

論文

# 提升製造業中小企業安全衛生之實務研究

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## 摘要

本研究旨在探討中小企業製造業安全衛生管理的困境及提升中小企業安全衛生的實務作法。本研究以台灣地區中小企業製造業之雇主為研究母群體，共計發出300份正式調查問卷，回收有效問卷共215份，有效回收率為71.67%。本研究結論如下：

1. 中小企業製造業面臨的安全衛生管理困境主要係以「勞動檢查」及「安衛資源」的面向為主。
2. 中小企業製造業希望政府或相關部門提供安衛相關資訊最優先為「中小企業適用的安全衛生法規」、「中小企業安全衛生管理手冊」及「安全衛生宣導資料(小冊子、摺頁、單張、海報)」等前三項資訊。
3. 中小企業製造業希望政府或相關部門提供的安衛相關活動最優先為「勞工的安全衛生訓練」、「安全衛生專業人員的訓練」及「安全衛生常見問題諮詢服務」等前三項活動。
4. 中小企業製造業認為有效提升勞工安全意識的實務作法最優先為「實工作場所危害識別」、「舉辦新進人員訓練」、「舉辦急救課程」等前三項作法。

本研究建議如下：

1. 政府機構應持續強化對中小企業安全衛生方面的「勞動檢查」，以主動傳遞簡易應用之風險評估和控制的方法。
2. 政府機構應提供中小企業多樣性的「安全衛生資源」，以強化安全衛生宣導的功能。
3. 政府機構應深化中小企業「安全衛生家族」活動之推展，以達致相互學習及資源共享。
4. 中小企業製造業應辦理勞工的安全衛生教育訓練，以強化勞工工作場所危害識別的能力。
5. 中小企業製造業應推動完善的安全衛生管理制度，以提高勞工安全衛生的滿意度，進而強化其安全意識。

**關鍵詞：**職業安全衛生、製造業、中小企業、安全衛生實務

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## 緒論

2007年台灣勞工保險局(Bureau of Labor Insurance)統計資料指出，200人以下的中小企業發生職業疾病之比例，約佔總發生件數的85%以上，顯示中小企業工作場所的職業衛生狀況較差[1]。此外，行政院勞工委員會勞工安全衛生研究所亦指出，2008年我國勞保職業災害保險給付金額約41億元，產生間接經濟損失金額高達200億元，如加上其他包括機械損失、停工損失、營運損失等所造成的間接損失，金額更是難以估計[2]。而國內有97.8%為中小企業（僱用人數佔全就業人數68%以上），受限於經費，故對非生產性之安全衛生設備忽略，導致近幾年職業災害傷亡，高居全產業達50%以上[3]。因此，本研究綜合整理國內外許多學者專家的研究文獻，探討國內外中小企業在推展安全衛生管理實務所面臨的困境，以及如何有效提升中小企業安全衛生的實務作法，說明如下：

### 1. 國內外中小企業安全衛生管理之困境

#### (1) 在「法令要求」方面的困境

根據國外學者研究發現，歐盟一般小企業(small firms)往往都不清楚他們應遵守安全衛生的相關法律與義務，同時也沒有充分的人力與資源做好安全衛生管理實務，故不僅沒有危害風險的認知，同時也忽視唯有做好安全衛生管理實務才能帶給企業的真正效益[4]。我國由於中小企業的財務規模往往不大，中小企業為符合法令最低標準，大部分都傾向於使用最便宜的職業安全衛生服務；同時，小企業普遍認為勞工檢查員只是強迫企業遵守法令要求，而無法為企業提供建議或幫助[5]。

#### (2) 在「人員知能」方面的困境

Champoux與Brun於2003年的研究顯示，一般中小企業對安全衛生相關的知識和經驗有限，且因工作場所在生產頻繁、時間有限、人力不足、缺乏相關知識及技術、以及短期看不到效益的情況下，往往會忽略安全衛生管理[6]。如果小型企業的組織系統有分層負責的授權制度，或是企業的高階經理人對安全衛生比較有概念，這樣的企業對安全衛生輔導或服務的需求較多，且實施安全衛生管理比較容易成功[7]；但是，目前中小企業普遍存在一些如：勞工一人兼任多項業務、缺乏危害認知能力；以及雇主欠缺安全衛生的相關知識、未依規定實施安全衛生教育訓練等現象，再加上公司營運困難經濟困頓，故導致安全衛生管理工作推行的困難[8-11]。

#### (3) 在「勞動檢查」方面的困境

Walters研究指出，英國職業安全衛生署(Health and Safety Executive, HSE)對於中小企業實施例行性的勞動檢查頻率較低，中小企業對於職業安全衛生法相關規定的執行能力亦低於大型企業[12]。由於勞動檢查人力擴充受限，故無法有效督導所有企業進行職業衛生改善，中小企業往往受到勞動檢查機構限期改善的壓力，委託非政府專業顧問組織協助改善，所以大部分的中小企業都屬於被動的一方；甚至會抗拒安全衛生的輔導[13]。由於國內勞工檢查機構及職業安全衛生的資源普遍不足，造成多數中小企業成立職業安全衛生管理系統無法落實[14]。

#### (4) 在「安衛資源」方面的困境

國外研究顯示，在職業衛生方面，中小企業(small and medium sized enterprises,

SMEs)普遍缺乏人力資源和/或設備，以符合法令的要求[15]。尤其大多數的中小企業雇主認為安全衛生的管理需要很高的成本，礙於成本的關係，無法雇用職業安全衛生管理專責人員，故無法建置職業安全衛生的管理[16]。中小企業對於安全衛生管理的量測，亦會影響到其安全衛生活動的實施，並受限於企業本身缺乏人力資源、管理的能力、有限的資金財源、被動式的預防職災等結構性的問題；尤其一些國外針對中小企業安全衛生管理的研究顯示，中小型企業常因繁瑣的業務導致忽略安全衛生的相關活動，且缺乏系統化安全衛生的活動規劃[17-19]。

#### (5) 在「參與互動」方面的困境

歐盟一些學者研究顯示，一般中小企業除了對職業安全衛生相關法規內容，無法有正確的認知與瞭解外，而且與政府有關單位(如英國職業安全衛生署，HSE)在溝通聯繫上，會感到困擾[20,21]；而且，中小型企業在安全衛生的推動常會受到時間與資源的實務上影響，致使挪不出時間參加安全衛生研討會，甚至有些中小企業有時會懷疑政府單位所舉辦的免費安全衛生研討會，甚至認為該項研討會對於企業營運會帶來負面效應；甚至擔心參加免費安全衛生研討會後，未來所要花費更多人力經費，而排擠到企業可應用的資源[22,23]。

