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Nighttime approaches to offshore installations in Brazil: Safety shortcomings experienced by helicopter pilots

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ABSTRACT

Accident rates for night sorties by helicopters traveling to offshore oil and gas platforms are at least five times higher than those during the daytime. Because pilots need to transition from automated flight to a manually flown night visual segment during arrival, the approach and landing phases cause great concern. Despite this, in Brazil, regulatory changes have been sought to allow for the execution of offshore night flights because of the rapid expansion of the petroleum industry. This study explores the factors that affect safety during night visual segments in Brazil using 28 semi-structured interviews with offshore helicopter pilots, followed by a template analysis of the narratives. The relationships among the factors suggest that flawed safety oversights, caused by a combination of lack of infrastructure for night flights offshore and declining training, currently favor spatial disorientation on the approach and near misses when close to the destination. Safety initiatives can be derived on the basis of these results.

1. Introduction

Helicopters are essential for supporting offshore oil and gas activities around the world. According to the International Association of Oil and Gas Producers (OGP, 2009b), there were 2.7 million flights over the seas in 2007, accounting for over 9 million passengers. Because the majority of operations involve ferrying personnel, disruptions can lead to discontinuities in oil and gas production flows, with potentially severe economic, political and social impacts (Mitchell and Braithwaite, 2008).

With over 85% of its production coming from offshore fields (Petrobras News Agency, 2010), Brazil is heavily reliant on helicopters for oil and gas activities. In 2008, nearly half a million people were transported in over 100 thousand flights, serving mainly the Campos Basin (Gomes et al., 2009). Macaé is the main operations hub, with fewer movements to this basin also occurring from Cabo Frio, Campos dos Goytacazes, São Tomé, Vitória and Rio de Janeiro. There are over 80 fixed platforms in the Campos basin, employing more than 25,000 workers. Based on the volume of passangers transported, it is one of the largest non-military helicopter operations in the world (Menezes et al., 2010), ranking third after the USA and the UK yet in 2000 (Williams, 2000). Future demands are expected; since 2007, oil and gas activities have been boosted by the discovery of major underwater reserves (Hawkes, 2010; Leahy, 2011; Sosa, 2010; Wheatley, 2010; Yapp, 2010). As a consequence, rotary aviation has rapidly expanded in the Brazilian oil and gas industry (Flores, 2010; Moody, 2009).

Regulatory changes have recently occurred in Brazil in order to enable more intense flight schedules offshore, including greater flexibility in the execution of nighttime operations. Until October 2008, such missions were restricted to flights that were related to search and rescue (SAR) and the transportation of severe casualties, a rule that was subsequently relaxed to allow for their training (ICA, 2008).

Worldwide, nighttime offshore helicopter operations have been a cause of considerable concern to both operators and regulators. Ross and Gibb (2008) estimated that the average accident rate between 1995 and 2007 was as high as 8.4 per 100,000 flight hours, which is over five times greater than that for daytime operations during the same period. Fig. 1 shows the annual numbers of nighttime accidents and their five-year rolling average, as investigated by the authors.

The increase in accidents observed in the 2003–2006 period occurred as the worldwide annual hours flown by offshore helicopter remained fairly level, between 853,000 and 895,000 (OGP, 1999, 2001, 2003, 2004, 2005, 2006, 2007, 2009b). In 2004, the least hours were flown and the greatest number of nighttime accidents occurred (Ross and Gibb, 2008).

A further analysis undertaken by Nascimento et al. (2011) showed that the worldwide fatal accident rate during 1997–2007 was 15 times greater for the nighttime than that for daytime. Additionally, the number of people who were fatally injured was also

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