

Ove Njå, Professor

“Kapasitetsløft til sikkerhet”  
- building capacity in  
the field of tunnel safety

**Develop research based competence that enables the regional industry  
to provide efficient solutions to tunnel safety**



Universitetet  
i Stavanger

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# The project – a comprehensive collaboration effort



Statens vegvesen

- Associated PhD-candidates
- Expert-group
- Other Arena-cluster members

# «Capability boost» project

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- Develop research based competence that enables the regional industry to provide efficient solutions to tunnel safety.
- Success is to be measured upon the cooperation between industry actors and the research environment. The collaboration must be functional!
- The capability project shall also strengthen the academic institutions in the region – the ambitions are high.

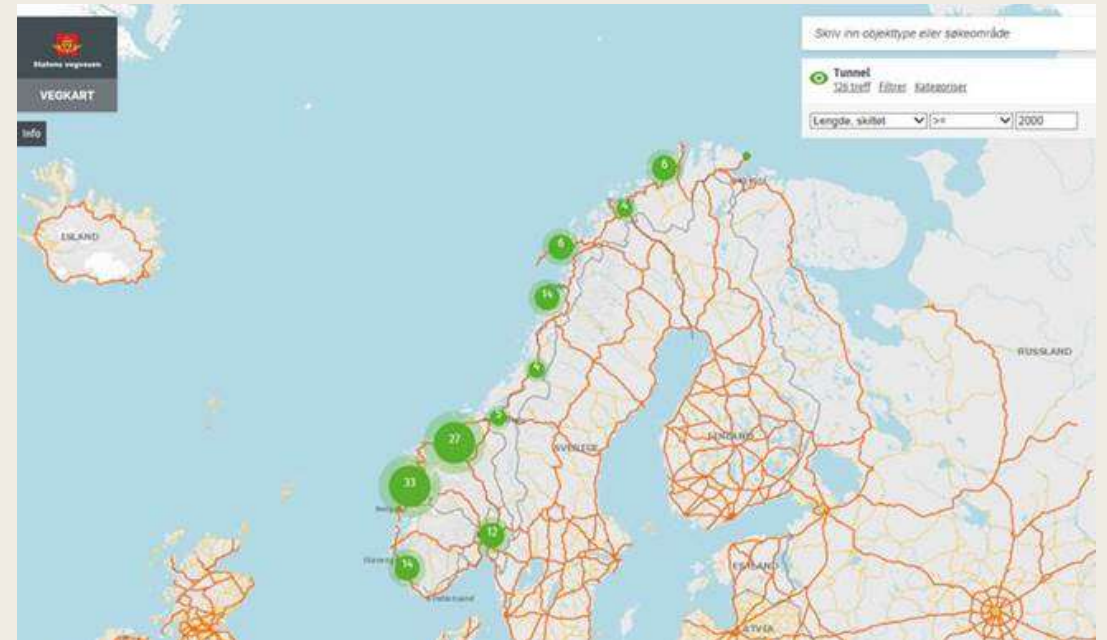
## Tunneler

- ▲ Tunnel med lengde mer enn 2km
- Uttrekk fra NVDB 22.01.2018



## Norwegian tunnels – an example

126–160 (?) the technical and operational standard varies



# New tunnel regulations

Risk informed management

«Compliance»

Minimum requirements to technical systems

Emergency preparedness and response

How safe is safe enough?





The Norwegian experiences



# Functional requirements - examples

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- Human capabilities/prerequisites shall be used as a basis for the tunnel designs; human capabilities in traffic, tenability related to physical forces, toxins, stress etc., and the human ability to cope with critical situations.
- The Zero vision assume protection against serious consequences from errors. The tunnel must be designed with barriers against such consequences. The tunnel walls are of specific challenge.
- Alarms shall be given in a way that all involved road users will understand the situation and then evacuate to safe shelter.
- An efficient cooperation within and across organisations and resources able to respond to accidents, is a superior design requirement for the tunnel.