## 2. 國內外提升中小企業安全衛生的實務作法

### (1) 我國「勞工安全衛生在地扎根計畫」的實務作法

勞工委員會（以下簡稱勞委會）為

協助中小事業單位改善安全衛生缺失並降低職業災害，擷取各國相關經驗推動「勞工安全衛生在地扎根計畫」，早期於2007年在15縣市試行「勞工安全衛生在地扎根先期計畫」，並於2008年起正式推動為期3年的「勞工安全衛生在地扎根計畫」（簡稱蒲公英計畫），藉由地方就近的臨廠（場）職災預防宣導、教育訓練及輔導等措施，協助中小企業改善工作環境及提升勞工安衛知識與技能[24]。根據資料顯示，我國在地扎根計畫2007至2010年度的執行成效，共訪視或一次輔導廠家共約51,692家、深入工程改善輔導約430家、特定行業職安衛輔導約350家、安衛設施補助共補助686家(1,218件)，共補助新台幣1,460萬；執行成果顯示，2008與2009年受輔導廠商於2010年相對於各輔導前一年的職災消滅率平均約為30%，減少之職災直接與間接損失約為本計畫投入經費之4.7倍[25]。

### (2) 歐盟各國提升中小企業安全衛生的實務作法

歐洲工作安全衛生局(European Agency for Safety and Health at Work)為有效提升中小企業安全衛生的實務作法，分別於2001~2004年實施「中小企業贊助計畫(2001-2004)：促進歐洲的中小企業之安全衛生」(SME Funding Scheme 2001~2004: Promoting health and safety in European Small and Medium-sized Enterprises)，並於2003、2004、2005年分別發表研究報告[26-28]。歐盟2003~2005年的研究報告顯示，總共有11個國家（英國、芬蘭、西班牙、奧地利、丹麥、愛爾蘭、比利時、義大利、瑞典、德國、及法國）分別參與38

個援助中小企業安全衛生優良的實務。歐盟各國提升中小企業安全衛生的實務作法的內涵，包括：各產業臨時工的安全衛生相關教育；運用研討會、問卷及實地調查法剖析職場事故原因；協助企業安全文化的建立；運用網絡實施安全衛生教育訓練與諮詢服務；以及發展各種宣導安全衛生教育的教材工具等實務作法。

### 3. 小結

綜合上述研究分析，國內中小企業目前普遍欠缺職業安全衛生專業知識與技術，因此我國政府及相關單位應設法發展一套屬於中小企業的職業安全衛生管理機制，藉由清楚明瞭的機制和步驟，幫助中小企業達成安全衛生管理的目的，以提升中小型企業職業安全衛生水準、有效降低職業災害。故本研究擬以問卷調查研究方法進行國內中小企業製造業之「中小企業安全衛生管理之困境」與「提升中小企業安全衛生的實務作法」之探討分析，希以研究建議提供國內政府相關單位及中小企業製造業雇主之參考。

## 研究方法

### 1. 研究對象

本研究依據研究目的，以2012年台灣地區中小企業事業單位之雇主為研究母群體，分為二階段施測，第一階段為預試施測，於2012年7月15日至7月30日以雲林、台南、及高雄地區進行問卷施測，共發放雇主卷40份，總共回收36份，扣除填答不完整無效問卷後，獲得有效問卷為雇主卷33份，有效回收率為82.50%。第二階段為正式施測，於2012年9月初至10月中旬以北部、中部、及南部地區進行問卷施測，

針對全國中小企業製造業的雇主共計發出300份，回收有效雇主問卷共215份，有效回收率為71.67%。

### 2. 研究工具

本研究問卷內容共包括三大部份：第一部份為「基本資料」，主要測量「個人因素」：包含性別、職稱、服務年資等3個題項；以及「組織因素」：包含公司全體員工人數、有無加入安全衛生家族、及公司的行業類別等3個題項；第二部分為「中小企業推動安全衛生管理之困境量表」共有20個題項，主要瞭解受測者對自己公司在法令要求(3題)、人員知能(3題)、勞動檢查(3題)、安衛資源(8題)、以及參與互動(3題)等5種推動安全衛生管理之困境的知覺為何？使用Likert5點計分法，共分「非常不同意」、「不同意」、「中立意見」、「同意」、「非常同意」等選項，分別給予1至5分。第三部分為「提升中小企業安全衛生的實務作法量表」有「安衛相關資訊」、「安衛相關活動」、以及「提升安全意識實務作法」等三個分量表；前兩個分量表主要瞭解受測者對自己公司希望政府或相關部門提供中小企業安衛相關的資訊(8題)及活動(8題)的知覺為何？使用Likert五點計分法，共分「非常不需要」、「不需要」、「普通」、「需要」、「非常需要」等選項，分別給予1至5分。另外，「提升中小企業勞工安全意識的實務作法」分量表共有17個題項，主要瞭解受測者對自己公司在有效提升中小企業勞工安全意識的實務作法上應具備的各種作法知覺為何？使用Likert五點計分法，共分「非常不同意」、「不同意」、「中立意見」、「同意」、「非常同意」等選項，分別給予1至5分。

### 3. 信、效度分析

本研究以Ringle, Wende, and Will 於2005年所研發SmartPLS 2.0(M3)Beta版[29]統計軟體分析問卷量表的各題項因素負荷量、及各構面的Cronbach's  $\alpha$ 、平均變異抽取量(AVE)、組合信度(CR)，以考驗各量表之建構效度(收斂效度及區別效度)，統計分析結果顯示，「推動安全衛生管理之困境量表」、「提升安全衛生的實務作法量表」兩個量表負荷量分別介於0.738至0.966、與0.695至0.942之間，均達到Hair 等人(1988)所建議必須超過0.5以上[30]。兩個量表的各構面之Cronbach's  $\alpha$ 分別介於0.781至0.956、與0.897至0.980之間，均符合Nunnally (1978) 的建議信度至少要大於0.70[31]。平均變異抽取量(AVE) 分別介於0.644至0.920、與0.621至0.759之間，均達到Fornell與Larckerx (1981)所建議必須大於0.5以上條件[32]；組合信度(CR)則分別介於0.872至0.972、與0.919至0.982，均達到Fornell與Larckerx (1981)所建議必須大於0.6以上條件[32]，證明兩個量表均具有良好的信度與收斂效度。

## 結果與討論

### 1. 基本資料分析

本研究215位受訪者之個人背景變項中，性別以男性136位(佔63.26%)居多；年資以15年以上者有80人(佔37.21%)居多；職務別以勞工安全衛生業務主管有90人(佔41.86%)居多。而在受訪企業之組織變項方面，公司員工人數以「10~29人」者有81家(佔37.67%)居多；有加入安全衛生家族的中小企業廠商有122家(佔56.74%)；行業別中最多的5個行業分別為紡織製造業(有64家，佔29.77%)、造紙、紙製品製

