

Health and Safety Policy at GH Mining: A Systematic Review

Xiaoyan Wang^{1,2,a,*}, Jessa Frida T. Festijo^{1,b}

¹Claro M. Recto Academy of Advanced Studies, Lyceum of the Philippines University Manila, Philippines

²Guangdong Technology College, Zhaoqing, China

^alcqlzq0620@163.com, ^bfrida.festijo@lpu.edu.ph

*Corresponding author

Abstract: This study aims to investigate the impact of GH Mining on work-related accidents, occupational diseases, workplace and conflicts after the implementation of the health and safety management policy proposed in 2017. The study is three pronged; first, it described the concept of policy review, the objectives of policy review, the background of the company, the whole health and safety policy; second, it discussed the results of the policy evaluation. Using qualitative and quantitative analysis methods, it revealed that the main problems of the company's policy. Lastly, it puts forward the need to modify the company's health and safety policy, and gives suggestions for modification.

Keywords: Mining Industry; Health and Safety Management Policy; Revised Policy

1. Introduction

1.1 Brief Background using Policy Review

Policy review refers to a type of applied research that evaluates the effects of a policy or program. Also known as policy evaluation or program evaluation. The purpose is to accurately assess whether a specific program of a policy or program has achieved the desired results. Evaluation studies can be carried out before or after program implementation and can provide a reliable basis for formulating, revising or selecting policies or plans. Since the 1960s, evaluation research has developed rapidly in the United States and has been paid more and more attention by governments and administrative departments around the world. ^[1].

Policy review is a necessary link in the dynamic operation of policies. A policy must go through the evaluation stage from its emergence to its termination. Without the evaluation results, it is inevitable that there is no practical basis for policy revision or termination. Policy evaluation is a necessary means to test the effect of policy implementation. The implementation of a policy, on the one hand, may complete the target and achieve good results, but from the comprehensive perspective of other aspects, it may also cause many potential problems. Therefore, in order to test the implementation effect of a policy comprehensively and correctly, including the positive and negative effects within and outside the scope of the policy debugging object, it is necessary to achieve a systematic and comprehensive evaluation. ^[2].

This study evaluates the health and Safety Management Policy proposed by GH Mining Company in 2017, and examines whether the implementation of this policy has an impact on work-related accidents, occupational diseases, and workplace and conflict.

2. Case Profiling

GH Mining is a large multinational mining group. Engaged in the exploration and development of copper, gold, zinc, battery and other metals, as well as engineering technology research worldwide, the group is committed to the development of green mines with high standards. The vision is "mining creates a better society", adhering to the values of "harmony is the most valuable" and "balanced development of the company, employees and society". ^[3]

In the interview, I learned that this policy lacks work safety supervision and review mechanism, and it needs to establish occupational health and safety hazard risk investigation and prevention mechanism.

The implementation of GH mining policy plays a great role in promoting the formation of good safety habits of employees and preventing non-occupational injuries and non-occupational deaths. Since the implementation of this policy in 2017, there have been no accidents among the owned employees of the company, and the accident rate of one million man-hours lost and the recordable accident rate have also decreased significantly compared with the same period last year. Unfortunately, in 2020, they have had 3 accidents in the mine, resulting in the death of 4 contractor employees. Therefore, it is necessary to carefully analyze the cause of the accident and formulate rectification and preventive measures to ensure that similar incidents will not happen again.

In view of the above policy analysis and evaluation, and to help GH Mining to achieve the work goal of zero-death zero-occupational disease of gig workers, Will the policy improvements improve the health and safety status of the company? So the following hypotheses can be put forward.

Ho1: Health and Safety policy implementation can significantly reduce work-related accidents.

Ho2: Health and Safety policy implementation can significantly reduce work-related stress and sickness;

Ho3: Health and Safety policy implementation can significantly reduce work-related violence and conflict.

3. Methodology

3.1 Sampling and Data

To obtain the data of GH Mining employees on policy format, policy content and health and safety status, a self-filled questionnaire was designed, and 10 questionnaires were collected from 2 senior executives, 3 grassroots supervisors and 5 employees. The study then utilized a detailed key informant interviewing via phone call to among ten employees to obtain scoping relevant information about the topic. I also searched the data of occupational diseases caused by industrial accidents in GH Mining in the past three years to obtain the real data of the health and safety status of the enterprise.

