Quantifying underground leakages

SUCTION METHOD FOR GAS DISTRIBUTION LINES

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GERG Project 2019 -2020

- Main message
- Lessons learned

- Challenge: a traceable method for quantifying a leakage from distribution pipelines (low pressure)
- The solution: “Suction sampling method”
- Short video: explaining the method listing its prerequisites

Video
Suction sampling

Created by Kiwa Technology 2020

Purpose

Explaining the method

Reference

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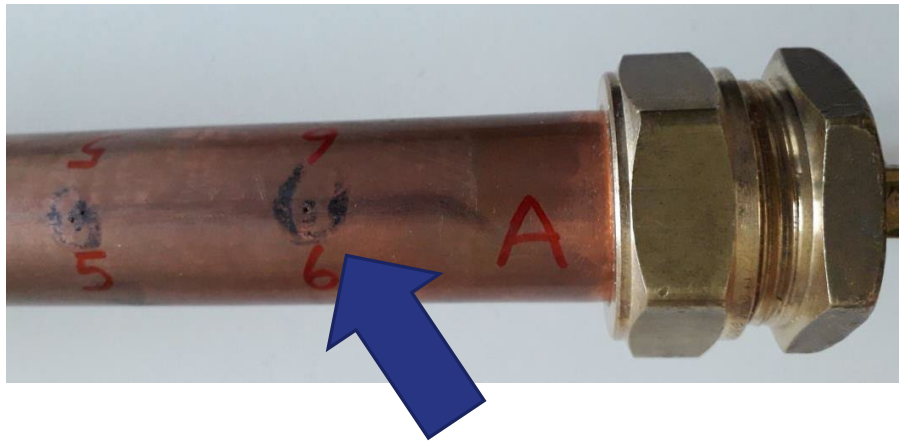
The project

To validate and fine-tune to suction sampling method

Give guidance to future field measurements campaigns

- Test site (blue arrow)

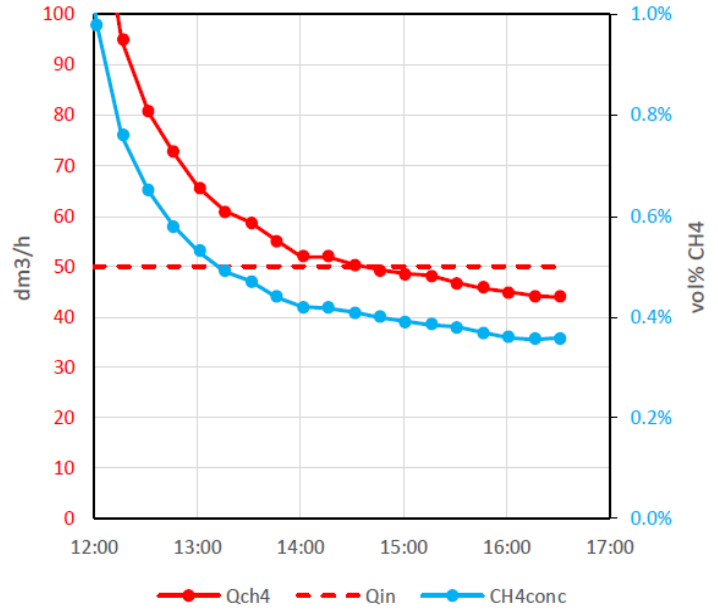
- Leaks: copper pipe buried,
  ca 100 mbar, pinhole leak of 0.3 mm, ca 100 dm^3/h



Accuracy of the suction sampling method

Multiple sources of error

- For validation: error in injection rate < 1% reading
- Measurement of suction flow < 1% reading
- Measurement of CH4 concentration (GC) < 1% reading
- Capture completeness < 10 % (systematic)



- Lesson learned: overestimation can readily occur.
- Mitigation: use initially additional suction rods at larger distance.

