



## ENHANCED PROACTIVE PLANNING APPROACH: A CRUCIAL TO AN IMPROVED WORKERS' SAFETY IN WESTERN NIGERIA SMALL SCALE INDUSTRY

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### Research article

**Abstract:** This study evaluated managements' proactive planning approach (PPA) to enhance safety among workers in South-western Nigeria small scale industry (SSI). The main objective was to rate the managements' efforts at eliminating risk among their employees. By worker participatory and psychological survey approach, three tools were used; workplace observation (visual), management safety culture (questionnaire) and managers interviews (oral). The survey included 200 workers, 120 supervisors and 80 managers, in 82 SSI. Four steps to a safety proactive action plans (PAP), (looking for clues, prioritization of identified potential hazard, making improvements to eliminate the risk and follow up), were rated by employees on a scale from 0 to 5. Paired t-test was used to appraise the significant difference between the managers' mean scores rated by the supervisors and other workers. 77.1% of workers and 64.2% supervisors rated their managers as either "not done at all" or "poorly done". Workers' scores for managers PPA had statistically significantly lower ratings (mean = 1.09, SEM = 0.22) compared to that of the supervisors rating (mean = 1.55, SEM = 0.32), with  $t(14) = -1.185$ ,  $p = 0.784$ . There is a closed poor performance perception gaps, of managers' PPA, of the two groups of employees. It can be concluded that safety is not emphasized, by managers of SSI, as overriding priority and this may have contributed to high reported injuries among their workforce. Courses to enhance managements' understanding for inclusion of safety among the leading priorities becomes necessary. This will reduce work-related risks and promotes occupational safety and health among the group of workers.

**Keywords:** Management, proactive, safety, program, workers, industry.

## Introduction

Safety in industry describes the protection of workers from the dangers of industrial accidents. Safety is freedom from the occurrence of risk, injury or loss (Akpan, 2011). Accident, in the other hand, is an unexpected event which occurs suddenly and may lead to human injury, loss of production hours, disease, permanent disability or death (Burns, 2006). Accidents most often occur as a result of unsafe conditions at work and human factor is the contributing cause in most situations (Adebiyi et al, 2007). Different forms of accidents were reported among workers in almost all types of industries.

However, accidents in the small scale industries (SSI) is more common (Ezenwa, 2001) because materials movement in SSI are mostly handled manually with most tasks requiring improper movement/postures and physical activity. (Adeyemi et al., 2016a)

Small scale industry can be referred to as a manufacturing processing, or servicing industry involved in a factory of production type of operation, employing up to 50 full-time workers (Ayozie, 2013). SSI was described as the main vehicle for accelerating economic activity, engine of economic growth and promotion of equitable development. The employment potential of SSI is at low capital cost but with higher labour intensity than that of the

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large enterprises (Butt, 2005; Bilal, and Bhat, 2013). In concrete terms, the SSI constitutes a greater percentage of all registered companies in Nigeria (Ayozie, 2013). However hazards among SSI workers in the developing countries such as Nigeria were highly reported (Ezenwa, 2001; Ogechukwu and Kosi, 2014) and many authors highlighted lack of training, low use of personal protective equipment, socio demographic, socio economic, personal work behaviour and the poor working environment (Adeyemi, 2016b; Waju and Yohannes, 2015; Rongo et al., 2004) among the leading causes.

Accidents, in workplaces usually arise from lapses of the responsibility of management in an organisation to establish strong policies and procedures that leads to safety (Soumen, 2011). It is widely accepted that if hazards are to be effectively controlled in any workplace, there needs to be effective management processes in place (Alison, 2002). One of the methods to enhance such control is by taking a proactive problem solving approach (Ralph and Shoji, 2011). Managers and supervisors adopt workplace physical inspections regularly using observation, checklists and discuss with workers to identify potential hazards. However, lack of management decisions in line with this approach can lead to: a reduced supervision for safety practices; work scheduling and rosters which failed to take account of the problems of safety; inadequate resources allocation to training; placing people in positions for which they had insufficient experience (HSE, 1997; Western Allied Mechanical, 2015).

