

Safety and Health Campaign to Improve Environment Occupational Safety and Health in Indonesia Leading Distributor Heavy Equipment Company

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Abstract—An effort to sustain company, environment occupational health and safety is important part of the business. If accident has happened, it will be impact to individuals and organizations. The uniqueness of heavy equipment operational characteristics has various challenges such employee concern, working area, variant service support and business sectors. The company still process with previous method, which that give main most problem lack of awareness and lack of information management. This research explain, the company was had new solution with technology approach as improvement campaign from design plan, justification and requirement and information management and an effect that give improvement evaluated. Several effect from this research are UAT, Human error and biases judgement, SMCL and EHS Performance. The effect of UAT had expected concept and schedule plan previously and by use case application identified. UAT metode become validation tool to known error handling for next processes. The effect of human error and biases judgement known as continue based line to corrective action, improvement and to identified new opportunities. The effect of safety culture maturity ladder has reported value in 3.86 points or increase 0,9 points than previous year as expected company policy and another effect is increased EHS Performance, known by decreased accident rate minus 50% and increase brand image the company researched from companies group.

Keywords—campaign improvement, safety and health improvement, information environment occupational health and safety.

I. INTRODUCTION

A. Background

In various heavy equipment Indonesia needs by government, companies or individuals from many business sectors such as mining, construction, plantation, forestry to

transportation. With the company vision to become a world-class company based on solutions of heavy equipment, mining and energy to create benefits for stakeholders The company researched are supported with 20 branch offices, 38 Site Support, 25 Representative Offices and ± 7,000 employees. As an effort as sustainable company, the company must oriented the environment occupational safety and health run the business. 76 EHS Officer as frontline personel are does not enough to protection business by following the main issue throughout repeatedly the operation.

B. Research Problem

In current condition, process are continue reviewed in many the level of position person and coordination include branch and site. Which though every human resources as employee development will periodically have to employee turn over because employee specialist, operation urgency, promotion, displament and others needed. So the employee turn over has an impact that of PDCA process, that mostly became lack of awareness.

In the other side, to obtained lot of data information that must be process and validation. Some risk factors that occurs from difference like error reporting, response speed, inability to prevent, inability to monitor, damage and become lost of record data had been occurred. So the mostly impact has been give lack of information management. This problem is most improtant step analysis and bring to do the prevention. Even though indirectly leads but this problem had been occurred to a failure to oversee efforts to accident prevention, health monitoring, pollution prevention, legal obedience, budget forecasts EHS. those lack of information management causing various had impacts for performance

audit, losses, Fatality, disobedience even business termination.

With the main problem are lack of awareness and lack of information management, also depends with the speed and accuracy many kind of data information to become as predictive for preventive action for reability of EHS performance in all operations. but the company researched still used of the previous method as coordinate information. From the problem above, new solution must to be found as urgent case. How to improve EHS Campaign Improvement can impact Environment Occupational Safety and health.

II. LITERATURE REVIEW & RESEARCH METHODOLOGY

A. Literature Review

By the theme optimizing the independence of a community with a culture of occupational safety and health in the era of the 4.0 revolution based on information technology. The Indonesian Manpower Ministry presented will involving related institutions including will establish program for the 2020 to 2024 with the EHS promotion movement, Strengthening the promotion of EHS resources, Strengthening supervision and enforcement of OSH legal norms, Strengthening EHS reporting and management data and information systems as well as EHS coordination, synergy and collaboration as shown in Fig. 1.

From tittle book Measurement of Safety Performance by Petersen [1] asserts that one of the best ways to assess future safety performance is through employee perception surveys. The choice of performance measure is one of the most critical challenges facing organizations [2]. Poorly chosen performance measures routinely create the wrong signals for managers, leading to poor decisions and undesirable results. There are enormous hidden costs in misused performance measures.

The mature safety culture is regarded as an important means of ensuring good safety performance and particularly in reducing accidents. The toolkit intends to help organisations to achieve a world-class health, safety and environment (HSE) performance by more than mechanically applying a management system. it requires the involvement of all in the organisation, from top to bottom, in a change process. Same the company researched measures with SCML.

Another effect, The stages of the system in which each stage will be worked in sequence decreasing from the analysis, design, implementation, testing and evaluation of the results of the information system. User acceptance testing (UAT), which is a form of testing performed by the end user, to correction design explained about use case application diagram, activity diagram and black box testing.

