

**BLACKPOWDER WEAPONS AWARENESS FOR RE-ENACTORS.
EMA TRAINING EVENT, 8th – 9th APRIL 2011**

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Agenda:

Introduction, and briefing on safety rules

1. Blackpowder and Blackpowder weapons fundamentals.

2. A brief history of medieval firearms

An outline of the development of blackpowder and firearms through the medieval period, and a brief look at what happened next. – Useful facts for talking to the public.

This section of the talk may involve some firing of example firearms, unless it's raining and we decide to stay under cover.

3. Reenactors, Firearms and the law.

This section will cover the various firearms and explosives legislation that's applies to re-enactment. We'll cover very briefly what it says and where to find the detail if you ever need it.

4. Practical session, Handguns.

Loading and firing several medieval handguns.

5. Practical Session, Canon.

Loading and firing a small medieval cannon.

6. Closing Q&A, advice for people wanting to take it further.

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Introduction.

These training notes are written by Dave Banks, of the Company of St Dysmas, and training will be carried out by Paul 'Fox' Turner and Jenny Garside.

A word of warning about the content of this talk. The section on the history of firearms is based on my own reading and opinions. This is an area of history that is being seriously re-examined by historians. There are currently strong disagreements between serious chaps with history doctorates and jobs at universities on a number of issues, so it's hard to be absolute and definitive. I'm giving my opinion which I hope is a well informed one, but do your own reading and make your own mind up.

The legal aspects can also be controversial. By and large the law wasn't written with much consideration about how it would be applied to re-enactment, and we operate in a number of grey areas. Until there is an incident and someone gets prosecuted we may not get a completely definitive answer on some issues. These notes cover how I interpret the law, but I'd recommend reading the relevant sections for yourself. Please remember also that firearms licensing officers mostly deal with more straightforward law relating to target shooters, clay pigeon shoots, farmers etc. I'd always recommend reading up yourself before speaking to them.

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Section 1, Blackpowder and Blackpowder weapons fundamentals.

1.1 What is blackpowder?

Blackpowder is generally defined as 'an explosive mixture of Charcoal, Saltpetre, and Sulphur', and the term tends to be used interchangeably with the word 'Gunpowder'.

However it is important to remember that Gunpowder can be any chemical mixture used to fire a gun, including modern smokeless powders. Black powder is specifically the 'traditional' charcoal, Saltpetre, and Sulphur mix. Interestingly it was not called Blackpowder until Victorian times, when the phrase was coined to differentiate it from the newer 'low smoke' compounds, which were generally a light colour.

Generally black powder is made to the following recipe:

75% Potassium nitrate (saltpetre)
15% Charcoal
10% Sulphur

The ingredients can either be mixed dry, which is the earlier method or 'corned' where the ingredients are mixed as a wet slurry, then forced through a fine sieve or mesh to make separate grains that are then dried. Corned powder is more stable as it cannot separate.

It's also worth noting that contrary to general belief, black powder is NOT affected by humidity. Liquid water will ruin it, but humidity is generally not a problem, and guns can be fired after being left loaded for years.

Saltpetre is Potassium Nitrate (KNO₃) it is now produced synthetically, however it can be naturally produced by bacteria feeding on animal wastes. Almost pure saltpetre can be found as a white 'furry' deposit on the walls of cattle byres and similar buildings that have animal wastes soaking onto the floor. Early blackpowder was probably made with this naturally occurring stuff. Later it was extracted by digging up the earth floors of animal buildings and boiling them up, and by the end of the medieval period purpose built compost heaps were used to make saltpetre from animal waste.

Charcoal is made by heating wood to around 400 degrees C in the absence of oxygen, It was commonly made and used for all kinds of things in the medieval period. The best charcoal for gunpowder is made of a lower density wood like Willow or Hazel and is 'cooked' at a lowish temperature, giving a brown charcoal.

Sulphur is a yellow crystalline solid. These days it is produced as a sideproduct of refining natural gas. In medieval periods it was either separated from the sulphur rich ores found particularly in Italy, or produced by heating 'fools gold' (iron pyrites) in the absence of oxygen.

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1.2 What does it do?

When gunpowder is ignited, the charcoal burns, releasing energy. The Saltpeter provides the oxygen for the reaction, and the sulphur lowers the ignition temperature, making it easier to light (like using sulphur on the end of a spill for lighting with a flint and steel).

The reaction is classified as a low explosive reaction. This is because the reaction spreads though the powder in a flame front, rather than through a shockwave – in other words it burns it DOES NOT detonate. This gives Blackpowder a low 'Brisance' or shattering power, so it is less useful for jobs like shattering stone, but ideal for pushing a bullet out of a gun in a controlled way.

The chemical reaction is available in plenty of textbooks, I'm not enough of a chemist to explain it, so I will not include it here. Basically what happens is that the powder burns very rapidly.

About half of the powder (by mass) becomes a sooty ash or residue, containing; potassium carbonate, potassium sulfate, potassium sulfide, sulfur, potassium nitrate, potassium thiocyanate, carbon, and ammonium carbonate.

The other half is converted to gasses: carbon dioxide, nitrogen, carbon monoxide, hydrogen sulfide, hydrogen, methane, water vapour.

The gasses, as you might expect, are over 1000 times less dense than the gunpowder. So half the powder has suddenly become about 1200 times bigger. If you put a teaspoon of blackpowder on the ground and light it, this isn't terribly impressive. There is a whoosh and a flash as the powder burns, and an instantaneous cloud of smoke.

If I tip the powder into a gun barrel and light it though it's a different matter. The 5 gram teaspoonful of powder becomes 2.5 grams of soot and about 3 liters of gas. This gas is formed so suddenly it has to go very quickly to get out of the barrel, and there is a 'bang' as it suddenly escapes, at perhaps up to 1000mph.

