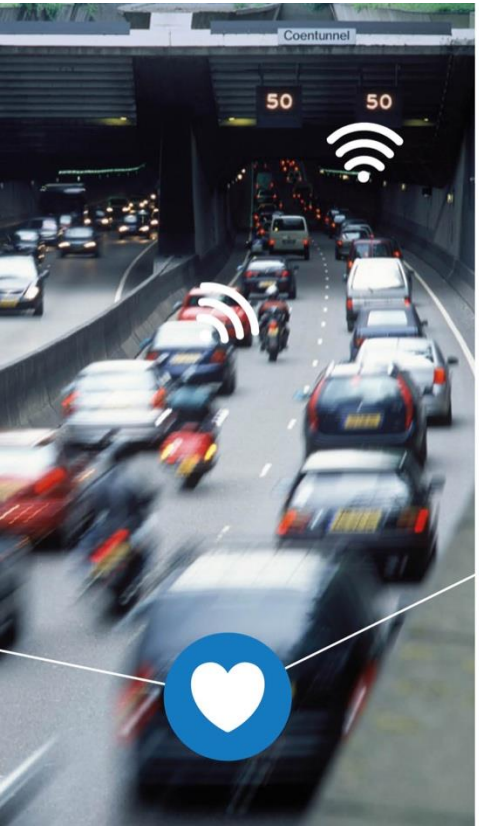
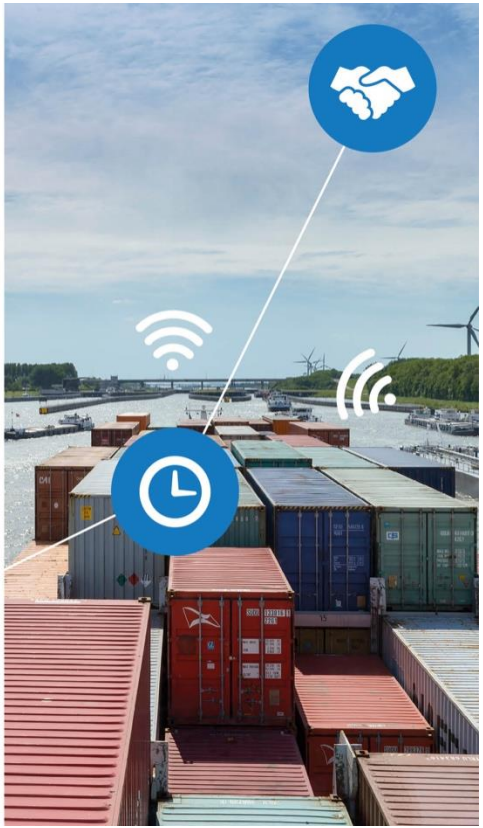
National Data Warehouse
for Traffic Information

Ministry of Infrastructure
and Water Management

Rijkswaterstaat
Ministry of Infrastructure
and Water Management

Get smart together





Blue Wave Connections

Multimodal Traffic Management

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Tony Meeuwsen

Website
Blauwegolfverbindend.nl

Project Blue Wave Connections

Goal: Better information exchange between both road and water authorities

and users (skipper and road user)

Aiming for:

Data of bridges and/or locks both real-time and planned

Blue Wave connections

Results: Less inconvenience and predictable travel times for road and waterway users

- Road users spend less time waiting at open bridges, so less time wasted.

- Shipping: Smooth and safe passage of bridges and easy finding of appropriate berths.

- More safety and less air pollution, less costs.

Waterways and inland shipping in the Netherlands

Annual transport by inland shipping

- 365 million tonnes of cargo
- 38% of the total transportation of goods in the Netherlands
- 80% of bulk shipping
- 3.2 million containers

