CHAPTER 1

INTRODUCTION

1.1. Research Background

Accident is unexpected or unplanned event that may result in death, injury, property damage, or a combination of serious effects. The victim may or may not be directly involved in the cause of the accident. Accidents frequently are the result of both physical and mental factors that can result in unsafe operating systems at work, home and other sites (Mosby, 2009).

Accident will repeat itself. It will never stop until some prevention measures are implemented. Accident occurs because of human behavior and actions which took place in the whole accident sequences.

After the researcher reading many thousands of accident reports, it can be concluded that almost all accident involve goal-directed activity, even if the goal is not considered desirable, or the product involved is only peripheral to the goal.

Accident involving a certain product could be classified into major groups which they call "Hazard patterns". Sometimes the grouping is by injury, sometimes by contingency, and sometimes by human behavior (Drury, 1983).

By focusing on accident patterns, expectantly accident prevention outcome can be attained optimally even though by using minimum amount of resource. By knowing where, why, when, how, and to whom accident are happening means a great deal in learning **how** important to teach employees to avoid them to next accident(Anton, 1989)

Accident information should be classified into specific categories thus it can be used for accident analysis and referred to an inspector for a decision on what action to take**.** Qualitative information like how accident occurred, why accident happened, and accident prevention on investigation forms becomes unmanageable if individual inspector complete an accident reports in free format and **inconsistent.**

A consistent database will help inspector to **make a report and translate** qualitative data into analyzable data. If the report is complete then accident pattern

can be generated more easily. Therefore, the current research proposed to develop a consistent template (coding system and database) for an accident analysis.

Database template describes coding system and explains about **basic information of accident** and it would be easier for inspector to fill the accident report. The table below is an example of database template.

Table1.1. Key data elements or accident template used to reconstruct an injury event

Data Element	Definition
Activity	The type of broad activity the injured person was engaged in when the injury occurred (for the example, maintenance).
Task	The specific activity engaged in when injury occurred providing additional detail (for example, inspecting engine)
Contributing factor	The key element that increase the risk such that what is normally completed without incident resulted in injury
Precipitating mechanism	The cause that initiate the chain of events leading to injury; those mechanisms involved at the start of the injury event
Primary source	The object, substance bodily motion, or exposure that directly produced or inflicted the previously indentified injury or illness
Secondary Source	The object, substance or person that generated the source of injury or illness or that contributed to the event or exposure.
Injury event/exposure	The manner in which the injury or illness was produced or inflicted by the source of injury or illness
Nature of Injury	The principal physical characteristic(s) of the injury or illness
Outcome	The medical, functional, and / or financial results of the injury

(Lincoln, 2004)

Elements in Table 1.1 are the most valuable data elements to develop the capacity to reconstruct the injury event using a standardized template. The elements included the primary or underlying mechanism (‘precipitating mechanism”) and object (“secondary source”) that initiate the injury producing event as well as the direct mechanism (“injury event/exposure”) or object (“primary source”) that resulted in injury(Lincoln, 2004) **.**

The elements also have relationship among the various categories to permit cross tabulation of the summarized data for detail interpretation, but these interrelationship maintain their meaning only if variables are coded in proper order (i.e. nature of injury, body part, source of injury, accident type, secondary source of injury).

Some elements in the Table 1.1 are valuable information for accident report. However, to create accident report obvious enough for future analyzing, some information should be added i.e. gender, age, working experience, occupation, type of industry, and etc. To make the accident report analyzable, accident information is classified into meaningful groups, there are individual data, company profile, time of event, accident information and other information. Table 1.2 shows the modification of database template for accident report.

