



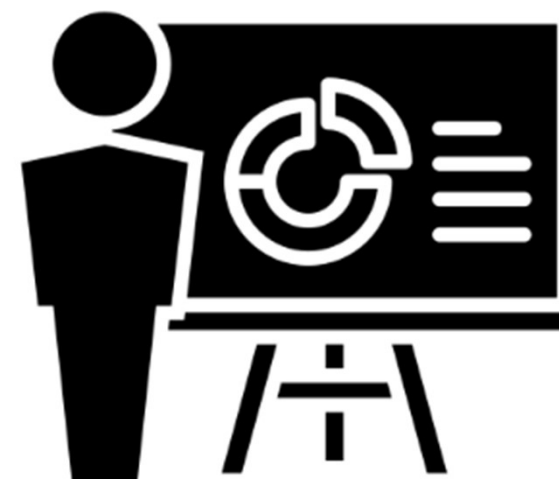
 **17-21**  
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 **Vienna, Austria**  
Aula der Wissenschaften

# Best Practices Benchmarking on Tunnel Safety in Europe

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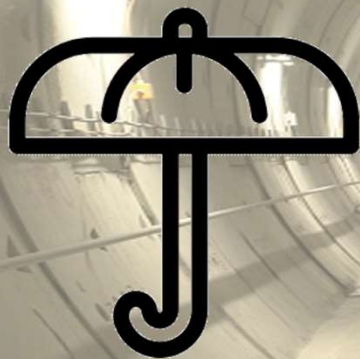






## Railway tunnel safety

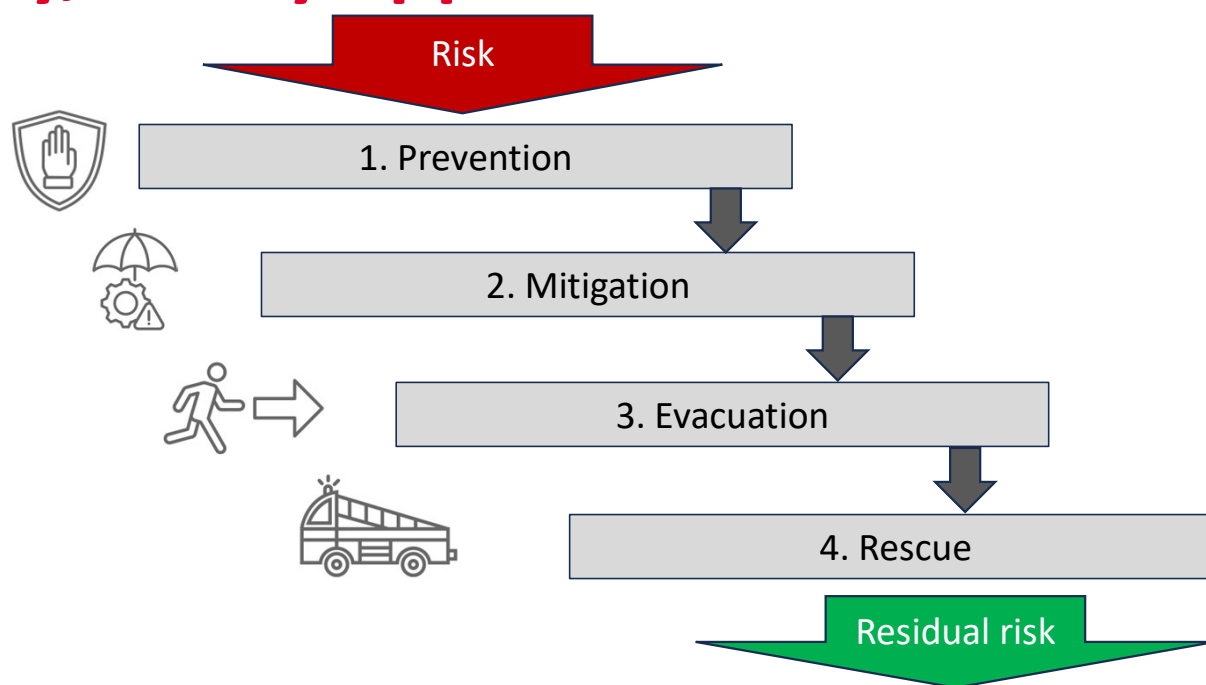
- Protection against potential dangers



- Specific vulnerabilities due to confined space



# Today, safety approach to minimize risks



## Most of tunnels in Europe are from 19th century



**Average age in France ~130 years**

# Rail tunnel safety bibliography

- UIC IRS 70779-9 “Safety in railway tunnels” of 01 June 2021
- Collection of measures for improving safety in rail tunnels
- Find the right balance between few “heavy” and numerous “light” measures

INTERNATIONAL  
RAILWAY SOLUTION

IRS  
70779-9 - Ed. 1

1st edition: June 2021  
Version: Original

Safety in railway tunnels



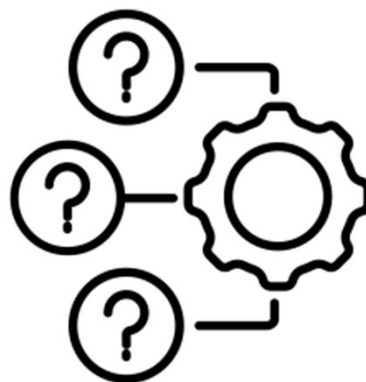
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# Best practices by National Safety Authorities

**Infrastructure**

**Rolling Stock**

**Operations**



Detection systems



Improve fire protection








Create a 'tunnels' governance body



## Regulatory frameworks

- Besides Technical Specifications for Interoperability (TSI-Tunnel 2023)

France		<b>ITI 98-300</b> Interministerial Technical Instruction
Austria		<b>ÖBFV-RL-A-12</b> Directive of firefighters
Germany		<b>Tunnel directive</b> (new one in 2025)
Italy		<b>Decree of 28 october 2005</b>
Switzerland		<b>BAV-511.5-36/19/1/2/1</b> for existing tunnels <b>SIA 197 &amp; SIA 197/1</b> standards for building



## Future developments



**Control portal**



**Real time  
monitoring and  
big data / AI**



**Adapt  
regulations**

## Challenges ahead



**Climate change**



**New dangers**



**Traffic increase**



**Merci pour votre attention et au revoir !**

**Thank you for your attention and goodbye !**

**Vielen Dank für Ihre Aufmerksamkeit und auf Wiedersehen / Wiederschaun !**

