

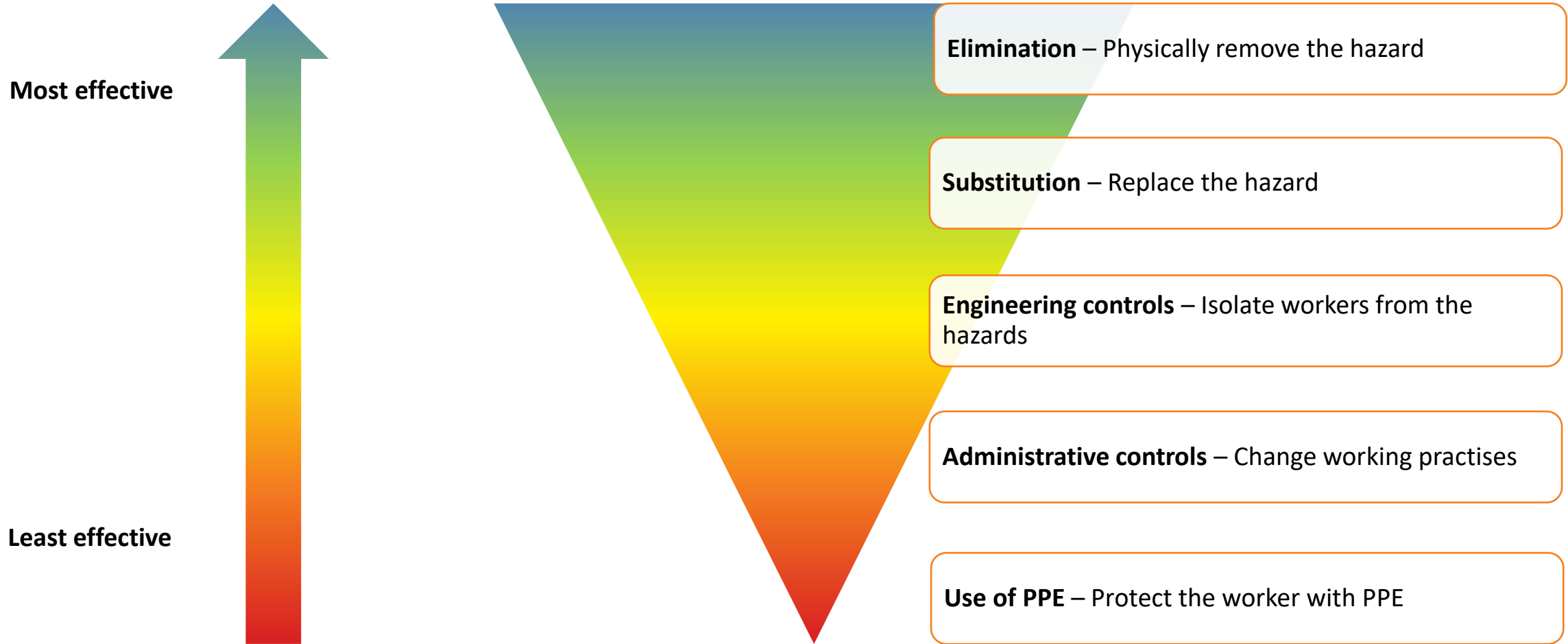
# RPE— role within the hierarchy of controls, and the importance of good selection and use

**Stewart Ayrey**  
**Senior AE Specialist**

# Opening Points / Disclaimer

- This presentation provides a general overview of and tips for implementing a respiratory protective equipment (RPE) programme and includes various 3M safety solutions. This presentation content should not be relied upon to make specific RPE selection, use and maintenance choices.
- Local country or regional regulations and guidance varies, and the responsibility for the correct implementation of a respiratory protection programme in compliance with local country or regional regulations is with the employer.
- Information is current as of the date listed for this presentation, and requirements can change in the future.
- This presentation should not be relied upon in isolation, as the content is often accompanied by additional and/or clarifying information or discussion.
- 3M owns all rights in the presentation, and digital recording or other reproduction is strictly prohibited without permission.

