Inspectietechnieken voor persleidingen - resultaten

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Amersfoort, 6 december 2023

Korte introductie

Probleemstelling:

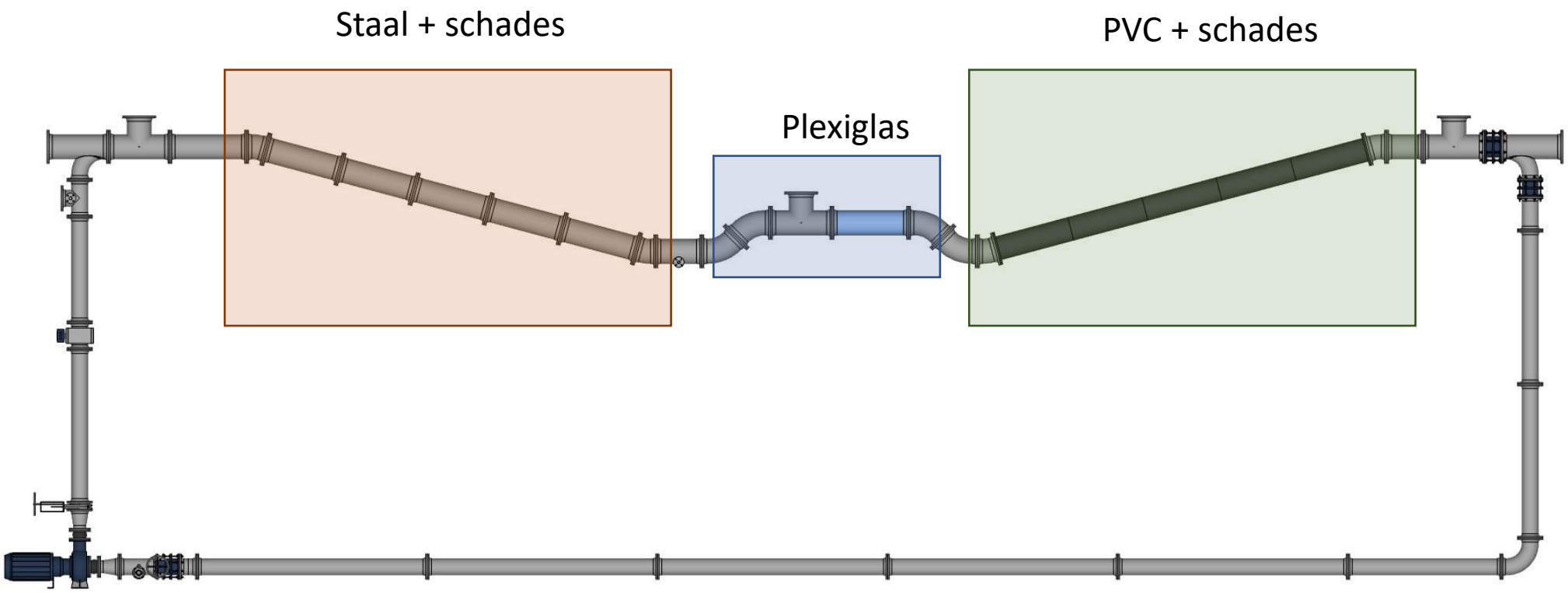
- Onzekerheid over welke technieken onder welke omstandigheden de gewenste informatie geven

Projectdoelen samengevat:

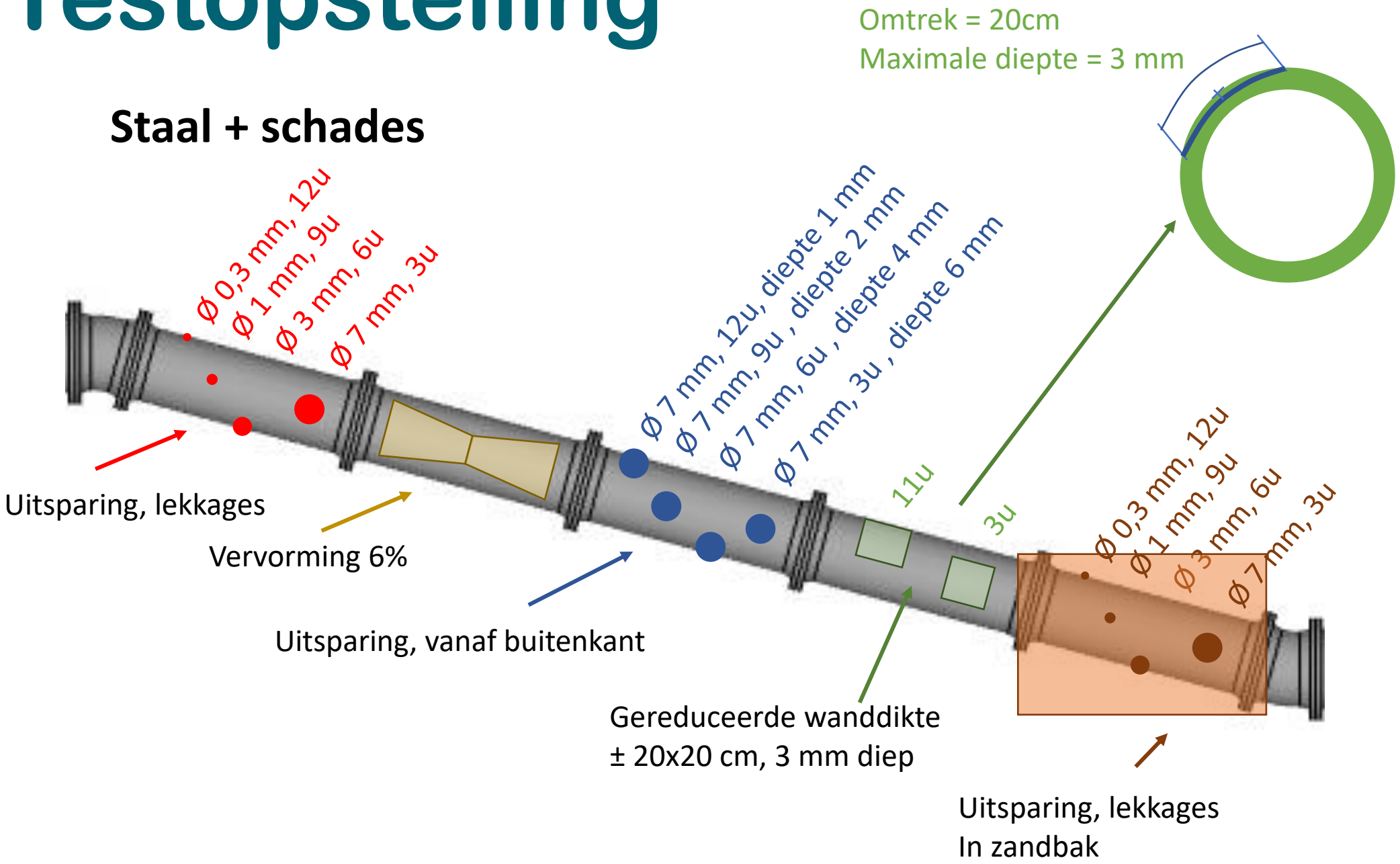
- Betrouwbaarheid data verschillende inspectietechnieken onderzoeken
- Innovatie en doorontwikkeling stimuleren
- Kennis van eindgebruikers vergroten (verwachtingsmanagement)
- Aansluiting tussen markt en gebruiker