造業(有27家，佔12.56%)、塑膠製品製造業(有25家，佔11.63%)、金屬製品製造業(有18家，佔8.37%)、機械設備製造修配業(有17家，佔7.91%)，此前5個行業合計151家，佔總數的70.24%。

### 2. 不同組織變項對安全衛生管理困境之差異分析

#### (1) 安全衛生管理困境之現況分析

依據「安全衛生管理困境」分量表20個題項平均得分比較結果，排行前第六名為「勞動檢查」3題：「7.會擔心因勞動檢查而遭到處罰」(平均數=3.28)、「9.勞動檢查人力有限，無法有效督導安衛改善」(平均數=3.20)、「8.受到政府單位的勞動檢查頻率較低」(平均數=3.18)與「安衛資源」(3題)：「16.缺乏適合安全衛生管理的執行工具與程序」(平均數=3.22)、「17.中小企業職業安全衛生管理的宣導不足」(平均數=3.18)、「15.缺乏外部資源協助推行安全衛生活動」(平均數=3.18)；可見填答者對自己公司在「安全衛生管理困境」方面，以「勞動檢查」與「安衛資源」不足的安全衛生管理困境知覺最為強烈，其餘依次為「法令要求」、「人員知能」、「安衛資源」、「參與互動」4個構面。

#### (2) 不同公司規模對安全衛生管理困境之差異分析

如表1顯示，在單變量變異數分析後，公司規模對安全衛生管理困境之各構面均未達顯著差異，「法令要求」( $F=.718$ ,  $p > .05$ )、「人員知能」( $F=.376$ ,  $p > .05$ )、「勞動檢查」( $F=.241$ ,  $p > .05$ )、「安衛資源」( $F=1.856$ ,  $p > .05$ )、「參與互動」( $F=2.159$ ,  $p > .05$ )，表示不同公司規模對

「對安全衛生管理困境」之各因素沒有任何差異情形。

(3) 參加安衛家族與否對安全衛生管理困境之差異分析

如表2顯示，在t檢定分析後，參加安衛家族與否對安全衛生管理困境之各構面均達顯著差異，「法令要求」(t=2.114,  $p < .05$ , 非安衛家族>安衛家族)、「人員知能」(t=2.579,  $p < .05$ , 非安衛家族>安衛家族)、「勞動檢查」(t=2.384,  $p < .05$ , 非安衛家族>安衛家族)、「安衛資源」(t=4.228,  $p < .001$ , 非安衛家族>安衛家族)、「參與互動」(t=3.715,  $p < .001$ , 非安衛家族>安衛家族)，表示未加入安衛家族的中小企業對「對安全衛生管理困境」之各因素均高於有參加安衛家族的中小企業。

表1 不同公司規模對安全衛生管理困境之差異分析表

構面	公司規模	公司數 (212家)	平均數	標準差	F	p值
法令要求	1. 1~9	37	3.20	0.79	.718	0.542
	2. 10~29	81	3.17	0.84		
	3. 30~49	29	3.05	0.90		
	4. 50~99	65	2.99	0.92		
人員知能	1. 1~9	37	3.23	0.98	.376	0.770
	2. 10~29	81	3.04	0.93		
	3. 30~49	29	3.16	1.05		
	4. 50~99	65	3.08	0.93		
勞動檢查	1. 1~9	37	3.23	0.86	.241	0.868
	2. 10~29	81	3.24	0.73		
	3. 30~49	29	3.31	0.94		
	4. 50~99	65	3.16	0.80		
安衛資源	1. 1~9	37	3.29	0.82	1.856	0.138
	2. 10~29	81	3.12	0.71		
	3. 30~49	29	2.97	0.93		
	4. 50~99	65	2.93	0.85		
參與互動	1. 1~9	37	3.07	0.69	2.159	0.094
	2. 10~29	81	3.06	0.84		
	3. 30~49	29	2.67	0.90		
	4. 50~99	65	2.86	0.85		

表2 參加安衛家族與否對安全衛生管理困境之差異分析表

構面	參加安衛家族	公司數 (N=215)	平均數	標準差	t值
法令要求	非安衛家族	93	3.24	0.82	2.114*
	安衛家族	122	2.99	0.88	
人員知能	非安衛家族	93	3.30	0.87	2.579*
	安衛家族	122	2.96	0.99	
勞動檢查	非安衛家族	93	3.37	0.85	2.384*
	安衛家族	122	3.11	0.75	
安衛資源	非安衛家族	93	3.33	0.74	4.228***
	安衛家族	122	2.88	0.81	
參與互動	非安衛家族	93	3.19	0.82	3.715***
	安衛家族	122	2.77	0.81	

註：\* $p < .05$ , \*\*\* $p < .001$

3. 不同組織變項對提升中小企業安全衛生的實務作法之差異分析

(1) 提升中小企業安全衛生的實務作法之現況分析

A. 希望政府或相關部門提供中小企業安衛相關的資訊方面

依據「提供安衛相關的資訊」分量表8個題項平均得分比較結果，排行前第五名分別為：「5.中小企業適用的安全衛生法規」(平均數=4.02)、「1.中小企業安全衛生管理手冊」(平均數=3.92)、「2.安全衛生宣導資料(小冊子、摺頁、單張、海報)」(平均數=3.92)、「3.網際網路的安全衛生資源」(平均數=3.87)、「7.中小企業的風險評估工具」(平均數=3.86)，均接近「需要」選項，顯示填答者知覺自己公司需要政府或相關部門提供安全衛生相關法規、手冊、宣導資料、網際網路資源、以及風險評估工具等中小企業安衛相關資訊為。

B. 希望政府或相關部門提供中小企業安衛相關活動方面

依據「提供安衛相關的活動」分量表8個題項平均得分比較結果，排行前第五名分別為：「1.勞工的安全衛生訓練」(平均數=3.92)、「2.安全衛生專業人員的訓練」(平均數=3.91)、「7.安全衛生常見問題諮詢服務」(平均數=3.78)、「3.雇主的安全衛生訓練」(平均數=3.74)、「6.專家協助解決安全衛生問題」(平均數=3.72)，均介於「普通」與「需要」之間，但較接近「需要」選項，可見填答者知覺自己公司需要政府或相關部門提供中小企業安衛相關活動為安全衛生相關人員的訓練、諮詢服務、以及協助解決安全衛生相關問題。

