



Onsite Explosives Mixing & Deploying

**Atlantic Alliance V
Leesburg, Virginia
25 September, 2008**

DYNO
Dyno Nobel

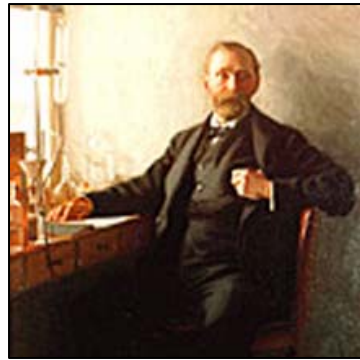
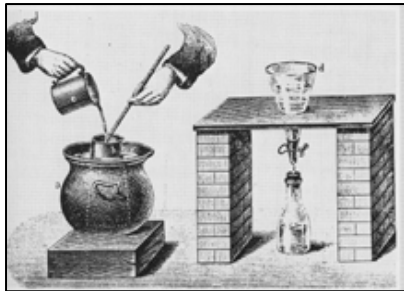
Groundbreaking Performance

Dyno Nobel



- A division of Incitec Pivot Ltd (IPL).
- World #2 explosives producer.
- 4,500 employees in 10 countries.
- \$1.2B in revenue in 2007
- Complete vertical integration:
 - Oxidizers (Ammonium nitrate)
 - Fertilizers
 - Emulsions
 - Packaged explosives (dynamite)
 - Initiating systems
 - Delivery systems
 - Drilling, blasting & consulting services

The Recent History of Explosives



Water Gels

Ammonium nitrate

TNT



FIG. 91—ELECTRIC BLASTING CAP CROSS SECTION

ANFO



1863

1866

1866

1884

1950's

1956

1969

1971

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Groundbreaking Performance

Ammonium Nitrate



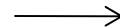
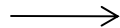
[Ammonia + nitric acid] + [H₂O] + [Oil] + [Surfactant] = Emulsion