If we pop a ball or bullet on top of that, it comes out of the barrel fast enough to do a lot of damage.

1.3 Principles of a muzzle loading gun.

In it's simplest form, a muzzle loading gun is a tube, closed at one end (the breech).

There is a small hole (the touchhole) through the wall of the gun to allow a spark in to ignite the charge.

The charge of black powder goes in first, followed by some sort of 'wad' the wad can be a disk of wood or of fibrous material, a piece of cloth, or in re-enactment something like wool, straw, or grass. The purpose of the wad is to make a seal in the barrel, forcing the gasses to push the wad, and anything in front of it, along out of the barrel.

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The ball (or shot) is placed in next, generally followed by another wad to stop it rolling out.

A small loose 'priming' charge is placed on top of the touchhole.

When the priming charge is lit the flamefront travels down the touchhole, and ignites the main charge. This produced rapidly expanding gas, which cannot get past the wad, and so it pushes it down the barrel.

The shot is pushed ahead of the wad and comes out of the end of the barrel at great speed.

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Section 2, A brief history of medieval firearms.

2.1 Prior to the 13th C.

Prior to the 13thC, there is no clear evidence of blackpowder anywhere in the world.

Until relatively recently historians generally believed that the Chinese had developed blackpowder as early as the 11thC, but to me the evidence does not now seem to stack up.

These claims are mostly based on a Chinese book written in 1044, the Wu Ching Tsung Yao, which discusses chemical mixtures for use in war. However there are a couple of problems. Firstly the earliest surviving copy of the book was copied in the 15thC, and it isn't clear if there were later updates. Secondly there is no clear recipe and it isn't clear from the context whether the author is talking about actual gunpowder, or an incendiary powder.

Nonetheless there are increasing references to chemical mixtures, incendiary devices, flamethrowers and bombs (which could be incendiary or explosive) in Chinese sources throughout the 11th and 12thC.

So whilst they may or may not have invented gunpowder, the Chinese were certainly active in the use of chemical mixtures in war, and were working in that sort of direction.

I've seen no convincing evidence that there were any significant developments in Europe in the same period.

2.2 1250 – 1325, Emergence of blackpowder in Europe.

Our earliest conclusive evidence of gunpowder in Europe comes from the work of Roger Bacon. Bacon was a Franciscan friar and scientist, known by succeeding generations of scientists as 'Doctor Mirabilis', which is a pretty cool superhero name, and means 'the wonderful teacher'. It's known that Bacon had strong links with middle eastern scholars through Muslim Spain. Don't confuse him with the Elizabethan scientist and philosopher Francis Bacon.

In 1248, Bacon wrote *Epistola Fratris Rog. Baconis, de secretis operibus artis et naturae et nullitate magiae* (Epistle of Roger Bacon on the Secret Works of Art and of Nature and Also on the Nullity of Magic)' In this he gives a description of gunpowder, and a coded recipe

We can, with saltpeter and other substances, compose artificially a fire that can be launched over long distances

*By only using a very small quantity of this material much light can be created accompanied by a horrible fracas. It is possible with it to destroy a town or an army
In order to produce this artificial lightning and thunder it is necessary to take*

Don't assume from this that blackpowder had been successfully used in a military context. Friar Bacon was a bit of an early Leonardo da Vinci type, and he famously

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speculated on the possibilities for many practical applications of the science he studied, including aircraft, steam engines, and microscopes. Nonetheless it's clear that gunpowder was known in Europe by 1250.

To put this date in context, Bacon is writing in the high middle ages, in the reign of Henry III, just before Henry's troubles with Simon De Montfort and the Barons' revolt really get going.

In 1268 or so, Bacon writes 'Opus Majus', literally his great book of science. Again he visits the subject of gunpowder, and this time he seems to view it as less of a novelty, and talks about it being used to make firecrackers to amuse children.

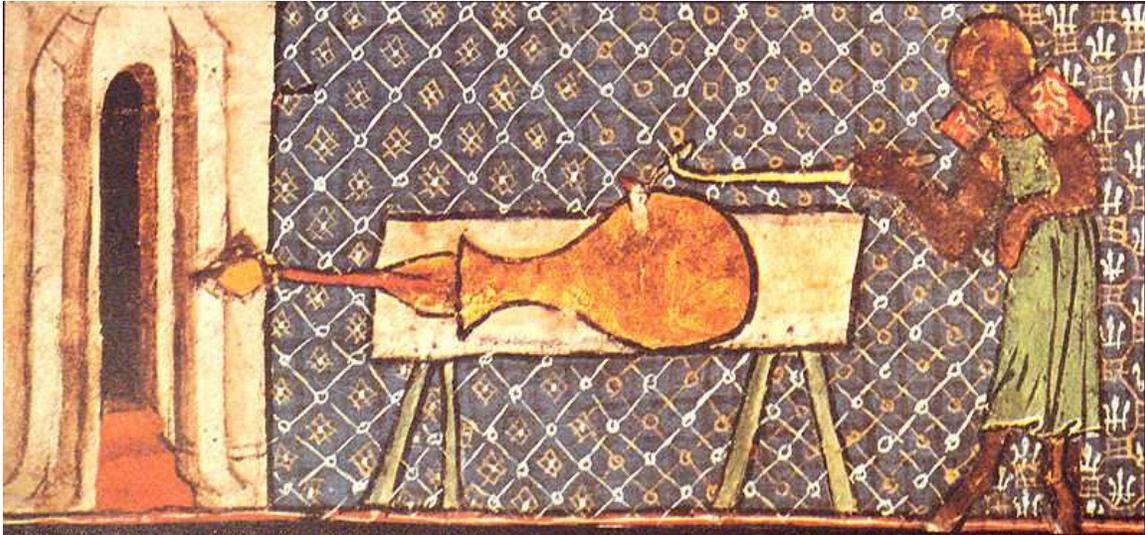
In 1280 or possibly a little earlier, Albertus Magnus, a German philosopher and Dominican bishop, also wrote about gunpowder. He describes flying fire, and it seems clear that he's talking about rockets.