Testopstelling

Uiteindelijke testontwerp

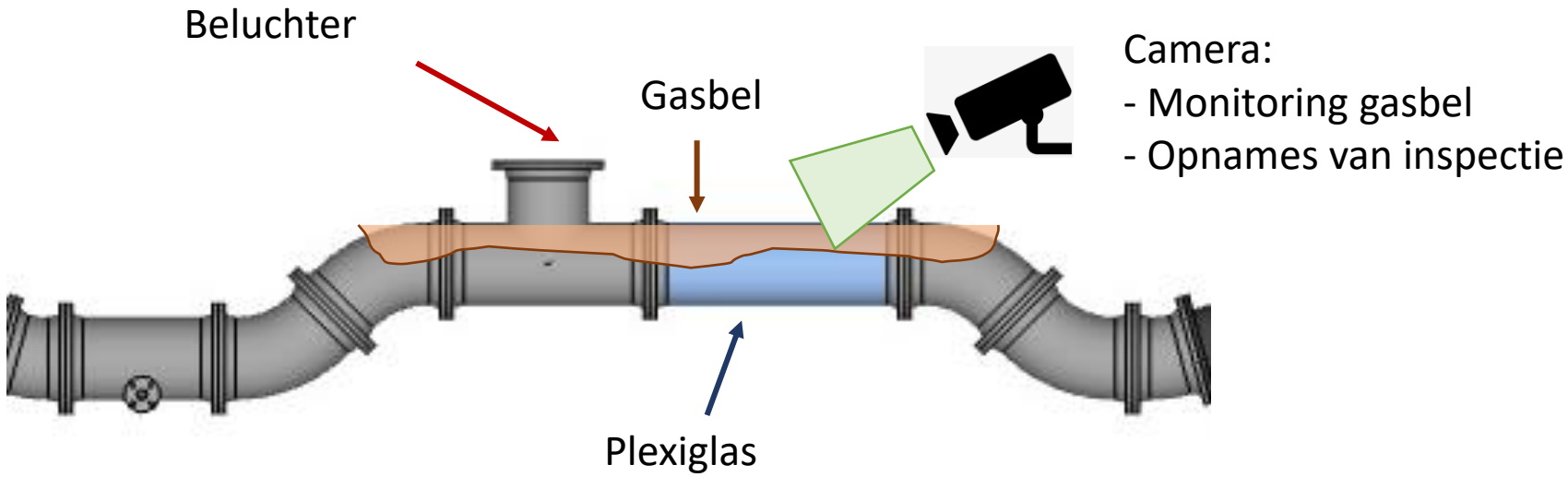


Testopstelling



Testopstelling

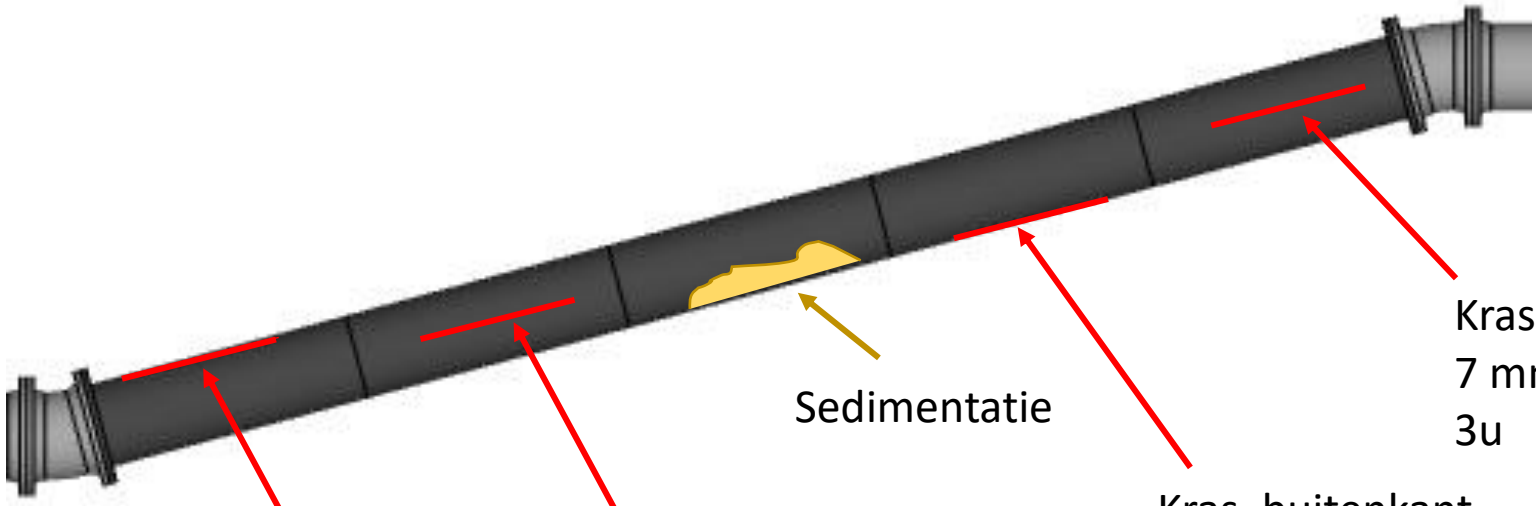
Plexiglas



Camera:
- Monitoring gasbel
- Opnames van inspectie

Testopstelling

PVC + schades



Kras, buitenkant
1 mm diep, 50 cm lang
12u

Kras, buitenkant
3 mm diep, 50 cm lang
9u

Sedimentatie

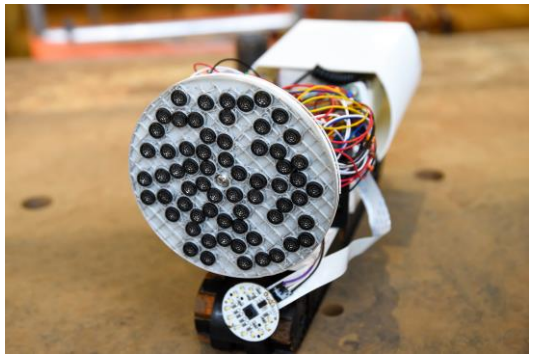
Kras, buitenkant
5 mm diep, 50 cm lang
6u

Kras, buitenkant
7 mm diep, 50 cm lang
3u

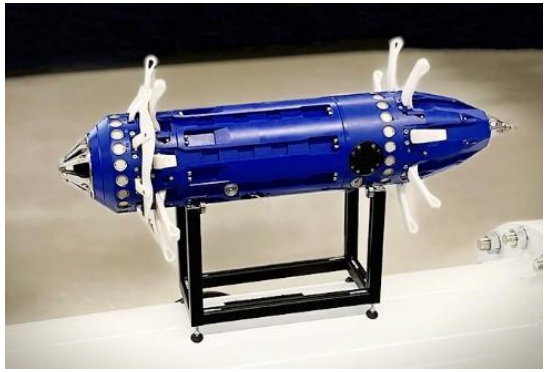
Deelnemende technieken

Pipebots acoustic sensor
(University of Sheffield)

