

# Engineering in the Arctic – Changing Times

John Thornley, PhD, PE  
Senior Geotechnical Engineer

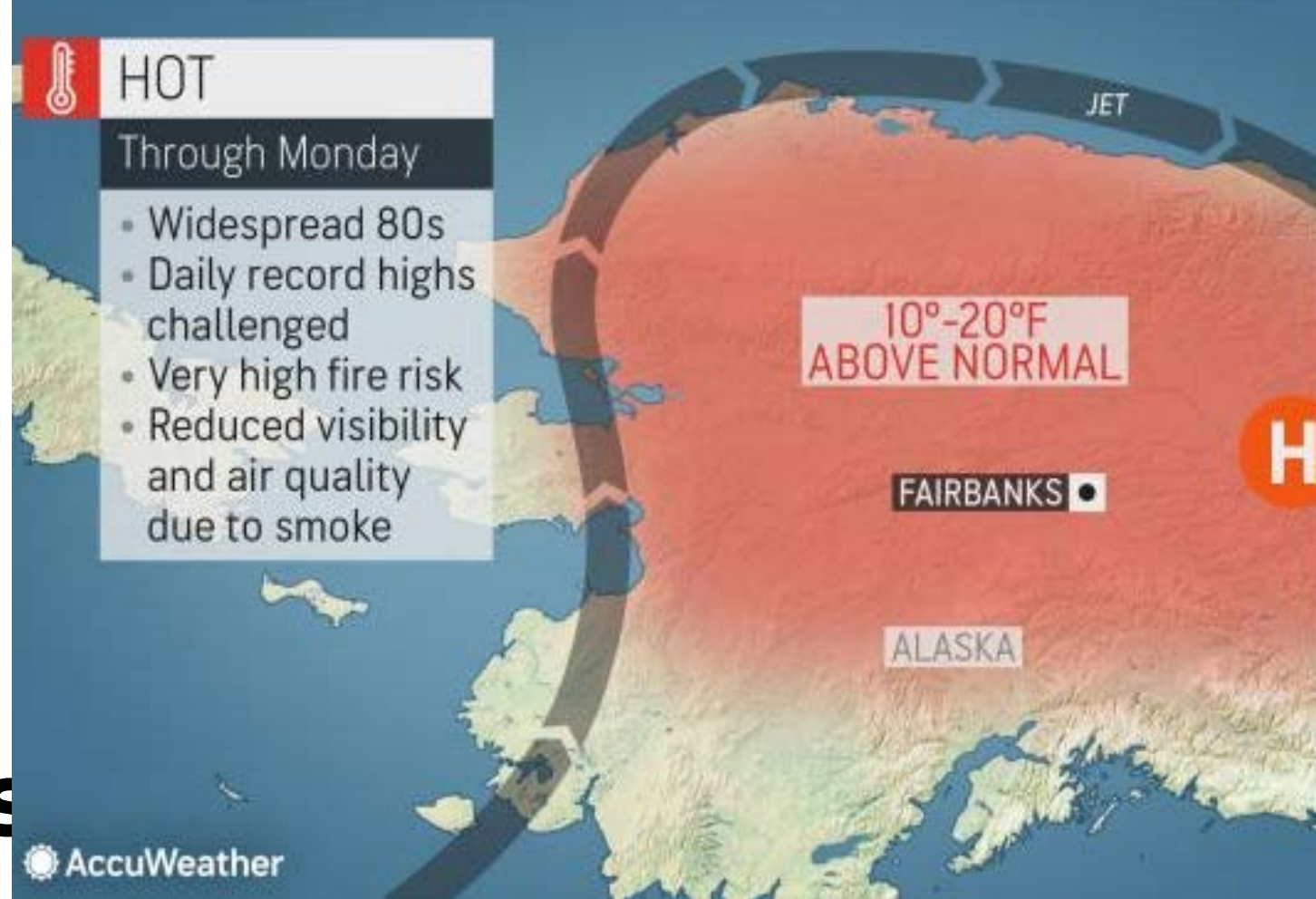
2 August 2022



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# Here Today with Two Hats

*Engineer and U.S. Permafrost Association President*



# First, the Engineer

*The Fancy New Shed*



# Poor Shed...

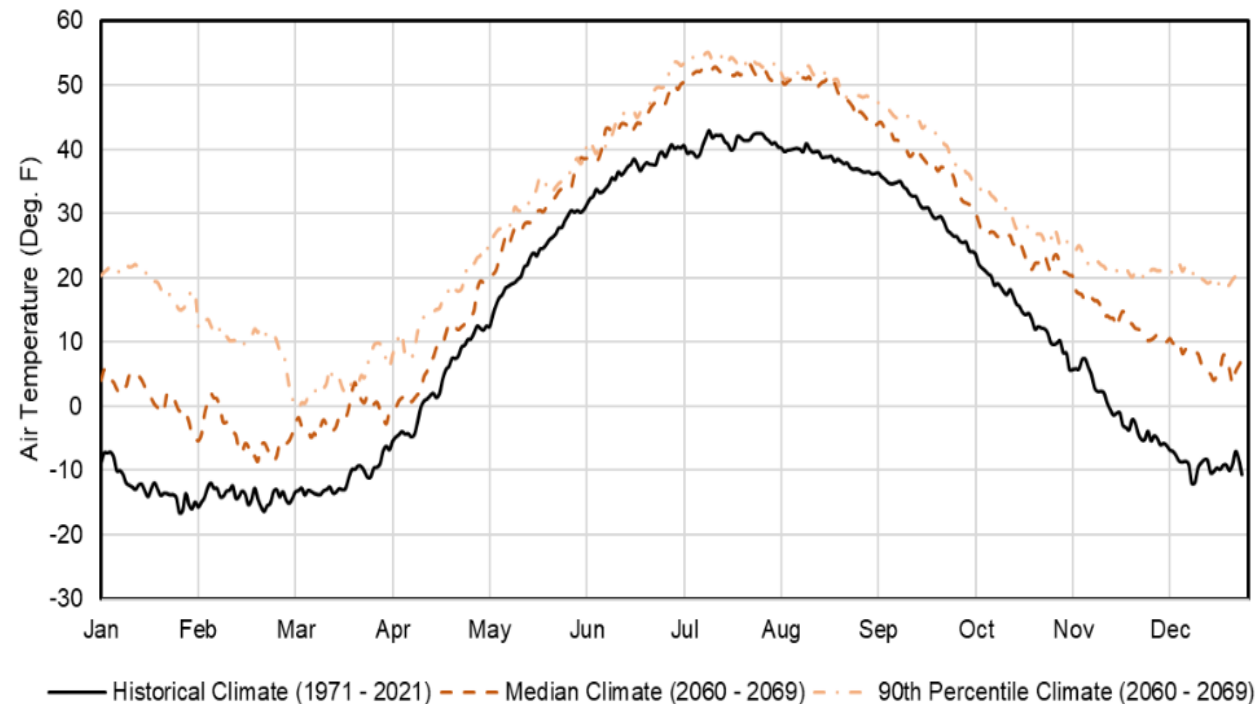


# EARTHQUAKE



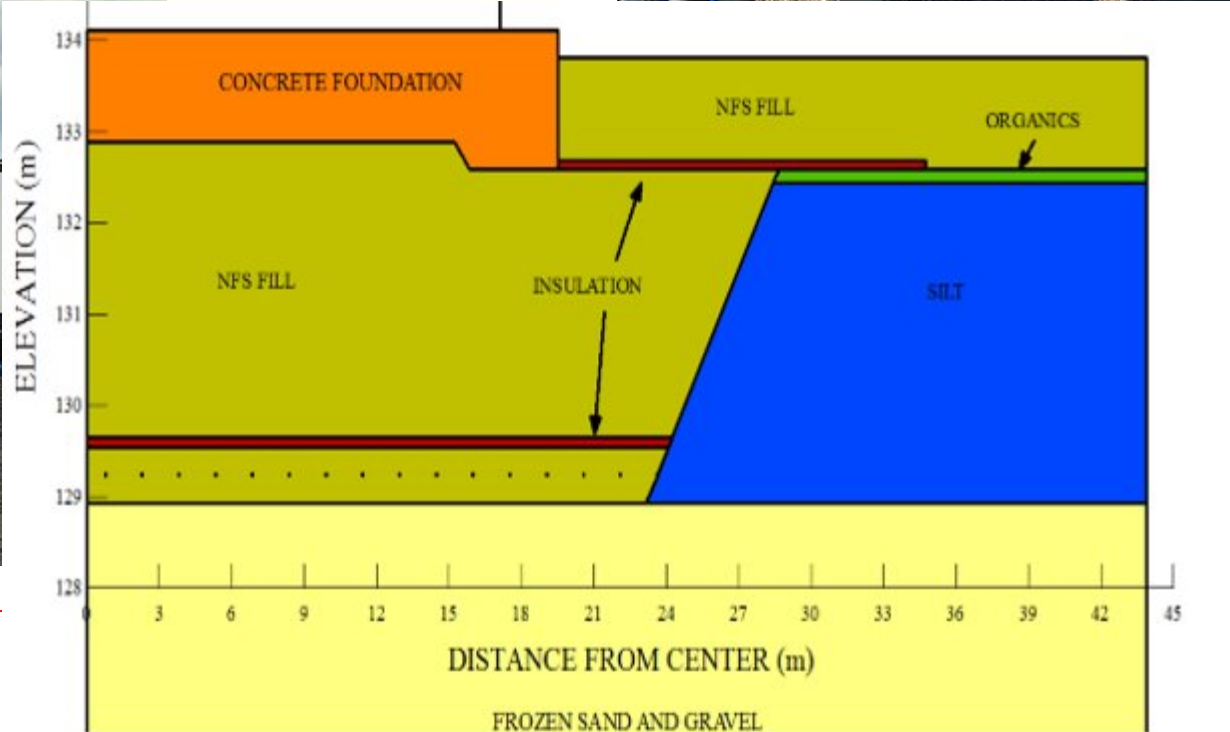
# Engineering in the Arctic

- The first rule of engineering in frozen ground is to keep the ground frozen
- What happens when that is not possible any longer?
- What about other loads like wind and snow and how they may change over time?
- Designing for the future
- Freezing Degree Days
- Research is critical



# Engineering Using the Fundamentals

Natural Gas Storage Tank – Fairbanks





# Switching Gears – U.S. Permafrost Association

*Scientists and Engineers working together*

USPA Mission:

The purpose of the USPA is to encourage scientific and engineering investigations in permafrost and related topics and to disseminate results related to permafrost research.





## USPA Activities

- *Permafrost Monthly Alerts*
- *USPA – PYRN Educational Fund (UPEF)*
- *Permafrost Engineering Education Program (PEEP)*
- *Regional Conference on Permafrost (RCOP) in 2021*
  
- *Celebrating 20 years this year*
  - Look out for activities this fall to celebrate
- *Annual meeting at AGU in Chicago*
  
- *Join at [USPermafrost.org](https://USPermafrost.org)*

# Conclusions

Dalton Highway Utility Trench (KTOO.com)



Shishmaref (<http://icestories.exploratorium.edu>)



Utqiagvik

(Louise Farquharson)

Thank you for the invitation to speak to you today.