Being proactive is to find the challenges first by looking around the workplace rather than waiting for problems to occur. The process involves workers, supervisors, and managers observing jobs, communicating the hazards, making decisions on effective options, and then taking action. Four steps to an effective proactive action plans were reported. These include; looking for potential hazards clues, assessment and prioritization of identified hazards, make improvements to reduce or eliminate the identified risk and follow up to see if the new steps introduced are being effective (Brock University, 2011). This study however evaluated the level of forward-looking approach of SSI administrators in Southwest Nigeria to potential work related hazards at improving the safety of employees. The objectives are to; assess managements' level of understanding of preventive safety measure, rate the proactive performance of managers and supervisors at ensuring safety of their workers and, measure the placement of safety among leading priorities of the managements.

## Materials and Methods

### *Study domain and Subjects Selection*

Worker participatory and psychological approaches were used in this study that focused specifically on how workers feel and/or perceive about managements' style of handling safety, and on their supervisors' attitudes regarding manner of handling safety implementation. In total, the study included 400 subjects (200 factory workers (150 males and 50 females), 120 supervisors (95 males and 25 females) and 80 managers (75 males and 5 females)) from 82 SSI within Lagos and Abeokuta, the South Western Nigeria. The various trade group accessed included; 6 bottle making factory (BMF); 12 water factories (WF); 13 welding and/or metal cutting workshops (WMC); 7 machine shops (MS); 8 feed mill factory (FMF); 11 wood working workshops (WWW); 13 printing press shop (PPS) and; 12 sand crete block making factories (SCBI). All subjects have spent not less than two (2) years on their current job and all SSI were not less than 2 years in operation.

### *Safety Proactive Approach Assessment Tools*

Three tools were used for assessing the proactive attitudes of managers and the supervisors regarding ensuring health and safety of their workforce. The tool measured whether the existing culture emphasizes safety as one of the overriding priority or not. The three (3) parts to the assessment process are; workplace observation by visual assessment, supervisors' level of ergonomics method of lifting knowledge and safety culture survey by questionnaires and Managers interviews by oral.

### *Workplace observation*

Observation of safety culture performance indicators in the manual handling tasks, work methods and workplace were carried out. The trained personnel (assessors) moved round the workplace to conduct visual observation of key indicators under each of the key safety culture elements, which included; workplace layout and cleanliness, Personal Protective Equipment (PPE) usage, environmental conditions, condition of plant/equipment, safety information displayed, ergonomics method of lifting among others.

*Safety proactive culture survey  
 with employees and employers*

The survey, using questionnaire, was designed to assess each of the key safety proactive culture elements in the form of statements which captured the important aspects of the element, including efforts at; 1) identifying potential hazard clues, 2) prioritizing the severity of identified problems, 3) making improvement to eradicating the identified problem and, 4) follow up to ensure safety measure program is followed. Workers and supervisors rated these statements on a scale from 0 (not done), 1 (poorly done), 3 (done acceptably) and to 5 (done exceptionally). The survey was anonymous and also had several open-ended questions to allow employees to record their own views and concerns about safety related issues affecting them. Employers were also evaluated on the same safety proactive culture elements using oral interview. This was to measure key elements of management commitment and involvement to preventive safety. The responses collected were used to supplement and verify the workplace observation and the questionnaire results.

**Statistical Analysis**

A paired t-test on SPSS version 20 package was used to test the significant difference between the mean scores rated by supervisors and that of workers for PPA put in place by managers. A paired t-test compares two different sets of variables and test the null hypothesis that the difference between two related means is 0 (KSU, 2016).

**Results**

**Description of Subjects' Responses and Questionnaire Return Rate**

One hundred and eighty five (92.5%) of the total two hundred (200) workers, 115 (95.8%) of 120 supervisors and 75 (93.8%) of 80 managers who participated in the study from 82 SSI completed the questionnaires and interview. All subjects have spent not less than two (2) years on their current job. The demographics of the respondents are presented in Table 1.

