining also makes it much easier to push the snow because polyethylene creates less friction and requires less horsepower., making for more efficient operation and fuel savings. Pulling and blowing berms are a less frequent activity because snow is cast farther away from the road. The down side is that signs are more easily damaged, usually because the force of the blown snow wraps the sign around its post. In heavy snow areas signs should be wind-braced.•

Date	Event	Sponsor/Contact	Location
January 10-14	TRB 78th Annual Meeting: Aviation Events	Transportation Research Board @ 202-334-3472, fax 202-334-229	Washington, D.C. Connecticut Avenue Collection Hotels
January 12	Georgia Superpave for Local Governments	Georgia LTAP Program @ (800) 573-6445 or (404) 656-5364	Albany, Georgia Statesboro, Georgia Atlanta, Georgia
January 24-27	The Asphalt Conference and Expo	Asphalt Contractor, Asphalt Institute, FHWA, Florida LTAP Wendy Cantwell @ 1-800-254-2123	Tampa/St. Petersburg, Florida Bayfront Center
February 2-5	Transportation Projects and the Environment	Michigan LTAP Program @ 906-487-2102	Higgins Lake, Michigan Ralph A. MacMullan Conference Center
February 3-4	Road Surface Management System & Sign Inventory Management System	Maryland DOT, FHWA, Maryland T2 Center @ 301-405-2009, fax: 301-405-2585	College Park, Maryland University of Maryland
February 7-11	National Asphalt Pavement 44th Annual Convention	Erika Larson, NAPA @ 1-888-468-6499, fax (301) 731-4621	San Diego, California Hyatt Regency
March 2-4	NHI #13027 Urban Drainage Design	Alaska T2 Center, Sharon McLeod-Everette (907) 451-5323	Anchorage, Alaska
May 23-27	Seventh International Conference on Low-Volume Roads	Transportation Research Board @ 2101 Constitution Ave, N.W. Washington D.C. 20418	Baton Rouge, Louisiana Louisiana State University

Meetings Around Alaska

Society	Chapter	Meeting Days	Location
ASCE	Anchorage Fairbanks Juneau	Monthly, 3rd Tues., noon Monthly, 3rd Wed., noon Monthly, 2nd Wed., noon*	Northern Lights Inn Captain Bartlett Inn Westmark Hotel *except June-Aug.
ASPE	Anchorage Fairbanks Juneau	Monthly, 2nd Thurs., noon Monthly, 1st Fri., noon Monthly, 2nd Wed., noon*	West Coast International Inn Captain Bartlett Inn Westmark Juneau Hotel *except June-Aug.
ASPLS	Anchorage Fairbanks Mat-Su Valley	Monthly, 3rd Tuesday., noon Monthly, 4th Fri., noon Monthly, last Wed., noon	Executive Cafeteria, Federal Building Ethel's Sunset Inn Windbreak Cafe; George Strother, 745-9810
ITE	Anchorage	Monthly, 4th Thurs., noon	Sourdough Mining Company
IRWA	Sourdoughs Ch. 49 Arctic Trails Ch. 71 Totem Ch. 59	Monthly, 3rd Thurs., noon** Monthly, 2nd Thurs., noon** Monthly, 1st Wed., noon	West Coast International Inn **except July & Dec. Last Frontier Club Mike's Place, Douglas
ICBO	Northern Chapter	Monthly, 1st Wed., noon	Zach's Sophie Station
AWRA	Northern Region	Monthly, 3rd Wed., noon, Brown Bag Lunch	Rm 531 Duckering Bldg., University of Alaska Fairbanks, Larry Hinzman, 474-7331
PE in Government	Anchorage	Monthly, last Fri., 7am	Elmer's Restaurant

How to Use Anti-icing Liquids

General guidelines for using anti-icing brines call for placing them on dry pavement or before so much snow builds that the liquid cannot penetrate to the road surface. Application should be uniform and just heavy enough to leave the surface damp but not slippery. They should not be used with rain, freezing rain or sleet since these can wash them away or dilute them.

