

# Detection of Cracks and Potholes in Roads using Infrared Thermography



T. Ahmad, H. Khawaja

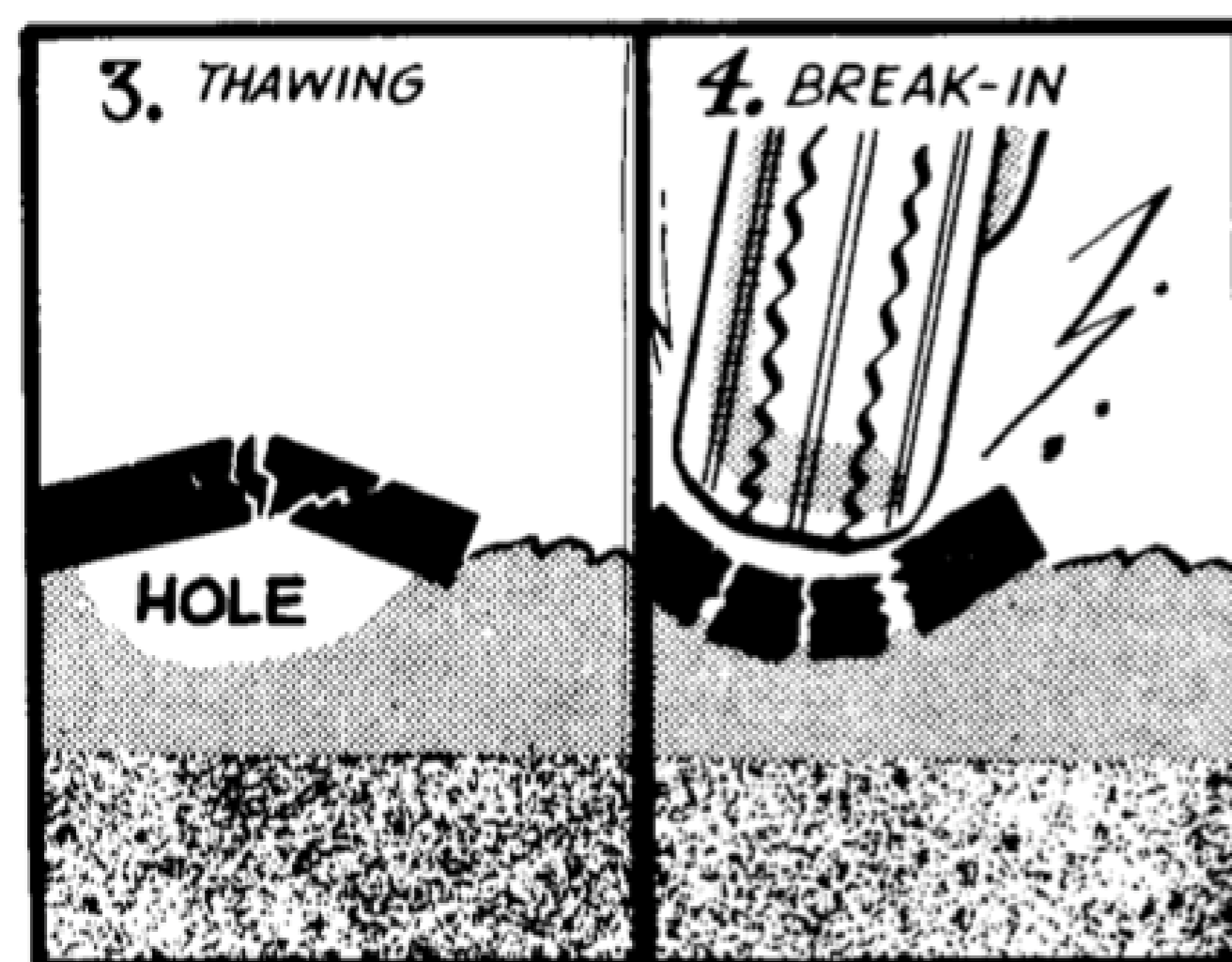
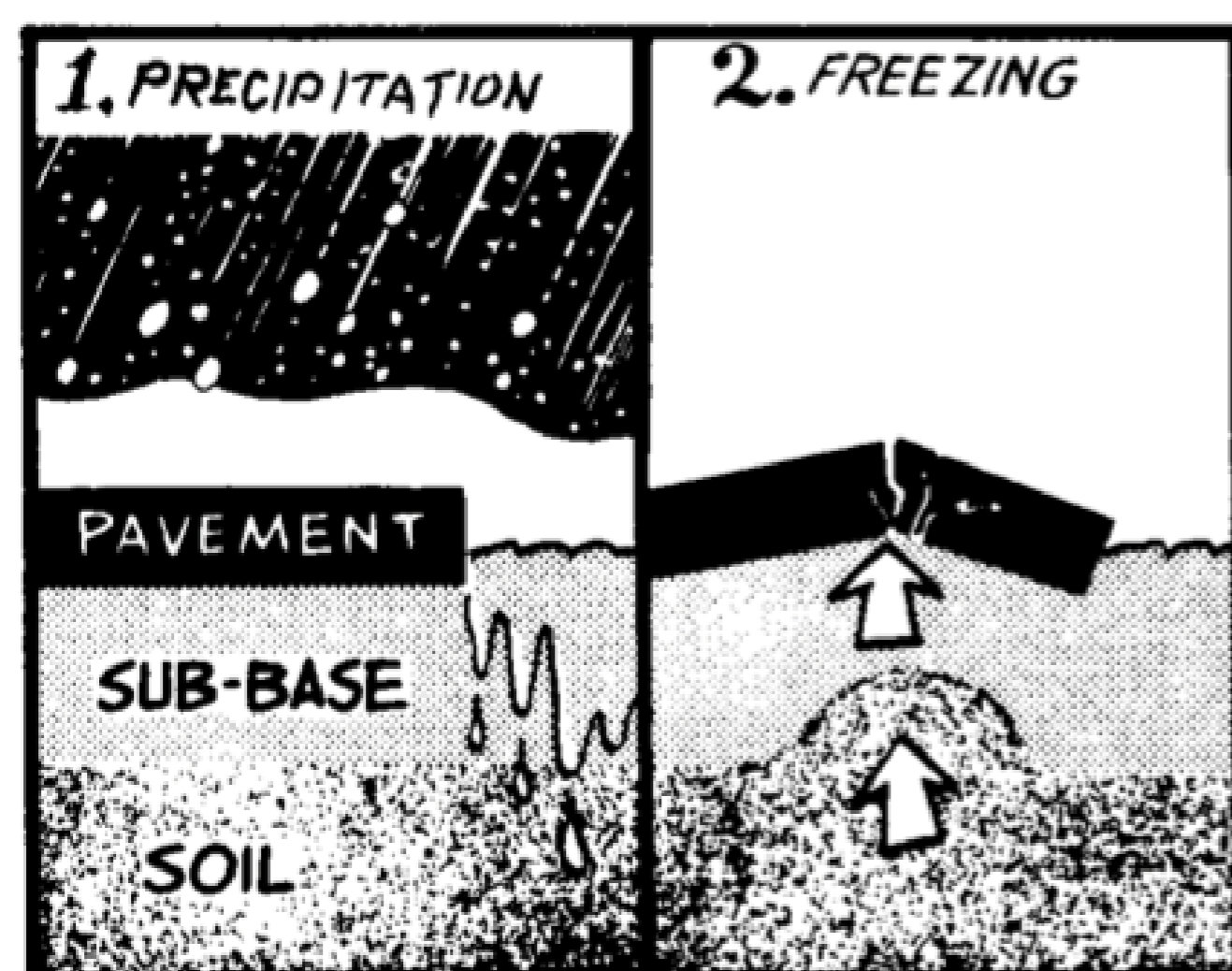
UIT The Arctic University of Norway, Tromsø, Norway

