

GWPD 6—Recognizing and removing debris from a well

VERSION: 2010.1

PURPOSE: To recognize when a well contains debris and how to remove the debris from the well.

Materials and Instruments

1. Steel tape graduated in feet, tenths and hundredths of feet, or an electric tape
2. Blue carpenter’s chalk
3. Clean rag
4. Mirror
5. Flashlight
6. Pencil or pen, blue or black ink. Strikethrough, date, and initial errors; no erasures
7. Field notebook
8. Water-level measurement field form or handheld computer for data entry
9. A grappling device with wire line or heavy duty treble fishing hook and rope
10. Safety equipment: gloves, safety glasses, first-aid kit

Data Accuracy and Limitations

1. Debris that is present in a well can affect the plumbness of the tape and cause errors in water-level measurements.
2. The quality of water-level data from a well is directly related to well maintenance.
3. Success rate for this procedure increases with increasing well diameter and decreasing well depth.

Assumptions

1. Individual has been trained to make water-level measurements with a graduated steel tape (GWPD 1) or an electric tape (GWPD 4).
2. State or local ordinances do not prevent retrieval of an item in a well.

Instructions

1. Make a water-level measurement as described in GWPD 1 or GWPD 4. Lack of agreement between the original water-level measurement and subsequent water-level check measurements could indicate that the well contains debris. If the measuring tape goes slack as it is being slowly lowered into the well, the weight or probe probably has encountered debris in the well.
2. To check for debris on a sunny day, use a mirror to look into the well. Hold the mirror in the hand and rotate it back and forth until the proper angle is obtained to allow the sun to reflect off the mirror and down the well onto the water surface.
3. If the well is located in a dark enclosed area away from the sun, or the weather is overcast, use a flashlight to look down the well for debris.
4. To remove light- to medium-weight wood debris from a well, use a simple inexpensive device such as a heavy duty treble fishing hook attached to a rope. Lower the hook down the well while using the mirror to see when the hook is below the debris. To remove the debris from the well, move the rope upward with a quick jerking motion until the wood debris becomes snagged on the treble hook. Slowly remove the rope and debris from the well. If the object is below the water surface where it cannot be seen, feel for the debris while trying to snag it.

5. To remove heavy wood or debris that cannot be snagged, use a grappling device similar to a pair of ice tongs. The device shown in figure 1 has been designed and used to remove debris from wells effectively and easily. This type of device can be used to remove blocks of wood, stones, cans, bottles, pipes, and poles from wells and can be constructed by a machine shop from the photographs shown in figure 1. To remove debris from a well, cock the device in the open position (fig. 1*B*) and lower into the well on a suspension cable that is fastened to a shackle. When the tripping rod strikes the debris in the well, the rod pushes upward on the locking bar, releasing it, and the spring opposite the locking bar (fig. 1*B*) pulls the arms together. Figure 1*C* shows the grappling device in the closed position grappling a heavy object (15 pounds). The weight of the debris being lifted from

the well holds the arms together. The heavier the object, the tighter the arms grip. In case the tripping rod will not close the arms, the arms can be closed from the surface by attaching a line at the pivot point of the locking bar. Lower the grappling device into the well and pull on the line connected to the locking bar when the arms are in the desired position. The arms will close around the debris without the aid of the tripping rod.

Data Recording

Data are recorded in a field notebook and on a water-level measurement field form (fig. 2).

