

Standing Water

Much more common than expected.

ACI-APAC Webinar
29-09-'22
By: Athi Agambaram

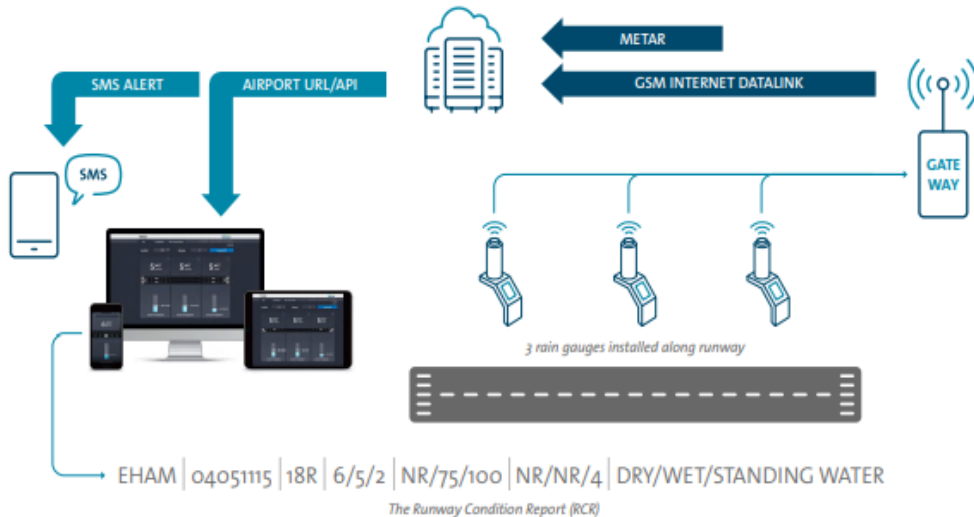


Airport Resilience: Our Vision on Living with Water

Climate change is having more and more impact on our infrastructure, as the pictures below show



NACO's RCR-Tool[©]



The tool uses advanced simulation software to calculate the amount and location of water on the runway at any one location and time. Inputs are the **geometry of the runway** for which it will report, and **real-time rainfall data** collected near the runway.

The tool:

- automates BOTH the assessment and the report
- alerts at every significant change
- reports real-time
- Is capable of forecasting

Misconceptions about Standing Water

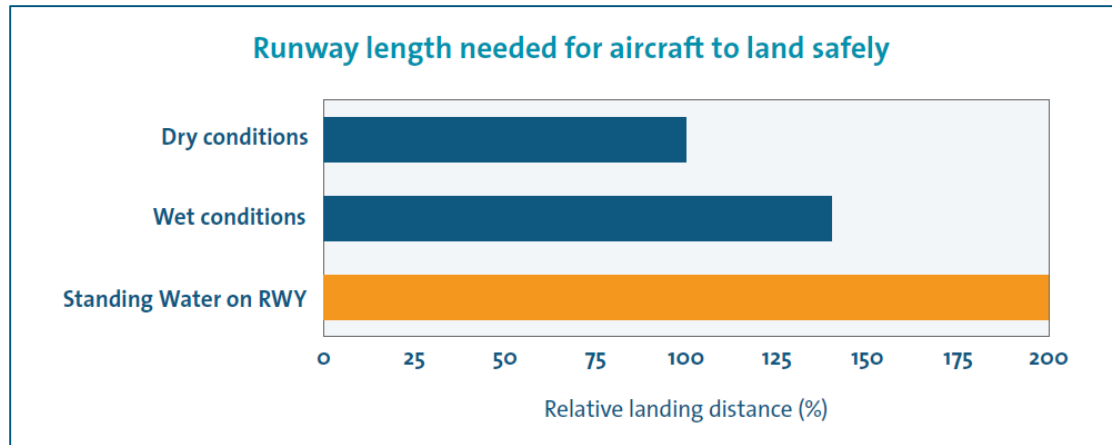
At conferences and webinars, we heard people say,

“We never experience standing water because:

- we do not experience the rainfall intensity you need, like in tropical climates”.
- our runway surface is such that standing water cannot occur (well maintained, macro texture (Antiskid®, grooving))”

But also: “at what rainfall intensity should we expect Standing Water?”

