THE INFLUENCE OF WORK PRESSURE, SAFETY CLIMATE AND SAFETY PARTICIPATION IN DETERMINING SAFETY BEHAVIOUR AMONG LOCAL AND FOREIGN WORKERS IN A MALAYSIAN STEEL INDUSTRY

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ABSTRACT

This study was conducted to determine the factors which influence safety behaviour among workers at a Malaysian steel industry. The significance of this study is explained by the fact that the country is experiencing a surge in foreign workers which could detrimentally affect the overall safety behaviour of employees. A total of 160 questionnaires' were distributed to the workers in a metal stamping industry. The questionnaire encompasses 3 independent variables of safety climate, safety participation, perceived work pressure and a dependent variable which is represented by safety behaviour. Results from this research shows that safety behaviour is positively correlated with safety participation and safety climate, and negatively correlated with work pressure. Workers who are working in morning shifts have been found to possess better safety participation, an increase in perceived work pressure, a better perception of safety climate and safety behaviour. Comparison between the Malaysian work force and foreign workers showed that Malaysian workers possess better safety behaviour, an elevated perceived safety climate and good safety participation compared to their foreign counterparts. In addition, workers with an education level below primary school lack safety participation. In another note, better safety participation was reported among employees with higher academic qualifications. Multiple regression analyses were performed to predict the safety behaviour of workers with respect to safety climate, safety participation and perceived work pressure. The results of the regression analyses suggest that safety climate and safety participation were more predictive and accounted for more unique variance in the safety behaviour variables than perceived safety pressure. Future researches are worth extended to include high risk metal and steel industry

Key words: Safety behaviour, safety participation, safety climate, perceived work pressure

ABSTRAK

Kajian ini dijalankan bagi menentukan faktor - faktor yang mempengaruhi tingkah laku keselamatan dalam kalangan pekerja-pekerja di salah sebuah industri besi dan keluli di Malaysia. Sumber kajian menunjukkan bahawa negara sedang dibanjiri pekerja asing yang boleh menjejaskan tingkah laku keselamatan pekerja secara keseluruhannya. Sebanyak 160 borang soal selidik telah diedarkan kepada pekerja-pekerja di kilang tersebut. Senarai soalan tersebut merangkumi tiga pembolehubah tidak bersandar dan satu pembolehubah bersandar. Pembolehubah tidak bersandar ialah iklim keselamatan, penyertaan keselamatan dan tanggapan tekanan kerja manakala pembolehubah bersandar ialah tingkah laku keselamatan. Hasil daripada kajian ini menunjukkan bahawa tingkah laku keselamatan secara positifnya berkait rapat dengan penyertaan keselamatan dan iklim keselamatan, serta berhubung kait secara negatif dengan tanggapan tekanan kerja. Pekerja yang bekerja dalam syif pagi pula didapati mempunyai penyertaan keselamatan yang lebih baik serta menunjukkan peningkatan dalam tanggapan tekanan kerja. Sehubungan itu, golongan pekerja ini juga mempunyai persepsi yang lebih baik dari segi iklim keselamatan dan tingkah laku keselamatan. Pekerja-pekerja Malaysia didapati mempunyai tahap tingkah laku keselamatan, iklim keselamatan dan penyertaan keselamatan yang lebih tinggi berbanding pekerja-pekerja asing. Di samping itu, kajian ini juga menunjukkan bahawa pekerja-pekerja yang berkelulusan di peringkat sekolah rendah mempunyai penyertaan keselamatan yang rendah. Dalam perkembangan yang lain, penyertaan keselamatan yang lebih baik telah dilaporkan dalam kalangan pekerja yang memiliki kelayakan akademik yang lebih tinggi. Analisa regresi berganda menunjukkan terdapat hubungkait antara pembolehubah tidak bersandar iaitu iklim keselamatan, penyertaan keselamatan dengan pembolehubah bersandar iaitu tingkah laku keselamatan. Walaubagaimanapun, analisa regresi berganda menunjukkan terdapat hubungkait yang lemah antara tingkah laku keselamatan dengan tanggapan tekanan kerja. Kajian seumpama ini disyorkan dalam industri besi dan keluli berisiko tinggi pada masa akan datang.

Kata kunci: Tingkah laku keselamatan, penyertaan keselamatan, iklim keselamatan, tanggapan tekanan kerja.

