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ENVIRONMENTAL AND ECONOMIC ASPECTS CONCERNING THE REUSE OF EXPLOSIVES

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ABSTRACT

When munitions such as air-bombs and sea-mines are subjected to a disposal process focused on "Resources, Recovery, and Recycling" (R 3), almost all of the explosive is melted and removed from the casing prior to further handling. The casing scraps with the remains of the explosives need, however, to be de-contaminated before the metal can be recovered in a recycling process.

Decontamination, *i.e.*, the cleaning of the emptied casings, is done by means of a burn-out process. In this study, heating the ammunition casings in an open wood fire is compared with heating the casings under controlled conditions in an oven equipped for after-burning of the fumes from the pyrolized explosives. The burned-out casings are sent for re-smelting without further treatment.

An alternative is to cool the casings cryogenically to about -100 °C and crush them before putting the material into the fire or charging it into the oven. The fragmentation method is less risky and, at the same time, the burned-out scrap becomes easier to handle. There may also be a possibility to remove the tars and residual explosive mechanically after cooling, why burning may not be needed.

Our calculations show that the crushing of cooled casings followed by heating in simple wood fires is slightly more economical for a disposal company than using an oven for the burn-out process. However, in a wider perspective, heating in open-air fires costs society twice as much as heating in ovens due to the fact that the resulting air pollution reduces the production of crops and increases corrosion of, *e.g.*, cars. If we can use the cryogenic method without having to heat-treat afterwards this will be the by far most economical way.