So by the end of the 13thC, as we enter the late middle ages, gunpowder is known. Its use in rockets and bombs is understood. Its military application has at least been foreseen although there is no specific evidence that it has been used to any great extent. The evidence does not suggest that gunpowder is being used to fire either cannon or handguns at this time.

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2.3 1325 – 1400 The early pole guns and cannon

The Late middle ages is now generally considered to start in the early 14th Century, and so does the history of guns.



In 1326, Walter de Milemete was tutor to the 14 year old prince Edward, later to be Edward III. He wrote young Edward his very own textbook '*De nobilitatibus, sapientiis, et prudentiis regum*' Which seems to translate as something like 'the nobility, knowledge and intelligence of a king (get a latin check). Basically a big book of everything a king should know. This contains a picture that is clearly primitive 'pot de fer' cannon firing an arrow towards fortifications.

This seems to be the earliest solid proof of the use of firearms in great Britain, and one of the earliest in europe, although there are some housebook entries on the continent that suggest the acquisition of handguns at least a few years earlier. It is believed that a cannon was used in the bombardment of the British fortress La Réole in Gascony – I suppose it's even possible that this is what the Milmete picture refers to, it doesn't say in the text.

Clearly young Edward was listening, as one document shows 3 cannon with 5 breeches and one handgun with him when he went on campaign in 133?

Throughout the 1300s, references to Handguns, cannons and gunpowder become more common, until by the end of the 1300s it seems likely that every army has guns and they are an use at plenty of battles.

However both illustrations and surviving guns that are definitely pre 1400 are very rare, so although we know that they had them, we know little about what they looked like in these early days. The best we can do is the odd reference to them being mounted on a pole, or even 'in the manner of a pike' which suggests a small barrel socketed onto a pole.

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There are several guns thought to date from this early period. There are the 'berne' guns, which were retrieved from the bottom of Lake Constance and are now in berne museum. It's thought that they date from about 1350.

Other guns probably from the period include the Loshult gun, large handgun or small cannon in a 'pot de fer' or vase shape, which looks almost exactly like the milemete drawings but smaller. This has lead some historians to provisionally date it to the early 14thC.

There are a number of other possible candidates for 'oldest surviving gun' but as you cannot carbon date metal objects, and neither of them could be dated from being buried with or under other materials, we can't be sure. Generally though these early guns are cast brass or forged irons, with short (<12") barrels on a wooden pole or stock.

The only Definitely 14thC gun I am aware of is the 'tannenberg gun' In 1399, the castle tannenberg, in Saxony, burnt down. When it was excavated a well or cistern under the castle was found, and at the bottom of this a loaded handgun was found, it dates to sometime earlier than 1399.



The tannenberg gun – in a museum in germany.

2.4 1400 – 1500 Technological development and widespread adoption of firearms.

In 1400, we see the first clear illustration of a handgun, in Konrad Kieslers Bellifortis. It is a straight pole gun, similar to the tannenberg gun but apparently bigger.



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From this point we see more and more illustrations and records of both handguns and cannon, and more surviving guns. In the first half of the 15thC, these are still generally simple pole guns, often in iron, but barrels are getting longer on average

In 1411, we see The first drawing of a matchlock gun. It is another pole gun, but with a simple serpentine lock attached. This must have dramatically increased the usefulness of handgunners on the battlefield. (Codex Vindobana 3069, Austrian national library)



In the 1420s - 1430's The hussites demonstrate the effectiveness of handguns and artillery. Tactics for use of gunpowder weapons develop greatly through this period.



In 1449, Mons Meg is constructed. Many other great bombards were constructed around this time, changing the face of siege warfare. Technology is moving quickly and many handguns now look recognisably like modern weapons, with triggers and locks, albeit still dependant on a lit match for ignition. However in Britain the common fashion still seems to be for pole guns through the remainder of the medieval period.

1453. At least 300 french guns were used to break the siege of Castillon, effectively ending English ambitions in France. Some historians (not all) believe that artillery was

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the deciding factor, making blackpowder weapons key in british military history perhaps for the first time.

From this point firearms become more common, and more mass produced. Some remain as simple tubes on poles, some become more of a shape we would

2.5 1500 and onward. Development of firelocks, firearms become dominant.

The matchlock, consisting of an iron tube, on top of a wooden stock, and with a simple mechanism to drop lighted match into the pan, is around from about 1450, and is the mainstay of british warfare from the end of the medieval period through the civil wars of the mid 17thC. However other alternatives were starting to emerge.

About 1500, the Wheelock starts to emerge, it works like a cigarette lighter, with a spinning wheel drawing sparks from a piece of iron pyrites (fools gold). They can be very effective, but had a number of moving parts and were expensive to make and easy to break – they never entirely caught on.

Around 1550, the snaphaunce (pecking hen) lock was developed, by around 1610, this develops into a simple design, the true flintlock or french lock. This becomes reliable, and relatively cheap to manufacture. They gradually replace matchlocks and by 1720 or so almost all guns are using this mechanism, and they remain the most important type of gun till perhaps 1850.

Whilst the flintlock is relatively cheap and reliable, it isn't perfect. The priming pan is still vulnerable to wet weather, there is a delay between pulling the trigger and firing, and quite a flash from the pan, right near the shooters face. A military musket misfired about 1 shot in 7. A Scottish minister, amateur chemist and duckhunter, Alexander John Forsyth, tried to solve these problems. He came up with the idea of using fulminated to fire a gun. By 1805, he had invented a working percussion lock.

