



TUSC - TUNNEL AND UNDERGROUND SAFETY CENTER

Haukur Ingason

Norwegian Tunnel Safety Conference
Stavanger 18-19 of June 2018

Research Institutes of Sweden

Safety and Transport - Fire Reserach



Tunnel and Underground Safety Center (TUSC)



- Consists of the Swedish Transport Adm (STA), Swedish Nuclear Fuel and Waste Management Company (SKB) , Swedish Fortifications Agency (SFA) and RISE
- Research program for 2017 – 2021
- TUSC steering board have decided on 6 projects startet 2017 and 9 projects 2018
- Today budget 350 kEuro each year for five years, total 1,75 Meuro.
- Additional awarded research projects: over 1MEuro

Goal of TUSC

- Important player in fire safety research in tunnels and other underground facilities worldwide
- Implementation of innovative solutions and new knowledge in various infrastructure projects by verifying and validating technologies, methods and processes
- Contribute to safer and more efficient rescue efforts in complex underground environments
- International and national networking – research, standardization and education



Exampels from TUSC research projects



- Point extraction ventilation
- New energy carriers
- Evacuation in sloped tunnels
- Automatic sprinkler systems
- Drainage systems
- Maximum ceiling temperatures

Point extraction system in scale 1:15

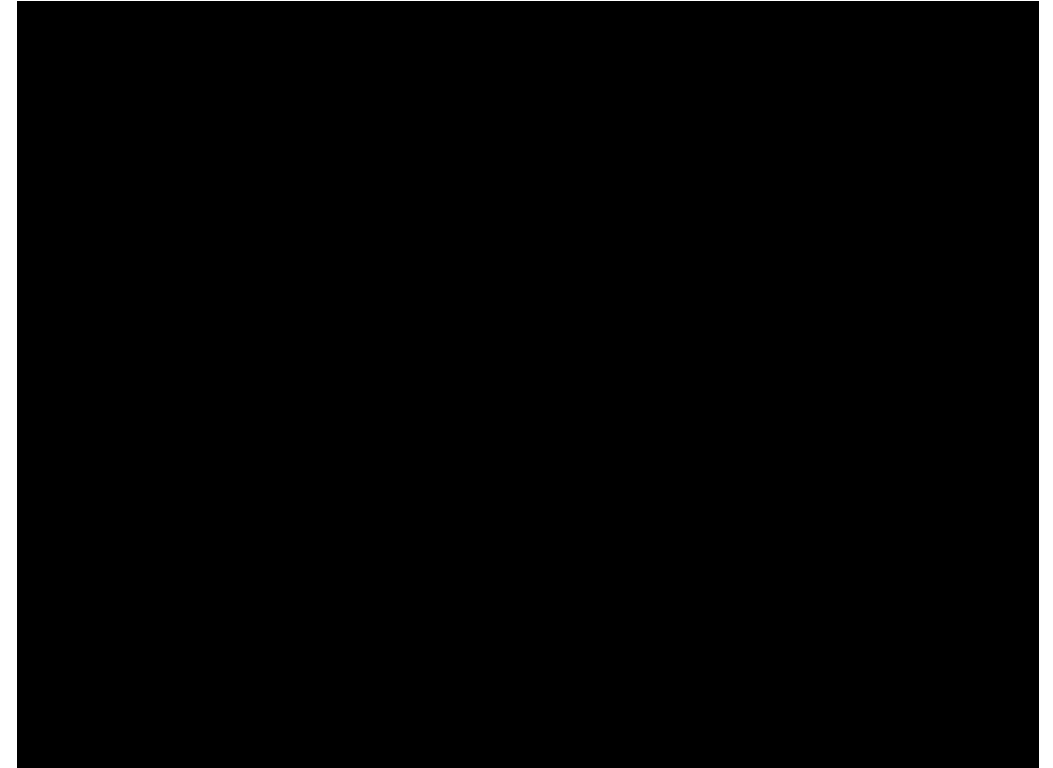
Example – Fire exposure of an empty CNG tank



