



An evaluation of occupational accidents in the wooden furniture industry – A regional study in South East Asia

Jegatheswaran Ratnasingam^{a,*}, Florin Ioras^b, Ioan Vasile Abrudan^c

^a Faculty of Forestry, Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia

^b Buckinghamshire New University, Queen Alexandra Road, High Wycombe, HP 11 2JZ Buckinghamshire, England, United Kingdom

^c Faculty of Silviculture and Forest Engineering, Transilvania University, Sirul Beethoven 1, Brasov, Romania

ARTICLE INFO

Article history:

Received 17 June 2011

Received in revised form 17 November 2011

Accepted 27 December 2011

Available online 10 February 2012

Keywords:

Contract workers

Injuries

Furniture manufacturing

Training

Accident risks

South East Asia

ABSTRACT

Studies on the rate of occupational accidents among workers in the wooden furniture industry is sparse, although the industry is deemed to be highly accident prone. Therefore, the rate of occupational accidents among workers in the wooden furniture industry in Malaysia, Thailand, Indonesia and Vietnam were studied, in 240 furniture manufacturing factories, using a structured questionnaire. The findings of the study suggest that contract workers are less prone to occupational accidents compared to their permanent counterparts, and hence, are more productive. Further, the results also revealed that the contract workers have a more positive attitude towards the work, and hence, pick up the essentials of safe working practices quickly. It must therefore be recognized that the “production oriented mentality” prevalent in the wooden furniture industry, which has been argued to compromise occupational safety and health standards in the industry may be debatable. In this context, it is essential for the policy makers to re-examine the employment of contract workers for the furniture manufacturing industry, as changing the psycho-economic parameters of the industry may be warranted before the industry is deemed attractive to a permanent workforce.

© 2011 Elsevier Ltd. All rights reserved.

1. Introduction

Although, the nature of occupational accidents in the wood-working industry has been extensively reviewed (Holcroft and Punnett, 2009), most of the reports are focused on the nature of processing rather than the characteristics of the workforce. A case for concern is the increasing use of contract workers in the value-added wood products sector, especially furniture manufacturing, in countries such as Malaysia, Thailand and Vietnam (Ratnasingam and Bennet, 2009). Although workforce characteristics have been shown to contribute to occupational accidents in the wood products sector (Holcroft and Punnett, 2009), the role of the contract workforce in occupational accidents have attracted little research interests. In a recent report by Ratnasingam and Bennet (2009), it was reported that almost 55% of the total workforce in the wooden furniture sector in the South East Asian region are migratory contractual workers, from rural areas.

Furniture manufacturing has evolved from being a cottage based, skill-dependent industry to a highly mechanized and labour intensive industry operating in high-volume production environments in countries such as Malaysia, Thailand and Vietnam (Rampal and Nizam, 2006). On this account, there is a growing need to ascertain

the effects of using migrant contractual workers on occupational accidents in the furniture industry, which is an important socioeconomic sector in many South East Asian countries.

The furniture manufacturing industry has emerged as one of the fastest growing industrial sectors in Malaysia, Thailand, Indonesia and Vietnam and its socioeconomic importance, both in terms of workforce employment and foreign exchange earnings has increased significantly over the years. In 2009, the sector contributed US\$ 7.6 billion in export earnings, while employing almost 679,000 workers (Ratnasingam and Bennet, 2009). Nevertheless, the prevailing risky work environment in the furniture industry, which is regarded as dirty, dangerous and degenerative, i.e. “3D environment”, is not deemed attractive to the local workforce. Hence, migrant contractual workers, usually from rural areas and also an increasing proportion from neighbouring countries are increasingly employed within the wooden furniture manufacturing industry (Ratnasingam and Bennet, 2009). Whether the use of migrant contractual workers’ increases occupational accidents is highly debatable (Ratnasingam et al., 2010a,b), but published statistics on accidents in by the National Institute of Occupational Safety and Health (NIOSH) of Malaysia, suggest that occupational accidents in the furniture industry is above the national average of the manufacturing sector, and often resulted in huge compensation payouts, emphasizing that studies into this subject is warranted (NIOSH, 2009). Further, the impact of accident on workers on the overall

* Corresponding author. Tel.: +60 3 89467175; fax: +60 3 89432514.

