

Control rod drive WWER 1000 – tuning of input parameters

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Abstract

The article picks up on the contributions presented at the conferences Computational Mechanics 2005 and 2006, in which a calculational model of an upgraded control rod linear stepping drive for the reactors WWER 1000 (LKP-M/3) was described and results of analysis of dynamical response of its individual parts when moving up- and downwards were included. The contribution deals with the tuning of input parameters of the 3rd generation drive with the objective of reaching its running as smooth as possible so as to get a minimum wear of its parts as a result and hence to achieve maximum life-time.

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1. Introduction

A linear stepping drive is a major element of WWER 1000 reactor safety actuating control system. It is placed on reactor head nozzle in a containment. It is used for inserting into the reactor core a suspension bar provided with a control element or for pulling it out of it, for keeping the control element in extreme and intermediate positions, and for indicating the control rod position. It also makes possible for the control organ to fall down into the core at emergency operation. If the drive housing is leaking it prevents the control element sliding out of the core as a result of a pressure gradient.

The reactor always-safe operation at normal service operation modes as well as the safe shutdown on all levels of the accident protection system interventions depends largely on the drives service reliability. The third modernized series of linear stepping drives (LKP-M/3) is being developed in ŠKODA JS a.s. at present time.

The contribution deals with the tuning of input parameters of the 3rd generation drive with the objective of reaching its running as smooth as possible so as to get a minimum wear of its parts as a result and hence to achieve maximum life-time (cf. [5]).

2. Brief description of the LKP-M/3 drive and the calculational model

2.1. Description of the LKP-M/3 linear stepping drive

The LKP-M/3 drive consists of five basic parts:

The *drive housing* is a pressure barrier between the primary circuit and the space above the reactor head. It holds other parts of the drive. There is a flange in the bottom part with which the drive housing is fastened to the reactor head nozzle by six prestrained studs.

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