

Engineering, Recreation Tech Tips

USDA United States Department of Agriculture
Forest Service



Technology &
Development Program

February 2005

7100/2300

0571-2311P-MTDC

New Accessible Handpump for Campgrounds

Tyler Kuhn, Mechanical Engineer, and Bob Beckley, Project Leader

The Forest Service is committed to making its campgrounds and recreation sites accessible to individuals of all abilities. National and regional accessibility coordinators have been working with the Forest Service Technology and Development program to identify accommodation needs.

One recurring need has been an accessible handpump (figure 1) for potable water in Forest Service campgrounds and recreation sites.



Figure 1—The first Forest Service accessible handpump was installed on the Lolo National Forest in the fall of 2002.

The Missoula Technology and Development Center (MTDC) conducted an indepth market search and found that no hand-operated water pumps met the Americans With Disabilities Act (ADA) standards. The ADA Accessibility Guidelines (14.15.4) require that an accessible handpump must operate with a maximum force of 5 pounds. The pump's control heights should be between 28 and 40 inches from the ground. Industrial managers contacted by the center felt that private development of an accessible handpump was not economically feasible because the market was too limited.

MTDC designed and built an accessible handpump that meets ADA requirements. It operates with no more than 5 pounds of force (figure 2), and its handle is easy to reach and operate from a wheelchair.



Figure 2—Lightweight fiberglass pump sucker rods help the accessible handpump meet the 5-pound maximum force requirement of the Americans With Disabilities Act.

The center built 12 accessible handpumps for field testing. They were installed at these locations:

- **Tioga Lake Campground**
Inyo National Forest, Lee Vining, CA
Contact Steve O'Connor, phone: 760-937-8427
- **Bonfils-Stanton Outdoor Recreation Center**
Winter Park, CO
Contact Beth Fox, phone: 970-726-1646
- **Grouse Campground**
Payette National Forest, McCall, ID
Contact Wayne Hersel, phone: 208-634-0740
- **Norton Campground**
Lolo National Forest, Rock Creek, MT
Contact Al Hilshey, phone: 406-329-3970
- **Holy Ghost Campground**
Santa Fe National Forest, Pecos, NM
Contact Carol Linn, phone: 505-438-7879
- **Elizabeth Furnace Campground**
George Washington National Forest, Edinburg, VA
Contact Barry Stata, phone: 540-265-5192
- **Woodbine Recreation Area**
Monongahela National Forest, Richwood, WV
Contact Mary M. Smakula, phone: 304-636-1800, ext. 260
- **Five campgrounds** (Rawlings Field Station, BLM)
Rawlings, WY
Contact Mike Jensen, phone: 307-328-4380

All of the pumps were installed (figure 3) between the fall of 2002 and the summer of 2004. They have performed with few problems.

The accessible handpump uses a rotary crank that has an offset weight to ease its operation. When the weight is going down, the pump's piston is coming up. When the weight is going up, the piston is going down. As a result, although 10 pounds of force is available when the water is being lifted, the user applies an even 5 pounds of force throughout the rotation of the pump's handle. The pump has relatively few moving parts.

The pump needs to be adjusted based on the water depth at a particular site. The deeper the water, the more force that is required to lift water to the surface. A pin allows the pump to be adjusted to determine how much force is generated with each rotation of the handle. The deeper the well, the more times the handle will have to be rotated to pump a given amount of water. The pump works best when the well is less than 60 feet deep. The pump can produce an average flow rate of about 1.5 gallons a minute (figure 4).

The pump's handle has been approved for use with a closed fist. A demonstration of the pump in use can be viewed at the Technology and Development Internet site: <http://www.fs.fed.us/t-d/programs/eng/handpump.htm>.



Figure 3—The accessible handpump is easily installed on standard well casings.



Figure 4—Water flows an average of 1.5 gallons per minute.

The Forest Service received a patent on the pump (figure 5). Other Federal agencies have expressed a need for an accessible handpump, not only for public lands and sites in the United States but also for use in developing countries.

Forest Service units hoping to use an accessible handpump should ensure that the selected sites are accessible. For further information on the accessible handpump, contact MTDC.

Ordering an Accessible Handpump—The Simple Pump Co., is now manufacturing an accessible handpump, the ADA 100 Handpump. To contact the company:

Simple Pump Co.
1140 Amarillo Drive
Gardnerville, NV 89460
Phone: 877-492-8711
Web site: <http://www.simplepump.com>

Other companies have expressed an interest in manufacturing an accessible handpump.