Jim Reed, president of Reed Systems, Ltd., in Ellenville, N.Y., has broad experience with anti-icing liquids. He says that an area's winter temperature range is often the key on choosing a liquid. "Sodium chloride works into the mid 20s, but freezes at about eight degrees," he says. "Magnesium chloride works at colder temperatures depending on its quality and concentration, but if temperatures swing over a wide range that extends to 0 degrees or less, calcium chloride works effectively and presents no handling problems.

"Practically speaking, a highway department needs a single product that meets the thermal range and other conditions of its operating region. It doesn't make sense to have a material that can't be used when the worst conditions occur."

The *Manual of Practice for an Effective Anti-Icing Program*, published last year by the Federal Highway Administration, contains a wealth of practical information on how to conduct an anti-icing program, including details on liquid chemicals. To this body of data, Reed would add a number of concepts learned through experience.

◊ Determine the desired end result of your maintenance operation. Do you want bare pavement or to make abrasive stick better?

◊ Understand the effects of air and pavement temperature and the capability of various melting agents.

◊ Write specifications for anti-icing liquids that define quality and strength. Understand the effective temperature range of the various products to ensure they work well in your region, especially as concerns percent concentration and suspended solids.

◊ Solid stream nozzles allow melting agents to penetrate a light layer of snow and run downslope along the pavement to prevent bonding. A fan spray causes slush without penetrating to the pavement.

◊ Never apply anti-icing liquids to hardpack or thick ice without abrasives. It will cause wet ice that cannot even be walked on.

◊ Understand the relationship between pavement type, temperature, humidity, road grime, and the anti-icing liquid you use. At times, an application of an anti-icing liquid will cause slippery conditions.

◊ Understand the relationship between pavement temperature, ambient temperature trends, and the concentration of melting agent on the precipitation on the road. A refreeze is a function of temperature and dilution and can happen with any material. Reapplication of melting agent is required to revert to conventional tactics.•

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a 0.15 meter lift of compacted hot mix.

The capacity of the shed is approximately 250 cubic meters of bulk road salt or calcium. The cost of this shed was $30,000, including labor and materials. By reducing the amount of wasted salt and calcium, this storage shed has been a money saver. The conceptual design, although altered for this shed, came from a design used by the Manitoba Department of Highways. Manitoba's salt shed had a capacity of 75 tons and cost $16,000. The cost difference is a result of the high cost of materials and labor in the Yukon.

For more information concerning the design of this storage shed, please contact: *Yukon Community and Transportation Services, Transportation Maintenance Branch S-4, Box 2703 Whitehorse, Yukon Y1A-2C6.*

Alaska DOT&PFs Southcentral region uses a similar sand shed in Valdez and several other locations. For information or a copy of Southcentral's plans, see the Fall/Winter 1997 issue of ***Technology for Alaskan Transportation*** or contact T2 directly by fax, (907) 451-5340.•

Highways: Stay the Course!

The recently passed federal highway bill (H.R. 2400, Transportation Equity Act for the 21st Century, or TEA-21) has canceled the Federal Highway Administration's year 2000 deadline for state implementation of the metric system in the design and construction of federally funded highway projects. This is a setback for the thousands of highway professionals who have been working hard to ensure a coordinated, orderly transition of highway construction to the metric system.

But let's look at the big picture. Federally funded construction amounts to roughly $50 billion annually, with about half going to buildings and nonhighway civil works and the other half going to state highway projects. The first half, dominated by the Corps of Engineers, Navy, Air Force and General Services Administration, predominantly uses metric now.

The second half, highways, would have been fully integrated the metric system within about two years. Happily, a telephone survey conducted be the Construction Metrication Council shortly after passage of the highway bill indicates that of the 43 state highway departments already in the process of converting to the metric system, almost all plan to stay the course. Of the balance, Arizona, North Dakota, Rhode Island, South Carolina, and West Virginia say they will continue using inch-pound measures. Maryland, Hawaii and the District of Columbia are still undecided. Most of the 43 metric states, such as California, are quite firm in their commitment to metrication.

