Working towards a future powered by renewable energy

Lessons on Winterisation from the UK

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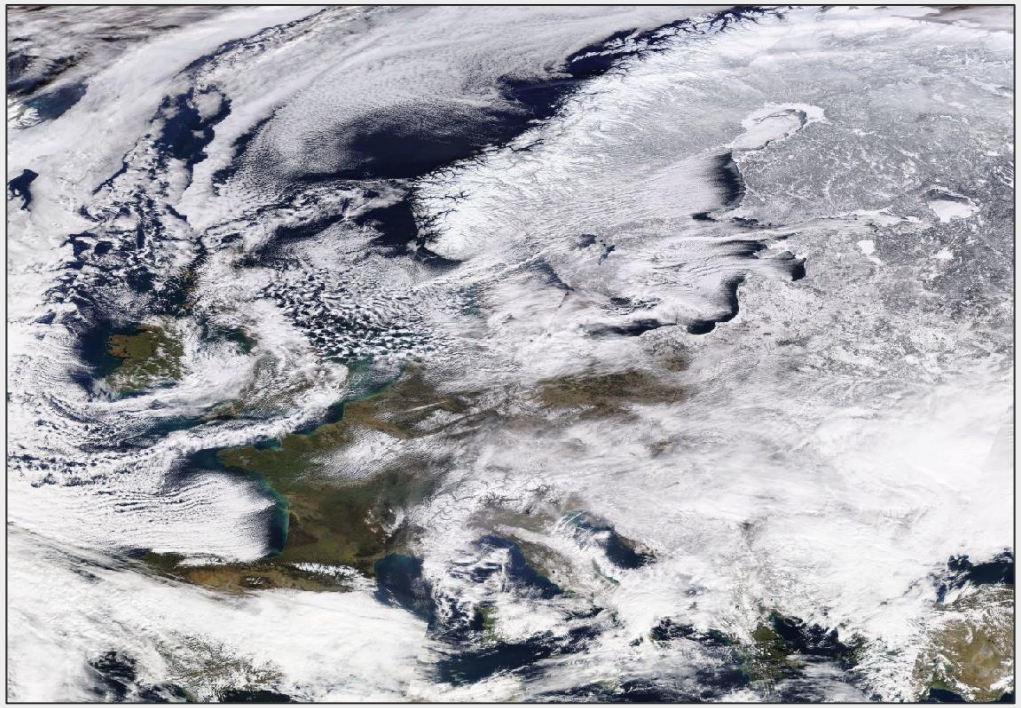
What does the UK know about winter?

Winter in the UK

- Clearly Sweden and the UK do not have comparable winters
- Extreme weather is fairly rare in the UK and generally in the North of Scotland

- Anticyclone Hartmut began 22nd February 2018 and had a significant effect across Europe
- As a result, the majority of onshore windfarms in the UK were inaccessible for several weeks
- UK's Met office issued red warnings to areas of the UK warning that there was risk to life
- Although winter storms similar to this had occurred in the past, they are considered rare



What is Winterisation?

Preparation of a site and equipment to operate during winter weather and associated conditions. Ensuring emergency procedures and arrangements are fit for purpose during winter weather conditions

Winter conditions include:

- Low levels of daylight
- Snow fall
- Ice both on blades, towers and the ground
- Low / extreme low temperatures
- High wind speed / storm conditions
- Limited emergency response capability

When it goes wrong

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Wind farm worker, 74, dies after being stranded in snow

23 January 2018

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Stranded wind farm workers airlifted to safety

15 February 2018

What to consider when developing a winterisation plan?

- Weather monitoring systems
- Site layouts
  - Approach roads are in good condition
  - Road markers, signage and edge markers
- Site access and occupancy parameters
  - Site / turbine entry conditions
  - Site evacuation conditions
  - Site evacuation procedures
- Site equipment
  - Capable of use in extreme cold weather
  - Communication system suitable
  - Redundancies in place in case of failure
- Personal Equipment
  - Fit for purpose
  - Comfortable
- Training
  - First aid training in cold related conditions
  - Specialist equipment training

Emergency Response Considerations

- The EMS should not be your primary method for rescue from site:
  - Can the EMS can get to your location quickly enough?
  - If heli-evac is not an option, how long will an ambulance take to reach your location
  - Will the ambulance access your site in winter conditions
  - Can you effectively maintain a casualty's condition until the EMS arrive?

- If there is no immediate risk to life, is creating a place of refuge (POR) more appropriate? A POR should include:
  - Shelter from the conditions
  - Suitable method of keeping warm
  - Provision of a suitable power supply
  - Rations
  - Welfare provisions
  - Method of communication

Human Performance in low temperatures

While winterisation of sites and equipment, is important, ensuring organisations recognise the effect of winter conditions on the workforce is vital

While preparing this presentation, I went looking for evidence to support the theory that people do not perform as well in cold conditions:

Table 20.2 Symptoms and physiological consequences of hypothermia (°C)

Core temperatures	
35–33	Confusion, disorientation, amnesia
33–30	Cardiac arrhythmia, unconsciousness
28–27	Inability to respond to verbal commands, loss of voluntary movement, possible ventricular fibrillation
26–24	Loss of pupillary light reaction and deep tendon reflexes, loss of superficial skin responses and the gag reflex, death or failure to revive
<17	Cerebral electrical activity ceases in some individuals at this temperature

Physiological bases of human performance during work and exercise (pp.359-377) Edition: 1st Chapter: 20 Publisher: Churchill Livingstone Elselvier

The UK's regulator, the Health and Safety Executive has carried out research into human error and identified some factors which contribute to workers making mistakes, these include:

- *The work environment – eg too hot, too cold, poor lighting, restricted workspace, noise.*
- *Extreme task demands – eg high workloads, boring and repetitive*

Health and Safety Executive Leadership and worker involvement toolkit, Understanding human failure

exposure to cold temperatures can decrease finger dexterity and, as result, increase work-related accidents"

Brajkovic, D. and Ducharme, M., 2003. Finger dexterity, skin temperature, and blood flow during auxiliary heating in the cold. Journal of Applied Physiology, 95(2), pp.758-770.

MVC declined by 12% at the conclusion of the 40th minute of cold exposure, and returned to normal by the 15th minute of re-warming

Effect of Cold Temperatures on Dexterity Peter Budnick, PhD, CPE 19th November, 2013

In Summary

We work in a high risk industry, there are hazards everywhere!! We must ensure these hazards are managed appropriately

Things can go wrong and we should be prepared for that, procedures should be resilient and capable of quickly detecting and correcting when things start to go off track

As an industry we are increasing our knowledge of working in winter conditions all the times, however unfortunately some of this learning has been the result of an incident investigation

Our techs generally want to get the work done, and at times this can “drive” their behaviour and lead to well intentioned corner cutting

There is room for improvement when developing winterisation strategies, especially around emergency preparedness and response

Recognising that working in arduous conditions is difficult and our site preparation should help the workforce get the work done

Any questions?

Thank you for your time.