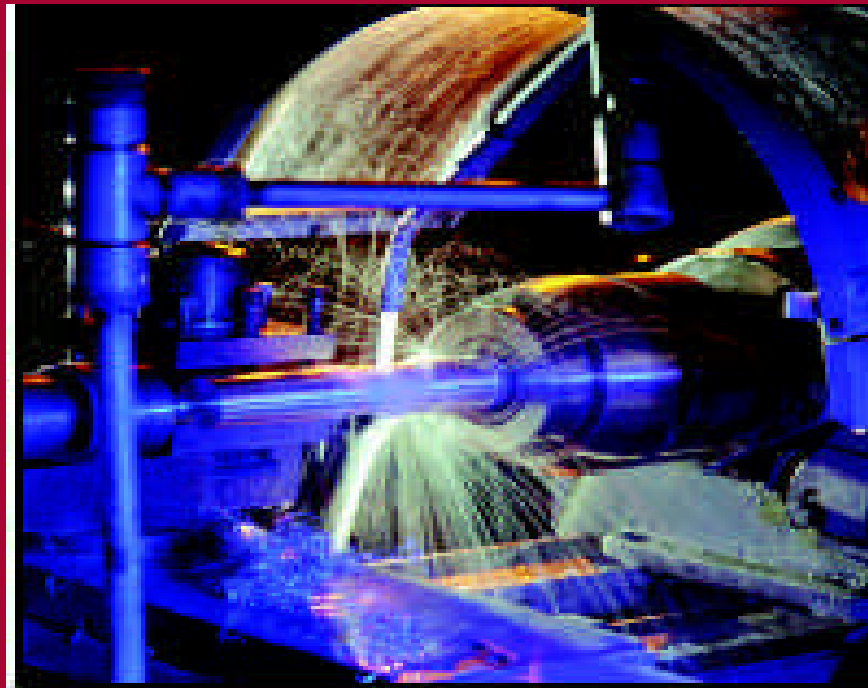


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[www.hse.gov.uk/metalworking](http://www.hse.gov.uk/metalworking)



