

A - 6928

NATIONAL TRANSPORTATION SAFETY BOARD  
DEPARTMENT OF TRANSPORTATION  
WASHINGTON, D.C. 20591

February 27, 1969

IN REPLY  
REFER TO:

• Mr. David D. Thomas  
Acting Administrator  
Federal Aviation Administration  
Department of Transportation  
Washington, D. C. 20590

Dear Mr. Thomas:

The investigation of the Los Angeles Airways' S-61-L helicopter accident of August 14, 1968, revealed, as you know, that a main rotor blade spindle, P/N S6110-23325-2, Serial No. AJ19, had failed while in flight. This caused the (yellow) main rotor blade to separate from the hub. The spindle had failed due to metal fatigue.

The history of the part indicated the spindle underwent rework at a total time of 4717.49 hours which involved grinding, shot peening, plating and finish grinding. The rework process had been developed by Sikorsky Aircraft, but in this instance was accomplished at the facilities of firms available locally to Los Angeles Airways.

The spindle, as originally designed and tested, was certificated as an unlimited life item by the FAA. As testified to at the recent hearing held in connection with this accident, this certification was based on data submitted by the Sikorsky Aircraft Corporation and approved by the FAA. No such data were submitted in regard to reworking a spindle. Further, it appeared, from testimony given at the hearing by FAA personnel, that the FAA was not aware of the rework procedure until after the accident.

FAR Section 21.93 defines a major change as one having, among other things, an appreciable effect on structural strength and reliability affecting the airworthiness of the product. FAR Section 21.97 requires the submittal of substantiating and necessary descriptive data for inclusion in the type design. Reworking the spindle in our view falls in the category of a major change and as such requires the submission of substantiating data.

At the time spindle rework was developed by Sikorsky, it is apparent that the criteria for determining what constituted a major or a minor change, allowed the rework to be classified a minor change. Under such a

classification, no notification to the FAA by the manufacturer was necessary and no substantiating and descriptive data were required. It is understood that the FAA was not aware that spindles were being reworked and were still continuing to be considered an unlimited life item.

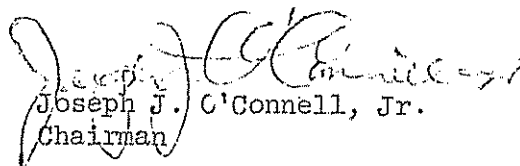
In retrospect however, based on information divulged through the investigation, it is now evident that the spindle rework should have been classified as a major change. As such, substantiating and descriptive data would have been compiled which could have raised questions concerning the continuation of the unlimited life aspect of the part. At the very least, submission of such data would have made the FAA aware of a change to a part which is considered critical to the continued safe operation of the aircraft.

Original certification of the part was based, in part, upon data obtained through fatigue testing of production spindles. Fatigue tests were not carried out in regard to the reworked spindles. This was done after the accident, the results of which indicate a lower fatigue life for the reworked spindle than for the new part.

It is quite possible that a Sikorsky proposal indicating the rework would have no appreciable effect on the service life of the spindle would have met with FAA approval. There was much to justify such a stand being taken at the time. The point the Safety Board is making here is that the FAA should have been made aware of a change to a part critical to the continued safe operation of the helicopter so that any action deemed appropriate could have been taken.

In view of the foregoing discussion, the Safety Board recommends a reevaluation of the FAA procedures and criteria involved in carrying out the intent of FAR Part 21, Subpart D (changes to type certificates). The procedures and criteria should insure that all changes affecting a part critical to the continued safe operation of the aircraft come to the attention of the appropriate FAA inspector so that proper action may be taken.

Sincerely yours,

  
Joseph J. C'Connell, Jr.  
Chairman