Example – Evacuation in highly sloped tunnel

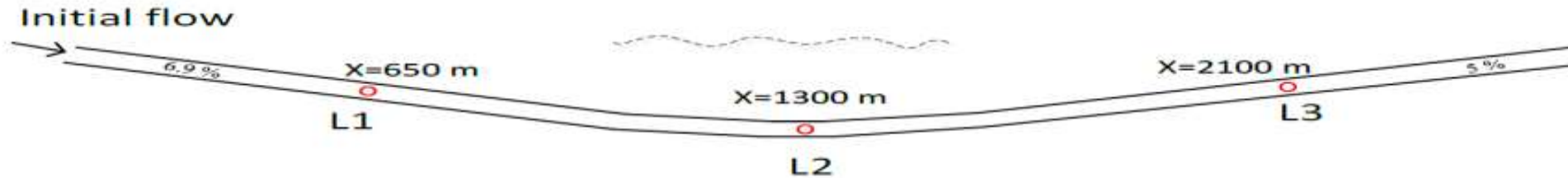


Example – Automatic sprinklers in Muskö tunnel

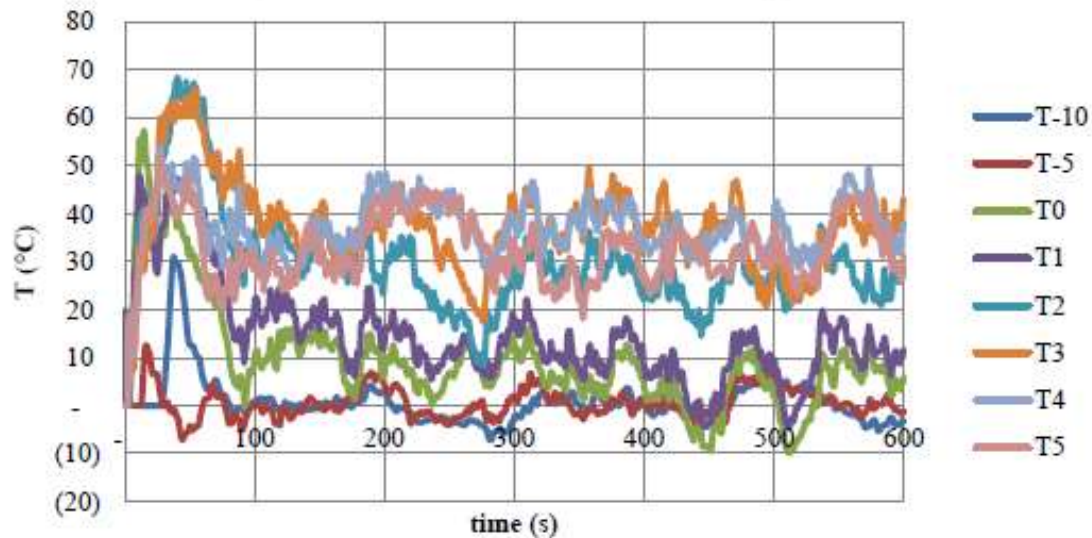


Video Runehamar tests 2016

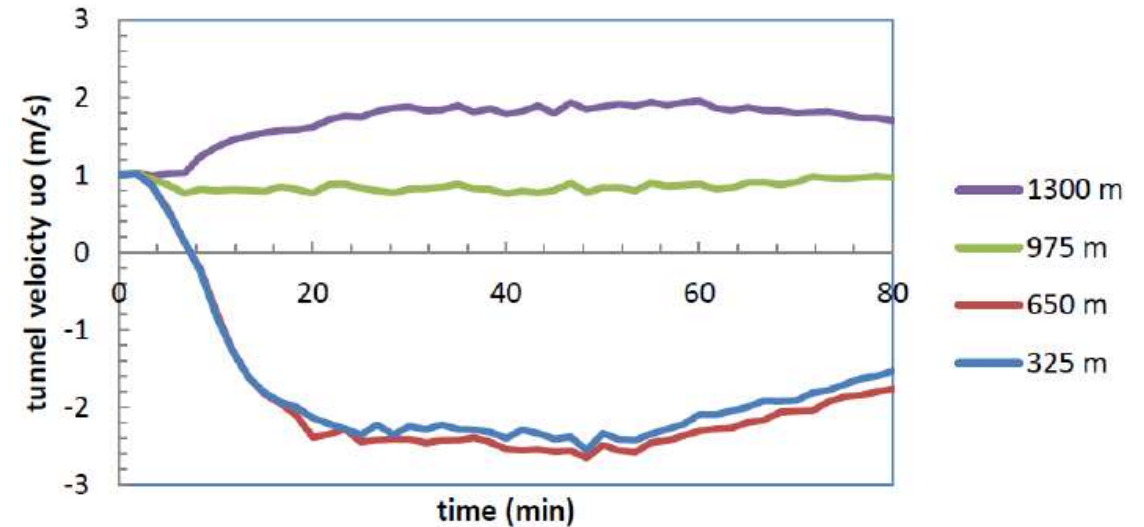
Example – automatic sprinkler in Muskö tunnel