Airborne ultrasonic array devices
(University of Bristol)



LINEGY (ROSEN Group)



SmartBall (Xylem)

Acquarius (Acquaint)

Co-UDlabs

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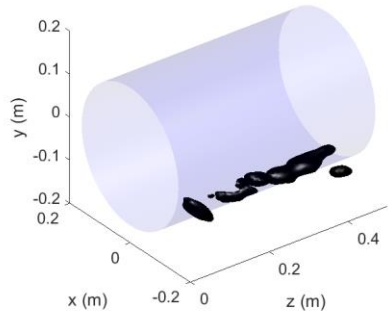
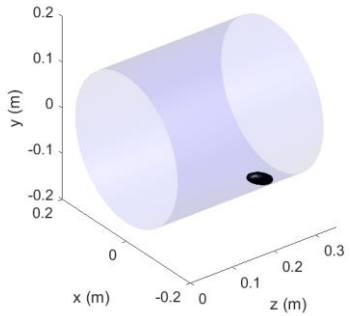
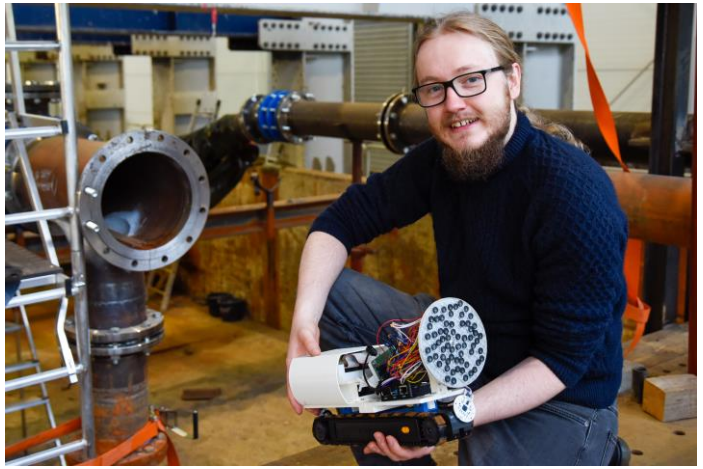
Resultaten inspecties

Academische onderzoeksprojecten

- Sheffield: 1 lek gevonden
- Bristol: 1 lek + sedimentatie gevonden







Conclusies

- Deelname was een grote kans om onderzoek te verbeteren
- Resultaten van de producten zijn op dit moment nog niet robuust en stabiel
- Veelbelovend voor de toekomst!

