Preliminary Study of the Safety Culture in a Manufacturing Industry

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Abstract

Safety culture plays a key function in determining an organization's success or failure. An organization with a poor or negative safety culture might recognize the list of corrective actions, and perhaps need guidance to improve its safety culture. Therefore, this paper aims to explore the perception of employees towards safety culture in a manufacturing industry by using safety climate questionnaire. The finding of this research will be a guideline to propose a better working condition so that the safety culture can be created. Respondents were asked to answer two sections question which are question about respondents' demography and question about safety climate, respectively. Seven factors in the safety climate questionnaire have been used to measure safety culture: safety management system and procedure, management commitment, safety attitudes, workmate's influences, employee's involvement, safety knowledge, and safety behavior. The result shows that, employees have positive perceptions towards safety management system and procedures that implemented in the organization, workmate's influence, employee involvement, safety knowledge and safety behavior. In contrast however, employees' perceptions towards management commitment are negative, whereby they felt that management commitments in term of safety and health in the organization is still weak. For the factor of safety attitude, the positive and negative perceptions are equal.

Keywords: Safety culture, Manufacturing Industry

1.0 Introduction

A combination of workplace safety and large scale disaster has encouraged high risk industries to reduce the potential workplace incidents and accidents with routine tasks. This idea encourages the promotion of a homogenous worldwide safety culture which has attracted much attention across a broad spectrum of industries such as offshore, manufacturing, shipping, nuclear, airports, mining and construction. Safety culture can be considered as a viable technique of controlling workforce beliefs, attitudes, and behaviors with regard to safety (Beck & Woolfson, 1999). Ritcher and Koch (2004) described the ideal safety culture as the shared and learned meaning, experiences and interpretation of work and safety – expressed partially symbolically – which guide peoples. Safety culture plays a key function in determining an organization's success or failure. A development of positive safety culture provided little guidance on how organizations might improve safety performance. A goal of positive safety culture is to create an atmosphere in which employees are aware of the risk in their workplace, continually on guard against them, and avoid taking any unsafe actions (Ostrom et. al., 1993).

Muniz and co-workers suggested that a positive safety culture is a set of values, perceptions, attitudes and patterns of behavior with regard to safety shared by members of the organization. It is a set of policies, practices and procedures which relate to reduce employees' exposure to occupational risk, implemented at every level of the organization, and reflecting a high level of concern and commitment to the prevention of accidents and illness. After the Chernobyl disaster (1986), the term of 'safety culture' appeared largely in scientific debated on safety (Cooper, 2000). According to *Safety Culture: A report by the International Nuclear Safety Advisory Group*, the definition of safety culture focused on two dominant components which are good safety attitudes and assigning the highest priority to safety (INSAG, 1991). In 1993, the concept of safety cultures has evolved by concerning the three new focuses of social system; (i) its scopes; (ii) knowledge of workers about it; and (iii) their commitment to make it works.

Thus, *Advisory Committee on the Safety of Nuclear Installation* (ACSNI) revealed that the safety culture of organization refers to the product of individual and groups values, attitudes perceptions, competencies and patterns of behavior that determine the commitment to and the style and proficiency of an organization's health and safety management.

The latest definition of safety culture is proposed by Fang and co-workers: a set of prevailing indicators, beliefs and that the organization owns in safety. In practice, creating or engineering a safety culture is due to the goal-directed of various organizational characteristics by considering the impact upon safety management practices. The specific principles are reductions in number of accidents and incidents, ensuring that safety issues receive appropriate attention, ensuring that organizational members share the same ideas and beliefs about risks, accidents, and ill related to health and, determining the style and proficiency of an organization's health and safety programs. Many experts and academics believed that the key factors in developing an environment conducive to a positive safety culture include: (1) management (Cox and Cheyne, 2000), (2) individual and behavioral (workforce) (Cooper, 2000) and (3) rules and procedures (HSE, 1997). These factors and their elements are summarized in Table 1.