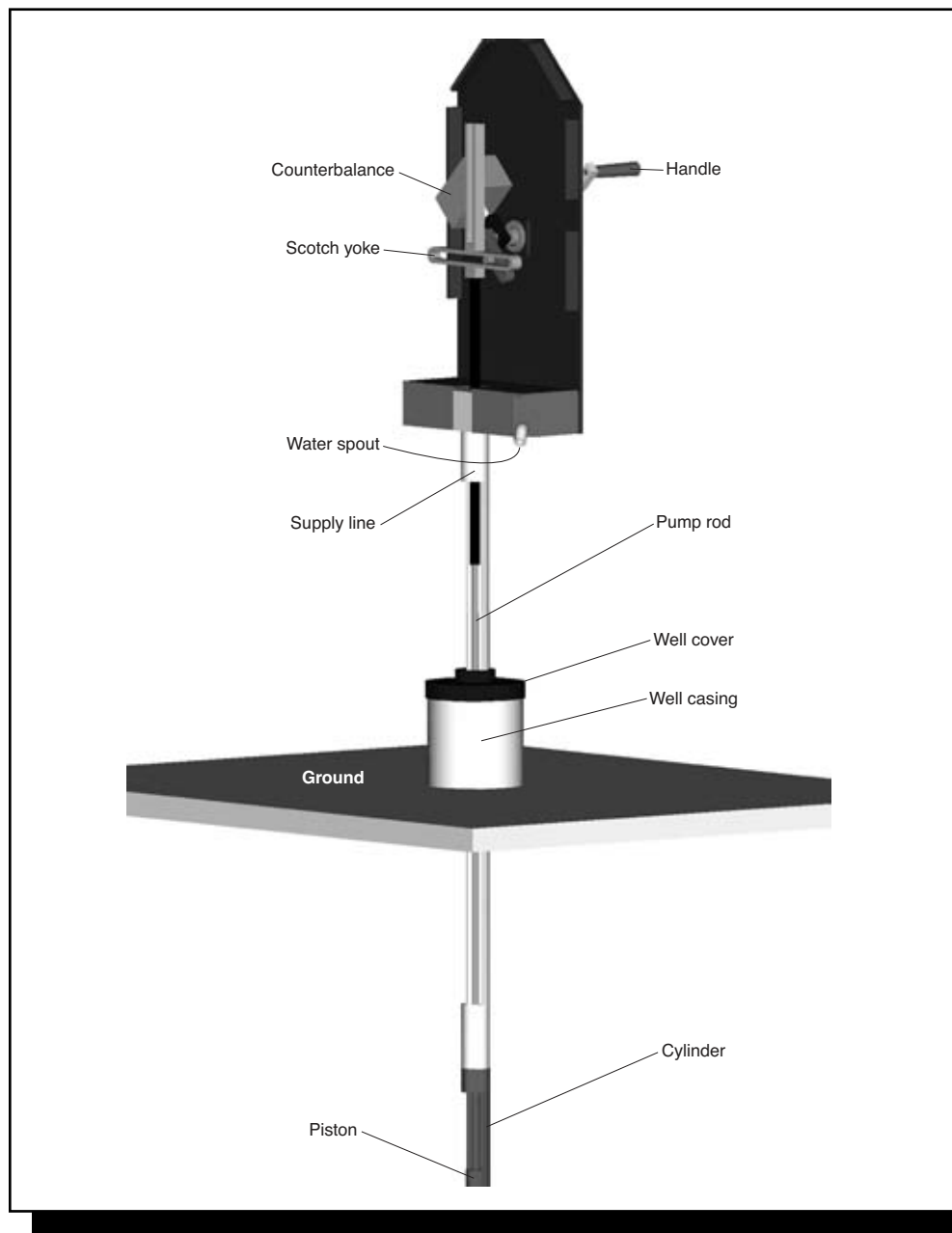


Figure 5—The inner workings of the patented prototype of the accessible handpump. The ADA 100 handpump looks slightly different, but works the same way.

About the Authors

Tyler Kuhn began working at MTDC as an intern in 2000. He received a bachelor's degree in mechanical engineering from Montana State University in 2001 and works for the center as a mechanical engineering technician.

Bob Beckley received a bachelor's degree in political science from the University of Montana in 1982. He began his Forest Service career as a timber technician on the Nez Perce National Forest. Beckley was a smokejumper when he came to MTDC in 1990. He works as a project leader, public affairs specialist, and blaster.

Library Card

Kuhn, Tyler; Beckley, Bob. 2005. New accessible hand-pump for campgrounds. Tech Tip 0571–2311P–MTDC. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center. 4 p.

Describes an accessible handpump for pumping water from shallow wells (less than 60 feet deep) at campgrounds or other areas with wells. The rotary pump can be operated with just 5 pounds of force and its handle is easily reached by a person in a wheelchair. Water flows at about 1.5 gallons per minute. A dozen accessible handpump prototypes

were manufactured by the Missoula Technology and Development Center for field testing at U.S. Department of Agriculture, Forest Service and U.S. Department of the Interior, Bureau of Land Management campgrounds in eight States. The pump is now being manufactured commercially as the ADA 100 by the Simple Pump Co. in Gardnerville, NV, (<http://www.simplepump.com>). This tech tip updates Accessible Handpump for Forest Service Campgrounds (0371–2333–MTDC).

Keywords: accessibility, hand pump, water supply, wells

Single copies of this document may be ordered from:

USDA Forest Service
Missoula Technology and Development Center
5785 Hwy. 10 West
Missoula, MT 59808–9361
Phone: 406–329–3978
Fax: 406–329–3719
Email: wo_mtdc_pubs@fs.fed.us

Forest Service and Bureau of Land management employees can search MTDC's documents, videos, and CDs on their internal computer networks at:

<http://fsweb.mtdc.wo.fs.fed.us/search/>

For technical information, contact MTDC.

Phone: 406–329–3900
Fax: 406–329–3719

Electronic copies of MTDC's reports are available on the Internet at:

<http://www.fs.fed.us/eng/pubs>



The Forest Service, United States Department of Agriculture (USDA), has developed this information for the guidance of its employees, its contractors, and its cooperating Federal and State agencies and is not responsible for the interpretation or use of this information by anyone except its own employees. The use of trade, firm, or corporation names in this document is for the information and convenience of the reader and does not constitute an endorsement by the Department of any product or service to the exclusion of others that may be suitable.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.