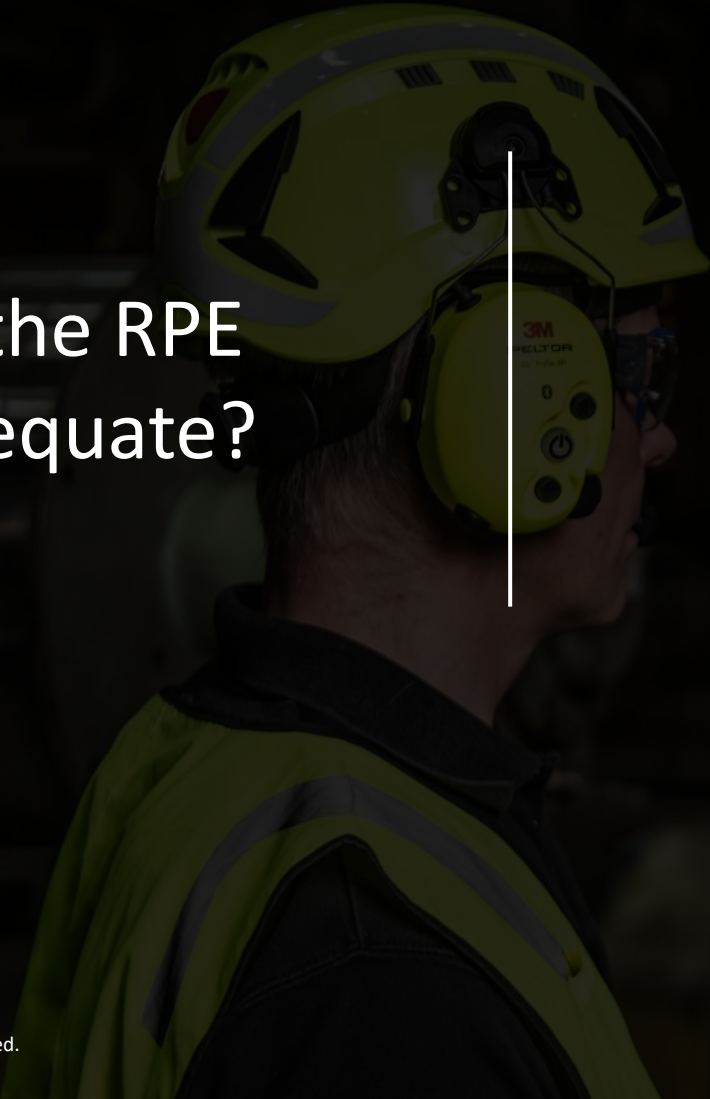
# Hierarchy of controls



NIOSH Workplace Safety and Health Topic, CDC Hierarchy of Controls, [www.cdc.gov/niosh/topics/hierarchy](https://www.cdc.gov/niosh/topics/hierarchy)