Table 1: Factors that contribute to safety culture (Farrington-Darby et al., 2005)

Management	Management commitment	Reporting system	Reporting near misses
	Ability		Open door policy
	Leadership		No blame culture
	Participatory style		Analysis
	Communication		Risk / incident analysis
	Flexible culture		Confidentiality
	Co-ordination		Feedback
Individual and behavioral	Involvement	Immediate supervisors	Leading by example
	Competency	Supervisor subordinate relationship	Open door policy
	Training		Participation
	Attitude		Support correct behavior
	Behavior		
Rules	Clear	Communication	Visibility of leadership
	Practical		Style
			Commitment

MacDonald et. al., (2000) claimed that the reason for many accidents (especially in airlines industry) is deeply linked in organizational and management factors. Incompatibility management policies and practices may cause a fuzzy understanding about priorities (Thompson, 1999). It stated that the safety communication, safety training and safety systems must be considered for developing and measuring an organizational safety climate. Reason (1998) mentioned that safety cultures respond to conditions, past events, the leadership within organization and the overall attitude of the workplace. Since the concept of safety culture developed, there has been comprehensive research that has been carried out to establish the model of safety culture. A safety culture model explained the manner in which safety culture in consideration to be embedded in the organization's practices and safety management systems (Choudhry et al., 2007). Geller (1994) presented a model that has discriminated three dynamic and interactive factors consist of person, behavior and environment.

He mentioned that 'a total safety culture' within the workplace can be accomplished by utilized 10 importance principles. These principles include employee driven safety rules and procedures; a behavior based approach; a focus on safety processes not outcomes; a view of behavior being directed by activators and motivated by consequence; focus on achieving success, not on avoiding failure; observation and feedback on work practices; effective feedback through behavior based coaching; observation and coaching as key activities; the importance of self esteem; belonging and empowerment; and safety as a priority rather than a value. In 2000, Cooper proposed the Reciprocal Safety Culture model by adopting the Bandura's model of Reciprocal Determinism which derived from Social Cognitive Theory (SCT). This model suggested that the concept of safety culture to facilitate the measurement and quantification of safety culture.

It constitutes of three dominant dimensions of safety culture such as psychological (people; the values and beliefs that inspire their behavior), jobs (behavioral; brought to the surface through the observable practices) and organization (situational; an international organization's environment reinforced the preferred behavior and the adaptability on the safety). Besides, a triangulation of these factors can be acknowledged in; (1) safety culture definitions, (2) accident causation theories (Adam, 1976), (3) work conducted to identify the organizational systems (Cohen, 1977), (4) modes of organizational behavior and people's psychological attributes and, (5) research examining why cultural change initiatives (Cooper and Philips, 1994). This model also offers self – regulatory processes based on a top – down approach practices that are concerned with minimizing the exposure to conditions considered dangerous or injurious to the entire group members (Faridah et al., 2004).

The Reciprocal Safety Culture model presents an integrative way of thinking about many processes that impact on safety culture, a set of measurement techniques that do not depend solely on incident or accident index and, a dynamic framework that can be performed a multilevel analysis of the safety culture. It also emphasized that the safety culture can be measured by examining the reciprocal interaction between safety management systems; people perceptions about safety and people's actual safety related behavior (Cooper, 2002). The psychological dimension can be measured by using safety climate questions which assessed the people's perception and attitudes of safety. Zohar (1988) mentioned the dimensions covering workers perceptions of the importance safety training, management's attitude toward safety, effects of safe conduct on promotion, level risk at workplace, effects of work pace on safety, status of safety officer, effects of safe conduct on social status, and status of the safety committee. Actual safety related behaviors can be examined by checklist developed as part of behavioral safety initiatives. The behavioral dimension can be evaluated via peer observations, self reporting and outcome measures. The organizational dimension can be measured via safety management systems audits/inspections where it analyzed the structure of management systems, policies and working procedures (Choudhry et al., 2007).

1.1 Safety culture in Malaysian manufacturing industry

During 2010, the statistic of occupational accident in Malaysia illustrated that the highest non-permanent and permanent disabilities were involved by manufacturing industry (DOSH Malaysia, 2010). Thus, accidents and their consequences continue to be a major public health concern. Besides, the Occupational Safety and Health Act (OSHA) 1994 stated that the self regulation concept was promulgated based on the primary responsibility of ensuring safety, health and welfare of all persons at all places of work. Therefore, an introduction of safety culture can be seen as a systematic solution towards the establishment of zero accidents in the workplace. According to this scenario, this study was carried out to measure the safety culture in Malaysian in manufacturing industry. Choudhry and co-workers (2007) suggested that the dimension of safety culture can be assessed independently or in combination of qualitative and quantitative methods. An intention of this study was focused on such as safety management systems and procedures (situational), management commitment (behavioral), employee involvement (behavioral), safety attitudes (psychological), workmate influence (psychological), safety knowledge (psychological) and safety behavior (psychological).