C. 有效提升中小企業勞工安全意識的實務作法方面

依據「提升勞工安全意識的實務作法」分量表17個題項平均得分比較結果，排行前第五名分別為：「11.實施工作場所危害識別」(平均數=4.08)、「2.舉辦新進人員訓練」(平均數=4.06)、「3.舉辦急救課程」(平均數=4.02)、「12.實施設施的安全衛生檢查」(平均數=4.00)、「10.制訂設施/裝備的安全作業標準/程序」(平均數=3.99)，均介於「同意」與「非常同意」之間，均較接近「同意」選項，可見填答者知覺自己公司在提升勞工安全意識的實務作法上，應將識別工作危害、新進人員訓練、舉辦急救課程、進行設施的安全衛生檢查、以及制訂設施/裝備的安全作業標準/程序等實務作

法列為優先條件。

(2) 不同公司規模對提升勞工安全意識的實務作法之差異分析

如表3顯示，在單因子變異數分析後，公司規模對提升勞工安全意識的實務作法之各構面均均達顯著差異，在「提供安衛相關資訊」方面( $F=3.918, p < .01$ )，公司規模「30~49人」在提供安衛相關資訊的需求程度高於「1~9人」的公司；在「提供安衛相關活動」方面( $F=3.736, p < .05$ )，公司規模「30~49人」在提供安衛相關活動的需求程度高於「1~9人」的公司；此外，在「提升安全意識實務」方面( $F=4.840, p < .01$ )，公司規模「30~49人」與「50~99人」在提升勞工安全意識的實務作法需求程度高於「1~9人」的公司。

表3 不同公司規模對提升勞工安全意識的實務作法之差異分析表

構面	公司規模	公司數 (212家)	平均數	標準差	F	事後比較 (Tukey HSD 檢定)
提供安衛 相關資訊	1. 1~9	37	3.60	0.62	3.918**	3>1
	2. 10~29	81	3.72	0.60		
	3. 30~49	29	4.04	0.61		
	4. 50~99	65	3.88	0.53		
提供安衛 相關活動	1. 1~9	37	3.52	0.77	3.736*	3>1
	2. 10~29	81	3.65	0.65		
	3. 30~49	29	3.99	0.69		
	4. 50~99	65	3.85	0.62		
提升安全 意識實務	1. 1~9	37	3.65	0.79	4.840**	3,4>1
	2. 10~29	81	3.82	0.57		
	3. 30~49	29	4.12	0.58		
	4. 50~99	65	4.05	0.59		

註：\*  $p < .05$ , \*\*  $p < .01$

(3) 參加安衛家族與否對提升勞工安全意識的實務作法之差異分析

本研究經t檢定分析後，發現參加安衛家族與否對提升勞工安全意識的實務

作法之各構面僅「提升勞工安全意識的實務作法」構面達顯著差異( $t=-2.822$ ,  $p<.01$ , 安衛家族>非安衛家族), 其餘構面均未達顯著, 表示有加入安衛家族的中小企業對有效提升勞工安全意識之各種實務作法的認同程度高於未參加安衛家族的中小企業。

## 結論與建議

### 1. 結論

依據本研究實證調查215家中小企業雇主或安衛主管的資料中顯示中小企業製造業所面臨的5大類共20項的困境中, 最首要的六項分屬為「勞動檢查」面向的「會擔心因勞動檢查而遭到處罰」、「勞動檢查人力有限, 無法有效督導安衛改善」、「受到政府單位的勞動檢查頻率較低」、以及「安衛資源」面向的「缺乏適合安全衛生管理的執行工具與程序」、「中小企業職業安全衛生管理的宣導不足」、「缺乏外部資源協助推行安全衛生活動」。此外, 無論在法令要求、人員知能、勞動檢查、安衛資源、參與互動等面向的安全衛生管理困境, 本研究發現非安衛家族均顯著高於安衛家族, 由此顯示勞委會多年來推動以「大廠帶小廠」的經驗分享與合作模式, 透過安衛家族組織平台, 交流安全衛生改善經驗, 相互學習及資源分享, 對於工安較為弱勢的中小企業提升安全衛生管理獲得顯著的成效。

中小企業製造業最希望政府或相關部門提供「中小企業適用的安全衛生法規」、「中小企業安全衛生管理手冊」及「安全衛生宣導資料(小冊子、摺頁、單張、海報)」等安衛相關資訊。而希望提供安衛相關活動係以「勞工的安全衛生訓練」、「安全衛生專業人員的訓

練」及「安全衛生常見問題諮詢服務」等三項為主。

### 2. 建議

本研究建議政府相關單位持續強化對中小企業安全衛生方面的「勞動檢查」, 以主動傳遞簡易應用之風險評估和控制的方法, 如採行「宣導、檢查、輔導」三合一作法、加強中小企業之高危險事業及工作場所之分級列管, 實施重點檢查、強化勞動檢查員在中小企業勞動檢查之能力, 並建置中小企業勞動檢查技術手冊、指引。此外, 應提供中小企業多樣性的「安全衛生資源」, 以強化安全衛生宣導的功能, 諸如: 深化中小企業風險評估的實務工具、辦理各產業別的工作坊與研討會、強化安全衛生宣導網站的功能、提供安衛相關資訊(安全相關法規、安全衛生管理手冊、安全衛生宣導資料)。而提供安衛相關活動應以「勞工的安全衛生訓練」、「安全衛生專業人員的訓練」及「安全衛生常見問題諮詢服務」等三項為優先。

本研究發現參與安衛家族之中小企業在管理面及組織面有顯著較優的成效, 但於員工面卻仍無法達到更佳的功效, 因此建議未來在推展安衛家族計畫, 宜做安全衛生教育訓練的活動規劃, 賦能中小企業的雇主或主管能進一步的對其現場勞工進行安全衛生訓練, 可採用本研究所規劃的「危害認知教育訓練指引」為教材, 辦理安衛家族成員的種子訓練, 期望能將危害認知的實務深化至職場的每一位員工。

最後, 本研究建議中小企業首應定期的辦理「工作場所危害識別」的訓練活動, 以強化勞工工作場所危害識別的能力, 並依據工作場所的實務現況, 做更適合的教育訓練活動之推展。此外, 除例行舉辦「新進人員訓練」、



「急救課程」等教育訓練外，亦應持續強化特殊群組之勞工的教育訓練及提供更多的支持，以提高勞工安全衛生的滿意度，進而強化其安全意識。

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## Research Articles

# The Practice Study for Promoting Health and Safety of SMEs in the Manufacturing Sector

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### Abstract

The purpose of this research was to inquiry the plight of the health and safety management and promoting health and safety practice of SMEs in the manufacturing sector. The population of this research was SMEs employers in Taiwan. The total questionnaires administered were 300. Finally, the total valid questionnaires returned were 215 employer questionnaires and the valid response rate was 71.67%. Based on the above background and motive, the purposes of this research were as follows:

1. Understanding of the domestic and foreign related researches and specific measures to enhance the safety awareness of SMEs workers.
2. Surveys and analysis on hazard recognition, safety participation and related influencing factors of SMEs' workers.
3. Investigation and understanding of current status and effectiveness of the "Dandelion plan of safety and health" for SMEs employers.
4. The compilation of education and training guidelines of hazard recognition for SMEs workers, and planning the practical measures to enhance employee safety participation.

