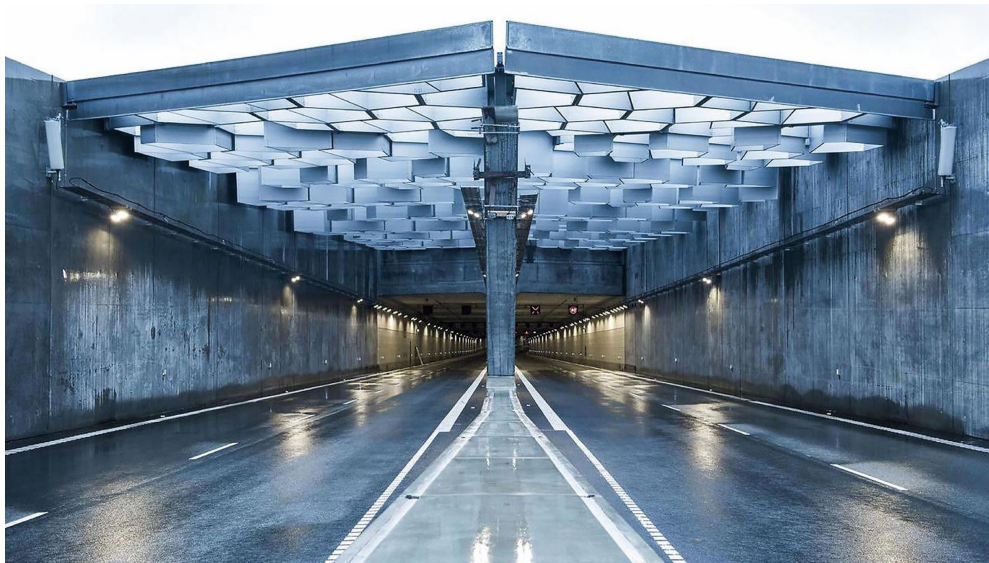




“Facts and myths about Low Pressure Watermist Fire Protection for road tunnels
-based on fire tests, guidelines & European practice”



Presenter: Johnny Jessen
Sales Manager (Tunnels)

Agenda



- 1 VID FireKILL
- 2 Water based Fire Suppression Systems)
- 3 Facts & Myths Droplet Size?
- 4 Facts & Myths Visibility?
- 5 How Many Fire Zones To Be Activated?
- 6 Which System Is The Best For Fire Suppression?
- 7 Costs Deluge Versus Watermist?

① VID FireKill

VID Fire Kill



VID FireKill is a Danish based global manufacturer of innovative Low Pressure Watermist firefighting products, specializing in environmentally friendly firefighting methods.

Business Segments



Commercial Buildings



Industrial facilities



Infrastructure



Marine



Offshore

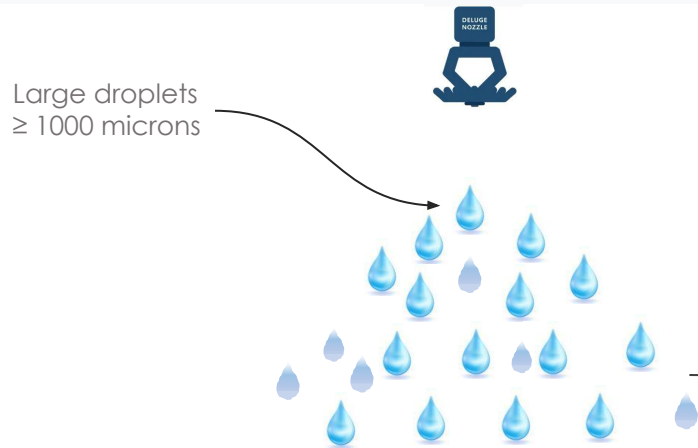
② Definition Water based Fire Suppression Systems

Water based Fire Suppression (Fundamentals)

