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Analysis of Risks Exploration Campaign Iron on Site Akom2

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Abstract: ***The evaluation of occupational and environmental hazards is one of the main levers of professional prevention approach in the exploration of mapping during the campaign. It represents a way of preserving the health and safety of Geologists .Our study aims to identify the level of occupational and environmental risks in order to put a policy of prevention in the case of mapping on the site of Akom2. The risk analysis is based on the most exhaustive inventory possible to all the scenario of accidents that may occur in the workplace. As part of this study, it is necessary to start from the preliminary risk analysis to identify, evaluate their level and then take steps to put a reliable safety device on our site. The summary tables as practical support for conducting discussion and summarize the results of the analysis have allowed us to realize that the risk rating between 6 and 12. We need to educate staff on security during the mapping, train geologists and casuals (workers) on aid techniques. We must have a box full pharmacy and mosquito nets for different campaigns. We must improve diet and buy mattresses that will allow our workers to have a great rest in order to produce the expected results.***

Keywords: Exploration, Risk, Security, Akom2, Mining.

1. Introduction

The laws in place regarding safety and environment are applied through the regulations of the mining code, environment and labor. Companies concerned about their image and having understood the place of safety and the environment does not hesitate to put the necessary resources to provide a pleasant working environment for their workers finally to limit the impacts of activities on the natural environment. Safety-Health-Environment Policy (HSE) plans to identify and implement measures to protect the environment and reduce workplace accidents. The evaluation of occupational and environmental hazards is one of the main levers of professional prevention approach in the exploration of mapping during the campaign [1] .It represents a way to protect the health and safety of geologists. Our study aims to identify the level of occupational and environmental risks in order to put a policy of prevention in the case of mapping the site AKOM2.Our analysis has collected information about the mapping [2]. It is based on the number of occupational accidents and negative impacts on the various operators and geologists during these campaigns. The present work aims to contribute to the continuous improvement of safety and environmental management system and the implementation of preventive measures for identified risks. Throughout this work, we will seek to answer the following fundamental questions: What are the occupational hazards encountered during the mapping on the site AKOM2 .What are possible mitigation measures that may be made during this phase of exploration on AKOM 2 website?

To achieve this, we undertook to work specifically to: Present techniques used by geologists for mapping; Identify all the risks associated with activities related to this activity; evaluate the safety and environmental provisions and to suggest corrective measures for the main occupational and environmental risks associated with this activity. It is question for us to bring out the first method used to process risk analysis.

2. Risk Analysis Method

Risk analysis is based on the most exhaustive survey of all possible accident scenarios likely to occur in the workplace. As part of this study, it is necessary to start from the preliminary risk analysis (PRA) to identify, assess their level and then take steps to put a reliable safety device on our site. [3] It is based on a process of continuous improvement of working conditions and environmental protection. It allows to make necessary corrections and continuous improvement.

2.1 Identifying workplace

Akom 2 is located in the extreme south-western Cameroon, this area is a typical ferralitique soil moderately and heavily distorted yellow brown. The study area has a humid tropical climate and watered by streams depending on two water sheds. As part of our study we identified risks by sector. The mapping is performed by four teams consisting of a geologist and three casuals on Akom2. After identifying the different activities of the mapping, we identified the different workplaces requiring a preliminary risk analysis [4]. The preliminary risk analysis is a method of identification, risk assessment and consequence. The

objective of the risk analysis will deduct the means and the corrective actions to eliminate or at least master the dangerous situations and potential accidents highlighted. The risks to be taken into account when mapping are [5]: risk of insect bite, mosquitoes may bite by reptiles such as snake, scorpion, risk of falling or burial, drowning or hazardous lianas , risk of accidental oil pollution or runoff, etc.