E-mail address: jegaratingam@yahoo.com (J. Ratnasingam).

industrial productivity is a matter of national and international interests, especially when industrial productivity dictates the competitiveness of the wooden furniture industry (Guldenmund, 2000; Clarke, 2006a; Pousette et al., 2008; Wu et al., 2008; Gyekye and Salminen, 2009).

Previous studies have shown that industrial accidents are closely related to the prevailing work environment and tasks carried out (Cooper, 2000; Clarke, 2006b; Das et al., 2008), and factors such as: (i) prevailing environment, (ii) nature of work, (iii) handling, (iv) ergonomic, (v) machine, (vi) training, (vii) maintenance, (viii) plant layout, (ix) workers characteristics and (x) safety climate and the risk posed by each of these factors may vary from factory to factory (Ratnasingam et al., 2011).

The safety management system within the wooden furniture industry is regarded poor as reported previously. The reason being the management are geared towards mass production, with a focus on increasing throughput with minimal focus on workers safety and work environment. With the exception of Thailand, the other countries normally attract workers who do not have any prior exposure to the woodworking environment, making them vulnerable to accidents. Systematic training schemes are also lacking. Perhaps, the single biggest issue is the lack of enforcement of legislations that make employers pay greater attention to the health and safety of workers. Despite the existence of relevant legislations, the enforcements of such laws are minimal. Further, the penalty of non compliant is almost negligible.

Against this background, a study was undertaken to evaluate: (1) the susceptibility of migrant contractual workers to occupational accidents in the furniture industry, and (2) the relationship between the migrant contractual workers and industrial productivity in the wooden furniture industry in Malaysia, Thailand, Indonesia and Vietnam. The results of this study will provide useful information to policy makers to formulate necessary guidelines to minimize occupational accidents in the furniture industry, as well as re-examine the policy on migrant contractual workers for labour intensive sectors.

2. Materials and methods

The study was conducted in two hundred and forty large (employing more than 100 workers, with an annual turnover in excess of US\$ 10 million) furniture-manufacturing companies in Malaysia, Thailand, Indonesia and Vietnam, using a three-part structured questionnaire. A total of 26,580 workers were involved in this study, with migrant contractual workers making up to 52% of the total sample size. The characteristics of the workforce involved in the study are as shown in Table 1. The companies were selected from the databases of the respective national furniture trade associations, and these companies were chosen on the basis of the number of occupational accidents reported to the respective National Institute of Occupational Health and Safety (NIOSH). In this study, accident rate refers to number of accidents at the workplace per million work

Table 1
Characteristics of the workforce in the regional wooden furniture industry.

	Malaysia	Thailand	Indonesia	Vietnam
Respondents	7200	6069	6782	6529
Age-class	23–27	21–25	21–25	23–27
Educational level	High school, college	High school	High school	High school, college
Sex	Male	Male	Male	Male
Local/permanent workers (%)	58	45	38	53
Migratory contract workers (%)	42	55	62	47

Table 2
Risks for occupational accidents.

Factor	Variable involved	Malaysia (1)	Thailand 4.21	Indonesia 4.28	Vietnam 4.15
Workers	Characteristics				
	Gender	4.36			
	(2) Age-class				
	(3) Education level				
	(4) Experience at work				
	(5) Permanent or contract				
Workers Attitude	(1) Careful and attentive	4.59	4.76	4.71	4.91
	(2) Hard working				
	(3) Pay attention to safety				
	(4) Disciplined				
Workers Training	(1) Safety Training	3.76	3.89	3.52	3.91
	(2) accident prevention training				
	(3) Exposing employees to safety and accident prevention rules				

Note: figures indicate average score for the variable.

hours, and the accident leads to at least an hour of production loss. The questionnaire-based study was carried out with the assistance of the respective national furniture trade associations.

