

DETERMINATION OF CRYSTALLIZER SERVICE LIFE ON CONTINUOUS STEEL CASTING BY MEANS OF THE KNOWLEDGE SYSTEM

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Abstract: In this paper there is described the input analysis of the crystallizer service life control problem for creation and exploitation of the software product in order to apply the knowledge systems complemented by the continuous diagnostics that will significantly reduce the human factor involvement in providing the manufacturing equipments inspection, in identification of technical condition and failures of equipments, specification of failures prediction and possibly also in failures elimination through a partial or total automation.

Keywords: Knowledge system, fuzzy systems, prediction, reliability, lifetime, steel industry.

1. Introduction

A full exploitation of continuous casting equipment (thereinafter ZPO) advantages can only be achieved through a control system that minimizes all undesirable effects on the technological process. Some of the undesirable effects influencing the ZPO process effectiveness are the failures and service interruptions. The failures and service interruptions are caused by a number of factors, impacts and processes that effect and run directly on the equipment in its individual parts during its operation[1]. These impacts result in changing the characteristics of equipment and its parts functional faces and they are the primary technical reasons for the failures affecting the process effectiveness and the service life of individual parts. These effects often have a vague character and their correction will no longer be managed in a traditional way of addressing the problem of technological systems service life control.

2. Technological Systems Service Life

The technological systems service life control includes the process and its control when we determine the period of time during which the equipment or its parts are able to perform the

required function under given conditions of use and maintenance up to the moment when the limiting state has been achieved. When dealing with this problem it is necessary to be aware of the fact, that the meaning of service life term varies in various stages of equipment life cycle, therefore we must distinguish the terms as follows [2]:

- Planned technical life = the period of time determined by the designer, during which the equipment has to be able to perform safely and reliably its function; all economic evaluations and as a rule also the permitting procedures are related to the planned technical life (In principle the planned technical life is shorter than the rated technical life of the equipment);
- Rated technical life = the minimum period of time during which the equipment or its parts must be able to perform safely and reliably their functions under given conditions; this time is determined by means of calculation methods;
- Technical life = the period of time on the expiry of which the limiting state occurs (the technical life is always longer than the rated technical life);
- The total life = the maximum achievable service life of an equipment that is terminated by the final retirement of the equipment based on the limiting state;