## Abstract

Many remote sensing techniques can be used to identify the cracks/voids on the road surfaces. The given research focuses on applying infrared thermography (IRT). IRT technology can detect features based on the different thermal signature. This method would be an excellent tool for detecting the fracture/cracks. It is because of the reason that the naturally occurring water (rain, snowmelt, etc.) seeps into fractures/cracks. The water has different heat capacity than the material of road surface, and will not undergo cooling or heating as fast as roads surface, hence develop a qualitative thermal signature. This thermal image can be captured using IRT. Also, if the crack is in-depth and invisible from the surface may also be detected using IRT.

One of the most common reason for the road damages in high-north is the seepage of water, followed by the freezing/thawing cycle. Cracks have various topographical features and can be categorised based on their shape, depth, and propagation rate. One of the examples of such crack is referred to as a 'crocodile crack'. If left untreated, the 'crocodile crack' turns into even greater damage, such as potholes. Maintenance and repair cost of potholes is far larger than repairing the crack. Hence pre-emptive detection is essential for a cost-effective and an efficient solution.

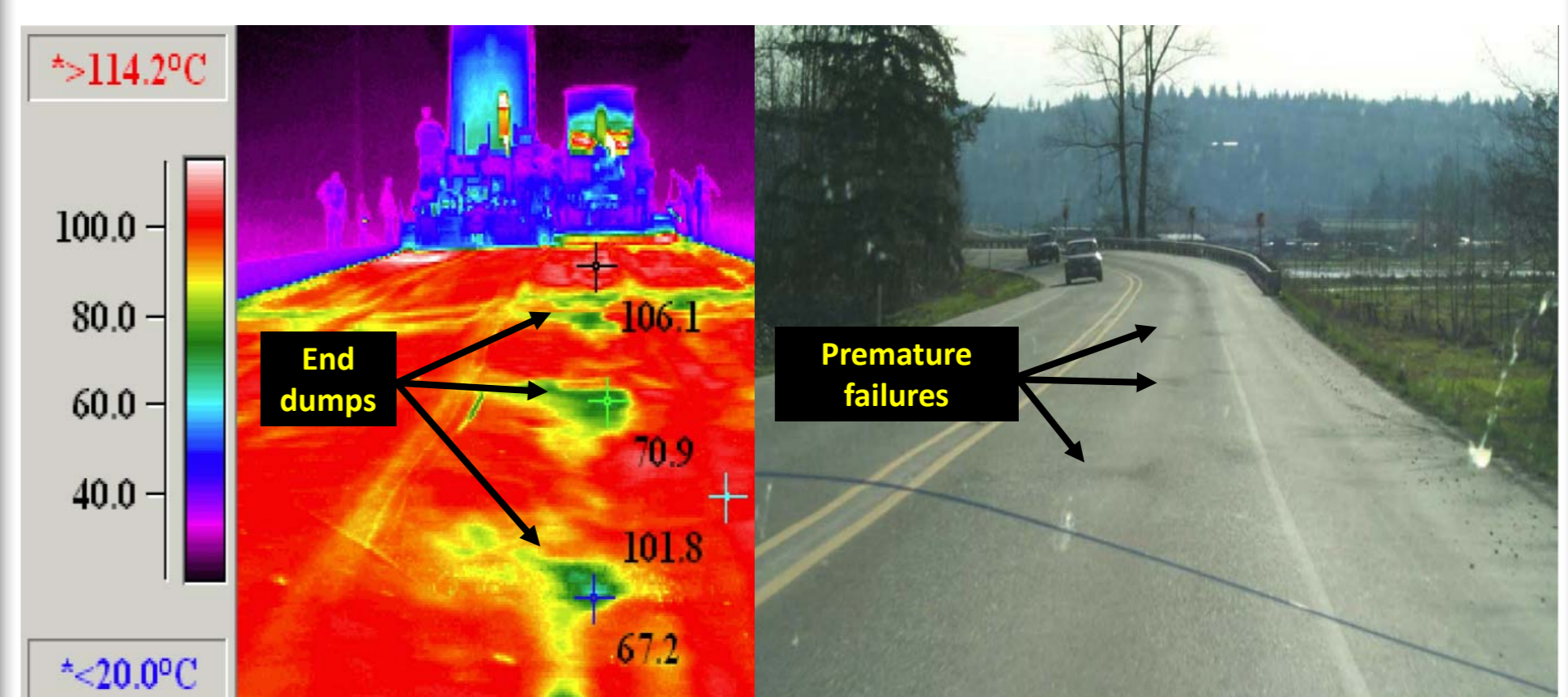
## Freezing Thawing Cycle Impact on a Road Surface



## Crocodile Cracks and Potholes



## IRT Detection Technology



## Conclusion

This project proposes to use IRT technology in the detecting the cracks and potholes in the roads surface. Considering that the water is the key element in damaging the roads, it is reasonable to say that IRT will be effective.

## Contact:

**Hassan Khawaja**  
University of Tromsø,  
Tromsø, Norway  
hassan.a.khawaja@uit.no