In 1838, the British army started to adopt percussion locks, a process more or less complete in the 1850's. Also in the 1850's Samuel Colt started mass producing revolvers, using the percussion mechanism to make a gun that could fire multiple times, finally allowing the gun to supersede all other personal weapons on the battlefield.

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3. Reenactors, Firearms and the law

3.1 Relevant legislation and advice.

There are several documents which reenactors should be familiar with. Because you need both a gun, and blackpowder to put in it, you need to deal with both firearms law and explosives law.

The 1968 firearms act: this has been amended several times, and covers most of the key laws relating to firearms, most importantly it covers all the definitions of types of firearms and the licences needed to own or use them

The 1968 act, like all UK legislation, can be downloaded from: <http://www.opsi.gov.uk/> Make sure you get the revised version, which incorporates the many amendments, it says right at the top.

Firearms Law: Guidance to police.

This is a document published by the home office, to advise the police on what the law means, and how to enforce it. I'd recommend reading and re-reading the relevant sections of this document before any dealings with the police

<http://police.homeoffice.gov.uk/publications/operational-policing/HO-Firearms-Guidance2835.pdf>

Placing on the Market and Supervision of Transfers of Explosives Regulations 1993' (POMSTER):

This is the main law covering storage and transport of black powder. Actually there is not much useful for reenactors in here. Also available from OPSI.

Control of explosives regulations, also known as COER. These are regulations (a statutory instrument) rather than standalone legislation, but these are the important regulations dealing with blackpowder licences etc. They are available from OPSI at this address:

http://www.opsi.gov.uk/si/si1991/Uksi_19911531_en_1.htm#end

HSE Advice on storage of shooters powders

<http://www.hse.gov.uk/explosives/shooterspawders.pdf>

The Manufacture and Storage of Explosives Regulations (MSER)

The name speaks for itself really. More important is the associated code of practice (ACOP) document which gives practical instructions for storing explosives. This has to be bought from the HSE, but the relevant sections have been put online by the excellent 'Muzzle Loaders association of Great Britain' (MLAGB) who also have some other useful stuff on their website.

<http://www.mlagb.com/news/legislation/mser2005.htm>

For anyone who's serious about re-enactment firearms it's probably worth being familiar with all the above and where to find it when you need the detail.

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3.2 Firearms Definitions:

UK law recognises 5 types of firearms.

1. Unregulated guns.

Basically this is Replicas, Blank firers, antiques and De-activated guns. Whist they do not require a licence they are still subject to the law. You need to be able to prove a 'reasonable excuse' to carry them. Realistic replica firearms cannot be imported manufactured or sold (see section 36 of the Violent Crime Reduction act, 2006, available from OPSI). However there is an exemption for the purposes of re-enactment. In addition blank firers that can be readily converted to real guns are treated as firearms. Generally the laws relating to replicas and blank firers apply more to later period reenactors so I won't go into them further here.

2. Firearms, not requiring a licence.

Basically this is low powered airguns. They are firearms, but do not need a licence.

3. Shotguns

A shotgun is defined as any smoothbore barrelled firearm with a barrel length of at least 24 inches, and which has no magazine or a non-detachable magazine incapable of holding more than two cartridges, and is not a revolver gun and has no barrel with a calibre of more than 2 inches. Most muskets and small cannon fall into this category. The definition of a shotgun is from section 2 of the 1968 firearms act, so shotguns are sometimes referred to as 'Section 2 weapons'.

Application for a Shotgun Certificate is made to the local Chief Officer of Police. The police must be satisfied that no good reason exists for refusing the grant of a certificate, and that the applicant is not a person prohibited from possessing firearms (generally, a person of intemperate habits or unsound mind, or a person who has been imprisoned for more than three months in the last five years or who has ever been imprisoned for more than three years).

The police will inspect the applicant's storage to make sure that it is secure. Certificates are granted with certain prescribed conditions, the main one being that the guns to which they relate must be kept securely.

A Shotgun Certificate entitles the holder to acquire as many shotguns as he pleases, provided they are kept securely. The police must be notified of every shotgun you acquire or get rid of though and will be in touch if you have more than they think you have a store for.

A Shotgun Certificate is valid for five years and the application fee is £50 Applications must be countersigned by a person of "good standing" and accompanied by four photographs of the applicant.

Shotguns can be borrowed or loaned out for up to 72 hours without informing the police, so once you have a shotgun certificate it is legal to borrow another re-enactors shotguns for an event.

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In theory, it is possible to have a shotgun certificate without your own store, on the basis that you are keeping your guns in someone else's cabinet and only taking them out for events. In practice many police forces are not too keen on this.

4. Firearms requiring a Firearm Certificate (FAC)

All remaining types of firearm require an FAC, though some may also require the authority of the Secretary of State (see below). These firearms are defined by section 1 of the 1968 act, and as a result are often referred to as 'Sections 1 weapons'.

Application for a FAC is made to the local Chief Officer of Police. An applicant must show "good reason" for each firearm he wishes to possess. Reenactment is defined as a good reason, although certificates issued purely for re-enactment will normally specify that the guns may only be fired with blank charges. You will be expected to show membership of a relevant re-enactment group, and why you need the particular firearm for your role.

This will generally mean getting documentation showing that your group is recognised by a body the police have heard of (such as NARES, all EMA groups are affiliated to NARES through the EMA). The police will also want to see that your group has current insurance for the type of re-enactment in question, this is now taken as a de-facto definition of a valid group by the police. Finally you'll want a letter from your commanding officer or similar explaining why you need the gun(s).

Applicants must nominate two referees to support their application. Generally you might expect this to be one person of standing in your group, and one professional person who's known you a good while.

