



United States Department of Agriculture • Forest Service • 0471-2828-MTDC

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SDTDC Employee Awarded Patent

The U.S. Patent Office has awarded Joe Fleming of the San Dimas Technology and Development Center (SDTDC) a patent for his improved fire hose roller. Fleming is a mechanical engineering technician at the center. His design uses a hub with multiple tines that can be added or removed to adapt the roller for various hose sizes and end connections. Existing rollers can be retrofitted easily to this new, adaptable design. Firefighters have found that the redesigned roller is durable, reliable, and simple to operate.

The Forest Products Laboratory, which assisted in the patent application, is trying to locate a manufacturer interested in adding the roller to its fire equipment product line.



For more information on the improved fire hose roller, contact Joe Fleming, mechanical engineering technician (phone: 909-599-1267, ext. 263; e-mail: jdfleming@fs.fed.us).

SDTDC Forest Roads and the Environment Video Series Wins Three National Awards

Alan Yamada, SDTDC's engineering program leader, Tony Edwards, SDTDC's project leader, and Jerry Firth, the Boise National Forest's engineering equipment operator foreman, won the 2003 Chief's Technology Transfer Award for their video series, *Forest Roads and the Environment*.

This video project strengthened the reputation of the San Dimas center and the Forest Service as leaders in the development of technology for constructing and maintaining low-volume roads. The videos took highly technical information in the Water/Road Interaction Technology Series and translated it into practical techniques for the field. The result of this technology transfer will be cleaner streams and lakes, improved habitat for aquatic species,

SDTDC Forest Roads and the Environment Video Series Wins Three National Awards *(continued)*

reduced road maintenance costs, and safer roads. The video series also helps road maintenance operators recognize that they are an essential part of accomplishing these goals.

The *Forest Roads and the Environment* video series also received the 2002 Telly Award. This award originally was given to outstanding nontechnical commercials. It was expanded some years ago to include video and film productions. In the past 23 years, winners have come from many agencies, production companies, television stations, and cable operators, as well as from corporate video departments. The Telly is one of the most sought-after awards in the video industry.



In addition, the *Forest Roads and the Environment* video series received the 2002 Communicator Award. This award is recognition by communications professionals of the videos' high standard of excellence.

For more information about the *Forest Roads and the Environment* video series, contact Tony Edwards, project leader (phone: 909-599-1267, ext. 235; e-mail: aedwards@fs.fed.us)

New Fireline Pack

MTDC has developed a new fireline pack designed to be more comfortable to wear and to address the ergonomic concerns of firefighters working on the fireline. Firefighters from many different agencies evaluated prototypes of this pack during the 2001 and 2002 fire seasons. Their suggestions were incorporated in the final design.

The pack can be adjusted to ride low, the preferred position while working on the fireline. The waist belt has hanger loops for attaching a radio, fire shelter carrying case, or canteen case. The fire shelter sleeve and the flap on the bottom of the pack fit the New Generation Fire Shelter and allow quick access to the shelter's pull strap. Four 1-quart water bottles can fit in pockets that are positioned for easy access. The pack's two fusee pockets will hold four fusees each. Pocket flaps fully cover the fusees, holding them securely and complying with the requirements for transportation of hazardous materials aboard Forest Service aircraft.



This improved fireline pack will enable wildland firefighters to carry their equipment more comfortably, reducing muscle fatigue and back problems. The

New Fireline Pack *(continued)*

packs are in the new General Services Administration fire equipment catalog and should be available in early May.

For more information on the new fireline pack, contact Tony Petrilli, project leader (phone: 406-329-3965; e-mail: apetrilli@fs.fed.us).

Fire Shelters Weaken Transmissions From Hand-Held Radios

A study conducted by MTDC shows that when firefighters use their hand-held radios inside fire shelters, the transmissions often are blocked.

When firefighters were inside the shelters and within 50 feet of each other, they could communicate using the older VHF (very high frequency, 30 to 300 megahertz) Bendix-King radios. They could not communicate using the newer UHF (ultra high frequency, 300 to 3,000 megahertz) Motorola Astro XTS 3000 radios.

In either case, the signals were considerably weaker when the radios were used inside the New Generation Fire Shelter rather than inside the standard fire shelter it is replacing.