3.2 Data Analytical Procedure

In the first step, mean and SD values corresponding to the problems in Table1, Table2 and Table3 were calculated by SPSS software to obtain employees' evaluation of health and safety policy. In the second step, qualitative analysis was used to analyze Table4, Table5 and Table6 Questions and suggestions raised by employees on this policy in Table7. Third, regression analysis technique is used to analyze the impact of policy implementation on industrial accidents, occupational diseases and workplace violence and conflict. Lastly, qualitative analysis is utilized to propose modification of the current policy.

4. Results and Discussion

We can through the descriptive statistics to understand respondents format of GH mining health and safety policy evaluation Through the descriptive statistics to understand how variables and the correlation coefficient between, thus to provide information for the back of the regression analysis according to the mean and SD value calculated in table 1, shows the satisfaction of all employees on the company's health and safety policy format with a mean of 4.3 shows that satisfied with the policy of the format for employees, the standard deviation is the average deviation of the average distance data, is reflected the discrete degree of a data set, the smaller the standard deviation value represents the staff to the evaluation of policy format, the more consistent Through the following form of less than 1 standard deviation was 0.75, can indicate the employee evaluation more consistent.

Table 1: Employees' Assessment on the Format of the Health and Safety Policy

Policy Formation	Mean	SD
1.The policy document title is succinct and easily understood by most potential users	4	0.8165
2.The policy is aligned with the stated purpose and scope of the policy document	4.5	0.70711
3.The policy is consistent with (or at least not inconsistent with) with the company policy and reflects the companys core values	4.8	0.42164
4.The policy does not conflict with or duplicate other company policy documents	3.9	0.99443
5.The policy is comprehensive, incorporating all aspects of a general topic, rather than segregated into multiple policy documents	4.5	0.70711
6.Definition of terms included are appropriate and complete	4.5	0.70711
7.The policy is written in plain unambiguous everyday English, without the use of jargon, or unexplained technical or legal terms, acronyms or abbreviations	4.1	0.99443
8.Roles and responsibilities for the policy implementation, monitoring and evaluation are clearly defined	4.7	0.67495
Total	4.3	0.75

According to the mean and SD value calculated in table 2, know the satisfaction degree of the employees for the company health and safety policy content With a mean of 4.4 shows that satisfied with the policy of the format for employees, the standard deviation is the average deviation of the average distance data, is reflected the discrete degree of a data set, the smaller the standard deviation value represents the staff to the evaluation of policy format, the more consistent. The standard deviation of the table below is 0.68 less than 1, indicating that the evaluation of employees is relatively consistent.

Table 2: Implementation of the Health and Safety Policy Content

Policy Content	Mean	SD
1. Risk assessments are conducted on the health and safety of organizational members.	4.6	0.5164
2. Significant findings of the risk assessment are being recorded and communicated to the members of the organization	4.7	0.48305
3. Health and safety measures are implemented	4.5	0.70711
4. There is an assigned competent individual/s for the health and safety responsibilities	4.3	0.67495
5. There are emergency procedures	4.7	0.48305
6. There are First Aid facilities	4.6	0.5164
7. There is sufficient ventilation, lighting and sanitary facilities	4.4	0.69921
8. Work equipment is suitable for its intended use as far as health and safety is concerned, and that it is properly maintained	4.6	0.69921
9. There are adequate control measures to prevent exposures to substances that may damage health	4.1	0.73786
10. There are adequate measures against danger from flammable or explosive hazards, electrical equipment, noise or radiation.	4.8	0.42164
11. There are measures to avoid hazardous manual handling operations and, where they cannot be avoided, reduce the risk of injury.	4.1	0.8756
12. There is provision of free protective clothing or equipment, where risks are not adequately controlled by other means	4.7	0.48305
13. Appropriate safety signs are provided and maintained	4.7	0.67495
14. There is proper reporting of certain injuries, diseases and dangerous occurrences to the appropriate health and safety enforcing authority.	4	1.1547
15. There are provisions for organizational proper conduct and decorum.	3.6	1.07497
Total	4.4	0.68

According to the mean values and SD values calculated in Table 3, the status of employees' attitude to the company's health and safety policies can be known. The average value of 2.7 indicates that GH mining has less occurrence in the three aspects of accidents, stress and sickness, violence and conflict.

Standard deviation is the mean of the deviation from the mean of all data, which reflects the degree

of dispersion of a data set. The smaller the standard deviation is, the more consistent the employees' evaluation of the policy format is. As the standard deviation of the table below is 1 greater than 1, it can be indicated that the evaluation of employees is not consistent, and some employees think that sometimes accidents, stress and sickness, violence and conflict occur in the company.

