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TD NEWS

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Fire

The Pros and Cons of Biodiesel Fuel Use in Diesel Engines

Biodiesel is a nonpetroleum-based fuel that can be used with a few modifications in diesel engines manufactured after 1987. It is an alternative fuel for diesel engines in the USDA Forest Service fleet. Because biodiesel is derived from soybeans or vegetable oils and animal fats, the cooking oils dumped by restaurants and fast food eateries can be used as a source of this fuel.

The tech tip, *Biodiesel Fuel Use in Diesel Engines* (0451-1309P-SDTDC) from the San Dimas Technology and Development Center (SDTDC), describes both the benefits and disadvantages of biodiesel. The U.S. Department of the Interior National Park Service, Channel Islands National Park, and the city of Berkeley, CA, use biodiesel in their fleets of buses, garbage trucks, and utility vehicles.

USDA Forest Service and U.S. Department of the Interior Bureau of Land Management employees can access the SDTDC fire program's Web site at: <http://fsweb.sdtc.wo.fs.fed.us/programs/fire/>

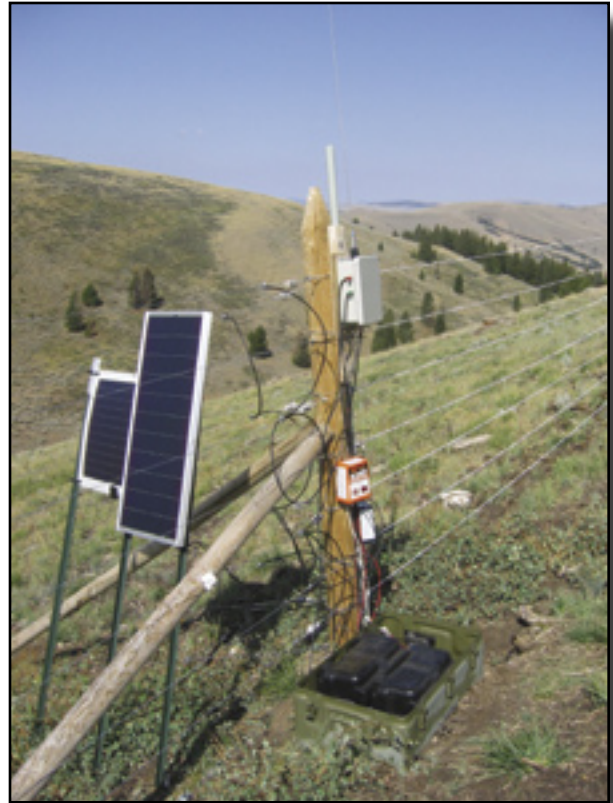
An electronic version of this tech tip can be found at: <http://www.fs.fed.us/eng/pubs/html/04511309/04511309.html>

For more information about biodiesel use, contact Ron Tam, project leader (phone: 909-599-1267, ext. 274; e-mail: rtam@fs.fed.us).



Keeping Elk and Moose Out

The Missoula Technology and Development Center (MTDC) was asked to evaluate various fence materials and designs to keep elk and moose from entering plantations, riparian areas, and aspen regeneration areas. The goal was to design a reasonably priced fence that was durable and easy to install or remove. Three different types of temporary fence were installed on a steep slope near the Continental Divide in the fall of 2002. This location was chosen because large amounts of



snow and high winds make it a worst-case testing ground for weather conditions. The fences installed consisted of two battery-powered electric fences with solar charging systems, and one plastic mesh fence.

The report, *Fencing Out Wildlife: Plastic Mesh Fences and Electric Fences Monitored by Satellite Telemetry* (0424–2838–MTDC), provides information on the materials, costs, and construction of the fences tested. Results of the tests are provided, along with an explanation of how the electric fences are monitored remotely using a satellite transmitter.

For more information on wildlife fences, contact Gary Kees, project leader (phone: 406–829–6753; e-mail: gkees@fs.fed.us).