2.0 Methodology

2.1 Sample

The survey is conducted at a manufacturing industry located at Pahang, Malaysia. A safety climate questionnaire was distributed to thirty employees who took place at manufacture of concrete tower. The numbers of respondents in this research are 30 respondents and all of them are male. The age range is from 21 years old until 36 years old and above. Researchers also take account into work experience for this survey.

2.2 Instrument

Respondents were asked to answer two sections question which are question about respondents' demography and question about safety climate, respectively. In the second section, respondents were asked to answer each question using a five-point Likert-scale ranging from '1: Strongly agree' to '5: Strongly disagree'. Seven factors in the safety climate questionnaire have been used to measure safety culture: safety management system and procedure, management commitment, safety attitudes, workmate's influences, employee's involvement, safety knowledge, and safety behavior. The collected results then have been analyzed using Microsoft Excel.

3.0 Result and Discussion

3.1 Demographic

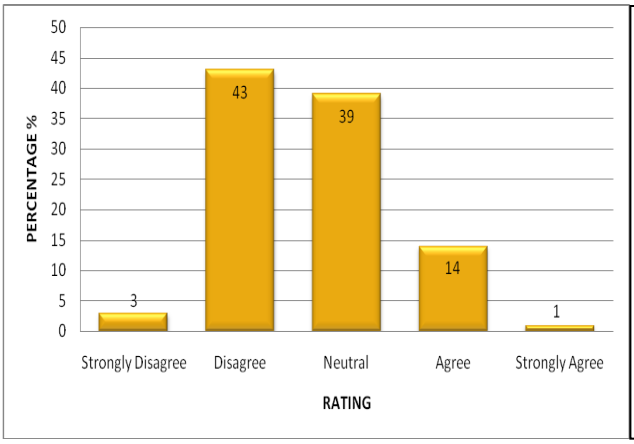
Table 2 shows the profile of study sample that have been obtained in this study. Majority of the respondents are in the range of 26 – 30 years old which is contribute to 46%. Two workers are from the category of 21-25 years and the percentage for this category is 6% and meanwhile eleven workers fall into the category of 31-35 years with 36%. The remaining three workers belong to the category of 36 years and above. The percentage of this category is 10%.

Table 2: Profile of study sample

Item and response category	N=30 N	Percentage (%)
Age		
21 - 25	2	6
26 - 30	14	46
31 - 35	11	36
36 and above	3	10
Education Level		
Secondary	10	33
Certificate/Diploma	15	50
College/Higher	5	16
Length of Experience		
Less than 3 years	4	13
3-10 years	11	36
11-15 years	9	30
16 – 20 years	4	13
More than 20 years	2	6

In term of education experience, 33% of them have the lowest level of education experience which is secondary school. Fifteen workers have certificate/diploma which is 50% the highest percentage for education experience. Five workers (16%) have college/higher education experience and most of the workers have appropriate education level. In term of developing competency in an individual, education is the important element (Shaikhah et al., 2009). With appropriate education, people will having appropriate knowledge that is good to individual in term of meeting any job compliance as well as for his/her personal development. In the distribution of working experience four workers have less than 3 years working experience and the percentage is 13%. Workers who have work experience of 3-10 years are eleven and the percentage is 36%. For more than 20 years work experience are two of them (6%). Results showed that more than 50% of respondents are having more than 10 years working experience. In that case, their expertise could be classified as good as long as term practices and coaching are contributed to excellent work performance (Chassy & Gobet, 2010).

