XVIII SAFEX CONGRESS (2014)

AN SHIPMENT FIRE – THE EVENT AND KEY LESSONS

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ABSTRACT

- **What:** A road accident causes a fire on a truck carrying 21 metric tons of AN that affects the load
- **When:** 2:10 am on 4th October 2011
- **Where:** Highway Dammam – Somman site (KSA)
- **How:** Mechanical failure in wheel creates fire in tyre
  Fire is transferred to the container
- **Effects:** No personal injuries
  Damages on container and truck chassis
  16 out of 21.5 tons of AN as waste
  Disturbance of public traffic

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Location of Incident

Saudi Arabia High way no 40 Dammam to Riyadh. 80 km from site

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Purpose of the Presentation

- Explain the happenings that followed the incident
- Go back to the causes that led to the event
- Review the suitability of actions and analyze the emergency response
- Provide key learnings to minimize risk in the future

Background - Company

civil explosives manufacturing and supply

J.V.

Drilling and blasting services

Modern Chemicals and Services

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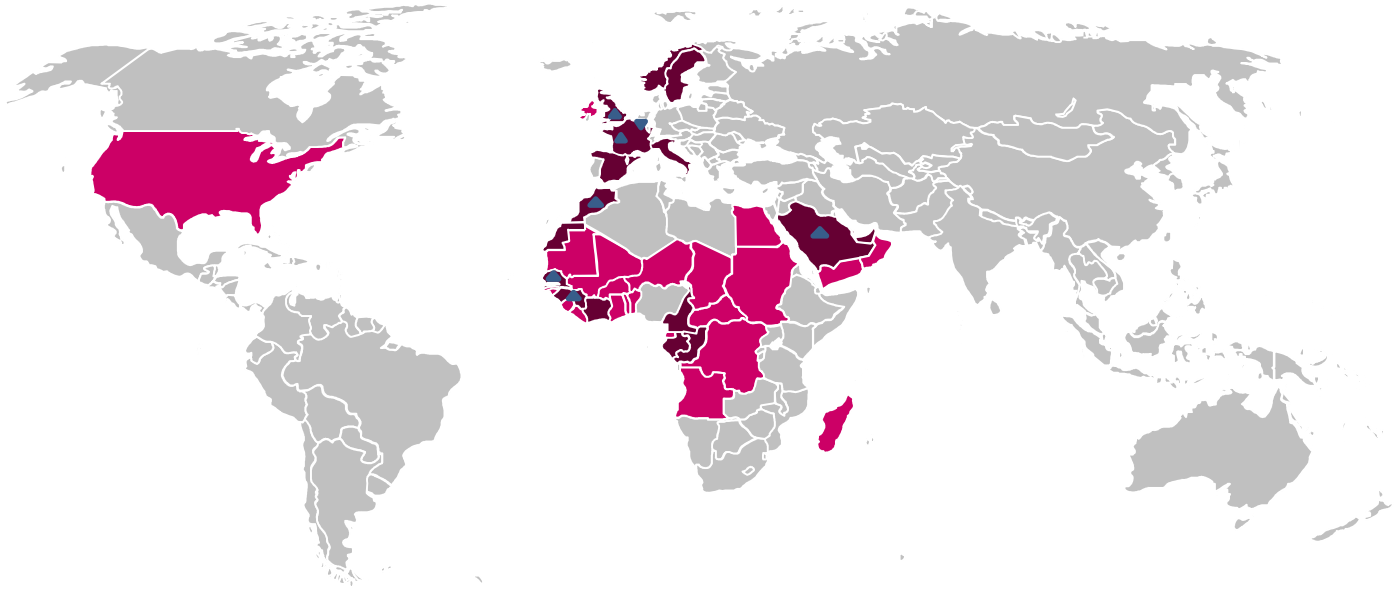
EPC GROUPE - SUMMARY

The EPC Groupe was established in 1893.

The group's core activity is the manufacturing and supplying of commercial explosive and tailor-made services to the mining, cement, aggregates and civil engineering industries.

EPC has expanded into a multinational organisation with activities in Europe, US, Africa and the Middle East.