[Emulsion] + [sensitizer] = bulk sensitized emulsion

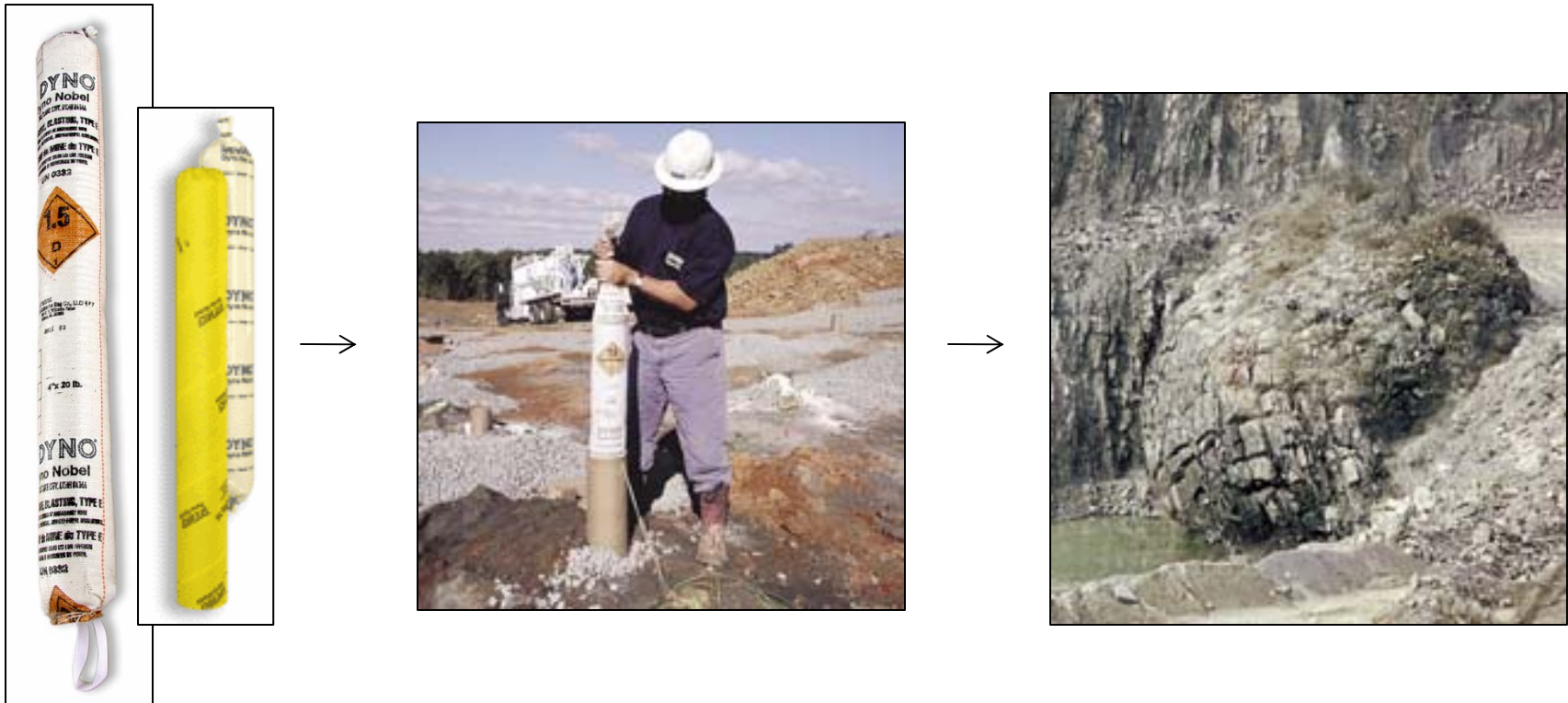
Emulsions

Benefits

- Improved manufacturing, distribution & application safety.
- Custom formulations (fixed site, packaged & on-site).
- Enhanced performance (explosive power).
- Can work in either wet or dry conditions.
- Full borehole coupling optimizes energy transfer.



