

國立交通大學工學院產業安全與防災碩士專班

摘要

緊急應變中最重要的人物是應變指揮官，而其最重要的任務即是迅速且正確的下達決策，發揮緊急應變體系的功能，降低事故的影響範圍和損失。然而事故的發生是不可預知的，因此如何確保決策的適切性，而且能夠讓指揮官在最短的時間內取得其所需要的應變資訊，使應變決策的品質也會相對的提昇，是本論文最主要的目的。本論文研究過程中，首先進行半導體製造業晶圓廠製程資料收集與分析，將收集累積之資料加以整合過濾，決定出廠內較有可能發生危害之場所，並針對可能發生的危害使用火災模擬方法進行危害評估，將其結果作為應變程序書參考依據，完成應變程序書之後，將應變所需之各項資訊予以電腦化，並依實際的需求將電腦化之規劃內容分為事故狀況、應變資源、及建議行動三要項。在事故狀況部份:建立廠區配置圖、設備配置圖、消防管線配置圖、氣體管線配置圖、化學品管線配置圖、儲存或使用的物質及 MSDS 等資訊，將救災所需了解之建物特性、管線輸送資訊及事故可能危害建立相互連結資料庫，使得指揮官能在最短的時間內了解事故發生的位置，決定應變的首要任務(人員疏散/救災/搶救財物/區域隔離等)，並訂定人員的進出動線。應變資源部份:建立事故區域應變人員、應變器材、個人防護具、器材運送方式、及器材緊急供應廠商及其聯絡方式等資訊，使得指揮官能夠確切掌握所有應變資源。建議行動部份則包含了緊急應變程序、各單位應變 checklist、火災模擬建議行動、指揮官資料夾，使指揮官掌握事故動態發展。為了達到預期目的，及快速取得救災所需各項資料，另發展以資料庫方式互相垂直、橫向連結，並以 logfile 方式記錄災變的發展，期望達到完整且實用的緊急應變電腦系統。再者網路化後可與企業內網路及控制系統、人事系統、教育訓練系統等連線，達到線上教育訓練、線上應變演練、線上指揮應變的目的。

關鍵詞： 半導體廠、火災緊急應變系統、決策機制、應變指揮官

Abstract

The most important person in emergency response is IC (incident commander), who is responsible to initiate and end the whole response processes. However, the occurrence of incident is unpredictable and incident site is dynamically changing that impose tremendous physical and mental pressures on IC. Emergency response not only determines the damage caused by the incident to the company, but also decides whether the company would be survived and retained to exist in the market. The major task for incident commander is to make correct and fast decisions to give order directly to emergency response team responding to the event such that the consequence and damage of the incident are minimized. Three major factors are considered to be the most critical concerns for IC to make qualitative decisions and give orders to responders. They are: (1) IC must have the full control over the incident site. (2) IC has to acknowledge whole response resources on hands and put them into rescue actions at the right time and right locations. (3) IC must acquire these information in the shortest time interval. In this work, a computer software is developed for IC in order to respond properly to unexpected incident. The purpose of this research is to develop such software that can provide incident commander as much as and detailed information for his decision making. The structure of the software is divided into 3 categories: incident status, response resources, and recommended actions. In incident status category, it consists of drawings of plant site, plant layout, equipment layout, piping and instrument, existing fixed detection and protection systems (fire suppression systems, gas detection system, leak sensing system, etc.) and other relevant information. Consequently, incident commander will be acknowledged the location of incident, adjacent areas to incident site, occupancy, protection system, and other information in a fast way in order to determine the major tasks of responding strategy (life safety/incident confinement/property preservation/building isolation) and tactics for lives rescuing and identifying evacuation routes. Response resources category includes emergency response team members, tools and equipments, PPE (personal protective equipment), equipment transportation means, and other resources provided by external agencies (government, vendors, mutual aid, etc.). Therefore, incident commander can control all the resources on hands and put them into the locations needed mostly. In addition, commander also knows where and how to get more resources in case of more resources are required. In recommended actions category, they consists of emergency response procedures, communication, recommended actions to the incident, etc. This software is developed in both stand-alone and internet versions, which have been tested in an existing semiconductor company with satisfactory results. It is hoped that, in the future, this software can be integrated with internal network system (Notes, human resource, facility, and training systems) of the company such that the optimal goals of on-line

training, drilling and commanding systems are achieved.



Keywords: Semiconductor industry, Emergency response system for fire scenario, decision making mechanism, Incident commander.