Table 3: Status of Company's Health and Safety Policy

Satus	Mean	SD
1. Work-related accidents (i.e., physical injury, dismemberment disability or death)	2.9	0.99443
2. Work-related stress and sickness (i.e., due to exposure to bacteria, viruses, chemical substances, poor working conditions, etc.)	2.6	1.07497
3. Workplace violence and conflict (i.e., bullying, sexual harassment, interpersonal conflict)	2.6	0.96609
Total	2.7	1.01

In order to more clearly understand the company's health and safety policy implementation effect, this study was carried out on 10 different position staff telephone interviews, collected 2 and 7 employees unified recommendations of target of policy, in the aspect of the safety of the concrete behavior, No. 8 and No. 1 employee Suggestions are given, specific topics and Suggestions can be found in the listed in table 4.

Table4: Thematic Analysis on Suggested Improvements on the Policy Purpose and Outcomes

Themes	Statement	Key Informant
Unity of Purpose	1. The issuing of policies should organize employees to learn and ensure their understanding of the policies	#2
	2. Strengthen health and safety training and establish the safety concept of life first	#7
Concrete safety behavior	1. We will promote a three-year campaign to improve work safety	#8
	2. The risk management of "no risk identification, no work" and "one book, one certificate and two lists" should be carried out at the grass-roots level.	#1

As for the thematic analysis of the new data that should be included in the policy, No. 3 and No. 6 employees proposed to actively implement ISO45001 safety production standardization and other health issues within the whole company, formulate standard manual of GH Mining's full-cycle management process, require self-examination and self-correction, implement systematic and standardized process management, as shown in Table 5

Table5: Thematic Analysis on new sets of Information that Should be Included in the Policy

a	Statement	Key Informant
management system	Actively implement ISO45001 safety production standardization and other health and safety management system certification throughout the company	#3
Risk prevention	The standard manual of GH Mining full-cycle management process was formulated, requiring self-examination and self-correction, and implementing systematic and standardized process management.	#6

As for suggestions related to the company's business policies, Employee No. 10 proposed to establish and set health and safety performance goals and incorporate performance into the salary evaluation; Employee No. 7 proposed to use 5G technology to realize drone operation (Table 6)

Table6: Thematic Analysis on the Relevance of the Policy on Company Operation

Themes	Statement	Key Informant
Production safety assessment standards	Set wellness at all levels and functions, including senior management and safety performance objectives, and incorporate relevant performance into compensation evaluation factors.	#10
Application of 5G technology to achieve Drone operation	Remote control of working machines through 5G technology can reduce the risk of accidents and improve the working environment for miners.	#7

How to make the company policy meet the external or regulatory requirements to achieve internal and external unity? No. 4 employee proposed to use the information platform to promote the deep integration of information technology and production safety, and realize the early warning and whole process control of production safety risk at all posts. No. 6 employee proposed to bring stakeholders into the health and safety management system. (Table 7)

Table 7: Thematic Analysis on what Needs to be done to make the policy consistent with external or regulatory requirements

Themes	Statement	Key Informant
information platform	Promote the deep integration of information technology and work safety, and realize the early warning and control of work safety risks at all posts	#4
Integrate stakeholders into the health and safety management system	Integrate contractors into the health and safety management system to achieve unified systems, unified standards and cultural integration.	#6

The extent to which a regression equation explains the change of the dependent variable depends on how well the equation fits the observed value. R^2 is called the "determinate coefficient of the equation," and its value is between [0,1]. The closer R^2 is to 1, the better the variables in the equation can explain Y. Table 8 puts the survey data of "work-related accidents" and "policy implementation content" into dependent variables and independent variables respectively, and uses SPSS software to calculate the data in Table 8. The value of R^2 is 0.233, indicating that all variables in the model jointly explain the 2.3% change of work-related accidents.

Table 8: Effects of Policy Implementation on Work-related Accidents

Variable	B	95CI	β	t	p	R^2
(Constant)	8.446	[0.204, 16.689]		2.363	0.046	
Policy	-0.083	[-0.205, 0.040]	-0.482	-1.557	0.158	
Implementation					0.158	0.233

Table 9 put the survey data of "occupational disease" and "policy implementation" into the dependent variable and independent variable respectively, and calculate with SPSS software to obtain the data in Table 8. The value of R^2 is 0.268, indicating that all variables in the model jointly explain the 2.68% change of industrial accidents.