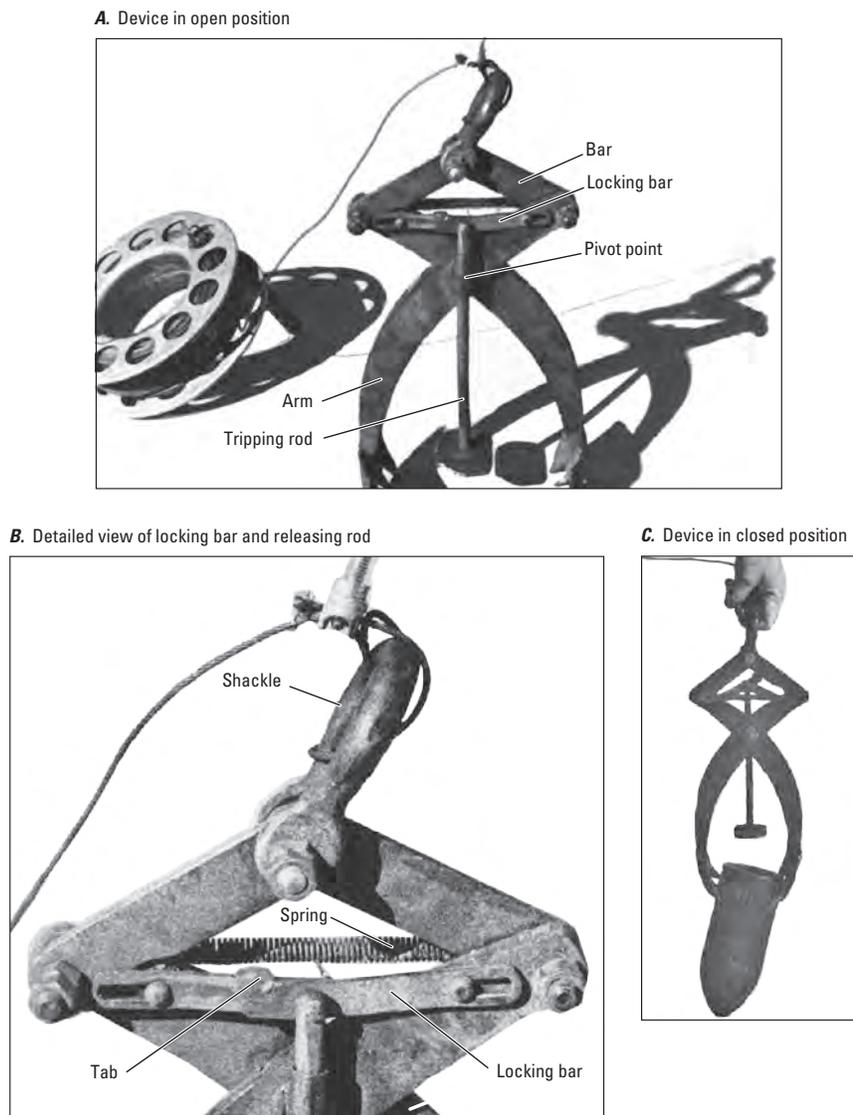


Figure 1. Grappling device for removing debris from wells (Bader, 1966).



WATER-LEVEL MEASUREMENT FIELD FORM

Steel Tape Measurement



SITE INFORMATION

SITE ID (C1) Equipment ID Date of Field Visit

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Station name (C12)

WATER-LEVEL DATA

	1	2	3	4	5
Time					
Hold					
Cut					
Tape correction					
WL below MP					
MP correction					
WL below LSD					

Measured by _____ COMMENTS* _____

*Comments should include quality concerns and changes in: M.P., ownership, access, locks, dogs, measuring problems, et al.

MEASURING POINT DATA (for MP Changes)

M.P. REMARKS (C324)	BEGINNING DATE (C321)	ENDING DATE (C322)	M.P. HEIGHT (C323) NOTE: (-) for MP below land surface																																								
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Final Measurement for GWSI

WATER LEVEL TYPE CODE (C243)

L	M	S
below land surface	below meas. pt.	sea level

DATE WATER LEVEL MEASURED (C235)	TIME (C709)	STATUS (C238)	METHOD (C239)	TYPE (C243)	WATER LEVEL (C237)																																																													
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METHOD OF WATER-LEVEL MEASUREMENT (C239)

A	B	C	E	G	H	L	M	N	R	S	T	V	Z
airline,	analog,	calibrated airline,	estimated,	pressure gage,	calibrated press. gage,	geophysical logs,	manometer,	non-rec. gage,	reported,	steel tape,	electric tape,	calibrated elec. tape	other

SITE STATUS FOR WATER LEVEL (C238)

D	E	F	G	H	I	J	M	N	O	P	R	S	T	V	W	X	Z	BLANK
dry,	recently flowing,	flowing,	nearby flowing	nearby recently flowing,	injector site,	injector site monitor,	plugged,	measurement discon.,	obstruction,	pumping,	recently pumped,	nearby pumping,	nearby recently pumped,	foreign substance,	well destroyed,	surface water effects,	other	static

Figure 2. Water-level measurement field form for steel tape measurements. This form, or an equivalent custom-designed form, should be used to record field measurements.

References

- Bader, J.S., 1966, Device for removing debris from wells, *in* Mesnier, G.N., and Chase, E.B., comps., Selected techniques in water resources investigations, 1965: U.S. Geological Survey Water-Supply Paper 1822, p. 43–46.
- Cunningham, W.L., and Schalk, C.W., comps., 2011a, Groundwater technical procedures of the U.S. Geological Survey, GWPD 1—Measuring water levels by use of a graduated steel tape: U.S. Geological Survey Techniques and Methods 1–A1, 4 p.
- Cunningham, W.L., and Schalk, C.W., comps., 2011b, Groundwater technical procedures of the U.S. Geological Survey, GWPD 4—Measuring water levels by use of an electric tape: U.S. Geological Survey Techniques and Methods 1–A1, 6 p.