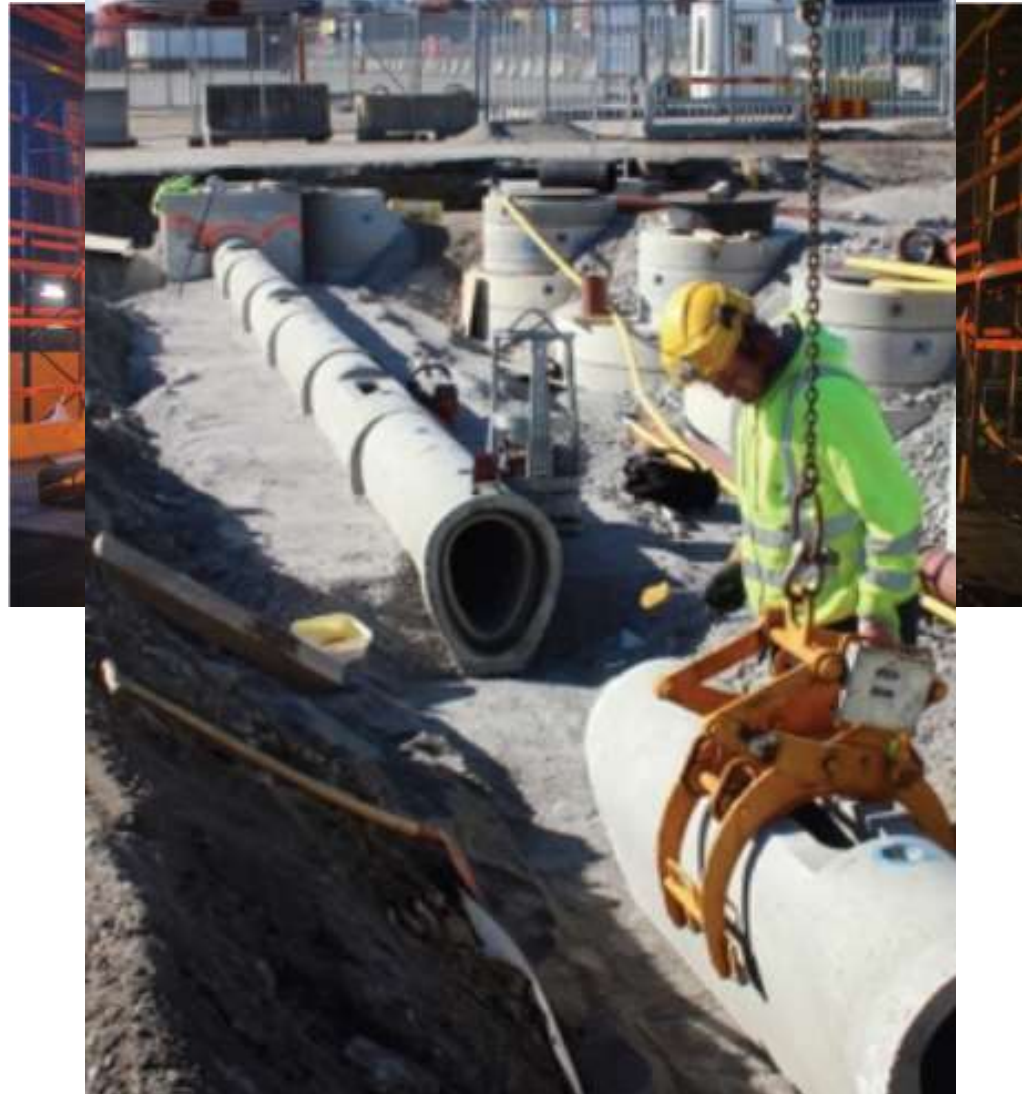
Temperature difference between the two positions