Finally, this study proposed conclusions and suggestions to the relevant government agencies and reference for future researchers as follow :

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1. The relevant government agencies should continue to strengthen the SMEs' labor inspection on safety and health aspects to take the initiative to transfer a simple application method of risk assessment and control.
2. The relevant government agencies should provide SMEs diversity "safety and health resources" to strengthen the function of safety and health promotion.
3. The relevant government agencies should intensifying promote "Safety and Health Family" activities of SMEs, in order to achieve mutual learning and sharing of resources.
4. SMEs in manufacturing industry should develop and implement safety and health training for employees to strengthen the ability of workers for workplace hazards identification.
5. SMEs in manufacturing industry should promote effective safety and health management system to improve workers safety and health satisfaction, thereby strengthening their safety awareness.

**Keywords:** Occupational safety and health, Manufacturing industry, Small and medium enterprises, Health and safety practice.

## Introduction

According to statistical data from Taiwan's Bureau of Labor Insurance, cases of occupational disease in small and medium sized enterprises ("SMEs") accounts for more than 85% of total cases reported, which shows that the occupational health of SME work environments has considerably poor conditions. [1] Furthermore, the Institute of Safety and Health of the Executive Yuan's Council of Labor Affairs has specified that insurance payments due to occupational accidents amounted to approximately NTDS\$4.1 billion in 2008 and its collateral economic damages amounted to around NTDS\$20 billion. Moreover, if collateral losses such as mechanical damages, loss of ceased work, loss of operation, etc., are also included, the total loss is inestimable. [2] Since around 97.8% of enterprises are SMEs (hired employees account for more than 68% of the working population), due to financial limitations, non-production safety and health equipment is often neglected. The consequences are that occupational damages have accounted for more than 50% of losses for the entire industry in recent years. [3]

Therefore, this study has integrated and organized international research literature, as well as the work of domestic researchers, in order to investigate the issues and difficulties faced when SMEs are promoting practical measures regarding safety and health management and to discuss practical measures for improving the safety and health of SMEs.

## 1. Issues of Safety and Health Management for international and domestic SMEs

### (1) Issues regarding legal requirements

According to studies by foreign researchers, the EUs small firms usually do not clearly understand the laws and obligations regarding safety and health, which they are supposed to know. Furthermore, they do not fully prepare for practical perspectives in management of personnel and resources thereof. Hence, in addition to a lack of understanding of dangers and risks, the real efficacy experienced by enterprises by actual safety and health management practices is often by-passed [4]. Since the SMEs in Taiwan are not big in terms of financial scale, for SMEs to be in line with the minimum legal requirements, they often choose to purchase the least expensive safety and health services. Meanwhile, it is widely accepted among small firms that occupational inspectors are simply forcing enterprises to abide by the laws and are not able to provide suggestions or assistance. [5]

### (2) Issues regarding personnel awareness

In accordance with research by Champoux and Brun (2003), SMEs are traditionally quite limited in terms of safety and health-related awareness and experiments. Furthermore, since working environments are busy with the production process and have limited time, insufficient labor, a lack of related know-how and techniques in a short-term period, so safety and health management are often subject to neglect. [6] If SMEs organizational

systems are introduced an authorization system for hierarchical management or one requiring that the seniors managers become more accustomed to safety and health management, the demands for safety and health consulting or services will be more in need and thus the management thereof will more easily be successful. [7] However, some difficulties are common in SMEs, such as that of single labor handling multiple tasks or a lack of danger awareness, that employers do not fully appreciate safety and health awareness, that pertinent safety and health training is practiced without following certain regulations, and that the company experiences financial difficulties. These difficulties put even more hardships on the promotion of safety and health management [8-11].

(3) Issues regarding labor inspection

Walters research reveals that the Health and Safety Executive (HSE) of the United Kingdom exercises scheduled labor inspections of SMEs with less frequency and that SMEs execution power is also lower than that of major enterprises. [12] Since human power expansion in labor inspection is limited, safety and health improvements in all enterprises are rarely monitored. While SMEs are subject to the pressure of improvement in a limited timeframe posed by the labor inspection authority, they tend to commission non-governmental specialized consulting organizations for such improvement works, and hence they are acting more passively in

such situations and even refuse consultations. [13] Since labor inspection facilities and resources towards occupational safety and health are generally insufficient, the management system thereof in most SMEs is not realized. [14]

(4) Issues regarding safety and health resources

Foreign studies have revealed that, regarding occupational health, SMEs generally lack the human resources and facilities necessary to be in line with regulations. [15] Especially most employers of SMEs consider that safety and health management requires higher operational costs, which causes them to not hire specialized management personnel. Therefore, the management of occupational safety and health cannot be established. [16] Safety and health practices will also be affected by measurement of the management thereof, as well as by the limitation of enterprises human resources, capability in management, financial resources, and passive occupational accident prevention. Moreover, some research on safety and health management of domestic SMEs reveals that systematic safety and health session planning and its sessions are lacking often because of the busy tasks that need to be handled within the SMEs. [17-19]

(5) Issues regarding participation and interactions

Researchers from the EU have indicated that in addition to a lack of correct understanding and awareness of safety and health-related regulations, SMEs have trouble communicating with governmental agencies, such as HSE.

