Lecture PT9

Explosive Waste Management In UEE. Installations for the Disposal

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1. INTRODUCTION

A carefully planned explosive waste management system is an effective method for reducing the risks of destroying explosives to a minimum. At UEE, this management system is based on different aspects that will be analysed throughout the presentation and is reflected in working methods that are being developed in specific installations.

UEE intends to give a quick summary of which guidelines and considerations are thought to be the most important from our point of view. At the end of the presentation, it willbe placed special emphasise on the installations, its characteristics and the working methods used in this system in order to show the final results and the implementation of the management system.

2. INPUT & OUTPUT OF UEE'S EXPLOSIVE WASTE MANAGEMENT SYSTEM

Firstly, where does our company's management system come from? The INPUT source feed is found in three aspects:

- Legislation in force
- Recognised Organisms that deal with explosives
- Experience

An explosive waste management system arises from these three points that is carried out in three other very important aspects of OUTPUT.

- Procedures
- Personnel
- Installations

3. WHAT ARE THE INPUTS?

3.1 Legislation in force

Every country will have some sort of national regulations implemented that will condition the management system and which will always have to be complied with. In the case of Spain, three regulations stand out as good examples:

- Explosive Regulations
- Labour Risk Prevention Law
- Hazardous and Toxic Waste Law

However, there are also dozens of royal decrees that are applicable to explosive waste destruction and can be found within the framework of Hazardous Waste, Prevention Laws or environmental legislation.

3.2 Prestigious organisms in the chemical and explosives field

UEE's Explosive Waste Management system considers aspects such as FEIQUE's Commitment of Progress "Responsible Care" concerning environment and security issues,

which are also based on the good practice codes of FEEM, listed in their publications 12, 13 and 21.

3.3 Accumulated experience

The best way to avoid new accidents and incidents is to analyse the details of previous accidents and incidents. The causes must be analysed in order to draw appropriate conclusions. In order to do this, every incident, no matter how small it may be, is investigated by UEE's technicians who then create a report that becomes part of a file that has been increasing in size for dozens of years. Experience from other organisms like SAFEX is also beneficial. SAFEX plays an important role in these matters. Their files and accident databases are very useful.

Another useful tool that is also based on experience are Risk Evaluations. These evaluations must be applied to working methods used in operations like waste destruction. File reports from past incidents are also very useful for this task.

4. WHAT ARE THE OUTPUTS?

On the other hand, the OUTPUTS have been considered in completing UEE's explosive waste management system.

4.1 Procedures

With regard to those procedures related to this subject, it is important to point out that they must be exclusive to explosive waste elimination. In some ways, the natural characteristics of waste are essential and distinguish waste from the perfectly controlled characteristics of finished products. This means that the procedures related to transport or storing of finished products cannot be the same as those for explosive waste. Therefore, there are expressed procedures, which are used as models by UEE and are listed below:

- Destruction of explosive waste by means of combustion
- Destruction of explosive waste by means of detonation
- Handling and storing of explosive waste
- Storing and reusing material and equipment that has been contaminated by explosives
- Combustion of equipment with explosive waste

Each one of these procedures has their own peculiarities.

4.2 Personnel

The procedures must be appropriate and must be preceded by a risk evaluation. In addition, the personnel designated to carry out the job must follow them correctly. In order to do this, there are two very important aspects:

- Continuous training for personnel
- Exclusively dedicated "destruction team"

We believe that explosive waste elimination should be treated as part of the production process and not as something secondary that will be done by any ordinary employee. UEE has a "Destruction Team" that is exclusively dedicated to this task. Despite the fact that they know the working methods and installations perfectly, they must be holders of an special qualification for this purpose. Moreover they receive continuous information on the subject. It is a kind of "recycling method" that ensures an updated knowledge.