Newer Motorola radio (left) and Bendix-King radio (right).

Firefighters should not expect to use their hand-held radios when they are trapped inside their fire shelters. They will have to wait until the fire has safely passed before they leave their shelters and try to reestablish communications with each other and with their supervisors.

A tech tip, *Fire Shelters Weaken Transmissions from Hand-Held Radios* (0351-2342-MTDC), available from MTDC, describes the findings in more detail.

For more information on VHF and UHF radio performance in fire shelters, contact Ted Etter, project leader (phone: 406-329-3980; fax: 406-329-3719; e-mail: tetter@fs.fed.us).

An electronic version of the tech tip can be found on the Internet at: <http://www.fs.fed.us/eng/t-d.php?link=pubs/pdfpubs/pdf03512342/pdf03512342dpi300.pdf>

To order the tech tip, contact Cailen Hegman, MTDC publications (phone: 406-329-3978; fax: 406-329-3719; e-mail: cahegman@fs.fed.us).

Maintaining Accountability for Military-Type GPS Receivers

Since 1995, the Forest Service has been able to purchase military-type GPS (global positioning system) receivers. These receivers can receive not only the civilian accessible (CA) signals broadcast from GPS satellites, but also the military P(Y) signals that otherwise are available only to the armed forces. The Forest Service bought nearly 800 of these military-type GPS receivers. They have served the agency well for the past decade in forests and grasslands from Alaska to Puerto Rico.

Until 2000, the accuracy of the civilian signals was purposely degraded by the Department of Defense (DOD). The positioning data was as much as 100 yards in error.

Since 2000, the civilian signal has not been degraded. Now, in open terrain civilian GPS receivers, such as those manufactured by Magellan and Garmin, may be just as accurate as military-type receivers. What's more, the civilian receivers appeal to field personnel because they are smaller and lighter. Some can even be slipped into a shirt pocket.

The military-type receivers are more rugged than their civilian counterparts. In addition, the military-type receivers often provide an accurate position under a heavy tree canopy when a Garmin or Magellan receiver cannot. But, because civilian GPS receivers are more convenient to use, many Forest Service units often are putting military-type GPS receivers into storage.



Trimble Centurion GPS Receiver



Rockwell PLGR GPS Receiver

These military-type receivers are a sensitive item and must be stored in a secure area. They must be accounted for and cannot be put on a surplus list. If a Forest Service unit wishes to get rid of a military-type GPS receiver, the unit must turn the receiver in to MTDC. Property personnel need to be aware of this restriction.

The two military-type GPS receivers used by the Forest Service are the Trimble Centurion and the Rockwell PLGR (pronounced "Pluggger").

Both models usually are army green, with the exception of a few PLGRs that are light tan (sand). The Forest Service has many civilian GPS receivers manufactured by Trimble. They are usually bright yellow and black. The Centurion military-type GPS receiver is the only Trimble product that is green.

If your organization has military-type receivers, is not using them, and foresees no future use for them, return the receivers to MTDC.

For more information on military GPS receivers or how to turn them in, contact Bill Kilroy, communications security custodian at MTDC (phone: 406-329-3925; e-mail: bkilroy@fs.fed.us).

Laboratory Evaluation of Real-Time Smoke Particulate Monitors

Three new real-time smoke particulate monitors were tested by MTDC recently. Monitoring the smoke particulate concentrations generated by prescribed burns and wildland fires is becoming more important as the number of fires increases across the West. Federal, State, and local governments are issuing more frequent and more detailed smoke advisories and health warnings. Determining particulate concentrations in real time is important to health officials.

The instruments tested included two new models developed by MetOne Instruments, Inc., and an improved version of an instrument that had been tested previously, the MIE DataRAM4. The tests were conducted in the Fire Sciences Laboratory's burn chamber adjacent to MTDC's facility. The monitors were placed on a platform within the chamber, and pine needles were burned to produce the smoke. The monitors were calibrated before the tests. A Federal Reference Method gravimetric sampler was used to establish the standard to which the real-time monitors were compared.

The goal of these tests was to determine the accuracy of each instrument and to compare the precision of the different units.