And humans are can be using their intuition and expertise in many situations, even human as experts are susceptible to errors in judgment and a failure to recognize

the limits of knowledge. Therefore, must be a critic for operationalizing the judgement or decision making, like bug and repair strategies in this research. Human error and biases judgement divided into Introduction, Information Acquisition, Information Processing, Indeed Output, Feedback, Knowledge and Result.

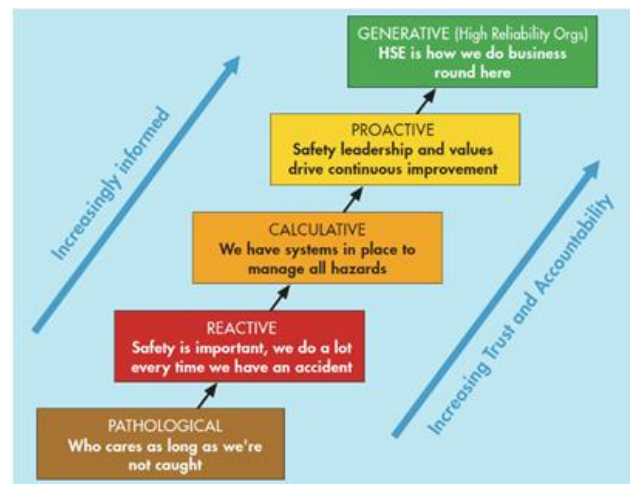


Fig. 1. EHS culture step ladder

B. Research Framework

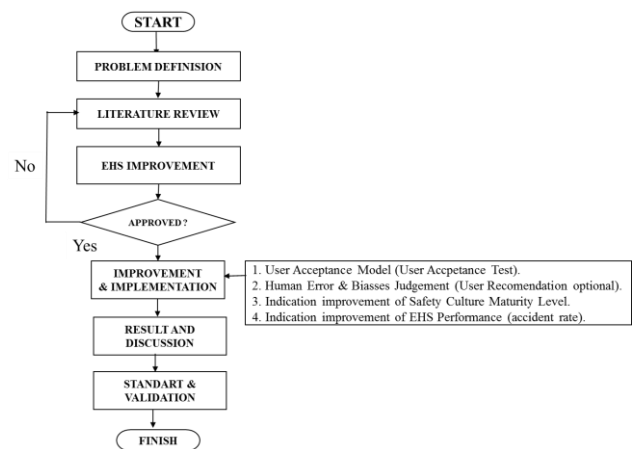


Fig. 2. Flow Diagram of research method

Referring to Fig. 2, the study was conducted applied in the branch and site operational. Several effect from this research are UAT, Human error and biases judgement, SMCL and EHS Performance. The limitation of the research about information technology data code, fullfillment EHS management system and next master plan with detail expansion improvement.

C. Improvement Campaign

Previously approach with determining the problems that occur the improvement and looking for literature related. First step research, indentified root cause problem with Fault Tree Analysis. There are several correlation such as to determinstion method and not yet availabe special program to use. Then create provision application design by using the

thinking design method and next passed the justification design by coordinated with internal organization and purpose by presented the master plan of EHS Campaign.

The improvement (Fig. 3) can faster proceed and predictive efforts with simplified and reported than before, through such as big data formed in company server. With advantages such as structure, planning, responsibility, implementation, achievement, review and the maintenance can be ensured and monitored appropriately and to build companies culture to protect workers and production facilities from work accidents or occupational diseases and environment pollution protection with technology approach. divide in two group. At first wave EHS pantau shown flow for operational or external campaign and second wave shown flow for internal management campiang. and automaticly tabulating report with status, expired and attachment in mobile app and web based utilization.

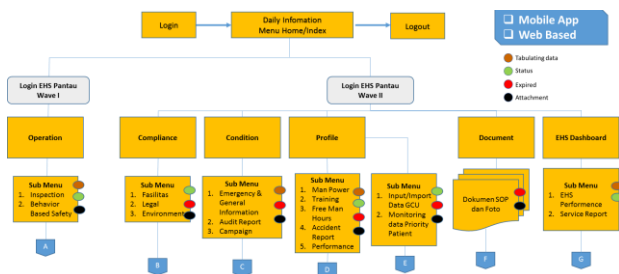


Fig. 3. Flow improvement health and safety

Inspection is effort to manage risk by finding hazard such as un safe condition or un safe action with reporting procedure cause analysis. Behavior Based Safety and Quality (BBSQ) is effort to campaign behavior by analysis employee with BBSQ identification filling process and observation are adjusted to the needs and the work that is being carried out. Profile data management are being intergrated data as follow part such Man Power, Training, Health, Accident and Performance. Condition data management are not being intergrated data as follow part such as Emergency and General Information, Audit and Campaign. Compliance data management are not being intergrated data as follow part such as Facility, Legal and Environment Management.