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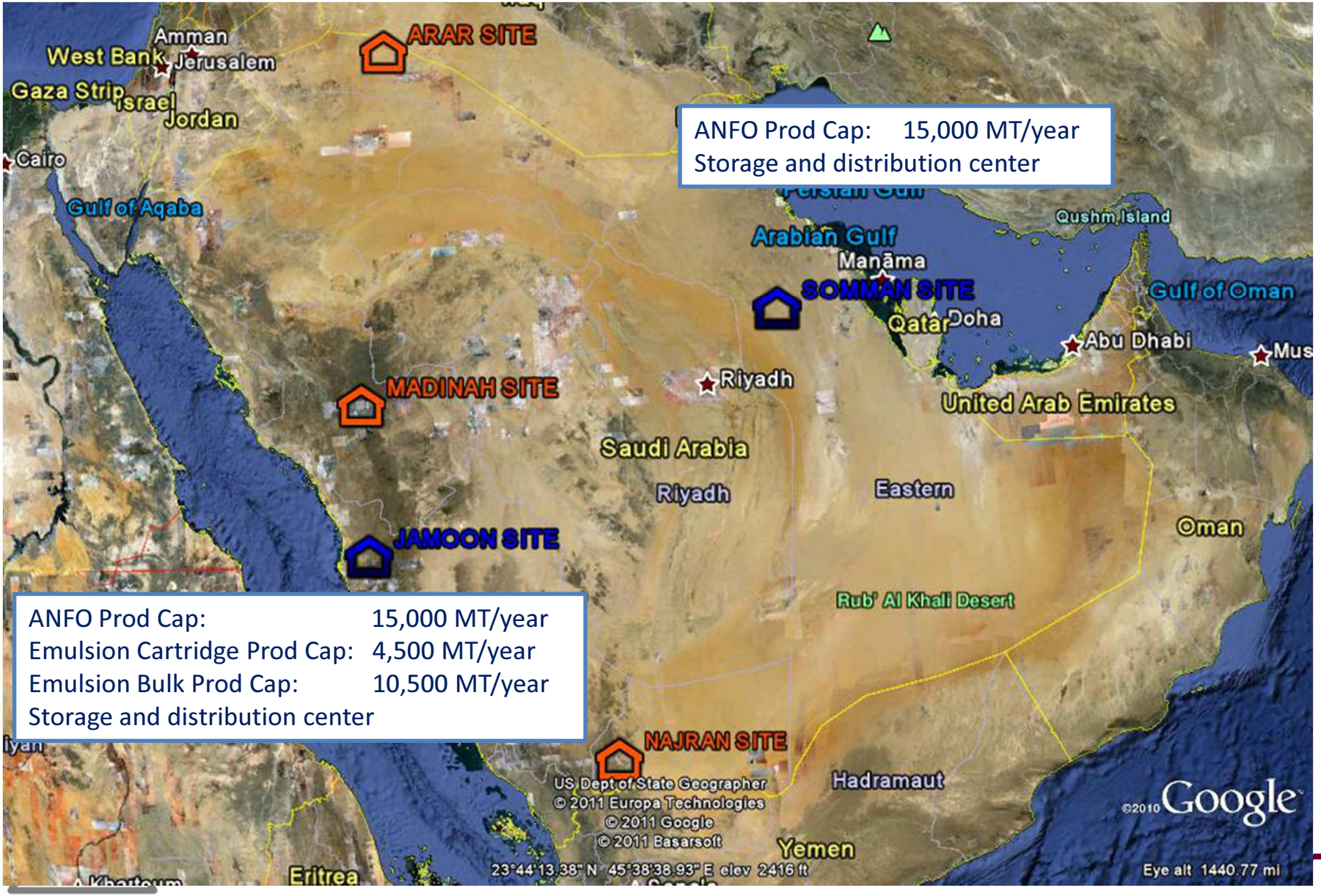
MCS Sites in Saudi Arabia



Site layout - SOMMAN

AN storage and ANFO production

nes view

Garage, security Buildings,
utilities, accommodation

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ANFO PRODUCTION

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Buildings – EMULSION PLANT

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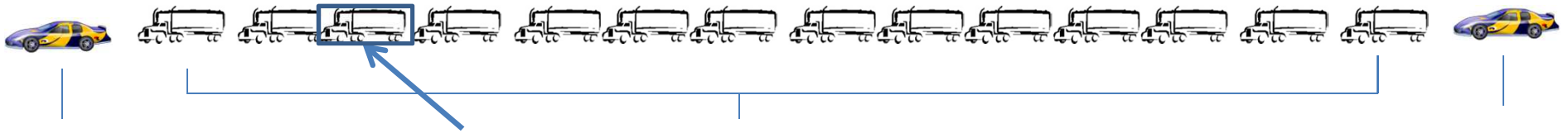
Background - ENVIRONMENT

- Saudi Arabia has one the highest Road Accident death toll in the world
- Increasing efforts from authorities to improve road safety (general trafic and dangerous goods)
- Long distance transports
- Ammonium Nitrate is subject to direct delivery and escort