Deluge

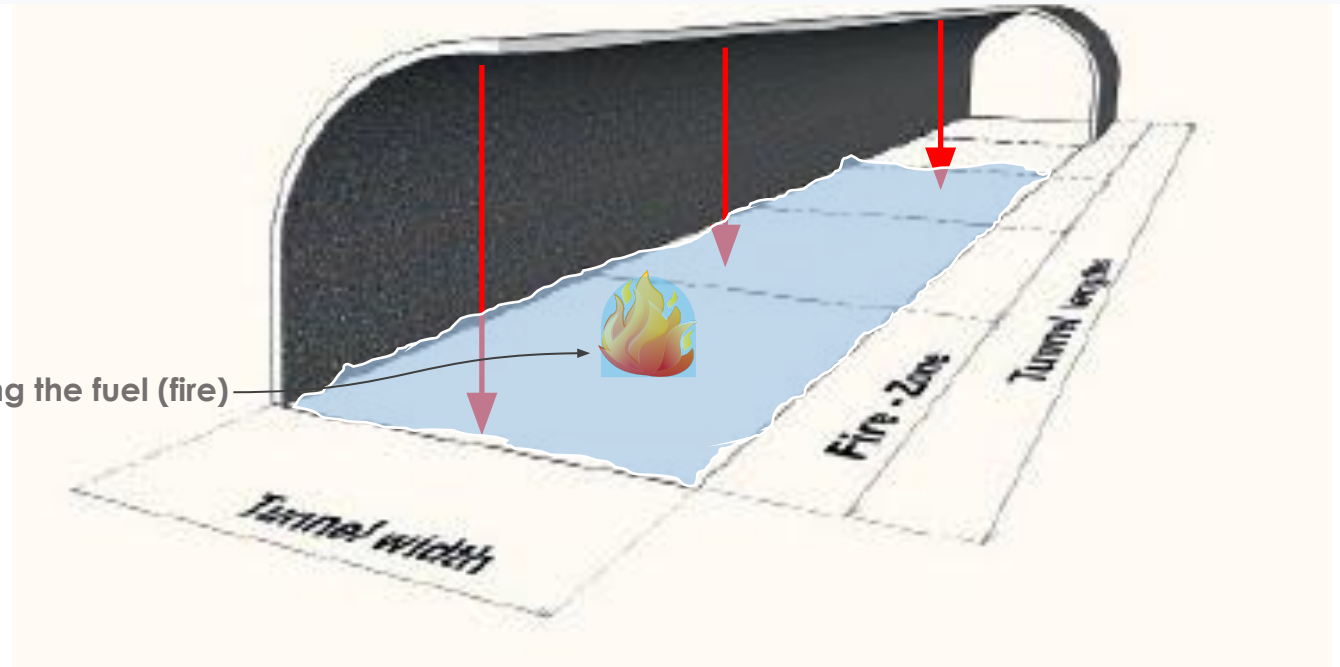
Is a water spray for which the volume of liquid being distributed in droplets of diameter larger than 1000 microns.

in very popular terms, you could say that deluge is about covering the fuel source completely with water



Density 7,0 -12,0 mm/min.

Wetting the fuel (fire)



