Application of ICCTV and CVVR for intelligent transportation system with monitoring operations through a management to zero accident (OHS) in oil company: A case studies of Chevron Pacific Indonesia Company, Duri, Province of Riau

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Abstract. Competent human resources and workplace security are one of the main assets that serve as the operational drivers of the company to achieve high efficiency and productivity. This research is about the implementation of ICCTV and CVVR in supporting occupational health and safety to reduce the dangerous incident at PT Chevron Pacific Indonesia, Duri, Riau. The study to find out how the implementation of ICCTV and CVVR were affected in reducing the work accidents in oil and gas companies that implemented high technology and developed rapidly. The method used is the observation of data both directly and secondary, interviews or ask questions about / on the staff directly related to the application of ICCTV and CVVR. While the analysis technique is done descriptively by comparing the results of the research on the implementation of occupational safety and health with theories derived from the study of the library. From this research can be concluded that the functions and benefits of applying ICCTV and CVVR can reduce even no work accident during the last year of its implementation.

1. Introduction
Modern civilization with sophisticated machine tool uses high working accident and detrimental to the company [1]. Occupational health and safety (OHS) is one part of the standards relating to the safety, health, and welfare of workers in a job under the company's auspices. Health includes various aspects such as physical both mind and body should be in the protection while in the workplace to avoid harm in the form of injury or illness. Safety is related to physical conditions in the workplace and applies to circumstances where the risk of danger has been removed from being reduced [2]. Employee health and safety programs should be a top priority for management because they are safe to live, increase
productivity, and reduce costs. The Program should emphasize employee engagement, continuously monitoring, and overall health components [1]. The standard regulation is in regulation No. OHSAS18001:2007 which is a common standard implemented in almost all countries to provide a structural approach to health and safety management systems (OHS MSs), and organizations that wish to possess MS OHS that conform to these standards can be formally certified by the certification body [3]. Standard No. OHSAS 18001:2007, which is a standard occupational health and Safety (OHS), is widely accepted worldwide. Companies from different sectors and have different sizes apply these standards [4].

Many cases of occupational accidents in industry companies, especially oil and gas sectors, can occur at both upstream and downstream locations [5]. Cases of occupational accidents on the downstream are generally during the process of distribution of diesel fuel sources. Public complaints arise from the inconvenience of trucks – oil fuels transport tank trucks that use roads do not comply with prevailing traffic regulations [6]. Based on the driver's statement the truck user was due to the tank truck rider pursuing the target of the mobilize so that is driving his vehicles often violated the prevailing regulations. Besides also have a strong influence that can be affected their health of workers at the workplace. The low relative humidity (5 – 30%) and increase from occurrence of dry air and the sensory irritation of the upper airways and eye [7]. This is due to the un functionality in the application of occupational health and Safety (OHS) [8]. The cause of work accidents in the industry is caused by a very basic thing that is the functioning of the operational standard procedure. In today's era of supported with increasingly sophisticated science and technology, occupational health and safety is an important condition that must be implemented by the job organizer [9].

The application of CVVR (Comprehensive Video and Voice Recording) and ICCTV (Internet Closed Circuit Television) on the vehicle and monitoring of the workplace is crucial to minimize accidents and as tools for real time observation and intervention of behavior that is not safe at work. CVVR (Comprehensive Video and Voice Recording) is generally a portable tool used in the oil and gas industry to monitor and control employee activity in the working environment [10]. Internet Closed Circuit Television (CCTV) is a video camera device used to send signals in a closed pass via wireless as well as recording in the recordable media [11]. CCVR and ICCTV are one of the solutions that are considered capable of addressing and minimizing the occurrence of work accidents and achieving zero accident targets in related companies. The research aims to analyze the impacts on the use of CCVR and ICCTV against occupational accidents in transportation systems in oil and gas companies.