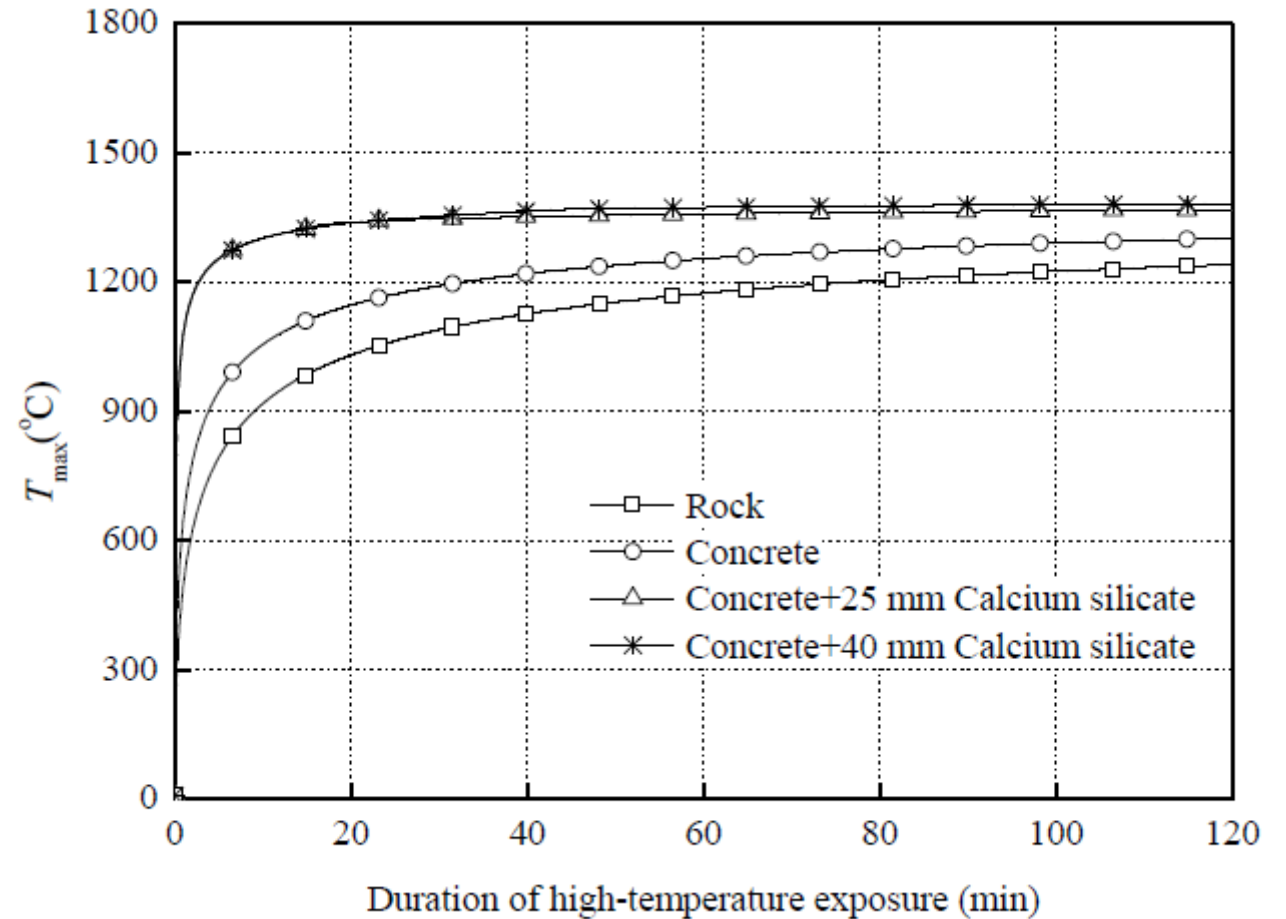
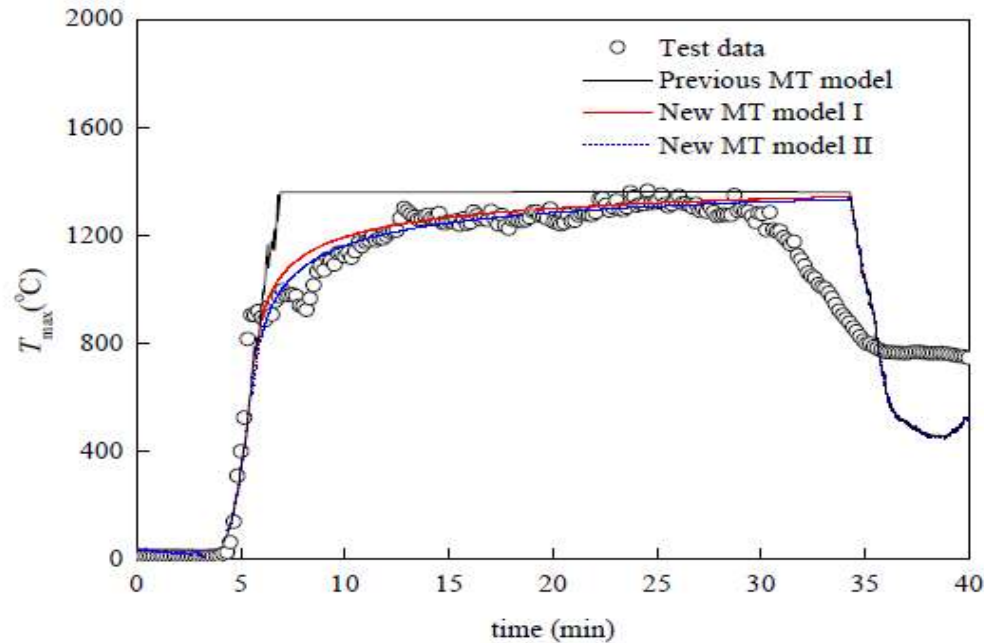
Velocity vs. time for fire on left side