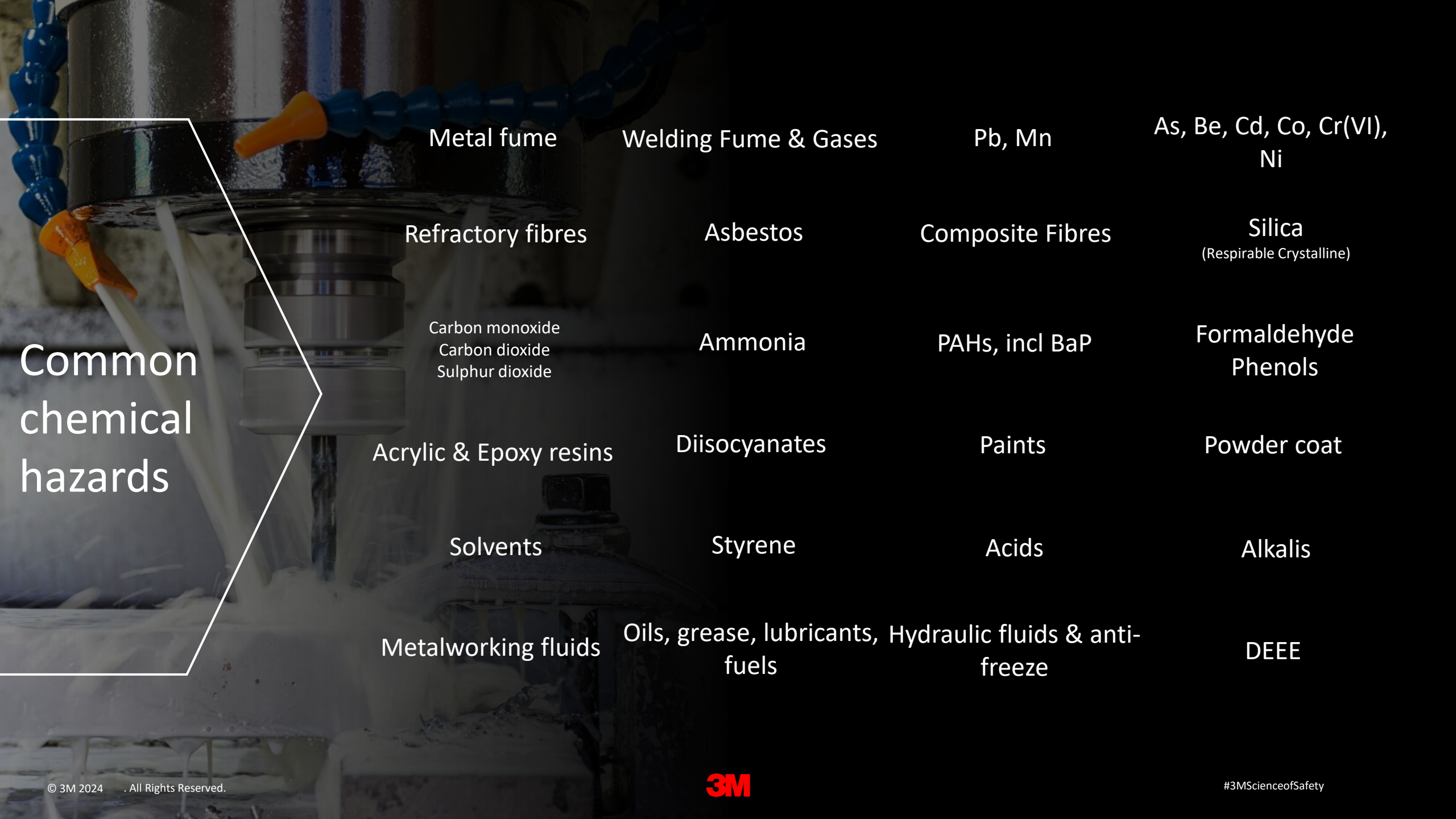
# HSG53



Is the RPE  
adequate?

Is the RPE  
suitable?

Will the RPE  
be worn?



# Common chemical hazards

Metal fume

Welding Fume & Gases

Pb, Mn

As, Be, Cd, Co, Cr(VI),  
Ni

Refractory fibres

Asbestos

Composite Fibres

Silica  
(Respirable Crystalline)