Document data management are being intergrated all data record as attachment in many office report and picture file. Dashboard data management are being intergrated data with other user depent from area coverage. The dashboard are divided into EHS Performance and Service report. With spesific indenty and integrated data to become represent value branch or site performance.

III. RESULT AND DISCUSSION

A. User Acceptance Test

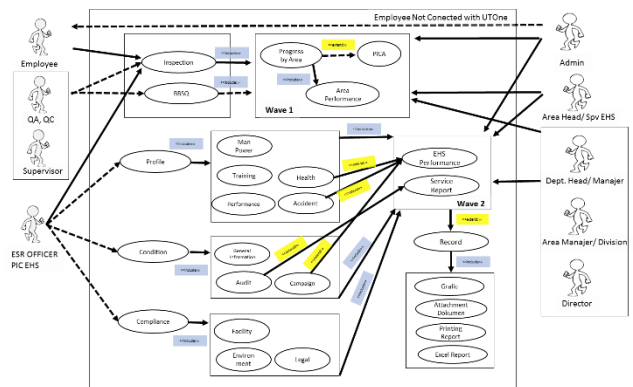


Fig. 4. Work flow use case application program

Use Case Application Diagram describing the improvement has created a new model of interaction between user (actors) and interrelated between systems than before is showing Fig. 4. The flow use case application diagram also explained improvement integrated with data that can be automaticly process and give some report from each need every user. During the process has any obstacles development such as as new regulation, covid-19 pandemic diseases, new technology use and other technique case like user for subcontractors, calculating process etc. Which is new way to indentified obligation element of fullfulness Environment Occupational Health and Safety.

Activity Diagram is another effect that has been socialized and reviewed test Socialization were attended by all users, admin and EHS department as the department in charge of the improvement as shown in Fig. 5.

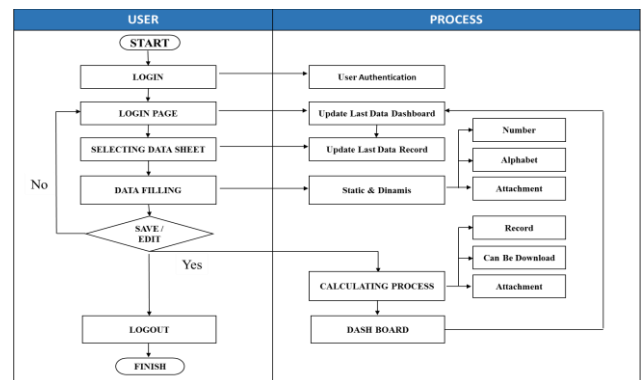


Fig. 5. Work flow activity diagram.

User has integrated with internal company technology system such internal data of HC or even though with email access which can not record in system HC. Authentication which is can be keep up adapted with change of data human resource including position, area, and other employee identity. It is describe improvement devide an area operation with process calculating and giving the result on dashboard. Activity diagram as methode had implemented as planed master plan previously which integrated with internal. Avantage for external recomendation such as

business or obligation of company which can add fulfillment wealth of campaign of EHS.

TABLE I
IDENTIFICATION BLACK BOX TESTING

No	Label	Black Box Testing			UAT	
		Input	Process	Output	Close	Open
1	Inspection	5	0	0	4	1
2	BBSQ	0	5	0	0	5
3	Accident	7	1	4	12	0
4	Campaign	2	2	1	5	0
5	Dashboard	1	5	4	10	0
6	Emergency	6	0	5	11	0
7	Environment	13	0	0	13	0
8	Facility	21	0	0	21	0
9	Health	1	0	5	6	0
10	Legal	5	0	2	7	0
11	Man Power	3	1	2	6	0
12	Profile	8	1	7	16	0
13	Performance	6	0	1	7	0
14	Training	3	0	2	5	0
Total		81	15	33	123	6

The black box testing method analyzes specific functions or the requirements of the user plan previously without letting the tester see the internal code structure of the software. Black Box Testing is showing Table 1 has identified 129 point finding non-conformities activities those 123 point finding or 95.4 % finding had improvements according the expectations. Among improvement there are 81 point for input finding with the most finding in facility category.