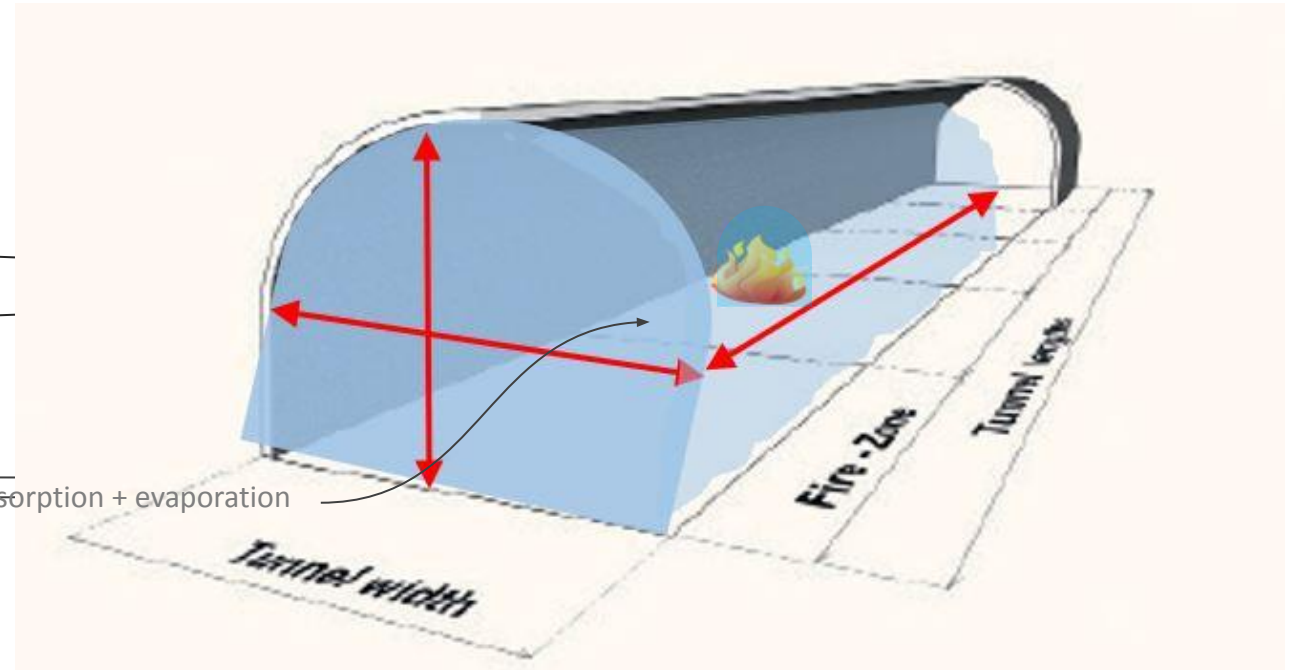
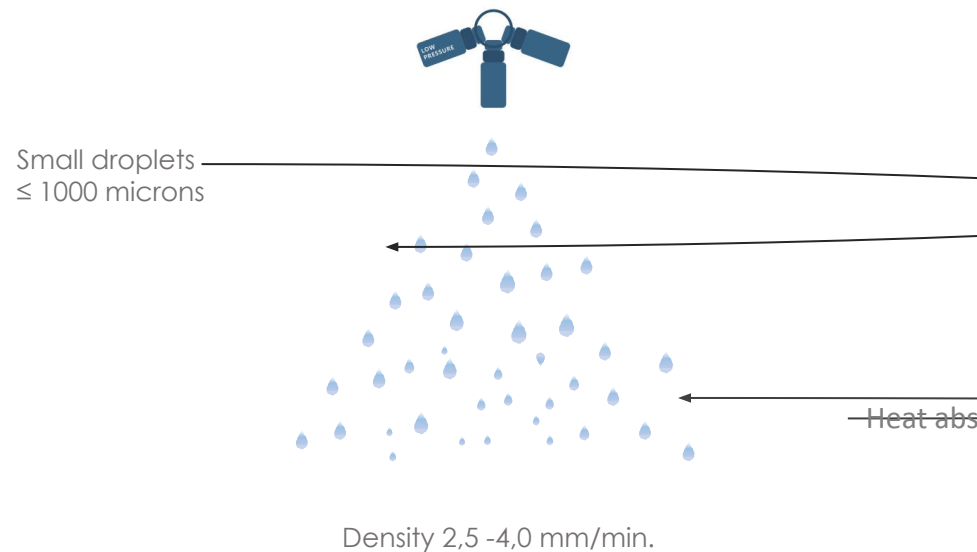
Main mitigate fire fighting capability : Wetting

In very popular terms, you could say that deluge is about covering the fire source completely with water

Water based Fire Suppression (Fundamentals)

Watermist

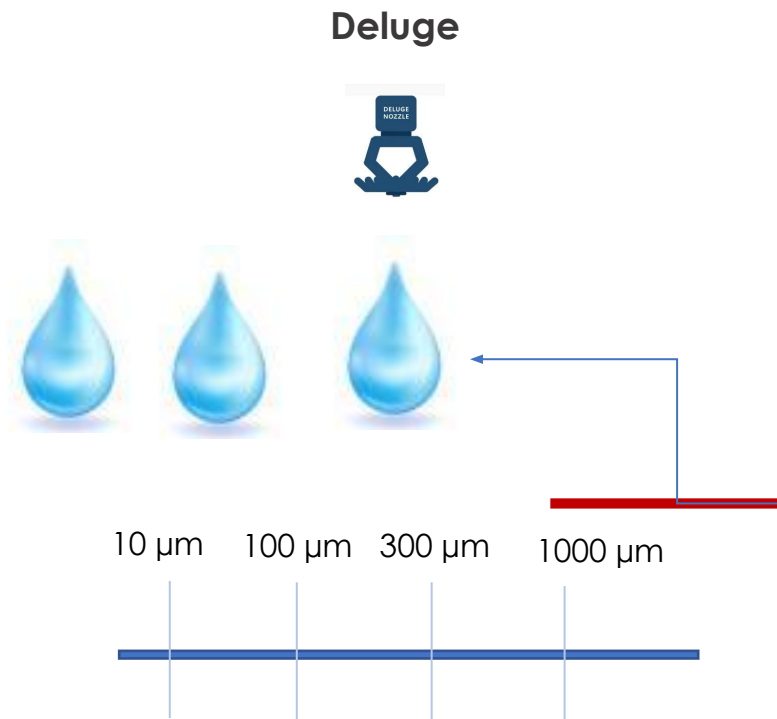
Re. EN 14972 Watermist is a water spray for which the 90% of the total volume of liquid (Dv0.90) being distributed in droplets of diameter smaller than 1000 microns.



