Lecture W14

Dangerous to Handle Obsolete Military Devices Disposal Based on Incineration

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1. BACKGROUND

Obsolete ammunition demilitarization is one of the activities of FAEX since 1985.

The demilitarization process comprises a range of operations as herein shown.

There are some preliminary actions, such as:

- Study of the available technical documentation
- Visual examination about the actual condition of ammunition
- Planning of transportation in safety conditions
- Reception control at the factory and appropriate storage
- Definition of works to be applied
- Fitting up the facilities and tools to the defined operations

Subsequently, the ammunition to be demilitarizised is subjected to the following operations:

- Unpacking
- Unfuzing
- Disassembly
- Unloading

As a result of above, the following materials are recovered:

- Inert components
- Small calibre cartridges
- Fuzes
- Primers
- Propellant charges
- Iluminant charges
- Smoke charges
- Explosive charges

NBQ charges are not considered here.

What to do with this material, taking into account the safety and environmental requirements?

The answer to the above question is recycling or incineration with flue gas treatment. Open burning or open detonation do not meet the environmental requirements.

The demilitarization process diagram shows the possibilities of these two ways of treatment for each of the recovered products.

Recycling is in principle the best way of treatment and it has to be applied whenever it is possible. That is the case of propellants and explosive charges and some illuminant or smoke charges (WP).

Other products, however, such as fuzes, primers, detonators, small calibre cartridges, pyrotecnic devices, etc. can not be recycled because their handling is really dangerous or at least it is not profitable. In this case, the incineration with flue gas treatment is the appropriate way.

2. INCINERATION DISPOSAL PLANT OF FAEX

The incineration disposal plant of FAEX has been designed for destruction of these pyrotecnic components and small calibre cartridges without a previous disassembly.

These products have a small explosive charge, but will eject metallic splinters when they are burned.

Consequently the plant do not need high capacity of flue•gas treatment, but the burning chamber has to withstand the impact of the splinters.

The incineration plant consists of the following:

- One static kiln
- One flue•gas treatment line
- One feeding system for the products to be burned
- One control cabinet

A reinforced concrete wall separates the feeding and cabinet stations from the static kiln and flue-gas treatments line, to provide the appropriate personnel protection.

2.1. The static kiln consists of two concentric chambers without any connection in

between. The outer chamber provides the heat with a propane burner and transmits it to the inner one by radiation.

The products are burned in the inner chamber at a temperature of 500º C.

The flue-gases of that are evacuated by overpressure to the gas treatment line, but they do not mix with the gases from the propane burning of the outer chamber, because both chambers have their own independent outlets. In this way it makes it easier the cleaning of the flue-gas.

The ashes and roasted metallic parts of fuzes and so on are collected at the bottom of the inner chamber and they are recovered in a scraps container when their weight amounts to 500 Kg. This is made by rotating 180º the static kiln, after a previous stop of the burning process.

2.2. The flue-gas treatment line provides a cleaning process as follows:

- A leveling of flue-gas pressure coming from the static kiln in a buffer reservoir
- A dust precipitation in a for it designed cyclon
- A cracking of the flue-gas at 2.000º C with a propane burner in a so called converter unit. At this temperature the compact molecule structure of the substances introduced is atomized in its individual elements.

- A drastic quenching down of the gases at about 80º C in few milliseconds. This is achieved by injection of an alkaline cold wash liquid in extreme turbulence. In this way, the novosynthesis into undesirable organic combinations such as dioxins and furanes is avoided
- Chemical washing in four stainless steel towers under a pH measurement control. Sedimented residues like heavy metals, slag or other solid products can be extracted through a discharge container provided at the towers' basement.
- A by zeolithe or activated carbon absortion of potentially present pollutants
- A catalic oxidation of residual CO to CO_2
- Emission of cleaned gases to the atmosphere, according to the European Regulation

2.3. The feeding system is operated for the products to be burned.

The munition to be destroyed is placed by hand inside a cardboard box on a conveyor, which carries it up to the loading chamber on top of the static kiln.

The loading chamber is connected with the inner burning chamber through a system of intermediate hatches, which are opened and closed alternately to prevent the gases and debris of destruction process from escaping during the feeding operation.

2.4. The control cabinet undertakes the setting of the complete process parameters, such as feeding intervals, temperatures, pressions, flue-gas flow, etc.

There is an operation unit for automatic and manual operation modes.

The process is controlled by a process monitoring and visualition unit with an integrated personal computer software.

A TV monitor connected to a TV camera at the kiln provides visual control of the feeding operation.

A recording system permits the registration of all the process parameters.

The incineration plant is operated by one person for the feeding operation and another one for the control cabinet from where the static kiln ant the flue-gas treatment line are operated automatically.

The capacity of the plant depends to the ammunition to be destroyed, but it is limited to the equivalent to 20 kg of TNT per hour.