Part I of the questionnaire examined the occupational accidents' records at the respective furniture companies for the period, from 2005 to 2009. The occupational accidents data were segregated based on (i) permanent or contract worker (ii) gender (95% male), (iii) age-class (20–30), (iv) educational level (high school or diploma), (v) experience at work (between 3 and 10 years), (vi) work station, (vii) shift/time of injury, (viii) type of injury/accident, (ix) period of continuous work prior to accident, (x) time when food last consumed, (xi) recent sleep disturbances, (xii) presence of any family or work-related tension/stress, (xiii) presence of any acute illness, (xiv) on medication/treatment and (xv) period of absence from work after injury/accident. These fourteen criteria were selected based on the previous study on occupational accidents by Bazroy et al. (2003) and after consulting industrial experts, to ensure that it represented the entire spectrum of workforce-related factors that could possibly cause accident.

Part II of the questionnaire was related to the measurement of occupational accident risks due in the companies, where 12 variables were evaluated based on the Likert's five-point rating scale (Table 2). The senior managers at the respective factories were interviewed to determine the ratings for the variables. These variables were then grouped into groups, namely: (1) workers characteristics, (2) workers attitude, and (3) workers training.

Part III of the questionnaire examined the interaction between education, skill-skill level, training program and rate of occupational accidents among the workers in the wooden furniture industry. The data compiled from Parts I and II of the study, were used to establish the correlation between these variables.

The data compiled from the questionnaires were primarily analyzed with the FOXBASE program, which provide time series analysis for the day of the week and month. Standard error of proportions was used to determine the difference between the number of accidents in the 1st half and 2nd half of shifts. Chi square test was employed to identify the occupational accidents risk factors, whereas the strength of the association was determined using the correlation analysis (Bazroy et al., 2003; Holcroft and Punnett, 2009).

3. Results

3.1. Occupational accidents among migrant contract workers and local workers

Table 3 provides an analysis of the rate of occupational accidents among the migrant contract workers and local workers, based on the data gathered from the 240 respondent factories. It was apparent that the permanent workers were more prone to occupational accidents compared to migratory contractual workers. The results of the study revealed that contrary to common belief, contract workers suffered less occupational accidents compared to their permanent counterparts, even in the risky workstations, such as the machining centres and rough-milling section. Further, the workers' hands and wrists were the most common anatomical sites for injury, while their eyes, ankle, feet and other anatomical parts accounted for less than 12% of the injuries reported. Almost all accidents occurred at machines centres operating at high speeds (>18,000 rpm) such as at routers and shapers, while in the rough mill the accidents were mainly at the cross cut saw due to poor handling of wood stock, insufficient safety gadgets i.e. safety boots, gloves. The machines also lack safety gadgets. This observation is applicable to all countries in the study. This finding was similar to the reports by Bazroy et al. (2003) and Holcroft and Punnett (2009) who found that in labour

Table 3
Records of occupational accidents (2005–2009).

	Malaysia	Thailand	Indonesia	Vietnam
Experience at work	3.1 (1.2)	4.3 (1.7)	2.9 (0.9)	3.8 (3.1)
Frequency of accidents/injuries (per 10,00,000 h)	129 (441)	121 (242)	136 (459)	103 (167)
Average loss of productive time (hours) per year	1.6 (5.9)	1.3(5.3)	2.1 (7.1)	1.1 (3.1)
Work station of accident	Machine centre	Machine centre	Machine centre	Machine centre
Tasks related to the accident	Rough mill Handling of heavy and bulky wood stocks, falling off-cuts, wood splinters, machines operating at high speeds (>18,000 rpm), mishandling of machines, lack of safety guards at machines	Rough mill Handling of heavy and bulky wood stocks, mishandling of machines, poor extraction of waste	Rough mill Handling of heavy and bulky wood stocks, high cutting speeds at routers (>18,000 rpm), mishandling of machines, lack of safety guards at machines	Rough mill High cuttings speeds at routers, shapers (>18,000 rpm), mishandling of machines, poor extraction of waste
Type of accident	Severe cuts/bruises/sprain	Severe cuts/bruises/sprain	Severe cuts/bruises/sprain	Severe cuts/bruises/sprain
Duration of work (hours) prior to accident	8 (4–8)	8 (4–8)	8 (4–8)	8 (4–8)
Last meal/time of food consumption	On time	On time	On time	On time
Sleep disturbances	Yes	Yes	Yes	Yes
Stress/family tension	Yes	Yes	Yes	Yes
Acute illness	No	No	No	No
On medication	No	No	No	No

