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Poster

GLOBAL FLOW MEASUREMENT WORKSHOP
measuring for the energy transition

Poster Title: How Gas Pipeline Operating Imbalances can be Improved with detailed Line Pack Calculations?

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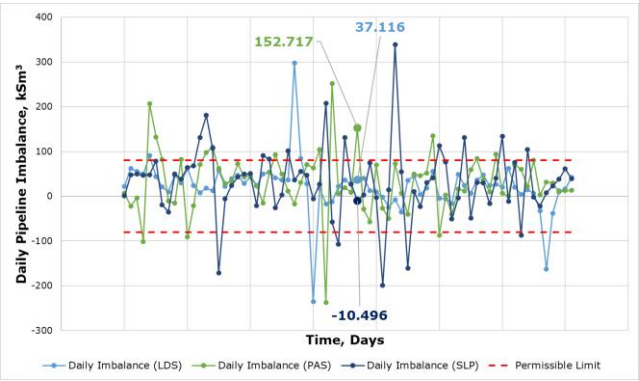
Content

A gas pipeline comprises pipe segments and various equipment. To assess pipeline integrity and the performance of metering systems, an imbalance over the pipeline can be calculated. An imbalance exceeding permissible limits may indicate issues with metering systems, line pack calculations, or the presence of leaks or losses, and may result in financial consequences.

Imbalance = In− Out+ FG+ Vent+ [**LP**(d)−**LP**(d-1)]

The line pack calculation (**LP**) is a key component of imbalance calculations, along with the inlet (In), outlet (Out), and fuel gas (FG) metering systems. There are multiple off-the-shelf applications available to choose from, and there is also the option to develop it in-house.

Imagine you have three different line pack calculation tools, and as the result, you obtain three significantly different imbalance values, as shown in the graph. **How will you choose the one for reporting?**



To avoid this dilemma, the selection of the line pack calculation tool should be made with careful consideration and a thorough understanding of their purpose and specifications. The completed analysis showed that employing robust real-time software packages for line pack calculations enhances accuracy, with the Leak Detection System (LDS) emerging as the best option.

While the quality of software plays a crucial role, its accuracy is predominantly shaped by its configuration, including the equation of state, pipeline geometry, and measurement instruments, as well as input data. It is essential to validate the line pack calculation, as it confirms the correct implementation of ongoing changes in the configuration of line pack.

Another frequently asked question is how to set up the permissible limits for imbalance. The imbalance limits are defined by the line pack flexibility and the uncertainties of measuring instruments and calculation methods. These limits should be closely aligned with the capabilities of the hardware and software in use, and they can serve as alarm levels to trigger immediate corrective actions when exceeded.

Finally, the question of "**how gas pipeline operating imbalances can be improved**" can be answered as follows: by understanding the importance of line pack calculation for gaseous fluids; by selecting the appropriate tools for line pack calculation; and by establishing the appropriate permissible limits for imbalances.