Waterways and objects in the Netherlands

- 1,350 moveable bridges
- 209 moveable bridges on the main roads
- 200+ Locks

Multimodal traffic management

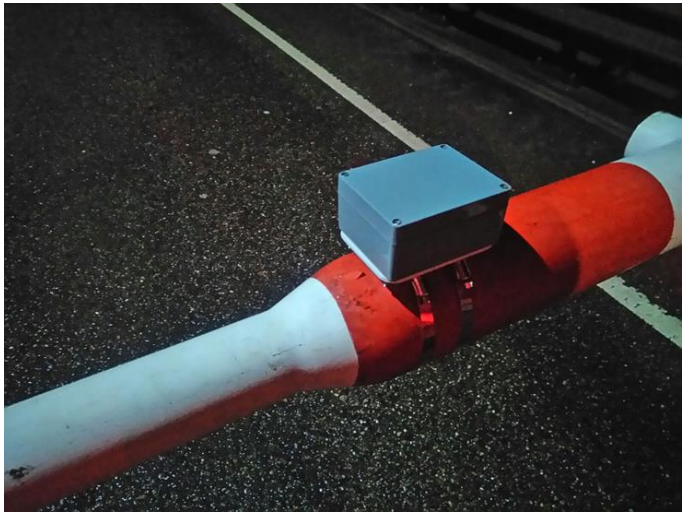
BridgeData

	Reliability	DATEXII:
0. No data – due to technical failure sensor	unknown	record type trafficElement.EquipmentOrSystemFault
1. PLANNED and expected (timetable)	low	ProbabilityOfOccurence riskOf
2. APPROVED (by bridge operator) 5-30 min	high	Probable
3. CURRENT (sensor)	high	Certain

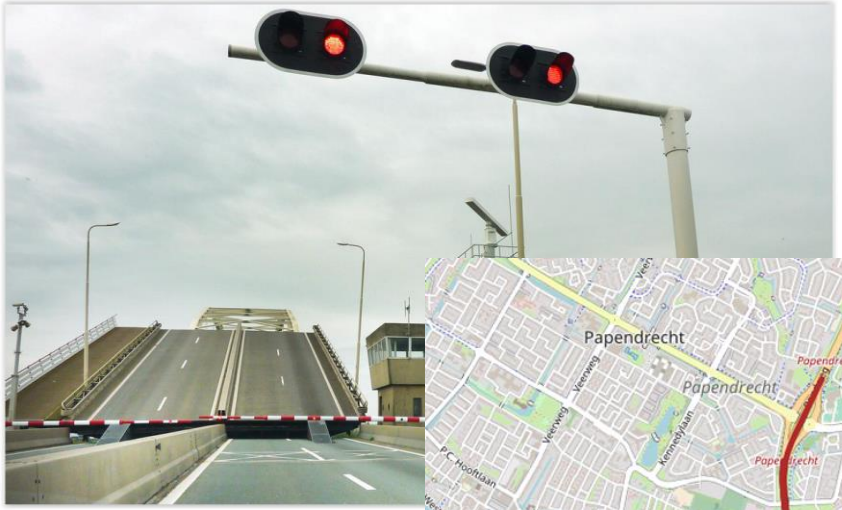
Status bridge	operatorActionStatus	lifecyclemanagement
Closed for Road traffic	beingImplemented, Implemented, beingTerminated	-
Open for road traffic	beingTerminated or empty	lifecycleManagement End = true
Open for ships	Implemented	empty
Closed for ships	Empty, beingImplemented, Beingterminated	Empty or lifecycleManagement End = true