Before an FAC is granted, the police will inspect the applicant's security to make sure it is secure. Usually, the police require separate lockable safes for the guns and ammunition (if any), securely affixed to the residence of the applicant.

Unlike a Shotgun Certificate, a firearm certificate only relates to the specific guns on it. It DOES NOT allow you to use anyone else's firearms. Obviously this makes shotguns a little easier in a re-enactment context. Unfortunately all but the latest of medieval firearms had barrels shorter than 24", So ideally medieval re-enactors who want to portray hand gunners should be using section 1 firearms.

A Firearm Certificate is valid for five years and the application fee is £50, although you can apply for a firearms cert and a shotgun cert together and pay only one fee.

If the holder wishes to dispose of or acquire firearms to which his certificate relates, the FAC must be varied by the police. A fee is payable when the FAC holder wishes to vary his certificate to acquire more firearms than his FAC currently allows. The variation fee is £26.

5) Prohibited weapons

Prohibited weapons additionally require the authority of the Secretary of State as well as an FAC or registered firearm dealer's certificate (RFD). Prohibited weapons include modern pistols and self loading rifles, as well as oddball things like tazers, and exploding ammunition.

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As prohibited weapons fall under section 5 of the 1968 act, they may also be referred to as 'Section 5 weapons'. It's unlikely that any will be relevant to medieval re-enactment.

3.3. Who needs a firearms or shotgun licence and for what.

Section 1 of the 1968 act says: *Subject to any exemption under this Act, it is an offence for a person....to have in his possession, or to purchase or acquire, a firearm to which this section applies without holding a firearm certificate in force at the time, or otherwise than as authorised by such a certificate;*

Section 2 of the 1968 act says: *Subject to any exemption under this Act, it is an offence for a person to have in his possession, or to purchase or acquire, a shot gun without holding a certificate under this Act authorising him to possess shot guns.*

So it is clear that other than specific circumstances, you should not have hold of any shotgun without a shotgun certificate, and you should not have any firearms without a firearms certificate. Even without a firearms certificate you should not have anyone else's firearms.

Note also that it says 'Possession' not 'use' the law is interested in who controls that gun, not whether you make it go bang. Consider this if you are ever asked to carry someones guns back to their tent for them for example.

However there are exemptions as the extract above hints. The main one that interests re-enactors is section 12: *A person taking part in a theatrical performance or a rehearsal thereof, or in the production of a cinematograph film, may, without holding a certificate, have a firearm in his possession during and for the purpose of the performance, rehearsal or production.*

The HO guidance to police clarifies this further. It says that a costumed performance with a script is covered by this defense but that general battle reenactment is not assumed to be. This is taken to mean that firearms arena displays are covered (after all that makes sense as they are a much more controlled environment) but that general battle reenactment is not.

Of course you can never be definite about what the law means until someone has been prosecuted, either successfully or unsuccessfully, but I believe it is legally fine for people to take part in these displays if they are competent to do so even without firearms or shotgun licenses. Remember that this exemption only talks about the guns – certificates for the explosives with which to load them is a different matter.

More recently there has been further guidance from the ACPO Firearms and Explosives working party. This suggests that any event which is held for public entertainment and follows a script (which battles generally do) is considered to be covered by the section 12 defense, and therefore only the people supervising and actually bringing the guns to the events need licenses.

On 9th October 2008 the chair of the ACPO FELWG wrote a letter to licencing officers as follows: *The view reached at ACPO FELWG in 2003 was that battle re-enactment was more likely than not to be covered by Section 12.1. While participants do not need their own personal certificates during the course of the actual re-enactment, firearms and shotguns would need to be on certificate or held by RFDs between events.* For this reason

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our group is now working on the basis that firearms and/or shotgun certificates are not required by all gunners.

Another 'exemption' is crewed guns. The Home office guidance to police, in section 13.64, says that for a gun requiring a crew, only the captain needs a certificate. The example given is a large cannon, but it would appear to apply to all guns that are fired by more than one person such as a two man pole gun. Obviously this means that you do not need a firearms or shotgun certificate to crew a cannon, but do consider what happens then when the gun captain needs to go to the toilet

By extension I'd suggest the 12.64 shows that the drafters of the law did not consider possession to be a simple matter of 'touching'. After all, for a crew served cannon it is the crew that touch the cannon and who move it, it is the Captain who is in control and therefore possession of the gun. This suggests that as long as I control the use of my firearms, a person without certificates can fire them under my direction. Be aware that this position has not been tested in the courts

3.4. Explosives law.

The COER act says: No person shall acquire explosives unless they have a certificate to do so. This is pretty clear, and does not have any exemptions which are useful to reenactors.

However, it does clarify that acquire means 'to take possession of'. As with firearms law I would argue that if I hand you the powder flask to allow you to load your gun, stand next to you, and then take it back when you have loaded, the flask has not left my control, I still possess it. I don't therefore suggest that everyone needs to get a certificate in order to load a gun at all, even in training. This the basis upon which we are able to train gunners.

However, there is not a broad exemption as there is under section 12 of the firearms act. For that reason I strongly suggest that anyone who is likely to load guns at an event gets an explosives certificate.

Explosives certificates are free, and come in two flavours.

Acquire and keep. This allows you to buy gunpowder and keep it at home. Obviously you have to show the firearms licensing officer that you have a safe place to store it. This should not be necessary unless you are going to be the person in charge of explosives for your group, so I won't go into it further here, but there is some excellent information on the MLGB site. A certificate lasts for 5 years.

Acquire only. This allows you to acquire explosives at an event, and hand any leftovers back after the battle.

Be aware that neither of the above allow for transporting gunpowder. This requires a 'Recipient Competent Authority' document (RCA) these are issued on request by the HSE to anyone with an acquire and keep who requests one, and are also free. Without an RCA document in your possession you must not transport explosives. Even moving them from one part of a site to another part which is down the road is an offence if you leave the event site to get there.