Putting the two halves together, well over 90 percent of all federally funded constriction will be using metric by the year 2000. The states that do not convert are only delaying the inevitable, and perhaps putting their workforce at a competitive disadvantage in doing so.

These states will eventually convert, too. The rest of the world uses the metric system and many major U.S. industries, including the automobile industry, are metric based. Both the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO) will be conducting their work solely in metric units, making it difficult for inch-pound users to keep up. Since state borders are mostly just lines on a map to the construction industry, engineering firms and road contractors will begin to demand that nonmetric states use the same measurement as everyone else.

Highway near Fairbanks.

To those of you who have led metric efforts in your state and local highway departments, keep up the great work and stay the course. Some of you will be pressured to revert back to the inch-pound system and a few of you may be forced to do so. But in the end, your commitment to metrication will move your profession, your industry, and your country forward.•

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Don't forget to fill out the response card! This is your last chance to stay on the maillist and keep receiving T2 publications.

Widespread Virus Myths

Viruses are simple! They are merely programs written to create copies of themselves and to attach these copies to other programs. These infected programs can be files containing executable code (most commonly .COM and .EXE files) or boot sectors. **The only way any virus can infect your PC is by executing one of these programs or by booting from a diskette containing an infected boot sector.** Simple, right? Well, it should be simple, but there is a lot of myth and misinformation regarding viruses so things often appear to be not so simple. These myths are harmful to you if you believe them.

Viruses Come From Online Systems

Simply being attached to a network (such as CompuServe, or Internet), a bulletin board system (BBS), or even a local area network, will not make you susceptible to viruses. **The only was you can get a virus is to execute a program on your PC that you obtained over the network.** The mere act of downloading a program is harmless; it's only by downloading and then executing an infected program that your PC can become infected. I hope it's clear that the mere act of reading electronic mail cannot infect you.

More than 90% of all infected PC's are infected by system sector viruses such as Michelangelo, Stoned, Monkey, or Form. These viruses only spread by booting from an infected diskette. This makes it clear that online communication plays no part in the spread of most viruses.

There is a potential threat that you may want to be aware of. You are under some threat of virus infection if your web browser or mail reader will automatically execute MS Word. If you have MS Word installed and your software has this capability, we strongly suggest you use the option setting to turn it off.

There is another potential threat that you may want to be aware of. (This is not a virus but falls into the category of 'dirty trick'.) If you have the device driver ANSI.SYS loaded (in your CONFIG.SYS file), someone could send a sequence of characters to your screen (known as an ANSI sequence) which assigns a set of keystrokes to a key on your keyboard. These keystrokes could easily be something harmful like "DEL*.*". When you hit the key that was reassigned, the command will execute just as if you had typed it yourself. Let me reassure you that while this "trick" is possible, it is fairly rare since many people no longer load the ANSI.SYS device driver or use a version without keyboard remapping.

Viruses Only Infect .com and .exe Files

Viruses also infect **system (boot) sectors**. These viruses do quire well because sectors do not show up as files and are therefore "invisible" to the average user. System sector viruses account for almost 80% of all in-the-wild infection.

Viruses can also infect any file that is in some way executed. This includes device drivers (commonly .SYS

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Internet Update

For those looking for more information on deicing and anti-icing, many Web sites have further information about winter roads and maintenance.

Odin Systems International has a site devoted to winter maintenance issues. Helpful articles on anti-icing techniques and new anti-icing equipment are linked to the site, as are updated weather information and conferences, exhibitions and seminars. The site is http://www.odin.com/winter.htm.

The Alaska Department of Transportation and Public Facilities has a site with information about road and weather conditions around the state. Information is updated daily October 15 to April 15 with new temperatures, wind, sky conditions, and road conditions for a number of points along the highways. The site can be reached by going to the AKDOT&PF Web site at http://www.dot.state.ak.us/ and going to Road & Weather.

