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*
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**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

**Codes and Standards**

**Corporate Standards**

**Safety Report**

**Hazard Analysis**

**Site SMS**

**Practices and Procedures**

**MACHINERY DIRECTIVE**

**SEVESO DIRECTIVE**

**UN DIRECTIVE**

**NATIONAL EXPLOSIVES SAFETY REGULATIONS**

**NATIONAL EXPLOSIVES SECURITY REGULATIONS**

**Ministry of Labour**

**Ministry of Interior**

**Ministry of Defence**

**Ministry of Environment**

**Municipality and Police**
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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