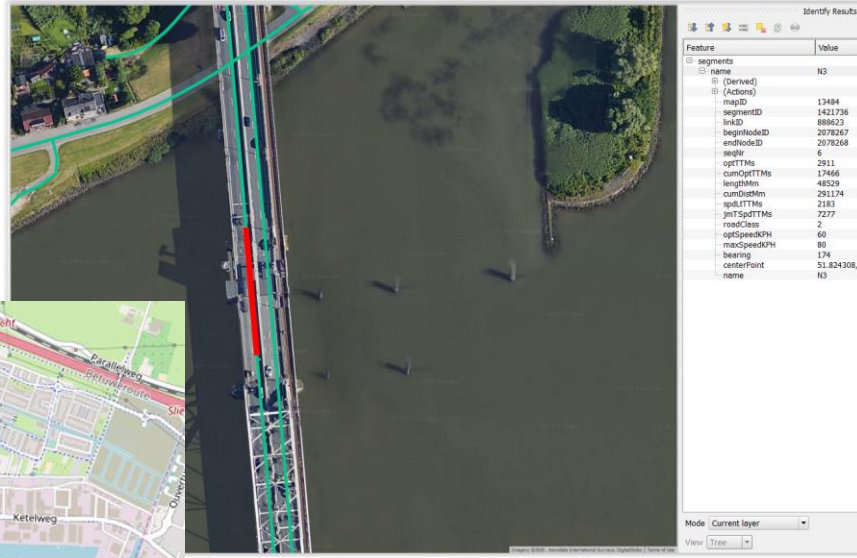
Measuring with sensors

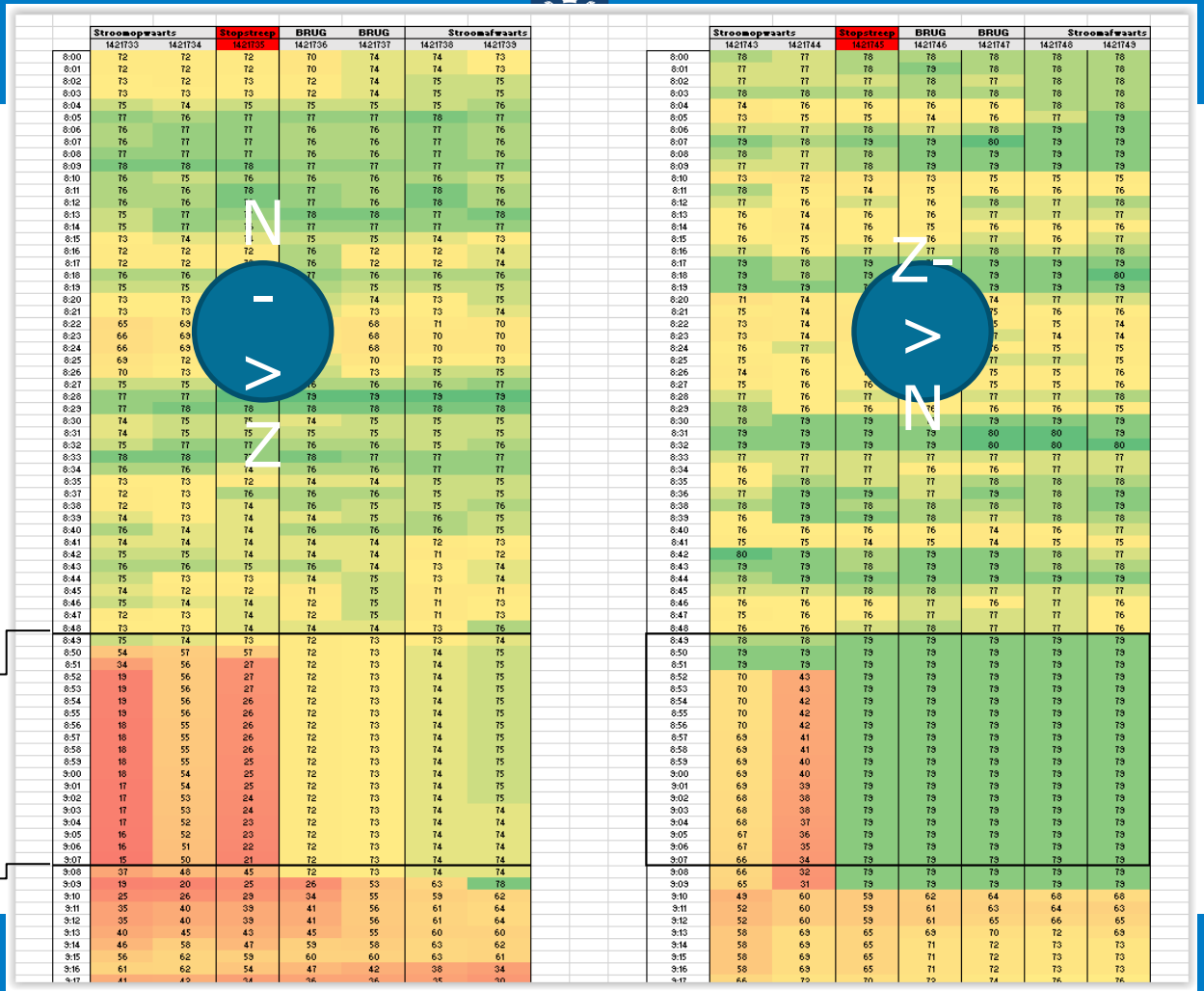
- Sensor technology
    - Light meters connected to warning lights
    - Position detectors connected to a barrier
    - Status changes are transmitted via LORA network
- Potential Advantages
    - Low energy use
    - Independent measurement
    - No connections to SCADA
    - Purchase as a service



