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Aspects of Occupational Safety Practices and Injury Analysis: A Case Study

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Abstract

With continuous sophistication of valued metal extraction methods and processing routes in recent years, occupational health and safety practices of workers are very necessary for improved productivity and financial performance of the mining industry. In the current paper, aspects of occupational safety practices at AngloGold Ashanti Limited, Iduapriem Mine, have been investigated towards ameliorating the safe acts and conditions necessary at the workplace. Three year (2008, 2009 and 2011) records of injuries due to unsafe behaviour and conditions have been extracted from the mine and analysed. The data showed that AngloGold Ashanti Iduapriem mine is relentlessly working towards achieving zero injuries at the workplace. The behaviour-based safety management employed in the process of achieving this goal worked very effectively by mitigating the number of injuries realized in the last quarter of the year. Even though the total number of injuries decreased per year in the mine, the first aid injuries recorded were the highest in each year. Reducing the number of first aid injuries markedly reduced the number of dressing, lost time, and restricted work injuries. Furthermore, there were no fatalities recorded in 2008, 2009 and 2011 records of the mine. Overall, the data provided pragmatic information on the safety management style employed at the mine.

Keywords: Workplace health and safety; Mining injuries; Behaviour-based safety management; Safety practices

Introduction

The mining industry plays very crucial role in the Ghanaian economy. Consequently, both government and industry critically evaluate the field to make sure workers mine safely and are free of injuries and fatalities. Due to the nature of mining processes compared with other major industries (e.g., manufacturing), continual, increasing attention has to be given to safety aspects to ensure a zero-harm operation [1-3].

Generally, safety practices outline measures that are carried out by workers and their management to safeguard life and properties of an establishment. Internationally recognized health and safety standards have been established by several agencies (e.g., Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), and World Health Organization (WHO)] throughout the world to protect the safety, health and welfare of people engaged in work or employment. These standards also protect co-workers, family members, employers, customers, nearby communities, and other members of the public that may be impacted by the workplace environment [4-10].

The three main foci in occupational health and safety are: (a) maintenance and promotion of workers' health and working capacity; (b) improvement of working environment; and (c) development of work organizations and working cultures in a direction which supports health and safety. These areas enhance the mine productivity and promote a positive social climate for smooth operation. It is necessary to pragmatically reflect the working culture in the managerial systems, personnel policy, training policies, and quality management of the workplace. Despite the various safety models employed by management to help manage safety, significant incidents and accidents have been recorded by most industries [7,11-14]. Majority of these are due to the sophistication of process routes, introducing working conditions which were not previously considered.

Injuries are unintentional or intentional damage to the body which may result from acute exposure to thermal, mechanical, electrical, or chemical energy. Injuries can be prevented by changing the environment, individual behavior, products, social norms, legislation, and governmental and institutional policies. In most cases, injuries are the leading cause of death and disability at the workplace [15-17]. Organizations incur both direct and indirect costs from workplace accidents and injuries: direct costs include payments to injured workers and costs of their treatment, and costs of health and accident insurance; indirect costs include lost productivity and overtime charges. The health care system gets stretched, given increased usage and efforts by governments to constrain costs, and the injured worker and their families endure considerable financial and emotional suffering [10]. There is a need to better understand the relationships among occupational safety management style, safety practices, and reflected injury records.

In this paper, therefore, a three year (2008, 2009 and 2011) case study involving injury and occupational safety practices at AngloGold Ashanti Iduapriem mine have been undertaken. This has been linked with the specific safety motivated policies or management styles that have been implemented within those years for improved operation in a safe manner.

Anglogold Ashanti Iduapriem Mine and Safety Practices

AngloGold Ashanti Iduapriem mine may have started with an average safety performance but have creditably improved over the years. Currently, AngloGold Ashanti Iduapriem mine runs safety education talks for its employees and contractors through inductions and safety meetings. The safety policies adopted by the mine were based on moral, economic and legal values. The management has instituted rules and safety policies for all activities within the establishment. Some of these safety policies are alcohol, drug abuse, and Human Immune Virus (HIV) policy.