Table1.2.Modification of data base template for accident report

Information	**Detail Information**
Individual data	Gender
	Age
	Working Experience
	Occupation
Company	Type of Industry
	Company Size (workers)
Time of event	Month & Year
	Days (workdays and weekend)
	Weather
	Temperature
Accident Information	Place of Accident
	Performing Task
	Cause of Accident
	Source of Injury
	Secondary Source of Injury
Other	Work hours
	Overtime hours

Some information will be explained in more detail to make the reader understand how it happened and why it happened, afterward the reader can conclude what kind of prevention that effectives for preventing another accident. **Example of accident report as displayed in Table 1.3.**

Table 1.3. Example of accident analysis

EXAMPLE OF ACCIDENT ANALYSIS IN CHINEES VERSION
一、行業種類：XX外牆清洗工程有限公司(Industry) 二、災害類型：墜落(Accident type) 三、媒介物：屋頂(Source of injury) (falling site) 四、罹災情形：死亡女一人 (Gender)，二十一**歲** (Age)，工作經**歷**：**不詳**(Experience) 五、災害發生經過：(How it happen) XX外牆清洗工程公司僱用勞工曾XX（罹災者）與李XX2人於XX興業OO廠房新建工程**內以吊籠從事大樓外牆清潔作業**， 於當日第7次吊籠移機安裝時，因架設位置跨越大樓轉角處（該處樓頂轉角處改以設置造型欄杆連結，形成女兒牆未相連之缺口）， 因現場移裝鋼索作業，即由罹災者至造型欄杆（高83公分）邊**緣作業**，**因造型欄杆尚未施作裝設下方之強化玻璃且以暫固定方式結合**， 罹災者以身體靠著大樓外牆造型欄杆作業，致該欄杆因無法承受力量而鬆**脫變形**，**致發生罹災者由**12樓頂墜落至1樓地面（現場高度50公尺），經醫仍不幸死亡。 六、災害發生原因(Why it happen) 公司對於防止墜落之虞之作業場所引起之危害，未訂定自動檢**查計畫實施自動檢查。** 承攬人與再承攬人分別僱用勞工共同作業時，工作場所負責人未指揮停止有立即發生墜落危險之虞的大樓外牆清潔作業， 未確實巡視大樓外牆清潔作業之工作場所，又對於該場所之墜落危害，未連繫調整必要之安全防護設備或措施， 或採取其他協調管制等防止墜落職災之必要措施。 七、防止災害對策：(Suggested prevention measure based on legal violations) 為防止類似災害發生，有採取下列措施之必要。 雇主對於高度2公尺以上之屋頂依規定設置之護欄，高度未在90公分以上及未設置中欄杆、**腳趾板及杆柱等構材**， 且未有足**夠抵抗變形之強度。事業單位與承攬人、再承攬人分別僱用勞工共同作業時，為防止職業災害**， 未採取下列必要措施：（1）設置協議組織，並指定工作場所負責人，擔任指揮及協調之工作。（2）工作之連繫與調整。 （3）工作場所之巡視。（5）其他為防止職業災害之必要事項。 1. 高度二公尺以上高處作業，雇主應使勞工確實使用安全帶、安全帽及其他必要之防護具。 2.

雇主需依本法及相關規定會同勞工代表訂定適合需要之安全衛生工作守則，報經檢**查機構備查後，公告實施** 3. 雇主對於營造工程之大樓外牆作業應依規定訂定自動檢**查計畫實施自動檢查**。

Table 1.3. Example of accident analysis (Continued)