Note: figures in parentheses are for permanent workers, and where no parentheses appear, it means contract and permanent workers are similar.

intensive industries, the hands and wrists were easily injured due to the manual nature of the job. Cuts and lacerations accounted for almost 55% of the accidents/injuries reported, followed by eye injuries (20%), sprains (12%) and other types of injuries making up the rest, similar to the report borne out by Smith et al., (1994). The incidence of occupational accidents was higher during the 2nd shift (3.00–11.00 pm) and among workers who continued to work beyond the normal 8-h shift. Time series analysis of the occupational accidents revealed that workers in the 2nd shift of work were more prone to accidents, and higher rate of accidents were reported during the weekend as well. Further, there was a statistically significant difference ($P = 0.05$) between the higher proportion of accidents in the second half of the 2nd shift compared to first half, and this is probably attributed to the fatigue and loss of concentration on the part of the workers towards the later part of the shift as the manufacturing process is monotonous and continuous (Smith et al., 1994). Male workers with a year of experience were also more prone to suffer from occupational accidents, compared to female workers. This is possibly attributed to the lack of attention among male workers compared to female workers in monotonous and repetitive tasks, as frequently found in the furniture manufacturing industry (Jinadu, 1990). However, the age-class had no significant ($P = 0.05$) influence on the rate of occupational accidents. Incidentally, workers with episodes of sleep disturbances, insufficient food uptake, on medication or treatment for previous accidents and under family tension/stress also more prone to accidents compared to workers free from these characteristics. The results from study are somewhat similar to the report by Bazroy et al. (2003), who showed that the “degree of tiredness” of the worker attributed to the lack of sleep, food consumption or even level of stress may increase the susceptibility to accidents in mechanized work environment, as in the furniture manufacturing industry. On the other hand, the higher degree of attention given by the migratory contract workers during on the job training enables them to master safe working habits faster compared to their permanent counterparts, hence reducing the rate of occupational accidents (Holcroft and Punnett, 2009). Perhaps, the higher average educational level among the migratory contract workers compared to the permanent workers, could also explain the comparatively lower rate of occupational accidents among them (Ratnasingam and Bennet, 2009; Ratnasingam et al., 2011). In comparison, the study reveals that migratory contract workers were more productive compared to their permanent counterparts in the furniture industry, as they suffered a lower loss in productive time due to occupational accidents and the period of absence after injury was significantly shorter.

3.2. Occupational accident risks among workers

In evaluating the risks for occupational accidents among workers in the factories involved in the study, it was found that the workers attitude received the highest score, followed by workers characteristics and finally the workers training (Table 2). The occupational accidents were strongly correlated with the workers attitude and workers characteristics ($r = 0.941$ and $r = 0.861$ at $P = 0.05$, respectively), which describes the occupational accidents risk factors. However, workers training showed a weak correlation ($r = 0.338$ at $P = 0.05$) with the rate of occupational accidents. In this context, workers training program may be insufficient to pre-empt the risks of occupational accidents, if the workers attitude and workers characteristics are not positively inclined to minimize occupational accidents. This finding emphasizes the fact that in labour-intensive manufacturing environments, such as in the furniture industry, the overall workforce attitude and characteristics play pivotal role in avoiding occupational accidents as well as boosting productivity

Table 4
Correlation coefficient between accident rate and workers characteristics.

				Correlation coefficient (R^2)
Accident rate	Education level			0.73
Accident rate	Education level	Skill level		0.81
Accident rate	Education level	Skill level	Training	0.96

(Gyekye and Salminen, 2009; Salminen et al., 2009; Ratnasingam et al., 2011).