# Outbreak of lung disease at Powertrain

Investigation and emerging  
lessons

# Why it matters

Outbreak has changed the perception of risk

Thousands of workplaces use metalworking fluids

Tens of thousands of workers are exposed

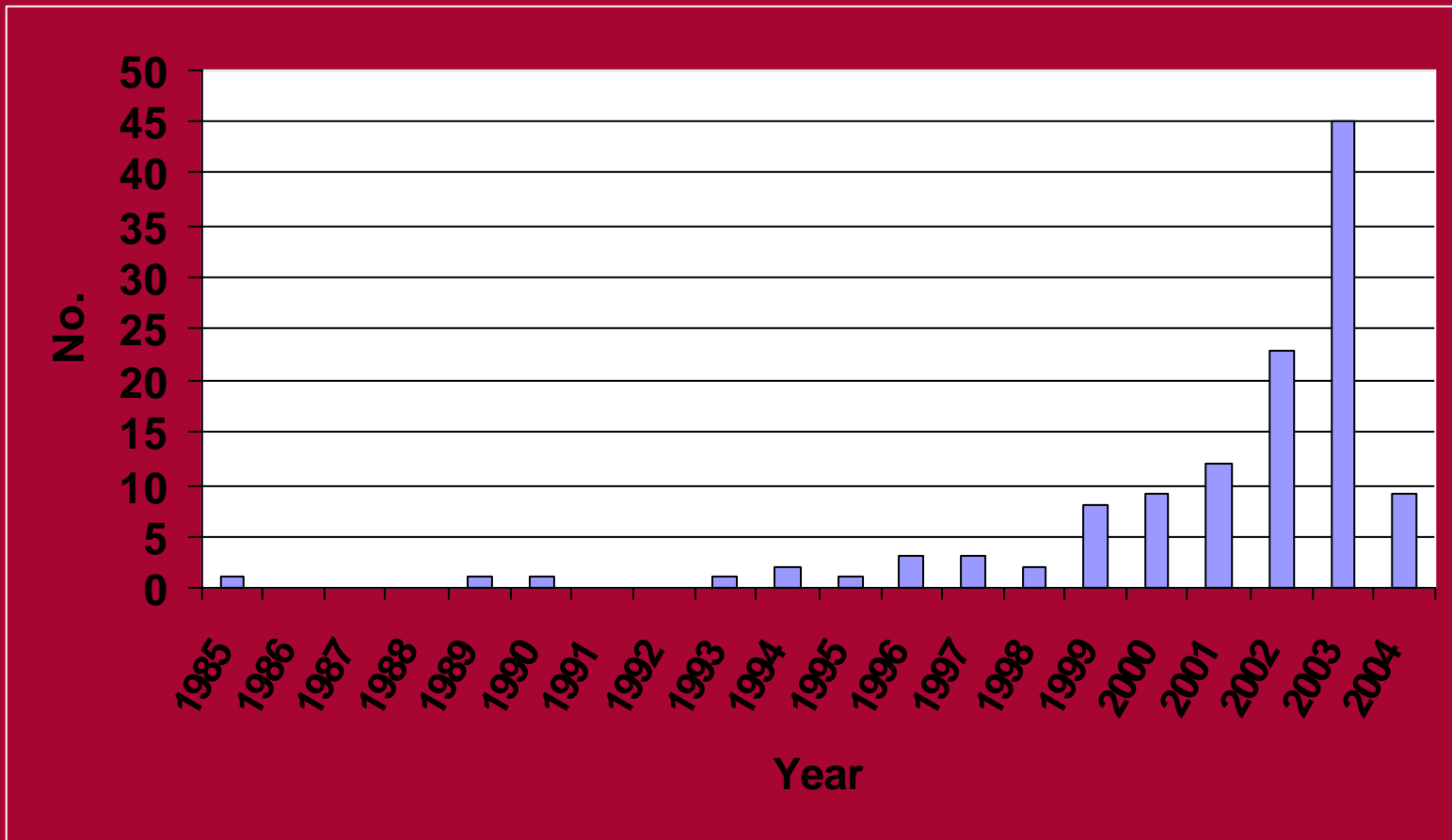
# Investigation

- Multi – agency investigation
- HSE
- Health and Safety Laboratory (HSL)
- Birmingham Chest Clinic (BCC)
- Other experts and peer review

## Outbreak – of what?

- The world's largest recorded outbreak linked to metalworking fluids (MWF)
- 101 definite and probable cases diagnosed
- 87 - occupational asthma (OA)  
24 - extrinsic allergic alveolitis (EAA)
- Some have more than one disease
- Some very badly affected