Getting ready for workzone training? Check out the ATSSA web site for information on workshops and training programs, including the Workzone Traffic Control Technician and Workzone Traffic Control Supervisor. The site is http://www.atssa.com.•

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Hypothermia

		Body Temp
Initial symptom	Shivering (may become uncontrollable)	96° F
Second stage	Sluggish thinking, irrational reasoning, false feeling of warmth may occur	95-90° F
Third stage	Muscle rigidity, unconsciousness and barely detectable signs of life	90-86° F
Fourth stage	Death is almost certain and below	77° F

Treatment

Place victim in warm sleeping bag with one or two other people. All should be naked.

If victim is conscious, give him warm to hot sweetened fluids. Use honey or dextrose. If they're not available, use sugar, cocoa or a similar soluble sweetener. Check for gag reflexes before giving fluids.

Dangers

Rewarming the body too rapidly can cause the victim to have circulatory problems resulting in heart failure.

For more information on future winter survival classes, contact the Nevada Technology Transfer Center at (702) 784-1433, or fax: (702) 784-1429.•

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or .BIN) and overlay files. It's even possible to write viruses for batch files, word processors, or spreadsheet macros.

Would you believe that a virus could infect your files without changing a single byte in the file? Well, it is true! A companion virus infects your files by locating a file name ending in ". EXE". The virus then creates a matching file name ending in ". COM", which contains the viral code. The virus may place this file in the same directory or in another directory on your DOS path. Here's what happens. Let's say a companion virus is executing (resident) on your PC and decides it's time to infect a file. It looks around and happens to find a file called "WP.EXE". It now creates a file called "WP.COM" containing the virus. If you type "WP" and hit enter, DOS will execute "WP.COM" instead of "WP.EXE". The virus executes, possibly infecting more files, and then loads and executes "WP.EXE". The user probably doesn't notice anything wrong. This type of virus is fortunately easy to detect by the presence of the extra files. There are some instances where it is normal to have both ". COM" and ". EXE" files of the same name (such as DOS 5's DOSSHELL), but this is relatively rare. It is possible for a virus to plant either .COM or .EXE files for existing .BAT files, but this is unlikely to be an effective strategy. If you use the NDOS or 4DOS COMAND.COM replacement, there is a further risk of a virus planting .BTM files.

You Can Get a Virus from Data

Since data is not executed, you cannot become infected from data. Some of the pro-virus kiddies love to scare people by perpetuating myths that data or email can transmit viruses. If someone sent you a data file that contained a virus, you would have to rename the file and then execute it to become infected!

Since Microsoft Word users can receive viruses inside what appear to be document files, they can become infected from a document sent by email or the Web. The infection can only happen when you start MS Word on our computer, so if you use MS Word, **it's important to note to configure your web browser or mail reader not to launch MS Word automatically for .Doc files.**

Data files can't infect you but you can, become infected from a diskette that is not bootable and contains no (apparent) programs. The explanation for this is that all diskettes have a boot sector, which contains a program that can become infected by a boot sector virus. If you leave such an infected diskette in your drive when you power up or boot, your PC will be infected! This is how most viruses spread. You will see the typical "Non-system disk or disk error" message, but the virus will have your PC.•

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New Publications for loan.

_____ **Site Characterization for Explosives Contamination at a Military Firing Range Impact Area,** CRREL, Special Report 98-9, August 1998

_____ **Design and Implementation of Automatic Vehicle Identification Technologies for Traffic Monitoring in Houston, Texas - Phase 2 Final Report,** Texas Transportation Institute, Research Report 1999-1F, May 1997

_____ **Guidelines for Evaluating Superheavy Load Routes**, Texas Transportation Institute, Project Summary Report 3923-S, Oct 1997

_____ **Evaluation of Innovative Coordination Methods Utilizing ITS Technology for Traffic Signals,** Texas Transportation Institute, Project Summary Report 2971-S, Oct 1997