4.3 Installations

Installations are essential to carry out the elimination of wastes and must be appropriate for the task that is to be completed following the established procedures. These installations

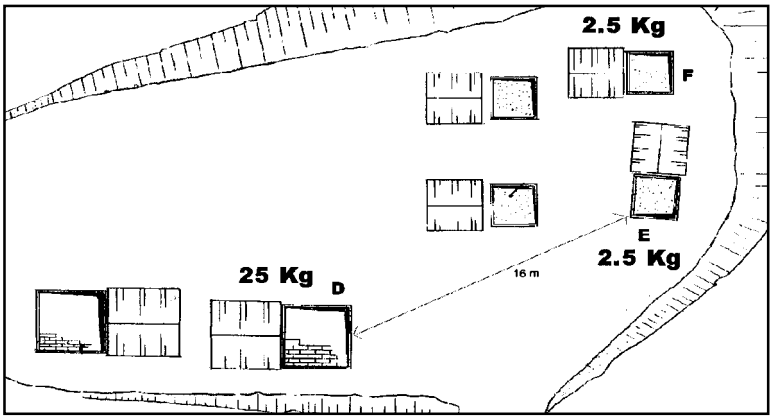
are shown during the lecture in small videos, and the methods of working are explained. In any case, some examples are shown. All of them enable the remains collection after the explosive disposal, may be considered safer than ground incineration, and do not implies a great inversion.

- OPEN INCINERATOR WITH REMOVABLE COVER

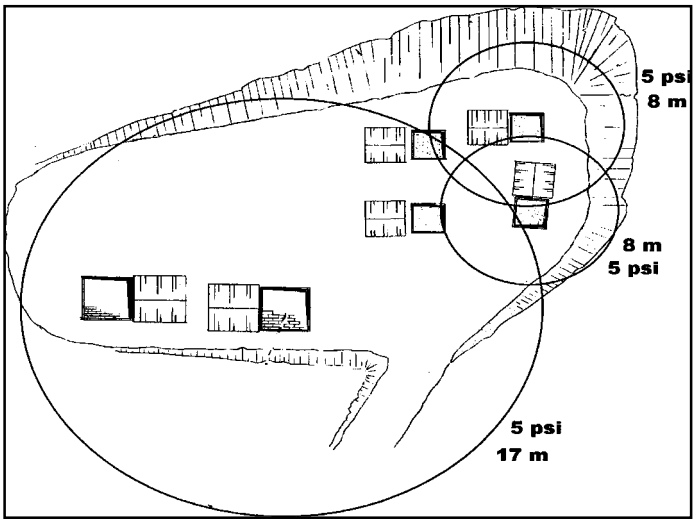
Very useful for detonating cord, PENT, TNT, pentolite...

Basing our information on FEEM's recommendations, the maximum amount to be destroyed is limited by the formula d=4.4 (Q)1/3 which gives the relationship between distance (d) and the quantity of explosive to be destroyed (Q). With 6 meters separating one unit from another, the maximum quantity established is 2.5 kg. of TNT equivalent. This would provoke an overpressure of 8 psi. There is no danger of detonation because of the proximity of other explosives.

In special cases, an installation with these characteristics could be used for larger quantities of explosives. For example, in our situation with six of these construction, if three basins on one hand and the other three on the other are alternatively used to achieve a maximum separation distance, more relevant quantities could be reached. Even though it is accepted by the formula d=4.4 (Q)1/3 , it is not recommended to surpass 10 Kg per lot of explosives containing nitro-glycerine or 25 Kg for emulsions and watergels. In these conditions and for the assumed explosive emulsions and watergels, the results of using basins D, E and F for this case would be the following:



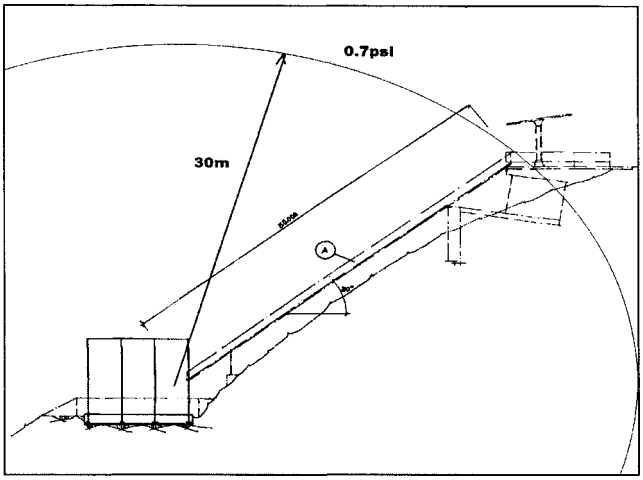
If this case were used to study the consequences of an eventual accident, we would find a danger zone subject to 5 psi (which is the level at which eardrums start to break). Operators handling these quantities would have to keep a safe distance of 120 meters and be safe from fragments. The overpressure of a detonation at this distance would be 0.03 psi (140 dB sound level), which means the individual is out of any possible danger:



• NON-STOP LOADING OPEN INCINERATOR

Used for granular explosives, some powders, packaging and bags that have been in contact with the explosive material...

The overpressure calculation at the distance from the worker feeds the installation helps to limit the maximum quantities that the installation can hold without putting workers in danger in case of explosion during burning. The study performed is the same that in the previous example.



• SEMI-CLOSED CHAMBER INCINERATOR

This installation still could improve, with an open channel feed, which would increase safety levels because it allows a visual control of the feeding process. In addition, this installation concept could also be used for detonators. However, for this use, a stronger design would have to be planned.

• INCINERATION PLANT WITH FUME SCRUBBING

An enviromental friendly way of disposing the waste detonators is carried out in such an installation that is also used for the disposal of obsolete ammunition.

A flue-gas treatment cleans the fumes generated before their emission to the atmosphere according to the European Regulations. The inert components are recovered and sent to a Waste Management Authority.

5. CONCLUSIONS

- Explosive waste destruction should be considered part of the production process.
- There should be trained personnel solely dedicated to the destruction process.
- Destruction methods should be subject to a risk evaluation.
- Each process should be studied using the distance —> effect relationship, and use it to determine maximum quantities per operation.
- Exclusive procedures for explosive waste and its management should be written.
- Simple installations notably improve safety levels and environmental impact.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THEME III: EXPLOSIVES WASTE MANAGEMENT
EXPLOSIVE WASTE MANAGEMENT IN UEE. INSTALLATIONS FOR THE DISPOSAL
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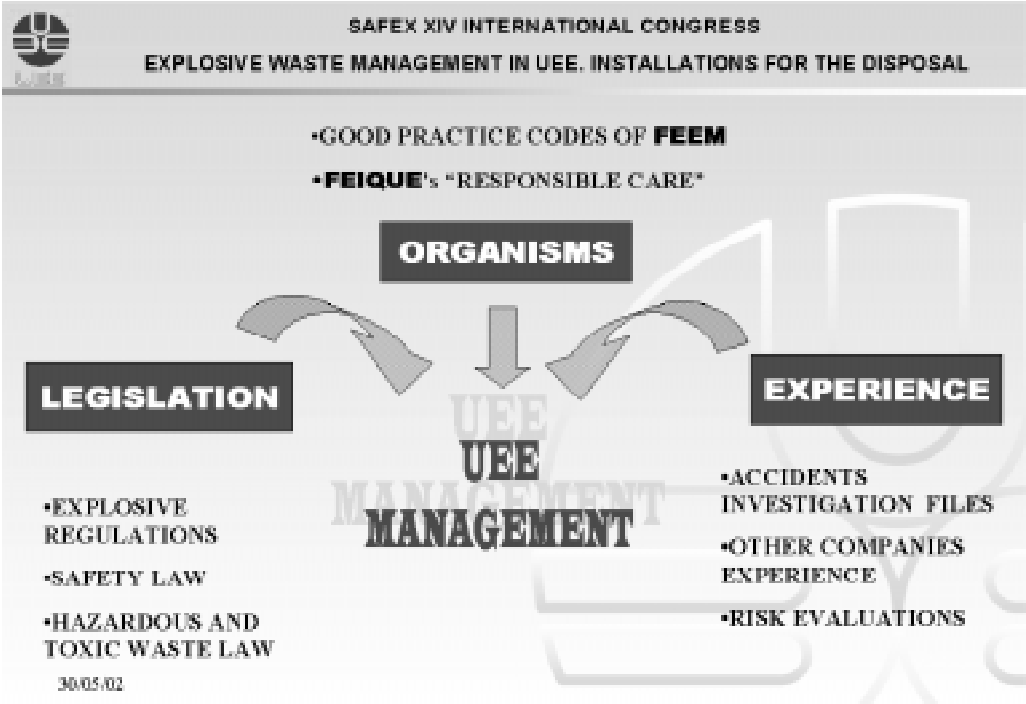
SAFEX XIV INTERNATIONAL CONGRESS
EXPLOSIVE WASTE MANAGEMENT IN UEE. INSTALLATIONS FOR THE DISPOSAL
ORGANISMS
LEGISLATION
EXPERIENCE
UEE
MANAGEMENT
PROCEDURES
PERSONNEL
INSTALLATIONS
30/05/02