Resultaten inspecties

Commerciële bedrijven

Staal

PVC

Pipe defect	Pipe segment / pipe joint ID	Inspection results		
		Acquaint - Acquarius	*ROSEN group*	*Xylem - SmartBall*
Leak, 6 o'clock, 3 mm	P4	-	Possible deviation, 9 o'clock	(Entrained) air
Leak, 3 o'clock, 7 mm	P4	Leakage in pipe segment	Leak	Unknown deviation
Ovalisation, 6% or 18 mm	P5	Ovalisation, 6.44%	Dent, 12 o'clock, 350x200x18 mm	(Entrained) air
Wall loss outside, Ø 7 mm, 1 mm deep, 12 o'clock	P6		-	(Entrained) air
Wall loss outside, Ø 7 mm, 2 mm deep, 9 o'clock	P6		-	(Entrained) air
Wall loss outside, Ø 7 mm, 4 mm deep, 6 o'clock	P6		-	(Entrained) air
Wall loss outside, Ø 7 mm, 6 mm deep, 3 o'clock	P6		-	(Entrained) air
Wall loss outside, 11-12 o'clock, 200x200x3 mm	P7	10-12 o'clock, 260x232x3.8 mm	11-12 o'clock, 200x200x3.5 mm	(Entrained) air
Wall loss outside, 2-3 o'clock, 200x200x3 mm	P7	2-4 o'clock, 280x174x3.1 mm	3-4 o'clock, 200x200x3.5 mm	(Entrained) air
Leak, 6 o'clock, 3 mm	P8	-	-	(Entrained) air
Leak, 3 o'clock, 7 mm	P8	Leakage in pipe segment	Leak	(Entrained) air
Tap	P10		Tap	(Entrained) air
Gas pocket, ±2 m	P12 - P15	-	Gas pocket, 2 m	Wind blowing
Tap	P16		Unknown,(tap?), 6 o'clock	
	J17	Joint displacement, longitudinal, 12 mm		
		Joint ovality, 3%		
Scratch, outside, 1x3.4x500mm, 12 o'clock	P18	Scratch, outside, 1.23x520 mm, 12 o'clock		
	J18	Joint displacement, longitudinal, 5 mm	Joint displacement, radial, 8 mm	
		Joint ovality, 4.5%		
		Joint leakage		
Scratch, outside, 3x3.4x500mm, 9 o'clock	P19	Scratch, outside, 2.92x510 mm, 9 o'clock		
	J19	Joint displacement, longitudinal, 14 mm	Joint displacement, longitudinal, 16 mm	
		Joint Ovality, 4.5%	Debris	
Incrustation, 400x90x15 mm, 6 o'clock	P20	Incrustation, 389 mm, 6 o'clock	Incrustation, 400x100x15, 6 o'clock	
	J20	Joint displacement, longitudinal, 80 mm	Joint displacement, longitudinal, 66 mm	
		Joint ovality, 4.5%	Ovality, 6%	
			Debris	
Scratch, outside, 5x3.4x500mm, 6 o'clock	P21	Scratch, outside, 5.61x490 mm, 6.1 o'clock		
	J21	Joint displacement, longitudinal, 22 mm	Joint displacement, longitudinal, 16 mm	
		Joint ovality, 4.5%	Ovality, 6%	
Scratch, outside, 7x3.4x500mm, 3 o'clock	P22	Scratch, outside, 7.16x520 mm, 3 o'clock		
	J22	Joint displacement, longitudinal, 21 mm	Debris	