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According to Jasen and Brent [18], the phrase behaviour-based safety refers to the use of applied behaviour analysis methods to achieve improvement in safety performance. To actually achieve long-term continuous improvement, these methods need to be coupled with significant employee involvement. AngloGold Ashanti adopted this technique for application on a more pragmatic manner to improve its safety practices and deduce ways of fine tuning the technique for future injury elimination on the site. AngloGold Ashanti Iduapriem mine has noted records of injuries due to unsafe behaviours and conditions and fatigue within the investigated years. The majority of mine health and safety authorities around the world agree that the major causes of mine accidents and fatalities are unsafe conditions, poor management, and especially unsafe practices [19].

Poor human behaviour, however, is a known detrimental factor in mine safety. This is evident from the cyclical recurrence of accidents. Some of the unsafe behaviors are short cuts, carelessness, negligence and horse play. Also, some unsafe conditions include slippery floors, unguarded machines and broken glasses. Fatigue which is also one route cause of accident on the mine heightens at the end of production shift where most workers are eager to meet their families at home. This could be referred to as "end of shift rush syndrome". There are many different definitions of fatigue, but generally fatigue is a state of feeling tired, weary, or sleepy that results from prolonged mental and physical work, extended periods of anxiety, exposure to harsh environment, or loss of sleep. It is a work place hazard and can be associated with safety and health of the worker [20].

Different types of injuries, each adversely affecting the productivity of the mine, have been classified into:

- First aid injury, representing an injury to tendons, ligaments, or muscles, which does not result in impairment to the injured person. It is any one-time treatment, and any follow-up visit for the purpose of observation of minor cuts, burns, splinters, or other minor industrial injury, which do not ordinarily require medical care.

- Dressing case injury, representing an occupational injury which results in loss of consciousness or medical treatment other than first aid.

- Lost time injury, representing a work related injury that leads to the loss of significant amount of working time at the mine.

- Restricted work injury, representing an injury that leads to the restriction of the staff in carrying out his/her role. His/her work duty may be changed due to the workplace injury.

- Fatal injury, representing any injury that results in death of an individual. This is highly undesirable and should always be prevented.

Personal Protection Equipment (PPE) is a mandatory requirement to enter AngloGold Ashanti Iduapriem mine. At AngloGold Ashanti Iduapriem mine, different sets of PPE's are required at different sections of the mine. However, some basic PPE's (safety boots and helmet) are required irrespective of the section of the mine. There are also hundreds of safety signage across the mine site giving specific guidance. The mine also identifies the safety issues that occur during all phases of the mine cycle. The company developed a framework within which to manage all safety issues based on Occupational Health and Safety Assessment Series (OHSAS 18001). This OHSAS adopted standard, comprising five elements, is based on the methodology known as Plan-Do-Check-Act (PDCA).

Data Collection

Data on work related injury records, experienced on monthly basis, in 2008, 2009, and 2011 were collected from AngloGold Ashanti Iduapriem mine. The main focus was on first aid injury, dressing case injuries, lost time injuries, restricted work injuries and fatalities. Due to confidentiality agreement, the details regarding the compensation policy cannot be disclosed.

Occupational Safety Performance and Injury Assessment

The work related injury data for 2008, 2009 and 2011 are presented in Figures 1-3 below and analyzed to elucidate the influence of specific safety policies implemented. In Figure 1, the different injury classes recorded for 2008 have been shown. It is evident that first aid injuries were the predominant injury type occurring each month of the year 2008. The highest first aid injuries of four were recorded in the months of November and December. This was followed by: three first aid injuries occurring in February, March, April, May, July and October; three dressing injuries occurring in May and December; and three lost time injuries occurring in July.

Furthermore, two first aid injuries were observed in January, June and September followed by one first aid injury in August. Similarly, two dressing injuries were observed in January, August and October followed by one dressing injury in April and November. One loss time injury was also observed in May, June, August, October and December. The only one restricted work injury in 2008 occurred in October.

