

Problems Solved by the Missoula Technology and Development Center

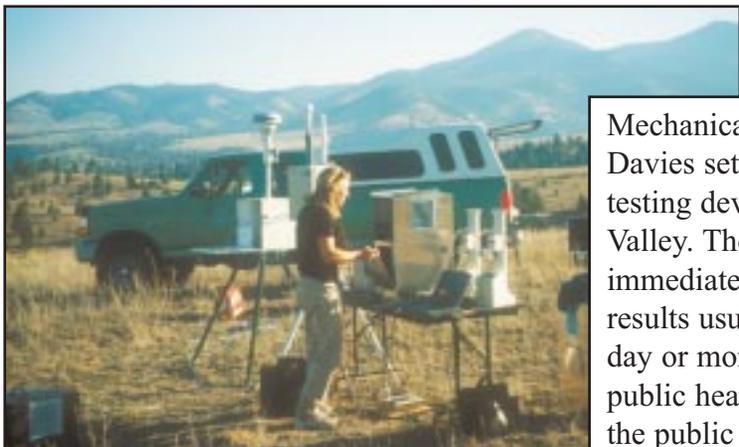
Although these photographs show boat ramps, parachutes, all-terrain vehicles, and similar devices, the products the center produces are often prototypes. Mechanical drawings, specifications, reports, videos, Web sites, and CDs allow others to reproduce the center's successes. Each year, the center distributes more than 100,000 copies of its reports, videos, CDs, and technical drawings.



Traditional skills, such as felling trees with a crosscut saw, are lost as experienced Forest Service employees retire. The center helps maintain these skills by producing videos, publishing reports, and preparing training materials.



Firefighters rappel from helicopters using equipment developed by the center. The use of rappelling has been growing in recent years.



Mechanical engineer Mary Ann Davies sets up portable air quality testing devices in the Bitterroot Valley. These devices give results immediately. With standard devices, results usually aren't available for a day or more. With the new devices, public health officials could notify the public the moment air quality deteriorates.



Center personnel conduct a pull test for the Federal Aviation Administration during the 1980s. This test shows that the center's anchor for parachute static lines can safely handle anticipated loads. Nearly every smokejumper aircraft used by the Forest Service has been equipped with modifications designed by the center.

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Forest Service smoke-jumpers have softer landings and can get closer to their target using a new parachute developed by the center in cooperation with a parachute design firm. The parachute is the first round chute that can fly backward. It has been so successful that it has also been adopted by the U.S. Army.



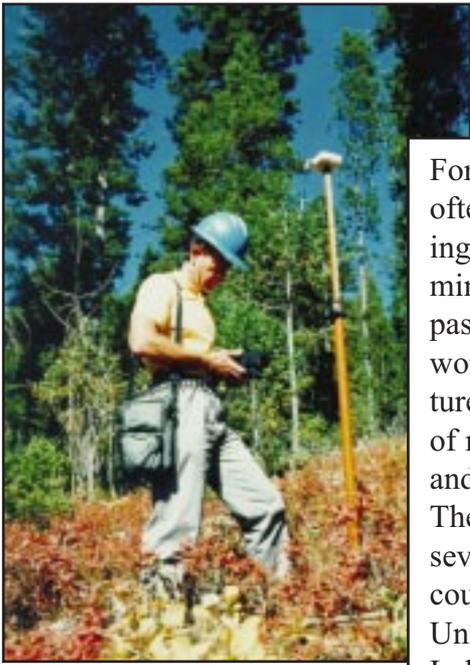
Physiologist Dr. Brian Sharkey measures the extra work required for a firefighter to breathe while wearing a respirator at the University of Montana's Human Performance Laboratory. Among the results of Sharkey's studies for the center over the past three decades have been the step and pack tests that measure the fitness of firefighters. Now, Sharkey and his colleagues at the university are studying the effects of the arduous duties of firefighting on immune function and fatigue.



Special panniers make it easier to carry and dump gravel during trail construction in the backcountry. Trail construction is also aided by drawings of equipment for pack stock, a series of videos, and a trail construction notebook published by the center.



All chemical products (such as retardants, foams, and gels) for wildland firefighting must be proven safe and effective before the Forest Service qualifies them for use. This wind tunnel test of the effectiveness of fire retardant is one of many tests the center conducts on each product.



Forest Service employees often rely on global positioning system receivers to determine their location. Over the past 20 years, the center has worked closely with manufacturers to improve the accuracy of receivers under tree cover and in mountainous terrain. The center tests receivers at several carefully surveyed test courses, including one at the University of Montana's Lubrecht Experimental Forest 30 miles east of Missoula.

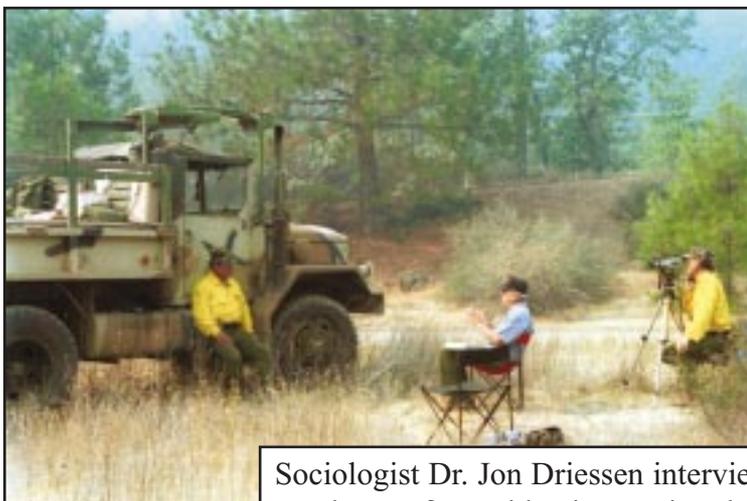


The Forest Service needs effective ways to start fires as well as to put them out. In some cases, helicopters carrying torches that dispense gelled gasoline are safer and quicker than the alternative of having firefighters on the ground do the job.