1st Safety Climate Factor: Safety Management Systems and Procedures



Items in the questions:

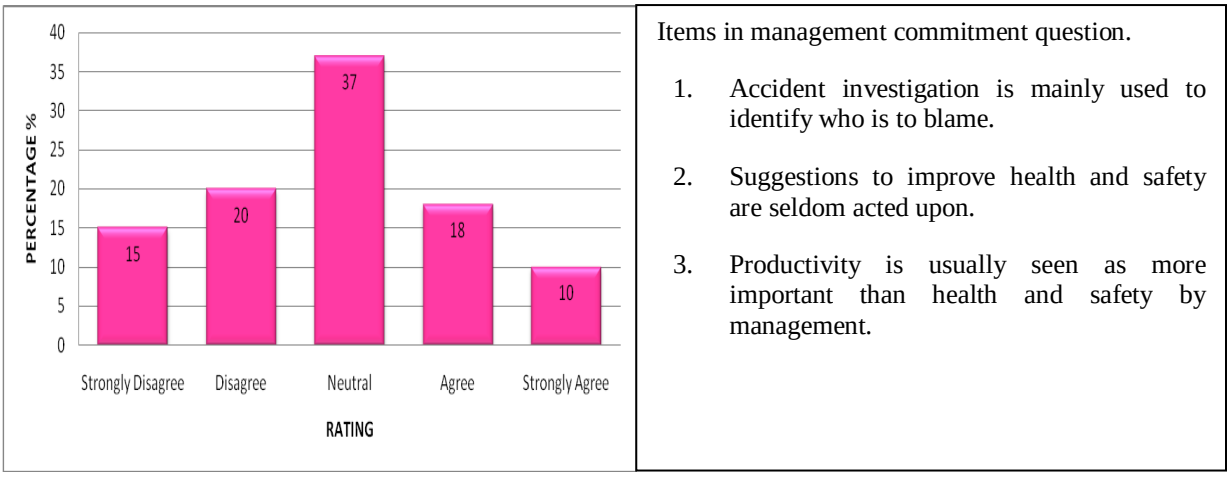
1. Some job here are difficult to do safely
2. Some health and safety procedure/instruction rules do not reflect how the job is now done
3. Some health and safety procedure/instruction/rules are difficult to follow.
4. The permit towards system is over the top given the real risk of some of the jobs it is used for.

Figure1 Safety management systems and procedures

The Figure 1 above shows the agreement or disagreement of workers towards their safety management system and procedure in the workplace.

According to the graph, disagree take the huge portion which are 43%, then followed by neutral which is 39%. Strongly agree is the least which is 1%. Agree and strongly disagree make up 14% and 3% respectively. As per stated in the figure, most of the respondents are disagreed with the prepared questions which indicate that the organization's safety management systems and procedures are in place.

2nd Safety Climate Factor: Management Commitment



Items in management commitment question.

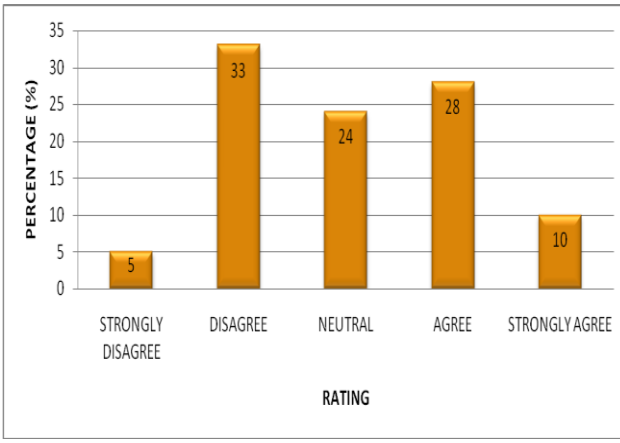
1. Accident investigation is mainly used to identify who is to blame.
2. Suggestions to improve health and safety are seldom acted upon.
3. Productivity is usually seen as more important than health and safety by management.

Figure 2 Management commitment

Figure 2 above illustrates the percentage of workers perception towards management commitment in the organization. Neutral perception regarding to the prepared questions has the highest percentage for the management commitments while, strongly agree is the least percentage. The finding revealed that the commitment from the managerial level in order to create and promote safety culture is still weak. Putting more priority in making profit instead of workers, safety is not acceptable at all. However, it is what some workers felt about their management. This is proven by the expression made by some of the workers through the survey.

In addition, there are shown that some workers still not fully understand with the purpose of conducting accident investigations. They assumed that, it is made to find who's to be blame in any accident or incident rather than to focus on reoccurrence of accident or incident prevention. This ineffective communication between both parties, which is the employees and the employer, may be due to negative transfer of different culture they nurtured before (Xiaohong, 2009). Most of them also agreed that there is no enforcement in enhancement of safety and health issues being proposed.