Merwedebrug – opening validation with Floating car data and sensor data







	Stroomopwaarts		Stopstreep	BRUG	BRUG	Stroomafwaarts	
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8:01	72	72	72	70	74	74	73
8:02	73	72	73	72	74	75	75
8:03	73	73	73	72	74	75	75
8:04	75	74	75	75	75	75	76
8:05	77	76	77	77	77	78	77
8:06	76	77	77	76	76	77	76
8:07	76	77	77	76	76	77	76
8:08	77	77	77	76	76	77	76
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	Stroomopwaarts		Stopstreep	BRUG	BRUG	Stroomafwaarts	
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8:10	73	72	73	73	75	75	75
8:11	78	75	74	75	76	76	76
8:12	77	76	77	76	78	77	78
8:13	76	74	76	76	77	77	77
8:14	76	74	76	75	76	76	76
8:15	76	75	76	76	77	76	77
8:16	77	76	77	77	78	77	78
8:17	79	78	79	79	79	79	79
8:18	79	78	79	79	79	79	80
8:19	79	79	79	79	79	79	79
8:20	71	74	74	74	74	77	77
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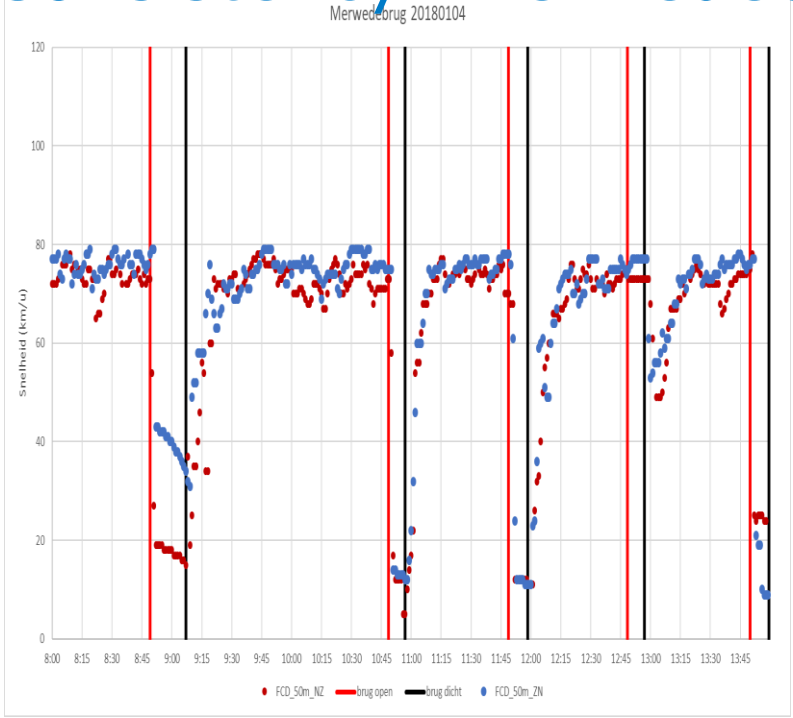
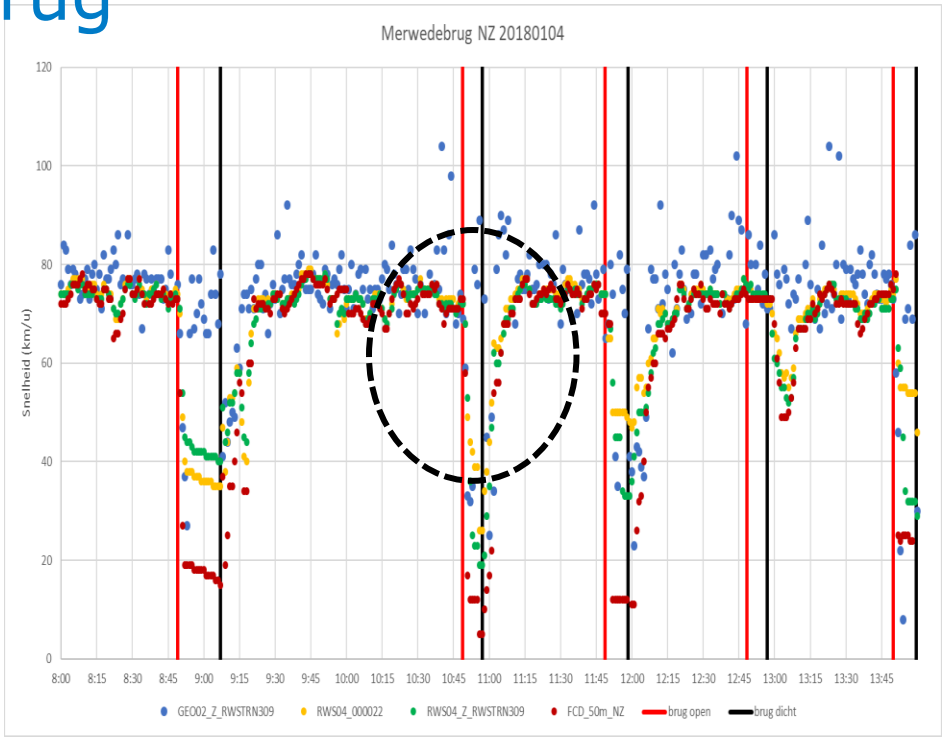
operatorAction Status implemented