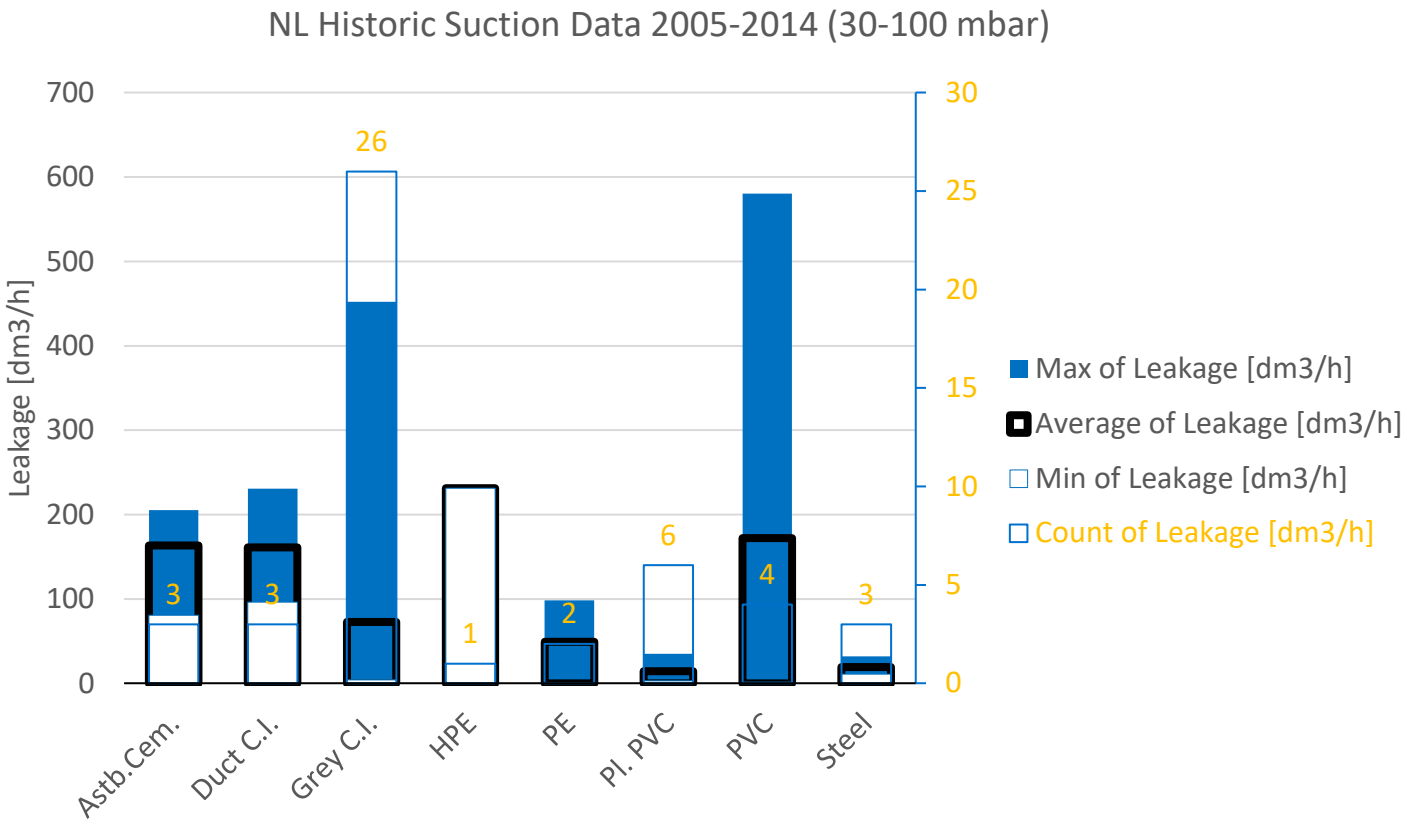
Dutch field experience

2 campaigns: 67 measurements

2005 -2014

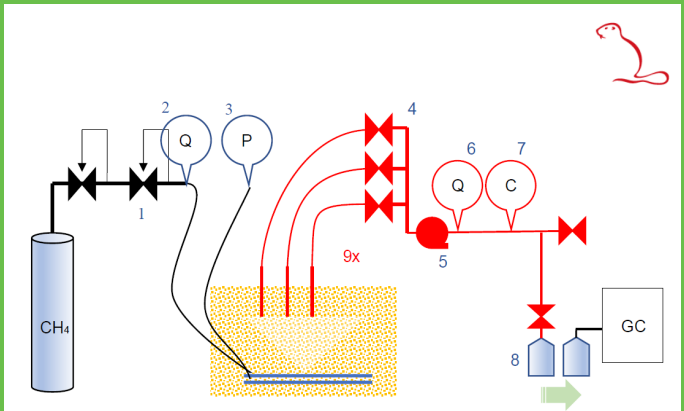
Dataset publicly available:

http://www.emissieregistratie.nl/erpubliek/documenten/Lucht%20(Air)/Industrie%20en%20Energieopwekking%20(Industry%20and%20Energy)/Industrie%20en%20Energie/KIWA,%202015.%20Evaluatie%20emissiefactoren.pdf



- Main lesson learned:
  - variation in leak rates is about 100% of average leak rate
  - uncertainty in average leak rate is the most relevant factor that determines the uncertainty in the total system emission estimate
- Periodic extension of the dataset is advised.

Summary



- Protocol, hardware and experience is available

  see report & video

- Limited dataset available

- Attributed accuracy of population average of leak rate per single leak is the major source of uncertainty in the total emission estimate

- Further field measurements, are advised:

  on a regular basis

  adequately documented (see report and video)

THANK YOU FOR YOUR ATTENTION !

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