

## *Wireless printed electronics moisture sensors for pavement monitoring*

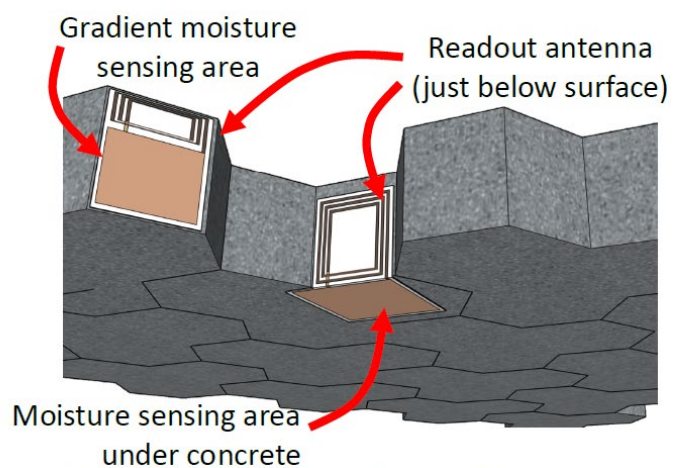
The pavement in industrial container ports, such as Norvik Port in Nynäshamn, is under heavy loads and exposed to harsh environmental conditions. Maintaining the pavement in working condition is crucial, because any unforeseen damage can cause huge delays and disrupt the entire supply-chain (as just witnessed in the Suez-canal). However, there are currently no easy methods to monitor the condition of the pavement. So, this project aims at developing a monitoring method by integrating a very flat printed electronics humidity sensor with a wireless read-out antenna below the concrete tiles of the pavement (Figure 1a and b). This sensor will be used to continuously monitor the condition of the pavement and will help to extend the lifetime of the pavement as well as predict damage before it happens.

This master thesis project entails:

- building of an experimental setup by integrating the thin humidity sensor into a test piece of pavement.
- performing tests using load-cells and temperature/humidity-controlled climate chambers to evaluate if the sensors can withstand the real-life conditions at the port.
- analyse the data to predict the condition of the pavement.
- develop an improved test setup for real-life pavement monitoring in the field, i.e. at Norvik port Nynäshamn.



*Figure 1a: Norvik Port concrete Trihex pavers on asphalt*



*Figure 1b: Two sensor designs for measurement along and under Trihex pavers.*