2.2 Risk Analysis Approach

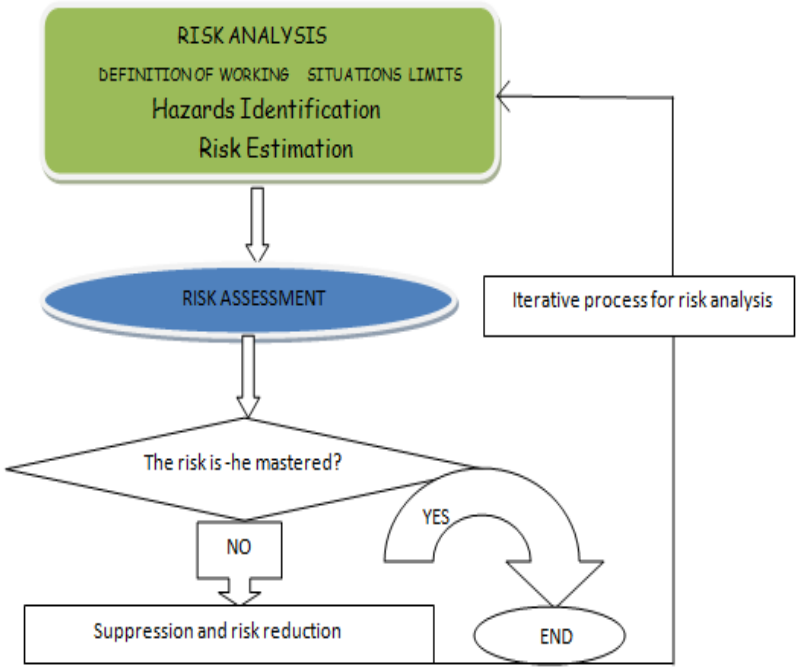

Figure 1: Risk analysis approach (Source: IEC 300-3-9, 1995)

The methods that catch our attention in this study are:

- Preliminary risk analysis (PRA);
- Analysis methods failures of their effects and criticality(FMEA);
- Fault tree.

3. Development of Analysis

Safety management practices comprising this system can be conceptualized as global data point .[6] describes global data points as being top-town and largely within the control of organizational managers. [7] further describes them objective group properties that vary between group but not within them. This is how the framework is consistent with the conclusion that the application of systems thinking methods afford the opportunity to take a far more holistic approach system [8].Our analysis should be directed to improve strategies of action designed to prevent accident and occupational diseases and promote a systematic approach to safety and health management. In addition, we noticed that motivation is related to the degree of participation [9].Future researches will have to focus on these managerial and organizational factors. As part of this campaign we face data lot of difficulties on the ground we took some pictures to illustrated this. The following images illustrate some risks in the field.

Figure 2: Difficulties encountered during the mapping.

a: Saw Operator clearing tree trunks blocking the way, b: Poor visibility of the old forest road, c: Appearance of an outcrop of GN in the field, d:A view of a portion of the old forest road overgrown with grass and tree trunks. The different tables and figures present the preliminary analysis method of risk (APR) with which we do our study during our iron exploration campaign on the site Akom2.

Table 1: Trading probability used for the evaluation of occupational hazards

Probability level	Scale	Comments
1	Improbable	Annually or un likely or never met
2	Able rarely	Occur several times a year on the workplace
3	Able likely	Occurence a month on the workplace
4	Able inevitable	Inevitable occur several month on the workplace

Table 2: Gravity quotation used for the evaluation of occupational hazards

Severity	Scale	Comments
1	Low	Noor little damage without a work stoppage(AT,PM)
2	medium	Low Damage, stopping work(AT,PM)
3	reversible	Severe damage, resulting in permanent partial disability (AT, PM)
4	Very serious	Irreversible damage: total disability or death(AT,PM)

MP represents Vocational Disease, and AT Crash Labour. The Farmer diagram establishes the criticality of risks and prioritizes them based on color codes. The criticality of risk is the product of the probability of occurrence of the damage $C = P * D$ (1)

Table 3: Risk scoring grid

	Severity of injury			
Probability of occurrence	1	2	3	4
	2	4	6	8
	3	6	9	12
	4	8	12	16

	The risk is reduced to the highest level.
	The risk must be reduced: no emergency work.
	The risk must be reduced or eliminated: urgent action.
	Any activity causing such risks should be discontinued.

3.1 Professional risk analysis synthesis.

Table 4: Evaluation of Environmental risk [10]

Unit:									**Day :**			
Designation spots	Dangerous situation	Predictive Risk	Protection Equipment			Potential severity	Occurrence probability	Listingthe risk	Level of Prevention			Corrective action
			Good	means	missing				Good	means	missing	

Table 5 : Environmental risk assessment criteria [10].

Evaluation criteria	Ratings	Definitions
Frequency	1	1 to several times a year
	4	1 to several times month
	7	1 to several times a week
	10	Everyday
Severity	1	Negligibleconsequences
	4	Temporary consequences
	7	Durable but resersible consequences
	10	Lasting and irreversible consequences
Environnemental sensitivity	1	Low : No sensitive area
	4	Average : Little vegetation or implacable environment
	7	Sensible: Urban area, near streams,
	10	Very sensitive: Sites or protected species, formal regulatory protection, specific to site stopped ,

		sensitive institution,…
Risk control	1	No control.
	4	Impact partially controlled : specific actions
	7	Controlled impact and reduced: safety devices and procedures.
	10	Impact avoided: Protective devices and operational procedures, means and appropriate resources, organization of checks ,emergency test…

The evaluation of the environmental impact "E" is the product of the frequency, severity and sensitivity of the environment, weighted by the means of mastering:

$$E = F * G * S/M \qquad (2)$$

		regularly.
50<E<250	2	Significant impact: Actions to implement as soon as possible, followed to define.
E≤50	3	Insignificant impact: non-priority actions that can be medium to long term..