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Resultaten inspecties

Verbindingen PVC

Resultaten inspecties

Commerciële bedrijven

Staal

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	J18	Joint displacement, longitudinal, 5 mm	Joint displacement, radial, 8 mm	
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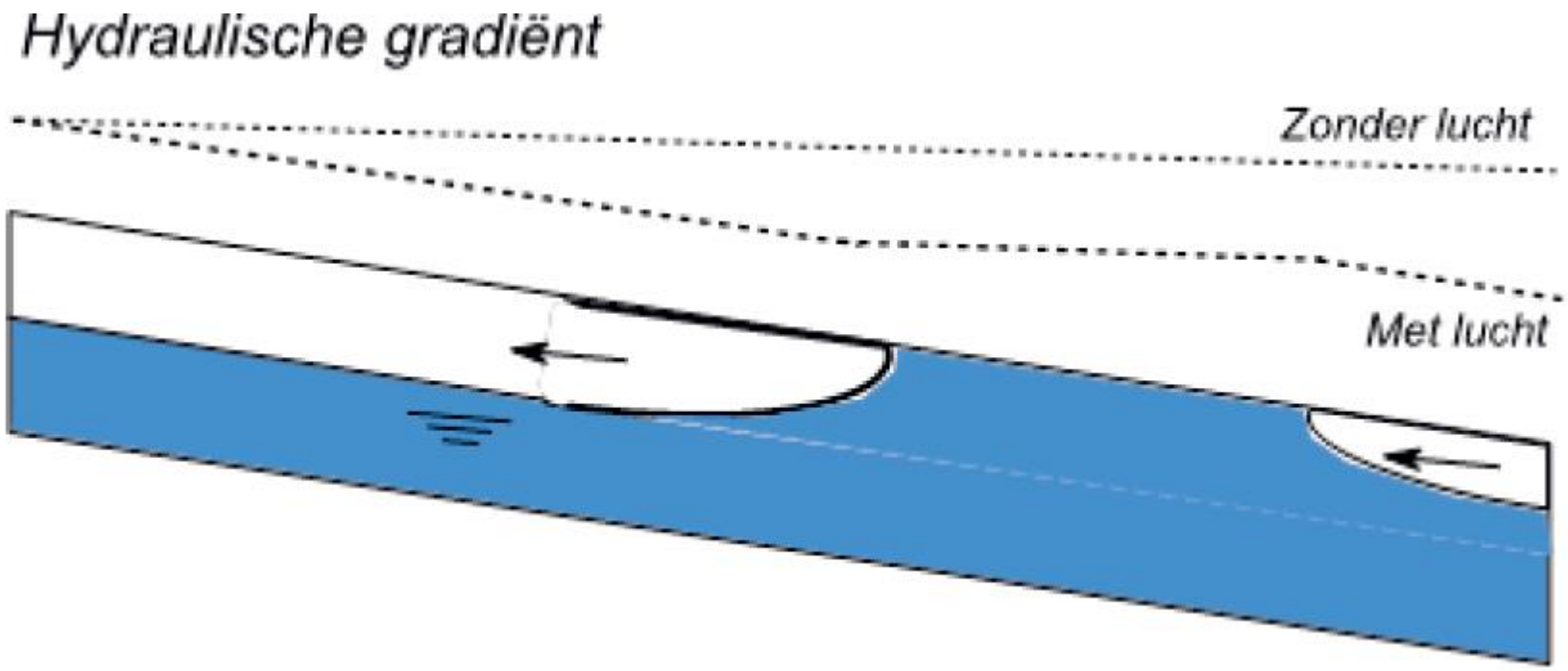
Resultaten inspecties

Gastransport neergaande leiding



Bron: STOWA, Hydraulisch ontwerp en beheer van afvalwatertransportsystemen, 2012.