3.3. Correlation between education, skill, training and the rate of occupational accidents

The survey revealed a strong correlation ($R^2 = 0.96$) between workers education level, skill level, training attended and the rate of occupational accidents in the wooden furniture manufacturing industry (Table 4). Nevertheless, contract migratory workers suffered a lesser rate of occupational accidents, despite having lower educational levels compared to their permanent counterparts. Therefore, it is apparent that the workforce attitude and characteristics plays a greater role in determining the rate of occupational accidents in the wooden furniture manufacturing industry throughout the South East Asian region. This study suggest that unlike other manufacturing industries, skills-based training is more important than competency-based training in the wooden furniture industry, and essentially more skill full workers are less susceptible to industrial accidents, as demonstrated by the contract workers. The monotony of the tasks in the wooden furniture industry makes it necessary for workers to be skilful, in order not to slack in their tasks, as this is often the cause of accidents (Ratnasingam and McNulty, 2009).

4. Discussions

The results of this study corresponds to the findings of Varonen and Mattila (2000), Smith et al. (2006) and Holcroft and Punnett (2009) that emphasized the fact that occupational accidents in the furniture industry is attributed to the workforce characteristics as well as the prevailing safety climate at the workplace. Further, the study also emphasizes the fact that workers training and safety regulations are not the answers to accident prevention. A study by Sheehy and Chapman (1987) has shown that occupational safety can be improved in “accident prone” areas by changing the work ergonomics and equipment safety features. In this context, Holcroft and Punnett (2009) have conclusively shown that the most productive path to reducing accidents is through a greater use of techniques from industrial psychology and organizational science.

Previous study by Ratnasingam et al. (2011) has shown that the primary accident risk factors for the wooden furniture industry are associated with the immediate work environment (such as airborne dusts from machining operations, noise emission, chemicals exposure and manual handling of materials). The prevailing safety climate within the furniture sector must create the “culture of safety” through the concerted efforts of the management (Clarke, 2006b). The human resource practices that ensure a workforce that can meet goals for safety, productivity, and quality is valuable for increasing safety performance.

As the workers' characteristics and training programs have been recognized to play a strong role in the prevailing safety climate in the furniture industry (Ratnasingam et al., 2011), the results from this study further expounds the notion that workers' characteris-

Table 5a
Risk factor analysis for Malaysia.

Risk factor	Rating	Chi-square (p-value)
Worker characteristics	4.61	5.4 (0.013)
Worker attitude	4.71	6.4 (0.004)
Worker training	3.49	4.7 (0.01)

Table 5b
Risk factor analysis for Thailand.

Risk factor	Rating	Chi-square (p-value)
Worker characteristics	4.51	6.4 (0.013)
Worker attitude	4.81	8.4 (0.004)
Worker training	3.89	5.1 (0.01)

Table 5c
Risk factor analysis for Indonesia.

Risk factor	Rating	Chi-square (p-value)
Worker characteristics	4.21	6.1 (0.013)
Worker attitude	4.71	7.2(0.004)
Worker training	3.19	5.5 (0.01)

Table 5d
Risk factor analysis for Vietnam.

Risk factor	Rating	Chi-square (p-value)
Worker characteristics	4.69	6.4 (0.013)
Worker attitude	4.86	8.4 (0.004)
Worker training	3.96	5.7 (0.01)

tics has an overriding influence on safety climate, as it determines the attitude and work habits towards safety and health (Tables 5a–d). As noted by Clarke (2006b), the characteristics of the workforce is crucial in determining the motivation training and accident prevention, and as shown in this study, appears to limit the influences of training and supervision on the rate of accidents in the wooden furniture industry.

