PAPER REF: 4727

MAINTENANCE IN INDUSTRIAL EQUIPMENT: FAILURE INVESTIGATION IN A STAMPING PRESS THROUGH A RELIABILITY ANALYSIS

Luiz Henrique Sbardelotto, Jairo José de Oliveira Andrade(*)

Department of Production Engineering, Pontifical Univ. of Rio Grande do Sul (PUCRS), Porto Alegre, Brazil
(*)*Email:* jairo.andrade@pucrs.br

ABSTRACT

This paper presents a failure analysis performed in equipment that is part of a stamping process in an elevators industry. Data were collected between January 2008 and July 2012. Based on the priority of the failure modes a reliability analysis was conducted in order to determine the most appropriate maintenance procedure according to the characteristics of failures observed.

Keywords: reliability, maintenance, failure analysis.

INTRODUCTION

Currently the reliability analysis is becoming an important tool to support decision-making in many industrial sectors, such as product development, the production and maintenance of productive systems (Moubray, 2006). A paradigm shift in current management systems of industrial maintenance is the establishment of a formal strategy for such activity, based on reliability theory. This proposition can be an alternative to the strategies found in informal enterprises, based on personal experience of managers in most cases (Andrade, 2011; Simões, Gomes and Yasin, 2011).

In this context, the present study analysed the failure modes that occurred in a stamping press, using the reliability concepts for adequate maintenance procedures. A database with fault data comprising the period from January 2008 to July 2012 were analysed, which were obtained in 165 failure data. These data were analysed considering the frequency, the inactivity time and the severity of each type of failure. Furthermore, the equipment availability was determined considering the period analysed.

RESULTS AND CONCLUSIONS

Fig. 1 shows the main failures that have occurred in the stamping press. The claws failure and mat failure were responsible for more than half of the problems that occurred in the equipment. Furthermore, these causes accounted for 65% of downtime of the equipment, as can be seen in Fig. 2.

Defined the failure modes that can cause problems in production, was made a reliability analysis, where the failure data followed a Weibull distribution, whose parameters can be seen in Table 1.

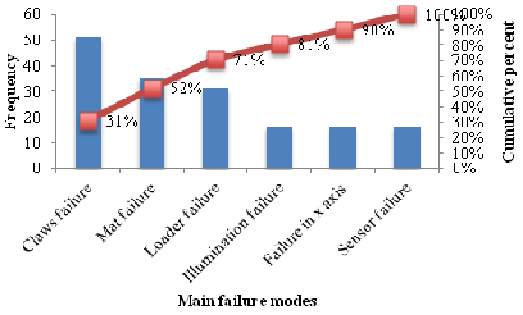

Fig. 1 - Origin of failures in a stamping press

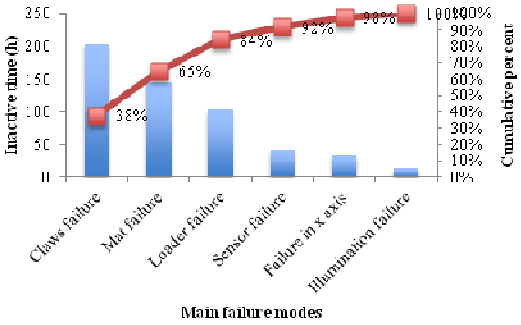

Fig. 2 - Inactive time versus failure modes in stamping press

Table 1- Weibull parameters

Failure mode	Shape parameter (γ)	Scale parameter (θ)	MTBF (hours)	Availability
Claws failure	0.8485	491.4	537	33%
Mat failure	0.6715	553.6	743	34%

Based on the data presented in Table 1 were proposed appropriate maintenance procedures to maximize equipment availability, minimizing the occurrence of failures and/or optimizing the repair activities for the failure modes observed.

REFERENCES

[1]-Andrade, JJO. Use of reliability theory in maintenance management: some case studies. In: International Reliability Symposium, 2011. Fortaleza, Brazil, 11p. (available in portuguese).

[2]-Moubray J. Reliability-centered maintenance. 2nd ed. New York: Industrial Press Inc., 2000.

[3]-Simões JM, Gomes, CF, Yasin, MM. A literature review of maintenance performance measurement: A conceptual framework and directions for future research. Journal of Quality in Maintenance Engineering, 2011, v. 17, issue 2, p. 116-137.