Tab. 1 Statistic of the demographic information of respondent in 82 small scale industries

| Descriptions   | Age        | Years of Working Experience |
|----------------|------------|-----------------------------|
| Mean           | 32 (40)*   | 3.5 (3.0)*(6.5)**           |
| Mode           | 29 (38)*   | 4.0 (2.5)*(5.0)**           |
| Std. Deviation | 5.2 (2.3)* | 0.63 (1.1)*(3.2)**          |

Source: Fieldwork, ( )\*= supervisors, ( )\*\* = managers.

**Assessment of the Supervisors' degree of knowledge about ergonomics methods manual lifting**

From Figure 1, the majority of supervisors (58%) interviewed had no knowledge of ergonomics as it applies to lifting objects/ materials rightly in the work place. 38% of them however had some little knowledge but not enough to instruct their workers while 4% were rated high and may rightly inform their subjects on proper methods of lifting.

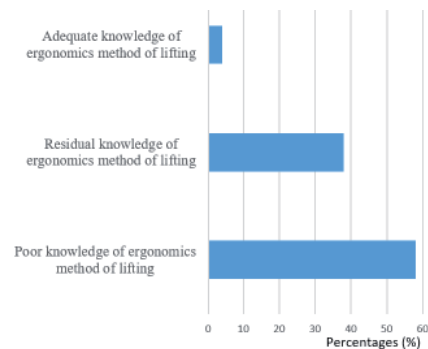


Fig. 1 Supervisors' measured degree of knowledge about ergonomics methods manual lifting

**Workers and/or Supervisors responses**

**Managements' proactive action plans ratings**



Fig. 2 Workers' and Supervisors' ratings for the level of proactive action plans put in place by administrators

Figure 2 described the average ratings of SSI workers and their supervisors regarding their opinions about administrators' attitudes to safety proactive planning approach. 43% of all supervisors who participated in the study poorly rated their administrators while about 40% of all workers allocated zero mark (not done at all). 8.8% of all the supervisors and 12.3% of all the workers rated their employers very high (done exceptionally) and commended the efforts put in place at enhancing safety in manual handlings and generally.

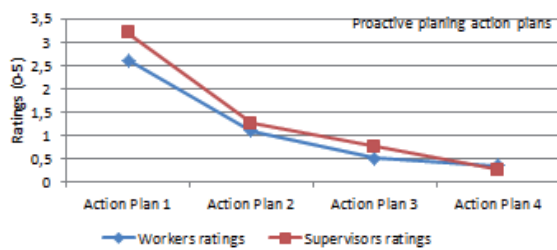


Fig. 3 The average scores for each of the proactive action plans as rated by factory workers and their supervisors

Figure 3 described the average scores for each of the proactive action plans as rated by workers and their supervisors. Out of the total 5 marks, action plan 1 was averagely rated 2.6 and 3.2 respectively, indicating “done acceptably” and/or showing level of importance placed on identifying potential hazards clues around the workplace. The mark allocated by the two groups continued to reduce from action plan 1 (2.6, 3.2) to action plan 2 (1.1, 1.25), action plan 3 (0.5, 0.75) and action plan 4 (0.35, 0.25). These decline ratings can be interpreted as “done acceptably”, “done poorly” and “not done” for action plans 2, 3 and 4 respectively.

Table 2 showed workers' ratings for injuries preventing habits of their supervisors by the various trade sectors of the studied SSI. 44% and 48% of

the total workers in BMI and WF respectively rated the hazard preventive program /habits of their supervisors as “done acceptably”. These was followed by PPW (16%), MS (14%) and FMF (12%) to mention few. On the average, majority of the workers (40.8%) in all the sectors stated that their supervisors did almost nothing to ease the difficulties and hazards of the job. 34.3% (14.07) of the total workers rated their supervisors as “done poorly”, 19.6% (16.70) assigned “done acceptably” while 5.4% (3.5) allocated “done acceptably”

### Ratings of managements' perceived priorities



Fig. 4 Managements leading priorities as perceived and rated by workers and supervisors

Figure 4 describes the order of managements' priorities as felt by the group of workers and supervisors. ‘Production rate’ is one element rated very high (38% and 37% respectively) by both the two group of employees. This was followed by the ‘quality of product’ (32% and 41%) and ‘volume of sales’ (26% and 36%). Majority of the two groups of employees believed that safety is among the least of item valued among other priorities hence only 19% of the supervisors and 12% of the workers mentioned that safety formed part of their own managements' first priority.