3rd Safety Climate Factor: Safety Attitude



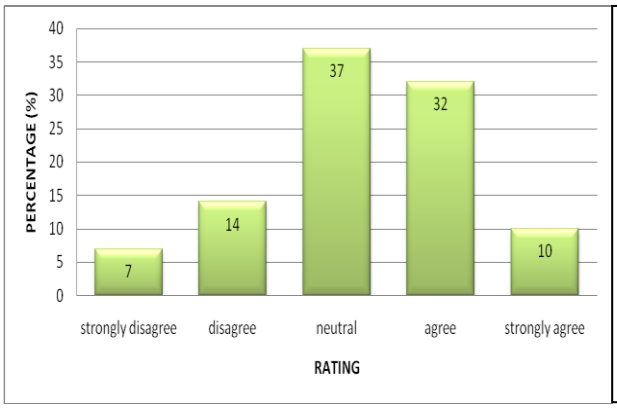
Items in the safety attitudes question

1. The permit to work systems is over the top given the real risk of some of the jobs is used for.
2. Safety publications and posters have little influence of the awareness and behavior of people here.
3. Health and safety is not my problem.
4. People are just unlucky to suffer an accident.

Figure 3 Safety attitude

Figure 3 shows the percentage of workers' attitude and perception towards safety issue in the organization. As illustrated by the bar chart, there are same agreements of negative and positive perceptions towards safety attitude, with 38% respectively. The rest 24% of respondents have neutral perception. Based on the results it shown that safety attitude among the respondents is not strong enough. Everybody needs to feel that safety is everyone's responsibility in order to create the safety culture in the organization.

4th Safety Climate Factor: Workmate's Influences



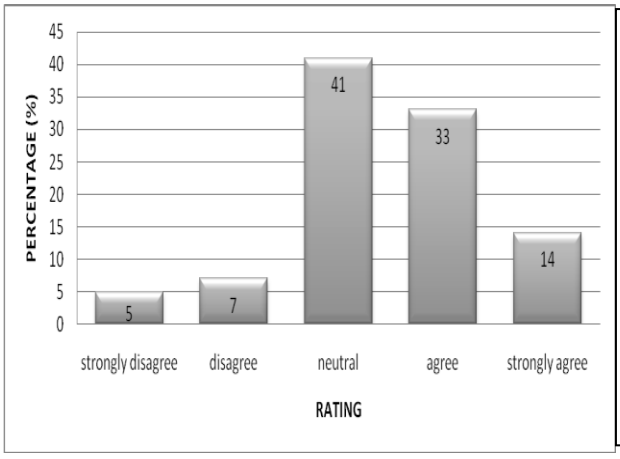
Items in workmate's influences questions

1. My workmates would react strongly against people who break health and safety procedure/instructions/rules.
2. All the people who work in my team are fully committed to health and safety.
3. It is important for me to work safely if I am to keep the respect of the other in my team.

Figure 4Workmate's influence

The Figure 4 shows the percentage of workers perception on workmate's influences at the manufacturing industry. Most of the respondents have chosen neutral for their workmate's influence questions. While majority of the respondents agreed with the prepared questions. From the results, it shows that most of the respondents feel that in taking care of safety in the organization, more or less, workmate's influence will give some effects in the decision making.

5th Safety Climate Factor: Employee's Involvement



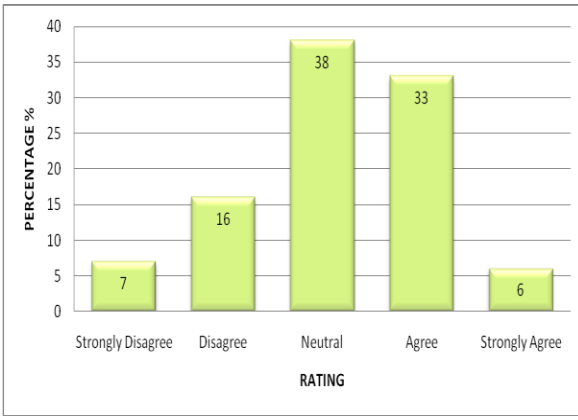
Items in employee's involvement questions

1. I feel involved when help and safety procedures/instructions/rules are developed or reviewed.
2. I am always informed of the outcomes of safety committee meeting which address health and safety.
3. The company shows interest in my views on health and safety.

