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TECHNOLOGY AND DEVELOPMENT PROGRAM

TD NEWS

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WINTER 2001

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Missoula Technology and Development Center

New Retardant Delivery System for the C-130 Airtanker

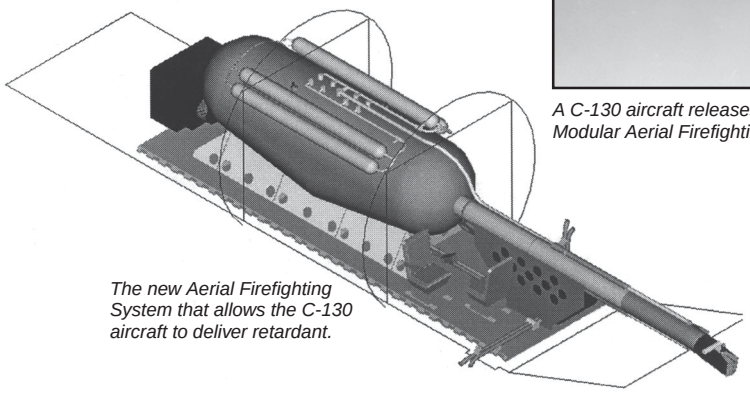
The Forest Service recently awarded a contract to the Aero Union Corp. to manufacture the Aerial Firefighting System for the C-130 aircraft. This system replaces the Modular Aerial Firefighting System, which has been used since 1970. The new system is easily installed in or removed from the aircraft. It is operated by compressed air and releases retardant from the rear of the aircraft. The new system does not require a ground-based compressor for recharging. It will be certified to carry 3,700 gallons of retardant and can deliver partial releases. The system's capacity will be 4,200 gallons. When more powerful C-130's are available, the system may be certified to carry its full capacity. The old system was designed to carry just 3,000 gallons of retardant.

The Aerial Project of the San Dimas and Missoula Technology and Development Centers uses flow rate and drop-test data to ensure that all contracted delivery systems meet Interagency Airtanker Board requirements. Drop tests measure the deposition pattern of retardant released by an aircraft over a large array of plastic bowls in a field. With most gravity systems the relationship between flow rate and coverage level has been determined through experience. Because the new system uses compressed air to evacuate the system's tanks, the Aerial Project plans to conduct drop tests of the prototype in December 2001.

At the request of Aero Union, the Aerial Project will perform a scaled-down drop test near the company's home base in Chico, CA, during March 2001. This test will involve a 1,000-gallon pressurized system. Information gathered during this test will be used to establish the optimum nozzle design and flow rate to ensure satisfactory performance.



A C-130 aircraft releases retardant using the old Modular Aerial Firefighting System.

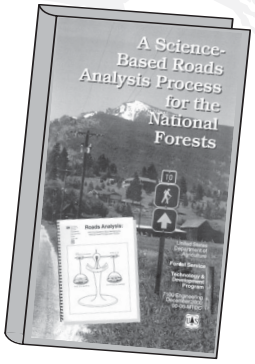


The new Aerial Firefighting System that allows the C-130 aircraft to deliver retardant.

For additional information on the Aerial Fire Fighting System, contact Greg Lovellette:
Phone: 406–329–4815
Fax: 406–329–4811
E-mail: glovellette@fs.fed.us

Missoula Technology and Development Center

Roads Analysis Communication Tools



The new Forest Service Road Management Policy requires science-based interdisciplinary roads analysis. Forest Supervisors must complete forest-scale roads analyses within 2 years. To help field units understand the new policy, and particularly the roads analysis process, the Technology and Development program has distributed an overview video and an explanatory Tech Tip. Regional training sessions are being conducted during February and March 2001.

The video, *A Science-Based Roads Analysis Process for the National Forests,* and a Tech Tip with the same title were mailed to all regions, national forests, and ranger districts during early January. These communication tools are intended for line officers, interested staff, and anyone who will be conducting the road analyses.