[20,21] Furthermore, SMEs promotion of safety and health is limited by time and resources so that they are not able to attend pertinent seminars. Sometimes, SMEs suspect that such free-of-charge seminars hosted by the government can cause negative impacts on their own enterprises operations. They worry that after attending such seminars they will cost more in human resource items while squeezing other applicable resources within the enterprise.[22,23]

## **2. Practical Measures in Promoting SME Safety and Health in Taiwan and Foreign Countries**

### **(1) Taiwans Practical Measures in the “Program of Rooting Occupational Safety and Health”**

The Council of Labor Affairs of the Executive Yuan (CLA), in order to assist SMEs in correcting safety and health defects and decreasing professional accidents, adopt the so-called Program of Rooting Occupational Safety and Health according to foreign countries experiences. A Pilot Program of Rooting Labors Safety and Health was implemented as early as 2007 in 15 counties and cities. Subsequently, the so-called Program of Rooting Occupational Safety and Health (“Dandelion Program”) was activated in 2008 for a term of three years. By measures of local on-site training for occupational accident prevention, educational training and consulting, is the program aims to assist SMEs in improving their working environments and their workforce’s awareness and skills in safety and health. [24] According to relevant

data, Taiwans Rooting Program has visited 51,692 enterprises, consulted 430 enterprises, specially consulted 350 enterprises, and subsidized facilities for 686 enterprises (1,218 cases), all with a total subsidy of NTD \$14.6 million in the period from 2007 to 2010. The execution results show that the program achieved an annual average reduction of about 30% in counseled enterprises in 2010 compared to 2008 and 2009. The reduction of direct and indirect loss is 4.7 times the investments of the Program. [25]

### **(2) EU Member States Practical Measures for Promoting SME Safety and Health**

To effectively improve SMEs safety and health, the European Agency for Safety and Health at Work, from 2001 to 2004, adopted the “SME Funding Scheme 2001-2004: Promoting Health and Safety in European Small and Medium-sized Enterprises” and published research reports in 2003, 2004, 2005 [26-28]. According to EU reports of 2003-2005, there were 11 countries (Great Britain, Finland, Spain, Austria, Denmark, Ireland, Belgium, Italy, Sweden, Germany, and France) participating in 38 schemes respectively to fund SME safety and health. The details of the scheme include pertinent educational training for part-time workers, analysis of occupational accidents via seminars, questionnaires, and on-site investigations, assisting in the establishment of safety culture in enterprises, on-line consulting services and educational training for safety and health, and the development of



various kinds of training tools for safety and health education.

### **3. Brief summary**

Considering the above mentioned analysis as a whole, both domestic and foreign enterprises are generally lacking professional awareness and skills in occupational safety and health. Therefore, our government and pertinent authority agencies should try to develop an occupational safety and health management system for SMEs. By establishing a clear and understandable mechanism and steps and making assisting SME safety and health management as a goal, said system should aim to improve SMEs safety and health quality and to further effectively reduce occupational accidents. Hence, using the research methodology of questionnaire investigations, this study aims to analyze the “hardships in SME safety and health management” and “practical measures to improve SME safety and health” in order to serve as a reference for Taiwan's SME manufacturing employers and responsible governmental agencies.

## **Research Methodology**

### **1. Research Subject**

According to the purpose of this research, this study designates the employers of Taiwanese SMEs in 2012 as the research population. The research was conducted in two phases. The first phase is the pre-trial survey phase. From July 15 to July 30 of 2012 in Yunlin, Tainan, and the Kaohsiung area, the survey was conducted with 40 employers with a return number of 36. Discarding

the incompletely answered surveys, the number of effective surveys is 33, which is an effective return rate of 82.50%. The second phase is the survey phase. From early September to mid-October of 2012 in the Northern, Central, and Southern areas, the survey was conducted with 300 employers in the manufacturing industry of the entire country with a return number of 215. The return rate is 71.67%.

### **2. Research Instruments**

The survey consisted of three major components. The first component is “Basic Information,” which is mainly to assess the “Personal Factors,” including three questions regarding gender, job title, and seniority in services, and the “Organizational Factors,” which included three questions regarding number of total employees, whether the company joined the safety and health family, and the industrial type of the company. The second component is “Scale of Difficulties when SMEs Improve Safety and Health Management,” which is comprised of 20 questions. The questions examine how the respondents feel when their company faces difficulties in promoting safety and health management in terms of legal requirements (3 questions), personnel awareness (3 questions), labor inspection (3 questions), safety and health resources (8 questions), and participation and interaction (3 questions). Using the Likert 5-point scale, response options are “Totally Disagree,” “Disagree,” “Neutral,” “Agree,” and “Totally Agree,” allocated with 1 to 5 points, respectively. The third component is “Scale for Practical Measures in Improving SME Safety and Health,” including three sub-scales of

“Safety and Health Information,” “Safety and Health Sessions,” and “Practical Measures for Improving Safety Awareness.” The first two sub-scales are to survey how the respondents perceive their companies would like the government and its related agencies to provide information and safety and health sessions to SMEs. Again, the Likert 5-point scale is used, and the options are “Totally Disagree,” “Disagree,” “Neutral,” “Agree,” “Totally Agree,” allocated with 1 to 5 points, respectively. Furthermore, the sub-scale of “Practical Measures for Improving Safety Awareness,” with 17 questions, is mainly to survey how respondents perceive that measures are supposed to be in order to effectively improve awareness of SMEs labor safety in their own company. The Likert 5-point scale is used, and the options are “Totally Disagree,” “Disagree,” “Neutral,” “Agree,” “Totally Agree,” allocated with 1 to 5 points, respectively.

### 3. Analysis of Reliability and Validity

Based on the analytical surveying scale of statistical software SmartPLS 2.0 (M3) Beta version [29] developed by Ringle, Wende, & Will in 2005, this study examines the constructive validity (convergent validity and discriminant validity) with the surveys various load of factors and Cronbachs  $\alpha$  in each aspect, the average amount of variation extracted (AVE), and the composite reliability (CR). The analysis shows that the scale loads of “Scale of Difficulties when SMEs Improve Safety and Health Management” and “Scale for Practical Measures in Improving SME Safety and Health” are between 0.738 to 0.966, and 0.695 to 0.942, respectively, both of which are over 0.5 as suggested by Hair et al.

(1998) [30]. Cronbachs  $\alpha$  of each aspect of the two scales are between 0.781 to 0.956 and 0.897 to 0.980, respectively, both of which are over 0.70 reliability as suggested by Nunnally (1978) [31]. The average amounts of variation (AVE) extracted are between 0.644 to 0.920 and 0.621 to 0.759, respectively, both of which are over 0.5 as suggested by Fornell and Larcker (1981) [32]. The composite reliability is between 0.872 to 0.972 and 0.919 to 0.982, respectively, both of which are over 0.6 as suggested by Fornell and Larcker (1981) [32]. The statistics show that the two scales both have good reliability and convergent validity.

## Results and Discussions

### 1. Analysis of Basic Information

The personal background of the 215 respondents in this study found that the gender majority with 136 counts consists mostly of men (representing 63.26%), that the seniority majority with 80 counts consists of those who have been working for 15 years (37.21%), and that the occupation majority with 90 counts consists of those acting as chiefs of safety and health (41.86%). With respect to the variable of responding enterprises organization, those companies with 10-29 employees are the majority with 81 counts (accounting for 37.67%). The number of SMEs joining the safety and health family is 122 (representing 56.74%). The five leading business categories in the survey are textiles manufacturers (64 counts, accounting for 29.77%), paper and paper products manufacturers (27 counts, accounting for 12.56%), plastic products manufacturers (25 counts, accounting for 11.63

%), metallic products manufacturers (18 counts, accounting for 8.37%), machinery and equipment manufacturers and repair (17 counts, accounting for 7.91%). These five industry categories comprise a total of 151 respondents, accounting for 70.24% of all respondents.