The change from RWYCC 5 to 2 has a significant impact on breaking action, as shown below!



Misconceptions about Standing Water

Our research shows that:

- Very high rainfall intensities do occur, even in moderate climates,
- Even well maintained, well drained and grooved runways experience standing water.
- Climate change is expected to increase the frequency of extreme weather => We must therefore conclude that the probability of standing water occurring on your runway is very real and should not be dismissed.

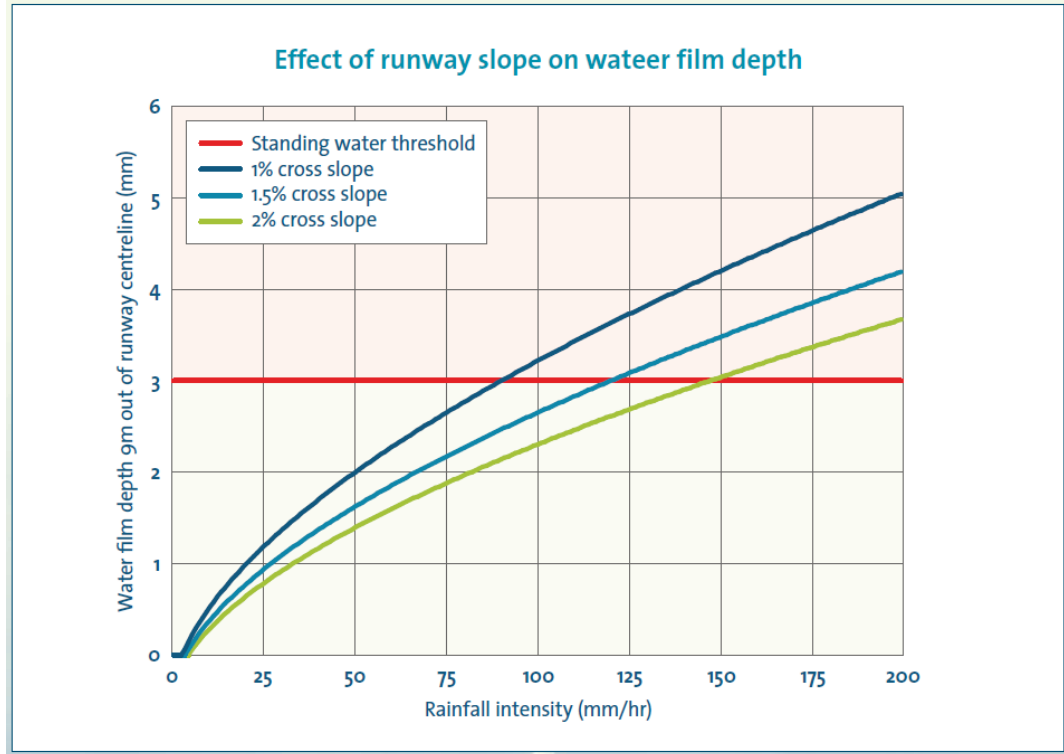


Grooving being implemented on a newly paved runway shows the impact on runway surface condition.

Effect of Runway Profile on Water Film Depth

The runway profile plays a big role in when to expect standing water on your runway.