Operators on all-terrain vehicles can maintain lanes and trails using accessories developed by the center.

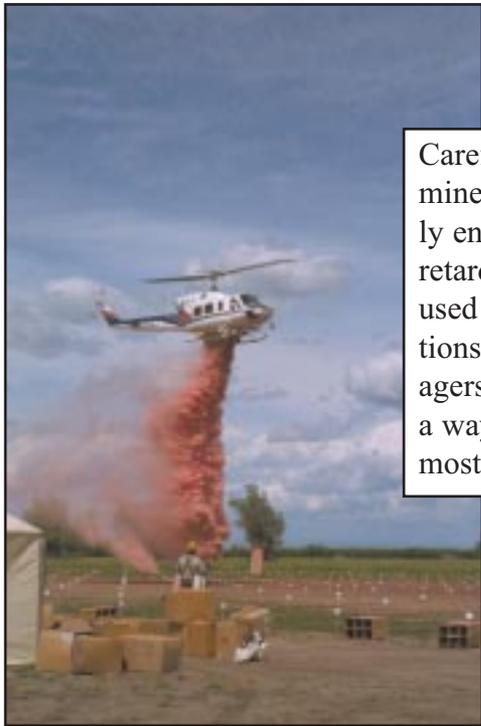
This prototype machine injected steam into the soil at Forest Service nurseries, killing disease organisms. The machine was developed to reduce the need for fumigation with ethyl bromide. Although the prototype worked, it would need a larger boiler to be practical.



Sociologist Dr. Jon Driessen interviews experienced employees for a video instructing drivers who transport firefighters to wildland fires. Over the past three decades, Driessen, a University of Montana professor, and his graduate students have conducted studies that formed the basis for training programs to help Forest Service employees adapt to a changing workplace.



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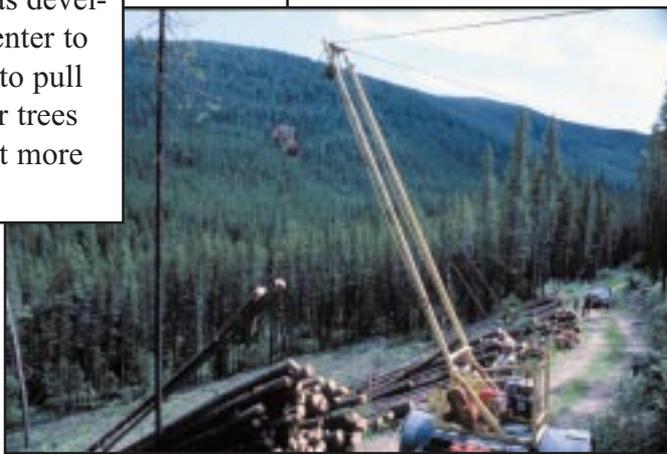


Carefully conducted tests determine how much retardant actually ends up on the fuels when retardant delivery systems are used under a variety of conditions. These tests allow fire managers to order retardant drops in a way that's likely to do the most good for the least cost.

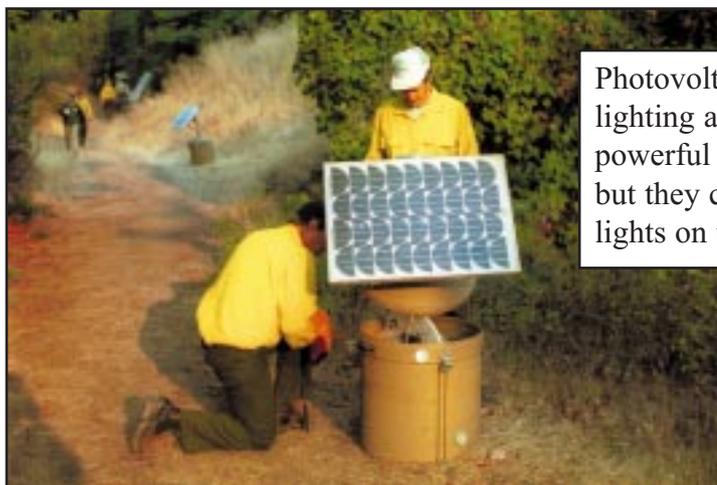


Accessible loading platforms make it easier for people with limited mobility to get in and out of boats. Once boaters have boarded, the boat is backed to the water for launching. This platform and drawings were developed by the center.

Unlike most commercial yarders, the Bitterroot miniyarder is small enough to be hauled behind a pickup truck. It was developed by the center to allow loggers to pull small-diameter trees from the forest more economically.



The center's fabrication shop allows us to produce prototypes of new products.



Photovoltaic cells are being tested for lighting at fire camps. The cells aren't powerful enough to replace generators, but they can quietly charge batteries for lights on trails to sleeping areas.