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Applying MORT to the analysis of the "Tláhuac" incident

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ABSTRACT

The "Tláhuac" incident occurred in Mexico City on 23 November 2004. The fatal incident took place when an angry crowd burnt two police officers alive and seriously injured another after mistaking them for child kidnappers. The third policeman who was finally rescued by colleagues suffered serious injuries. This paper presents some preliminary results of the incident by applying the management over-sight risk tree (MORT) technique. The MORT technique may be regarded as a structured checklist in the form of a complex "fault tree" model that is intended to ensure that all aspects of an organization's management are looked into when assessing the possible causes of an incident. Some other approaches such as a systemic view will be adopted in the future for further analysis. It is hoped that by conducting such analysis lessons can be learnt so that incidents such as the case of "Tláhuac" can be prevented in the future.

1. Introduction

Safety in industrial sectors has become an issue of global importance in recent years. In the past few years several accidents have occurred, having severe consequences in terms of loss of life, injury, and plant or environmental damage [1–4]. Very often public or judicial inquires are demanded in the aftermath of such accidents [5–7]. The inquiries are intended to bring changes to the industry so that similar incidents can be prevented. A great deal of effort has been made, by academe, governmental organizations, and practitioners, to investigate and develop approaches to analyse past failure. For example, the concept of "safety barriers" is often related to the accident model called "energy model" developed by Gibson [8]. The concept has evolved and been used in different industrial sectors (see e.g. [9–19]). Moreover, there have been projects on the analysis of "safety barriers" when applied in different industries [20,21]. Furthermore, the concept of "safety barriers" has been incorporated within national and international regulations aiming at reducing the risk of accidents; for example, the European regulations such as the Seveso II directive [22]; the Machinery directive [23], and standards such as ISO:13702 [24], IEC:61508 [25], and IEC:61511 [26].

On the other hand, researchers have developed new approaches intended to better understand accidents. For example, Johnson [27,28] has classified these techniques into "elicitation approaches", "incident reconstruction" and "argumentation" techniques. The author argues that "elicitation" techniques (e.g., barrier and change analysis) may help to assist in the elicitation of information after an accident because they "encourage investigators to determine both what did happen and what should have happened". "Incident reconstruction" analysis techniques, on the other hand, can be used to map out the sequence of events leading to an accident. Examples of techniques that support incident reconstruction are timelines, accident fault trees, failure event trees, etc. [27]. Many of these techniques use a second stage of analysis based on counterfactual reasoning to distinguish root causes from contributory factors.

According to Johnson [27] "flow chart" methods such as management oversight and risk trees (MORT) [10] and prevention and recovery information system for monitoring and analysis (PRISMA) [29] are intended to help to encourage consistency by guiding analysts to reach a limited number of conclusions about the causes of an accident. "flow charts" and "reconstruction" techniques make minimal assumptions about the nature of accidents or incidents. In contrast, "accident models" are intended to provide guidance about the manner in which accidents are caused. For instance, the "tripod-delta" and "review" methods [30,31] are intended to help the analyst to trace the way in which barriers fail to protect a target from a hazard. In addition, the preconditions for the failure of any barrier must be tied back to a number of general failure types [31]. Similarly, Leveson et al. [32] have proposed a method called the "systems theoretic accident modelling and process" (STAMP) and it is intended to model accidents using control theory. Leveson argues that accidents are conceived to be resulting from inadequate control of safety-related constrains on the design, development and operations of the system [33]. Other researchers, such as Ladkin and Loer [34],

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have developed a method called "why-because analysis" (WBA) that is intended to address the structure of arguments that are made about the causes of accidents.

Overall, it may be argued that the accident analysis approaches reviewed above have been applied predominantly to the analysis of accidents in the industrial sectors such as aviation, chemical, construction, nuclear, offshore oil and gas, rail, marine. However, there is no evidence in the literature review of the application of the above techniques to the case of a "human activity system", that is, the analysis of incidents that have occurred in systems that have a substantial human activity content, i.e. crime, public disorder, etc.

1.1. Crime and public disorder

Crime and disorder may comprise a "vast set of events involving behaviour formally deemed against the law and usually committed with 'evil intent'" [35]. These events range from murder to fraud, theft, vandalism, dealing in drugs, kidnappings and terrorist atrocities that threaten public safety. Public safety, on the other hand, may be defined as "a state of existence in which people, individually and collectively, are sufficiently free from a range or real and perceived risks centring on crime and disorder, are sufficiently able to cope with those they nevertheless experience, and where unable to cope unaided, are sufficiently well protected from the consequences of these risks" [35]. Some examples of public disorder incidents that have occurred worldwide are presented in the subsequent paragraphs.

