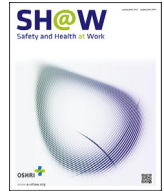




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Original Article

Proposal for an Evaluation Method for the Performance of Work Procedures

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ABSTRACT

Background: Noncompliance of operators with work procedures is a recurrent problem. This human behavior has been said to be situational and studied by many different approaches (ergonomic and others), which consider the noncompliance with work procedures to be obvious and seek to analyze its causes as well as consequences.

Methods: The object of the proposed method is to solve this problem by focusing on the performance of work procedures and ensuring improved performance on a continuous basis.

Results: This study has multiple results: (1) assessment of the work procedures' performance by a multicriteria approach; (2) the use of a continuous improvement approach as a framework for the sustainability of the assessment method of work procedures' performance; and (3) adaptation of the Stop-Card as a facilitator support for continuous improvement of work procedures.

Conclusion: The proposed method emphasizes to put in value the inputs of continuous improvement of the work procedures in relation with the conventional approaches which adopt the obvious evidence of the noncompliance to the working procedures and seek to analyze the cause–effect relationships related to this unacceptable phenomenon, especially in strategic industry.

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1. Introduction

Work procedures (WPs), which are considered as safety rules [1], are operational principles created to protect the operator against all threats to health [2]. In spite of their important roles in health and safety at work, these WPs are not systematically respected by operators [3].

The specialized literature in health and safety at work qualifies the nonrespect of work procedures (NR-WPs) as a recurrent problem due, mainly, to the limitations of the WPs themselves [4]. For this, Vidal-Gomel [5] distinguishes three factors, which are largely discussed by different authors; these factors have widely been considered as the sources of those limitations. These factors include companies' security policies [6,7], use conditions [8], and work conditions [9,10].

Vidal-Gomel [5] emphasizes that these findings do not discuss a very important aspect of NR-WPs, which is operators' competence. Consequently, the problem of the NR-WPs must be approached

from two points of view [5]: violation of the WPs and the regulations implemented by the operator.

Battmann and Klumb [11] consider that WP violation is an intentional action, and according to Nordlöf et al [12], it is considered as a risk-taking approach. Reason and collaborators [13] distinguish three types of WP violations: routine violations, optimization violations, and exceptional or situational violations.

All these violations, which are materialized by the deviations between what is really done and what should have been done [14–17], were discussed by various authors in terms of causes [2] and consequences [18]. In other words, and broadly speaking, the question is about a set of cause–effect factors highlighted in the field of ergonomics [19,20].

Concerning the regulations implemented by an operator, violation of WP by the operator is narrowly linked to the operator's competence [1]. According to Hale et al [21], these are the “safety initiatives” or “informal practices of safety” that are implemented by experienced operators. In this context, some authors [18]

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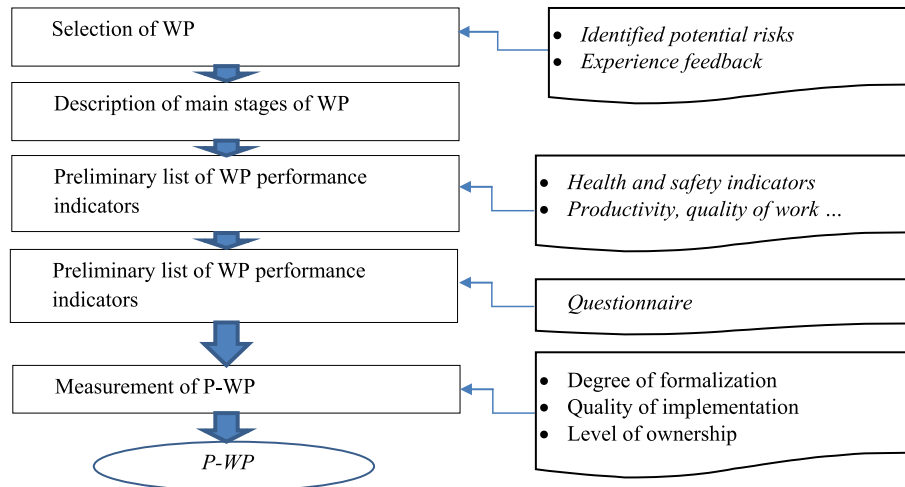


Fig. 1. Steps of the proposed method. P-WP, performance of work procedure; WP, work procedure.

confirms that if certain WPs are systematically implemented, others are not, and they are just considered implemented according to the context.