The report on these tests, *Laboratory Evaluation of Real-Time Smoke Particulate Monitors* (0325-2834-MTDC), is available on the Internet at: <http://www.fs.fed.us/eng/t-d.php?link=pubs/pdfpubs/pdf03252834/pdf03252834dpi72.pdf>

For more information on real-time particulate samplers and the test results, contact Andy Trent, project leader (phone: 406-329-3912; e-mail: atrent@fs.fed.us).

To order the report, contact Cailen Hegman, MTDC publications (phone: 406-329-3978; fax: 406-329-3719; e-mail: cahegman@fs.fed.us).

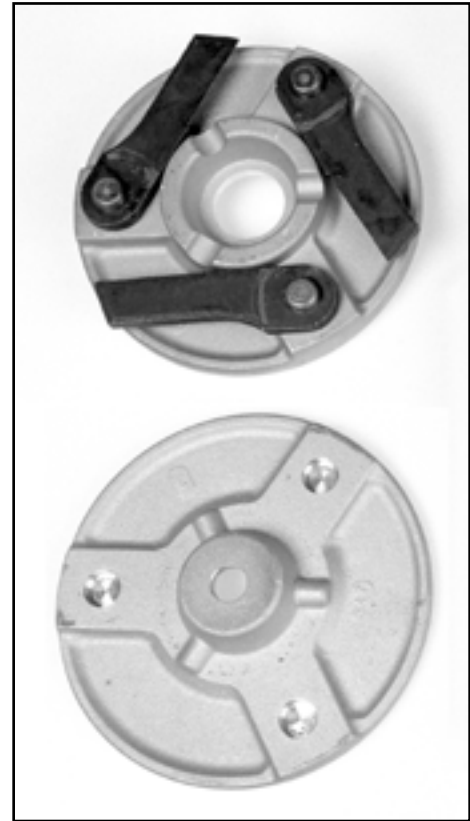


Brush-Clearing Head Evaluated

After large wildfires, the natural regeneration of some pine species can produce extremely thick stands of immature lodgepole and ponderosa pine. Because the stands are so dense, they grow slowly and are susceptible to disease and insects. The stands will naturally thin themselves over time, but that process takes many years. Thinning these stands is an important step in producing and maintaining sustainable ecosystems. MTDC was asked to investigate tools that could be used to thin these stands of immature pine.

A market search uncovered a new brush-clearing attachment for brush-clearing saws that was supposed to eliminate the problems associated with using circular saw blades in dirt and rocks.

This commercial tool is an attachment with an aluminum housing and three replaceable steel blades that make up a flail-type cutting mechanism. The attachment can be used to cut below the ground and around rocks to remove brush and trees smaller than 1 1/4 inches in diameter. The main benefit of this brush-clearing head is its ability to strike the ground and rocks repeatedly without affecting its performance. The blades are designed to shorten as they wear, but do not require sharpening.



The attachment was field tested extensively for 2 years. The results are reported in the tech tip, *Brush-Clearing Head Evaluation* (0324-2336-MTDC, <http://www.fs.fed.us/eng/t-d.php?link=pubs/htmlpubs/htm03242336>).

For more information on the brush-clearing head, contact Andy Trent, project leader (phone: 406-329-3912; e-mail: atrent@fs.fed.us).

To order the tech tip, contact Cailen Hegman, MTDC publications (phone: 406-329-3978; fax: 406-329-3719; e-mail: cahegman@fs.fed.us).

Deterring Bears

Forest Service employees in Southeast Alaska need a more effective way of deterring problem bears without killing them. MTDC was asked to search for a product that would do the job.

Most existing deterrents have limitations. Chemical agents, such as pepper spray in aerosol cans, are designed to be used at close range—10 feet or less. Projectiles, such as rubber bullets, have an unpredictable effect because different bears react differently to pain. Projectiles may induce an attack, especially if the pain is perceived as an annoyance associated with humans. Cracker shells—explosive noisemakers that can be fired from a shotgun—may detonate on the opposite side of a bear, sending it headlong into the shooter.

Detering Bears *(continued)*

Other explosive rounds may disable the bear, making it more dependent on human food sources and leading to future problems.

Field employees requested a 12-gauge shotgun round that could deliver a temporarily disabling chemical at ranges of 10 to 30 yards. Such a round could reduce the chances of permanently injuring a bear while increasing the likelihood that the bear would be deterred. Such a round might also help some bears learn to avoid humans.