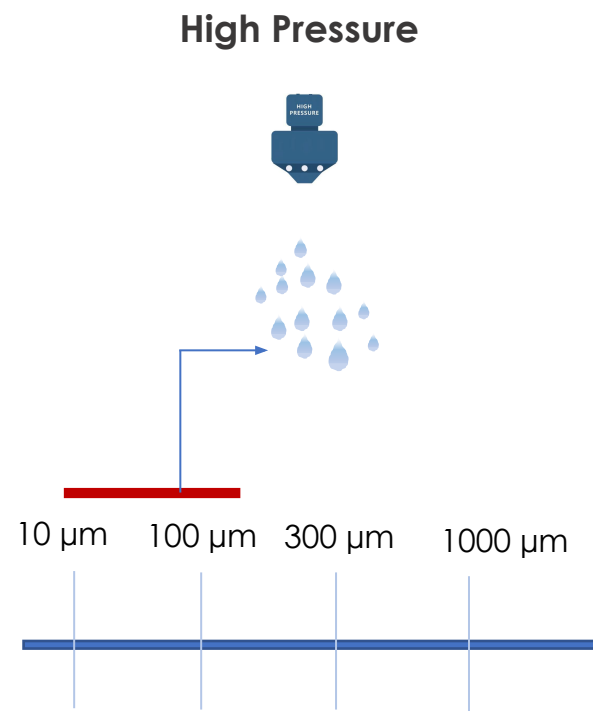
Main mitigate fire fighting capability : Heat absorption + evaporation + smothering
In popular terms, you could say that watermist is about filling the entire cross section with watermist to create a large volume to absorb heat from a fire

③ Facts & Myths (Droplet Sizes)?

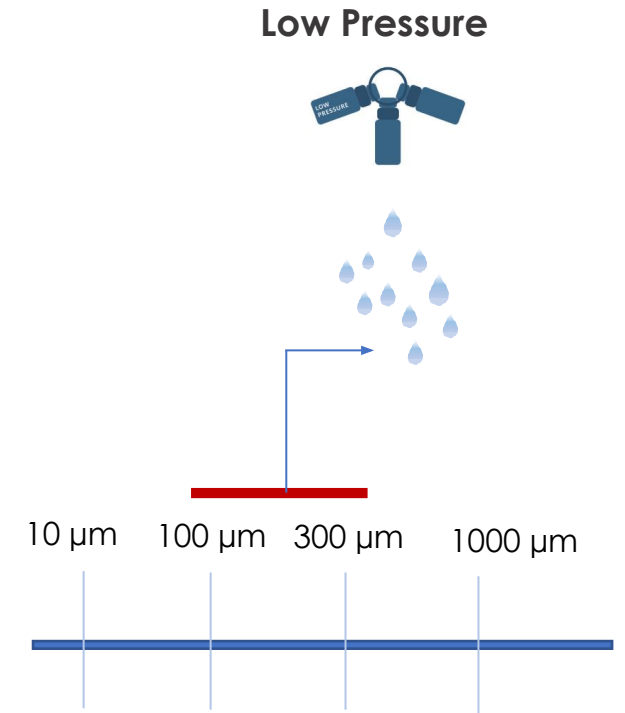
Facts/Myths – (Does Droplet Size Matters)?



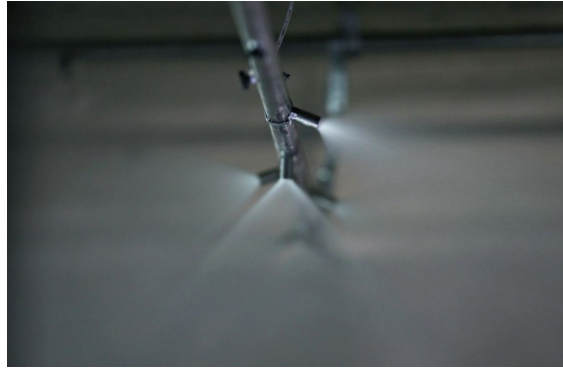
Deluge systems have no limitation on the droplet sizes. Most Deluge systems droplets, with droplet sizes around 5000 microns in diameter.