Figure 5 Employee's involvement

The figure 5 shows the percentage of workers' perception on employee's involvement at the organization. As shown in the chart, neutral has the highest percentage for employee's involvement while strongly disagreed is the least of employee's involvement. However 47% of total respondents agreed with the items that have been asked in the factor of employee's involvement. It can be concluded majority of employees felt that every time safety is a concern in the organization, each of them either direct or directly will be involved in that particular matter.

6th Safety Climate Factor: Safety Knowledge



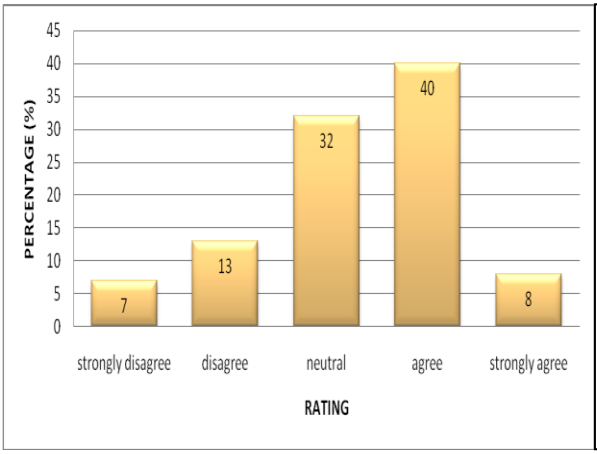
Items in safety knowledge questions:

1. I have little knowledge about safety.
2. I understand necessary safety information and general hazard onsite.
3. I understand on job-specific hazard.
4. I know how to control or avoid all potential according to safety procedure in my work.
5. I am highly recognized by my immediate boss and workmates for my experience and Safety knowledge.

Figure 6 Safety knowledge

The figure 6 illustrates the percentage of workers perception on safety knowledge and according to the figure, both neutral and agree parts dominate the total perception of respondents towards safety knowledge. Only 23% of total respondents under disagree part while 39% are in agree part. Based on the obtained result, it indicates that, most of the respondents in the organization have the knowledge to work safely for the example, they know about hazard in the specific job, the control measure that need to be taken in avoiding any accident to happen and any necessary information regarding to their job task.

7th Safety Climate Factor: Safety Behavior



Items in safety behavior questions:

1. I haven't had any injury, incident or accident, whether reportable or not, while working here.
2. I have seldom broken safety procedures/instructions/rules while working here.

Figure 7 Safety behavior

The Figures 7 above shows the percentage of workers perception on safety behavior at the manufacturing industry. As shown by the chart, almost half of total respondents agreed with the prepared questions to identify their perceptions towards safety behavior. While, 32% chose neutral and the rest 20% disagreed with the questions. Based on the result, it indicates that, most of the respondents confessed that they are most of the times follow any rules, procedures and instruction while doing their job and they also have no experience in any incident and accident while performing their task.

Conclusion

The objective of doing the safety climate survey is to investigate the safety culture in manufacturing industry. To fulfill the objective of this study, seven factors in the safety climate questionnairse have been used to measure safety culture: safety management system and procedure, management commitment, safety attitudes, workmate's influences, employee's involvement, safety knowledge, and safety behavior . From the selected manufacturing industry, result shows that, employees have positive perceptions towards safety management system and procedures that implemented in the organization, workmate's influence, employee involvement, safety knowledge and safety behavior.

In contrast however, employees' perceptions towards management commitment are negative, whereby they felt that management commitments in term of safety and health in the organization is still weak. For the factor of safety attitude, both parties, which is positive and egative perceptions is equal. The results that have been obtained in this study will be beneficial in term of correcting and improving the current implementation in the organization so that the useful intervention can be made to improve safety and health in the workplace. People knew that, safety culture is not a one day implementation; it is an on-going instillation to the work environment. In conclusion, to create the safety culture, the management must ensure all machinery; engineering and workplace related issues have been catered first. Sense of belonging must first been taken into consideration before any other aspect of safety culture being instilled. Both the management and employees need to play their own roles and responsibility in order to ensure the objective of safety culture is achieved.

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