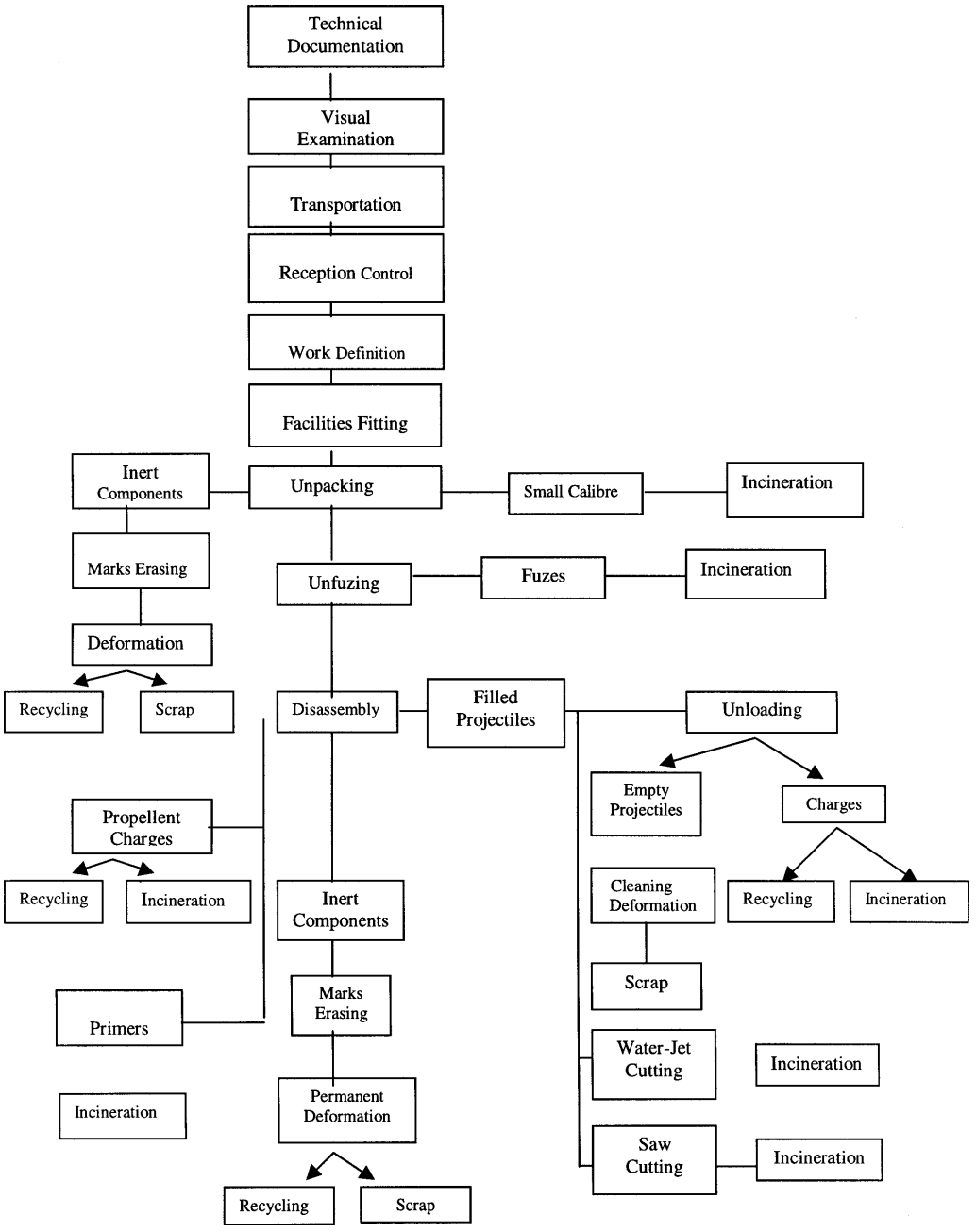
3. CONCLUSION

FAEX has planned its demilitarization plant considering that recycling of most propellant and explosive charges into civil use applications can be made by our UEE Group of Companies.

The incineration of bulk propellants and explosives requires an incineration plant with high capacity and so, with high investment and it can be made by other plants already installed.

Therefore, an incineration plant as it has been described was the best recommended one por FAEX's demilitarization activities.

DEMILITARIZATION PROCESS

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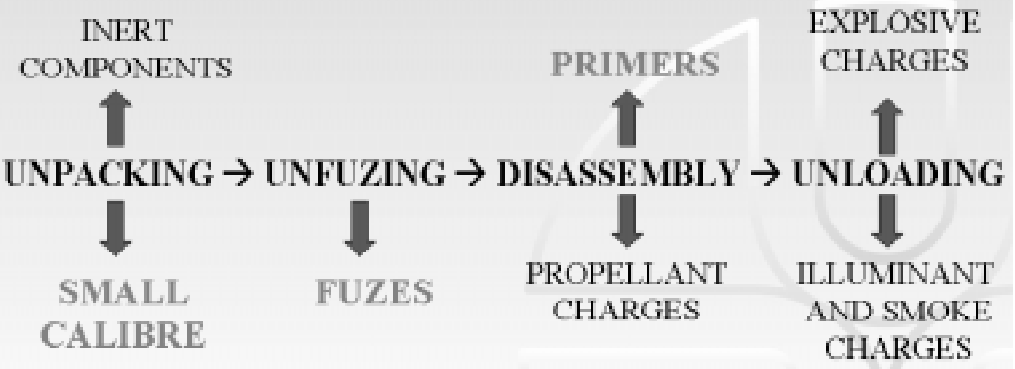
PRELIMINARY ACTIONS