_____ **Data and Information Required in Feasibility Studies for Private Toll Road Projects by States and Private Entities Involved in the Evaluation, Approval or Financing of Private Toll Road Projects**, Texas Transportation Institute, Research Report 1756-1, Feb 1998

_____ **Procedures and Criteria Used to Evaluate the financial Viability of Private Entities Involved in the Approval, Financing and/or Evaluation of Private Toll Road Projects,** Texas Transportation Institute, Research Report 1756-2, April 1998

_____ **Highway Planning and Operations for the Dallas District: Freeway System Plan Methodology,** Texas Transportation Institute, Project Summary Report 1994-16S, Nov 1997

_____ **Highway Planning and Operations for the Dallas District,** Texas Transportation Institute, Project Summary Report 1994-12S

_____ **Highway Planning and Operations for the Dallas District,** Texas Transportation Institute, Project Summary Report 1994-14S

_____ **Notice of Proposed Amendments to the Manual on Uniform Traffic Control Devices Parts 2A, 2D, 2E, 2F, and 21,** US DOT and FHWA FHWA Docket No. 98-3644, FHWA-SA-98-067, 1998

_____ **Toll Facilities in the United States: Bridges-Roads-Tunnels-Ferries,** US DOT, FHWA, FHWA-PL-97-008, Feb 1997

_____ **Strategic Plan for Environmental Research FHWA,** US DOT, FHWA, FHWA-PD-98-016, 1998

_____ **Design Manual for Permanent Ground Anchor Walls,** US DOT & FHWA, FHWA-RD-97-130, Sept 1998

_____ **Summary Report of Research on Permanent Ground Anchor Walls, Volume I: Current Practice and Limiting Equilibrium Analyses,** US DOT & FHWA, FHWA-RD-98-065, Sept 1998

_____ **Summary Report of Research on Permanent Ground Anchor Walls, Volume II: Full-Scale Wall**

Tests and a Soil-Structure Interaction Model, US DOT & FHWA, FHWA-RD-98-066, Sept 1998

_____ **Summary Report of Research on Permanent Ground Anchor Walls, Volume III: Model-Scale Wall Tests and Ground Anchor Tests,** US DOT & FHWA, FHWA-RD-067, Sept 1998

_____ **Summary Report of Research on Permanent Ground Anchor Walls, Volume IV: Conclusions and Recommendations,** US DOT & FHWA, FHWA-RD-98-068, Sept 1998

_____ **Policy Options for Intermodal Freight Transportation,** Transportation Research Board, National Research Council, Special Report 252, 1998

_____ **Traffic Operations Manual Highway Operations,** Texas DOT, Research Report 1467-6F1, Aug 1998

_____ **Social and Economic Effects of Elevated, Depressed and At-Grade Level Freeways in Texas,** Texas Transportation Institute, Texas DOT, Research Report 1327-1, Nov 1997

_____ **Structural Supports for Highway Signs, Luminaires, and Traffic Signals,** Transportation Research Board - National Research Council, NCHRP Report 411, 1998

_____ **Tolling Practices for Highway Facilities,** Transportation Research Board - National Research Council, NCHRP Synthesis 262, 1998

_____ **HOV Systems Manual,** Transportation Research Board - National Research Council, NCHRP Report 414, 1998

_____ **FHWA Traffic Noise Model Look-Up Tables,** US DOT, FHWA, FHWA-PD-98-047, July 1998

_____ **Remediation of Wastewater by Land Treatment - Consideration of Soil Temperatures in Winter,** US Army Corps of Engineering, Cold Regions Research & Engineering Laboratory, CRREL Report 98-8, August 1998

_____ **Dredging as Remediation for White Phosphorus Contamination at Eagle River Flats, Alaska,** US Army Corps of Engineering, Cold Regions Research & Engineering Laboratory, CRREL Report 98-5, August 1998

