

THE AMERICAN CIVIL WAR SOCIETY LTD

SAFETY NOTES FOR PYROTECHNICS EFFECTS

The use of explosive (pyrotechnical) effects enhances the re-enactment performance and the verisimilitude of the re-enactment battle or event. They are created for a range of reasons (e.g. fire damage to buildings, massed rifle fire and demolition charges etc.) but their principal *raison d'être* is to simulate the arrival of artillery fire.

Inherently dangerous, unless handled and delivered safely, they are a prime source of creating “the spectacular” on the battlefield. The following rules and guidance are espoused as the ACWS procedures for the safe handling and delivery of pyrotechnical effects for the better enjoyment and for the simulation of reality on an American Civil War battlefield or event.

The following rules and procedures shall apply:-

- 1) The Board of ACWS shall appoint its Pyrotechnics Officer who shall be suitably qualified and/or have been appropriately trained for the purpose.
- 2) The Pyrotechnics Officer shall be responsible for advising the Board and the Commanders of both Armies (Confederate and Federal) of pyrotechnical matters and on safety procedures. He/she shall train to a suitable level of competence each and every member of his/her pyrotechnics team and ensure that they comply with the rules and regulations of this H&S directive and as laid down by himself/herself. The Pyrotechnics Officer (in consultation with the Projects Director) shall assess the needs of events for pyrotechnical effects and discuss such requirements and their costs with the Finance Director upon a suitable budget of expenditure being agreed (subject to Board approval) it shall be the Pyrotechnics Officer's responsibility to order, procure, keep safe and deliver the same at and for each event for the agreed purpose and to supervise the laying and making live, course to be detonated and check the recovery of and filling in of holes and making safe any undischarged pyrotechnical effects as may be deployed. In all regards the safe handling, deployment and detonation of the same shall be paramount in the Pyrotechnics Officers consideration.
- 3) The Pyrotechnics Officer's responsibility shall be to comply with all legal regulations and considerations applicable to what he/she is causing to be done and controls.
- 4) Prior to a battle/event where pyrotechnical effects are required, the Commanders of both Armies (together with the Projects and/or Marketing Director if required – in consultation with the Chairman or Secretary and the H&S Director of ACWS, as may be necessary) will consult to ensure (a) that the pyrotechnical effects are positioned as required and to create the appropriate impression (b) that they are of the size/volume appropriate to the event and safe for the site/location and (c) the leaders of each army (plus the Cavalry Commander, if cavalry present) know what is where and what it is and its risks, so as to manoeuvre their troops to avoid any risk.
- 5) During a battle/event, the Pyrotechnics Officer shall be in charge of his/her pyrotechnics team and shall brief them what is wanted where and when, in terms of pyrotechnical effects. Upon delivery of clear orders to his/her team, the Pyrotechnics Officer shall use his/her best endeavours to ensure the safe and appropriate discharge of pyrotechnical effects. However, any individual so under command and instructed shall always be responsible for the safe laying, ignition and discharge of any pyrotechnical effects under their care and control and the safe handling and disposal (including misfires) of the same.
- 6) If there is a fire or other risk, buckets of water and/or sand shall be strategically positioned

as may be necessary to extinguish any inadvertent fire or contain any inappropriate explosive effect, so that the same shall be ready and available (but realistically positioned for the purposes of both safety, practicality and authenticity) in the case of any untoward event requiring their use and intervention. Pyrotechnical effects shall not be used within 10 meters of a tented area because of the hazard (unless by special prior arrangement and appropriate risk-prevention precautions are taken)).

- 7) As for safety and medical matters generally, see ACWS General H&S guidance notes & refer to H&S Director.
- 8) Those using, laying and creating pyrotechnical effects, under the Pyrotechnics Officer, shall ensure they know the danger area of what effect or charge they have laid in each and every case. They shall be prepared to explain and brief any Board Members and Officer or NCO of ACWS upon enquiry of what is positioned where and what its effect and danger area might be. There are to be no surprises for re-enacting troops and those in charge of any detonation box or method of discharge of ANY pyrotechnical effects MUST ensure they are ONLY discharged or detonated when it is safe to do so. On NO OCCASION is a pyrotechnical effect (whether a ground charge or otherwise) to be discharged⁹
 - a) When the firer cannot/does not clearly see the charge from the firing position and be certain that no person or property is or will be adversely affected or could be damaged or harmed by such discharge.
Subject always to rule 8 (c) , NEVER detonate a charge / effect when any person(s) are closer to it than 10 feet & in any event always try to maintain a minimum clearance distance of 15 feet from the charge of person(s) on the field when firing charges.