Table 9: Effects of Policy Implementation on Work-related Sickness

Variable	B	95CI	β	t	p	R^2
(Constant)	9.034	[0.330, 17.737]		2.394	0.044	
Policy	-0.096	[-0.225, 0.033]	-0.517	-1.710	0.126	
Implementation					0.126	0.268

Table 10 puts the survey data of "workplace violence and conflict" and "policy implementation" into the dependent variable and independent variable respectively. SPSS software is used to calculate, and the data in Table 8 is obtained. The value of R^2 is 0.54, indicating that all variables in the model jointly explain the 5.4% change of work-related accidents.

Table 10: Effect of Policy Implementation on Workplace Violence and Conflict

Variable	B	95CI	β	t	p	R^2
(Constant)	10.809	[4.607,17.010]		4.019	0.004	
Policy	-0.123	[-0.215,-0.030]	-0.735	-3.062	0.016	
Implementation					0.016	0.540

Through questionnaires and interviews we learn about the staff of the GH mining group is now the health and safety policy implementation effect is satisfactory, but if the company to reach "zero fatalities, zero occupational" goals, need from the risk management system to identify and responsibility to carry out the three aspects to improve, table 11 for the old policy put forward some Suggestions and lists the revised policy

Table 11: Proposed Changes to Existing Policy

Old Policy Provision	Comments/Suggestions	Proposed Revised Statements
1. Improve the occupational health system	Establish a leading occupational health and safety	Comply with applicable occupational health and safety regulations in the place of operation, including relevant industry management standards, and commit to establishing a leading occupational health and safety management system using industry-leading practices and standards.
2. Strengthen the identification of occupational hazard risks	Formulate corresponding control measures and organize implementation	Through identification and evaluation of hazardous and harmful factors, formulate and implement corresponding engineering technology, safety management, education and training, personal protection, emergency response and other control measures to minimize the health and safety risks to employees, contractors and visitors.
3. Assess the implementation of health management responsibilities by all levels of management and ownership enterprises	Set health and safety performance targets	Set wellness at all levels and functions, including senior management and safety performance objectives, and incorporate relevant performance into compensation evaluation factors. Regularly review the effectiveness and sustainability of current h&S management systems and provide the leadership and resources needed to ensure continuous improvement in our operations.

The questionnaire survey results in Table 1 and Table 2 show that GH Mining employees agree with the format of the policy. The data in Table 3 also show that there are few work-related accidents, occupational diseases and workplace violence and conflict after the implementation of this policy. Table 4 to Table 7 shows that the suggestions put forward by employees are optimized on the basis of the original policies. Table 8 to 10 of the topic of cancer analysis results also verify the implementation of policies to reduce accidents and occupational diseases and workplace violence and conflict, this suggests that the policy implementation effect is very good, employee satisfaction is high, can reduce accidents and occupational diseases and workplace violence and conflict, but to achieve GH "zero casualty and zero occupational disease", based on the results of the questionnaire survey, we suggest GH company to optimize the original policy and adopt a better health and safety management system as well as risk identification and prevention.

5. The Revised Policy

Through qualitative and quantitative analysis methods, it finds that the main problems of the company's policy are: there is no sound occupational health and safety management system, no specific measures for occupational hazard risk identification, and no health and safety performance objectives. So, this study is modified and optimized on the basis of GH Mining's original policies to help GH Mining achieve "zero work fatality and zero occupational disease", we recommend that the company adopt the following policies:

(1) Comply with applicable occupational health and safety regulations in the place of operation, including relevant industry management standards, and commit to establishing a leading occupational health and safety management system using industry-leading practices and standards. ^[4]

(2) Under the leadership of the board of Directors, the senior management, including the president, are responsible for GH mining's health and safety strategy and performance, committed to ensuring safe working conditions, and taking the lead in creating and cultivating a positive and healthy safety culture from their own and details.

(3) Each employee and contractor shall be responsible for their own safety and the safety of those around them, participate in activities that reduce operational risk, and have the right to intervene if work is unsafe.

(4) Through identification and evaluation of hazardous and harmful factors, formulate and

implement corresponding engineering technology, safety management, education and training, personal protection, emergency response and other control measures to minimize the health and safety risks to employees, contractors and visitors.

(5) Set wellness at all levels and functions, including senior management and safety performance objectives, and incorporate relevant performance into compensation evaluation factors. Regularly review the effectiveness and sustainability of current H&S management systems and provide the leadership and resources needed to ensure continuous improvement in our operations. ^[4].

(6) Transparently communicate and engage internal and external stakeholders about our health and safety management policies and performance and make them available to the public.

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