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LIST OF ABBREVIATIONS

TESB	Topaz Evergreen Sdn. Bhd.
OSHA	Occupational Safety and Health Act
BBS	Behaviour Based Safety

CHAPTER 1

INTRODUCTION

1.0 Background of the Study

Minimizing overhead costs via providing a safe and health workplace is one of the most effective strategies for reducing business operating costs. While most of the occupational safety behaviour indicators had used workplace injuries as an indicator of safety failures, researchers had investigated more proximal and positive safety-related outcomes, such as the safety related behaviours that precede and may prevent workplace injuries (Turner, Stride, Carter, McCaughey, & Carroll, 2012).

Accidents frequencies and property losses create great impact to industry. The impacts from accidents and incidents culminate in operational delays and also directly and indirectly incur cost. Therefore, it is mandatory for industries to provide a safe working environment for their workers and subcontractors and ensure safety behaviour of the employees is controlled effectively via elevating their level of participation (Walker, 2010)

Steel industry has been regarded as hazardous in nature due to its decentralization augmented by mobility and prevalence of hazards (Brown, Willis, & Prussia, 2000). Safety climate in steel industries has been recorded as lower compared to other industries (Smith, Huang, Ho, & Chen, 2006).

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REFERENCES

Ajzen,I.(1991). The theory of planned behavior. *Organizational Behavior and Human Decision Process,* 50 , 179-211.

Arezes, P.M., & Miguel, A.S.(2008). Risk perception and safety behaviour : A study in an occupational environment. *Safety Science*, 46 , 900-907.

Brondino,M., Silva,S.A., & Pasini,M.(2012). Multilevel approach to organizational and group safety climate and safety performance : Co-workers as the missing link. *Safety Science*, 50, 1847-1856.

Brown, K.A.,Willis, P.G., & Prussia, G.E.(2000). Predicting safe employee behavior in the steel industry: Development and test of a sociotechnical model. *Journal of Operations Management*, 18, 445–465.

Brown,S.(2012).Measures of Shape: Skewness and Kurtosis. Retrieved from http://www.tc3.edu/instruct/sbrown/stat/shape.htm.

Choudhry,R.M., & Fang,D.(2008). Why operatives engage in unsafe work behaviour : Investigating factors on construction sites. *Safety Science*, 46 , 566-584.

Clarke,S.(2006). Safety climate in an automobile manufacturing plant: The effects of work environment, job communication and safety attitudes on accidents and unsafe behaviour. *Personnel Review*, 4 , 413-430.

Coakes,S.J., Steed,L., & Ong, C. (2010). SPSS: analysis without anguish:version 17 for windows (1 st ed). John Wiley & Sons,Australia.

Cooper, M.D., & Phillips,R.A. (2004). Exploratory analysis of the safety climate and safety behaviour relationship. *Journal of Safety Research,* 35, 497–512.

Das,A., Pagell, M., Behm,M., & Veltri ,A.(2008). Toward a theory of the linkages between safety and quality. *Journal of Operations Management,* 26, 521–535.

DeArmond, S., Smith,A.E., Wilson,A.E., Chen, P.Y., & Cigularov,K.P. (2011). Individual safety performance in the construction industry: Development and validation of two short scales. *Accident Analysis and Prevention,* 43, 948–954.

Demirer,A.,Durat,M., & Hasimoglu,C.(2012). Investigation of seat belt use among drivers of different education levels. *Safety Science,* 50(2012),1005-1008.

DePasquale,J.D., & Geller, E.S. (1999). Critical success for behaviour based safety : A study of twenty industry- wide applications. *Journal of Safety Research,* 30(4),237-

249.

Fam,M.I., Nikoomaram,H., & Soltanian,A. (2012). Comparative analysis of creative and classic training methods in health, safety and environment (HSE) participation improvement. *Journal of Loss Prevention in the Process Industries*, 25 , 250-253.

Fang,D., Chen,Y., & Wong,L.(2006). Safety climate in construction industry: A case study in Hong Kong. *Journal of Construction Engineering and Management*, 132 (6), 573–584.

Ford, M.T., & Tetrick,L.E.(2011). Relations among occupational hazards, attitudes, and safety performance. *Journal of Occupational Health Psychology*, 16 (1), 48–66.

Fugas,C,S., Silva,S.A., & Melia, J.L.(2012). Another look at safety climate and safety behavior. : Deepening the cognitive and social mediator mechanisms. *Accident Analysis and Prevention* , 45, 468–477.