Carbon monoxide  
Carbon dioxide  
Sulphur dioxide

Ammonia

PAHs, incl BaP

Formaldehyde  
Phenols

Acrylic & Epoxy resins

Diisocyanates

Paints

Powder coat

Solvents

Styrene

Acids

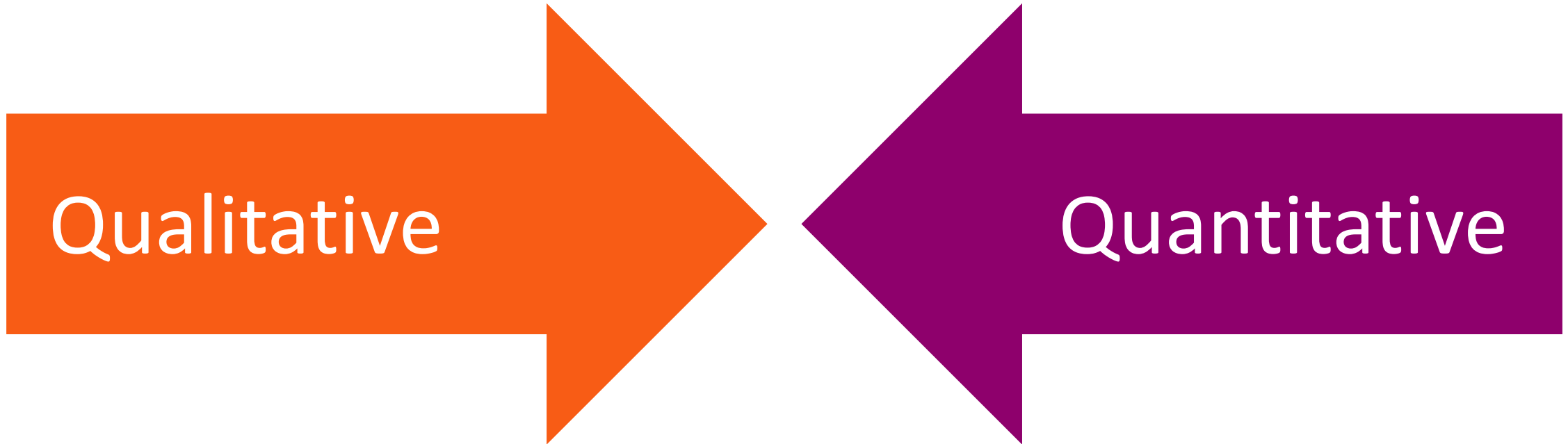
Alkalis








Metalworking fluids

Oils, grease, lubricants, Hydraulic fluids & anti-  
freezes

DEEE

# Adequacy assessment



Adequacy/suitability	Respirators						
RPE type							
	Disposable half mask – particle filter*	Reusable half mask – particle filter	Reusable half mask – gas/vapour filter	Full face mask – particle filter	Full face mask – gas/vapour filter	Powered mask	Powered hoods/helmets
Effective for particles	✓	✓	✗	✓	✗	✓ **	✓ **