SAFEX XIV INTERNATIONAL CONGRESS
EXPLOSIVE WASTE MANAGEMENT IN UEE. INSTALLATIONS FOR THE DISPOSAL
•GOOD PRACTICE CODES OF FEEM
•FEIQUE's "RESPONSIBLE CARE"
ORGANISMS
LEGISLATION
EXPERIENCE
UEE
MANAGEMENT
•EXPLOSIVE REGULATIONS
•SAFETY LAW
•HAZARDOUS AND TOXIC WASTE LAW
•ACCIDENTS INVESTIGATION FILES
•OTHER COMPANIES EXPERIENCE
•RISK EVALUATIONS
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UEE MANAGEMENT

PROCEDURES

- DESTRUCTION by MEANS OF COMBUSTION
- DESTRUCTION by MEANS OF DETONATION
- HANDLING AND STORAGE OF EXPLOSIVE WASTE
- STORAGE & REUSING
- COMBUSTION OF EQUIPMENT

PERSONNEL

- CONTINUOUS TRAINING FOR PERSONNEL
- EXCLUSIVELY DEDICATED "DESTRUCTION TEAM"

INSTALLATIONS

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EXPLOSIVE WASTE MANAGEMENT IN UEE. INSTALLATIONS FOR THE DISPOSAL

EXPLOSIVE WASTE DISPOSAL INSTALLATIONS

- INTRODUCTION
- OPEN INCINERATOR WITH REMOVABLE COVER
- NON-STOP LOADING OPEN INCINERATOR
- SEMI-CLOSED CHAMBER INCINERATOR
- INCINERATION PLANT

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CONCLUSIONS

- EXPLOSIVE WASTE DISPOSAL SHOULD BE CONSIDERATED PART OF THE PRODUCTION PROCESS
- THERE SHOUD BE TRAINED PERSONNEL SOLELY DEDICATED TO THE DISPOSAL PROCESS
- DESTRUCTION METHODS SHOULD BE SUBJECT TO A RISK EVALUATION
- EACH PROCESS SHOULD BE STUDIED USING THE DISTANCE → EFFECT RELATIONSHIP
- EXCLUSIVE PROCEDURES FOR THE ESPLOSIVE WASTE AND ITS MANAGEMENT SHOUL BE WRITTEN
- SIMPLE INSTALLATIONS NOTABLY IMPROVE SAFETY LEVELS AND ENVIROMENTAL IMPACT

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THEME III: EXPLOSIVES WASTE MANAGEMENT

