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Equip Tips

U. S. DEPARTMENT OF AGRICULTURE — FOREST SERVICE EQUIPMENT DEVELOPMENT CENTER — SAN DIMAS, CALIFORNIA

A HELICOPTER SERVICED TOILET SYSTEM

Toilet facilities are often desirable in difficult locations where on-site treatment is impossible and where vehicle access is not feasible for the usual pumping and hauling operation. Examples are island campsites, trail access observation sites, back country high elevation campsites (not in Wilderness), and fire lookouts. Helicopters can sometimes be used to advantage in these situations to transport sewage.

In 1972 a toilet system was developed, installed, and serviced by helicopter at a 12,000-ft elevation trail camp. The equipment was designed and built by Superior Fiberglass, Inc. to criteria furnished by the Mt. Whitney Ranger District and the San Dimas Equipment Development Center.

The toilet facility consists of a portable fiberglass toilet building with a number of 30-gallon capacity holding tanks which, when full, can be removed from under the toilet seat, covered, and stored until helicopter transportation is scheduled. The system has these additional features:

1. Rough exterior texture; granite gray color.
2. Smooth gel-coat interior finish.
3. No roof for maximum self-cleaning, disinfection and ventilation.
4. Spring latch door lock to prevent wind damage.
5. "D" rings for transporting by helicopter.
6. Locking holding tank compartment.
7. Aluminum skid rails to help slide out a full holding tank.
8. Individual covers for each holding tank.
9. Three handles on each holding tank to facilitate handling.

A high elevation trail camp with extremely heavy use was selected to test the toilet system. The toilet and eight holding tanks weighing 365 lb were transported 13 miles and 8300 vertical ft to the trail camp late in June by a Bell 47G3B-1 helicopter and a pilot experienced in mountain flying. The toilet was serviced and holding tanks changed by one man until the tanks were full and servicing was needed early in August. Servicing was done with an Army UH-1 (Bell 204B) helicopter with an Army crew. Holding tanks were flown singly to a road turnout, 5 miles and 5600 vertical ft distant, where they were pumped, cleaned and disinfected before being flown back to the trail camp. The toilet was maintained until late in September when all eight full holding tanks were flown out one at a time using the Bell 47G3B-1 and pilot that had been used in June.

Figure 1. Superior Fiberglass Inc., toilet system installed with seven holding tanks in reserve.

Operational costs during the summer were about $863. (The Army UH-1 helicopter was free). About 420 gal of sewage were removed from the trail camp. This summarizes to about $2.00 per gal or about $0.25 per visitor use. Costs would have been significantly higher had not the Army helicopter been available free of cost. Costs would also be higher if a recreation aid had to be added to maintain the toilet. In the test an aid was available in the area and presumably the presence of the toilet made some of his other cleanup and policing duties less time-consuming.

Figure 2. Holding tank partially removed from compartment.

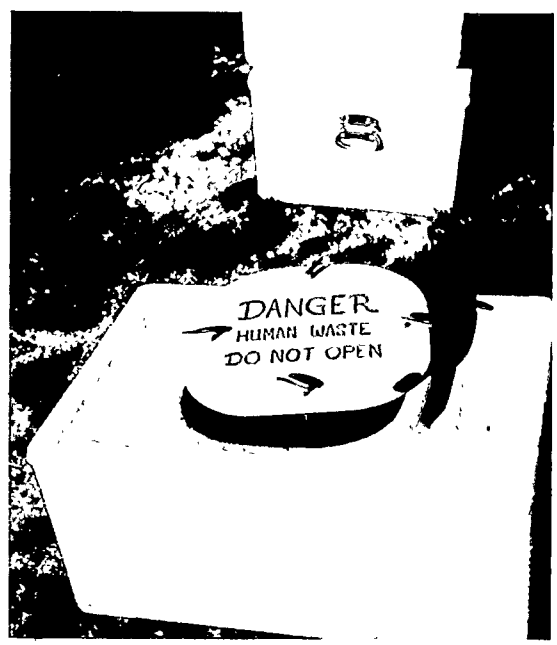

Figure 3. Holding tank cover detail.

The toilet system can be obtained from Superior Fiberglass, Inc., 513 West 8th South, Salt Lake City, Utah. The toilet is designated the "Port-A-Hole Model 103" at about $310 each. Holding tanks are ordered separately and are $51 each.

The choice of helicopter and pilot to service this kind of toilet system is very important. Performance of various helicopters at various density altitudes can be found in performance curves in "National Air Operations Guide," and the "Fireline Notebook."

Figure 4. Lift-off of a full holding tank. The toilet structure is on its side in order to clear the tail rotor.

Usually, large turbine-powered helicopters such as are available from the military are severely degraded in performance at high altitudes, especially when air temperature is above normal. Coupled with this, military crews are usually not proficient in high mountain flying. The Bell 47G3B-1 or B-2 turbo-supercharged helicopters, which are commonly under fire fighting contract, maintain their performance very well at high altitudes, and usually come with a pilot experienced in mountain flying.

Two other toilet systems are available for use with helicopter transport. Both use 50-gal subsurface vaults, and therefore require helicopter servicing or some other 450-lb capacity lifting device in order to change vaults. One is manufactured by Sims Fiberglass Co., Jefferson, Oregon, and was extensively tested in Rocky Mountain National Park during the summer of 1972. The other is available from Helicopter Air Transport Service, Inc., Lancaster, New Hampshire, and is used in conjunction with the A.M.C. Hut System in the White Mountains of New Hampshire.