# Article information:

A simplified model for churn and annular flow regimes in small- and large-diameter pipes - ScienceDirect  
<https://www.sciencedirect.com/science/article/abs/pii/S0009250916307035>

# Article summary:

1. Gas-liquid two-phase flow is common in many industrial areas, and there is a need for better models for large diameter gas-liquid two-phase flows.

2. The behavior of flow regimes is significantly different in large pipe diameters compared to small-diameter pipes, with the churn flow regime commonly observed in larger pipes.

3. This study proposes a simplified model for churn and annular flow regimes in vertical and near-vertical pipes, applicable to both small and large pipe diameters across a wide range of operating conditions.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

The article titled "A simplified model for churn and annular flow regimes in small- and large-diameter pipes" discusses the need for accurate models to predict gas-liquid two-phase flows in large diameter pipes. The article highlights the complexity of gas-liquid two-phase flow due to the effects of gas compressibility and deformable interface between phases. The article proposes a simplified model based on mass and momentum conservation equations for churn and annular flows.

The article provides a comprehensive overview of the challenges associated with modeling gas-liquid two-phase flow in large diameter pipes. It highlights the need for accurate models to calculate Worst Case Discharge (WCD) for offshore wells, which is required by the Bureau of Ocean Energy Management. The article also discusses the different flow regimes observed in vertical and near-vertical pipes, including bubble, slug, churn, and annular flow regimes.

One potential bias in the article is that it focuses primarily on churn and annular flow regimes, while not providing as much detail on other flow regimes such as bubble or slug flows. Additionally, while the article acknowledges that there are numerous studies on pressure gradient and liquid holdup in vertical pipes, it does not provide a comprehensive review of these studies or their limitations.

Another potential bias is that the proposed model assumes no mass or heat transfer or chemical reaction. While this simplification may be necessary for developing a simplified model, it may limit its applicability to real-world scenarios where these factors are present.

Overall, the article provides valuable insights into modeling gas-liquid two-phase flows in large diameter pipes. However, readers should be aware of potential biases and limitations in the proposed model and consider additional research before applying it to real-world scenarios.

# Topics for further research:

* Pressure gradient and liquid holdup in vertical pipes studies
* Bubble flow regime in gas-liquid two-phase flow
* Slug flow regime in gas-liquid two-phase flow
* Mass transfer in gas-liquid two-phase flow
* Heat transfer in gas-liquid two-phase flow
* Chemical reaction in gas-liquid two-phase flow

# Report location:

<https://www.fullpicture.app/item/c51538034c5b68886d0be42c5afb4c6f>