It was noted that majority of the injuries in 2008 occurred in the last quarter. This showed that the "end of shift rush syndrome" also reflects in the overall end of production year. Most of the employees in the last quarter worked with less patience and care due to their anxiety for the end of year holidays after a full busy year. This increased their chances of getting hurt before the year ends. To reduce this, the mine introduced new compensation policy that was department based. This policy focused on giving specific bonuses at the end of the year for outstanding injury records. Individuals and departments that highly promote the zero-harm culture of the mine were to be rewarded by management. This followed the behaviour-based safety management as all the other necessary physical safety measures are in place.

The result after the implementation of the policy was realized in 2009 and beyond. Figure 2 shows the work related injuries experienced in the months of 2009. The injury records for 2009 showed that the high number of injuries, observed in the last quarter of 2008, reduced drastically in 2009. The observation confirmed the effectiveness of behaviour-based safety management in mitigating injuries on the mine site. In addition, the highest injury realized in 2009 was six for May, followed by five first aid injuries in April. The observation was consistent with the timing for mine site projects carried out by external contractors at the mine site. Upon investigating, most of the associated injuries were noted to occur through contracting companies.

Figure 3 also shows the work related injuries experience per month in 2011. The 2011 injury records showed an impressive result in the last quarter again owing to an improvement in the way compensations were done. In 2011, individuals with good safety records were rewarded at the end of the year. Again, the high injury record observed in September was due to external contractors at work on the mine site. The case study made evident the source of injury on the mine site besides the relationship between the safety management style, practices and injuries. The impact of safety practices from external contractors on the overall mine injury records was manifested. In the light of this,

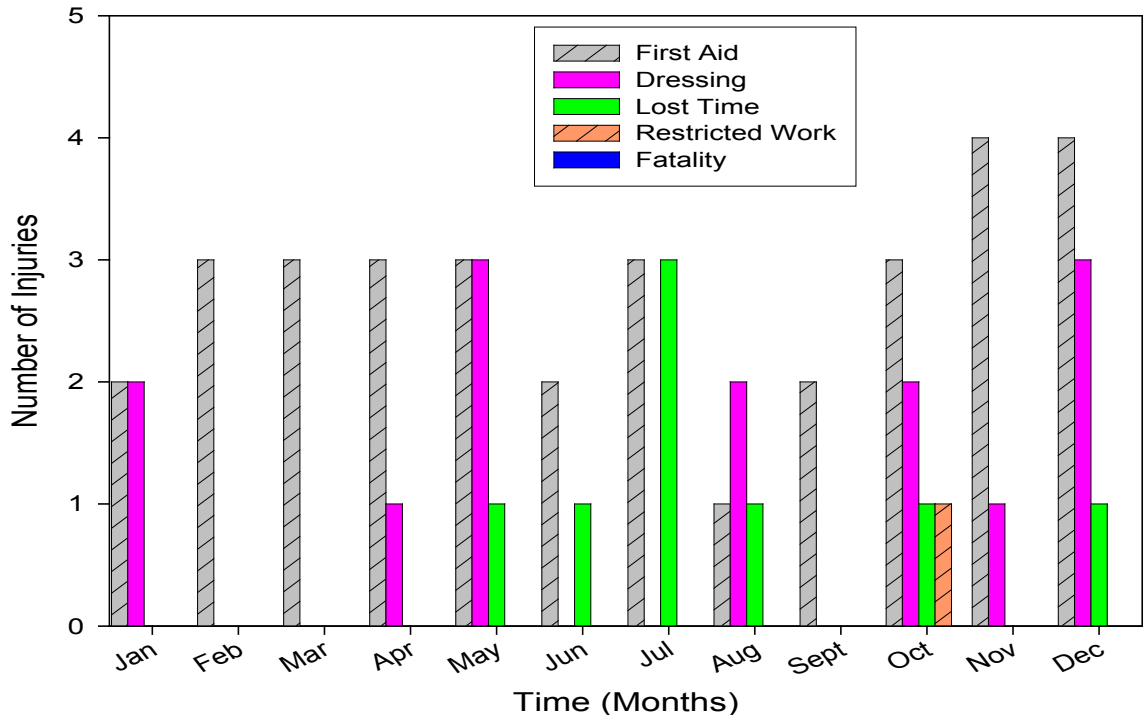

Figure 1: Work related injuries experienced per month in 2008.

