

Experimental investigation of hydrodynamic slug mitigation potential of an intermittent absorber

Adegboyega B. Ehinmowo^{a,b,*}, Oladipupo O. Ogunleye^c,
Oyinkepreye D. Orodu

Abstract

The need to handle hydrodynamic slugs in a more efficient way becomes important as oil and gas activities shift deep offshore. This study describes the use of a vessel coupled to the pipeline-riser system upstream of the first stage separator for hydrodynamic slug attenuation.

The experiments were carried out in a 2__ pipeline-riser system which comprises of a m long horizontal pipe connected to a 11 m high vertical riser followed by a 3 m horizontal section. Air and water were used as experimental fluids. Bifurcation maps and slug attenuation index (SAI) have been used to quantify increase in oil production and the slug attenuation potential of this concept. The device was observed to reduce the pressure fluctuations characterising hydrodynamic slug flow up to 22%. The device also provides additional benefits of stabilising the flow at higher valve opening (choke setting) and lower pressure compared to traditional choking. This in practice translates to increase in oil production. Special case of hydrodynamic slugs which exhibit overchoking induced slugging (OIS) was also observed to be relatively attenuated by the introduction of the absorber.