Problem analysis on the work cycle of occupational safety and health management system in manufacturing industry

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Abstract. The occurrence of work accidents affecting losses for the industry and workers. Prevention of negative impacts can be controlled through the occupational safety and health management system quality and integrated. This research aims to find the root of the problem in the work cycle occupational safety and health management system using problem tree analysis. This management cycle refers to the OHSAS 18001:2007 standard. This type of research is descriptive qualitative. Based on the results of data analysis, it was found the problems in the occupational safety and health management system at PT. Mega Andalas Kalasan includes the cycle of occupational safety and health policy, planning, implementation and operation, inspection and action to improve occupational safety and health, review of the occupational safety and health management system, and continuous improvement. Problems in each cycle will bring sustainable problems in the next cycle. Findings of problems in the cycle of occupational safety and health policy have an impact on the problems in the initial planning cycle, the weakness of the organization's managerial planning will bring up problems in the implementation and operation cycles, budget constraints in the implementation and operation cycle raises the problem of the lack of real action cycle improvement of safety and health improvement actions work, the absence of formal socialization of audit results to workers in the review and management system of occupational health and safety has an impact on creating barriers to the cycle of continuous improvement.

1. Introduction

Figures workplace accidents in Indonesia are among the highest in ASEAN. Data PT. Jamsostek show until the end of 2010 recorded 0.7% had an accident on the 8.9 million registered workers. Furthermore in 2011 the number of workplace accidents is 48.511 cases in which the biggest cause is the engine, gear transport aircraft and handwork. Impact seen from the lack of control control based on a survey of workplace accidents Executive Director of the Department of Statistics BI Hendy Sulistyowati namely contraction Manufacturing Growth Index (Prompt Manufacturing Index / PMI) in quarter one of 2016 amounted to 46.69% from the fourth quarter of 2015 amounted to 48.23% , This decrease is due to two main factors such as contraction in the total volume of orders and the number of workers.

Zhou et al [1] mentions five factors causing accidents include: (1) management of occupational safety and health; (2) the source of the basic causes; (3) symptoms; (4) contact and (5) loss. More [2] the causes of accidents in the industry, namely the demographic and organizational factors, conditions
and work equipment, conditions and unsafe acts, time and place, the health safety and environment training and control measures. Where these factors are part of the cycle occupational safety and health management system. This is in line with the findings of the study [3] that the rate of fatal accidents in the construction industry reduced significantly by implementing occupational safety and health management system. However, some primary and secondary data in the field is just still much evidence of contrast, occupational accidents still occur in many workplaces administratively has passed (comply) audit occupational safety and health management system.

The case of the application of occupational safety and health management system in the garage in the study [4] found in the lack of planning occupational safety and health, implementation, policy, culture occupational safety and health, performance evaluation occupational safety and health needs to be done simultaneously and factors reviewing and improving the performance occupational safety and health needs to be controlled. Furthermore, the findings of the issues [5] PT. kerimas witikko bitung there are discrepancies in the implementation of occupational safety and health management systems. There are five indicators of organizational structure, planning, implementation, procedures, and processes. The indicators included in either category is the planning, implementation and process, while two indicators that fall into the category of less good is the organizational structure and procedures. Likewise, [6] the results of research at PT. Mega Andalan Kalasan that the implementation of the occupational safety and health was not carried out properly, especially from the caretaker committee of occupational safety and Health. The medical examination is only done once a year for workers who work with a high degree of risk in the production unit. Further based on the results of preliminary observations dated August 11, 2017 data showed workplace accidents each year in the PT. Mega Andalan Kalasan experiencing decreased the look of 2015 amounted to 65, 2016 amounted to 52, and in 2017 amounted to 16. However, if examined from the data of occupational accidents, accidents still happen repetition of the same kind each year. By keeping the number of accidents and the repetition of such accidents indicate there are problems in the system of occupational safety and health management at PT. Mega Andalan Kalasan.

In substance occupational health and safety assessment series 18001: 2007 is explained that the work cycle occupational safety and health management system includes the establishment of policies occupational safety and health, planning, implementation and operation, checking and corrective action occupational safety and health, a review of occupational safety and health management system and repairs continuous and integrated in order to create a workplace that is safe, effective and productive [7]. In order to find the problems in each cycle, need to be thoroughly investigated the cause caused the problem. Problem tree analysis, or so-called method is an approach that tree issues detailing a problem into components of the main causes of into order to create a work plan [8]. More [9] issues are used to identify and analyze problems by mapping the major cause to its roots and examined result / impact, which means showing the actual state or unexpected situations. On the other hand [10] the problem tree analysis can also identify and visualize a problem and the relationship between the causes of the problem and its effects. It is thus important to identify the problems in the work cycle Occupational safety and health management system in PT. Mega Andalan Kalasan get to the root of the problem and are offset by mapping the impact through the problem tree analysis method to obtain accurate data and analysis.

