

# MJV

# Explosions and Pyrotechnics

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# Pattern of Risk

- Explosives vs. Pyrotechnics
- Responsible vs. Irresponsible?
- Corporate Culture vs. SMS privately owned
- Manufacturing vs. Storage and Distribution
- Old sites and manufacturing plant
- Warehousing, distribution and retail vs manufacturing
- Move over to MEMU; reduced bulk storage, reduced manufacturing
- AME import/manufacturing
- AME transport risk
- Ammunition risks?

*Complex regulatory framework and responsibilities in most countries. Split responsibility and diverse expertise*

Ministry of Labour

Ministry of Interior

Ministry of Defence

Ministry of Environment

Municipality and Police

SEVESO DIRECTIVE

NATIONAL EXPLOSIVES SAFETY REGULATIONS

NATIONAL EXPLOSIVES SECURITY REGULATIONS

MACHINERY DIRECTIVE

UN DIRECTIVE

<b>OPERATORS</b>	Explosives Top Tier	Explosives Lower Tier	Explosives Below Seveso
	Pyrotechnics Top Tier	Pyrotechnics Lower Tier	Pyrotechnics Below Seveso

Codes and Standards

Corporate Standards

Safety Report

Hazard Analysis

Site SMS

Practices and Procedures

**THIRD PARTIES.**

- Independent verifiers and plant certifiers
- Product certifiers CE
- Safety and Risk Consultants
- Operations, Maintenance and Design Contractors
- Industry organisations; SAFEX, FEEM, Pyrotechnics?
- Research/ Expert Bodies; BAM, HSL
- Insurance Companies

# Risk Drivers (1)

- Safety Culture in SMS
- Failure to appreciate risks;
  - Owners, municipalities, fire departments
- Disposal of munitions and off spec product
- Residences within hazard radius of old traditional plants
- Lack of industry guidance and SMS in fireworks industry
- Inventory control and storage of fireworks
- Control, marking and classification of imports
- Absence of common approach to structured hazard analysis such as FMEA or HAZOP
- Lack of effective emergency planning to suit hazards by fire departments and exposure of personnel
- Undeclared storage and distribution
- Lack of good practice in pyrotechnics industry compared with explosives

# Risk Drivers (2)

- Absence of common approach to structured hazard analysis such as FMEA or HAZOP
- Absence of simple structured hazard analysis for pyrotechnics storage and distribution
- Lack of effective emergency planning to suit hazards by fire departments and exposure of personnel
- Undeclared storage and distribution
- Lack of good practice in pyrotechnics industry compared with explosives
- Loading ANE trucks; how many on one site at one time; cross contamination?
- MEMU operators and relationship with Matrix suppliers and quarries/tunnelling/demolition operations?

# Safety Reports

- Quality?
- Written by consultants (same consultants, same report, different names?)
- Adequate/accurate description of plant, process, tasks and layout?
- Accurate and complete analysis of risks and effects?
- Structured process/ explosives safety analysis
- Description of SMS; plant, people, processes to manage risk? Adequate basis for inspection?
- Generic/specific emergency preparedness?

# Inspection (1)

- Lack of resources and expertise in Competent Authorities
- Joint inspections; Competent authority, municipality, explosives regulators, fire, police; *share knowledge, information, rumours?*
- Split responsibilities; is everything covered?
- Culture and attitude of operators, especially fireworks
- Site/Company risk ranking for inspection
- Emergency response plan

# Inspection (2)

- SMS
- Adequacy, knowledge and use of regulations, codes and good practice – FEEM
- Practices and procedures used by fireworks sites
- Competence and supervision
- Inventory classification, control, and record keeping
- Transient activities; assembly, movement of stock, filling trucks with ANE, packaging.....
- What else is going on?
- Open or temporary storage
- Building design and modification
- Competence; appreciation of classification
- Layout/ access/ escape routes



# Inspection (3)

- Management of change; what was the baseline; plant, people, processes?
- Audit and Improvement –do they audit, what did they find
- Accident reporting – internal systems, lessons learned?

# Emergency Preparedness and Response

- Accurate characterisation of effects; initial, domino and worst case
- Need to evacuate public to safe distance; awareness, numbers and resources
- Attraction of “ Firework Display” for the public and need to clear to safe zone
- Awareness that effects may be worse than predicted due to exceeding stated classifications and quantities
- Communication and appreciation of hazard potential
- Unpredictability of escalation and timing
- Risks to firefighters (and their limited effectiveness?)
- Toxic risks
- Escape routes/ fire department access (needed?)

# REQUEST

**Please send me your**

- Guidelines on inspection of explosives/  
pyrotechnics sites
- Safety bulletins issued by your department or  
industry in your company
- Key findings from investigations

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