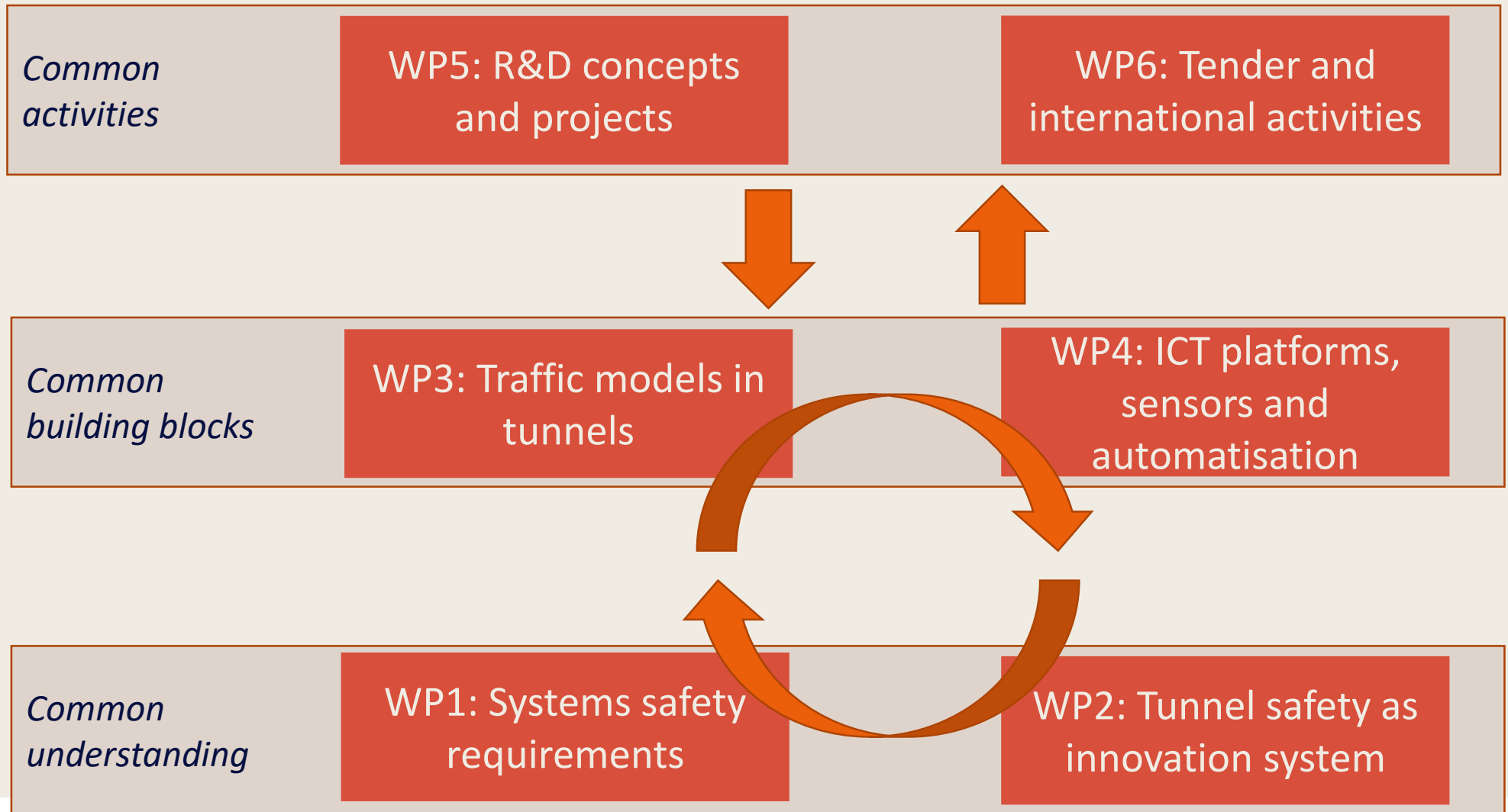


# Some issues

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- Self-evacuation and prescriptive emergency response strategies have not been properly assessed in tunnel safety planning
- Performance assessments of risk reducing measures are weak
- Knowledge based tunnel safety planning need considerations with respect to:
  - Emergency response principles, particularly the co-operation principle
  - Design principles
  - Knowledge criteria for various actors

# Capacity boost - project



# Strategies

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## ○ First phase:

- Involvement of all actors important – tunnel school (annual)
  - Innovations developed through project work
  - Cooperation across industries
  - Conference/workshops
- Three research projects commence as soon as possible
- Public and Industry PhD-projects, University PhD-projects
- Intervention studies – to be discussed through entire project
- Coordinating research activities in close cooperation with industry and innovation follow-up.

## ○ Phase two:

- Completing work packages and fresh phd or postdoc candidates