Effective for gas/vapour	✗	✗	✓	✗	✓	✓ **	✓ **
Continuous wear time	Less than 1 hr	Less than 1 hr	Less than 1 hr	Less than 1 hr	Less than 1 hr	More than 1 hr	More than 1 hr
APF4 types	✓	✓	✗	✓	✗	✗	✗
APF10 types	✓	✓	✓	✓	✗	✓	✓
APF20 types	✓	✓	✗	✗	✓	✓	✓
APF40 types	✗	✗	✗	✓	✗	✓	✓
APF200 types	✗	✗	✗	✗	✗	✗	✗
APF2000 types	✗	✗	✗	✗	✗	✗	✗
Page reference	29	30	31	32	33	34	35

\* Sometimes referred to as a filtering facepiece or orinasal respirator.

\*\* Only protects against particle or gas/vapour when the appropriate filter is fitted.





“

PPE can be...

*Slow*  
*Inconvenient*  
*Uncomfortable*

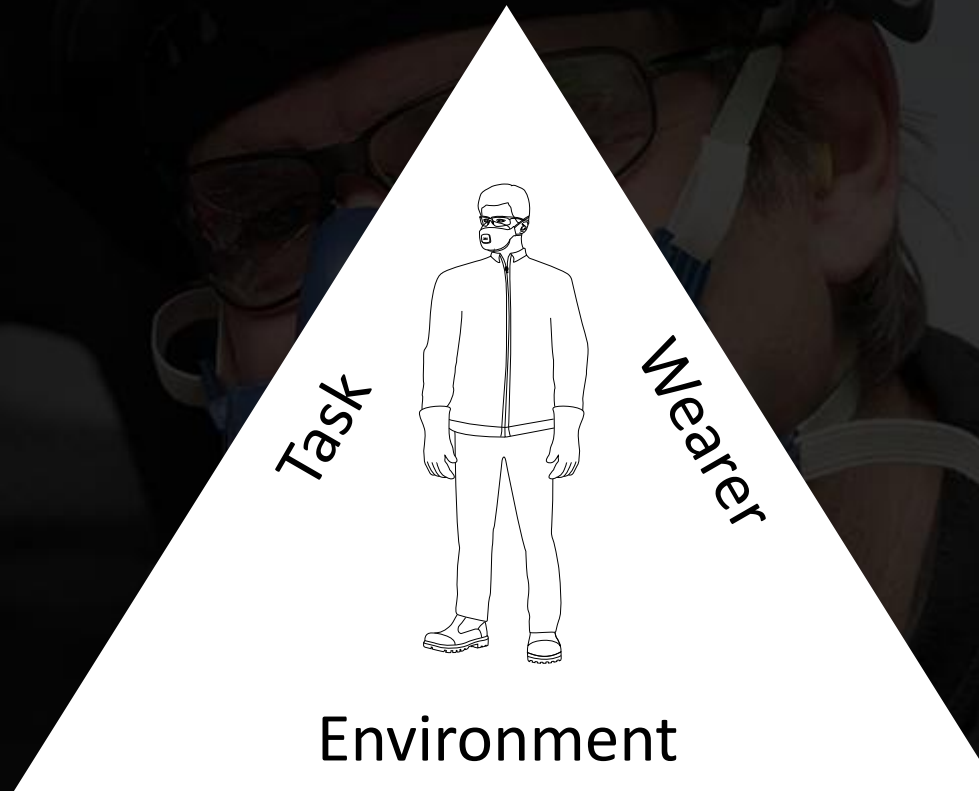
-- Tim Marsh, 2024

”



