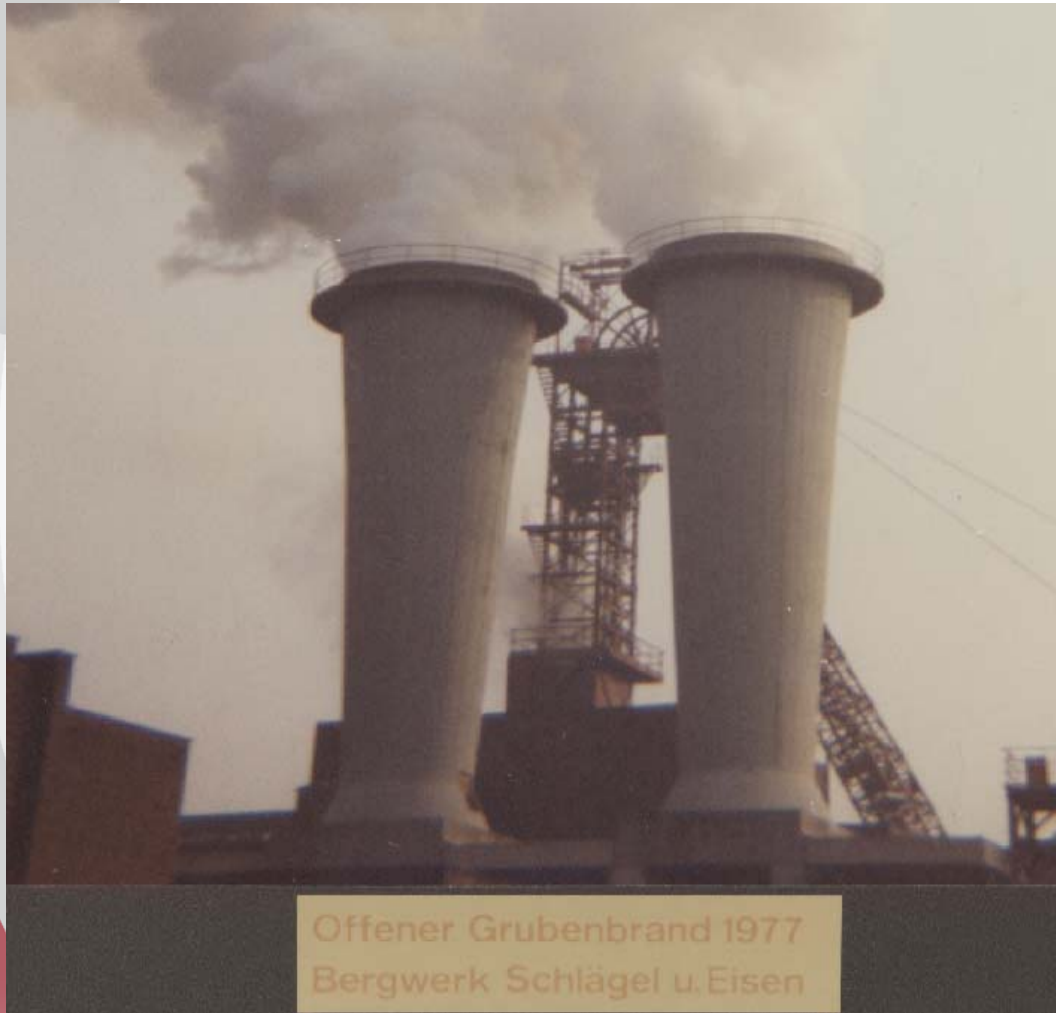


# Fire Prevention in Underground Mining – Requirements for Equipment in Germany and Europe

Christoph Möller, M.Sc.  
DMT – Test Body for Fire Protection

## Pit fires



Offener Grubenbrand 1977  
Bergwerk Schlängel u. Eisen

27.10.1977

open pit fire  
at „Schlängel & Eisen“  
coal mine  
(Essen, Germany)

7 casualties



[1]



[1] [http://images.clipartlogo.com/files/images/37/370750/fire-clip-art\\_f.jpg](http://images.clipartlogo.com/files/images/37/370750/fire-clip-art_f.jpg)

„self-extinguishing“ conveyor belts („V-belts“)

fire resistant fluids (7th Luxembourg report)



fire resistant PUR

water trough barriers

DIN EN ISO 284

DIN 22100

ISO 12922



7th Luxembourg report

DIN EN 1554

DIN EN ISO 15029-1

DIN EN 12881-1



DIN 22118

GesBergV

DIN EN 14973

DIN EN 12882

DIN EN ISO 20823

DIN EN ISO 340

# Today's standards

conveyor  
belts

hydraulic  
fluids

(PUR)  
foams

plastics

# conveyor belts

## for use in underground installations DIN EN 14 973

- classes A, B1, B2, C1, C2
- tests according to
  - ISO 340 (laboratory scale)
  - ISO 284 (electrical conductivity)
  - DIN EN 1554 (drum friction)
  - DIN EN 12881-1 (mid-scale)
  - DIN EN 12882 (large scale)



# hydraulic fluids

## lubricants, industrial oils and related products ISO 12922

- categories HFAE, HFAS, HFB, HFC, HFDR, HFDU
- tests according to
  - ISO 20823 (hot surface)
  - ISO 14935 (wickflame persistence)
  - ISO 15029-1 (spray ignition)
  - ISO 15029-2 (spray ignition)



# (PUR) foams

## health protection mining resolution Gesundheitsschutz-Bergverordnung GesBergV

- injection resins
- foams for filling cavities
- fire tests only a part besides hygienic requirements, etc.
  - curing temperature
  - foam consistency and its tendency to self-ignite
  - large scale fire test



# plastics

## articles and materials from synthetics for use in underground mines DIN 22100-7

- fire and health safety as well as electrostatic demands
  - ducting
  - hoses
  - v-belts, drive belts
  - brake lining
  - pipes
  - and many more



## summary

- fire safety is important for (underground) mines
- improving combustion characteristics of plastics may help against fire emergence and spread
- test standards create a certain level of safety

**→ prevention is better than cure**

# Thank you very much for your attention

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