Tab. 2 Supervisors' level of performance, as rated by worker, for their injury preventive culture

|                                    | Not Done [%] | Done Poorly [%] | Done Acceptably [%] | Done Exceptionally [%] |
|------------------------------------|--------------|-----------------|---------------------|------------------------|
| Bottle making industry (BMI)       | 20.0         | 28.0            | 44.0                | 8                      |
| Water Factories (WF)               | 12.0         | 29.0            | 48.0                | 11                     |
| Welding and/or Metal cutting (WMC) | 66.0         | 21.0            | 9.0                 | 4                      |
| Machine shops (MS)                 | 52.0         | 31.0            | 14.0                | 3                      |
| Feed Mill Factory (FMF)            | 12.0         | 67.0            | 12.0                | 9                      |
| Wood Working Workshops (WWW)       | 67.0         | 27.0            | 4.0                 | 2                      |
| Printing Press Workshop (PPW)      | 42.0         | 37.0            | 16.0                | 5                      |
| Sand Crete Block Industry (SCBI)   | 55.0         | 34.0            | 10.0                | 1                      |
| <b>Mean</b>                        | <b>40.8</b>  | <b>34.3</b>     | <b>19.6</b>         | <b>5.4</b>             |
| <b>Standard Deviation</b>          | <b>23.12</b> | <b>14.07</b>    | <b>16.70</b>        | <b>3.58</b>            |

### **Statistic test**

Result of the paired t-test which appraised whether the score means of the managements' proactive action plans rated low (done poorly or not done) by supervisors are significantly not different from mean of the scores rated by workers, found that workers' reports had statistically significantly lower ratings scores (mean = 1.09, SEM = 0.22) compared to that of supervisors (mean = 1.55, SEM = 0.32), with  $t(14) = -1.185$ ,  $p = 0.784$ . With "Sig. (2-tailed)" value greater than 0.05, the groups' means are significantly not different. 95% confidence interval for the difference, 0.375 and -1.299 were recorded for upper and lower boundary respectively with standard error difference of 0.390. Hence, the managers safety proactive planning approach rated low by the workers were also confirmed same by their supervisors.

### **Discussion**

Tasks which required movement and physical activity, such as manual material handlings, were widely reported common in small scale industries (Wahyudi et al., 2015; Adeyemi et al., 2013). However taking a proactive, work related problem solving, approach is one major techniques of improving safety in the jobs (HREHS, 2011). This study made efforts at evaluating the level of proactive planning approach adopted by the SSI managers and supervisors on accidents prevention to improve their workforce safety. The study noted low level of attention placed by supervisors and managers on accident prevention. No group of the employees rated their supervisors above 3 marks (3 marks had significant evidence of importance placed to PPA). Generally majority of the workers (40.8%) in all the sectors reported non-availability of PPA program by their supervisor.

Following the same pattern, workers and supervisors' rated the risk prevention program of their managers very low. 43% of all supervisors allocated poor marks for their administrators reporting that there was little efforts in place for hazard preventions. Most of the workers (40%) reported high level of managers' attention on production, profit and quality with less attention on safety. The agreement between the supervisors and workers as regards their poor ratings opinions of their managers was confirmed by the result of the statistical test conducted where the mean of the scores allocated for proactive action plans of managers by supervisors were significantly not different from the mean reported by workers. Among the few supervisors (8.8%) and workers (12.3%) who rated their employers very high (done

exceptionally) action plan 1 was averagely rated to be "acceptably". However the strength of the ratings reduced as the plans increased from stage 1 to 4. This is an evidence that majority of the managers looked out for potential job related hazards clues (action plan 1) but did little or nothing at further assessed and/or prioritized the severity of the identified problem (action plan 2), make improvements on eradicating them (action plan 3) and follow up to ensure the preventive and/or corrective measure(s) introduced are adequately used by the workers (action step 4).