For further information about the video or Tech Tip, contact Brian Vachowski:
Phone: 406–329–3935 • Fax: 406–329–3719 • E-mail: bvachowski@fs.fed.us

For information about the training sessions, contact Jeff Moll:
Phone: 909–599–1267, ext. 246 • Fax: 909–592–2309 • E-mail: jmoll@fs.fed.us

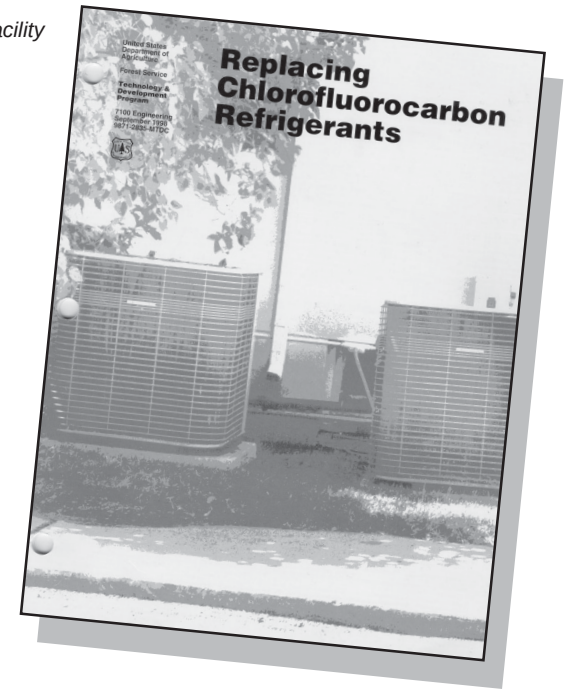
New Air-Conditioner Standards

In January, a tighter energy-efficiency standard was announced for residential-type central air-conditioners and heat pumps. Previous Federal rules required this equipment to have a Seasonal Energy Equivalent Rating (SEER) of 10. The new rule requires a SEER rating of 13, representing about a 30-percent increase in energy efficiency. Recent improvements in air-conditioning technology have allowed increased efficiency.

MTDC's report, *Replacing Chlorofluorocarbon Refrigerants,* 9871-2835-MTDC, is an excellent guide for repairing or replacing refrigeration equipment or air-conditioners. The report includes a glossary of refrigerant terms, an example of a life-cycle cost analysis, and some examples of contract clauses that should be included when negotiating the purchase or lease of new equipment.

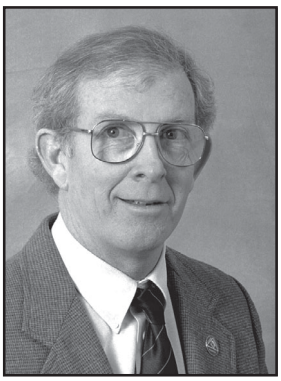
For additional information on facility energy-efficiency programs, contact Steve Oravetz:
Phone: 406–329–1037
Fax: 406–329–3719
E-mail: soravetz@fs.fed.us

To order MTDC publications, contact Emily Ranf:
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Missoula Technology and Development Center

National GEICO Public Service Award



Dick Mangan, recipient of the GEICO Public Service award.

A recently retired employee of the Missoula Technology and Development Center will receive the 2000 GEICO Public Service award. Dick Mangan is being honored for his contributions to wildland fire safety from 1990 to 2000. As Fire Program Leader before his retirement in December 2000, Dick directed projects involving: protective clothing, fire shelters, fitness and work capacity, health hazards of smoke, dozer-plow operator safety, and safe use of ATV's in fire operations. He has investigated many wildland fire entrapments and fatalities, including the South Canyon Fire in Colorado during 1994. Dick led a complex study comparing the heat-flux levels inside engines and inside fire shelters under identical field conditions (*Surviving Fire Entrapments,* 9751–2817–MTDC). He has helped set National Fire Protection Association standards for personal protective equipment for wildland firefighters.