# Suitable

- Work-rate
- Wear time
- Communications and vision
- Mobility
- Other PPE & compatibility



- Their health: medical evaluation and surveillance
- Need for corrective spectacles
- Size, adjustability, comfort
- Suitable fit for the wearer

- Temperature & humidity
- Flammable or explosive atmospheres
- Clean room / sterile

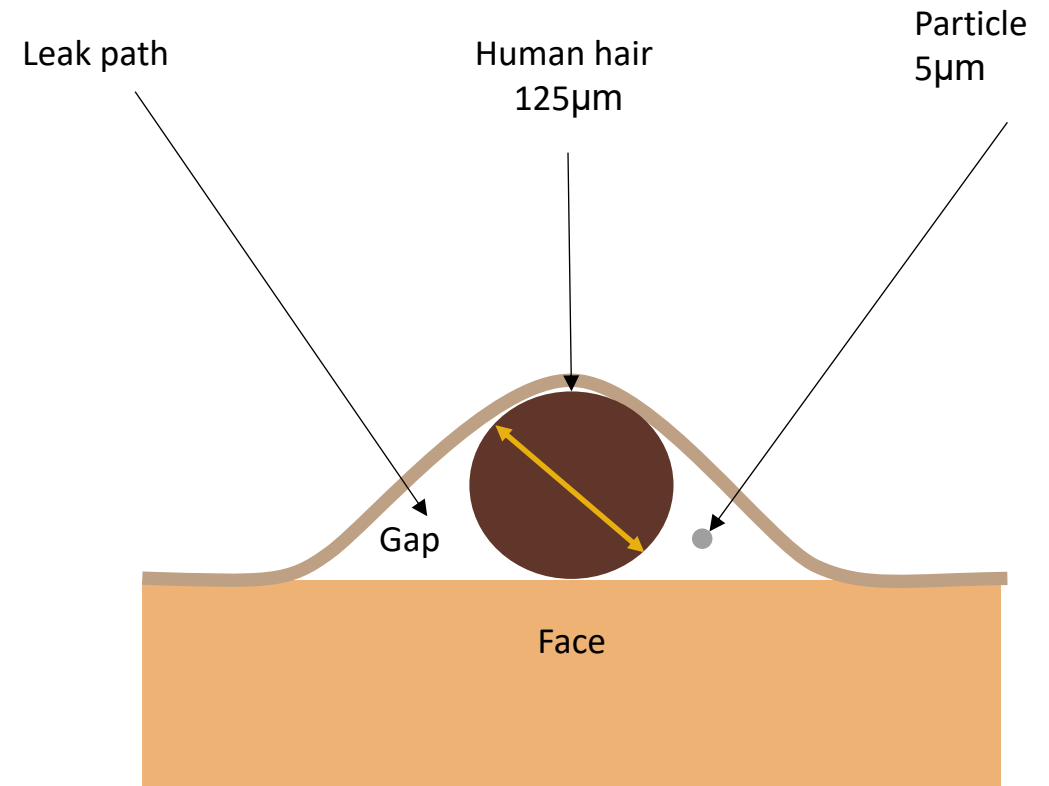
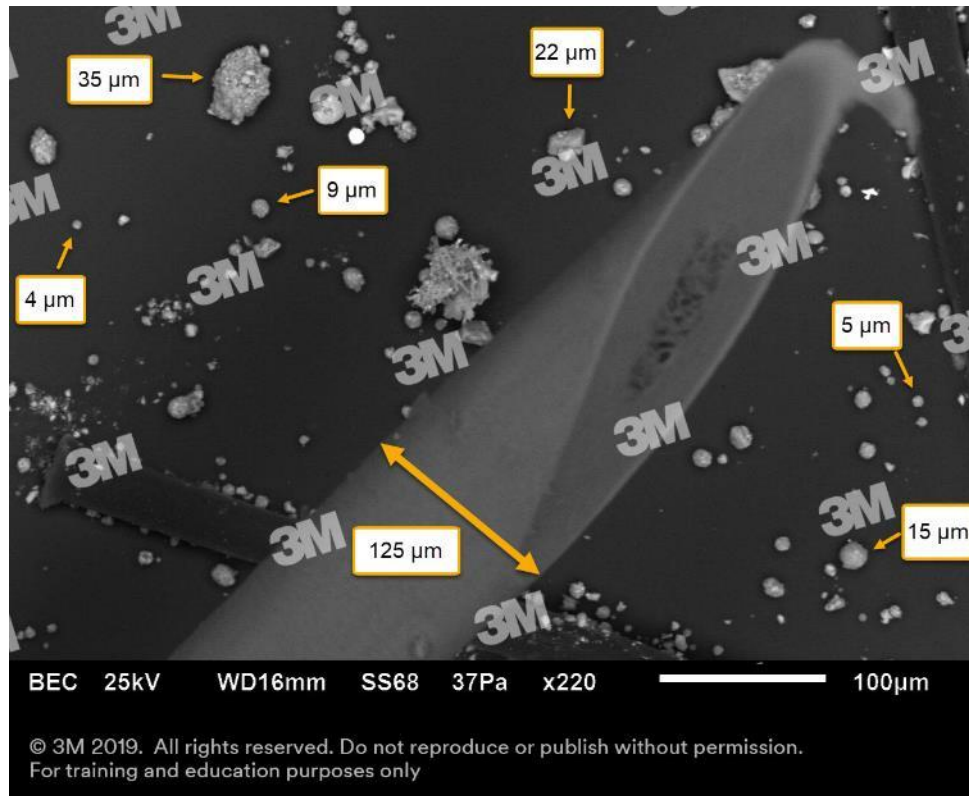
- Space to move
- Other hazards: trip, working at height, confined space. etc.