2. Methods

The study utilized a descriptive survey research design. The target populations for this study were all members of the employee and staff employed in the Chevron Pacific Indonesia [12]. The study used questionnaires and observation. Data was analyzed using quantitative techniques. For research that can be categorized into excitative research, which is the research aimed at explaining how a social phenomenon occurs to produce more complete research than descriptive research [13]. Validity tests for Pearson product moment correlation in practice, the use of validity test with rxy formula, Pearson Product Moment is a different test of the measuring instrument, which is a test that distinguishes between Group of with the bottom group, in the sense that the group answers should be able to answer (score 1) and the lower group should not be able to Answer (value score 0). Validity tests with Pearson product moment in practice, the use of validity test with rxy formula, Pearson Product Moment is a different test of the measuring instrument, which is a test that distinguishes between group of with the bottom group, in the sense that the group answers should be able to answer (score 1) and the lower group should not be able to Answer (value score 0) [14]. The parameters of the RXY test result are the magnitude Pearson correlation product-moment between 0.0 to 1 is said to be valid when Rxy size counts larger rxy table, > correlation coefficient of 0.50 [15]. The general formula of correlation coefficient Pearson product Moment is as follows:

\[
r = \frac{(N \Sigma X \cdot Y - \Sigma X \cdot \Sigma Y)}{\sqrt{(N \Sigma X^2 - (\Sigma X)^2) \cdot (N \Sigma Y^2 - (\Sigma Y)^2)}}
\]
Test normality used to test the Regression model, third-scale (free or with the normal distribution or at least close to normal [16]. In principle the normality can be detected View the data spread (dots) on the diagonal axis of the chart or by looking Histogram of the receipt as follows:

\[ Y = \beta_1 \cdot X_1 + \beta_2 \cdot X_2 + \beta_3 \cdot X_3 \]  

(2)

Where \( Y \) is change dependent (employee performance), \( A \) is constants, \( \beta_1, \beta_2, \beta_3 \) is coefficient of regression line, \( X_1, X_2, X_3 \) is independent change (impact Security, Health and Occupational safety) and \( E \) is error/Peubah Bully. Reliability tests were done with the Cronbach Alpha test. The Cronbach Alpha formula is as follows:

\[ \alpha = \left( \frac{K}{K-1} \right) \left( 1 - \frac{\Sigma Si^2}{\Sigma X^2} \right) \]

(3)

Where \( \alpha \) is the coefficient of reliability alpha Cronbach, \( K \) is several questions, \( \Sigma Si^2 \) is several item score variances, and \( \Sigma X^2 \) is a variance score \( K \) (all items \( K \)). Change dependent (employee performance), \( A \) is constants, \( \beta_1, \beta_2, \beta_3 \) is coefficient of the regression line, \( X_1, X_2, X_3 \) is independent change (impact Security, Health and Occupational safety) and \( E \) is error/Peubah Bully. If the value of alpha > 0.7 means sufficient reliability (sufficient reliability) while if Alpha > 0.80 It is suggestive of all the reliable items and all tests consistently internally because it has strong reliability or others have been the following like if Alpha > 0.90 then perfect reliability, the alpha is between 0.70 – 0.90 then high reliability, the alpha is between 0.50 – 0.70 then moderate reliability and the alpha is < 0.50 then low reliability [17].

3. Results and discussion

The results of the use of CCVR (Comprehensive Video and Voice Recording) and ICCTV (Internet Closed Circuit Television) in employee riders PT Chevron Pasific Indonesia, Duri, Riau showed that drivers are safely driving and have implemented safety procedures while driving by using safety belts or secuFrity due to strict supervision in order to create worker safety [18]. The effectiveness of CCVR and ICCTV use is very helpful for the company in controlling the workers from the actions performed and the conversation, so that the supervision of OHS can know the psychic condition of the worker or drivers (see in Figure 1).

![Figure 1. Truck drivers in oil and gas distribution, Tandun, Duri, Riau.](image)

Evidence and documentation travels on February 29, 2020 location of Pematang 11, indicating that Driver's normal driving speed is 40 Km/hour/road location near the intersection of the driver reduces the velocity [19]. The driver reduces the speed slowly and the buddy system informs the left and right
paths safely to be skipped out of the way the location at the general Asphalt road intersection of the
driver stops the vehicle while viewing the left lane and the right lane. LV Cars cross the road through
citizen settlements and slowly approach Jurong Road intersection. The street-crossing Jurong driver
stops and Buddy communication systems with drivers to ensure safe junctions to be skipped. Drivers
run following a secure path and keep the distance to the plate with general riders. For more detailed see
in Figure 2.