_____ **Application of GPS for Surveying and Other Positioning Needs in Departments of Transportation,** Transportation Research Board - National Research Council, NCHRP Synthesis 258, 1998

_____ **Community Impact Mitigation,** US DOT, FHWA, Case Studies, May 1998

_____ **Geological and Geophysical Investigations of the Hydrogeology of Fort Wainwright, Alaska - Part II: North - Central Cantonment Area,** US Army Corps of Engineering, Cold Regions Research & Engineering Laboratory, CRREL Report 98-6, August 1998

_____ **Real-Time Application of Passer IV: Project Summary and Guidelines,** Texas Transportation Institute, Texas DOT, Project Summary Report 1477-S, Oct 1997

_____ **Investigations of Plastic Composite Materials for Highway Safety Structures,** US Army Corps of Engineering, Cold Regions Research & Engineering Laboratory, CRREL Report 98-7, August 1998

_____ **Transportation Technology Transfer - A Primer on the State of the Practice - Addendum: References and Bibliography,** Transportation Research Board - National Research Council, Circular # 488, Sept 1998

_____ **LTPP Seasonal Asphalt Concrete (AC) Pavement Temperature Models**, US DOT, FHWA, FHWA-RD-97-103, Sept 1998

_____ **Developing Measures of Effectiveness for Truck Weight Enforcement Activities,** Transportation Research Board - National Research Council, Research Results Digest # 229, Aug 1998

_____ **Economic Effects of Restricting Left Turns,** Transportation Research Board - National Research Council, NCHRP Research Results Digest #231, Aug 1998

_____ **Evaluation of a Modified Steel Post W-Beam Guardrail System,** Texas Transportation Institute, Texas DOT, Project Summary Report 3963-S, Nov 1997

_____ **Economic Impacts of Restricting Left Turns,** NCHRP Transportation Research Board - National Research Council, Final Report Copy # 47, February 1995

_____ **Trends in Single-Occupant Vehicle and Vehicle Miles of Travel Growth in the United States,** Transportation Research Board - National Research Council, Research Results Digest # 30, August 1998

These materials may be borrowed for three weeks. However, if you need them longer, contact our office for an extension. Contact **Christel Kennedy** at (907) 451-5320 or TDD: (907) 451-2363.

Please print your name and address below, and mail, fax, or E-mail to:

Alaska Transportation Technology Transfer Center
Local Technical Assistance Program (LTAP)
Department of Transportation and Public Facilities
2301Peger Road M/S 2550
Fairbanks, AK 99709-5399
Fax: (907) 451-2313
E-mail to: Christel_Kennedy@dot.state.ak.us

Name:_____ **Title:**_____ **M/S:**_____
Organization:_____
Address:_____
City:_____ **State/Province:**_____ **Zip:**_____
Phone:_____ **Fax:**_____
E-mail:_____

Glaciological Data: Workshop on Permafrost Data Rescue and Access, Report GD-28. *Roger G. Barry, J. Alan Heginbottom, and Jerry Brown.* This report includes information on international efforts to provide access to data on permafrost, ground ice and seasonally frozen ground. The proceedings and information included in this document are from the workshop held in Oslo, Norway.

Design and Evaluation of Cold In-Place Recycled Pavements, Research Project 23241-95-8. *N. Paul Khosla, and M.E. Bienvenu.* The objectives of the study included developing cold mix design using CMS and HFMS emulsions as recycling agents; evaluating and comparing the likely performance with conventional hot asphalt mixes; evaluating the structural contribution of cold recycled mixes in pavements; and developing guidelines for design and construction of cold mix binders.

Snow covered street in Fairbanks, Alaska.

Problems Associated with Gravel Roads, FHWA-SA-98-045. *U.S. Department of Transportation Federal Highway Administration.* This publication includes training aimed at road maintenance crew members, road supervisors, equipment operators, and local elected officials responsible for gravel roads. Problems related to gravel roads around the country, including materials used to surface them, common surface defects, and equipment and techniques to repair and maintain them, are discussed. Universal principles and practices that can be shared, discussed, tailored as needed, and implemented to solve the problems of a local government.