Dick is among five Federal employees who will receive the GEICO Public Service award April 2 in Washington, DC. Ted Putnam and Jerry Jeffries, both retired MTDC employees, also received this award for their contributions to the Forest Service's safety program. GEICO, the Government Employees Insurance Co., has been presenting public service awards to Federal employees for the past 21 years.

Using Value Analysis to Review Airtanker Base Designs

Ed Gililland of the San Dimas Technology and Development Center has been using value analysis to evaluate the design of updates to airtanker bases. Steve Oravetz, the Facilities Program Leader at the Missoula Technology and Development Center, has helped Gililland head the value analysis teams.

The team's decisions have changed the way the bases will be organized and saved several million dollars. Value analysis is an organized method of evaluating an item, process, or system to achieve the required results at optimum costs. Many airtanker bases are being updated to correct deficiencies identified by the 1996 National Study of Large Airtanker Bases. Value analysis takes place during the design phase of the airtanker base, allowing time for changes to be made. The bases are reviewed by a team of five members with airtanker backgrounds. In January 2001, a value analysis team met in Phoenix, AZ, to review the design of four airtanker bases: Chester, CA; Klamath Falls, OR; Helena, MT; and Alamogordo, NM.



Value analysis team evaluating the Missoula Airtanker Base.

The Pacific Northwest Region will be offering value analysis training in September 2001.

For more information on value analysis training, contact John Steward: Phone: 503–808–2413 • Fax: 503–808–2429 E-mail: jsteward@fs.fed.us

You can learn more about value analysis at MTDC's FSweb Intranet web site: http://fsweb.mtdc.wo.fs.fed.us/toolbox/uva/

San Dimas Technology and Development Center

Quarter-Turn Connections for Firefighting Equipment



Quarter-turn connections maximize safety and efficiency by making it easier to connect or disconnect firefighting equipment. These 1- and $1^{1}I_{2}$-inch couplings are interchangeable, with no male or female fittings. They are designed to the same standard for State and Federal agencies in the United States and in Canada. The National Wildfire Coordinating Group, a multiagency fire-equipment leadership group, has determined that quarter-turn coupling technology has an application in current wildland firefighting activities.

The San Dimas Technology and Development Center is developing a Forest Service Specification (5100–192) describing forged quarter-turn couplings. The Center is conducting qualification testing of manufacturers' products and generating a qualified-products list for use by the General Services Administration (GSA). San Dimas is also providing technical support to the Quarter-Turn Implementation Team, a multiagency group consisting of cache managers, engineers, GSA personnel, and firefighters. This team will try to ensure that 1- and $1^{1}I_{2}$-inch threaded connections will be converted to quarter-turn fittings before the 2002 fire season.

A *Quarter-Turn Coupling Technology* report is available from the San Dimas Technology and Development Center. It includes an investigation of quarter-turn technology, a time-and-motion study, and a cost analysis of the conversion to quarter-turn couplings.

For more information, contact Lois Sicking:
Phone: 909–599–1267, ext. 294 • Fax: 909–592–2309 • E-mail: lsicking@fs.fed.us

Recycling Tree Marking Paint

Oil-based tree marking paint (TMP) can no longer be used by the Forest Service. The agency has over 100,000 gallons of oil-based tree marking paint that must be collected, remixed into other colors, and made available for other uses. San Dimas is managing the work. Materials are being collected and remixed at two sites: the Ashe Nursery in Mississippi and the Beaver Creek Nursery in Oregon. All the paint from the Pacific Northwest and Alaska Regions, and most of the paint from the Pacific Southwest Region, has been collected in Oregon. Remixing has begun there. Mississippi has received all the paint from the Northern Region, and some of the paint from the Southern Region. Mississippi has no more room for storage. Remixing is estimated to take over a year.