This applies to charges containing no more than 25 g of flash powder or equivalent or 3 1/2 to 4 oz of gunpowder. Such charges shall NEVER be detonated when horses are closer to it than 25 meters, whether to the side, front or rear (unless specifically agreed in advance with the Cavalry Commander). The bigger the charge or effect or risk, the further shall be this safety distance separation zone from anybody or thing likely to be in danger or harms way (but see rule 8 (h) & 10 also).

- b) If is any risk of any such damage or harm then the charge or pyrotechnical effect will NOT be fired, ignited or discharged
- c) Safe distances will always be maintained as necessary. This involves NOT ONLY the power of the charge or the pyrotechnical effect but also the ground and other conditions in which it is discharged. For example, hard ground or rock can project blast and fragments further than soft ground or in wet conditions. If earth is removed to bury a ground charge shall, if used to bed-in and bury a ground charge, be sifted to ensure it is only pure soil material and containing no dangerous missiles if propelled by the charge (e.g. metal fragments or stones etc.). Preferably, extracted material shall not be replaced over a charge (but kept to one side for filling in any hole created) but is shall be bedded into and covered lightly by pure peat or manufacturers garden loam. The Pyrotechnics Officer shall ensure no material that projects projectiles that might damage or burn any person or property is used or occurs. The greater the risk from the charge or effect, then proportionately the greater the distance from it on detonation by re-enactors & animals in the field. Special care needs to be taken with multiple charges, fire/flame effects & smoke producing effects & their impact on the battle carefully assessed & taken into account when moving troops & battle planning (but see rule 8 (h) also).

- d) General weather conditions shall be duly taken into account for all such purposes.
 - e) If firing a pyrotechnical device shall cause fire or risk of fire (e.g. a dry field of stubble or too close to tents) then the same shall not be ignited or discharged unless/until the whole area likely to be affected has been fully and effectually dampened down and sufficient persons are immediately available with water buckets and fire fighting equipment to ensure any resultant fire is promptly, efficiently and completely extinguished before any material damage occurs
 - f) Prior to placing any charges or pyrotechnical effects, all equipment used to discharge the same will be thoroughly tested (unconnected to any explosive device) and if it has been found to be and operate safely without fault “on test” then it can be used. .If it does not pass tests 100% it will NOT be used. This includes detonator boxes batteries, other fuses and detonators, transmitters and the wires from the detonator box to the charge. Only a sample detonator or fuse need be tested if the Pyrotechnical Officer judges this to be necessary. ALWAYS lay & wire-up a charge & run the wiring back TO the detonator box, after testing it for safety when unconnected –NEVER lay from the detonator box towards the charges, so you are away from the charges when it goes live.
 - g) Pyrotechnical effects will not be primed or made live unless and until such safety tests of any detonation mechanism to be employed have been carried out to the entire satisfaction of the Pyrotechnics Officer.
When all effects have been laid and their wires run to the control box, the words “GOING LIVE “will be shouted out to the pyro team(s) and the Armies. The pyrotechnician can now connect to his/her control box, making sure that the box is switched OFF. When all boxes are connected, the order “FIELD IS LIVE “(or similar) is to be issued, so everybody knows there are live pyro effects out there. All boxes are to be stood down (switched off) until the battle commences. When the field is laid, red markers & flags shall be flown & a suitable guard supplied by the Armies shall be mounted to keep everybody other than pyrotechnicians away.
 - h) When pyrotechnic effects are in water, where only water will be projected by the explosion (i.e. suspended in water, NOT buried in mud at the bottom of a stream or pond) & when there will be no adverse effects on re-enactors by blast or other damage, then it is acceptable for such charges to splatter re-enactors with water only as a result of detonation e.g. when crossing a stream on a footbridge. This must never happen with horses, which must be 25 M away minimum at all times (unless otherwise agreed in advance with the Cavalry Commander).
- 9) Additional rules and regulations that apply shall be:-
- a) All laid charges shall be suitably guarded and members of the public kept away and the charges and their ignition wiring shall not be interfered with. When the event or battle site is clear and when the battle starts and only ACWS members and re-enactor guests entitled to be “on the field” and when they have been blown/discharged/fired and no hang-fires or misfires then the pyrotechnical effects do not need to be specifically guarded
 - b) Any pyrotechnical effects that create air burst effects shall be so sited not to be deflected by e.g. overhanging tree branches or high winds, so that they discharge as intended safely in the air over the battlefield and nothing falls to earth out with the arena or the battlefield/event secure area and/or dangerously upon any re-enactors, tentage, animals or equipment.