## 2. Variance Analysis of Different Organizational Parameters to Difficulties of Safety and Health Management

### (1) Analysis of Current Situation of Difficulties in Safety and Health Management

According to the average scores in the subscale of Difficulties in Safety and Health Management's 20 questions, the questions ranked in the leading six places are three under Labor Inspection, including 7) worrying to be subject to penalty due to failure to pass labor inspection (average score=3.28), 9) improvement of safety and health cannot be effectively monitored due to limited human resources for labor inspections (average score=3.20), and 8) lower frequency of inspection by the government (average score=3.18), three under Safety and Health Resources including 16) lack of executive instruments and procedure of suitable safety and health management (average score=3.22), 17) insufficient promotion in SME safety and health management (average score =3.18), and 15) lack of assistance from external resources to support safety and health sessions (average score =3.18). The respondents were observed to strongly perceive the difficulties of safety and health management in insufficiency

of Labor Inspection and Safety and Health Resources in Difficulties of Safety and Health Management, while aspects of Requirements of Regulations, Awareness of Personnel, Safety and Health Resources, and Participation and Interaction follow.

### (2) Variance Analysis of Different Sizes of a Company to the Difficulties of Safety and Health Management

As shown in Table 1, in the one-way ANOVA, the company size for each aspect of health and safety management difficulty regarding "Legal Requirements" ( $F=.718, p>.05$ ), "Personnel Awareness" ( $F=.376, p>.05$ ), "Labor Inspection" ( $F=.241, p>.05$ ), "Safety and Health Resources" ( $F=1.856, p>.05$ ), and "Participation and Interaction" ( $F=2.159, p>.05$ ), has no significant difference, showing that the size of different companies does not pose any difference in factors in safety and health management difficulties.

### (3) Variance Analysis of Whether Joining Safety and Health Family to Difficulties of Safety and Health Management

As shown in Table 2, in the t-test analysis, aspects of whether joining the safety and health family versus safety and health management, regarding "Legal Requirements" ( $t=2.114, p<.05, \text{non-family} > \text{family}$ ), "Personnel Awareness" ( $t=2.579, p<.05, \text{non-family} > \text{family}$ ), "Labor Inspection" ( $t=2.384, p<.05, \text{non-family} > \text{family}$ ), "Safety and Health Resources." ( $t=4.228, p<.001, \text{non-family} > \text{family}$ ), "Participation and Interaction" ( $t=3.715, p<.001, \text{non-family} > \text{family}$ ), are

significant, which means that the non-family SMEs factors towards Difficulties of Safety and Health Management are higher than that of family SMEs.

Table 1: Table of Variance Analysis for Different Sizes of a Company to the Difficulties of Safety and Health Management(N=212)

Aspects	Size of Company	Number of Companies	Average	Standard Deviation	F	p Value
Legal Requirement	1. 1~9	37	3.20	0.79	.718	0.542
	2. 10~29	81	3.17	0.84		
	3. 30~49	29	3.05	0.90		
	4. 50~99	65	2.99	0.92		
Personnel Awareness	1. 1~9	37	3.23	0.98	.376	0.770
	2. 10~29	81	3.04	0.93		
	3. 30~49	29	3.16	1.05		
	4. 50~99	65	3.08	0.93		
Labor Inspection	1. 1~9	37	3.23	0.86	.241	0.868
	2. 10~29	81	3.24	0.73		
	3. 30~49	29	3.31	0.94		
	4. 50~99	65	3.16	0.80		
Safety and Health Resources	1. 1~9	37	3.29	0.82	1.856	0.138
	2. 10~29	81	3.12	0.71		
	3. 30~49	29	2.97	0.93		
	4. 50~99	65	2.93	0.85		
Participation and Interaction	1. 1~9	37	3.07	0.69	2.159	0.094
	2. 10~29	81	3.06	0.84		
	3. 30~49	29	2.67	0.90		
	4. 50~99	65	2.86	0.85		

Table 2: Table of Variance Analysis for Joining the Safety and Health Family to the Difficulties in Safety and Health Management (N=215)

Aspects	Whether Joining Safety and Health Family	Number of Companies	Average	Standard Deviation	t Value
Legal Requirement	non-family	93	3.24	0.82	2.114*
	family	122	2.99	0.88	
Personnel Awareness	non-family	93	3.30	0.87	2.579*
	family	122	2.96	0.99	
Labor Inspection	non-family	93	3.37	0.85	2.384*
	family	122	3.11	0.75	
Safety and Health Resources	non-family	93	3.33	0.74	4.228***
	family	122	2.88	0.81	
Participation and Interaction	non-family	93	3.19	0.82	3.715***
	family	122	2.77	0.81	

註：\* $p < .05$  , \*\*\* $p < .001$

### 3. Variance Analysis of Practical Measures in Different Organizational Parameters to Improvements of SME Safety and Health

#### (1) Analysis of Current Practical Measures in Improving SME Safety and Health Conditions

A. With respect to seeking safety and health related information from the government and its related agencies

According to comparative results from the eight questions of the “Providing Safety and Health Related Information” sub-scale, the leading five questions are 5) the health and safety regulations applicable for SMEs (Mean=4.02), 1) health and safety management manual for SMEs (mean=3.92), 2) safety and health

improvement information (pamphlets, brochures, leaflets, posters) (mean=3.92), 3) safety and health resources on the internet (mean=3.87), and 7) risk assessment tool for SMEs (mean=3.86), were all close to the “need” option, explaining that the respondents realize that their companies need the government or its related agencies to provide them with safety and health related information, such as health and safety regulations, manuals, promotional information, internet resources, and risk assessment tools.

- B. With respect to seeking safety and health related sessions from the government and its related agencies

According to the comparative results of the average scores from the eight questions of the “Providing Safety and Health Related Sessions” sub-scale, the leading five questions are 1) safety and health training for employees (mean=3.92), 2) safety and health training for professionals (mean=3.91), 7) health and safety FAQ consulting services, (mean=3.78), 3) safety and health training for employers (mean=3.74), and 6) solving safety and health issues by aide of an expert (mean=3.72), were between “ordinary” and “need” while being comparatively closer to the “need” option. These findings explain that the respondents considered that their companies need the government or its agencies to provide them with SME safety and health-related sessions of safety and health personnel training, consulting

services, and assistance in solving safety and health related issues.