MTDC found a new 12-gauge shell that fires a plastic capsule filled with oleoresin capsicum powder. The capsule breaks on impact. The shell is being developed by Pepperball Technologies for police and military use. Although the shell is not available commercially, the company agreed to supply MTDC with some ammunition for testing. The effectiveness of these rounds against Alaskan coastal brown bears is being tested in cooperation with the Alaska Department of Fish and Game and the Yakutat Ranger District of the Tongass National Forest.

For more information on deterrent rounds for bears, contact Gary Hoshide, program leader (phone: 406-329-1029; e-mail: ghoshide@fs.fed.us).



A captive grizzly bear tests a bear-resistant trash container at the Grizzly and Wolf Discovery Center in West Yellowstone, MT.

An Improved Method of Collecting and Monitoring Pine Oleoresin

A new method of collecting and monitoring pine oleoresin has been developed through a cooperative project involving MTDC, Brian Strom of the Southern Research Station, and the Forest Health Technology Enterprise Team. Oleoresin yield has become an increasingly popular measure of the health of pine trees. Oleoresin appears to increase the ability of a tree to resist the attacks of bark beetles and other pests.

In the past, oleoresin has been collected in open containers that allowed samples to be contaminated by rain or falling debris.



An Improved Method of Collecting and Monitoring Pine Oleoresin *(continued)*

Keith Windell, an engineer at MTDC, used *SolidWorks* 3-D modeling software to redesign the sampler. The new collection sampler resists contamination from outside elements and is reliable, inexpensive, and reusable. It represents an important improvement for collecting pine oleoresin.

The new samplers can be ordered from MTDC for about \$1.50 each when ordered in lots of 1,000. They are not kept in stock, so please allow for manufacturing time when ordering.

To order the oleoresin samplers or for more information on the project, contact Dick Karsky, program leader (phone: 406-329-3921; e-mail: rkarsky@fs.fed.us)

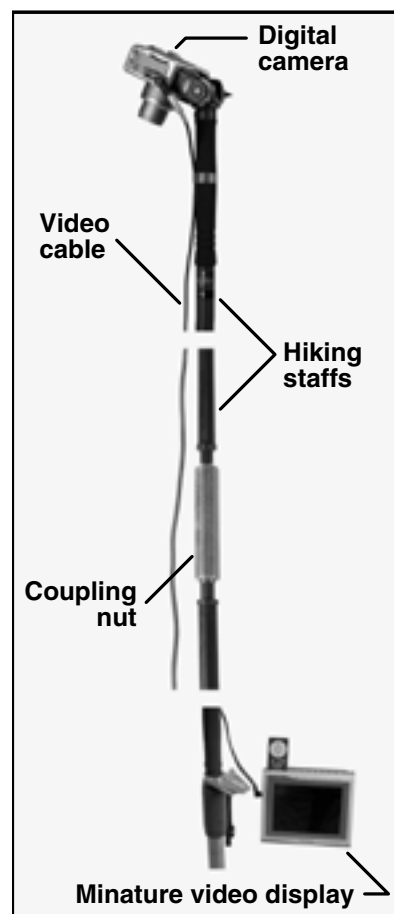
A tech tip describing the new sampler, *An Improved Method of Collecting and Monitoring Pine Oleoresin* (0434-2306-MTDC), is available at: <http://www.fs.fed.us/eng/t-d.php?link=pubs/pdfpubs/pdf04342306/pdf04342306dpi72.pdf>

To order the tech tip, contact Cailen Hegman, MTDC publications (phone: 406-329-3978; fax: 406-329-3719; e-mail: cahegman@fs.fed.us).

Cameras with Altitude for Wilderness Site Monitoring

Wilderness managers and rangers use a variety of monitoring techniques to document changes in vegetation, soil, and resource impacts over a period of years. Repeat photography is an effective method of documenting changes in site conditions. Taking photos from the ground at eye level limits the camera's view and restricts the photo's effectiveness in recording conditions at the site.

The MTDC tech tip, *Camera with Altitude for Wilderness Site Monitoring* (0423-2301-MTDC, http://www.fs.fed.us/eng/t-d.php?link=php/library_card.php?p_num=0423%202301), describes two systems that raise the camera for better viewing of a site. One system uses two hiking sticks and a monopod to raise the camera. This system adds only 3 pounds to a wilderness ranger's pack, assuming the ranger would be carrying a hiking staff anyway. The second system, which is heavier but less expensive, uses an extendable fiberglass painting pole.