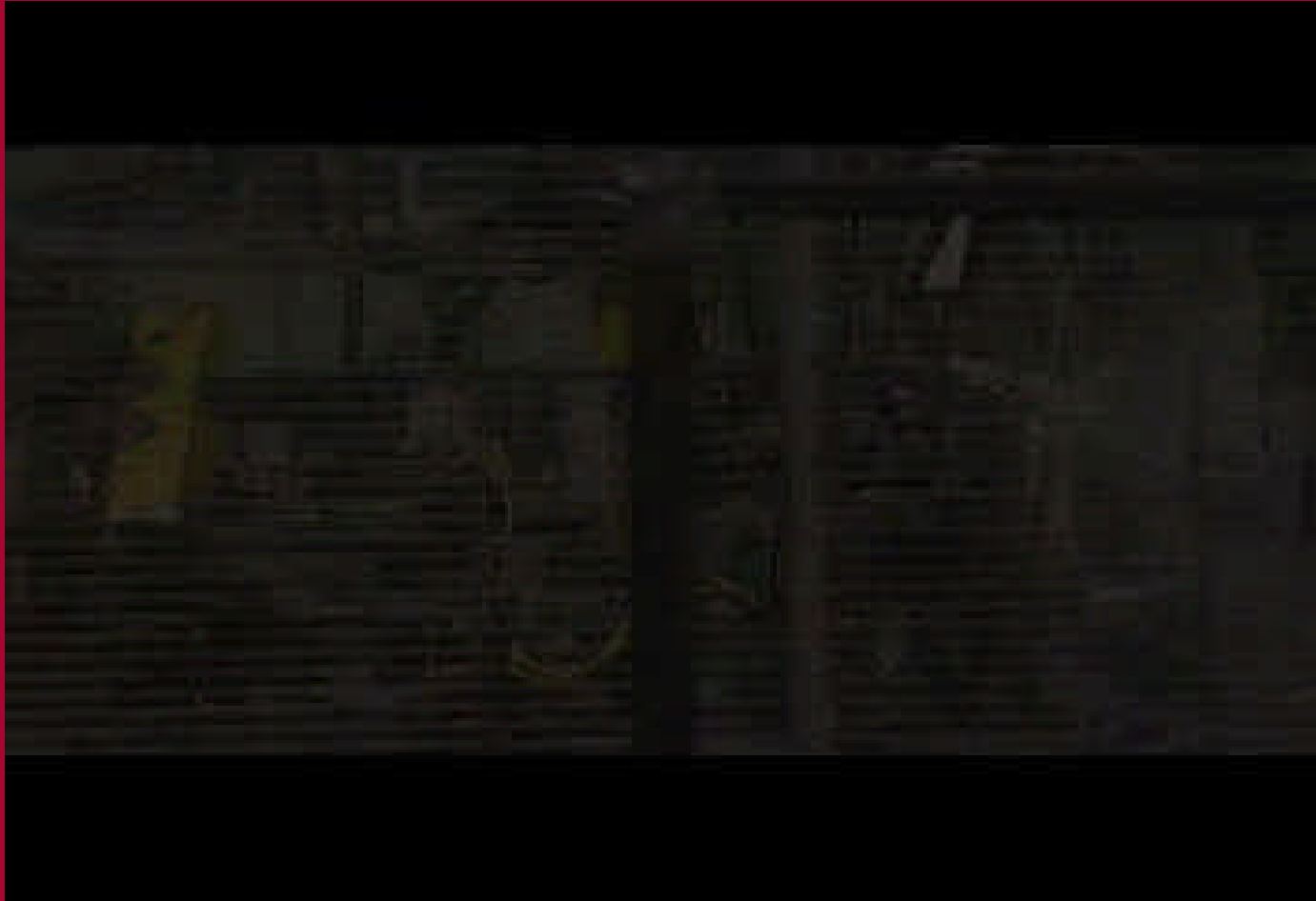
# Outbreak – onsets of breathlessness - when?



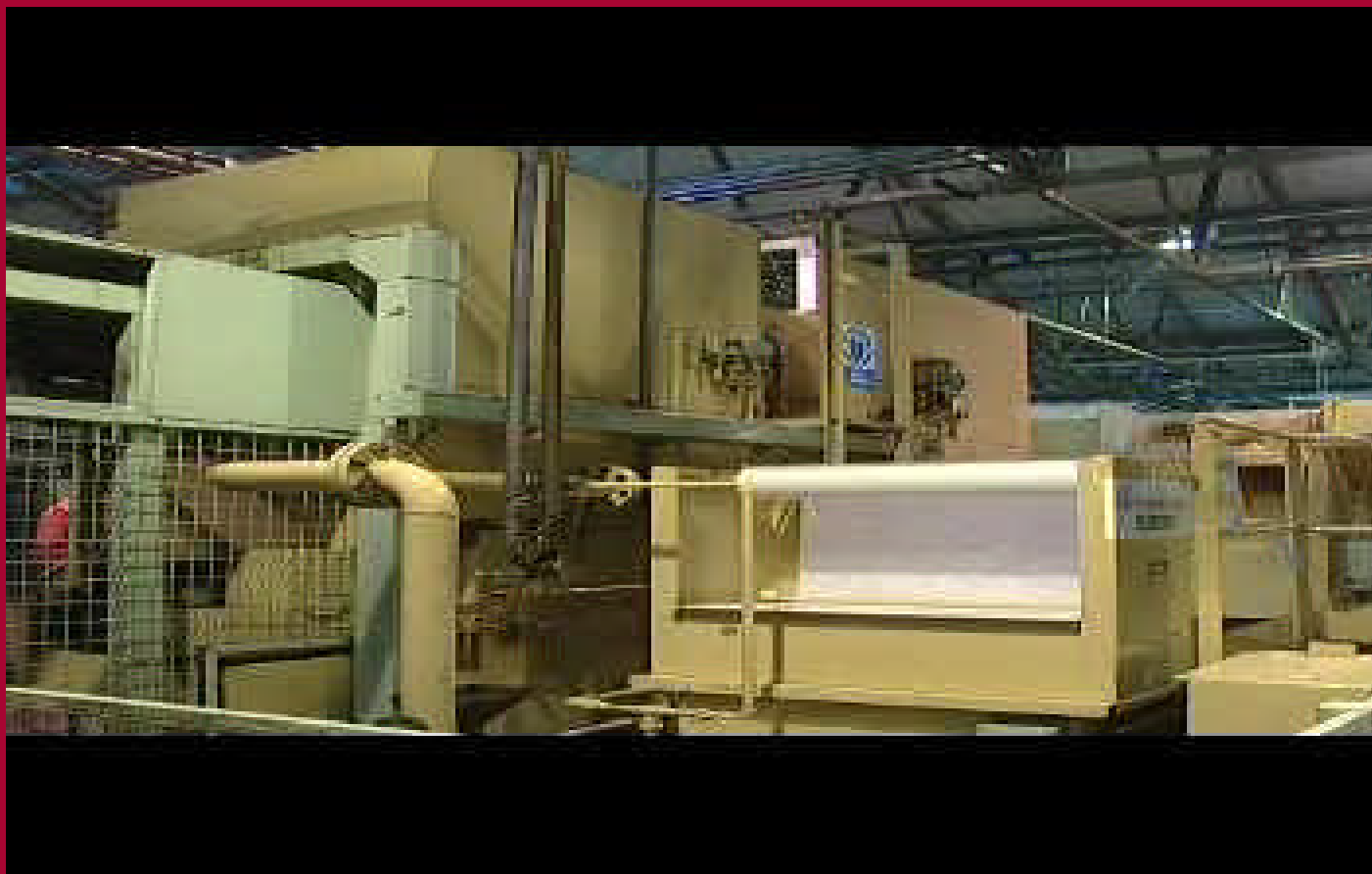
## Outbreak – cause?