U.S. Department of Agriculture (USDA) Forest Service and U.S. Department of the Interior Bureau of Land Management employees can view this report on the Forest Service's internal computer network at:

<http://fsweb.mtdc.wo.fs.fed.us/pubs/htmlpubs/htm04242838/>

Others can view the report over the Internet (Username: t-d, Password: t-d) at: <http://www.fs.fed.us/t-d/pubs/htmlpubs/htm04242838/>

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

Facilities Inspection Guide To Help New Engineers

In the past, the USDA Forest Service paired inexperienced facilities engineers with seasoned facilities engineers. As budgets dwindle and the workforce is reduced, on-the-job training opportunities decrease. Now, facilities professionals are typically hired directly from college, from other agencies or firms, or from other engineering specialties. These professionals may not have the in-depth knowledge of building codes and issues affecting Forest Service facilities.

One of the most important duties performed by a facilities engineer is to ensure that appropriate maintenance is performed on Forest Service structures. Proper maintenance enables structures to meet the needs of staffs and visitors and ensures that the structures will realize their full service life.

The facilities condition assessment survey is the primary tool for identifying maintenance problems. The report, *So That's Why It's Always Cold In Here: A Guide for Conducting Facilities Assessment Surveys* (0473-2839-MTDC), leads engineering and architecture staff through the inspection process. This guide will shorten the time new employees need to become proficient in conducting facilities condition assessment surveys.

The report offers an explanation of what a facilities condition assessment survey entails, and what to do with data collected during the survey. It also provides references to some existing "how-to" publications, recommended inspection tools, survey forms, and inspection specifics unique to the Forest Service.

For more information on conducting facilities condition assessment surveys, contact Kathie Snodgrass, project leader (phone: 406-329-3922; e-mail: ksnodgrass@fs.fed.us).

Forest Service and U.S. Department of the Interior Bureau of Land Management employees can view this report on the Forest Service's internal computer network at: <http://fsweb.mtdc.wo.fs.fed.us/pubs/htmlpubs/htm04732839/>

Others can view the report over the Internet (Username: t-d, Password: t-d) at: <http://www.fs.fed.us/t-d/pubs/htmlpubs/htm04732839/>

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



Creating Mulch for Erosion Control

Reducing erosion is an important issue during road construction, road removal, site restoration, and fire rehabilitation. Soil slumping onto roads (making them impassable), plugged culverts and ditches, loss of critical topsoil, and increased sedimentation in streams are just a few of the problems caused by erosion. Meanwhile, trees cleared from road rights-of-way need to be burned or chipped to reduce fire hazard. Could small-diameter trees cleared from road rights-of-way be shredded and used as mulch for erosion control? Engineers at MTDC were asked to evaluate this possibility.



The tech tip, *Shredding Small Trees To Create Mulch for Erosion Control* (0471-2335-MTDC), presents information on three shredding and grinding machines reviewed in the Missoula, MT, area: a Bandit 3680, a Rawlings Manufacturing Grinder, and a Universal Refiner PDR-80-63. Each machine is portable and can be mounted on tracks to reduce the pressure on the ground, limiting soil compaction.

For more information on these machines, contact Scott Groenier, project leader (phone: 406-329-4719; e-mail: jgroenier@fs.fed.us).

USDA Forest Service and U.S. Department of the Interior Bureau of Land Management employees can view this tech tip on the Forest Service's internal computer network at:

<http://fsweb.mtdc.wo.fs.fed.us/pubs/htmlpubs/htm04712335/>

Others can view the tech tip over the Internet (Username: t-d, Password: t-d) at: <http://www.fs.fed.us/t-d/pubs/htmlpubs/htm04712335/>

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

Repairing Concrete Toilets

Precast concrete toilets are virtually indestructible, although cracked panels and peeling paint are a common sight. Vandals, weather, and the nature of concrete itself may take a toll, leaving USDA Forest Service field personnel wondering how best to repair and maintain these toilets and precast concrete utility buildings.



Repairing Concrete Toilets *(continued)*

MTDC randomly inspected about 35 Sweet Smelling Toilets (SSTs) in Idaho, Montana, Wyoming, Colorado, and Nevada. The toilets ranged from 1 to 7 years old. Cracks were found in panels at the sharp angles near doors and windows and at panel connection joints. Paint commonly was seen peeling under the eaves and in areas where concrete was cracking.

