The Analysis of Human Errors in a Large Commercial Aircraft when Performing a Go-around *

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ABSTRACT

Human error is often the result of complex interrelationships between humans and computers. Despite the development for new technology in the aviation domain, new types of human errors have been provoked in the modern cockpit. This research applies Hierarchical Task Analysis (HTA) and utilizes the - Human Error Template (HET) method - to predict pilots’ errors during flight operations when performing a go-around in a large commercial transport aircraft. The method of HET is applied to each bottom level task step of the flight tasks in question based on HTA. A total of 67 pilots participated in this study including 25 captains and 42 first officers. The results show two inappropriate design-induced errors and three modes of pilots’ errors with high likelihood committed by pilots during performing go-around, ‘Fail to execute’; ‘Task execution incomplete’; and ‘Task executed too late’. Therefore, there is a increasing need to investigate further the impact to flight safety of such errors. The data gathered from this research will help to improve safety when performing a go-around by identifying potential errors on a step-by-step basis and allowing early remedial actions in procedures and crew coordination to be made.

Keywords: Design-induced human errors, Hierarchical task analysis, Human error identification, Standard operation procedures

I. INTRODUCTION

Many human error analysis methods focus upon the identification and classification of the errors that operators make at the so-called ‘sharp-end’ of system operation, such as forgetfulness, inattention, poor motivation, carelessness, negligence, and recklessness involved in accidents (Reason, 1990), and these seek to identify the psychological factors (e.g. inattention, loss of vigilance and carelessness) and organizational influences such as Human Factors Analysis and Classification System (HFACS, Wiegmann and Shappell, 2003). Li and Harris (2006) found that 30% of accidents in military aviation fell within the ‘violations’ category. These included intentionally ignoring standard operating procedures (SOPs); neglecting SOPs; applying improper SOPs; and diverting from SOPs. This figure was higher in commercial aviation, with almost 70% of accidents including some aspect of a deviation from SOPs (Li, Harris and Yu, 2008). There is a specific regulatory requirement for human-machine interface on the flight deck as an attempt to eradicate many aspects of accidents relevant to human factors at source. However, such rules relating to design can only address the fabric of the airframe and its systems so the new regulation can only minimize the likelihood of error as a result of poor interface design. It cannot consider errors resulting from such factors as poor or inappropriate implementation of procedures, etc. From a human factors viewpoint, which assumes that the root causes of human error are often many and inter-related, the new regulations have only addressed one component of the wider problem. The design of the flight deck interfaces cannot be separated from the aircraft’s operating procedures. Complex flight deck interfaces, while potentially more flexible, are also potentially more error

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