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To apply for the certificate, you proceed as follows.

1. You call your divisional police headquarters.
2. Ask for the firearms licensing department
3. Tell them you want an application form for acquire of explosives (COER1A). Be clear that this is for used in reenactment, and not in your own guns. This may cause confusion but if you direct them to the front of form COER1A it now says 'for use in the holders own guns OR in connection with reenactment'
4. Fill in the form and send it back. Be clear that you do not have black powder experience but that you will be loading and firing under supervision.
5. The police contact you and arrange an interview, and ask for clearance to check your medical records (for mental health issues)
6. If everything is OK, they issue the certificate.

Acquire only certificates used to be renewed annually however the law has recently changed to allow the police to issue a 5 year certificate. The paperwork some forces are using still has the one year dates, so it may be worth looking out for this and asking the firearms licensing officer about it.

If anyone has any further questions on firearms law, or wants a hand filling in forms, get in touch, and I can try to help or put you in touch with the right people.

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4. Loading and firing a muzzle loading handgun.

4.1 – Loading and Firing.

Not all muzzle loaders have the same loading and firing drill, It is very important to be familiar with the particular gun you are using and the safety rules of the event, but typically the loading drill is as follows.

1. Ensure that the gun is clear (drop in the ramrod and have a feel about if in doubt). You should always know how much of the ramrod sticks out of the gun when it is unloaded, so that you can tell if something is down there – consider marking the rod in some way.
2. Place the gun butt first on the ground, pointing at the sky (not your face), Hold it in your left hand. If it's muddy etc and you don't want the mark the gun, rest the butt on your foot.
3. Using your right hand, turn your safety flask upside down with your index finger over the end . Open the valve. Give the flask just one firm shake to start the flow (don't keep shaking it). Count to 10 then close the valve.
4. Turn the flask the right way up. Partially take your finger off the top and check by eye that the measure is full. If not repeat the previous step. Put your finger back firmly over the end. When making this check be mindful of the wind
5. Pour the measure down the barrel. This is where it gets dangerous. If there is any spark present in the barrel it will flash back, so avoid covering the muzzle with your fingers and keep your face away. If the safety valve in your flask fails the BACK of the flask will probably blow out so angle the flask so that the back does not point at you.
6. Allow the flask to fall back on it's strap (or return it to your glamorous assistant). Ideally the flask should hang on you so that its well away from muzzle flash, well away from the match you are carrying, and has a decent layer of clothing (such as your wool doublet) between the flask and your flesh.
7. Take a piece of wadding out. I often find it useful to keep a couple of pieces tucked in my hat or similar where I can get them in a hurry. I prefer loose sheeps wool, as it tends not to catch fire, and opens up as soon as it leaves the barrel. Roll it in your fingers / against your doublet, so that it will slip down the barrel
8. put the wadding into the mouth of the gun, avoiding putting your fingers directly over the barrel and certainly never poke your finger in unless you care to loose it.
9. Pull out your ramrod. If it is the sort that fixes under the gun, flip it over as you take it out – do not put the end that goes in the holder down the barrel, or the residue will make it swell so it doesn't fit.
10. Push the ramrod down the barrel. Hold it carefully between fingers and thumb. Again avoid putting your hand over the barrel more than you have to, and think about where the ramrod would go if the gun went off. Be sure that you are pushing the wadding down to the bottom of the barrel, not pushing past it or getting it stuck part way, firing with the wadding jammed part way up is dangerous. Again it helps if you know how much rod

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should be left slicking out. Once the wad is at the bottom, give it a few firm shoves to compact it.

11. Remove the ramrod, and replace it back where it lives, make sure you are absolutely sure on this point, firing the ramrod could easily kill someone.

12. Take stock of what is going on around you, and whether you are ready to prime the gun, consider leaving it unless you are going to fire quite soon, especially with a gun that does not have a close fitting pan cover.

14. Hold the gun for priming. You won't be able to point it at the sky anymore, but it should still point down a clear gunlane or over peoples heads.

13. Using your right hand, turn your safety flask upside down with your index finger over the end . Open the valve. Give the flask just one firm shake to start the flow (don't keep shaking it). Count to 3 (depends on the flask) then close the valve.

14. Hold the flask over the pan. Take your finger off the nozzle and fill the pan. When the pan is full, put your finger back over the nozzle. Put the flask the right way up, and open the valve for a few seconds to let any unused powder go back past the valve and back into the flask., and let the flask fall back on it's strap.

15. If there is going to be a pause before firing, cover the priming powder. If you have a pan cover close, it, if not cover it with the thumb or finger of a gloved hand.

16. Asses the situation – is it safe to fire? If in doubt keep the gun pointed in the air. If you are about to be over-run, consider discharging into the air, and possibly consider dumping your priming powder if you have no pan cover.

17, when ready to fire, make a last check that you are ready, the gun is loaded and primed, and that you know where your ramrod is. Point the gun in the general direction of the enemy, but never at anyone. The gun needs to point down a gun lane, or over the heads of and to the side of the 'target'.

18. Whilst keeping the priming pan covered, pick up your match, and blow sharply on the end, so that ash is blown away and the end is bright orange.

19. Shout 'Have a care' or other suitable warning (such as 'Get Orf My Land') Uncover the pan, and, keeping all your fingers and your face out of the way, put the match into the pile of powder. It should go in from the side, not directly above, or the jet up from the touchhole may blow it out. At this stage it is vital that you keep your eyes open and pay attention. It is VITAL that you know if your own gun fired, even if others fired at the same time.

20. Ensure the gun is clear for the next load and there is nothing smouldering. If you are 100% sure it fired, you may choose to blow through the gun. Opinions differ on this, it will quickly extinguish any sparks, but if the gun has had a 'hang fire' and goes of into your face, it will probably kill you. Otherwise wait for a period after you last saw smoke. If you are not sure if the gun went off at all, treat it as a misfire.