EXAMPLE OF ACCIDENT ANALYSIS IN ENGLISH VERSION
1. Type of Industry: XX Exterior Walls Cleaning Engineering Co., Ltd. (Industry) **2. Type of Accident:** Fell from the roof (Accident type) **3. Mediators:** Roof (Source of injury) (falling site) **4. Victims Condition:** death; Gender: woman; Age: 21-year-old; Working experience: unknown **5. Occurrence of The Accident:** (How it happens) XX Exterior Walls Cleaning Engineering Company ever hired a labor (Victim of accident) named Li XX2 to work in the new construction of OO factory in XX Industrial in the exterior walls cleaning operation's cage. On the 7th day of the cage installation, because the construction position across/over the building corner (the roof corner was replaced by establishing railing molding connection which formed unconnected gap parapet), and because on-site installation shifted to cable working, from the victim to the edge working of railing molding (83 cm high), due to modeling for the installation of railings have not been applied under the glass and temporary fixed combination. Occupational accident was happened because the victim rely on exterior walls, railing was not able to withstand the power and loosen deformation, so the victim fallen from 12th floor's roof to the surface of the 1st floor (50 meter high). She was being helped to the hospital but still could not save her life. **6. The cause of the accident (Why it happen)**: To prevent the falling-risk of workplace hazards, the company has no automatic inspection plan in implementing the automatic inspection. When the contractor and the re-employed contractor classified the works, the person who is responsible in the workplace did not command a risk and danger of falling of the exterior wall cleaning operations. He/she did not perform inspection tour in detail in the workplace and had not done necessary adjustments in the safety protection equipment or measures or the other controls coordination of the necessary measures to prevent the falling accident. **7. The strategies of preventing the accident**: (Suggested prevention measures based on legal violations) To prevent similar accident, the following measures is necessary: Pursuant to the regulations of the protection field setting, for the roof with 2 meters or more heights, the employer must not more than 90 cm in height and not set in the railings, toe boards and poles and other materials may, and did not have enough strength to resist deformation. When the Institutions and the contractor and the re-employed contractor classified the works, In order to prevent occupational accidents, should take the following necessary measures: (1) Set the protocol organization and design responsible person in the workplace, as the command and coordination of the work. (2) Work link and adjustment. (3) Workplace inspection. (5) Other necessary items for the prevention of occupational hazards: a. Work with Height of 2 meters or more, employers should really ask workers to use safety belts, helmets and other necessary protective equipment. b. Employers require to pursuant to the act and related regulations which are set in conjunction with labor represents health and safety need for a code of practice, and after reported by the inspection team for future reference, then notice the implementation. c. Toward the project of building's exterior wall, the employer must have automatic inspection plan

in implementing the automatic inspection.

Example of accident report as shown in Table 1.3 explains **what was happened** in the accident in detail, how it happened, why it happened, and suggested prevention measure. The aforementioned information will lead us to prepare some actions to prevent another accident that is similar to the previous accident.

Accident analysis is an important source of information when developing accident prevention strategies and decisions. As stated by Tuominen and Saari (1982), an essential phase of accident analysis is the specification of the factors defined to have effects on the identified events. These factors consist of certain traits and conditions associated with such as worker's working environment, working process, and procedures in the system.

1.2. Research Objective

This research purposed to develop a database and program for possible accident analysis and prevention. This program will present accident database and template to create accident report. From each single accident we can investigate and determine potential factors that contribute to an accident.

The purpose of accident investigation is to find out causative factors, the hazardous conditions or practices that brought about the accident, so proper action can be taken to prevent a recurrence of accident.

1.3. Research Scope and Constraints

Database will be created and designed to be adapted with accident type, because every industry has different information for each source and cause of accident. In this part researcher will focus on creating and designing database for fatal electrocution and fatal falls in construction Industries.

Database will be created and designed based on fatal accident reports that happened in Taiwan **between 2000 and 2005 (will be assured later)**.

Even though this research was conducted based on accident reports collected in Taiwan, however the researcher hopes that accident database program will be appropriate for other country.

1.4. Research Framework

This research has several steps:

1. Collecting accident data from construction industry
2. Constructing a database for each factor and item. In this case the database of accident will be input and stored in MySQL. Each of the database items will have a unique code to distinguish between each item in the level.
3. The data base software **must be appropriate to the program editor**. In this part researcher will use Dreamweaver as an editor to make the program for accident analysis.

   Dreamweaver is software that is used for website design. Dreamweaver helps us to make connection and standard query PHP and access to MYSQL with Dreamweaver software functions. Moreover some Dreamweaver code need to be changed in order to fulfill researcher needs in more detail.

   The **main benefit** of using Dreamweaver is that you can **manage your site easily.** For example, if you change the name of a folder or file, Dreamweaver scans the site to update any links to the re-named file. (www.jessett.com).

4. A program will be created with Dreamweaver software which can save database that input by inspector and can obtain an output sheet that will be usedfor further analysis.

Steps for make accident program are as shown in Figure 1.1.