DEVELOPING SAFETY MODEL BEHAVIORAL
FOR TECHNICIAN IN AIRCRAFT MAINTENANCE ORGANIZATION
IN INDONESIA

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Abstract. Safety is a key performance measure in the air transportation industry. Not infrequently the accidents that occur in air transport industry will develop into an organizational crisis. Organizational factors are a set of conditions that provide a context for human behavior in the form of actions and decisions. They arise from the dynamic interaction of organizational members to realize organizational goals. Zohar & Luria (2005), Griffin & Neal (2000) describe a safety climate expressed as a shared perception of employees about the safety of an organization. Error reports are used for administrative purposes such as documenting error situations rather than understanding the causal factors that lead to those errors This paper examines organizational design factors for unsafe reporting behavior through safety climate mediation

Keywords: Organizational design; Safety climate; unsafe Behavior

Introduction. Many findings indicate that the accident factor is caused by Human Error, but if further traced Human Error happens is the contribution of the organization or company. Human factors are still the main cause of flight events. In the Flight Safety Foundation (2011) report, it is explained that Human error is the main cause of almost 80% of aviation accidents, only 20% are associated with technical issues. Although flight safety has improved over time and the number of airline accidents has decreased, our desire to have a 100% secure flight is still far from being achieved. In terms of aviation technology advancements that have been very high, the human factor remains the weakest thing in air transport. Reason (1990) explains that an aviation accident can occur due to Organizational Influences (the influence of organizing and management policies in the event of an accident), Unsafe Supervision, Precondition for Unsafe Act (Unsafe Act) and unsafe Act. Some theories mention the causes of accidents mostly related to occupational safety (Hale and Hale, 1972, Benner, 1975, Smillie and Ayoub, 1976). Many theories focus on unsafe behavior or mistakes by individuals. In this study examines the organizational climate shown by the structural dimension and environmental dimension of unsafe reporting behavior through safety climate mediation.

In the aviation many interrelated of institutions to provide air transport services such as airports, airlines, ATC. The airline supported by activities of operations and maintenance. Maintenances Company as an institution that keeps the aircraft operational properly and safely to support airline operations. In this study aircraft maintenance became the object of research. The organization's climate as a social system is influenced by the internal and external environment. The internal environment includes job design, technology applications, organizational culture, managerial practices, and organizational characteristics. While the external environment includes the social, economic environment, where the organization resides. Internal and external environmental guidelines affect the activities of norms, attitudes, and executions of roles that ultimately affect productivity, satisfaction, organizational growth (Sujak,1990).

Modeling theory. The organizational climate is believed by Litwin and Stringer in Sergiovanni and Starrat (1979) as a result of the formal system, leadership style, and other important environmental factors on the attitudes, beliefs, values and motivations of people working within an organization. The organization's climate relates to the repetitive patterns of behavior shown in the daily environment of the organization, as the experience, understanding, and interpretation of individuals within the organization (Ekvall, 2001). It is about a person's perceptions that influence attitudes and behaviors in work such as performance and productivity levels. Meanwhile, according to Handoko (1996), the organizational climate provides a pleasant work environment or unpleasant for people in the organization where this further affects employee job satisfaction.

Omega Factor (Mosleh & Golfeiz, 1999) is an organization with a model not just a set of factors. The organizational model is a descriptive or predictive representation of how the organization affects worker and product performance. This model considers both structural as well as aspects of organizational behavior. structural aspects refers to (1) the position of the organization (e.g., general manager, unit manager, maintenance of workers, etc.) and (2) divisions of organization, group, work unit, etc. Conversely, behavioral aspects refer to (1) community responsibility (e.g., formal job specifications), (2) goals, performance benchmarks, and products from organization, or division, unit, group, etc., (3) the means and processes used for production and achieving the objectives, and (4) the above attributes and characteristics. The organization model recognizes the relationship between elements. Relationships can be implicit positions (e.g., relative an element in the model, e.g., supremacy of the manager over the worker in the hierarchy organization), or explicit (e.g., a worker's dependence on doing his work on the availability of training tools and quality). But approach to the development of this model is very focused on formal relationships, effectively ignoring the very important informal networks.

Organizational design encompasses a series of decisions about structures that define accountability and responsibility and enable the implementation of organizational goals (Miller & Friesen, 1984).

Daft (2012) explains to understand the organization looking at features which illustrates the hallmark of organizational design. There are two types of organizational interaction features: structural dimensions and contingency factors. The main structural dimensions of the organization include formalization, specialization, hierarchy of authority, and centralization. Formalization relates to the amount of written documentation in the organization. Specialization is the extent to which organizational tasks are divided into separate jobs. The authority hierarchy describes who reports to whom and the span of control for each manager. Decentralization refers to a hierarchical level that has the authority to make decisions. In this study tested Formalization, Hierarchy of authority and Decentralization. Contingency factors, including size, organizational technology, external environment, goals and strategies, and organizational culture. In this study, the environment is taken. The environment includes all elements beyond the boundaries of the organization, namely competition and human resources.