Maintenance Issues and Repair Guidelines for Precast Concrete Toilets and Utility Buildings (0471-2334-MTDC) documents the field inspections and describes the best methods and materials for repairing cracks in concrete and coatings. The tech tip also offers information on the two companies currently under contract with the Forest Service to produce concrete SSTs. The tech tip discusses safety and structural issues, as well as warranty and contract issues.

For more information on concrete toilets and utility buildings, contact Gary Kees, project leader (phone: 406-829-6753; e-mail: gkees@fs.fed.us).

Forest Service and U.S. Department of the Interior Bureau of Land Management employees can view this tech tip on the Forest Service's internal computer network at: <http://fsweb.mtdc.wo.fs.fed.us/pubs/htmlpubs/htm04712334/>

Others can view the tech tip over the Internet (Username: t-d, Password: t-d) at: <http://www.fs.fed.us/t-d/pubs/htmlpubs/htm04712334/>

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

Deep Patching Saves Money on Road Repairs

Many Forest Service roads are past their design lives and in dire need of reconstruction. Fill materials often have deteriorated, settled, or crept downhill, cracking and dislodging the pavement. One solution is using a deep patch to repair these distressed road embankments. The

deep patch is a limited-depth earthwork method that uses geosynthetic-reinforced soil materials. The technique is much less expensive than other methods, such as the construction of retaining structures. Deep patching provides a reasonable measure of stability and reduces maintenance costs.

An application guide from SDTDC will review how deep patching has been used in the past and explain how to analyze common road conditions related to problems with fill. Using a series of easy-to-understand graphs, the guide will recommend the depth requirements and reinforcement strengths to use when designing a deep patch. This guide will be available in 2005.



Deep Patching Saves Money on Road Repairs *(continued)*

USDA Forest Service and U.S. Department of the Interior Bureau of Land Management employees can access the SDTDC engineering program's Web site at: <http://fsweb.sdtc.wo.fs.fed.us/programs/eng/>

For more information about deep patch reconstruction, contact Charles Aldrich, project leader (phone: 909-599-1267, ext. 281; e-mail: caldrich@fs.fed.us).

Group Wins Physical Sciences Integration Award

A team of scientists and engineers led by Kim Clarkin, a hydrologist from SDTDC, won the Integration Group Award. The award was presented at the Advancing the Fundamental Sciences Conference in San Diego, CA, during October 2004. This award recognizes the work of USDA Forest Service employees toward integrating the engineering, earth sciences, and geology disciplines into management of public lands.

Clarkin's eight-member team, augmented by regional experts, has been presenting courses stressing habitat connectivity for 2 years. The training focuses on integrating fluvial geomorphology, hydraulics, hydrology, engineering, and biology to construct an artificial streambed inside a culvert or beneath a bridge. Properly designed artificial streambeds can adjust to varying flows like the surrounding natural streambed, allowing all aquatic species to pass through safely. The demand for these workshops continues, and the feedback ratings on course content and instruction are "excellent."

Forest Service and U.S. Department of the Interior Bureau of Land Management employees can access the Aquatic Organism Passage Web site at: <http://fsweb.sdtc.wo.fs.fed.us/programs/eng/aopxing/>

For more information on the Aquatic Organism Passage Project, contact Kim Clarkin (phone: 909-599-1267, ext. 209; e-mail: kclarkin@fs.fed.us).



Forest Health Protection

T&D Employees Attend Agricultural Aviation Convention

Agricultural aviators learned about the Technology and Development (T&D) Program's work in aerial spraying during the National Agricultural Aviation Association's December 2004 convention in Reno, NV. The T&D program has developed a spray droplet visualization CD that allows anyone working with aerial spraying to see the effects of wind drift on different sizes of spray droplets. Gary Kees, a mechanical engineer at MTDC, displayed the visualization on a laptop computer during the convention. The visualization interested not only agricultural

T&D Employees Attend Agricultural Aviation Convention *(continued)*

aviators, but also visiting schoolchildren who crowded around the MTDC booth.

