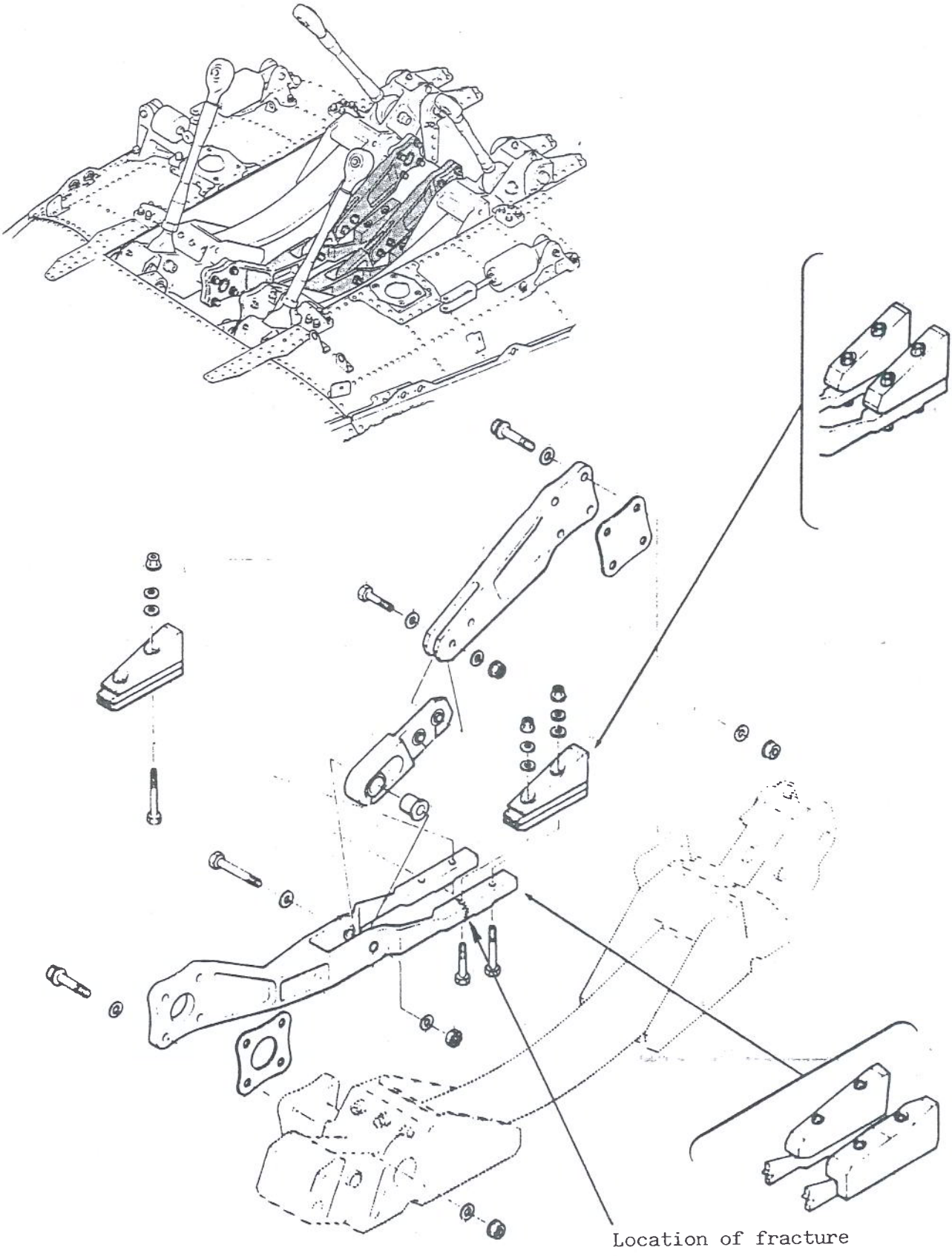
No: 5/90 **Ref: EW/G90/01/05** **Category: 2b**

Aircraft Type and Registration:	Bell 222A, G-OSEB
No & Type of Engines:	2 Lycoming LTS 101-650C-3 turboshafts
Year of Manufacture:	1980
Date and Time (UTC):	2 January 1990 at 0900 hrs
Location:	Blackbrook, Newcastle Under Lyme
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Main Rotor Transmission nodal suspension arm fractured.
Commander's Licence:	Airline Transport Pilot's Licence (helicopters)
Commander's Age:	43 years
Commander's Total Flying Experience:	4,330 hours Rotary Wing (of which 770 were on type) 60 hours Fixed Wing
Information Source:	Aircraft Accident Report Form submitted by the pilot

The helicopter was flying from Knutsford, Cheshire, to Blackbushe airport. In the cruise at a height of 1,500 feet and at a speed of 135 kt a severe vibration was suddenly experienced. Power was reduced but this had no effect on the vibration. All the instrument readings appeared normal and so an emergency call was made followed by a normal powered descent to a precautionary landing in a field.

Upon examination, it was found that a main rotor transmission suspension tuning weight had detached following failure of one of the fork ends of the arm, assembly part number 222-031-611-107 (see diagram). Subsequent metallurgical examination concluded that the fork end had failed in fatigue at the position where one of the holes through which the bolts retaining the weight pass. The fatigue origin appeared to be associated with a deep counterbore on the bottom face of the arm. It was also noted that the replacement arm, assembly part number 222-031-611-111, had a significantly shallower counterbore at this location. Total service life on the failed component was 1,328 hours.

A recommendation has been made to the Civil Aviation Authority that they require periodic inspection of these parts and monitor the performance of the later standard of arm, with a view to withdrawal of the earlier standard with deep counterbores.



G-OSEB FAILED NODAL SUSPENSION ARM