Resultaten inspecties

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Resultaten inspecties

Commerciële bedrijven

Conclusies

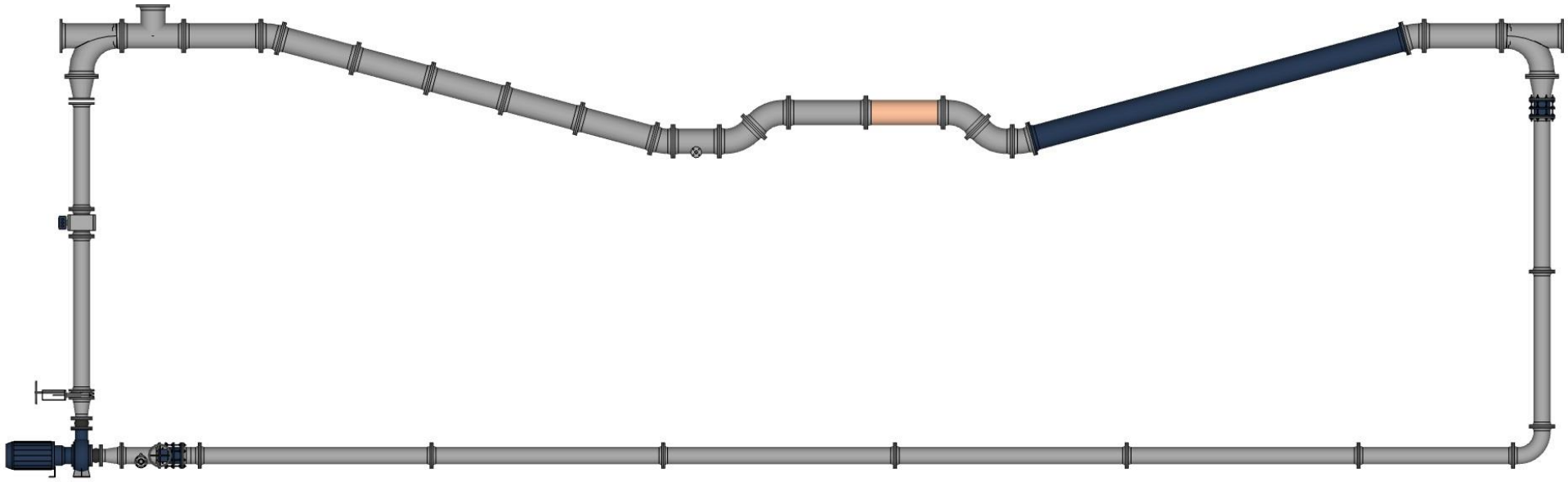
- UT: veel defecten gevonden
- UT: wanddikteverlies inschatting afhankelijk van werkelijke nominale wanddikte
- Inschatten grootte lekkage is lastig
- SmartBall gevoelig voor gasdetectie

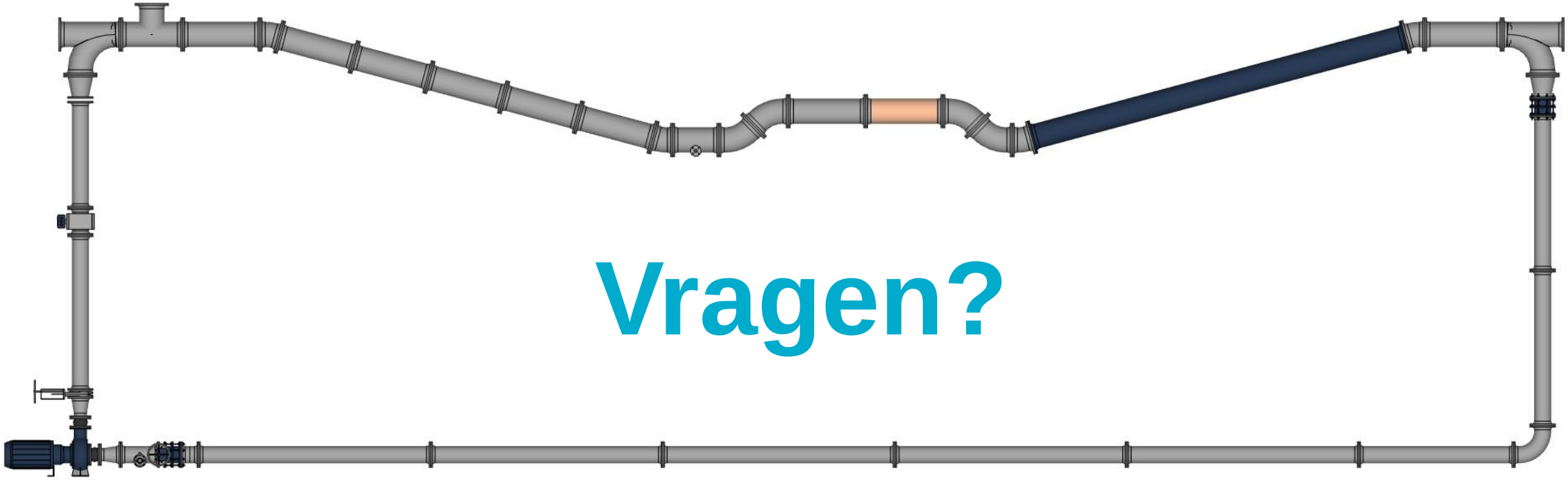
Vervolg

Veldonderzoek -> Johan Post

Permanente opstelling?

Meer inspectietechnieken betrekken





Vragen?

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