- C. With respect to practical measures in effectively improving SME employees awareness in safety and health

According to the comparative results of the average scores from the 17 questions of the “Practical Measures in Improving Laborers’ Awareness of Safety” sub-scale, the leading five questions are 11) implementing workplace hazard identification (mean=4.08), 2) organizing training of new personnel (mean=4.06), 3) organizing first aid courses (mean=4.02), 12) implementing facilities for safety and health inspections (mean=4.00), and 10) formulating SOP for facilities or equipment (mean=3.99), were between “agree” and “strongly agree” while being closer to the “Agree” option. These findings explain that the respondents considered that their companies should place a priority on identifying work hazards, new staff training, organizing first aid courses, implementing facility safety and health inspections, as well as formulating SOP for facilities or equipment among the practical measures for improving laborers safety awareness.

- (2) Variance Analysis of Practical Measures in Different Company Sizes to Improvement of Laborers’ Safety Awareness

As shown in Table 3, in the one-way ANOVA analysis, company size to each aspect of practical measures in improvement of employees safety awareness is significant. In the aspect of “providing safety and health related

information”(F=3.918,  $p < .01$ ), the level of demand for a company size ranging from 30 to 49 employees is higher than that ranging from 1 to 9 employees. In the aspect of “providing safety and health related sessions”(F=3.736,  $p < .05$ ), the level of demand for a company size ranging from 30 to 49 employees is greater than that ranging from 1 to 9 employees. Additionally, in the aspect of “improving safety awareness in practice” (F=4.840,  $p < .01$ ), the level of demand for a company size ranging from 30 to 49 employees and one ranging from 50 to 99 employees are greater than one ranging from 1 to 9 employees.

Table 3: Table of Variance Analysis for Practical Measures in Different Company Sizes to Improvement of Laborers’ Safety Awareness(N=212)

Aspect	Company Size	Number of Companies	Average	Standard Deviation	F	Comparison
Providing Safety and Health Related Information	1. 1~9	37	3.60	0.62	3.918**	3>1
	2. 10~29	81	3.72	0.60		
	3. 30~49	29	4.04	0.61		
	4. 50~99	65	3.88	0.53		
Providing Safety and Health Related Sessions	1. 1~9	37	3.52	0.77	3.736*	3>1
	2. 10~29	81	3.65	0.65		
	3. 30~49	29	3.99	0.69		
	4. 50~99	65	3.85	0.62		
Improving Safety Awareness in Practice	1. 1~9	37	3.65	0.79	4.840**	3,4>1
	2. 10~29	81	3.82	0.57		
	3. 30~49	29	4.12	0.58		
	4. 50~99	65	4.05	0.59		

Note : \*  $p < .05$  , \*\*  $p < .01$

(3) Variance Analysis of Practical Measures in Whether Joining the Safety and Health Family to Improvements of Employees’ Safety Awareness

Through T test analysis, it is found that joining the safety and health family is only significant to the aspect of “practical measures in improving employees’ safety awareness” of practical measures in improvement of employees safety awareness ( $t = -2.822$ ,  $p < .01$ , family > non-family) while having no significance on the other aspects. These findings explain that the level of recognition towards various practical measures for effectively improving employees’ safety awareness of SMEs who join the family is greater than those who do not join the family.

**Conclusions and Suggestions**

**1. Conclusions**

In this study, based on the empirical investigation of 215 SMEs employers or chiefs of safety and health, the information has shown that, among the 20 difficulties of the five major aspects, the leading six are the “worrying about penalties due to labor inspections,” the “improvement of safety and health cannot be effectively monitored due to limited human resources for labor inspections,” and the “lower frequency of inspection by the government” in the aspect of “Labor Inspection,” and the “lack of executive instruments and procedure of suitable safety and health management,” the “insufficient promotion in SMEs’ safety and health management,”

and the “lack of assistance from external resources to support safety and health sessions.” Furthermore, in terms of safety and health management difficulties in aspects of legal requirements, personnel knowledge, labor inspection, and safety and health resources, this study has found that the level of demand for safety and health of the SMEs that do not join the family is greater than those who join the family. This finding explains that the experience sharing and cooperation model called “Large Companies Leading Small Companies” promoted by the CLA throughout the years has harvested positive results of improving the management of safety and health for those SMEs with weaker working safety, via a family's organizational platform to exchange improvement experiences in order to learn from each other and share information.

SMEs would most like that the government and its related agencies would provide related information of safety and health regarding the “safety and health regulations applicable for SMEs,” the “management manual for SMEs safety and health,” and “safety and health improvement information (pamphlets, brochures, leaflets, posters),” as well as related sessions of safety and health regarding mainly “safety and health training for employees,” “safety and health training for professionals,” and the “health and safety FAQ consulting services.”

## **2. Suggestions**

In this study, it is suggested that the governmental related agencies continue strengthening the “Labor Inspection” for SME safety and health. By risk assessment and a controlling method of simply transferring applications, for example, the 3-in-1

measure of promotion, inspection, and consulting, the governmental agencies can strengthen hierarchical regulations of SMEs’ highly dangerous businesses and workplaces. Key inspections and inspector ability in SME labor inspections can be strengthened, and SME labor inspection manuals and guidance will be set up and edited. Moreover, the various safety and health resources should be provided to SMEs in order to strengthen the functionality of safety and health promotions, such as implementing practical instruments in SME risk assessment, holding workshops and seminars for each industry, strengthening the function of safety and health promotional websites, and providing safety and health related information (safety related regulations, safety and health management manual, safety and health promotional information), while related safety and health sessions should require “safety and health training for employees,” “safety and health training for professionals,” and “health and safety FAQ consulting services” as the three priority topics.

It is also found in this study that the safety and health study family renders significantly beneficial performances in aspects of management and organization, although it did not improve the employee aspects. It is suggested that, before any safety and health family programs are implemented in the future, implementing session planning for safety and health training is preferable in order to enable SME employers and chiefs to further conduct safety and health trainings for their employees on-site. The “Danger Acknowledgement Training Guide” published by our institute can be the teaching material used for seed training of the family members. It is expected

that each one of the employees are able to understand practical knowledge about workplace dangers.

Finally, this study suggests that SMEs should first routinely schedule training activities for “workplace danger identification” in order to strengthen employees’ ability in identifying dangers in workplaces, and also, based on the practical situation in the workplaces, SMEs are encouraged to promote more suitable educational and training sessions. Moreover, in addition to routine educational training such as “new employee training” and “emergency lessons,” support for educational training for employees of specialized groups should also be strengthened in continuation so as to improve the employees’ level of satisfaction towards safety and health and further strengthen their awareness of safety.

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