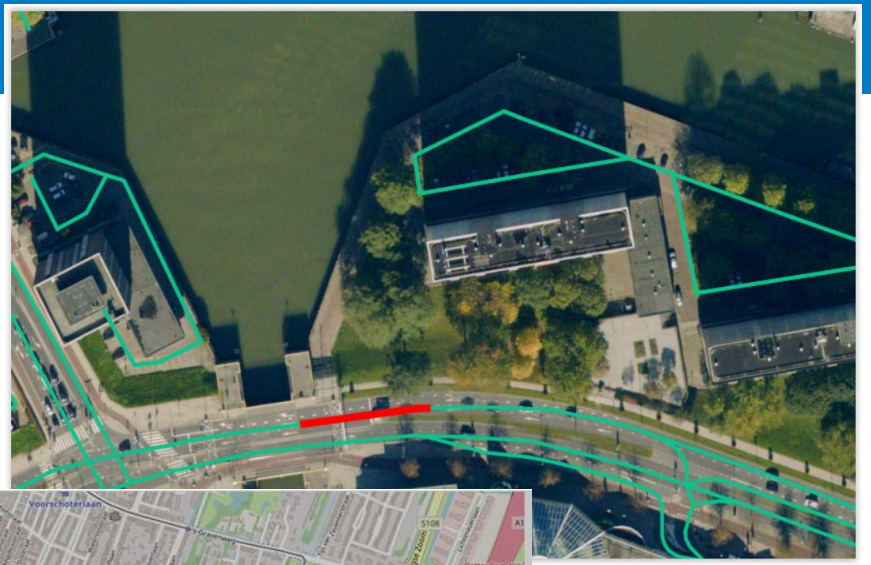
lifeCycleManagement End=true

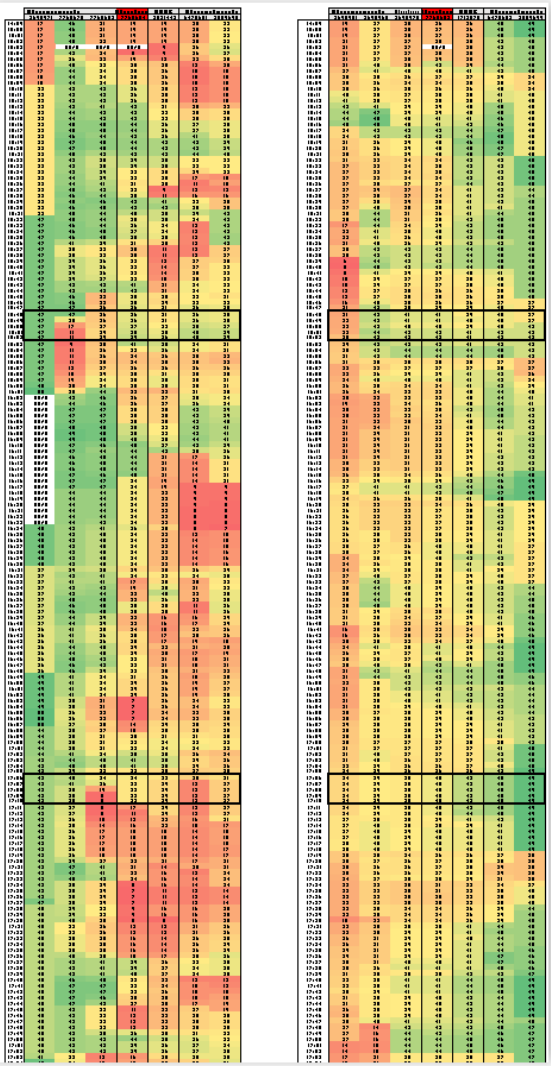
Consistency: Merwedebrug

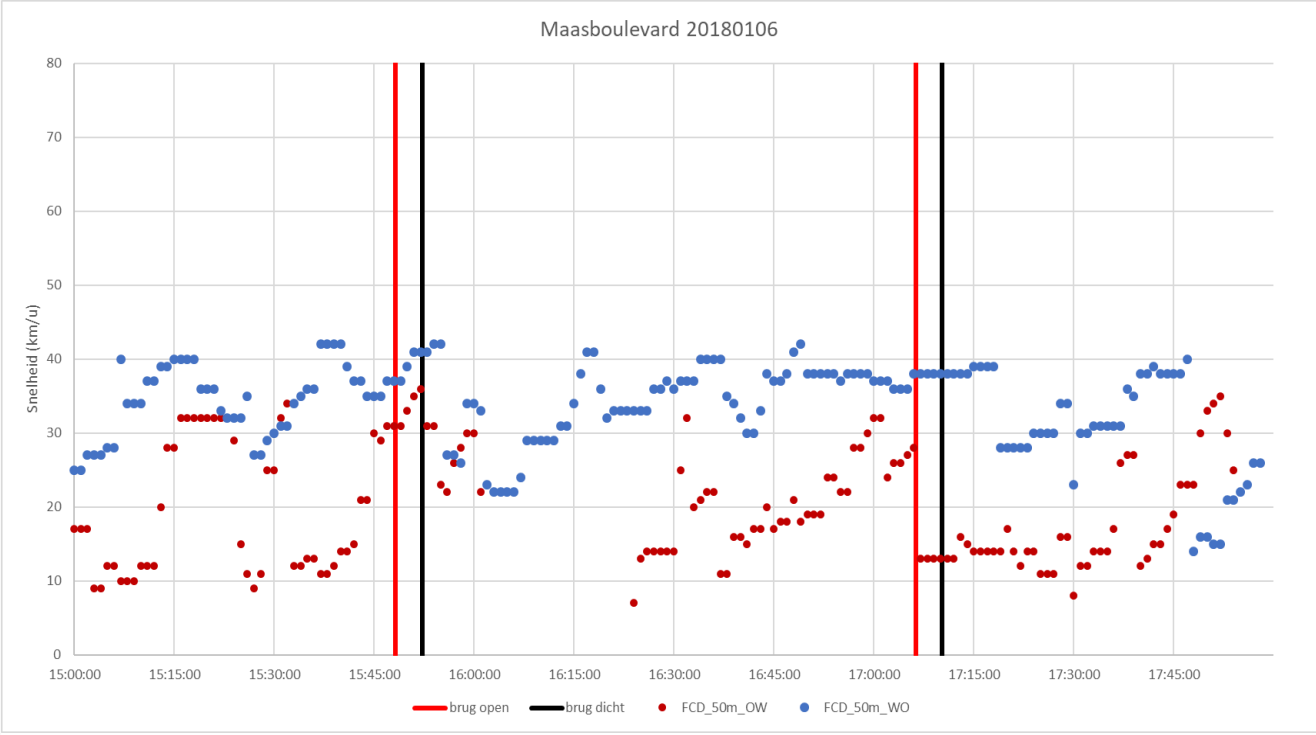