The study revealed a clear drop of 75% and 57.7% of managers' efforts from action plan 1 to carrying out action plan 2 as rated by the supervisors and the workers respectively. At plan 2, assessment of the type and severity of each potential hazard relating to the size and weight of the handled load, motions involved, physical abilities of the worker, education and training needed, among others were expected to be carried out which could improve the safety of doing the work. As stated by HSE, (1997) effective policies are not simply examples of management paying lip service to improved health and safety performance but a genuine commitment to action. These responsibilities were probably not considered important by the managers and this necessitated poor handlings of other action plans. Hence the workers repetitively carry out the tasks in the same conditions using the same method without information on how to eliminate the potential hazards connected with the tasks as noted by their managers.

According to Zimolong and Elke (2012), among the key aspects of an effective proactive safety culture, management commitment is very important. They are responsible for providing a safe work environment for their employees and produces higher levels of motivation and concern for health and safety. This responsibility appeared not adequately handled by the SSI managers and one of the symptoms of the poor performance factors included managements' decisions to put high production, quality and/or profit before safety as reported by the supervisors and workers. reason behind this may be as a result of the poverty level, little or no active government policy to control activities of SSI in terms of enforcement of workplace safety measures and the management strong desire at amassing profit at the detriment of their workforce. This might have formed one of the major reasons why risk for different forms of injuries is persistently elevated among the group of workers as reported by other authors (Eakin, et al., 2010; U.S. Department of Labour, Bureau of Labour Statistics, 2011). However, if high standards of health and safety are to be achieved and maintained among workers in the small scale industry, the development

of proactive safety attitudes is important by the management teams and the workers. Manager and supervisors should handle health and safety as responsibility equal in importance to production, quality and profit. Government and other relevant authority should equally ensure putting in place proper health and safety practices policy for the group of industry, monitoring their activities and enforce implementations.

## Conclusion

This study, evaluated the level of proactive approach of administrators in South-western Nigeria small scale industry to work related hazards at

improving the safety of manual material handlers. It can be concluded from the study that proactive approach measure of the managers were rated either “not done at all” or “poorly done” by 77.1% of workers and 64.2% supervisors with a closed perception gaps between the two groups of employees in respect to their managers’ weak strengths of health and safety priority performance. Hence, courses to assist the managements’ group, most especially, on the short and long time merits of placing priority on safety before production, quality and/or profit becomes very necessary and urgent. This will reduce the widely reported risks for different forms of injuries and enhances the occupational safety and health among small scale industry workers.