- Mist from metalworking and possibly also washing machines

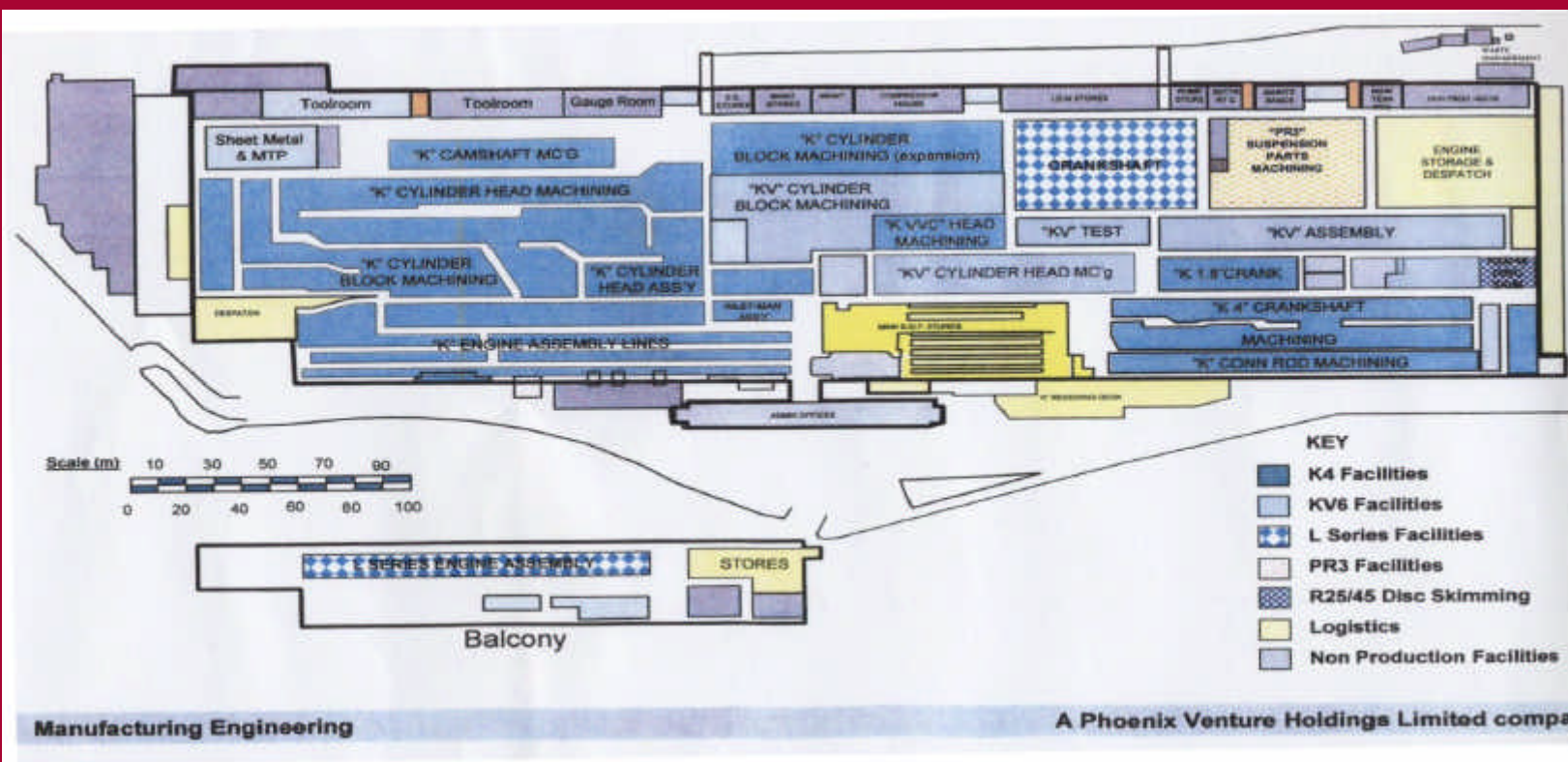
# Mist from metalworking



# Mist from washing



# Mist – where?



## How much mist was there?

- Amount of mist variable
- When measured during the outbreak found to be within guidance values
- $1\text{mg/m}^3$  for mwf concentrate and  $3\text{mg/m}^3$  for mineral oil
- Guidance values now withdrawn

# What was in the mist?

- Metals from machining
- Chemicals – additives
- Micro- organisms, including bacteria
- Proportions and make – up of constituents change in use

# Metals and chemicals

- Metals, potential sensitisers and chemical constituents
- But none calculated to be at harmful levels
- No reaction to unused mwf from large sump

## Bacteria (measured in 2004)

- Large MWF sumps had traces of two types of bacteria (*Ochrobactrum* and *Acinetobacter*)
- Smaller MWF and washing machine sumps had up to 10 million bacteria (including *Ochrobactrum* and *Acinetobacter*) and 300,000 endotoxin units per ml
- No *Mycobacterium* found

## Bacteria tests

- Sera from 3 workers with EAA and 2 with OA showed response to extract from large Mayfram sump
- Sera from 10 workers with EAA showed response to *Ochrobactrum* and *Acinetobacter* from Mayfram
- Larger scale tests showed a few responses to specific bacteria

# Chest Clinic Breathing Challenge tests

- One worker with EAA and one with OA
- Significant reaction to samples of used MWF from largest (Mayfram) sump
- No reaction to samples of unused MWF for same sump

## Cause summary

- Used mwfs
- Bacteria played a part in EAA
- Low likelihood of other causes
- Enough information gained to clarify risk factors and warrant new guidance

# Research

- Continuing epidemiology
- How fast can bacteria grow in fluids?
- Can mist transfer bacteria between machines?
- How dangerous are other processes in other industries which produce a lot of mist?

## Emerging lessons

- Risk assessments need to address risk of serious lung disease, including EAA
- Fluid management needs to include measurement and control of bacteria in fluids
- Better prevention/control of mist needed
- Health surveillance needed where there is exposure to mist

## Doing better – how?

- Updated guidance at [www.hse.gov.uk/metalorking](http://www.hse.gov.uk/metalorking)
- Reducing risks at large users – questionnaires with follow - up
- Reducing risks at small users – road shows with follow – up
- Publicity – HSL workshop, articles, MACH'06



## Outbreak reports

- Emerging lessons (HSE)
  - Epidemiology (BCC)
  - Immunology (HSL)
  - Links to reports will be at
- 
- [www.hse.gov.uk/metalworking](http://www.hse.gov.uk/metalworking)

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