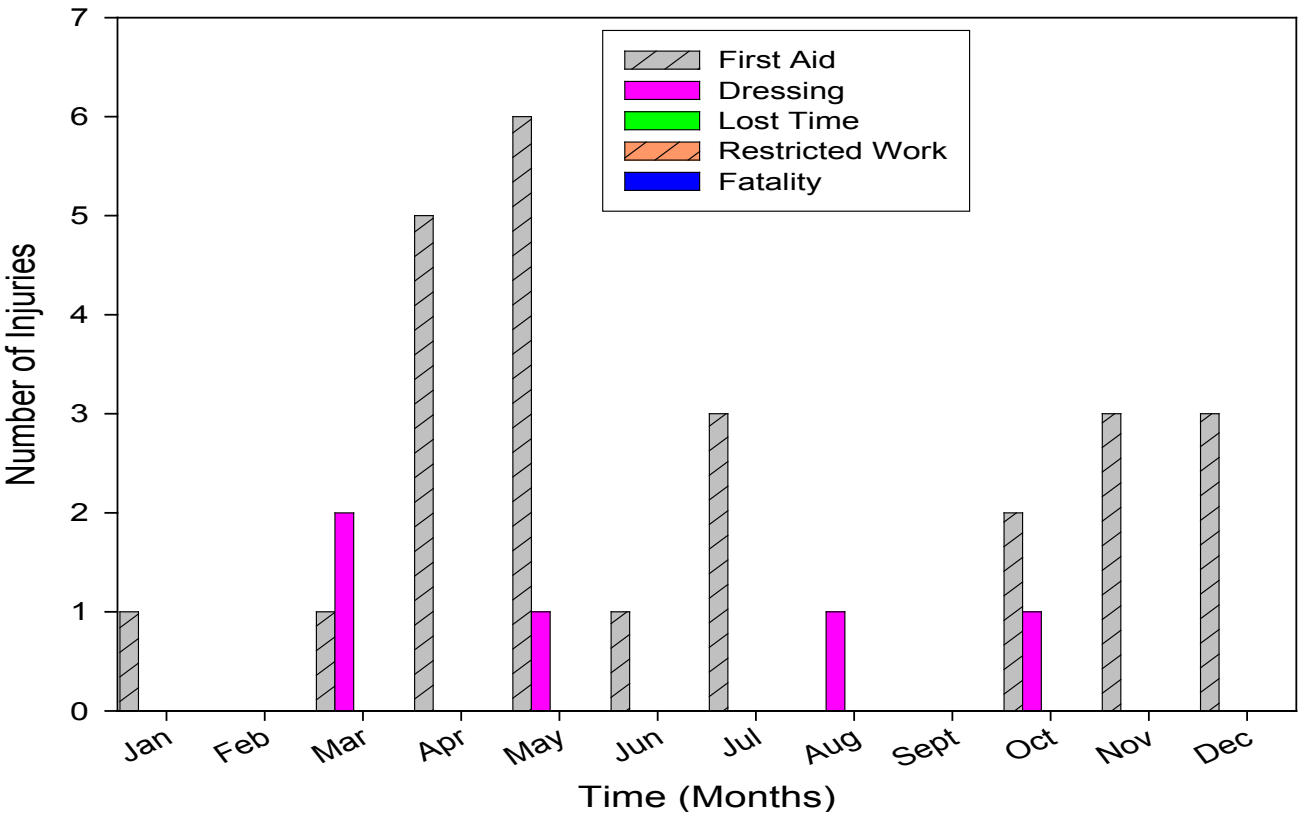

Figure 2: Work related injuries experience per month in 2009.