4.2 Misfire drill.

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If the gun fails to fire, there are several things you should do.

1. Wait for at least 20 seconds, with the gun pointing in the right direction. It is possible to have a hangfire, where the gun fires after a short delay

If you are not confident of dealing with the misfire, get a more experienced gunner to help you, do not point the gun at anyone whilst looking for help.

If you can do so safely, consider seeing if the gun really IS still loaded, by dropping the ramrod down the barrel. Do so cautiously, hold it gently between finger and thumb, and remember that if the gun goes off, the ramrod will fire out literally like a bullet. Think about where it will go.

2. Prick and re-prime the gun.

2.1 Point the gun in a safe direction and take a small pricker, using it to clear the touchhole.

2.2. Pour about a teaspoon of powder into a gloved hand, remembering to use the safety flask properly, as you did when loading.

2.3 tip the powder onto the pan, whilst not getting your hand directly above, you will probably spill some, that isn't important.

1.4. Try firing the gun again.

It is generally worth trying to re-prime twice before giving up.

If this does not work, consider seriously whether there is time and a safe enough area to deal with the gun where it is, or whether it should be left until after the end of the battle or display.

If you are leaving a gun, think about where it is left, it's vital that no idiot picks it up. Consider pouring a little water into the touchhole. NEVER pour water down the barrel, all you are doing is giving the wadding enough mass to kill much more easily.

3. Worming the gun.

3.1 Assemble your rods, and fit the worm. Offer it up alongside the gun, make sure you know how far down the barrel you are expecting it to go so that you know if you are getting stuck. Make sure it's all secure, sometimes it helps to have pliers to make sure it's all screwed in tight. Also make sure you turn it and that you know which way to turn to screw it into the wad.

3.2 Lay the gun down so that if it fires the rods it will not shoot anyone. Or if appropriate get an assistant to hold it, pointing up at 45 degrees. Slide in the rods, and gently turn them to get hold of the wad. Remember that not all worms are non-sparking, and make sure you don't make a spark on the bottom of the barrel.

3.3 Draw the wad up out of the gun, and put the rods to one side.

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3.4 Tip the gun muzzle down and look for the powder pouring out. If it does not come out, that either means that you have not got all the wad out or that you forgot to put the powder in in the first place, and that's why it failed to fire.

3.5 Drop in the Ramrod, and make sure it goes in it's full length and that you hear the 'clack' of it hitting an empty breech.

4.3 Gun Tools.

It's important to have the correct tools available for any eventualities with the gun, or to have them available.

These include:

1. A pricker. I'd suggest that everyone loading and firing a gun should have a suitable pricker stuck in their hat or somewhere handy
2. A set of rods and a worm. You may decide that one experienced gunner will carry these tools, and sort out any misfires or problems.
3. Cleaning kit.

4.4 Gun Cleaning

The residue left by the cleaning of a blackpowder gun draw moisture from the air and form extremely corrosive hydroxides. If guns are not cleaned after use, they will just rot.

Ideally guns should be fully cleaned after use. Again this will vary from one gun to another, but I recommend the following procedure for general use.

1. Boil the kettle. Hold the gun muzzle up, wearing decent gloves. Cover the touchhole with your finger. Pop In a single drop of fairy liquid if you have it, then fill the barrel with boiling water.
2. After filling, remove your finger, and let the barrel empty out though the touchhole
3. Repeat the above until the metal of the barrel is too hot too touch. This way you know it will dry internally when you stop.
4. Use a set of rods with a jag (a split end) and a rag wrapped round, or with a mop, to dry and clean the barrel. Give the outside a good wipe with a rag
5. Spray in aerosol blackpowder gun oil. Spray some on the outside and wipe it off with a rag.

If for some reason you can't do the full clean straight away, the absolute minimum is to give it a good spray with blackpowder gun oil. This should exclude the moisture from the air and slow down any corrosion.

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5. Loading and firing a small cannon.

5.1 Loading drill

Unlike the handgun, firing even a small cannon is a team effort. The drill will vary quite markedly depending on how many you have in your crew and the size and type of cannon, however the following is a typical drill we use.

Setup:

Number 1 Stands on the left of the gun. They have the following tools on their side:

Wetmop (and bucket)

Powder scoop

Ramrod

Number 2 stands to the right of the gun, with the following

Drymop

A pile of wadding balls

A spare glove

The worm

The captain stands behind the gun, with the powder in pre-measured charges in the powderbox, and a priming flask.

The linstock and match is set well out of the way, or a volunteer holds it.

Positioning of equipment is key, so that no one crosses the line of the muzzle to get anything.

The drill starts as follows.

1. For the first shot, the captain and crew will make sure that they all have the equipment in the right place. Number 2 will 'search' the gun with the end of the ramrod to make sure no-one has dropped anything down. Number 1 wets and then shakes out the wet mop.

2. Number 1 wet mops the gun. Number 2 puts their finger over as the mop is pulled out, this should draw a vacuum, making a POP noise – if not do it again.

3. Number 2 Dry mops the gun, number 1 puts their finger over the touchhole when it comes out.

4. Number 1 rests the scoop in the mouth of the muzzle. The captain takes one powder flask, comes forward past No.2, and tips it into the scoop.

5. Number 1 feeds the scoop carefully down the barrel. When it taps the bottom it is turned upside down to tip out the powder at the bottom.

6 Number 2 takes a wadding ball, checks it for foreign objects, and pops it into the end of the barrel, avoiding getting in front, or sticking their fingers in.