And the last, 6 point or 4,6 % finding of black box testing Has not been improvements such as BBSQ need develop for the target achievement for each branch and site based on target the SPV and QA, BBSQ need develop for the achievement of comparison targets based on the name of SPV and QA, BBSQ need develop monitoring system close by subcontractors ESR officer with employee number register and email, BBSQ need develop for the achievement of BBSQ against with the 10 highest findings of safe conditions, BBSQ need develop for the achievement of BBSQ against with the top 10 findings unsafe behavior, Inspection need develop for monitoring for inspection close by subcontractors and Inspection ESR officer with employee registered number and official email.

Some various impact will be an causes and complex of new potential improvement such as interconnecting data with companies group as master plan previously, ability new user from companies group, interpretation of new obligation of government regulation or standar with information technology etc are part of opportunity master plan will be reached.

B. Human Error And Biasses Judgement

Human error and biasses judgement divided into Introduction, Information Acquistion, Information Processing, Indeed Output, Feedback, Knowledge and Result as shown in Fig. 6. Following the interview, every respondent know introduction question is basic information about knowledge respondents such as the EHS indicators of

success, knowledge improvement EHS campaign, the improvement EHS campaign tools or methods, and the target or scope of the improvement EHS campaign.

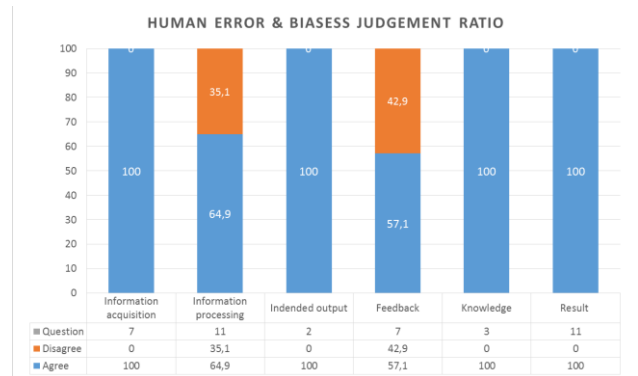


Fig. 6. Human error and biasses judgement ratio

Information acquisition explained, several information such as ability easier to find information, the information should be ability of all users because login access such as for subcontractor employees and some field workers. at least in 1 year, several data has not been running as regularly yet. New information must be continue to provide adjust existing needs such as work permits in critical works etc.

Information processing explained, should be improve for validation of process data, so that ease of access does not change the inaccuracy of the data submitted. This can be managed by adding other methods such as adding photos, GPS to using the Internet of things, Pop Up Methode etc. With the result should be provide initial hypotheses based on various information data. For example initial hypotheses, it can code red or event black colour as resulted process legal fullfill or can sholud be pop up information as addition device, conclusion of BBSQ etc.

Information Feedback explained, administrator should have good EHS analysis with ability of technology as capability. Failure objectively from the administrator process and interpretation as prediction and indentification from failure of administrator process must sort out. For example which data will be have a result of prediction with out administrator process, the data will be have recorded as same procedure etc.

Result explained, are saftification from the implementation such as provide cost benefit to company, have a business impact, benefits to the employees, benefits to organization at the company, benefits to the culture of company, benefits to the EHS success indicator, benefits to company today, benefits to sustainability company and provide productivity Methode analysis of human error and biasses judgement will be use for another correction with another group discuss with open interview with another department as user or partner. And make it as improvement and development for the next similiar campaign. Those baseline data corrective as existing development improvement.

C. EHS Culture Ladder

Information questionnaire of safety culture maturity level that implemented in december 2020, using online microsoft form identified 1.452 respondent in several identification such as gender, educational, working area, occupational, etc. Those resulting the are value transformation from last year that 41 has increase value, 58% area had decrease value and 1% area had in the same value. SCML Part in several question such as hazard technique management, accident follow up, safety inspection, accident investigation, procedure objective, work permit, she existence, safety reward, contractor management, procedure development, safety priority, trend & statistic, safety report, safety socialization, training & competency, standard setting, audit and review, commitment, accident causes and safety meeting. Staff questionnaire resulted level of workforce commitment & care for fellow colleagues the highest score, includes all parties, including contractors and managerial questionnaire resulted contractor management the highest respondent score.