The safety management system within the wooden furniture industry in South East Asia is regarded poor as reported previously by Ratnasingam and Bennet (2009). The fact that the industry is predominated by small and medium enterprises, which lacks capital and systematic management, leads to a poor working environment that neglects workers' welfare in many instances (Ratnasingam and McNulty, 2009). Further, there is a general perception that the furniture factory management is often geared towards mass production, with a focus on increasing throughput with minimal focus on workers safety and work environment (Rampal and Nizam, 2006). As pointed out by Ratnasingam and McNulty (2009), safety issues are not given the importance it deserves in most wooden furniture factories, while the emphasis is usually on production and its supporting activities, such as product quality management. With the exception of Thailand, the other countries normally attract workers from rural areas who do not have any prior exposure to the wood-working environment, making them vulnerable to accidents. Systematic training schemes are also lacking in many of the nations, and the workers are usually called upon to learn on the job through trial and error (Wu et al., 2008). Perhaps, the single biggest issue is the lack of enforcement of legislations that make employers pay greater attention to the health and safety of workers. Despite the existence of relevant legislations, the enforcements of such laws are minimal (Rampal and Nizam, 2006). Further, the penalty of non compliant is almost negligible and most offenders are seldom

charged in a court of law. In this context, employment of contract migratory workers appears to be an economical option to the furniture industry, as the workers are more focused to ensure their safety and health, which in turn may cause a loss in their income. On the other hand, in instances where an accident does occur, the worker prefer not make a report for fear of losing his employment or loss of income. Although, Rampal and Nizam (2006) have reported the poor enforcement of safety and health legislations in the South East Asian nations, their report also indicated that the prevailing safety climate in the woodworking factory is largely dependent on the management as well as the safety systems put in place to improve the safety and health at the workplace. Therefore, it is not the nature of workforce rather the training and the work systems available that determines the safety and health levels of the workforce. It is apparent that the contract workers show a more positive and focused attitude towards work compared to their local counterparts for fear of loss of economic income. Inevitably, the study shows that the rate of occupational accidents in the wooden furniture industry could be reduced through concerted efforts by the factory management as well as legislative authorities, who must be more forthcoming in pulling up offenders who appear to compromise on the workers safety and health at the expense of economic profits.

5. Industrial implications

It is generally well accepted that the main hazards faced by the workers in the wooden furniture industry are those related to machine safety (saws, planers, high speed routers, borers, etc.), exposure to volatile organic compounds due to the use of solvents, chemical agents, risks related to hardwood dusts, risks arising from noise, physical pressure and manual loads, internal transport and traffic risks as well as the risks of fires and explosions (Holcroft and Punnett, 2009). Although these hazards and its management are covered in the prevailing legislations on workers safety and health in the South East Asian nations, its implementation and enforcement is rather poor (Ratnasingam and McNulty, 2009). Previous studies have shown that workplace safety in the furniture industry is poorly managed, and the measures implemented are often remedial in nature after the occurrences of accidents, rather than preventive measures. Inevitably, the employment of safety officers and the prevailing safety departments were not recorded in any of the factories surveyed in this study. Hence, it is apparent that most wooden furniture factories have an overall safety policy, with limited resources to implement and follow-through on such matters (Rampal and Nizam, 2006).

According to Ratnasingam and McNulty (2009), the lack of mandatory training for workers before entering the furniture factory, often presents workers who are ill-equipped to work safely in such tough environments. Inevitably, the contracted workers who are likely to suffer more economic losses due to accidents, tend to pay greater attention to safe working practices rather than their local counterparts who are often in-transition to a better employment in another sector (Rampal and Nizam, 2006; Holcroft and Punnett, 2009). The higher number of absentees among local workers also indicates that the local workers in the wooden furniture industry are usually not focused on a long-term employment in the wooden furniture sector, as opposed to their contract counterparts (Ratnasingam and McNulty, 2009).

Although, the safety climate within the wooden furniture industry is often perceived to be poor, Ratnasingam and McNulty (2009) have shown that the prevailing safety climate in the woodworking factory is dependent on the management as well as the systems put in place to improve the safety and health at the workplace. Therefore, it is not the nature of workforce rather the training and the work systems available that determines the safety and health levels of the workforce. Based on the survey conducted, it

was apparent that none of the factories had employed a safety officer, let alone has an independent safety department established in the factory. As previously suggested by Rampal and Nizam (2006), there is a general notion in South East Asia that safety practices in the workplace may hamper the production activities in the factory, and accidents are usually remedied after it occurs rather than implementing factory-wide accident preventive measures.