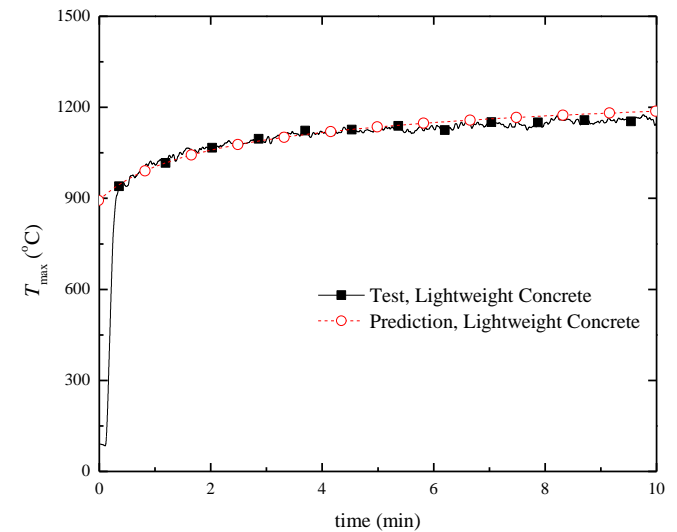
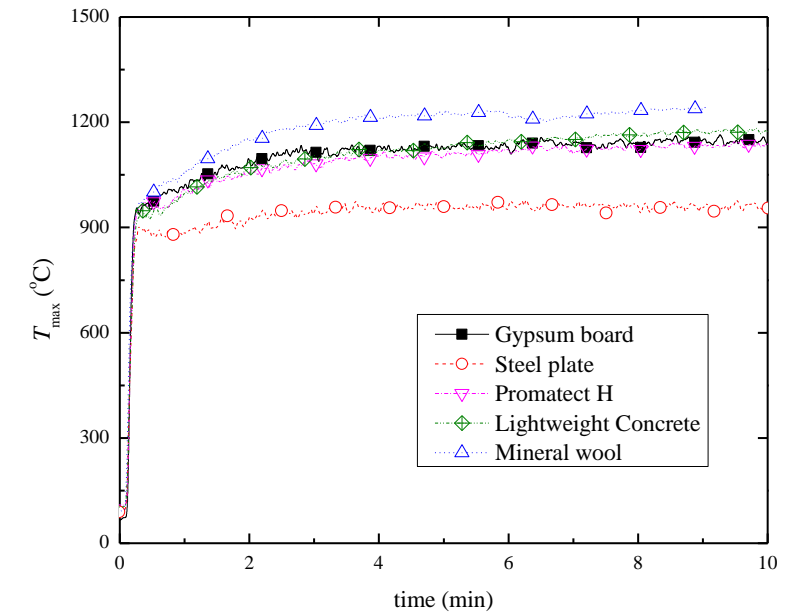
Example – Drainage in tunnels



Example - Effects of lining on max temperatures



Example – Effects of lining material on max temperatures



Summary

- TUSC as a concept works very well in Sweden
- The involved partners very satisfied
- Much easier to do directed research for the partners
- Give RISE a very good platform for the future
- Potential partners in near future are welcome!

RI. SE THANK YOU!

<https://www.sp.se/en/centres/sptunnel/sidor/default.aspx>

Haukur.ingason@ri.se

Research Institutes of Sweden

Safety and Transport - Fire Reserach