Other authors confirm the close link between competence and experience [22]. Indeed, inexperienced operators apply the WPs more systematically because they are the only means they have [23], whereas the most experienced operators also have their experimental inheritance and the WPs are only one of these means.

To summarize the link between experience and competence, we say that experience is necessary for the development of professional competence. Consequently, studies that carried out operators' competence for the NR-WPs focused on the complementary relations and substitution between formal safety rules and operators' informal practices [24] on the one hand, and on the approaches of professional competence development [24] on the other hand.

The two points of view of the NR-WPs detailed above are also discussed according to descending and ascending approaches [21]: the first approach considers the WPs as a static tool imposed on operators, and any violation of these WPs is considered a negative behavior of the operator; the second approach is said to be constructivist because the competence of the operators is considered as his capacity to adapt the WP to the reality diversity. According to the second approach, Djebabra et al [25] consider that the respect of work procedures (R-WPs) is a key element of the safety culture.

From this fast overview of the two view points of the NR-WP problem (violation and regulation of the WPs), we conclude that the WPs are neither applied nor violated. They are used, by the operators, according to their characteristics and those of situations. Hence, in this study, the key question that arises is the following: How can we measure the performance of the WPs (P-WPs) in a well-defined context? This article attempts to answer this key question by focusing on measuring the P-WPs that seem so important to us, since they allow the development of professional competence in order to establish durability of good practices in the WPs, by the aid of a suitable tool, the "Stop-Card" of the Sonatrach Group—Algeria, which is inspired from the DuPontSTOP tool [26,27].

2. Materials and methods

First, let us recall that the method proposed in this study aims to evaluate the P-WPs. This evaluation is based on operators' behavior vis-à-vis the hazard. On this subject, we recall that this behavior is

based on a mental reasoning developed by the operator [28], which includes the following [29]: operator's knowledge, capacity to solve problems, and motivations that affect the choice of the operator's actions.

For Lancry-Hoestlandt and Laville [30], operator behavior is the link between the activity in practice and the expected performance, which can be evaluated by a technical and organizational logic (indicators of quantity, quality, and compliance), a real cost logic (penalty indicators, fatigue and stress), and a logic of the real profit (salary indicators, recognition and satisfaction).

In addition, Borman and Motowidlo [31] consider two performance categories that are complementary to each other: performance of the tasks resulting from the analysis of the workplace and contextual performance, also called "organizational citizenship" [32].

The method proposed in this study integrates the evaluation of these two types of performance:

- Evaluation of the tasks where the importance is on the P-WPs of these tasks. This evaluation is carried out by a multicriteria approach integrating a set of suitable indicators.
- Evaluation based on the organizational citizenship of the operators, which is materialized by their good safety initiatives. It is important to emphasize that this evaluation is often omitted from organizations' formal system of evaluation [33]. For this reason, we found it useful to make this evaluation formal by a suitable tool called the "Stop-Card."

2.1. Task-based evaluation of the P-WPs

The evaluation process of the P-WPs in this article is inspired by the methodology of Tahon [34], which is made up of two successive steps: dimensions and performance indicators.

The first step allows structuring of the performance, which is considered as a complex concept [35], an evolutionary concept [36], and a specific concept in the context of its use [37]. The second step allows one to refine the performance dimensions in the form of observable and measurable indicators [38].

Thus for the performance dimensions, three of them are highly recommended by some authors to be integrated in any evaluation of the management system of health and safety at work [39–41]:

- The formalization of the WP (F-PT): the more a WP is well structured and is not overloaded with unnecessary instructions in

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