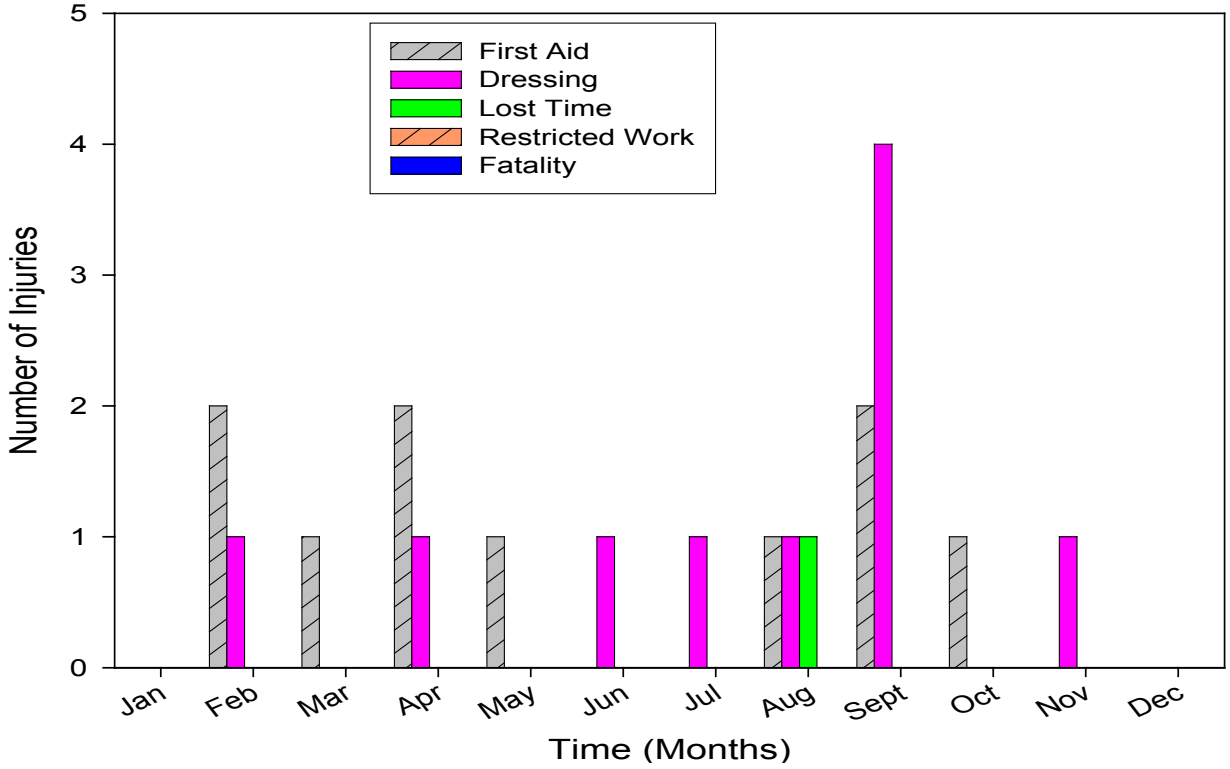

Figure 3: Work related injuries experienced per month in 2011.