2. Method

This study used a qualitative descriptive approach in order to gain in-depth and comprehensive study on the issue of the occupational safety and health management system in the industry. The research was conducted at PT. Mega Andalan Kalasan, one of the manufacturing industry in Yogyakarta, Indonesia. The type of data in this study is qualitative data obtained from informants selected by purposive sampling and snowball sampling. Among experts occupational safety and health, chairman of the committee of occupational safety and health, secretary environment health safety, supervisors,
and union. Data collection techniques are: (1) in-depth interviews; (2) the participant observation; (3) study the documentation; (4) and a questionnaire. Data analysis techniques using the model of Miles and Huberman [11] including data collection, data reduction, data presentation, conclusion and verification.

![Figure 1. Components in Data Analysis](image)

3. Result and Discussion

3.1. Interview Results

Interviews with the subject of a more detailed study can be seen in Table 1 below.

| Number | Interview Date | Resource | Findings |
|--------|----------------|----------|----------|
| 1.     | July 25, 2017  | Chairman of the Committee of Occupational Safety and Health | (1) Standard reference in the management of the occupational safety and health management system in PT. Mega Andalan Kalasan using the occupational health and safety assessment series 18001: 2007 (2) Standards of quality assurance based on ISO 9001: 2008 (3) Environmental management system refers ISO 14001: 2004 (4) The structure of organization occupational safety and health management system in concrete simply committee of occupational Safety and Health where the structure is not visible expert First Aid committee and the analysis of the risk / hazard that can handle and prevent occurrence of accident on work (5) The internal audit carried out every year is twice by the management committee of occupational safety and health |
| 2.     | July 25, 2017  | EHS Officer | (1) There is still work accidents each year despite the decreased number of accidents, as seen from the year 2015 amounted to 65, 2016 amounted to 52, and 2017 totaling 16 (2) Officers there has been no analysis of causes of accidents (3) There are no workplace hazard analysis for each unit of workplace (4) Industrial Parties provide health insurance to workers and are responsible to pay for treatment until cured but there is no First Aid officer in each unit. If there is a work accident immediately rushed to the nearest hospital by |
3.暑假 2017 | 工人在焊接和彩绘部门 | (1) 行业的稳固性在于实施安全法规和健康，而低水平的工人意识在使用个人防护装备上，提供个人防护装备如手套和口罩等，处理工作场所事故不灵活，经常延误库存，头目的人力管理，频繁延迟的供应，行业中负责支付员工工作中的治疗，总有一年安全和健康培训的员工。

(2) 没有具体报告的管理系统的安全和健康，但需要研究作为材料管理系统的改进安全和健康，但常规的内部审计已经进行了。

### 3.2. 观察

基于在 PT. Mega Andalan Kalasan 生产线于 2017 年 8 月 3 日进行的观察，PT. Mega Andalan Kalasan 已被协调得当：

1. 技术人员总是待命并根据工作要求工作；
2. 管理和物资的摆放以及常规的设备配备有标识；
3. 照明和温度的设施以及风扇灯光对应数量；
4. 环境的清洁和整洁性从工人的行为中看得出来，总是会保持工作区域的清洁和整理；
5. 定期的医疗检查，每年一次，如医疗报告所示；
6. 劳工和各级管理者的合作进行指导和监督；
7. 有完整的安全和健康设施，以及可看见的标识，如灭火器，消防栓，火警等。

然而，也有一些发现与之相违背的：

1. 噪音水平不佳，特别是在车工部门，但未使用耳塞；
2. 没有提供给员工的建议箱；
3. 个人防护装备提供了良好的头盔，耳塞，手套，口罩等，但仍有工人不戴手套，头盔，护目镜和靴子在工作时；
4. 职业安全和健康设施提供，但看起来并不完整，只有纱布，碘酒，绷带和酒精。
3.3. **Questionnaire Results**
Data from the questionnaires has been reduced by the method of problem tree analysis, can be seen further in Table 2 below.
Table 2. Results of the identification problem Occupational safety and health management system with problem tree analysis method