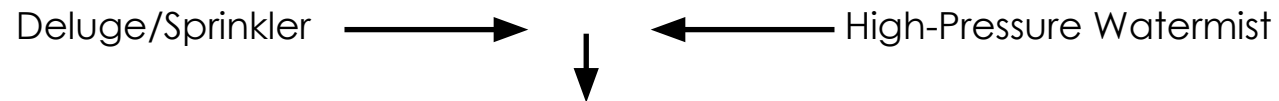
Doubling the diameter to 300 microns increases its weight by 8 times. Heavier droplets fall more quickly and are less affected by air movement.



Low Pressure Watermist



Low Pressure Watermist Combines The Best From Deluge & High Pressure Watermist System



- Low power consumption like deluge
- Low water consumption like high pressure watermist
- Cost-efficient = utilizing PN 16 components like deluge

④ Facts & Myths (Visibility)?

Facts/Myths – (Visibility)?

Is the visibility during activation worse for a Watermist System?

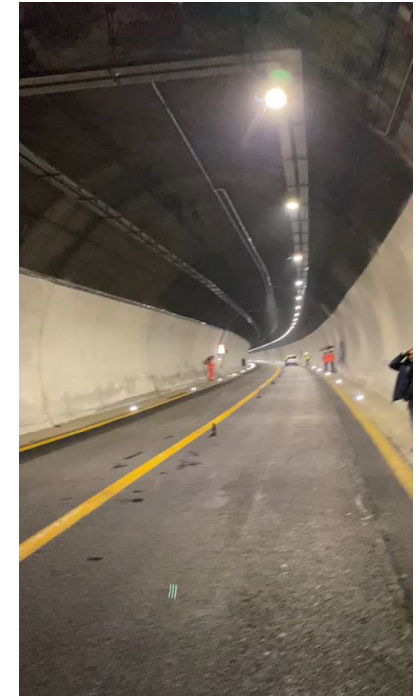
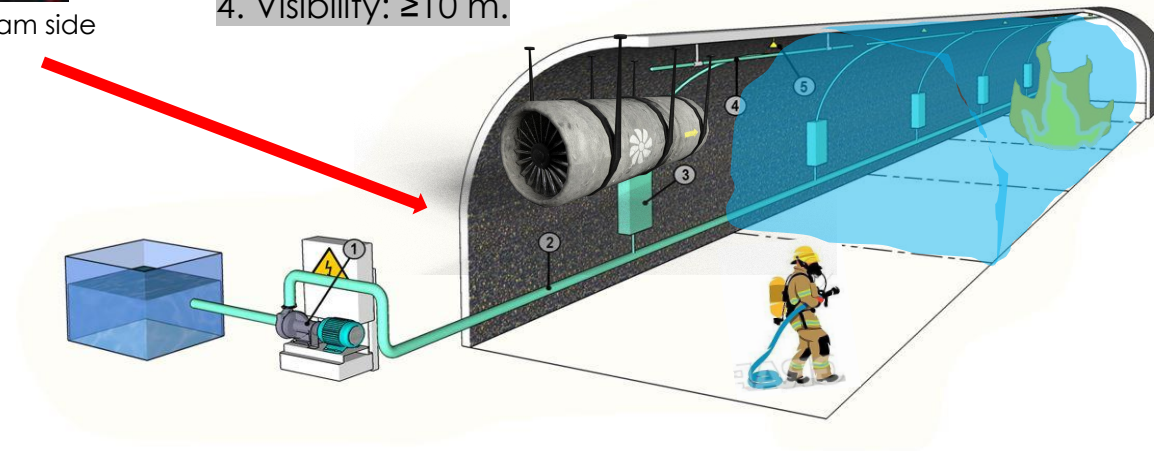


Tunnel vehicle fire seen from upstream side

Tenability criteria's must be specified in order to be able to calculate the time available for evacuation,
Such critical condition values have e.g., been defined by;
(Ingason, 2005, ISO, 2007, Blomqvist, 2005, BBRAD1, 2011) or NFPA 502.

Critical values include:

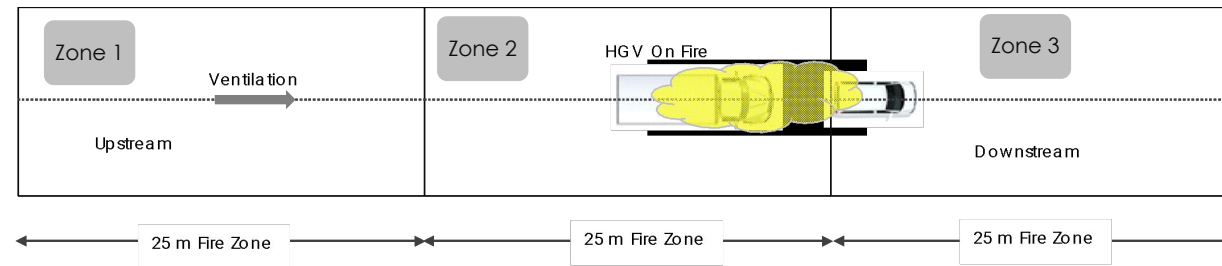
1. Thermal radiation: $< 2.5 \text{ kW/m}^2$
2. Temperature: $< 60 \text{ }^{\circ}\text{C}$.
3. Toxic gases: FED < 0.3 .
4. Visibility: $\geq 10 \text{ m}$.