- c) The pyrotechnics officer shall always ensure that no member of the public is ever in danger or likely to be in danger from the use of a discharge of pyrotechnical effects by him/her or the pyrotechnical team. That especially requires no missiles or debris from explosions to fall outside any roped off battlefield or event area or to fall on an area occupied or used by members of the public/spectators
- d) The pyrotechnics officer's advice and professional opinion shall be fully considered and taken into account in battle or event scenarios by Army Commanders and Members of the Board. If he/she says that pyrotechnics cannot be used in a certain way or place or manner because (in his/her reasonable opinion) of dangers or it is unsafe to do so, then they will NOT be so used/deployed. Like the H&S Director, the Pyrotechnics officer can over-ride command decisions in this regard and within this purview/area of responsibility
- e) Any other display or effect created by or under the control of the Pyrotechnics Officer, (e.g. firewalls or the like) shall (as for all pyrotechnics) only be ignited at a safe distance from all troops and animals any tentage or other inflammable things (e.g. dry grass) vehicles or other property and especially away from spectators/members of the public. The Pyrotechnics Officer will establish a safe distance (having considered the size of the charge, ground conditions, weather conditions and all other relevant factors) required for firing/use of any particular pyrotechnical effect (including detonation wire length or fuse length so that the operator is in no danger and is far enough away) both generally and specifically at an event or battle and will instruct his team and will not allow suffer or permit the ignition or discharge of any pyrotechnical effect if anything or any person or animal is within such danger area.
- f) The Pyrotechnical Officer shall make safe all unused unfired or misfired pyrotechnical effects as soon as is practicable after their use (e.g. straight after the battle or event). He/she shall cause/arrange for all detonation wires to be recovered safely, all holes created by or occurring as a result of the use of pyrotechnical effects to be filled in and the ground surface made safe and any other pyrotechnical effect tidied away and made safe. Any explosives remaining on the site of battlefield or event spilled, partially used or as a misfire he/she will render safe and inert and secure.
- g) The Pyrotechnics Officer shall keep his/her equipment including pyrotechnics and explosive devices safe and secure when not deployed and in use all to H&S Police and other regulatory bodies reasonable and proper requirements
- h) The Pyrotechnics Officer will always ensure that any ground charge is laid at the correct depth below ground level for (i) its purpose (ii) for safety and (iii) for the type of charge being used, before backfilling and covering of the same with safe material
- i) The Pyrotechnics Officer shall be responsible for and ensure the pattern of ground charges laid shall be safe e.g. not too many close together or their discharge likely to render another charge unsafe or create cross-detonation triggers. He/she will not disguise or hide or permit or allow any pyrotechnical effects to be hidden or disguised. All re-enactors on the field shall be able to clearly see where ground or other charges and effects are positioned or laid and any wires leading to or from the same etc. so that all can identify them and stay clear of them. Sometimes, with radio controlled explosions, this may not be possible.
Charges laid on surface plates that can clearly be seen require no other marking. However, buried charges (not obvious to the naked eye by other re-enactors) will be marked

on each charge by a brightly coloured cone or triangle of coloured paper or a good squirt of bright spray paint (that will disintegrate harmlessly on detonation) & H&S Director will determine the size of such marker & the detailed arrangements for their use.