Fogarty, G.J., & Shaw,A.(2010). Safety climate and the theory of planned behaviour: towards the prediction of unsafe behavior. *Accident Analysis and Prevention* , 42, 1455–1459.

Geller, E.S. (2001). A Behaviour-based safety in industry: Realizing the large-scale potential of psychology to promote human welfare. *Applied and Preventive Psychology, 10*, 87-105.

Gravel,S., Rheaume,J., & Legendre,G. (2011). Strategies to develop and maintain occupational health and safety measures in small business employing immigrant workers in metropolitan Montreal. *International Journal of Workplace Health Management* , 4(2), 164–178.

Guldenmund,F.,Cleal,B., & Mearns, K. (2012). An exploratory study of migrant workers and safety in three European countries. *Safety Science* , article in press.

Hale,A.R., Guldenmund,F.W.,Van Loenhout,P.L.C.H., & Oh,J.I.H. (2010). Evaluating safety management and culture interventions to improve safety : Effective intervention strategies. *Safety Science*, 48 , 1026-1035.

Hamalainen, P., Takala,J., & Saarela, K.L. (2012). Global estimates of occupational accidents. *Safety Science*, 44 , 137-156.

Hayes, J. (2012). Operator competence and capacity- Lessons from the Montara blow out. Safety Science, 50, 563-574.

Huang,Y.H., Chen,J.C., DeArmond,S., Cigularov,K., & Chen, P.Y. (2007). Roles of safety climate and shift work on perceived injury risk: A multi-level analysis. *Accident Analysis and Prevention* , 39, 1088–1096.

Jeremy,M.B., Bergman,M.E., & Payne,S.C. (2010). The influence of organizational tenure on safety climate strength : A first look. *Accident Analysis and Prevention* , 42, 1431-1437.

Jiang,L., Yu,G., Li,Y., & Li,F.(2010). Perceived colleagues' safety knowledge/behaviour and safety performance: Safety climate as a moderator in multilevel study. *Accident Analysis and Prevention* , 42, 1468-1476.

Kapp,E.A. (2012). The influence of supervisor leadership practices and perceived group safety climate on employee safety performance. *Safety Science*, 50, 1119–1124.

Keren,N.,Mills,T.R.,Freeman,S.A.,&Shelley,M.C.(2009). Can safety climate predict level of orientation toward safety in a decision making task?. *Safety Science*, 47, 1312–1323.

Khader,M.M.A (2004). Impact of human behaviour on process safety management in developing countries. *Process Safety and Environmental Protection*, 82(B6), 431-437.

Kines , P., Lappalainen,J., Mikkelsen,K,L., Olsen, E., Pousette, A., Tharaldsen,J., Tomasson, K., et al. (2011). Nordic safety climate questionnaire (NOSACQ-50): A new tool for diagnosing occupational safety climate. *International Journal of Industrial Ergonomics*, 41, 634–646.

Kjercie,R.V., & Morgan, D.W.(1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30, 607-610.

Krause,T.R., Seymour, K.K., & Sloat, K.C.M. (1999). Long term evaluation of a behavior-based methods for improving safety performance: a meta- analysis of 73 interrupted time-series replications.. *Safety Science*, 32, 1–18.

Lind,S., & Rahnasto,J.K. (2008). Utilization of external accident information in companies' safety promotion- Case : Finnish metal and transportation industry. *Safety Science*, 46, 802-814.

Lu,C.S., & Shang,K.C.(2005). An empirical investigation of safety climate in container terminal operators. *Journal of Safety Research*, 36, 297 – 308.

Lu,C.S.,&Yang,C.S.(2011). Safety climate and safety behaviour in the passenger ferry context. *Accident Analysis and Prevention*, 43, 329 – 341.

Luria,G.,&Yagil, D.(2010). Safety perception referents of permanent and temporary employees: Safety climate boundaries in the industrial workplace. *Accident Analysis and Prevention*, 42, 1423-1430.

Luria,G., & Morag, I.(2012). Safety management by walking around (SMBWA): A safety intervention program based on both peer and manager participation. *Accident*

Analysis and Prevention, 45, 248-257.

Luria,G., Zohar,D.,& Erev,I.(2008). The effect of workers' visibility on effectiveness of intervention programs : Supervisory-based safety interventions. *Journal of Safety Research,* 39, 273-280.