# Modern Diverse Workforce














# Facial hair and tight-fitting respirators



The effect of wearer stubble on the protection given by Filtering Facepieces Class 3 (FFP3) and Half Masks. Source: [www.hse.gov.uk/research/rrpdf/rr1052.pdf](http://www.hse.gov.uk/research/rrpdf/rr1052.pdf)



# Facial hair – which respirator may be acceptable?







		Full beard	Trimmed beard	Mustache	Clean shaven
					
 	Filtering facepiece Half-mask	✗	✗	✗	✓
	Full-face mask	✗	✗	✓	✓
 	Loose-fitting with face seal	✗	✗	✓	✓
 	Loose-fitting with neck seal or inner shroud	✓	✓	✓	✓



# Why fit test?

- ✓ Every wearer is different
- ✓ Confidence in performance
- ✓ Confirm your choice
- ✓ Comply with regulations
- ✓ Training on correct use
- ✓ Maximises Protection

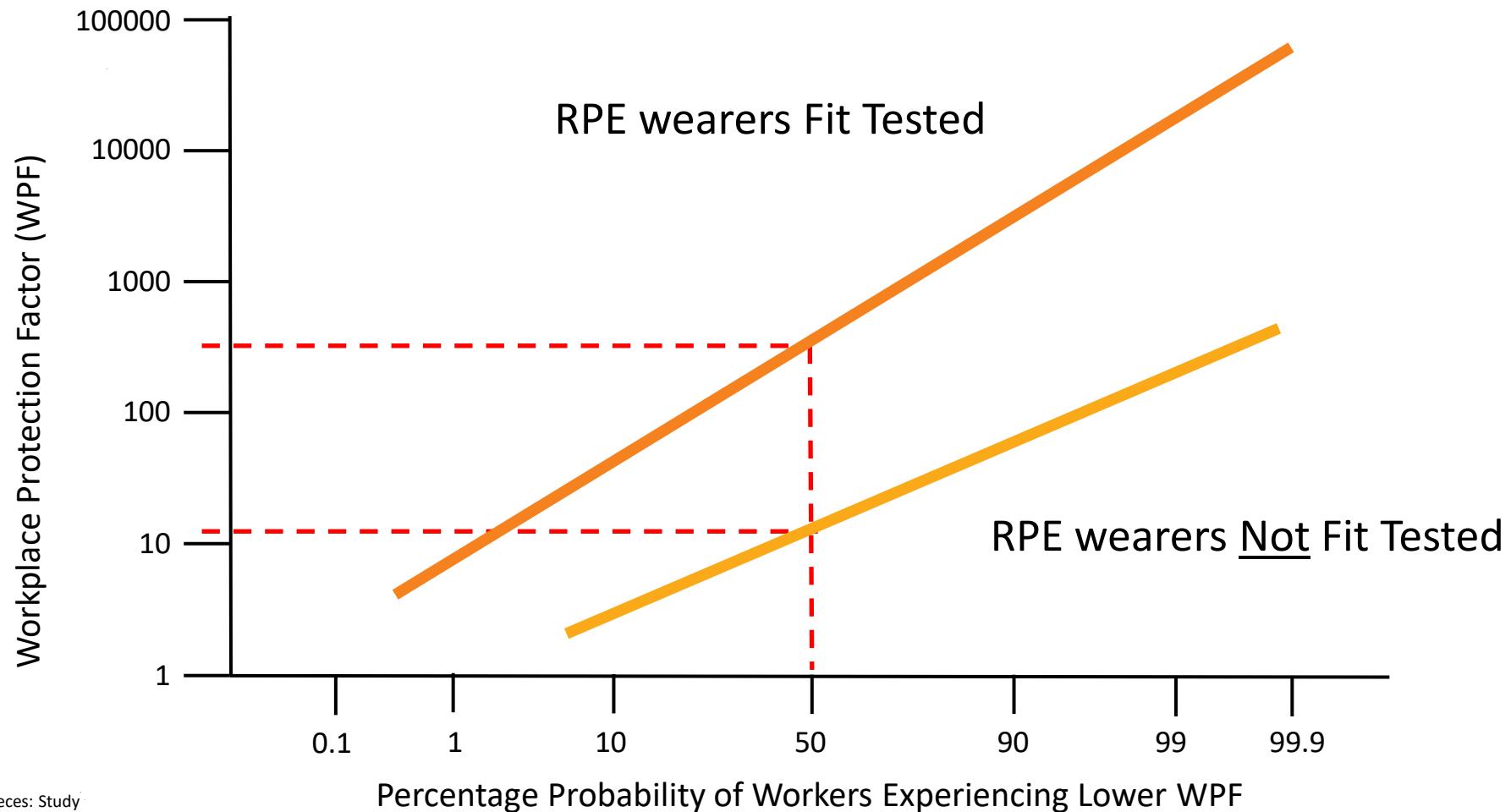
# Which Respirators Require Fit Testing?

REQUIRES fit testing		Do NOT need fit testing	
Loose-Fitting		Loose-Fitting	
Filtering facepiece	Full-face mask		
			
Half-mask			



# Benefits of respiratory fit testing

## Respirator performance with and without fit testing



Source: Colton, C., Filtering facepieces: Study supports need for fit testing. 3M Job Health Highlights Volume 17, Number 2, 1999

# PPE and Productivity

Negative Pressure  
Respirator

Powered / Supplied Air  
Respirator

UK

Recommended 60 mins then break

No restriction

Germany

Unvalved: 60 mins then 15 min break  
Valved: 90 mins then 15 min break

No restriction

Denmark

Maximum total wear time of 3 hours  
per day

No restriction

# Why should I be concerned by PPE Compatibility?

75%

said making PPE more comfortable would increase compliance

41%

said making PPE compatible with other PPE would increase compliance

3M survey of 226 UK construction workers  
PPE Matters – A report on attitudes towards Personal Protective Equipment in the construction industry, 2009. Available upon request



# Compatibility



+



=



# Usage / Total cost of ownership / Sustainability

240x working days = 1x year

1x



1x



1x



240x



1x



12x



12-48x



48x



Note:  
Products and consumption values shown are illustrative only.  
Conduct your own risk assessment and determine your own filter changeout schedule