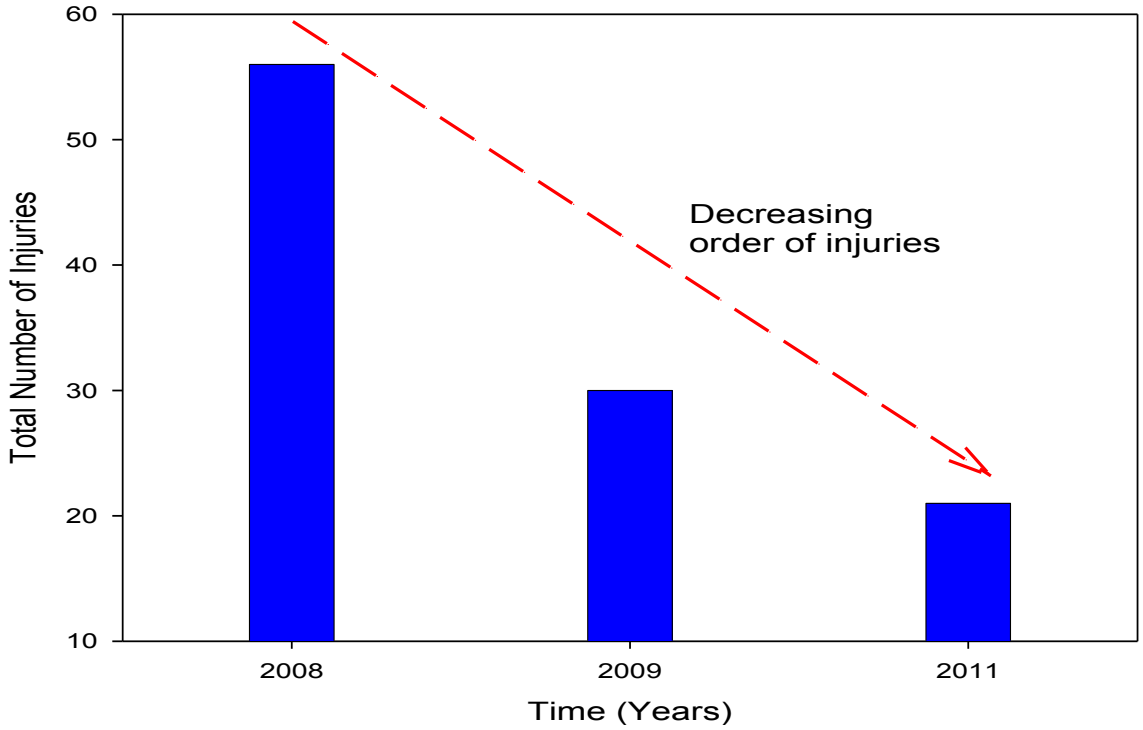

Figure 4: Total work related injuries experienced in 2008, 2009 and 2011.

Year	First Aid Injuries	Dressing Injuries	Lost Time Injuries	Restricted Work Injuries	Fatalities
2008	33	14	8	1	0
2009	25	5	0	0	0
2011	10	10	1	0	0

Table 1: Total first aid, dressing, lost time, restricted and fatality work related injuries in 2008, 2009 and 2011.

management specifically seeks to engage only contractors with high safety records for future projects to help minimize injuries on the mine site as a whole.

Table 1 shows the total individual first aid injuries, dressing injuries, lost time injuries, restricted work injuries and fatality in 2008, 2009 and 2011. It was evident that the first aid injuries were the most easily occurring injury class on the mine site. This could be attributed to unsafe acts (e.g., short cut approach to work, carelessness, and lack of attention and horse play) practiced by most workers. This was followed by the dressing injuries, lost time injuries and then restricted work injuries. No fatalities were recorded on the site. Furthermore, the results generally showed that, an increase in the first aid injuries led to a corresponding increase in the other classes of injuries. This suggests that, by focusing on minimizing the first aid injuries, the other forms of injuries could be eliminated from the site.

Figure 4 shows the total work related injuries experienced in 2008, 2009 and 2011. Notwithstanding the injuries observed after introducing the compensation policy, stupendous overall reduction in the injuries recorded was observed. The result emphasizes the efficacy of behavior-based safety management of employees.

Conclusions

From the case study undertaken, it is evident from the results that AngloGold Ashanti Iduapriem mine is striving to achieve zero injuries at the workplace. The company has progressed in fatigue management of the employees hence resulting in decrease injuries per year. In addition, the behavior-based safety management techniques worked very effectively in mitigating the number of injuries realized in the last quarter of 2009 and 2011. This provided pragmatic information on the safety management employed. Furthermore, first aid injuries recorded were the highest in each year despite the decrease in the total number of injuries per year. Reducing the number of first aid injuries markedly reduced the dressing, lost time, and restricted work injuries. The company's stupendous efforts towards safety led to zero fatalities in the years 2008, 2009 and 2011 of the mine.

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