To learn more about the paint collecting and remixing program, contact Robert Monk:
Phone: 909–599–1267, ext. 267 • Fax: 909–592–2309 • E-mail: rmonk@fs.fed.us

Tree Marking Paint With Citrus Solvent



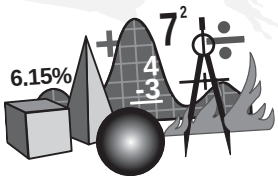
Citrus solvent (extract of citrus) is being considered as a replacement for mineral spirits in tree marking paint. One formulation, a rain-resistant paint, is designed to dry quickly even when the humidity is high. It will not wash off during showers. The citrus solvent has a very strong odor. Concerns have been raised that the paint may attract bears.

San Dimas and the Pacific Northwest Region are working with Charles Robbins of Washington State University to test the new citrus paint on grizzly bears. So far, test observations have not shown that the paint attracts bears. However, tree marking crews operating in grizzly bear habitat should use caution, and report any instances if the paint does appear to attract bears.

To learn more about tree marking paint with citrus solvent, contact Robert Monk:
Phone: 909–599–1267, ext. 267 • Fax: 909–592–2309 • E-mail: rmonk@fs.fed.us

San Dimas Technology and Development Center

San Dimas Documents



Firefighter Math (0051-1802-SDTDC)—This self-paced math course is intended as a primer for the intermediate and advanced firefighter courses S244, S290, and S390. The course fully explains all math concepts related to these courses, including unit conversions, basic surveying, hydraulics, map calculations, location calculations, basic statistics, weather factors, fuels, fire-behavior calculations, and nomograms. Illustrations and examples are included for each concept. A complete solution is provided for all sample problems. Quantities are limited now, but a reprint should replenish stocks by late spring.

USDA Forest Service Wildland Fire Engine Guide (0051-1203-SDTDC)—This guide lists the specifications and features of wildland fire engines. It divides the engines into five classes and compares all engines within each class.

Liquid Tank Baffles Tech Tip (0051-1302-SDTDC)-—This document describes a replacement baffle system for tanks on fire engines. The system can be easily installed in existing tanks without removing the cover or cutting a hole in the tank. Retrofitting tanks with broken baffles or modifying new tanks is easily accomplished. The retrofit does not significantly reduce the tank's volume.

Fuel-Spill Containment Equipment—This slide show on a CD-ROM presents the U.S. Environmental Protection Agency's regulations covering containment of hazardous-material spills. Available equipment is listed. Hot links will allow your web browser to take you to the manufacturer's website.

Synthetic Lead Line Tech Tip (0057-1303-SDTDC)—This Tech Tip discusses the use of nonmetallic lead lines in Forest Service helicopter operations.

Biomechanical Analysis of Grubbing Techniques in the Use of Fire Handtools (0051-1201-SDTDC)—This report is a comprehensive ergonomic analysis of the use of fire handtools, including the combi tool, the pulaski, and the super pulaski. Ergonomics related to foot and hand placement, tool swing, and muscle groups were investigated. Two Tech Tips on this subject will be published in the future.

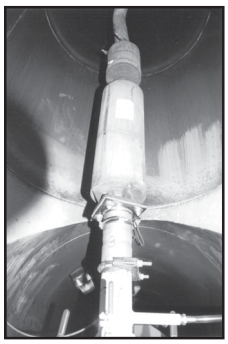
To order San Dimas documents, contact Richard Martinez:
Phone: 909–599–1267, ext. 201 • Fax: 909–592–2309 • E-mail: rmartinez@fs.fed.us

Laboratory Helps in Wildland Fire Investigations

SDTDC's Spark Arrester Laboratory can assist in wildland fire investigations. Spark arresters that are suspected of being faulty can be evaluated in the test chamber. If you wish to submit a spark arrester for evaluation, please include:

- Photos of the spark arrester mounted in the engine.
- Make and model of the engine.
- Engine displacement, horsepower, and maximum revolutions per minute (if available).
- Spark arrester exhaust system.

For additional information on spark arresters or to be added to the distribution list, contact Ralph Gonzales: Phone: 909–599–1267, ext. 212
Fax: 909–592–2309
E-mail: rhgonzales@fs.fed.us



Faulty exhaust system undergoing tests in the Spark Arrester Laboratory.

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