- j) The Pyrotechnics Officer shall establish (and train his/her team operatives) in the proper procedures that are safe for the laying arming and firing of any pyrotechnical effect and for dismantling/disarming any not discharged and making safe. The sequence of firing shall be within the script for a battle or event but ultimately the responsibility of a properly trained operative pressing any fire button or lighting any fuse or affecting a discharge. Fuses and detonators shall always be kept safe secure and dry and only handled when needed and then as little as possible. Detonators will NEVER be held or handled by the explosive or detonation end.
- k) Each detonator and pyrotechnical effect will be accounted for by the Pyrotechnics Officer to the end and intent that non shall be lost, left lying around or left behind anywhere and all shall be under his/her care control and custody at all times before safe use/discharge. He/she will ensure all have been used and fully ignited and discharged before disposal of any remains as waste.
- l) The production and/or creation of any complete pyrotechnical effect shall only occur at the site of any event or battleground (i.e. the assembly of the same and fusing as necessary/required for use) and where it is safe to do so, clear of any other people and property and in sufficient time for deployment or use. However, pre-loading of un-fused charges themselves is acceptable off-site, provided all other laws and rules relating to such work is obeyed. Detonators or separate fuses will not be put into pyrotechnical effects or charges so that the same are armed unless and until the same are in position and about to be used (e.g. just prior to start of battle etc.) as the Pyrotechnics Officer judges is safe and reasonable.
- m) Charges and pyrotechnical effects shall not otherwise be armed unless the same are manufacturers sealed or complete products. Separate detonators and fuses shall be kept separate from and in appropriate closed containers otherwise at all times (especially when being transported) from any charge or gunpowder or other pyrotechnical effect.
- n) Any pyrotechnics that fail to go off, once recovered, must be rendered safe and harmless as soon as practicable, guarded and stored in a safe place until disposed of by or at the command of the Pyrotechnics Officer in an appropriate or safe manner. They must not be left "lying around" at any time.
- o) Those handling any armed or when arming any pyrotechnical effects should wear suitable flash-resistant protective & flame proof clothing (such as woollen ACW clothing), eye goggles & gloves for their personal protection in case of accident or negligent discharge of a charge or effect. The practical & sensible discretion of the Pyrotechnics Officer shall apply, because it is not always possible to work with fine wiring, switches or small parts when wearing gloves & such kit, but wherever possible the pyrotechnics team shall wear suitable burn-proof & flash-proof clothing when laying & arming charges & effects & shall mitigate risk of personal injury as far as practicable (e.g. keep head & hands away from or directly over a charge / effect & be aware of location of nearest fire bucket & medical cover & have a colleague nearby & watching in the case of mishaps, to raise alarm / render assistance).
- p) When charges are detonated, Unit & Army Commanders are to ensure that nearby troops are to take "mock or pretend "casualties appropriately. Simulated artillery fire is to be re-

spected as such and re-enactors are to react to it in a realistic way.

10) Cavalry. Any pyrotechnical effect shall not be discharged when any mounted cavalry or loose horses are closer than 25 meters & for charges larger than referred to in rule 8 (a) then this safety distance increases to 50 m. Horses can cover ground very quickly, so pyro team firers must ensure they do not fire if horses are closer to charges than the stipulated safety distances, & so need to think ahead in such a situation.

If pyros and/or effects are to be detonated/discharged within an envelope less than 25m around any horse(s), then such discharges are to be agreed between Pyrotechnics Officer and The Cavalry Commander in advance of the start of the Battle, as part of the event planning process and battlefield co-ordination, so there are to be NO surprises for any “in field “re-enactors in this regard. Remember, others might also be in the nearby area, and care must be taken not to effect them either.

In accordance with rule 4, when mounted cavalry are part of a display/battle/event at which pyros are to be used, then the initial co-ordination of the deployment of pyro effects & charges will involve the active participation of the Cavalry Commander (e.g. when Projects & The Sponsor ‘s requirements are being implemented on the ground, Army & Cavalry Commanders & the Pyrotechnics Officer will confer & consult in advance of any charges being laid so that any pyro “no go” areas (whether before, during or after firing) are clear & the legitimate needs for cavalry to manoeuvre & to have escape routes from a battle area are to be taken into account. If pyros are to be fired in sequence (e.g. one area at one time & another at another) it is necessary for Cavalry Commander to know this so that he/she can position & manoeuvre the mounted cavalry safely accordingly.