Wiegmann et al (2002) defined Safety Climate as the measurement of transient state of Culture Safety, subject to the similarity between the individual's perception of the organization. So it was based-situational, referring to the perceived safety of the state in a certain place at a certain time, relatively unstable, and can change depending on the features of the current environment or the prevailing conditions. There are five variables proposed, namely the Organizational Commitment, Involvement Management, Employee Empowerment, Reward System, and Reporting System.

Dedobbeleer and Beland (1991) of the Construction, the US Occupational Safety defined climate as the individual attributes to safety. There are two variables proposed, namely Management Commitment to Safety and Worker Involvement in Safety.

Griffin and Neal (2000) defines Safety Climate as a higher factor consisting of more specific first order factors. The first order of safety climate factors must reflect the perception of the policies, procedures related to safety and efficacy. The higher the order of a factor of safety climate should reflect the extent to which employees believe that salvation valued in the organization. There are four variables proposed namely Management Value, Safety Inspection, Personnel Training and Safety Communications.

The selected safety climate measurement model is the NOSACQ-50 Model, a model developed by the Nordic Team representing the dimensions of other safety climate measurement models. The NOSACQ-50 model is developed with 7 dimensions, including: the dimensions of commitment and the capability of work safety management, the dimensions of the empowerment of safety management, the dimension of justice of safety management, the dimensions of workers' commitment to safety, the safety priority dimensions of workers and the non-tolerance of hazard risk, , communication, and belief, and the belief dimension to the effectiveness of occupational safety system, in this study are the dimensions of work safety management commitment and dimension, the dimension of the empowerment of safety management, the dimension of work safety management justice, the dimension of worker's commitment to safety, worker safety. Safety performance is viewed as reflecting behaviors, rather than outcomes" (Sackett, 2002). For example, violation of safety procedures is a behavior which might put individual, others, and organization at risk.

Understanding the importance of safety performance is critical for guiding management efforts toward the enhancement of safe work behavior. Burke, Sarpy, Tesluk, and Smith-Crowe (2002) defined general safety performance as individuals' behaviors that exhibit to encourage the health and safety of workers and environment. Fogarty and Buikstra (2008) have used self-reported errors and violations behaviors to measure safety performance in aviation maintenance. For self-report unsafe behaviors, managers should encourage employees to report nearmisses without fear of disciplinary action and blame, so they can look at potential failures or hazards which could lead to future accidents (Ball & Procter, 1994). Maintenance technicians may hesitate to report their own errors and violations for fear of reprisal from management. Therefore, any maintenance-error reporting system will likely require some level of immunity to disciplinary action to be successful (Goldman, Fiedler, & King, 2002). Most of error reports are used for administrative purposes such as documenting error situations rather than understanding the causal factors that lead to those errors (Latorella & Drury, 1992). Some punitive safety systems emphasize on reporting safety outcomes more than safety behaviors such as reporting safety concerns and thus they may discourage individuals to further report these kinds of concerns (Probst & Estrada, 2010). Finally, reporting behavior is most influenced by managers' reactions to reports (Clarke, 1998).

Method and hypotesis. The formulate the following hypotheses were tested :

Hypothesis H1: The organizational structure positively influences the safety climate.

Hypothesis H2. Environment postively influence the safety climate

Hypothesis H3. Climate safety as mediation positively affects the unsafe Behavioral report

Sample

Derived from the observation of 200 respondents working in the organization of aircraft maintenance. Aged between 21 to 30% are 69%, aged between 31-40 are 10%, aged between 41 and 50 are 14%, and aged between 51 - 55 are 7%. Male are 97% female are 3%. High school education as much as 68%, D3 as much as 22%, D4 and S1 as much as 10%. Work as technicians 90 % and Supervisor 7% and 3% were Asistant Manager. Respondent Experience working on Aircraft Maintenance Organization 48% have more 6 years, between 3 – 6 years were 17%, and less than 3 year were 35%. Respondents who have trained between 1 -3 times as much as 60%, 4- 6 times 8.6%, more than 7 times 4.6%, and never trained 28.67%.

Measures

The questionnaires, which involved 69 questions. The collected data were analyzed by structural equation modeling

(SEM).

Organizational Design.

Daft (2012) explain that the organization interaction features happen from structural dimensions and contingency factors in this study is Environment. Structural described by 16 questions and Environment descriped by 10 questions. Respondent chose on five scale ranging from (1) Strongly Agree to (5) Strongly Disagree.