EXPLOSIVE WASTE MANAGEMENT IN UEE. INSTALLATIONS FOR THE DISPOSAL

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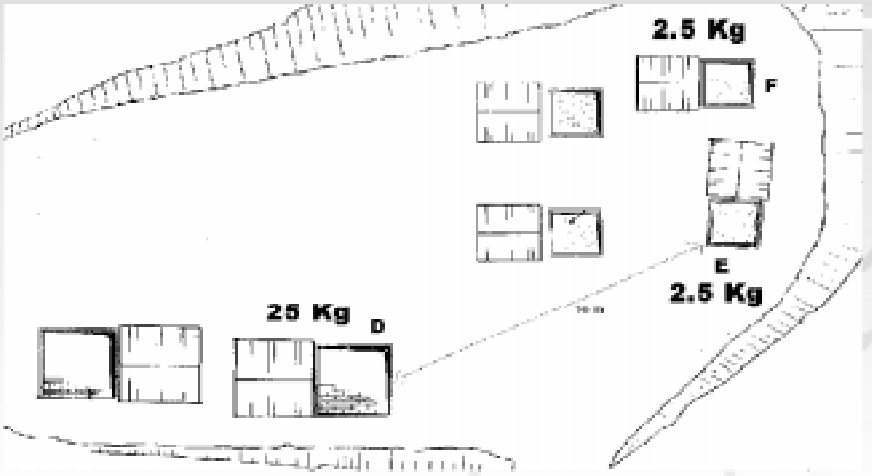
FORMULA $D=4.4\ (Q)^{1/3}$

10 Kilos MAX containing Nitroglycerine or 25 Kilos for Watergels



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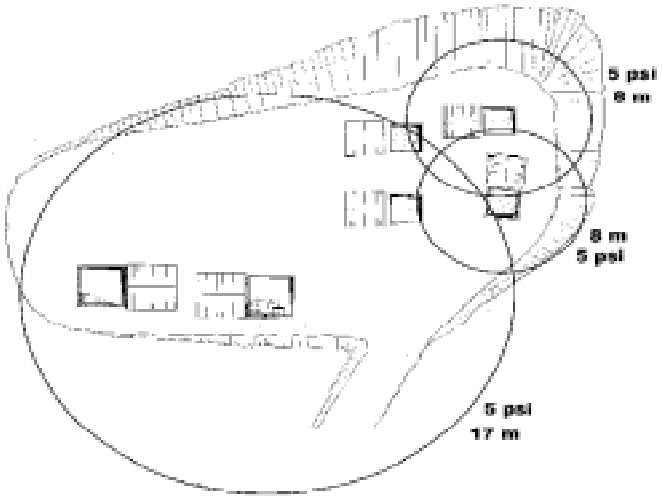

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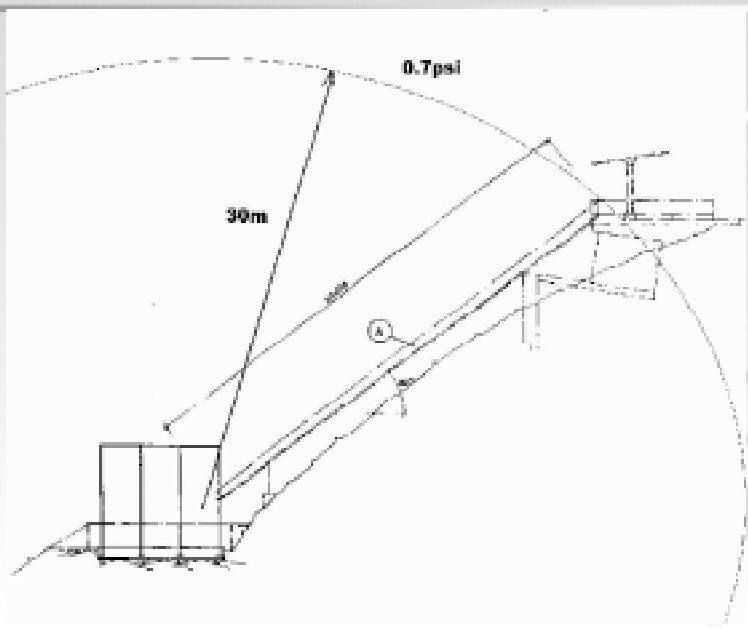

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