3.2 Summary used for the environmental risk assessment

Evaluation	*Priorite*	*Actions*
E≥250	1	Very significant impact: Actions to implement a priority and monitor

Unit :						**Day :**	
Environnemental aspect	Environnemental impact	Frequency(F)	Severity(G)	Environnemental Sensitivity (S)	Mastery level (M)	Evaluation E=F*G*S/M	Protection action/contingency provisions

4. Results and Discussions

Unit : forest												**Day: 15/02/2017**
Désignation spots	Dangerous Situation	Predictive Risk	Protection Equipment			Potential Severity	Occurrence Probability	Listing the risk	Level of prevention			Correctives actions
			Good	Means	Missing				Good	Means	Missing	
Walking	No wearing of PPE or not suitable PPE	Insect bites	X			Serious	Likely	9		X		Awareness of gloves.
Walking	No wearing of PPE or not suitable PPE	Bite by a snake		X		Very serious	Likely	12			X	Use suitable footwear and machetes.
Wheelchair car accident on Old Bridge	Bridge defective	Serious injury with trauma, fractures, drowning		X		Very serious	Likely	12		X		Sensitization to taking short breaks operators to guard long distances without rest.
Walking	Slipperywhenwet, tired	Fall,burial, drowning in the flooded areas.		X		Very serious	Likely	12		X		Geologists and casuals must be trained and made aware of the aid.

Table 8: Syntheses as practical supports for conducting reflection and summarize the results of the analysis [11].

Unit :forest		Day : 15/02/2017										
Designation Spot	Dangerous Situation	Predictive Risk	Protection Equipment			Potentiel severity	Occurrence Probability	Listing the risk	Level of prevention			Correctives actions
			Good	Means	Missing				Good	Means	Missing	
walking	Shifting Geologists and Casuals in a virgin forest.	Falling treesor vines		X		Very serious	Likely	12		X		Geologists and casuals should be trained and sensitized to aid
walking	Generalized tiredness	Aches.		X		Very serious	Likely	6		X		Use good ointments.
walking	Crossing the river	Drowning, fractures.		X		Very serious	Likely	6		X		Trained and sensitized first aid and swimming.

Breaking rocks by geologists	Bad geologist hammer Handling	injury		X		Very serious	Likely	6		X		Wear gloves and suitable eye protection.
Camp	Mosquito bite	malaria		X		Very serious	Likely	6		X		Sleeping under a mosquito net.
Camp	Attack wild animals in the night	Injuries serious		X		Very serious	Likely	6		x		Make fire.

Our risk rating between 6 and 12. We need to educate staff on security during the mapping, train geologists and casuals on first aid techniques. We must have a box full pharmacy and mosquito nets for different campaigns. We must improve diet and buy mattresses that will allow our workers to have a great rest in order to produce the expected results.

Table 9: Environmental Risks

Unit : forest					**Day : 15/02/2017**		
Environnemental Aspect	Environnemental Impact	Fréquency (F)	Severity (G)	Environnemental Sensitivity (S)	Mastery level (M)	Evaluation (E=F*G*S/M)	Protection action/contingency provisions
Production of hazardous waste (solid and liquid)	Soil pollution and degradation of flora	Everyday (10)	Durable and reversible effects (7)	Very sensitive (10)	Impact mastery and reduced (4)	175	Implement a waste sorting.
Production of exhaust fumes	Air pollution	1 to several times per week (7)	Temporary consequences (4)	Very sensitive (10)	Impact partially mastered (2)	140	All repairs should do with all the engines stopped, the need to start the engine just for verification.

Table 10: Key environmental impacts may occur in areas or workplace

Environmental Risks	*Impact on humans and the environment*
Dangerous toxic	Waste Environmental degradation and proliferation of diseases.
Improper destruction of trees and lianas.	Climate change and global warning.
Dumping of oils from accidental vehicles.	Carried by runoff into lakes or rivers downstream of the extraction area of materials.
Waters	Water related diseases (typhoid, diarrhea, skin).

5. Conclusion

After this campaign, it is a question of drawing the attention of mining companies on issues accident risks on our workers. We left the facts found in the field to present the various occupational and environmental hazards. This study will undoubtedly improve the working conditions of geologists and Casuals (workers) for this project in the making. Our study will improve the managerial system of our explorers for future campaigns. As recommendation, it would be necessary in the short term to provide for antivenoms for teams doing the mapping; boxes of pharmacy with special ointments and products for malaria; black stones; PPE and waterproof; vehicles with tires suited for each season (dry and rainy); predict talking walking to inform the supervisor geologist on site; high performance devices (GPS) adapted to a dense forest environment in particular. In the long run, making swimming and first aid training for geologists.

6. Acknowledgements

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