Safety Climate

Thirty five assessed perceptions of safety Climate used by 5 dimension of Noscaq-50. Respondent chose on five scale ranging from (1) Strongly Agree to (5) Strongly Disagree.

Unsave Act

Griffin and Neal (2000) describe safety compliance and safety participation as represented by safety behavior in the way maintenance errors occur. Reason describes the unsafe behavior consists of error and violations. Reason also explained that it is important to know that violations and error are recognized by workers as unsafe. In this study used 8 questions on five scale ranging from (1) Never to (5) Very often. **Experimental result.** The variable of structure indicator is 16 variable and has $\lambda > 0,5$ with CR value 0,966 and VE = 0,655. Environment indicator variable is 10 and has $\lambda > 0,5$ with CR value = 0,973 and VE = 0,785. The Safety Climate indicator variable is 35 and has $\lambda > 0.5$ with CR = 0.994 and VE = 0.763. Unsafe Behavior variables are 8 variables and have $\lambda > 0.5$ with CR = 0.955 and VE = 0,729
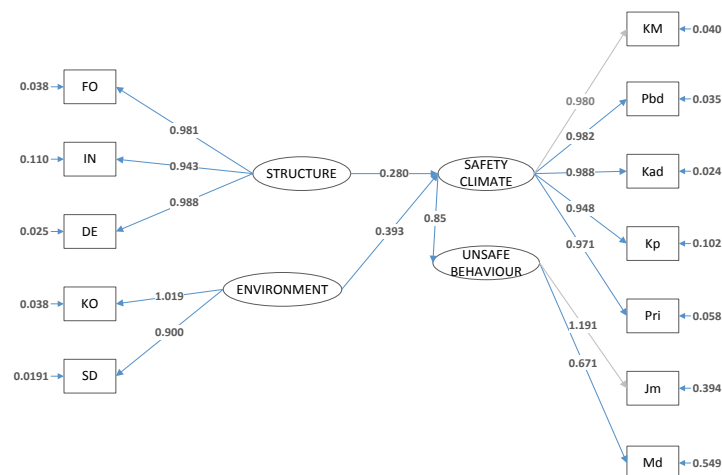

Fig 1. Final model from strucutral Equation Modeling (SEM) analysis

So it can be said that the all variable that forms the construct has value of $CR \geq 0.78$ and the value of $VE \geq 0.5$ which means that all constructs are said to be reliable, then the variabels can be used to this study. Measurement model can be seen in Fig. 1 that the influence of Structure variable to the safety climate is 0.280. The influence of Environment variable is 0.393 to the safety climate. Effect of Safety Climate variable on Unsave Behavior variable is 0.85. The output with Lisrel v8.7 shows that the value of R^2 for each measurement equation, safety climate variables affect all indicators are <0.5. Unsafe Behavior variables affect the all indicators are > 0.5, Structural variables affect all indicators are > 0.5, the Environment variable affect the indicators are <0.5. The value of R^2 for each structural equation, Structure variable and environment variable affect the safety climate variable equal to 1.80, the variable of safety climate has an effect on the Behavior unsafe is 0.82.

Fit Test Model. Probability Value (P-value) of 0.0107 which means that the model is correct. The model match value is represented by Chi-square of 71.94 which means, this model is poor. Goodness of Fit Test (GFI) is 0.8 which means that this model has a high fit, Root Mean Square Error of Approximation (RMSEA) of 0.056 this model is in general still considered ideal. Root Mean Square Residual (RMR) of 0.072 this model is still considered good. The model match based on the model matching index represented by the Normed Fit Index (NFI) of 0.56 which means the model is considered good, Comparative Fit Index (CFI) of 0.61 means the model is considered good, Adjusted Goodness of Fit Index (AGFI) of 0.89 means the model is still considered well. Parsimony Goodness of Fit Index (PGFI) of 0.55 means the model is still considered good enough. The results of this study have implications for both research and practice. First, this study shows that the safety climate is related to the design of the organization in general. This finding suggests that interventions designed to improve overall organizational design may have a positive impact on the safety climate. The findings also indicate that interventions specifically aimed at improving the safety climate (e.g. training, stressing the importance of safety) will be more effective when done in the context of a positive general organization design. Second, this study provides valuable evidence of the relative impact of the general climate shape on behavior. The results show that a specific climate for safety will have a positive impact on improving safety behavior.

Conclusions. The results provide empirical support for the proposed theoretical model. This study demonstrates that general organizational design can influence the perceptions of the safety climate, and that these safety climate perceptions influence reports of unsafe behavior. These findings provide valuable guidance for researchers and practitioners who are trying to identify mechanisms that can be done to improve safety behavior

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