

# Upstream and Midstream Oil & Gas - The Role of Slug Catchers

## A case study



Effective handling of multiphase flow in the oil and gas industry relies on advanced slug catchers and innovative instrumentation like ABB's LevelExpert™ guided wave radar technology to manage irregular liquid and gas flows and ensure operational efficiency and safety.

Measurement made easy

### Introduction

In the oil and gas industry, the effective handling of multiphase flow is crucial to ensure the efficiency and safety of operations. A key component in managing the irregular flow of liquids and gases, known as slugs, is the slug catcher. These devices are indispensable in both upstream and midstream sectors of the industry. They stabilize operations, protect equipment, and optimize the transportation and processing of hydrocarbons. Positioned at the front end of plants, slug catchers intercept slugs of incoming wet gases and potentially unwanted water before plant operations commence.

### Field Issues

A significant field issue with slug catchers is the tendency for clogs caused by slugs in the pipeline. Some plants and producers have attempted to mitigate this by using larger-sized piping. Despite this, frequent maintenance remains necessary to ensure the effective operation of slug catchers. The accumulation of slugs can severely disrupt the flow, leading to operational inefficiencies and increased maintenance costs.

### Measurement Challenges

Measuring the buildup of fluids inside slug catchers presents various maintenance challenges. The wide range of fluids collected within these devices can lead to faulty readings from certain types of instrumentation. Furthermore, slug catchers can have measurement lengths ranging from 80" to 192", complicating the measurement process. Accurate measurement is crucial for timely maintenance and efficient operation.



# Types of Instrumentation

## Magnetic Level Gauges

Magnetic level gauges (MLG) are commonly used, especially in midstream processing. However, plants often report issues with floats getting stuck inside the pipe due to the accumulation of suspended solids. This method is also costly for a process that is not critical to the plant's profitability.

If an end user is interested in this technology, it is important to ensure that any manufacturer includes guide rods on their gauge to allow suspended solids to move without impeding float movement. Additionally, a magnetostrictive transmitter should be attached to the MLG to report the position of the float at any given time.

## Through Air Radar

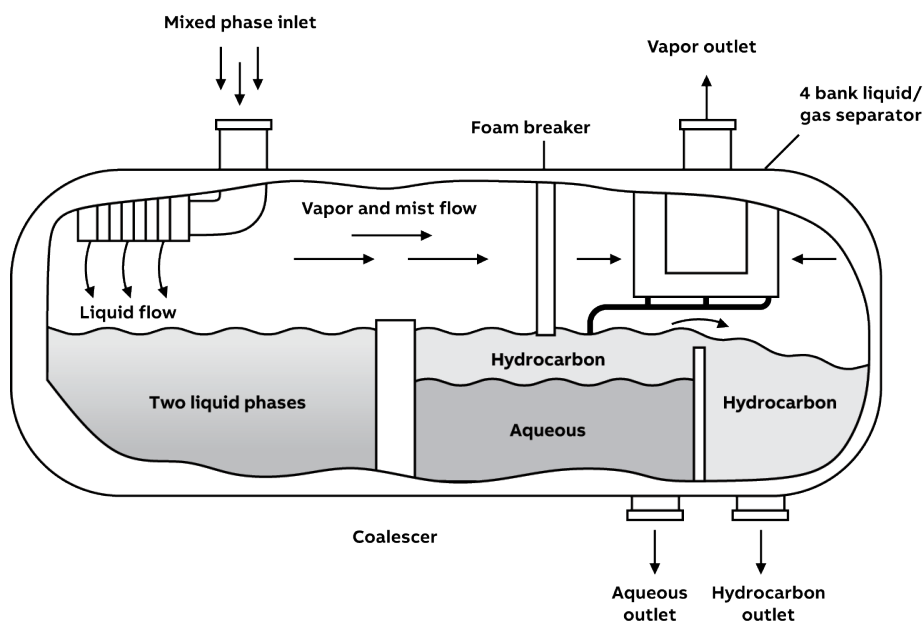
Through air radar is another common method for monitoring slug catcher levels. Typically, the instrumentation is mounted to a bridle, which helps trap the signal from the microwave technology to the surface of the fluids below. However, the presence of a mixture of extremely light hydrocarbons, called "condensate," and water can cause faulty readings as the device struggles to differentiate between the two liquids.

## Guided Wave Radar Technology

Guided wave radar technology is gaining popularity due to its cost-effectiveness and ability to read both interface and total level. The challenge with this technology is that buildup can accumulate on the probe, causing the reading to lock there instead of reading past it to the various liquids. ABB's algorithms, designed with a threshold-based user interface, address this issue. The LevelExpert™ system can identify that the waveform caused by the buildup isn't moving along the probe, allowing it to disregard this and lock onto the moving waveform below the buildup.

## Conclusion

Effective handling of multiphase flow in the oil and gas industry is essential for ensuring operational efficiency and safety. Slug catchers play a pivotal role in managing the irregular flow of liquids and gases within pipelines. Despite field issues and measurement challenges, advancements in instrumentation, such as ABB's LevelExpert™ guided wave radar technology, are improving the accuracy and reliability of fluid level measurements in slug catchers. Continued innovation and proper maintenance are key to optimizing the performance of these critical components in the industry.



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