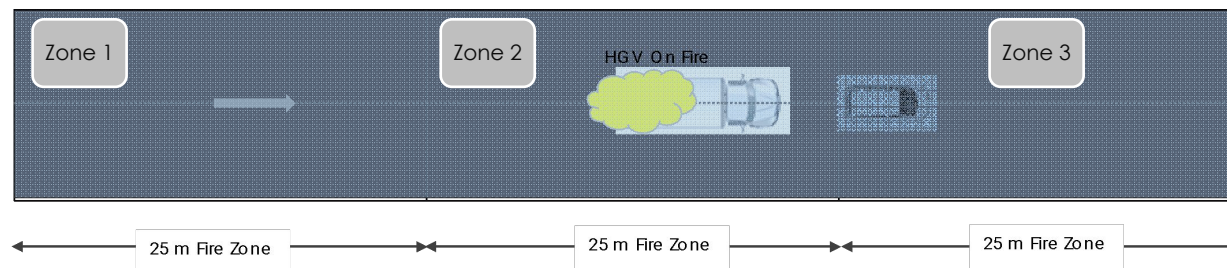
⑤ Facts & Myths (How Many Fire Zones To Be Activated)?

Facts & Myths – (How Many Fire Zones To Be Activated)?

Typically For European Tunnel Projects, a “3 - Zone Activation Strategy Being Used”
However, European Guidelines Like UpTun & SOLIT² Opens Up For a “2 - Zone Activation Strategy”..



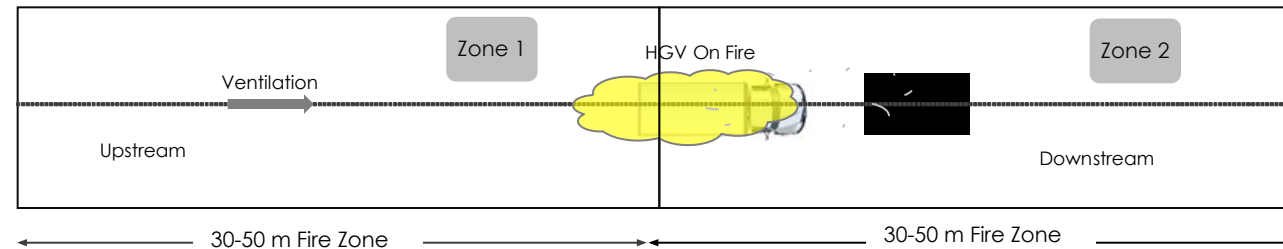
Fire in the tunnel detected



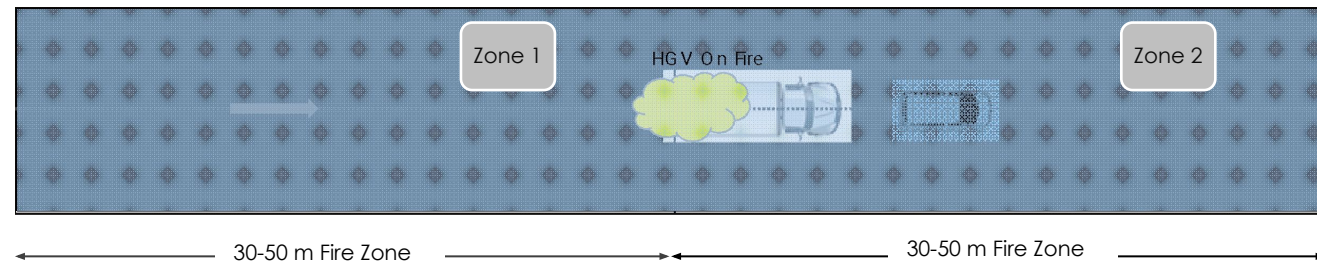
3x Fire Zones gets activated

Facts & Myths – (How Many Fire Zones To Be Activated)?

A "2 - Zone Activation Strategy Also Provides a Relatively Safe Strategy"
However, Fire Zones Typically being longer!!



