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某型飞机前起落架回中凸轮故障分析和改进措施

彭志军, 李彬, 崔阳

中航工业洪都飞机设计研究所, 江西 南昌 330024

Fault Analysis and Improvement for Certain Airplane Nose Landing Gear Return Cam

PENG Zhijun, LI Bin, CUI Yang

AVIC Hongdu Aircraft Design & Research Institute, Nanchang 330024, China

摘要　｜　参考文献　｜　相关文章

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摘要 推导了某型飞机前起落架回中凸轮最小压力角和最大压力角的计算公式。通过与其同类型飞机前起落架凸轮压力角的比较,指出某型飞机前起落架凸轮刚开始使用的时候,上、下凸轮接触面比较光滑,其摩擦系数比较小,此时实际压力角大于最小压力角,凸轮可以顺利回中;使用一段时间后,凸轮发生了磨损,表面粗糙度升高,上、下凸轮之间的摩擦系数增大,所需最小压力角相应增大;当凸轮之间的摩擦系数增大到一定程度后,回中所需的最小压力角将大于实际压力角,导致凸轮不能回中。但是,当凸轮的压力角增大,摩擦力也相应的增大,对上、下凸轮的磨损也增大,导致摩擦系数增大;当转弯作动筒驱动力不足以克服上、下凸轮之间的摩擦力和下部构件的重力而使凸轮转动时,前起落架操纵转弯将会变得困难。在不改变某型飞机前起落架缓冲性能的前提下,适当加大了凸轮的设计压力角,解决了前起落架凸轮不能回中的问题,并且前起落架可以顺利操纵转弯。

关键词：　前起落架　凸轮　最小压力角　最大压力角　操纵转弯

Abstract： The expressions of the minimum and maximum pressure angles of a nose landing gear return cam of a certain airplane were deduced in this paper. The cam pressure angle of this airplane was compared with the angles of other airplanes of the same type. The contact surfaces of the top and bottom cams were found to be smoother and the friction coefficient was smaller at the initial stage, and the actual pressure angle was larger than the minimum pressure angle so that cams could return smoothly. But the contact surfaces of cams experienced wear during the application process, and surface roughness increased; with it the friction coefficient also increased. The minimum pressure angle increased correspondingly when the friction coefficient reached a certain numerical value. The minimum pressure angle for return then became larger than the actual pressure angle, so that cams couldn't return. The pressure angle of the cam was not the larger the better. When the pressure angle of the cam increased, the friction coefficient also increased, which would make cams wear seriously. Manipulating the turning of the nose landing gear would be difficult as the driving load of the turn actuating cylinder would not be able to overcome the friction force or the gravity of the lower parts. The fault of this airplane return cam was corrected by an appropriate enlargement of the pressure angle of the cam without changing the nose landing gear buffer function, and the nose landing gear could manipulate turning easily as a result.

Keywords： nose landing gear　cams　minimum pressure angle　maximum pressure angle　manipulating turning

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