Introduction

The aviation industry, like the nuclear power, oil, medical, rail and marine transport industries, is a very complex and highly technical system. This industry is viewed as a system that incorporates various levels. For example, regulatory and investigation bodies, pilots, flight attendance, aircraft maintenance engineers, air traffic controllers and, each influencing and interacting with each other. Aircraft maintenance is an essential component of the aviation system, which supports the aviation industry. As air traffic grows and the stringent requirements of commercial; schedules impose increased demands upon aircraft utilisation, the pressures on maintenance operations for on-time performance will also continue to escalate. This will open further windows of opportunity for human error and subsequent breakdowns in the system’s safety net.

Human factors research on aviation accidents has placed much emphasis on the pilot’s judgement, decision making and interaction with air traffic control while paying limited attention to the maintenance environment (Goldman, Fiedler & King, 2002). It is argued that human error in aircraft maintenance has been the causal factor in several air carrier accidents (Civil aviation authority, 2002). Maintenance related errors have been associated with up to 15% of major aircraft accidents and it was found that maintenance errors are the second leading cause of fatal accidents in aviation, exceeded only by pilot error (Murray, 1997).
The aircraft maintenance industry has a range of issues tied to it. These issues can be placed into one or more of the following broad categories; effective and efficient training for technicians and inspectors, on the job safety of maintenance workers, the reduction of human errors that compromise public and maintenance worker’s safety and the reduction of the overall cost of maintenance (Maddox & Reason, 1998). The most important issue that has dominated aircraft maintenance is human error (Burchell, 2000). Human error is defined as “the failure of planned actions to achieve a desired goal” (Maddox & Reason, 1998; p3). It is stated that in common with other complex technical activities, human error is implicated in the majority of aviation maintenance-related quality lapses, incidents and accidents (Maddox & Reason, 1998). According to Johnson (1997), human error is a cause factor in 80% of aviation accidents.

The reasons given for human errors in aircraft maintenance include boredom, poor communication, being rushed, and distractions at vital times, lack of instructions, pressure from management to defer, fatigue and poor lighting, among others (Burchell, 2000). However Stockley (in Burchell, 2000;p1) “Contrasted these answers with those gleaned from management and argued that maintenance errors come from aircraft maintenance technician’s acting unprofessionally, lack of training, lack of time and lack of experience”. But one could argue that human error is caused by a vast range of aspects (i.e. humans, work, the environment, equipment and management). To illustrate the above, Hobbs and Williamson (2003) argue that most common accident models state that errors occur in the context of contributing factors such as deficiencies in training,
equipment or procedures. These errors in aircraft maintenance have the ability to remain undetected and seemingly become harmless over a period of time of operational use. But, by the time the error becomes operationally visible, the event chain may have become long and difficult to trace (Kanki, 2000).

It could be argued that in order to reduce the incidence of errors, there is a need to address all the contributing factors. The consequences of these errors have a huge impact in the aviation industry. For example, airlines are concerned about safety as well as cost control and profit generation, as these errors reduce profits. One could argue that considerable financial savings could be achieved merely by reducing “human error”. Related to the above, is increased training in aviation maintenance that needs to be ongoing to lessen the amount of errors that take place. Training in aircraft maintenance is driven by a combination of factors; public safety, complex equipment and very high workload. The technicians must combine their knowledge, complex mental information processing abilities, skillful use of information and advanced manual skills (Maddox & Reason, 1998). This can reduce the injuries, incidents and mishaps that are experienced in the maintenance environment.

The primary focus of the current study is safety of maintenance workers in aircraft maintenance. Early aviation maintenance operations focused mainly on ensuring that airplanes flew when needed. As these operations gained experience, they developed increasingly sophisticated procedures to guarantee this result. There was no organised responsibility for airplanes at the time.
There was probably even less systematic concern for safety in the maintenance workplace or environment (Smith, 1992). But, presently we need to take into account and realise the importance of safety in the workplace and how it will affect maintenance workers as well as the maintenance of work. It is not just the safety of the plane, but also the safety of maintenance workers themselves since the maintenance environment can be dangerous. William and Feyer (1990) state that human error has important health and safety implications for workers themselves, as unsafe behaviour plays a significant role in fatal accidents and other injuries in the workplace.

The examination of literature revealed that more research has focused on human error and how it affects the aviation industry, in terms of aircraft accidents, delays and returns of aircraft. Less focus has been on the safety of aircraft maintenance personnel. The aim of the study is to investigate the injuries and incidents that are occurring in major maintenance and the causal attributions of those injury incidents. Furthermore, investigate whether different types of errors and violations have any contribution towards those incidents and also compare team leaders and technicians’ responses. From the literature one could argue that research indicates that human error can be the greatest contributory factor in accidents. However, the current research aims to investigate whether human error is attributed to injury incidents as experienced by maintenance personnel themselves.