Packaged Products



Dynamite, ANFO, emulsions

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Groundbreaking Performance

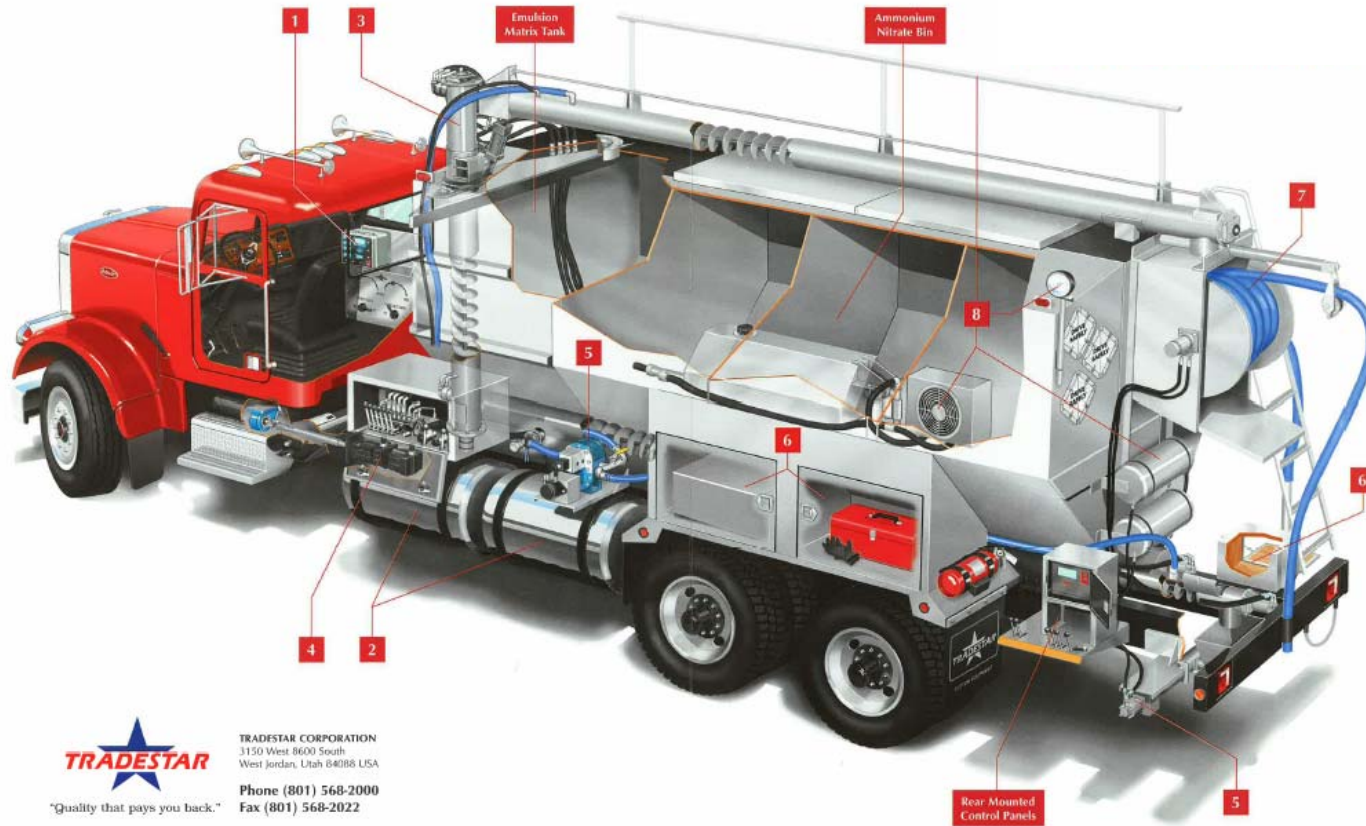
Delivery Systems



Bulk delivery truck vs MPU



MPU: Multiple Processing Unit



"Quality that pays you back."

TRADESTAR CORPORATION
3150 West 8600 South
West Jordan, Utah 84088 USA

Phone (801) 568-2000
Fax (801) 568-2022

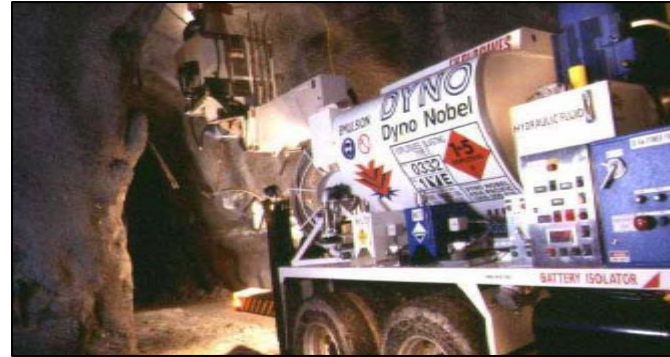
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Groundbreaking Performance

MPU's: Application Specification



MPU: Application Specification



MPU's: Application Specific



MPU Safety Engineering

Transfer Pumps:
High temp & pressure, low
flow shutdowns with rupture
discs.



Electro-hydraulic Controls:
Minimize loading errors.

