

General approach to man-machine system design: ergonomic and technical specification of actions

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Abstract

This paper aims to describe a general methodology for man-machine system design. Firstly a structure of production systems will be described emphasising the socio-technical aspects. Then, the concerns of managing to design a system really centred on man leads to propose a methodology which aims at defining the various design stages. One of these stages is a descendant stage which represents a general approach for design and redesign of socio-technical systems based on technical analysis and human models. An approximate method helping to specify actions from the man and machine implication point of view will be described. This method constitutes one of the steps in a general approach. Finally, a case study will be treated.

Introduction

Human centred systems can be applied to many fields. However, an interesting context for its observation and study is the manufacturing industry.

Human centred systems, socio-technical systems or human-machine interaction are different names for the human being in relation with its creation. Through the years, research directions have been established (and are being established). Today, they are oriented between artificial intelligence and phenomenological micro cognition oriented engineering approaches (Cacciabue, 1998). This paper focuses on the engineering design of such systems. It is recognised that a good design methodology allows the good use of the most expensive and flexible resources of the manufacturing firm. So, a general methodology for man-machine system design will be described. We begin by exposing the structure of the production system emphasising the socio-technical aspect of these systems, and we will finish with a case study.

structure of production system

A general structure for production systems is shown in Figure 1, where two levels are distinguished. The supervision level supported by two resources, the human (supervisor) and computer, and the execution level, composed of a machine (robot) and a human (operator).