Fire in the tunnel detected

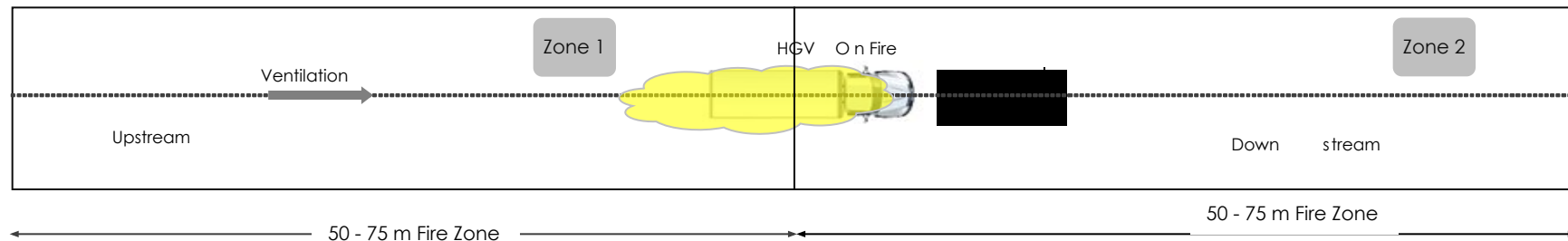


2x Fire Zones gets activated

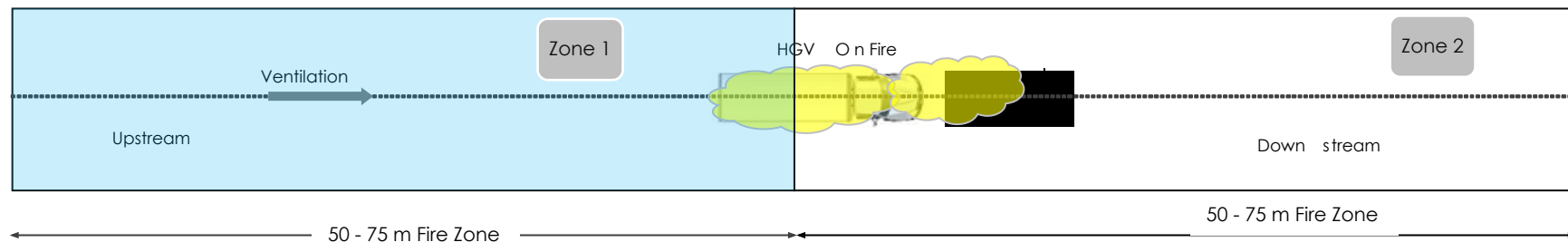
Facts & Myths – (How Many Fire Zones To Be Activated)?

A 1-Zone Activation Strategy Immediately Gives Some Challenges E.g.;

- If A Vehicle Fire Borders Two Fire Zones, then which zone to activate?



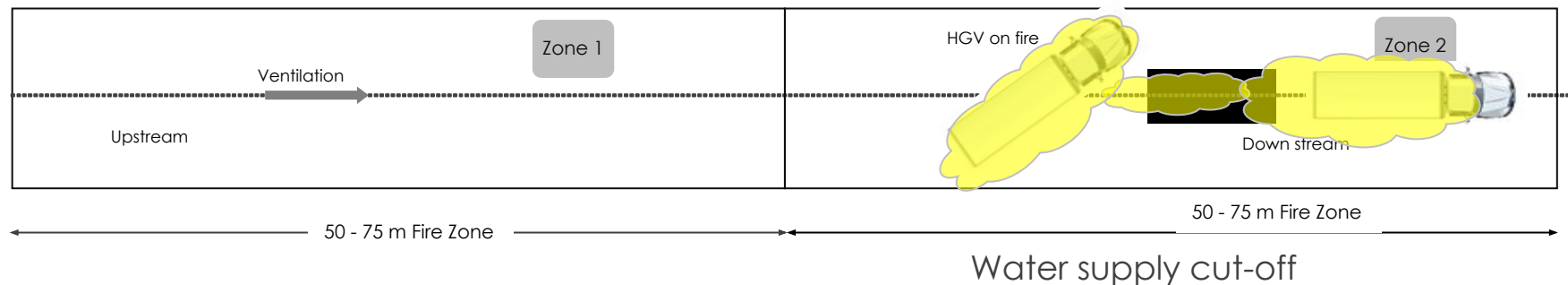
Fire in the tunnel detected



1x Fire Zones gets activated

Facts & Myths – (How Many Fire Zones To Be Activated)?