![Figure 2](image)

**Figure 2.** Evidence and documentation on trip location in Pematang (11) 29-02-2020.

| Table 1. Validity test before use of CVVR and ICCTV in year 2018 - 2020. |
|-------------------------------------------------|-----------------|-----------------|
| Indicators                                      | Corrected item-total indicator | Description    |
| The company performs hazard identification, assessment and risk control before applying OHS to its employees. | 0,626 | Valid |
| The company has a OHS procedure in accordance with the legislation and other requirements relating to the company's activities | 0,685 | Valid |
| The community around the company and the wider community is the target of OHS | 0,958 | Valid |
| The location where I work is one of the biggest construction companies in Indonesia | 0,958 | Valid |
| OHS management system that exists in the company makes workers minimize the level of mistakes in working | 0,538 | Valid |
| The OHS management system in the company makes workers strive to improve the quality of work | 0,958 | Valid |
| The existing OHS management system in the business can avoid the occurrence of accidents | 0,958 | Valid |
| In supervisory companies participate in hazard identification and make control efforts | 0,554 | Valid |
| The OHS management system that exists in the enterprise to make serving clients according to the target | 0,958 | Valid |
| The OHS management system that is in the company makes workers able to do the work independently | 0,685 | Valid |
Table 2. Validity test after use of CVVR and ICCTV in year 2018 - 2020.

| Indicators                                                                 | Corrected item-total indicator | Description |
|---------------------------------------------------------------------------|--------------------------------|-------------|
| The company performs hazard identification, assessment and risk control before applying OHS to its employees. | 0.626                          | Reliable    |
| The company has a OHS procedure in accordance with the legislation and other requirements relating to the company's activities | 0.685                          | Reliable    |
| The community around the company and the wider community is the target of OHS | 0.958                          | Reliable    |
| The location where work is one of the biggest construction companies in Indonesia | 0.958                          | Reliable    |
| OHS management system that exists in the company makes workers minimize the level of mistakes in working | 0.538                          | Reliable    |
| The OHS management system in the company makes workers strive to improve the quality of work | 0.958                          | Reliable    |
| The existing OHS management system in the business can avoid the occurrence of accidents | 0.958                          | Reliable    |
| In supervisory companies participate in hazard identification and make control efforts | 0.554                          | Reliable    |
| OHS management system that exists in the enterprise to make serving clients according to the target | 0.958                          | Reliable    |
| The level of safety and employee preparedness is increased due to strict supervision and integrated so that if any employee does not conform to company standards will be immediately dealt with firmly. | 0.685                          | Reliable    |

Based on the validation test in table 1 before and after the use of CVVR and ICCTV in 2018 – 2020 PT. Chevron Pacific Indonesia, Duri, Riau showed the overall reliability results. This results showed that the effectiveness in the application of CVVR and ICCTV for the occupational safety and Health of the company conducting hazard identification, assessment and risk control before applying OHS to its employees the company has an OHS procedure that has been adapted to the laws and type of the company. The level of safety and employee preparedness is increased due to strict supervision and integrated so that if an employee does not conform to the company's standards will be immediately dealt with firmly, it will be possible to reduce the level of employment accidents that will impact the increase in the productivity of the company and minimize the cost expenditure.

4. Conclusion
Based on the results of research that has been done using CCVR (Comprehensive Video and Voice Recording) and ICCTV (Internet Closed Circuit Television) in PT. Chevron Pasific Indonesia Company, Duri, Riau had an impact on the absence of a work accident in the years 2018 – 2019 and test validation results showed valid data. The level of employee preparedness is increasing because the system has been overseeing and directly cracking down if there are employees who do the work does not conform to the safety standards applicable in the company.

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