| Number | Identify the problem | Findings |
|--------|----------------------|----------|
| 1.     | Occupational Safety and Health Policy | Cause: (1) Commitment of management and performance occupational safety and health less consistent, as indicated by the lack of attitude / strict sanctions against negligent workers wear protective equipment (2) Occupational safety and health policy has been communicated to the workers but awareness of the obligations of occupational safety and health less (3) Less input from workers because the absence of a suggestion box as a conduit criticism and suggestions from workers to reporting the results of the evaluation / field conditions (4) Preliminary review conditions of occupational safety and health less: provision of facilities for personal protective equipment for masks and gloves one week only twice and not provided eyeglasses; Keith their work accident risk control through the analysis of causation and prevention of occupational accidents handled by a competent human resources; provision of drug / first aid box contents is often too late. Result: (1) The proliferation of undisciplined work culture (2) Occurred repetition of the same accident (3) Occurred dual role by supervisors that is to guide and coordinate the work process in accordance unit of work and take care of the cost of accommodation / treatment of workers injured at work |
| 2.     | Planning             | Cause: (1) Management lacking organization, socialization legislation / regulations occupational safety and health to-date has not been communicated to workers (2) Constrained by the administration of the financial management of the occupational safety and health: claim funds referral treatment of workers to the hospital long descent (4) Planning is the occupational safety and health only involves the committee development occupational safety and health, yet their analysis of accidents / only the work accidents (5) Plan of occupational safety and health is less aligned with the national legislation (6) a risk assessment has not been through procedure hazard identification. Result: (1) the absence of sanctions which according to the rules expressly legislation for employees who violate the rules of occupational safety and health (2) Less full contents of the box occupational safety and health in accordance legislation (3) Figures have not reached zero accident accident |
| 3.     | Implementation and Operation | Cause: (1) Budget has not memadahi, fulfilling tough safety equipment / has not been realized as a whole, such as the availability of glasses has been no cause accidents "eye contact with gram" repeated annually, the engine in unit maintenance there are worn not been replaced but only manoeuvred so that production remains the (2) lack of availability of human resources responsible for matters of Safety and working in the field of health, especially that dealing with emergencies such as accidents work (3) Not yet reporting and documentation of the work habits is not correct, the recommended discipline occupational safety and health has not been enforced in all |
work units, orderly if there is supervision / imaging esp usnya in unit maintenance is warning / command to wear a helmet if there is a guest (4) management infrastructure is less well-run, regular maintenance / repair / replacement work equipment should be observed to control accidents, such as drilling machines in the export oriented product unit have been unsuitable result thumb injury as the drill; The supply chain management unit goods storage rack unsuitable cause head injury. Air pollution levels in HE welding and painting units not managed optimally. (5) Workers' awareness of the importance of working according to standard operating procedures and occupational safety and health as well as concern for the safety co-workers need to be improved, because in unit maintenance work accident occurred because the third party / other workers. (6) Participation of workers less involved for investigation of incidents of accidents and hazards identification and the determination of control accidents.

Result: (1) availability of protective equipment has not been evenly distributed to each unit of production (2) occurred accidents that recur (3) Working tools / work facility into causes of accidents (4) occurred workplace accidents because running a work instruction that is less right

4. Inspection and corrective action Occupational Safety and Health

Cause: (1) Audit occupational safety and health held twice each year, but the results have not been used for corrective actions occupational safety and health in good repair facility shortage occupational safety and health, maintenance tools, as well as the investigation of incidents work accident. (2) Examination of the performance of the occupational safety and health in each work unit was uneven due to lack of human resources, the organization has not proactively monitor compliance with occupational safety and health management system program and operational criteria are further documented in the occupational safety and health management system.

Result: (1) Facilities occupational safety and health has not fulfilled the quality and quantity (2) There has been no in-depth study analysis of workplace accidents (3) There has been no improvement of the organizational structure occupational safety and health management system (4) Planning occupational safety and health did not cover all the needs in each work unit (5) Commitment the organization has not consistently related to compliance with the legislation occupational safety and health.

5. Review of the Occupational Safety and Health Management System

Cause: (1) The results of a review / audit occupational safety and health management system has not been formally communicated to workers (2) Repairs and improved performance occupational safety and health management system is not optimum, changes in the organizational structure but the mapping task is not yet clear, the contribution of the worker role for performance improvement occupational safety and health management system is not visible because we are not included in the forum planning occupational safety and health, accident data only recapitulated of pending work for prevention strategies (3) The management review have not considered input / complaints in each unit.