Portable, Pneumatic U/G MPU's



Portable, Pneumatic U/G MPU's



The Near Future



Mobile, project-based, bulk emulsion plants

Toulouse, France: 23 September, 2001

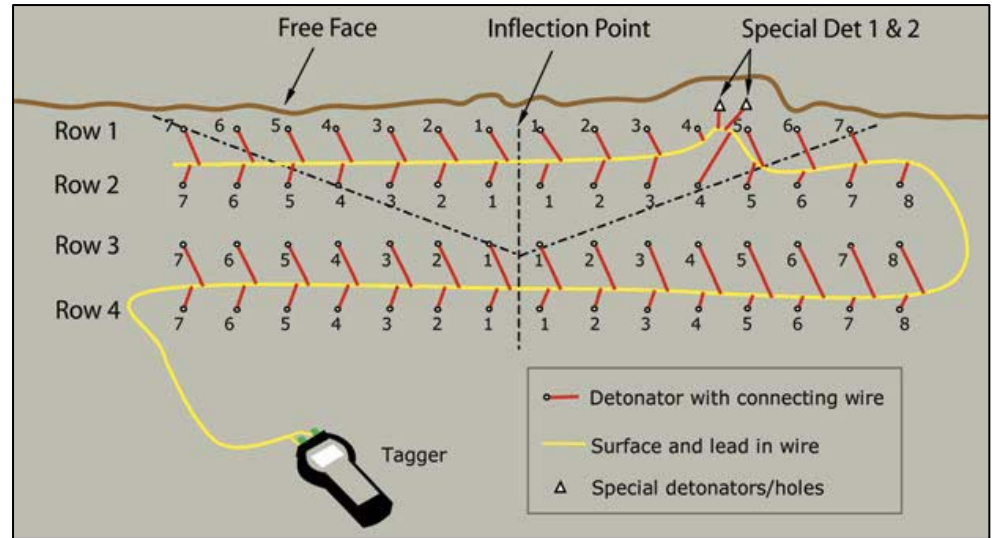
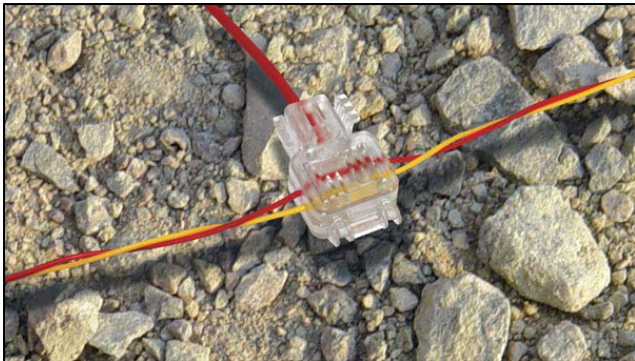