The visualization is based on the Forest Service's AGDISP computer model that predicts spray dispersion based on particle size, wing vortices created by the plane, wind speed, and other factors. Vendors

have been combining the AGDISP computer model with GPS data and aerial onboard weather instrumentation to automate aerial application, potentially increasing its accuracy and efficiency. Vendors continue to test such systems.

Greg Lovellette, a physical scientist who specializes in aerial drop testing for SDTDC, saw innovations in single-engine airtankers (SEATs). SEATs were originally designed for agricultural spraying or fertilizing and seeding. When a fire gate is added to a SEAT's hopper (storage compartment), the tanker can be used to drop fire retardant for wildland firefighting. SEATs were used effectively during the fire season of 2004.



Recreation

Trails Reports CD

The Forest Service Trails Reports 2004 CD (0423-2C03-MTDC) presents the USDA Forest Service's most popular trails technology reports in electronic form in one place for the first time. The CD contains 28 trails-related reports produced by the Forest Service's T&D program in HTML format for easy viewing and in Acrobat (PDF) format for printing. Popular reports on the CD include the *Crosscut Saw Manual*, *Trail Construction and Maintenance Notebook*, *Mountain Bike Accessories for Trail Work*, and *Floating Trail Bridges and Docks*.

Forest Service and U.S. Department of the Interior Bureau of Land Management employees can order the CD by contacting Cailen Hegman, MTDC publications (phone: 406-329-3978; e-mail: cahegman@fs.fed.us).



Trails Reports CD

(continued)

Or you can order the CD by using the order form on the FHWA's Recreational Trails Program Web site at:

<http://www.fhwa.dot.gov/environment/rectrails/publications.htm>

Fill out the order form and fax it to the distributor listed on the form. If you do not have Internet access, send a fax request to 301-577-1421, e-mail your request to: report.center@fhwa.dot.gov, or request by mail from:

USDOT, Federal Highway Administration
Office of Human Environment, Rm. 3240
400 7th St. SW.
Washington, DC 20590

New Faces

New Faces at MTDC



Marion Rackley came to MTDC in 2004 as the support program leader. She began her Forest Service career in the supervisor's office on the Plumas National Forest in 1987 as a mail/file clerk and receptionist. In 1989, Marion accepted a full-time permanent position as the support services supervisor there. In 1992, she moved to the Washington Office as the office manager for legislative affairs. In 1994, she moved to the timber staff, where she was a program analyst supervising the office support staff and the timber budget. In 2001, Marion became the staff program analyst for the WO engineering staff.



Damien Hoffman joined MTDC in December 2004 as a Web intern. He will be assisting the Webmaster with development and maintenance of the center's Web pages. Damien began work with the Forest Service as a computer technician at the Northern Region office in August of 2004. He was born in Morris, MN, and graduated with a bachelor's degree in sociology from the University of Minnesota-Morris. He is a senior at the University of Montana studying wildlife biology.



Andrew (Drew) McNaught joined MTDC in January 2005 as a Web intern. He will be assisting the Webmaster with development and maintenance of the center's Web pages. Drew is originally from the Finger Lakes region of upstate New York and has an associate's degree in English from Corning Community College. He is a senior at the University of Montana studying recreation management.

Library Card

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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:

- The Pros and Cons of Biodiesel Fuel Use in Diesel Engines
- Keeping Elk and Moose Out
- Facilities Inspection Guide To Help New Engineers
- Creating Mulch for Erosion Control
- Repairing Concrete Toilets
- Deep Patching Saves Money on Road Repairs
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- New Faces at MTDC

Keywords: biodiesel, computer models, deep patching, electric fences, elk, erosion, facilities, fences, geosynthetic reinforced materials, hydrology, inspections, mulch, newsletters, precast concrete buildings, repairs, roads, sedimentation, single-engine airtankers (SEAT), slumping, solar charging systems, spray droplet visualization, sweet smelling toilets, toilets, vegetable oils.

Forest Service Technology & Development Program
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, such as a new equipment design, a PowerPoint presentation, a video, a handbook, Web site, CD, etc.):*

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

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TECHNOLOGY AND
DEVELOPMENT
PROGRAM

NEWS

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