- Study of the available technical documentation
- Visual examination about the actual condition of ammunition
- Planning of transportation in safety conditions
- Reception control at the factory and appropiate storage
- Definition of works to be applied
- Fitting the facilities and tools to the defined operations

UNPACKING → UNFUZING → DISASSEMBLY → UNLOADING

MATERIALS RECOVERED



INCINERATION DISPOSAL PLANT

PRIMERS, FUZES AND SMALL CALIBRE ARE DESTROYED IN A SAFETY AND ENVIROMENTAL FRIENDLY INSTALLATION

- GENERAL DESCRIPTION
- INCINERATION PROCESS
- WORKING METHOD

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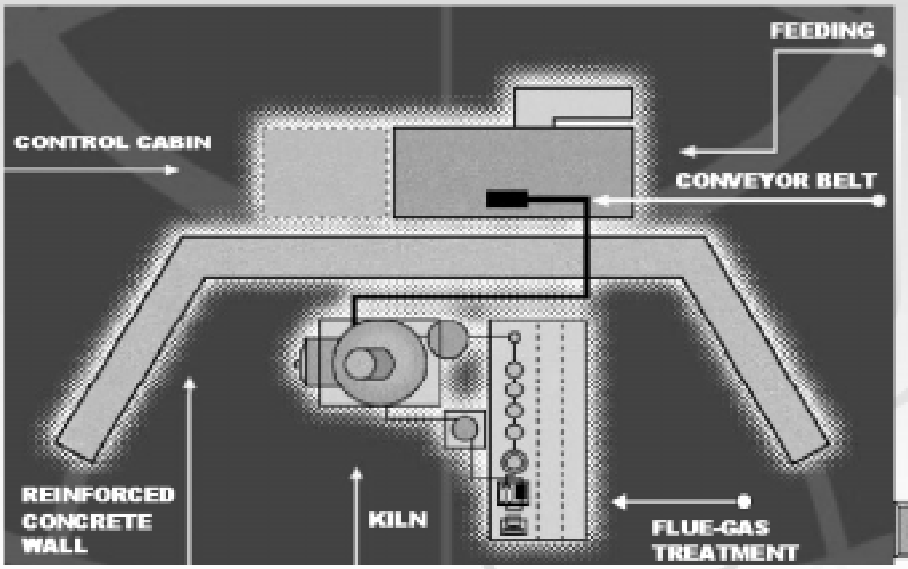
THEME III: EXPLOSIVES WASTE MANAGEMENT

WORKSHOP

DANGEROUS TO HANDLE OBSOLETE MILITARY DEVICES DISPOSAL BASED ON INCINERATION

SAFEX XIV INTERNATIONAL CONGRESS

DANGEROUS TO HANDLE OBSOLETE MILITARY DEVICES DISPOSAL BASED ON INCINERATION



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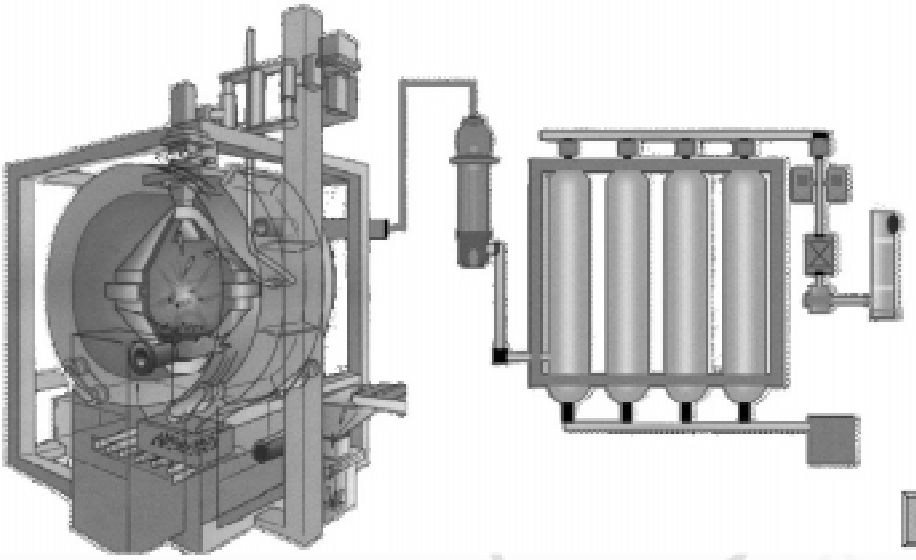

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