Description of Incident

- On 4th October 2011, 14 trucks carrying AN leave from Dammam port direction to MCS Somman site
- Escorted by 2 cars of the company
- Transport was contracted to Freight and Forwarder company, that at the same time subcontracted to another transport company
- Not being the usual trucks, they were not inspected prior to departure
- Containers transported in flat bed trailers
- 80 km from Somman site the right rear tyres of the 3rd truck catches fire
- Truck is parked on side of highway and drivers try to extinguish fire with 2 DCP fire extinguishers, but gets rapidly out of control
- Other 13 trucks parked away from incident location. Safety distance established



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Sequence of Events

2.10 am: Tyre of the 3rd truck catches fire

2.15 am: Civil Defense is informed

2.18 am: Incident controller & Key personnel Somman and HO informed

2.35 am: Civil Defense arrives to the accident site

2.53 am: Key Personnel from Somman Site arrives

2.55 am: Tractor head is removed from the trailer

3.05 am: Circulation on the road is re-opened. Remaining 13 trucks continue their way

2.35 am to 5.45 am: Fire Fighting takes place

1 pm: Container is moved to Somman site with a replacement truck

Fire Fighting

- 2.10 am: Fire is fought with 2 DCP fire extinguishers. No more fire extinguishers were found in the 14 trucks of the convoy.
  - The heat transferred from tyres ignited the plywood
- 2.35 am to 5.45 am: Fire fighting by Civil Defence
  - 3.10 am Container was opened to avoid confinement and allow to fight the fire
  - The extinguishing agents were water and foam
  - Area remained under observation from 4.30 am to 4.40 am
  - 4.40 am: Flares detected again
  - 5.45 am: Fire was totally extinguished

Impact

No personal injuries.

Other effects were:

- Disturbance of general traffic on the road,
- Environment affected by toxic fumes and flames,
- Delay in the delivery of raw materials and economic losses for the company.

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Investigation

Immediate Cause:

- Disk of one rim in the back right axle of the trailer got damaged, friction in the rim caused sparks, that ignited the tyre
- Only 7 wheels in the 2 rear axles (supposed to be 8)

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Investigation

Basic Causes:

- Defective maintenance of the vehicle:
  - Missing wheel in the axle
  - Excessive wear of tyres

- Lack of control of conditions of the truck: Deficiencies not detected
  - MCS contracted custom clearance and transport to Freight Forwarder
  - FF subcontracted transport to a 3rd party without notification to MCS
    - Insufficient contractual provisions
    - Weak homologation process
  - All 14 trucks were not inspected prior to departure
    - Verification measures used by MCS on own trucks were not applied to subcontracts

Investigation

Conditions that increased the gravity of the incident:

- Non-availability of sufficient fire extinguishers
- Bad condition of existing fire extinguishers
- Lack of training of drivers in the use of fire extinguishers
- General deficiencies in rest of trucks not affected by the fire. The incident suffered by the 3rd truck could have happened in any of the other vehicles

Emergency Procedure

Main parts involved in Emergency Response (details in Congress Papers):

- MCS Escort of delivery – Primary response team
- MCS Somman site manager
- MCS Safety officer
- MCS Security Supervisor
- MCS General Manager
- Civil Defence team deployed to accident
- General Security for Weapons and Explosives Department

Emergency Procedure

Main points observed:

- Need to improve communication channels.
  - Some key persons not available immediately
  - Part of the critical communications were done by email instead of phone

- ***Some response actions were not clear***
  - Decision to open container and **fight the fire** was taken by judging situation
  - Emergency **procedure did not clearly specify how to proceed**
  - This action was taken only after 1 hour

CONCLUSIONS

- Main reason of the accident was defective maintenance of the truck
- The severity was increased by deficiencies of training and equipment
- The problems were not detected due to insufficient control of subcontracted services
- Emergency procedure worked in general correctly, but issues of communication and need of defining clear actions for specific situations were detected
- Prior training in similar events helped in evaluating the risk of the situation, however some of the key learnings were not applied
- Decision to fight the fire could have resulted in serious personnel injuries or casualties.

ACTION PLAN

- Modification of the homologation procedure for all subcontracted operations and for transport activities specifically
- Review of subcontract agreements to include the minimum safety requirements
- Inspection of all vehicles before and after deliveries (checklists)
- Review emergency procedures (communication and response to situations)
- Perform mock drills in coordination with Civil Defence and Security Forces

KEY LEARNINGS

- It is necessary to have clear control and understanding of subcontracting chain for services that affect directly the safe transport, handling and use of dangerous goods
- Outsourced services must follow the same safety criteria than in-house operations
- An event that could have been controlled in the early stages became critical due to insufficient or defective equipment and training
- The simulation of crisis situations would have helped in preventing the deficiencies in emergency procedures