250 tons of ammonium nitrate

Initiating Systems: Electric & Non-electric



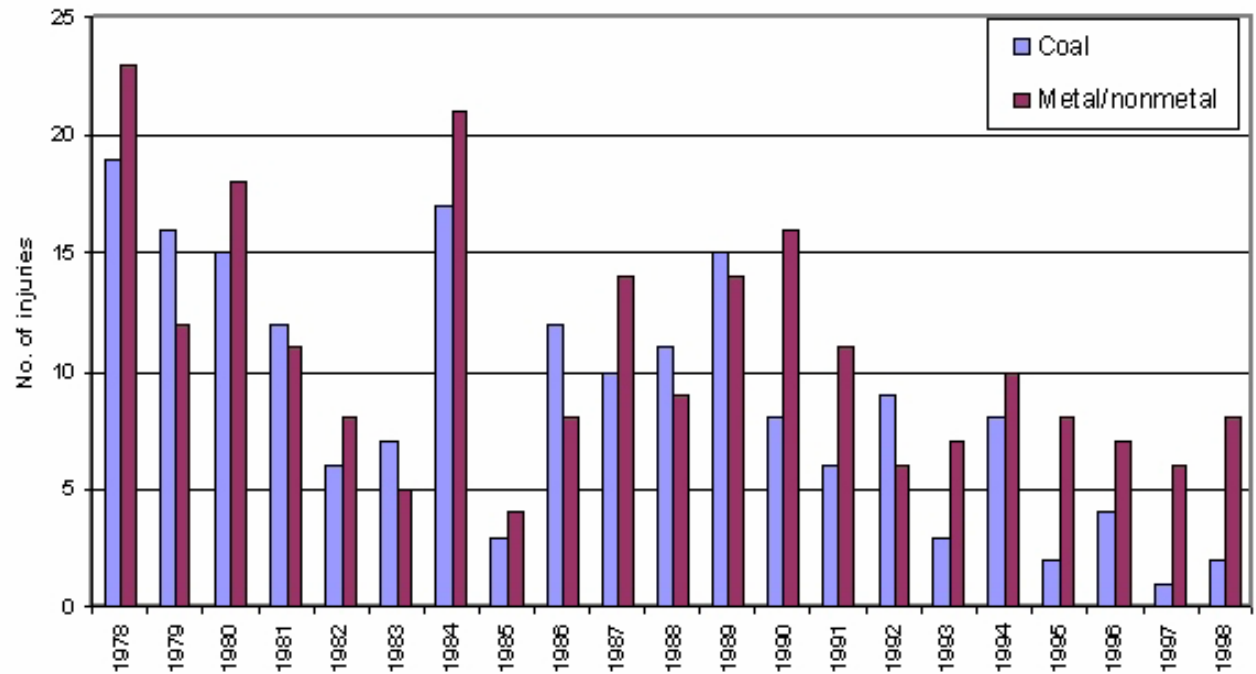
Initiation Systems: Electronic



Onsite Mixing & Blasting Safety Issues

- **Blast site security & control.**
- **Premature detonation: lightening, procedural errors.**
 - Lightening detectors
- **Toxic gases: CO, N₂O, NO₂.**
 - Oxidizer = Fuel: minimum potential for gas evolution
 - Oxidizer > Fuel: potential for NO_x evolution.
 - Oxidizer < Fuel: potential for CO evolution.
- **Improper blast design & management: fly rock.**

Blasting Injuries In Surface Mines United States (1978 – 1998)



Source: NIOSH

Ammonium Nitrate

“As they contain no ingredient that is an explosive in itself, and also because of the desensitizing effect of the water content, all such emulsions have a high degree of inherent safety.”

Rock Blasting & Explosives Engineering



Hwy 30 Cuatrocienegas, Mexico

7 September 2007

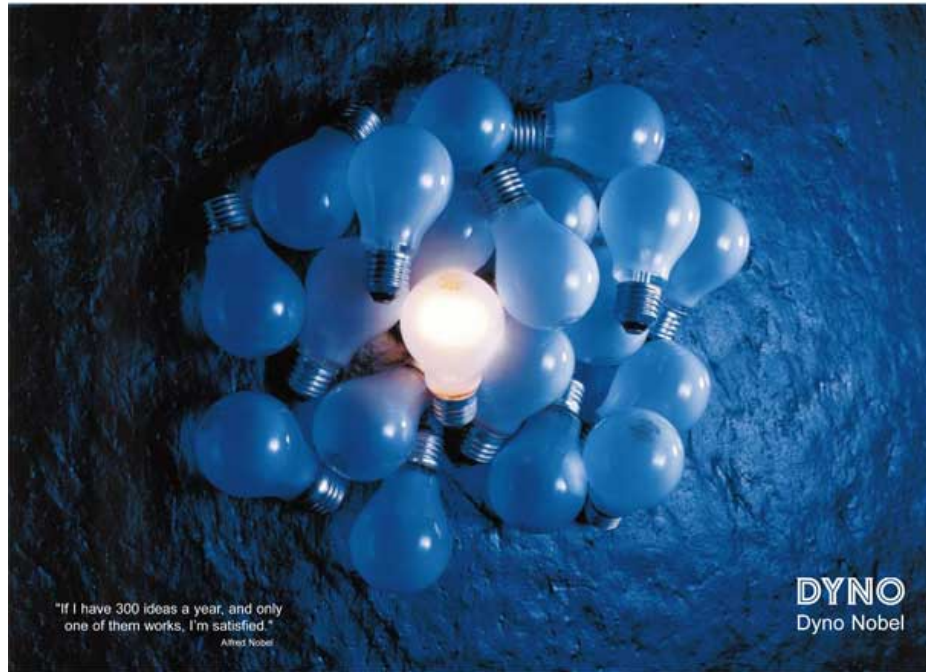


28 fatalities & 250 injuries

The Last Word in Explosives Safety



Thank You Atlantic Alliance



“If I have 300 ideas in a year and only one works, I’m satisfied”
Albert Nobel

Thank You For Your Attention

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