Boerengatbrug



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Snelheid (km/u)
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60
50
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30
20
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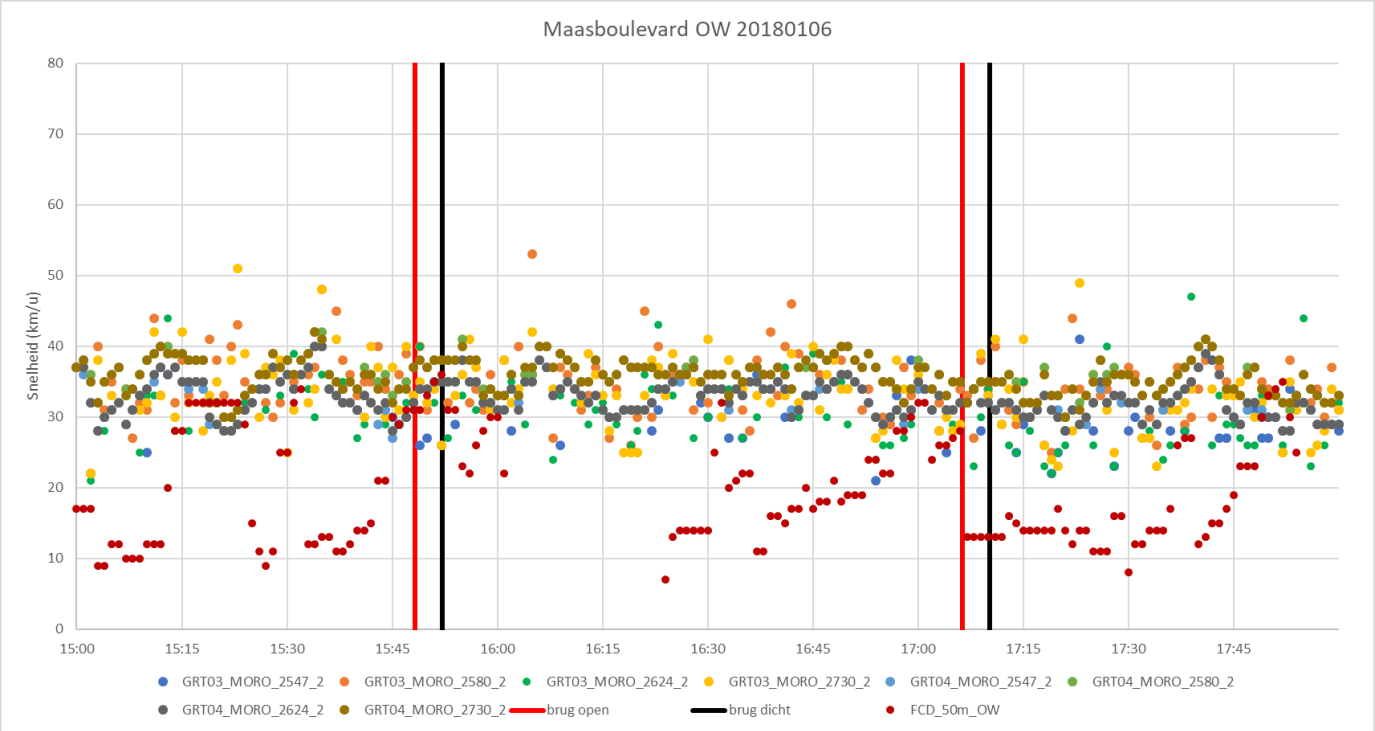
brug open
brug dicht
FCD_50m_OW
FCD_50m_WO

Consistency: Boerengatbrug



Blue ≈ Wave