International Conference of Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, Special Report 98-10. *U.S. Army Corps of Engineers CRREL.* This publication includes abstracts of the papers presented during the conference on snow hydrology held in Brownsville, Vermont October 6-9, 1998. They cover snow cover properties and processes, chemical processes in the seasonal snow cover, biotic interactions with the seasonal snow cover, distributed snowmelt models, and scaling problems in snow hydrology.

Effects of Winter Road Maintenance, VTI Report 423A-1997. *Carl-Gustaf Wallman, Peter Wretling, and Gudrun Öberg.* The study discusses winter road conditions. It includes a look at stopping distances and the influences of speed, appearance, and precipitation. The influence of salting roadways is also discussed.

ICETHK User's Manual: Version 1, CRREL Special Report 98-11. *Andrew M. Tuthill, James L. Wuebben, and John J. Gagnon.* The manual covers ICETHK, an ice utility program used in conjunction with the HEC-2 backwater model to simulate an equilibrium ice jam profile. The initial version was written in QUICK BASIC, and the current version is in FORTRAN. ICETHK uses hydraulic calculations from HEC-2 to produce models of steady-state ice flow.

The Interaction Between Wear and Polish on Swedish Roads, VTI särtryck 284-1998. *Peet Höbeda and Torbjörn Jacobson.* Paper prepared for the First World Conference on Highway Surfacing held May 11-13, 1998, Budapest, Hungary. The paper investigates the correlation between wear of road surfacing, specifically by studded tires, and skid resistance. The study hopes to lead to improved skid resistance and to avoid dangerous "black spots."

Air Convection Embankment Experimantal Feature Design Phase I, INE/TRC 97.06, AK-RD-97-02. *Douglas Goering.* This project report discusses the design and construction of the Parks/Chena Ridge Air Convection Embankment (ACE) experimental feature. The ACE is a technique of limiting thaw settlement damage that often occurs when roadway embankments are constructed in regions of warm permafrost.

Permafrost Database Spring 1996 Data, INE/TRC 97.07, SPR-UAF-96-R02. *J. Leroy Hulsey.* Temperature sensors at eight permafrost sites were read and converted to centigrade. The temperatures were entered in a historical permafrost database. Subsurface temperature profiles are provided.

Unsteady Ice Jam Processes, CRREL Report 97-7. *Jon E. Zufelt, and Robert Ettma.* This report evaluates the importance of ice momentum on ice jam thickness and thickness distribution using experiments conducted with laboratory flumes and a numerical model. A useful dimensionless parameter is identified for generalizing this finding.

Video Inspection of Highway Edgedrain Systems, FHWA-SA-98-044. *J.F. Daleiden.* The report documents the results of 287 video inspections of highway edgedrain systems in 29 states. The demonstration showed the equipment was effective in identifying edgedrain performance concerns, and how common they are. Recommendations for edgedrain design improvements for performance and quality control are provided. A Draft Guide Specification For Video Edgedrain Inspection and Acceptance is provided as an Appendix.

Use of Alaskan Coal Ash in Construction: Part 1, Use of Alaskan Fly Ash in Concrete, INE/TRC 95.1. *David W. Evans, and Lufti Raad.* Fly ash is filtered from the boiler exhaust of electric power generated by coal combustion. The study focuses on the use of fly ash in concrete. The study looked at the influence of rheology of fresh concrete and the properties of hardened concrete when 0 to 80% Portland cement and 0 to 100% fine aggregate were replaced with fly ash. Data was obtained generalization of hardened concrete properties and mix design relationships.

Use of Alaskan Coal Ash in Construction: Part 2, Re-Utilization of Coal Ash as a Road Base Material, INE/TRC 95.2. *D. Andrew Church, and Lufti Raad.* The report covers the characterization of fly ashes from six power plants and a study of the strength and durability properties of one ash, Golden Valley Electric Association. Tests included compressive, tensile and flexural strengths, freeze-thaw and vacuum saturation durability, static and dynamic moduli of elasticity and fatigue behavior. A column leaching study was performed using various field conditions.