## References

- ADEBIYI, K.A.; CHARLES-OWABA, E.O.; WAHEED, M.A. (2007).: "Safety performance evaluation models: a review", *Disaster Prevention and Management*, Vol. 16 (2), pp 178-187.
- ADEYEMI, H.O.; OLORUNFEMI, B.J.; ADEKUNLE, A.A. (2016).: Implementing Ergonomics Techniques of Lifting Among Truck Loading Workers In Nigeria Block Making Industry. *Proceedings of the 2016 International Conference on SET: A driving force for sustainable development tagged COLENG 2016*, Federal University of Agriculture, Abeokuta, March 7-11, 2016.
- ADEYEMI, H.O.; AKINYEMI, O.O.; MUSA I.A.; IBIKUNLE, B.Q. (2016).: Assessment of Work-Space and Work-Method Designs in Nigeria Automobile Service and Repair Industry. *Nigerian Journal of Technology*, Vol. 35(2), pp 321 - 328.
- ADEYEMI, H.O.; ADEJUYIGBE, S.B.; AKANBI, O.G.; ISMAILA, S.O.; ADEKOYA, A.F. (2013).: Manual Lifting Task Methods and Low Back Pain among Construction Workers in the Southwestern Nigeria. *Global Journal of Researches in Industrial Engineering*, Vol. 13(3), pp 27-34.
- AKPAN, E.I. (2011).: Effective Safety and Health Management Policy for Improved Performance of Organizations in Africa. *International Journal of Business and Management*, Vol. 6(3) pp 159-165.
- ALISON, G.V. (2002).: Organizational safety: Which management practices are most effective in reducing employee injury rates? *Journal of Safety Research* 33 (2002) pp 259-276.
- ANTONSEN, S., (2011).: *Safety culture: theory, method and improvement*, Ashgate Pub Co, UK, 2009.
- AYOZIE, D.O.; JACOB, S.O.; UMUKORO, F.; AYOZIE, V.U. (2013).: Small and Medium Scale Enterprises (SMES) in Nigeria the Marketing Interface. *Global Journal of Management and Business Research Marketing* Vol. 13(9), pp 1-12.
- BILAL, A.D.; BHAT, F.A. (2013).: Small scale industries in Jammu and Kashmir (J & K): Growth, performance and challenges. *International NGO Journal*. Vol. 8(2), pp 38-43.
- BURNS, C.M. (2006).: Towards Proactive Monitoring in the Petrochemical Industry. *Journal of Safety Science* Vol. 44, pp 27-36.
- Brock University (2011).: *Guidelines for Manual Material Handling*. Available from [https://brocku.ca/webfm\\_send/19254](https://brocku.ca/webfm_send/19254). Accessed March 4, 2016.
- BUTT, A.K. (2005).: *Strategizing Industrial Development in Jammu and Kashmir*. New Century Publications, New Delhi.
- EZENWA, A.O. (2001).: A study of fatal injuries in Nigerian factories. *Occup. Med.* Vol. 51(8), pp 485-489.
- GULDENMUND, F. (2010).: *Understanding and exploring safety culture*, Thesis (PhD), Delft University, The Netherlands.
- Health and Safety Executive (HSE) (1997).: *Successful health and safety management. Second edition*, Available from [www.hsebooks.co.uk](http://www.hsebooks.co.uk). Accessed March 4, 2016.

- International Labour Organization (2014).: *Triennial World Congress on Safety and health*. Available from <http://www.ilo.org>. Accessed May 2, 2016.
- International Labour Organization (ILO) (2011).: *Global Trends and Challenges on Occupational Safety and Health, ILO introductory Report to the XIX World Congress on Safety and Health at Work*. Istanbul, Turkey, 2011.
- Kent State University (KSU) (2016).: "SPSS Paired Sample Test". Available from <http://libguides.library.kent.edu/SPSS>. Accessed February 9, 2016.
- RALPH, O.; SHOJI, N. (2011).: AC 2011-933: *Creativity and workplace safety: proactive safety practices are vital in preventing employee injuries*. American Society for Engineering Education. Available from [www.asee.org/public/conferences/1/papers/933](http://www.asee.org/public/conferences/1/papers/933). Accessed May 3, 2016.
- SOUMEN, G. (2011).: Human error Vs. Work place Management in modern organizations. *International Journal of Research in Management and Technology (IJRMT)*, Vol. 1, No.1, pp 13-17.
- WAHYUDI, M.A.; WIKE, A.P.D.; RIZKY, L.R.S. (2015).: Work Posture Analysis of Manual Handling Using OWAS Method. *Ariculture and Agricultural Science Procedia*, Vol. 3 pp 195-199.
- Western Allied Mechanical. (2015).: *Health and Safety Manual- Injury and Illness Prevention Program*. Available from [www.westernallied.com/safety/downloadpublic](http://www.westernallied.com/safety/downloadpublic).
- ZIMOLONG, B.; ELKE, G. (2012).: *Occupational Health and Safety Management*. In G. Salvendy (Ed.), *Handbook of Human Factors and Ergonomics*. New York: Wiley.