A Non-electric Method for Releasing a Drop Net

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Abstract: A non-electric method of detonating blasting caps used to release white-tailed deer (*Odocoileus virginianus*) and turkey (*Meleagus gallapano*) drop nets was investigated under field conditions. This method was tested on 12 occasions, with 9 drops on deer or turkey. This method is considered safer than the electric dynamite cap method and results indicated that it is comparable to the electric blasting cap method in reliability and ease of assembly.

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The Texas Parks and Wildlife Department has traditionally trapped various species of wildlife using drop nets (Schatz 1983). The triggering devices used to release these nets were electric blasting caps detonated by a 12-volt battery. While this has proven to be an effective trapping technique, the questionable safety of this technique cannot be overlooked. Accidental discharge of electric blasting caps can be caused by human error, high frequency radio transmissions, static or stray electrical energy, flame, friction, or impact (Inst. Makers of Explosives 1984). For example, we have experienced 3 occasions when lightning was apparently responsible for detonating electric blasting caps in a drop net. High voltage transmission lines and towers are other sources of potentially hazardous electrical energy. Radios with approximately 100 watts of output power, such as those recently installed in most field vehicles by Texas Parks and Wildlife, create yet another hazard in the use of electric blasting caps (Inst. Makers of Explosives 1978).

Texas Parks and Wildlife personnel have always been aware of the safety hazards associated with the electric system; however, injuries recently suffered by several personnel from unexpected detonation of electric blasting caps prompted a search for a safer alternative. A recently developed, non-electric method of detonating blasting caps seemed to have the most merit.

Details of the Non-electric Technique

A small diameter plastic laminate tube with dimensions of 3.1 mm outside diameter and 1.3 mm inside diameter serves as an ignition system. The inside of the tube is coated with a thin layer of reactive material at a level of 0.1 grains/30.5 cm of tube. The reactive material within the tube is ignited (started) by a hand-operated device firing a No. 209 shot shell primer.

Once started, the controlled detonation travels through the tube at a speed of approximately 1,828.2 m/sec. This low energy detonation proceeds easily through the tube (e.g., through knots, stretched areas, and sharp bends). The relatively noiseless detonation is sustained by such a small quantity of material that the outer surface of the tube remains intact (The Ensign-Bickford Co. 1984).

The charge travels down the tube and detonates a non-electric, factory-assembled blasting cap on the end of the tube. During the demonstration, this first blasting cap was situated on the net center pole rope together with 4 tubes going to the 4 corners. When the first cap was detonated, it in turn ignited 4 additional tubes with 4 non-electric blasting caps factory assembled at their distal end and situated on each of the 4 net corner ropes. The 1 shot shell primer started a reaction down the plastic tube that detonated the 5 blasting caps arranged to drop the net smoothly and instantly.

The 4 plastic tubes radiating from the center of the net to the 4 corners of the net were clipped tightly together with a small plastic clip called a bunch block. This plastic clip bunches the center pole rope (to be cut by the detonation) and the 4 outgoing tubes going to each corner. Bunch blocks were also used in our demonstration to attach the blasting caps onto the 4 corner pole ropes.

To ensure a proper net drop, it is necessary to have all the non-electric tubes, the blasting cap, and the center pole rope packed tightly together. The bunch block performs this task efficiently. However, we feel that satisfactory results also could be obtained by wrapping the items together with electrical tape.

Also, it is important that the 4 outgoing plastic tubes originating out of the center pole rope bunch block assembly are arranged to come out of the distal end of the bunch block. Explosives experts felt this to be the most reliable means of ensuring ignition of the 4 firing tubes going to each net corner (P.E. Mill, pers. comm. Ensign-Bickford Co., Decauter, Ga. 30035). The reason for this suggested arrangement is that the blasting cap's explosive charge is situated in the distal end of the cap. The non-electric plastic tubes are available in several established lengths. The blasting cap is factory installed on 1 end and a waterproof seal is installed on the other end. Tube lengths needed would be dictated by net size and by the distance to the blind.

The plastic tube can be cut at any point and ignited with the No. 209 shot shell primer arrangement. If for some reason the net did not drop as planned, as is often the case in trapping, some provision for resealing the end should be considered. The sealed portion of the tube could be trimmed off when the trapper is again ready.

Results and Discussion

The non-electric method of detonating blasting caps installed in drop nets was demonstrated on 12 occasions. Three nets were dropped for demonstration purposes during 1985. Nine nets were dropped in actual trapping situations on both deer and turkey during January and February 1986.

According to explosives experts, non-electric blasting caps have been tested with 40,000 volts of electricity without detonation (P. E. Mill, pers. comm.). Lightning strikes, however, may detonate them as much greater voltages and heat are involved.

Currently, plastic tubes are available only in white or yellow. This could be a disadvantage when trapping wildlife. However, an appropriate dull color spray paint could be used to spray the rolled up tubes, caps, and bunch blocks prior to trapping.

The main advantage of the non-electric method is safety, as it eliminates the hazards associated with static electrical energy and high frequency radio transmissions. Additionally, the non-electric drop net was simple and quick to rig to fire and required no knowledge of electrical circuitry. The final hookup was visually checked for completeness.

The main disadvantage of the non-electric method is the cost. The variable costs per net drop using this non-electric method were compared to the traditional electric cap method and also to the cost of shooting a rocket net. The variable cost of the non-electric method was $23.51 per drop, the electric method was $11.12 per drop, and the rocket net ws $17.94 per shot. The variable cost of the non-electric method was approximately double the cost of the electric cap method. Another disadvantage is the plastic tube can be used for only 1 shot and then must be discarded.

Variations were apparent in how the non-electric system could be arranged. For example, the first blasting cap that detonates the other 4 caps on the net could be arranged at the center pole rope (as described above) or at any 1 of the 4 corners. Also, the distance from the blind to the net will vary in almost every trapping situation. This distance can be covered with more than 1 tube/cap combination. For example, 1 tube/cap combination can be arranged to set off a second tube/cap combination which in turn sets off the third tube/cap combination which drops the net.

The non-electric system can also be considered for use in areas where the use of the electric blasting caps is questionable, such as in the vicinity of high voltage transmission lines, high wattage transmission towers, CB and mobile unit radios. We now do not use the traditional electric blasting caps in these areas.

Initial testing and actual trapping of deer and turkey on 9 occasions by trained personnel indicated that dropping a net using the non-electric arrangement was not appreciably different from electrically dropping a net. The important advantages of the non-electric system are safety and simplicity of operation. The speed of the non-electric system, while slightly slower than the electric method, is much faster than the speed of sound and, therefore, is adequate for use in net drops on most wildlife.

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