IMPORTANT SYMPOSIUM: "LEAD IN AMMUNITION"
SPORT SHOOTING MAY FACE A TOUGH FUTURE
UNLESS WE REACT PROPERLY!

A forum named *World Forum on the future of Sport shooting Activities* – WFSA – is an international organization. The organization has three different types of memberships, namely Voting Members, Regular Members and Associate Members. The origin for the organization is to me a bit obscure. Neither ISSF, nor the European shooting organization, ESC, has any direct contact or membership in WFSA. However, WFSA may be a significant part of the international competition shooting and hunting organization.

WFSA meeting in Rome, Italy, 8th to 10th of September 2004:

World Symposium on Lead in Ammunition

Sport Shooting and the Environment -Sustainable Use of Lead Ammunition

The ISSF and ESC among other organizations were invited to propose participants to the meeting. Close to 150 persons, contributors and participants attended the meeting. 20 nations were represented.

The symposium was divided in 8 section or topics:

1. Opening remarks,
2. Lead in ammunition,
3. Risk associated with lead ammunition,
4. Environmental chemistry,
5. Risk management approaches,
6. Emerging Technologies,
7. Industry Education Effort and finally
8. The way forward.

A total of 30 lectures were presented covering a wide scientific field from advanced chemistry of lead and actual substitutes for lead, corrosion and mobility of lead in the soil to remediation of soil and recollection of spent lead. Exposure and risks to wildlife, possible contamination of food and ground/drinking water were discussed. After each session there was short general discussion.

Since many of the presentations were highly scientific and most of the participants were shooters or had administrative jobs in shooting organisations, the discussion could difficult to understand for most of the participants, however pinpointed many very important issues. Unlike most scientific symposia, abstracts of the lectures were not presented. Accordingly, I cannot give the readers a complete report from the meeting. However, the WFSA has promised full text of all the presentations. Until then I can only present the most important issues from the symposium and my own interpretation of the presentations. A more complete overview of the very important symposium will be printed in the ISSF-journal when all data are present.

Important conclusions

As we have known for centuries, lead may be a health risk. Local conditions like soil type, temperature, rainfall, the acidity of rain and soil (pH values) may vary tremendously from one area to another. Typically the corrosion of lead in Europe (northern Europe?) is extremely slow and the possibility for poisonous concentration of lead in the ground water is negligible. However, still local variations exist, which means that some areas are unsuited for shooting ranges. A range described from Florida (USA) showed a very high corrosion rate, with considerable leakage to the ground water.

The conclusion to be drawn from several speakers is: the lead from shotgun ammunition, rifle and pistol ammunition is manageable. At some places the breakdown is so slow that lead hardly is a health risk; at other ranges the breakdown may be very fast. Anyhow, the shooting organisations are aware of the risk, which simply means that within few years, any range where an international competition shall be conducted must verify that all spent lead is collected and recycled. This is a great challenge to ISSF.

Remediation or cleaning of old ranges is possible, however very expensive and may in a worst-case increase the possibility for leakage of toxic lead to the environment and drinking water. Old ranges may be treated be chemicals to stop or slow down the corrosion process. This issue will be further elaborated when the full reports are published.

Alternatives to lead

This issue covered a large part of the symposium. Here I trust my notes, however, watch for more detailed follow-up at a later time. Substitutes for lead shots have been available for several years. The rationale for lead substitution was reports on poisoned waterfowl, especially in the USA and Canada. In several other countries it is now illegal to use lead shots for waterfowl hunting. In several countries in Europe, the use of lead shot for competition shooting has emerged from the same rationale.

The simplest substitute is ***iron*** (steel) shots. Steel shots are inferior to lead shots in several ways, mainly because of much lower specific density, production problems, high pressure may ruin the shotgun and present a danger for the shooter himself and spectators and competitors. This is a problem that may be solved, but until old guns are substituted and shot shell producers can guarantee a safe cartridge the problem exists. The iron pellets are considerably harder than lead and will ricochet from surfaces where the lead shots will be completely fragmented. This obviously represent a safety problem at the shooting ranges, however, this risk may be overcome by proper range construction.

Another substitute is ***bismuth***, a soft pliable metal with a specific density between iron and lead. There are two main arguments against this substitute, it is very much more expensive with a moderate to small worldwide supply, and secondly the shots are more difficult to produce, especially large shots.

The third alternative is the metal ***tungsten*** (Wolfram) in either alloy with other metals (mainly **iron** and ***nickel***) or as powdered tungsten in a plastic polymer. Tungsten is a very hard metal with extremely high melting point. The thin treads in a common light bulb start to glow when current is passed trough the wires. They are made of tungsten, and most other materials would have melted by the same current.

The wolfram alloy shot is very hard and very expensive, and can probably never be a substitute to lead in competition shooting, simply because of the impossible high price. The tungsten polymer stuff is much softer, often too soft. Anyhow, the same argument as above applies to this possibility – the price level.

Are the mentioned substitutes environmentally as friendly as we may have assumed?

Iron or steel pellets consist of some 99% iron (Fe) and about 1% other metals among them***chromium, molybdenum, cobalt, zinc*** . Except in very dry environments, this small pellet 2 – 2.5 mm in diameter is completed corroded (rusted) in one year. Then we are left with corrosion products, which are mainly iron oxides and salts or ions from the abovementioned metals. These ”by-products” may have high mobility in the soil, be dissolved in the ground water. Some of them are definitely toxic. Iron oxide (rust), which easily may reach ground water, is probably not toxic in moderate concentrations, but could be so in higher concentrations. Who would today let say 10 to 100 car wracks be left on a small area like a shooting range every year and stay there to rust? **Iron or steel shots may be a much worse health hazard than the lead shots represents.**

What about tungsten?

Tungsten has also to most of us been presented as a friendly substitute for lead. I interpreted some of the presentations that tungsten is not a metal that may substitute for lead without health risk. Some of the metals that make up the tungsten alloy are definitely poisonous.

Conclusion of the substitute story

Most of us have taken it as granted that the above-mentioned substitutes reduce or completely release us from the possible health hazards of lead. This may be an illusion, and deserve serious further research.

A main issue on the symposium was the construction of ranges and methods to recollect the spent shots. This has been conducted at several ranges – to a great success. It must be admitted that it is not simple or inexpensive. It may be more or less impossible to manage in some ranges because of the local range situation – shooting into water, topological situation and so on. Devices for stopping shots – shot curtains were demonstrated.

The main conclusion of the symposium was, lead can be managed!

It is my personal opinion that shooting organizations, with ISSF in front must meet this serious challenge with hard creative brainwork and physical innovation!

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