Malaysia (1994). *Occupational Safety & Health Act 1994.* Act 512.

Ma,Q., & Yuan,J.(2009). Exploratory study on safety climate in Chinese manufacturing enterprises. *Safety Science*, 47, 1–18.1043-1046.

McGonagle,A.K.,& Kath,L.M.(2010). Work safety tension, perceived risk and worker injuries: A meso-mediational model. *Journal of Safety Research*, 41, 475-479.

McLain,D.L.,& Jarrell, K.A.(2007). The perceived compatibility of safety and production expectations in hazardous occupations. *Journal of Safety Research*, 38,299 – 309.

Mitropoulos,P.T., & Cupido,G. (2009).The role of production and teamwork practices in construction safety: A cognitive model and an empirical case study. *Journal of Safety Research*, 40, 265 – 275.

Mullen,J. (2004).Investigating factors that influence individual safety behaviour at work. . *Journal of Safety Research*, 35, 275 – 285.

Muniz, B.F., Montes-Peon, J.M.,& Vazques-Ordas, C, J.(2012).Safety climate in OHSAS 18001-certified organisations : Antecedents and consequences of safety behaviour. *Accident Analysis and Prevention*, 45, 745 – 758.

Neal,A.,Griffin,M.A.,& Hart,P.M.(2000). The impact of organizational climate on safety climate and individual behaviour. *Safety Science*, 34, 99-109.

Nohammer,E., Schusterschitz,C.,& Stummer,H.(2010). Determinants of employee participation in workplace health promotion. *International Journal of Workplace Health Management*, 12(3), 97-110.

NST (2012). Occupational accidents by sector for 2008 to 2011. Retrieved March 20, 2012 from Straits Times on 12th March 2012.

Parboteeah,K.P.,& Kapp,E.A.(2008). Ethical climates and workplace safety behaviours: An empirical investigation. *Journal of Business Ethics*, 80, 515-529.

PTI (2011). Malaysia to recruit 45,000 foreign workers, mostly from India. Retrieved April 2nd, 2012 from PTI.

Seo, D.C. (2005). An explicative model of unsafe work behaviour. *Safety Science*, 43, 187-211.

Shang K.C.,& Lu,C.S.(2009). Effects of safety climate on perceptions of safety performance in container terminal operations. *Transport Reviews,* 29(1), 1-19.

Smith,G., 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. *Accident Analysis and Prevention,* 38, 556-562.

Starren,A., Hornikx,J., & Luijters,K. (2012). Occupational safety in multicultural teams and organizations: A research agenda. *Safety Science* , article in press.

Turner,N.,Stride,C.B., Carter,A.J., McCaughey,D., & Carroll,A.E.(2012). Job demands-control-support model and employee safety performance. *Accident Analysis and Prevention,* 45, 811-817.

Vinodkumar,M.N., & Bhasi, M.(2010). Safety management practices and safety behaviour : assessing the mediating role of safety knowledge and motivation. *Accident Analysis and Prevention,* 45, 2082-2093.

Walker, G.W.(2010). A safety counterculture challenge to a "safety climate". *Safety Science, 4*8, 331-341.

Weigand,D.M.(2007). Exploring the role of emotional intelligence in behaviour-based safety coaching. *Journal of Safety Research,* 38, 391-398.

Williams, J.H., & Geller, E.S.(2000). Behavior- based safety intervention for occupational safety : Critical impact of social comparison feedback. *Journal of Safety Research,* 31, 135-142.

Wirth, O., & Sigurdsson,S.O. (2008). When workplace safety depends on behavioral change : Topics for behavioural safety research. *Journal of Safety Research,* 39, 589-598.

Wu,T.S., Chen,C.H., & Li, C.C. (2008). A correlation among safety leadership, safety climate and safety performance. *Journal of Loss Prevention in the Process Industries,* 21, 307-318.

Zohar, D.(2008). Safety climate and beyond: A multi-level multi climate framework. *Safety Science ,* 46, 376–387.

Zohar, D.(2010). Thirty years of safety climate research: Reflections and future directions. *Accident Analysis and Prevention ,* 42, 1517–1522.

Zhou,Q., Fang, D., & Wang,X.(2008). A method to identify strategies for the improvement of human safety behavior by considering safety climate and personal experience. *Safety Science ,* 46, 1406–1419.