# Use

My colleagues don't  
wear their PPE

I've not been trained

I've not been fit tested

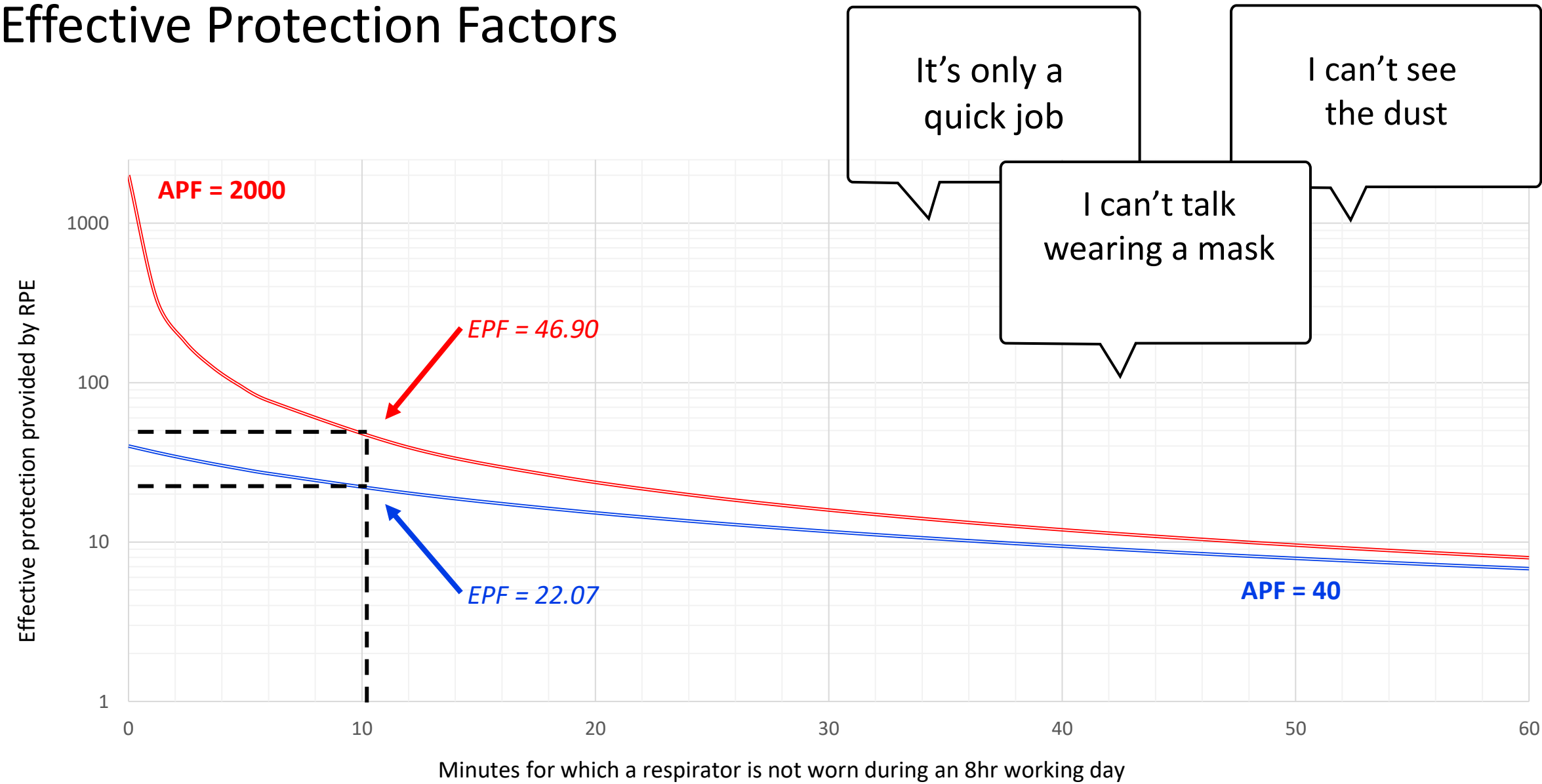
My supervisor doesn't  
make me wear it

No one checks whether I'm  
clean shaven


My manager doesn't, so  
why should I?



# Effective Protection Factors



# Train on using PPE

- 
- ✓ The need for protection
  - ✓ Uses and limitations
  - ✓ Inspection
  - ✓ Putting on and removing
  - ✓ Getting a good fit
  - ✓ Maintenance procedures & when to change
  - ✓ Storage or disposal
  - ✓ Medical signs and symptoms
  - ✓ Written procedures and training documentation

# Care & Maintenance: Cleaning

## Two main options

Hygienic clean after use



Periodic 'deep' clean





# Care & Maintenance: Changeout

End of shift	Damaged
End of week	Dirty
End of month	Breathing is difficult
End of shelf-life	Taste hazard



# Care & Maintenance: Storage



Thank you

Questions?