

## Buffalo Seismic Source



**! WARNING: !**

**Seismic energy sources can be harmful if used incorrectly. Please read instruction carefully before use. No liability for damage or injury will be accepted due to the misuse of this device.**

# Safety

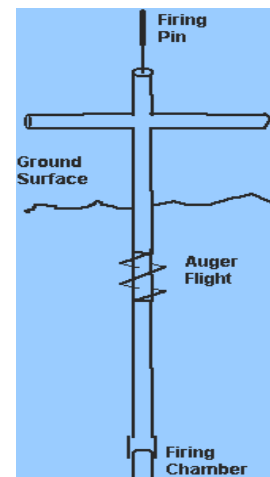
- Shotgun cartridges used are all blanks but can still cause injury if accidentally fired. Treat them gently and keep live cartridges in a dry covered box.
- Never place firing pins in the buffalo before the buffalo is inserted in the ground.
- Never lean over the buffalo when it is being fired.
- Beware of back injury and muscular strain if trying to use brute force to insert or remove buffalo from the ground.

Follow these instructions carefully. This instrument is quite safe if used properly but it can be dangerous if misused. Please ensure that all persons who use the instrument are properly trained.

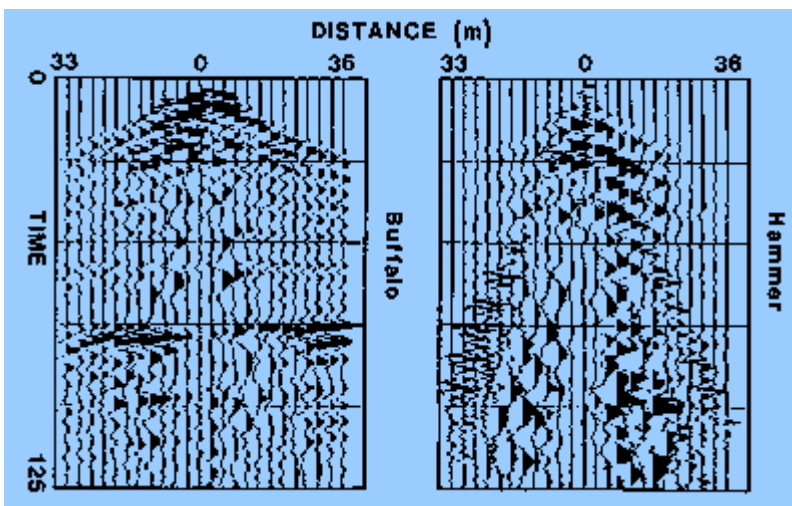
## Buffalo Seismic Source Efficient, Safe, Cheap

Quality seismic data, especially seismic reflection, requires a repeatable, efficient seismic source generating a high-frequency, high-energy pulse and low source generated noise. The buffalo can satisfy these criteria, and be tuned to the exact application by varying firing depth, cartridge load and number of stacks. The buffalo is supplied complete with trigger switch, ready to use. Firing below the surface gives the advantages of:

- Lower near-source attenuation
- Higher frequency P-waves
- Reduced Ground-Roll
- Reduced Airwave



Comparison with the sledge-hammer in a wide variety of geological situations confirms the advantages of the Buffalo as shown in Figure 2



## Buffalo Seismic Source Description

An auger-fitted Buffalo may be used as a source of high-frequency seismic energy.

It consists of five component parts:

- 1) A tube 1.5 m in length, 38 mm in diameter with the bottom end threaded internally to allow the cartridge chamber to be screwed in. Cross handles are screwed into a block at the top of the tube. An auger thread is added to the tube to help to drive the device deeper into the ground to ensure good coupling and to prevent recoil and escape of high pressure gas.



- 2) A cartridge chamber comprising an 80 mm long steel cylinder machined internally to house a 12-gauge blank shotgun Cartridge. This is fitted to the buffalo's tube by a screw thread.



- 3) A firing pin made from thin stainless steel rod inserted inside the main tube where its tip is kept clear of the primer cap of the cartridge by a spring and safety clip.



Safety clip and spring



Firing pin

- 4) Trigger switch constructed from Stainless steel fits into the cross handle of the energy source.



5) Cross handles are removable from the

Buffalo body to aid transportation. It is important to ensure threads are not damaged as this will make assembly difficult.



### Operating procedure.

1. Ensure the cartridge chamber is empty.
2. Ensure the buffalo is clean internally with no mud or rust particles which may obstruct the firing orifice between the shaft and the chamber.
3. Remove the firing rod from the main tube and ensure that the safety clip is in the correct position below the spring. This provides positive security against accidental firing.
4. To remove the firing rod from the main tube (see Fig.3).

a) Pull up on the disc at the top of the firing rod and rotate the disc until the notch in the bottom safety disc lines up with bottom safety pin. This will allow the firing rod to move out of the tube by about 30mm at which point the top safety disc hits the top safety pin.

b) Pull the firing rod again and rotate through 180 until the notch in the top safety disc lines up with the top safety pin which will allow the firing rod to move out of the tube by about 1.2m at which point the bottom safety disc hits the top safety pin.

c) Pull and rotate the firing rod again through 180 until the notch in the bottom safety disc lines up with the top safety pin. The firing rod can now be removed completely from the tube.

d) Replacing the firing rod in the tube is the reverse of the above but before inserting the firing rod check that the safety clip is in place below the spring. This ensures that the firing pin cannot strike a cartridge in the chamber.

5. Select one cartridge from a suitable carrying box and insert it in a clean chamber.
6. Ensure the firing rod is not in the buffalo and screw the cartridge chamber into the buffalo. This is easiest done with the buffalo inverted. Apply sufficient force to the chamber to ensure it is securely assembled. When correctly assembled there should be a gap of no more than 1.5mm between the cartridge chamber and the main tube.
7. Keeping the buffalo inverted carry it to a pre-drilled hole, which should have a closely matching diameter and be water-filled.
8. Insert the buffalo, screwing the auger flight into the ground.
9. Connect the trigger switch to the appropriate tube in the buffalo handle.
10. Lower the firing rod gently into the buffalo until the tube cap below the spring rests on the top of the main tube. This will require the operator to rotate the firing pin within the buffalo source itself to allow the two safety rings to pass locking pins constructed inside the main tube. This is a safety measure to ensure the firing pin cannot free fall onto the cartridge cap and fire prematurely.
11. When satisfied that the source is correctly secured in place, firing can proceed. Remove the safety clip at the top of the barrel. This clip prevents the spring loaded firing pin being accidentally depressed, causing the cartridge to be fired prematurely. Removing this safety pin puts the seismic source in firing state.
12. To fire the buffalo, sharply depress the top of the firing pin. It does not require much force to fire the cartridge, a tap with the hand or a lightweight soft hammer is sufficient.



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