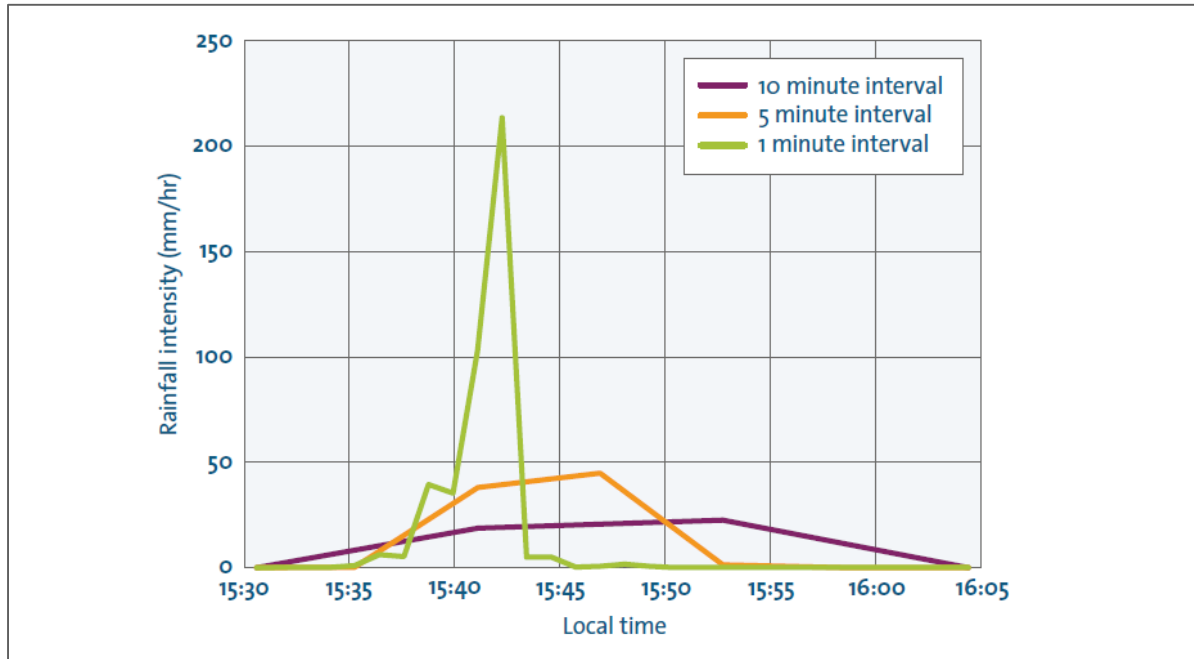
Depending on its profile, **standing water can occur during rainfall intensities ranging from around 90 mm/hr to over 150 mm/hr**, as illustrated in the figure to the right.



The Role of Meteorological Data!

- Regular meteorological data, like automated weather observing system (AWOS), suggest that significant rainfall intensities do not occur commonly.
- However, most systems report average rainfall intensities over 10 or 15-minute intervals.
- Given the dynamic character of water, this interval is too long to detect standing water, because:
 - The higher the rainfall intensity during a rainstorm, the shorter the rainstorm tends to be.
 - Peak intensities may only last minutes.
- As you can see in the next slide, interval matters.

Effect of Measurement Interval on Rainfall Intensity



Even though standing water may only occur for a short period of time, the (unexpected) impact on an aircraft landing or departing will be significant.

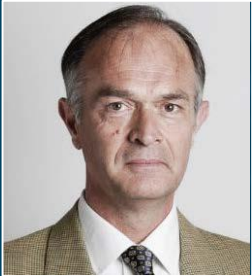


a company of Royal HaskoningDHV



THANK YOU

For more information:



Pim Meyboom

Senior Project Manager at NACO for large airport projects and airside automation

30 years of experience in projects in chemical industry and aviation
PPL Pilot Licence



Athinatha Agambaram

Sales Representative at NACO covering Asia Pacific Region for airside automation

16 years of experience in Aviation Industry covering Asia Pacific region aviation customers (CAA, Regulator, Airlines & MRO).

For more information please feel free to contact me at:

Pim.Meyboom@naco.rhdhv.com - +31 (0)6 305 41 289
athinathan.agambaram@naco.rhdhv.com - +65 83233165
Or check out <https://www.naco.nl/rcr-tool>

About NACO

NACO (Netherlands Airport Consultants), part of **Royal HaskoningDHV**, is a **world-leading** airport consultancy and engineering firm with over **70 years' experience** working in the aviation and air transport industry – from major landmark designs to smaller regional airports.

Since 1949, NACO has provided integrated and multi-disciplinary airport planning and design services for over **650 airports** in more than **100 countries**. We work with our clients to solve the increasing complexities that come with developing **world-class, future-proof airports**.

Contributing to **airport development** is at the **heart of our mission**. From Strategic Development Studies and Airport Master Planning to Passenger Terminal Building Design, Airside Engineering and Digital Solutions, our aim is to provide innovative, sustainable, solutions tailored to meet the local requirements for our clients.