On 22 July 2005, a police officer received minor injuries after being assaulted in Devon, England. The incident occurred when the police officer tried to make an arrest. It is believed two arrests were made, but in both cases the person arrested escaped after a crowd of people attacked the police. More police units were called in, and four teenage girls were taken into custody, including the two youths originally arrested [36].

On 4 September 2005 two police officers were injured in two separate attacks in west Belfast and Cushendall, UK. It is believed that the officers in Cushendall were surrounded by a crowd of up to 50 people as they tried to make an arrest in the area shortly after midnight. One of the three officers involved in the incident suffered bruises and a suspected broken nose as a result of the attack. Similarly, another police officer who was hurt in west Belfast received hospital treatment for a suspected broken wrist after being punched and kicked to the ground [37].

On 29 November 2006, two policemen needed medical treatment following an incident involving a father and son in a small town in England. It is believed the incident started when the son was arrested by the police. His father assaulted a policeman before a "hostile crowd" joined in. The two policemen were punched and kicked and one officer was hit by a bottle, resulting in the loss of some hearing [38].

On 19 August 2007 a police station in Norfolk, England, came under siege from a crowd of up to 100 people. It is believed the incident occurred after police arrested three people in a van carrying "sound equipment". The attack on the police station was declared a major incident by Norfolk police. Two police vehicles were damaged and it is believed the police officers narrowly voided serious injuries. The Norfolk police argued that 200 officers from across the region took part in the operation to control the situation and restore order [39].

Recently, on 6 December 2008, a teenager was shot dead by the police in the city of Athens, Greece. It is believed the shooting happened after a group of 30 youths threw stones at a police car with two officers inside. The two police officers responded, with one firing a stun grenade and the other shooting and fatally wounding the teenager. The two police officers were suspended, and an investigation into exactly what happened has started. Soon after, the shooting riots started in Athens and then spread to other Greek cities. Police said the first day of riots had left 24 police officers injured, one seriously injured and 31 shops, 9 banks and 25 cars damaged or burnt [40].

The paper presents a preliminary analysis of the "Tláhuac" incident by applying the management over-sight risk tree technique. The paper is organized as follows: some key findings of crime surveys that have been conducted in Mexico City are presented in Section 2. Some similar lynching incidents that have occurred from 1996 to 2006 in Mexico City are presented in Section 2.1.1. Section 2.2 describes the "Tláhuac" incident. A brief description of the MORT technique is presented in Section 3. The results of the analysis of the "Tláhuac" incident are presented in Section 4. Finally, some discussion and future work are presented in Section 5.

2. Crime in Mexico City and the "Tláhuac" incident

2.1. Crime in Mexico City

In 1989 the International Crime Victim Survey (ICVS) [41] was born and since then it has contributed to the international knowledge of crime trends in several countries. It is believed that since its conception, standardized victimization surveys have been conducted in more than 70 countries worldwide. The ICVS has been surrounded by a growing interest by both the crime research community and the policy makers. A part provides internationally standardized indicators for the perception and fear of crime across different socio-economic contexts; it also has contributed to an alternative source of data on crime. Similarly, in Mexico, four National Crime Victim Surveys (known as ENSI-1, -2, -3 and -4, respectively) have been conducted since 2001. The surveys are intended to help provide a better knowledge of the levels of crime that affect the safety of the Mexican citizens [42]. Some of the key findings from the surveys (i.e. ENSI-1 and -3) are as follows: (1) the public's perception of crime shows that 9 out of 10 citizens feel unsafe in Mexico City; (2) more than half of the population believes that crime has affected their quality of life; for example, one in two citizens gave up wearing jewellery, going out at night and taking cash with them [42].

2.1.1. Similar lynching incidents

A number of lynching incidents have occurred in Mexico City from 1999 to 2006. Figs. 1 and 2 show some of the cases that have been reported in the mass media [43,44]. However, it should be pointed out that there might be more cases than those that have been reported.

Fig. 1 shows a total of 42 lynching incidents that have occurred in Mexico City for a period of 8 years. Also, it can be seen that an average of five lynching incidents have occurred per year. On the other hand, Fig. 2 illustrates that 7.1% of the total of the incidents have resulted in fatalities. That is, six fatalities involving two police officers (see next section) and four burglars. Also, it can be seen that in 92.9% of the incidents, burglars have been injured by the inhabitants.

2.2. The "Tláhuac" incident

On 23 November 2004 an angry crowd burnt two police officers alive and seriously injured another after mistaking them for child kidnappers. The third police officer was finally rescued by colleagues three and half hours after the attack began. (The three