The minature video display allows the user to see the view from the digital camera.

Cameras with Altitude for Wilderness Site Monitoring *(continued)*

For more information on elevating cameras, contact Mary Ann Davies, project leader (phone: 406-329-3981; e-mail: mdavies@fs.fed.us).

To order the tech tip, contact Cailen Hegman, MTDC publications (phone: 406-329-3978; fax: 406-329-3719; e-mail: cahegman@fs.fed.us).

Visit SDTDC's Internal Forest Service Web Site

The San Dimas Technology and Development Center has an extensive Web site available to all Forest Service and BLM employees on the Forest Service's internal computer network. This site showcases all of the center's program areas. By clicking on any program area, you are able to view current and completed projects. Additional information for specific program areas is also available. Visit the site at: <http://fsweb.sdtdc wo.fs.fed.us>.



New Web Guide to Help Obligate Funds

According to director of engineering, Vaughn Stokes, in the April 2004 *Engineering Field Notes*, the Forest Service supported fire with \$120 million from construction accounts in 2003. Although supporting fire efforts is a top priority, the Forest Service is obligated to serve the public through funding a wide array of projects.



The T&D program personnel developed a Web-based desk reference, *e-Employment and Acquisitions Guide: Tools to Proactively Obligate Funds*. It provides information on contracting and purchasing goods and services, and employing nonpermanent personnel. It should be used before contacting human resources and acquisition management.

Click on the *Operations* graphic on the SDTDC home page to access this guide.

For information, contact Connie Relph (phone: 909-599-1267, ext. 250, e-mail: crelph@fs.fed.us).

New Faces at the SDTDC



Greg Napper has a bachelor's degree in civil engineering from the University of the Pacific in Stockton, CA. He began working for the Forest Service in 1978, starting on the Stanislaus National Forest as a co-op engineering student. He worked in many different engineering fields at the forest level before becoming a road manager in 1990 and a transportation planner in 1997. Greg joined SDTDC in October 2003.



Carolyn Napper has a bachelor's degree in marketing from Quinnipiac University in Connecticut and a master's degree in soil science from California State Polytechnic University, San Luis Obispo. She served as a Peace Corps volunteer in the Philippines for 5 years before joining the Forest Service. She worked for the Stanislaus National Forest for 10 years, serving as a soil scientist, hydrologist, and range program manager. Carolyn was a forest soil scientist and hydrologist program leader for the Lassen National Forest. She joined SDTDC in October 2003.

Library Card

Kilroy, Bill; Wolf, Jerry Taylor. 2004. T&D News: Number 1, 2004. Tech. Rep. 0471–2828–MTDC. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center. 12 p.

Describes projects that are underway and finished products that are available at the USDA Forest Service's Missoula and San Dimas Technology and Development Centers. Topics in this issue include:

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- SDTDC Forest Roads and the Environment Video Series Wins Three National Awards
- New Fireline Pack
- Fire Shelters Weaken Transmissions From Hand-Held Radios
- Maintaining Accountability for Military-Type GPS Receivers
- Laboratory Evaluation of Real-Time Smoke Particulate Monitors
- Brush-Clearing Head Evaluated
- Deterring Bears
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Keywords: Bendix-King, brush-clearing heads, communications, equipment, evaluations, gravimetric samplers, Motorola, oleoresins, patents, precommercial thinning, real time, roads, samplers, saws, smoke management, tools, Web sites, wood smoke

PROJECT PROPOSAL



Project Name/Title:



Date: _____

Submitted by: _____

Unit: _____

Address: _____

Phone: _____ E-mail: _____

OVERALL PROBLEM/OBJECTIVE STATEMENT *(Describe the problem, how the work is currently being done, and why improvement is needed):*

PROPOSED TECHNOLOGY & DEVELOPMENT WORK *(Describe your concept of the end product: publications, equipment, techniques to be developed or evaluated, or other suggestions):*

POTENTIAL BENEFITS *(Describe how this project will reduce costs, save time, improve safety, increase efficiency, or improve resource management):*



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