- A 1-Zone Strategy Also Create Other Challenges E.g.;
- If by any reason the water supply to the fire zone being cut-off, then what?



⑥ Facts/Myths (Which System is the best for Fire Suppression)?

Facts/Myths – Which System Best For Fire Suppression?

Deluge

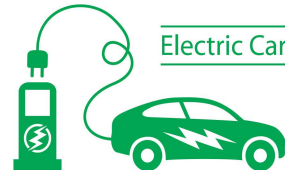


Needs 2-3 times higher flow rate
To do the same job!

Not so efficient against pool fires
Tends to spread a pool fire

Not so efficient against electrical fires

Overall, it can be said that both solutions suppress vehicle fires equally effectively, BUT!



Electric Car

Watermist

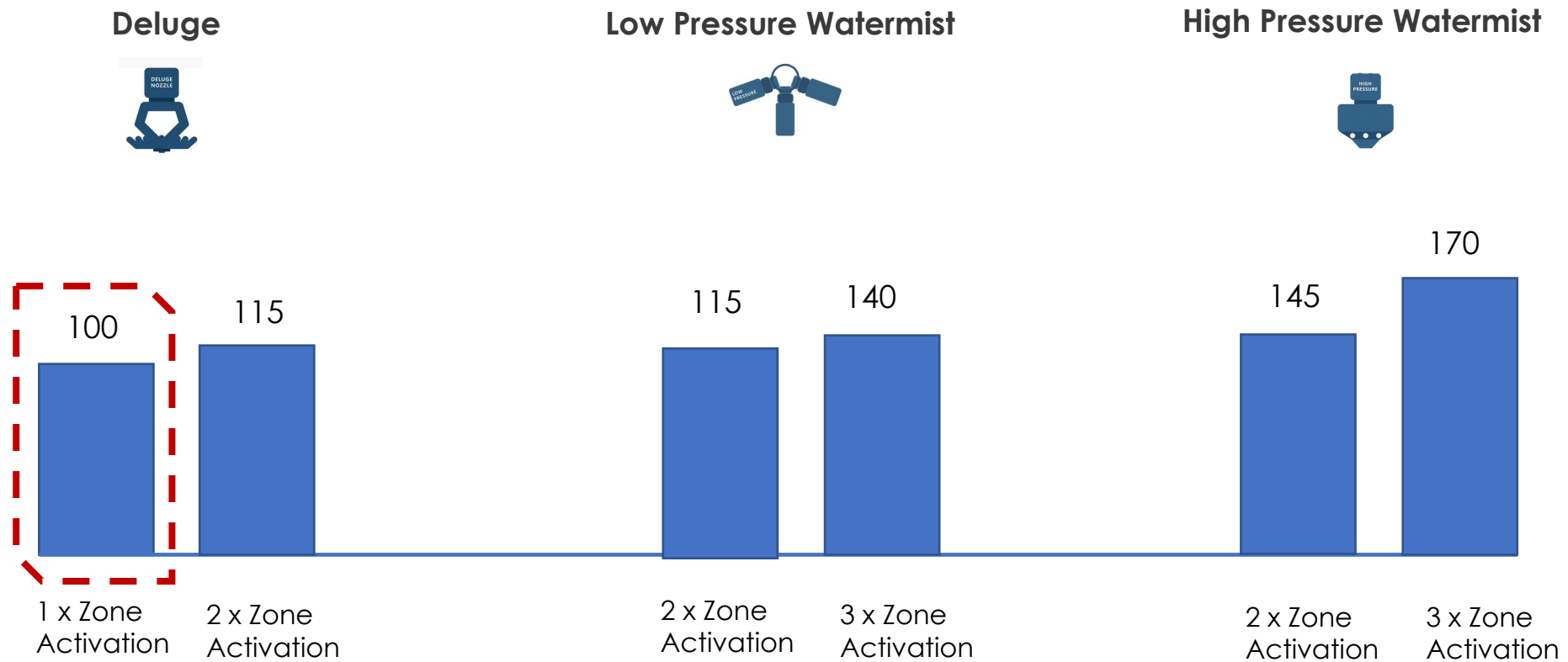


Due to The large evaporation + smothering effect
Makes it very efficient against pool fires

Due to the smaller droplets/ large surface area
Makes it very effective to cool & suppress

⑦ Facts/Myths (Costs Watermist Versus Deluge)?

Facts/Myths – Costs Watermist Against Deluge?



Thank you



Johnny Jessen – Sales Manager, Infrastructure
jj@vidfirekill.dk
Mobile +45 28408956

www.vidfirekill.com