The results of this study underlines the main reason for the preference for contract migratory workers in the regional wooden furniture manufacturing industry. The general reluctance of the local workers to work in the furniture industry due to the poor working conditions (i.e. 3D vision syndrome), has created a workforce inadequacy that could be readily overcome by the migrant workforce, who appear to provide a stable workforce supply, that is not only more productive but is also safety and health conscious. In this context, improving the workforce psychology rather than workers training, may prove to be a better approach to attract the local workforce to the furniture industry (Rampal and Nizam, 2006). Driven by the opportunity to improve their socio-economic status, these migratory contract workers have a more positive outlook towards work rather than the local workforce who appear to be pampered with many different choices of employment (Ratnasingam et al., 2011). The positive work attitude, willingness to learn and hard-working attribute have been cited as the main reasons for furniture manufacturers to employ migratory contract workers, despite the possibility of social problems. Moreover, their lack of communication skills, which often hampers their working habits at the early stages of employment, is soon overcome through their dedication to work (Bazroy et al., 2003). Inevitably, the migratory contract workers have shown to be more productive and less prone to occupational accidents at the workplace, which will boost the competitiveness of the furniture industry, as a whole.

The results of this study also forces policy makers to re-examine the migratory contract workers employment in the furniture industry, which is increasingly debatable. Unabated employment of migratory contract workers have been argued to lead to unemployment among local workers and increasing social maladies within the society (Ratnasingam et al., 2011). Nevertheless, the reluctance among local workers to seek employment in the furniture industry leaves furniture manufacturers with little choice than to employ these contract workers. The 3D (dirty, dangerous and degenerative) stigma associated with the woodworking industry keeps many workers away from seeking employment in this sector. Perhaps, there is an urgent need to give woodworkers a professional status, by requiring a mandatory registration with an authority, which in turn will ensure a higher wage rate, which could possibly be more attractive to the local workers (Ratnasingam and Bennet, 2009). Further, the training of woodworkers must also be transformed from being a skilled-based to a competency-oriented program, which will create a more skill workforce that could garner a higher socio-economic status as observed in many developed countries. In essence, it is imperative to realize that migratory contract workers are a boost to the labour intensive furniture industry, and their replacement would require a transformation of the local workforce from a psycho-economical dimension.

6. Conclusions

Although, the safety climate within the wooden furniture industry is often perceived to be poor, this study implies that the prevailing safety climate in the woodworking factory is dependent on the management as well as the systems put in place to improve the safety and health at the workplace. It also seems that in the wooden furniture industry, it is not the nature of workforce rather the training and the work systems available that determines the safety and health levels of the workforce. The results from this study reveal

that contrary to common perception migratory contract workers are essentially more productive compared to the local permanent workforce in terms of incidences of occupational accidents. Migratory workers are less prone to accidents because of their more positive attitude towards work as they are keen to stay safe and healthy in order to increase income. On the other hand, domestic workers tend to pay less attention to the work as they are not only affected by the 3D stigma associated with the woodworking industry, but also of their eagerness to look out for better employment opportunities. Further, the lack of enforcement of related safety and health legislations in the region is also another contributing reason for the poor safety performance of the sector. In a tough work environment, such as wooden furniture industry, the study also shows that the prevailing workers attitude and characteristics are more important than workers training to prevent occupational accidents in the wooden furniture manufacturing industry. Hence, the prevailing psycho-economic parameters of the wooden furniture industry need to be re-examined, if the wooden furniture industry is to attract local workforce to its fold. Until such time, contract migratory workers will continue to make up a large proportion of the workforce in the regional wooden furniture industry due to their higher productivity compared to the local workers.