Result: (1) There has been no improvement of the board and employees in relation to the working attitude which deviates from the
Based on the study results of the study, they found the problem / misbehavior of occupational health and safety assessment series 18001: 2007. Such irregularities can be identified: (1) the policy occupational safety and health; (2) planning; (3) the implementation and operation; (4) checking and corrective action occupational safety and health; (5) review of occupational safety and health management system; and (6) continuous improvement. Duty cycle occupational safety and health management system will be mutually affect each other's performance, because it is a coherent and integrated. As well as the problem of lacking commitment to the industry occupational safety and health policy, will have an impact on the planning cycle that is defective managerial and administrative organizational structure of financial management. Managerial awareness amongst the general manager to the manager occupational safety and health to develop a occupational safety and health management system effect on the cycle of continuous improvement activities [3].

On the other hand in the planning cycle issues such as the lack of analysis of hazards in the workplace and there is no hazard control officers through the analysis of causes of accidents will impact the repetition of the same accident as the data in Figure 2. Hazard analysis can begin by determining factor of danger in the workplace ranging from distinguished as dangerous (physical condition), harmful (chemical, biological, and physical) and cumbersome (psychophysical) in which the whole of these factors can potentially disease and accidents [12]. Accidents will impact more harmful to workers than companies. Losses incurred such workers financial, physical and psychological consequences far more numerous and longer [13]. Buoyed by the post-crash inspection data psychic by the PT. Mega Andalan Kalasan. While controlling hazards in the workplace can be done through continuous improvement actions in cycle occupational safety and health management system. Recommendations for corrective actions can be done through the goal-setting phase, an approach, establish procedures and conduct continuous evaluation [14].

Problems on the application and the operating cycle as indicated by the lack of human resources field of occupational safety and health will also affect the cycle of checking and corrective action as well as the response / reporting the number of completeness first aid facilities in the work unit. Key to the effectiveness of the implementation of occupational safety and health management systems depends on the type of system used, the senior management commitment and employee participation are effective. Employee engagement can be enhanced through the attitude of senior manager, management commitment, communication between workers and managers, the initiative / commitment to worker participation, knowledge and training baigi workers, providing suggestion boxes and performance evaluation occupational safety and health management system is more engaging employees [15] [16]. Further to the internal audit team can be based on standards and criteria occupational safety and health management system and conducted by members who are skilled to be actualized in the act of continuous improvement so that success in implementing occupational safety and health management system can be achieved, especially in the control of occupational accidents [17]. While the most influential factor in improving the implementation of occupational safety and health management system is the rate of participation, which reflects the significance of management commitment, management commitment, communication between workers and managers, the initiative / commitment to worker participation, knowledge and training baigi workers, providing suggestion boxes and performance evaluation occupational safety and health management system is more engaging employees [15] [16]. Further to the internal audit team can be based on standards and criteria occupational safety and health management system and conducted by members who are skilled to be actualized in the act of continuous improvement so that success in implementing occupational safety and health management system can be achieved, especially in the control of occupational accidents [17]. While the most influential factor in improving the implementation of occupational safety and health management system is the rate of participation, which reflects the significance of management commitment, management commitment, communication between workers and managers, the initiative / commitment to worker participation, knowledge and training baigi workers, providing suggestion boxes and performance evaluation occupational safety and health management system is more engaging employees [15] [16].
safety and health management systems is first aid, rest areas, waste management, toilets, personal protective equipment, labor, and signposts occupational safety and health [18]. Where these factors part of the policy cycle occupational safety and health, planning, implementation and operation.

4. Conclusion

Based on the results and discussion of research, it can be concluded that the problems that occur during each cycle occupational safety and health management system can be mapped to: (1) the policy occupational safety and health needs to scrutiny re-examine their initial conditions occupational safety and health, the policy commitments occupational safety and health and less powerful and less involving input / complaints of workers in policy formulation occupational safety and health; (2) planning is still weak in managerial organization, lack of attention to legislation that is relevant, and the lack of analysis of hazard control; (3) the implementation and operation are constrained in the budget issues occupational safety and health, the management of facilities and infrastructure on each unit of work, lack of awareness of workers on the occupational safety and health and the limited number of human resources in the organizational structure; (4) checking and corrective action issues arise there has been no real action for the improvement of audit results occupational safety and health Management System, the performance inspection occupational safety and health has not been evenly distributed on each unit; (5) review of occupational safety and health management system found the problem has not been lack of socialization audit results occupational safety and health management system formally to the worker; (6) the continued improvement in the phase still administrative / written evaluation.

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