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7. Number 1 takes the ramrod, and gently eases the wad to the bottom and compresses it. Once it is firmly in place it can be given a good 'Tamp', Depending on the gun, No.2 may need to cover the touchhole. Some crews prick the touchhole at this stage, I've not found it necessary.

8. The captain comes up and primes the gun, and if it is not to be fired straight away, Number 2 covers it with a spare glove.

9. The captain assesses the situation and decided when it is safe to fire. When it is they shout 'Give fire'

10. Number 2 fetches the match, blows on it so it glows brightly, and holds it above the gun. After making a last check that things are clear, Number 2 snatches the glove away, shouts 'Have a Care' and fires the gun, taking care to put the match into the powder from behind, not above.

11. Number 1 wetmops the gun, whilst Number 2 checks that the match is still lit and puts it aside, then covers the touchhole as before

12 Number 2 drymops the gun.

13 the crew wait for instruction from the gun captain, when told to reload they start the sequence again from step 4

You can use many variations on this sequence an use crews as small as 2 including the captain, or as large as 4 plus the captain or more. The key thing is that the work is organised so that no-one goes in front of the gun or leans over it, and that the gun is always well wetmopped before loading.

As with handguns remember not to put any part of your body over the end of the barrel, and especially not to put any part of you over the end of the tools. Limbs have been lost in this way.

Remember that even blank firing is dangerous. In firing saluting cannon people have been literally ripped apart by the wad at close range, and I have no doubts that even a small cannon would kill.

5.2 Misfire drill.

Misfire drill and worming is basically the same as for handgun (see 4.2 and 4.3 above) , except that it isn't normally possible to point the gun at the sky. For that reason you will need to work out a way to get the cannon pointing completely away from people, so that if it fires the worm it won't hit someone. Unless you can achieve this you will have to give up on worming, and leave the gun to be dealt with after the battle. At least 2 of the crew will have to stay with it to keep people away.

5.3, Gun tools

I'd expect every gun to have it's full set of tools with it at all times, as described in the loading drill above. It's worth knowing that the hydroxides rot wetmops in no-time so it is sensible to carry a spare mop – without it you cannot operate the gun safely.

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5.4 Cleaning

Cleaning the cannon is pretty much the same as the handguns, but bigger.

The quantities of soot deposited are quite large, so start by tipping the bucket of water down it to clear the worst.

Get the gun to it's maximum elevation, and have someone cover the touchole. Pour in the water till it's at the muzzle.

Put the end of the wetmop in the muzzle and uncover the touchole, push firmly, squirting a jet of black corrosive water high in the air. You may want to think about who's tent it lands on.

Once back at camp the barrel can be cleaned in the same way as the handguns.

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Appendix A – Reference Information

Powder measurements (approx)

1 Grain = 0.065grams

1 Gram = 15.5 grains

1Oz = 28.35 Grams = 436 grains = 16 drams = 2 tablespoons

1 dram = 1.75 Grams = 27grains = 2/3 teaspoon

1 lb = 453 Grams = 7000 grains = 1 pint

1 kilo = 35.3 Oz = 16000 grains = 1 litre.

Note: FFFG powder weighs about the same as water and the volume measurements above are based on that. Very course or very fine powders will be different.

Some suggested maximum loads for blank firing

Inches	Mm	Grains	Oz
3/16	4.5	15	.03 oz
1/4	6.25	20	.05 oz
3/8	9.4	40	.1 oz
1/2	13	60	.15 oz
5/8(20g approx)	16	100	.23 oz
¾ (12g approx)	19	140	.32 oz
1	25	438	1 oz
1.5	38	656	1.50 oz
2	50	875	2.00 oz
2.25	56.25	1313	3.00 oz
2.5	62.5	1313	3.00 oz
3	75	1750	4.00 oz

These are taken from an American cannon enthusiasts site, and are perhaps a little on the high side. Consider using ½ to ¾ this amount for a service load. My 12g fires well at 100 grains or less.

Up to and including 1 ½ ” these loads are based on ffg or similar, larger sizes are based on coarser, slower, cannon powders.

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Relationship between the bore and poundage of a gun

Bore - inches	Bore - CM	Weight (Kg)	Pounds
1	2.54	0.097	0.22
1.5	3.81	0.33	0.73
2	5.08	0.72	1.72
3	7.62	2.63	5.81
4	10.16	6.23	13.76
5	12.7	12.17	26.87
6	15.24	21.04	46.44
8	20.32	49.87	110.08
10	25.4	97.40	215.02
12	30.48	168.31	371.6
16	40.64	398.96	880.71
18	45.72	568.05	1253.98
24	60.96	1346.4	2972.4

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Shotgun Gauge.

Gauge is relatively modern, but worth knowing for context.

Its based on the number of lead balls for the gun it would take to make one pound. E.g. 12 round lead balls to fit a 12bore weigh one pound.

After 1 ½ bore barrels are referred to in poundage, e.g a 1 gauge would actually be called a 1 pounder, as the ball would weight 1 lb.

Gauge	Inches	MM	Oz	grams
1 ½	1.459	37.05	10.6	302.39
2	1.325	33.67	8	226.80
3	1.158	29.41	5.333	151.20
4	1.052	26.72	4.000	113.40
8	.835	21.21	2.000	56.70
10	.775	19.69	1.600	45.36
12	.729	18.53	1.333	37.80
13	.710	18.04	1.231	34.89
14	.693	17.60	1.143	32.40
16	.663	16.83	1.000	28.35
20	.615	16.53	0.800	22.68
24	.579	14.70	0.667	18.90
28	.550	13.97	0.571	16.20
32	.526	13.36	0.500	14.17
67.5	.410	10.41	0.237	6.71

Up to 4 bore are generally 'punt guns' the common shotgun is a 12gauge or a 20gauge. The smallest standard bore is referred to as a '410' and is also known as a garden gun. Its generally for ratting etc.