References

- Bazroy, J., Roy, G., Sahai, A., Soudarssanane, M.B., 2003. Magnitude and risk factors of injuries in a glass bottle manufacturing plant. *J. Occup. Health* 45, 53–59.
- Clarke, S., 2006a. The relationship between safety climate and safety: a meta-analytic review. *J. Occup. Health Psychol.* 11 (4), 315–327.
- Clarke, S., 2006b. Contrasting perceptual, attitudinal and dispositional approaches to accident involvement in the workplace. *Safety Sci.* 44 (6), 537–550.
- Cooper, M.D., 2000. Towards a model of safety culture. *Safety Sci.* 36 (2), 111–136.
- Das, A., Pagell, M., Behm, M., Veltri, A., 2008. Towards a theory of the linkages between safety and quality. *J. Operat. Manage.* 26 (4), 521–535.
- Guldenmund, F.W., 2000. The nature of safety culture: a review of theory and research. *Safety Sci.* 34 (1–3), 215–257.
- Gyekye, S.A., Salminen, S., 2009. Educational status and organizational safety climate: does education attainment influence workers perceptions of workplace safety. *Safety Sci.* 47 (1), 20–28.
- Holcroft, C.A., Punnett, L., 2009. Work environment risk factors for injuries in wood processing. *J. Safe Res.* 40, 247–255.
- Jinadu, M.K., 1990. A case study of accidents in a wood processing industry in Nigeria. *West Africa J. Med.* 9, 63–68.
- NIOSH 2009. Report on Workers Safety in the Manufacturing Sector. National Institute of Occupational Safety and Health (NIOSH), Bangi, Malaysia.
- Pousette, A., Larsson, S., Torner, M., 2008. Safety climate cross-validation, strength and prediction of safety behaviour. *Safety Sci.* 46 (3), 398–404.
- Rampal, K.G., Nizam, M.J., 2006. Developing regulations for occupational exposures to health hazards in Malaysia. *Regul. Toxicol. Pharm.* 46(2), 131–137. doi:10.1016/j.rtp.2006.01.013
- Ratnasingam, J., Bennet, M.C., 2009. Health and Safety Issues of the Malaysian Furniture Sector. IFRG Report No. 17, Singapore.
- Ratnasingam, J., McNulty, T., 2009. An assessment of safety climate in the woodworking industry in Malaysia and Thailand. *J. Appl. Sci.* 9 (6), 513–522.
- Ratnasingam, J., Ioras, F., Bennet, M., 2010a. Determinants of workers health and safety in the Malaysian wooden furniture industry. *J. Appl. Sci.* 10 (5), 425–430.
- Ratnasingam, J., Natthondan, V., Ioras, F., McNulty, T., 2010b. Dust, noise and chemical exposure of workers in the wooden furniture industry in South East Asia. *J. Appl. Sci.* 10 (14), 1413–1420.
- Ratnasingam, J., Ioras, F., Swan, T.T., Yoon, C.Y., Thanasegaran, G., 2011. Determinants of occupational accidents in the woodworking sector: the case of the Malaysian wooden furniture industry. *J. Appl. Sci.* 11, 561–566.
- Sheehy, N., Chapman, A., 1987. Industrial accidents. In: Cooper, C.L., Robinson, I.T. (Eds.), *International Review of Industrial and Organizational Psychology*. Wiley, Chichester, UK, pp. 201–227.
- Smith, L., Folkard, S., Poole, C.J., 1994. Increased injuries on night shift. *Lancet* 344, 1137–1139.
- Smith, G.S., Huang, Y.H., Ho, M., Chen, P.Y., 2006. The relationship between safety climate and injury rates across industries: the need to adjust for injury hazards. *Accid. Anal. Prevent.* 38, 556–562.
- Salminen, S., Vartia, M., Giorgiani, T., 2009. Occupational injuries to immigrant and Finnish bus drivers. *J. Safety Res.* 40, 203–205.
- Varonen, U., Mattila, M., 2000. The safety climate and its relationship to safety practices, safety of the work environment and occupational accidents in eight wood-processing companies. *Accid. Anal. Prevent.* 32, 761–769.
- Wu, T.C., Chen, C.H., Li, C.C., 2008. A correlation among safety leadership, safety climate and safety performance. *J. Loss Prevent. Proc.* 21 (3), 307–318.