EHS Culture Ladder interpreted that the organization can support achivement with EHS Performance in 2020. EHS Culture Ladder explained in 3.86 point. The company resereach same as involvement of the frontline employee is critical, if future improvements are going to be achieved. Managers recognise range of factors the root causes often originate from management decisions. The majority of staff accept personal responsibility for their own responsibility. EHS performance is actively monitored and the data is used effectively. the improvement has been able to adapt of changing needs accordance with changes in individual behavior for indentified a changes in good organizational culture as well as for the success EHS Performance as another effect.

D. EHS Performance

Accident information is carried out through an investigation process involving various witnesses, experts, leaders, K3 experts and other parties who need to be involved

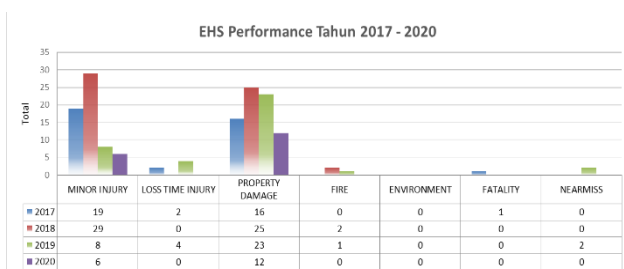


Fig. 7. EHS performance based on accident recorded

Referring to Fig. 7, an effect MI in 2020, There has been a decrease with 19 accident or Minus 25% Minor Injury Accident from previous year. Lost Time Injury has been a decrease with Zero accident or minus 400% from previous year. Property damage been a decrease with 12 accident or minus 45% PD accident from previous year. And zero

accident Fatality along in 3th previous year the absence of signs of life based on clinical features that perform medical examination. Nearmiss has been a decrease with Zero NM or minus 200% from previous year. Fire case has been a decrease with 1 accident or minus 100% from previous year. .And zero event along in 4th previous year in category Environmental pollution. The organization as an effort to protect companies and workers themselves with decreased accident rate minus 50%.

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The most accident recorded 12 or 71% cause of traffic accident. Traffic accident Which is does not yet provided from this campaign improvement of EHS, But it has been improvement by general affair as provider of equipment and facility by vehicle management system using another system which is not include from this researched. There was fire accident accident in februari 2020

The objective researched are known an effect campaign, But The number accident that had reduce could be from this improvement. From several analysis at the first the design was build from problem identification such hazard, investigation, expectation problem, etc, The second, improvement had goes well as EHS objective expectation in all operation including. The third an effect knowing hazard management to increase awareness EHS performance in many level fungsional. Another analysis the improvement can reduce the number accident.

An accident are would come from multiple causes from the uncontrolled hazard such as a new product, new process, new identification investigation etc, so improvement had been controlled the hazard, those effect can become a baseline data as prevent the accident. To convincing ability improvement to reduce the number of accident. the researched should be researched again the improvement for the next year. And It must be support as good as right protection from data campaign analysis. Develop as integrated with EHS management system and adopted as big data begin in Damabok to increase effect as operation and business risk management.

Another effect of improvement has become as a winner in holding company EHS contest in safety improvement and accident prevention category. Which is never won before. Therefore, the improvement has an effect the company research, with bring increase the image of the company and Similiar recognition are from customer but it was verbal of

voice of customer and does yet documented but it is have a broad disadvantage of business.

IV. CONCLUSION AND RECOMMENDATION

A. Conclusion

- Improvement EHS has running used as solution in the company research.
- Known effect use case test has been expected improvement concept and schedule plan previously. An effect use case application indentified another effect become tools terms of both validation and error handling processes for the user to running, corrective action and continual improvement.
- Known human error and biasess judgement has give an effect to become continue based line to corrective action and improvement. And indentified new opportunities.
- An effect of safety culture maturity level has reported value in 3.86 points or increase 0.8 points than previous year. It EHS Culture Ladder has exceed employee behavior from expected company policy. And become improvement as new indentification of performance.
- Effect Increase EHS Performance, by decreased accident rate minus 50% and increase brand image the company researched as subsidiaries group.

B. Recommendations

- In this study researched has known improvement and already adapt in heavy equipment business, it is can be used as a basis for compiling up-to-date analysis of the EHS management system. as maintain and improve safety culture, company obligation and customer needed.
- Regular evaluating and asking for both internal and external to the company. To addition having an increasing impact as EHS objectives, it can also support as business operation booster, appreciation and sustainability of the company's economy nationally.
- For next development and futher learning this improvement of campaign must be structured by adopted to big data begin from data integration in the company then develop as general accepted as international standart as best practice using framework Data Management Body of Knowledge (DAMA-DMBOK Guide).

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