Soil-Vapor Versus Discrete Soil Sample Measurements for VOCs in the Near-Surface Vadose Zone: Feasibility Study, CRREL Special Report 98-7. *Alan D. Hewitt.* This study measured trichloroethene in soil vapor samples taken from beneath the ground surface at 16 different locations. The linear slope and strong correlation of soil vapor to soil mass concentrations for this volatile organic compound(VOC) in a low organic carbon soil matrix suggests that active soil-vapor measurements could be used as an alternative to collecting and analyzing discrete soil samples during site characterization and monitoring.

Available from the T2 Library

Please request your personal copies of the following items by fax. They will be distributed on a first-come first-served basis. Fax: (907) 451-5340.

Alaska DOT&PF AKOD 98/AKPAVE 98. AKOD 98 is a new software program for mechanistic pavement overlay design. AKPAVE 98 is AKDOT&PFs Excess Fines Pavement Design Procedure for new pavements. Both are Windows95-based programs that automate the design.

Supplement to the AASHTO Guide for Design of Pavement Structures: Part II, Rigid Pavement Design & Rigid Joint Design. The report describes the alternative design procedures that began with AASHTO's NCHRP Project 1-30. The project used new data for the design of rigid pavements and overlays and to improve the selection of *k* values.

National Conference on Work Zone Safety: Proceedings, December 5-7, 1994. This report covers the proceedings of the conference, including guest speakers and workshop happenings.

Stream Stability at Highway Structures, Second Edition. *P.F. Lagasse, J.D. Schall, F. Johnson, E.V. Richardson, and F. Chang.* This report describes guidelines for identifying stream instability problems at highway stream crossings and for the selection and design of appropriate countermeasures to lessen potential damage to bridges and other highway components at stream crossings.

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pre-wetting sand.

An experimental period using a 28% magnesium chloride(MgCl) for both anti-icing and deicing began in Valdez during the winter of 1996-1997. Maintenance & Operations (M&O) purchased 6,000 gallons of MgCl, four 100 gallon saddle tanks for the sanders and a 2,000 gallon slip-in spray unit for anti-icing. This system allowed us to distribute chemicals for anti-icing prior to a storm event and to pre-wet sand that will be applied to the snowpack for deicing.

Bill Lusk, Valdez station foreman, took the lead and became the local contact for this project. Lusk worked closely with Gerry Reed in Anchorage, who coordinated the program in the Central Region. During the first year, most of the effort centered on the use of pre-wetted sand with MgCl. Before and after a storm event, sand was applied to the roadway and MgCl was sprayed onto the sand as it left the hopper belt. As the pre-wetted sand hit the snowpack it melted, diluted, and refroze, and embedded the sand into the pack. The sand provided immediate, long-lasting friction with very little sand blown off into the ditch by traffic. Our experience found that the chemical continued to work, migrating through the pack over the next couple of days, turning the pack into a loosely arranged, oatmeal consistency. This was easily plowed off and some of it sublimated (changed from a solid to a vapor) as traffic aerated the mixture. In 23 winters in Valdez, this was the first time I had experienced mostly ice-free roads. Our sand usage decreased by 30%. After experimenting with different application rates, we found 13 gallons per cubic yard to be optimum for our conditions.

The Valdez station conducted anti-icing efforts by applying about 40 gallons of MgCl per lane mile prior to a storm event. This program seemed to work well in drier storms to keep the ice bonds from forming but had poorer results in storms where the chemicals were diluted by rain.

Because of the success of the program, we have expanded the use to the Cordova and Thompson Pass stations. Two 6,000 gallon storage facilites have been assembled and five sanders are now equipped with prewetting systems. Future expansion to the interior stations is planned, especially for use during the fall and spring seasons. •

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