

# Analysis of Operator Activity in the Control Room of the Production and Transfer of Oil and Natural Gas in a Brazilian Oil Company

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## ABSTRACT

This article presents the analysis of the activity of the operator in the control room for continuous systems. The control room is located in an industry that explores and produces oil and natural gas. The theoretical framework is the ergonomics, using the methodology of ergonomic analysis, referenced in human activity. The activity analysis studies the behavior (action, observation, communication) and is interested in the speech of employees that directly explain the action. This study is justified by the identification and analysis of organizational, technological and cognitive determinants of activity, and thus leads to an understanding of the operator's control room activity. The results presented are preliminary and show that the process of cognition and decision-making occurs in a dynamic, complex and collaborative context between operators in the control room and field.

**Keywords:** Ergonomic, Work Analysis, Cognition, Human Supervisory Control

## INTRODUCTION

The overall objective of this research is to analyze the organizational, technological and cognitive determinants in the operator's control of the production and marketing of oil and natural gas activity room. The control room is located in the Brazilian unit of production of onshore oil and natural gas in South America. The hypothesis established for this research assumes that these determinants may hinder cognitive processes and actions of operators during the monitoring activity.

## OBJECTIVES

The specific research objectives are: a) to identify and classify the classes of interactions and their means used between operators and between operators and technical systems, b) identify and analyze the factors of mental workload present during the interactions, that could interfere their cognitive process and actions, c) identify and analyze how design and state of the technical system may be implicated in the workload of operators and system security; d) analyze the cognitive and operational strategies used by operators to minimize the workload and maintaining the expected performance and system security.

## MATERIALS AND METHODS

This research is ongoing. According to the methodology, literature review, reconstruction of ergonomic demands and focusing were performed. Up to now it were developed the direct observations (Vidal, 2003; Wisner, 1987, Guérin et al, 2001, Stanton *et al in* Stanton et al, 2004) were carried out semi-structured interviews (Vidal, 2003), record verbalizations (GUERIN et al, 2001) and conversations (VIDAL, 2003) together with operators and records images of operator activity in the control room into focus. The method adopted is the Ergonomic Work Analysis (GUÉRIN et al, 2001). Cognitive Work Analysis-CWA (VINCENT, 1999) will be applied to the analysis of the activity of operators needed to formulate the ergonomic diagnosis.

## PRELIMINARY FINDINGS

The control room operates 24 hours a day. The operators working in 12-hour shift. The shift schedule is planned seven days of work day, seven days off, seven days working night and fourteen days off. The operator's task is to monitor the process flow, handling and processing of petroleum. The operator identifies anomalies of the production system through the information presented in the supervisory system and the information sent by the field operator by telephone, radio, and electronic mail. These informations are analyzed and taken into account in the decision-making process. The operator works in the control room as a team with field operators and maintenance staff. The field research identified possible opacity of the information system and dubious information to the operator about the veracity of the variables presented by the systems. It was also found that these difficulties can be managed automatically or manually by the operator using the communication facilities available in the control and decision support tools.

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