

**AAIB Bulletin No: 2/94**      **Ref: EW/G93/08/20**      **Category: 1.3**

**Aircraft Type and Registration:** Morane Saulnier Rallye 110ST, G-BKGT  
**No & Type of Engines:** 1 Lycoming O-235-L2A piston engine  
**Year of Manufacture:** 1982  
**Date & Time (UTC):** 18 August 1993 at 1110 hrs  
**Location:** Wellesbourne Mountford Airfield, Warwickshire  
**Type of Flight:** Private  
**Persons on Board:** Crew - 1      Passengers - 1  
**Injuries:** Crew - None      Passengers - None  
**Nature of Damage:** Nose landing gear assembly, propeller, engine silencer assembly and the lower front engine cowling  
**Commander's Licence:** Private Pilot's Licence  
**Commander's Age:** 65 years  
**Commander's Flying Experience:** 400 hours (of which 50 were on type)  
Last 90 days - 16 hours  
Last 28 days - 9 hours  
**Information Source:** Aircraft Accident Report Form submitted by the pilot, enquiries and examination by an AAIB Inspector (Engineering) and metallurgical examination

The pilot made an approach for a normal landing in calm conditions. After a satisfactory touchdown the nosewheel started to 'shimmy', which had also occurred on this aircraft on previous flights. The pilot held the control stick back and the shimmy stopped, but was followed by a loud 'jingling' noise which then ceased. The pilot continued the landing run and used gentle braking. However as he eased the control stick forward, the aircraft settled onto its nose and slid to rest. The nose landing gear was later found in the centre of the runway some distance behind the aircraft.

Examination of the failed nose landing gear showed that the main failure was in the area where the support 'A' frame was welded to the landing gear leg (see Figure 1). This failure was of a buckling and overload nature, predominantly in a rearwards direction, with some buckling towards the left side of the aircraft. There was no evidence of fatigue or of pre-existing defect in the area of the main failure. Further examination of the nose landing gear and the aircraft revealed that the right-hand 'A' frame firewall attachment bracket (see Figure 1), part number 880.21.0.456.2 had failed some time prior to the nose landing gear failure. Metallurgical examination of the bracket concluded that a crack,

approximately half the width of the attachment bracket, had been initially caused by a single large overload force from the right-hand side (Photograph No.1). The remainder of the bracket had failed in fatigue over a period of time. Evidence of metal-to-metal rubbing on the failed faces of the bracket indicated that this failure had been present during a number of aircraft cycles prior to the nose landing gear failure. Examination of the nosewheel revealed severe damage to the right-hand rim which had occurred some time prior to the nose landing gear failure. There was no damage to the nosewheel tyre side wall, or to the inflation valve on the right-hand side of the wheel, indicating that the nosewheel tyre had been renewed between the time that the damage had occurred to the nosewheel rim and the nose landing gear had failed. There were no entries in the aircraft's log book to indicate that any damage or impact in the nosewheel area had taken place, although a new nosewheel tyre had been fitted on 31 May 1991. Since the nosewheel tyre was changed a Certificate of Airworthiness maintenance Check, an Annual Maintenance Check and numerous 50 hour Maintenance Checks had been carried out. Examination of the aircraft's Maintenance Manual did not reveal any requirement to check the nose landing gear lower firewall attachment brackets for cracks during any routine maintenance check.

In 1982 a Rallye aircraft had a nosewheel axle fail on landing after nosewheel shimmy had occurred (CAA occurrence number 8201940A). Sixteen days later the same aircraft had a nose landing gear detach following a normal landing (CAA occurrence number 8202163E). Examination of the nose landing gear following this failure revealed a pre-existing crack of one of the attachment lugs to the firewall.

Socata Service Bulletin number 48, to detect signs of fatigue or failures in the nose landing gear (part number 880.42.0.096.0.0) affects all Rallye aircraft, chiefly those utilised for the towing of aircraft (this aircraft was not fitted with a glider towing mechanism). Paragraph 3.1 of this Service Bulletin states 'Just prior to the 5000th landing or 500 hours for a towing one (if landings are not counted for), inspect carefully gear leg by removing fairing and by means of a Dye Penetrant method such as ARDROX or equivalent'. There is no specific requirement to inspect the lower firewall attachment brackets. Paragraph 3.2 states that 'these inspections should be repeated at every 200 landings and every 25 hours of operation for a towing one (if landings have not been counted for)'. There was no record of this Service Bulletin having been implemented on this aircraft. The part number of the nose landing gear leg fitted to this aircraft was 880.42.0.120.0, to which this Service Bulletin did not apply.

Socata Service Bulletin number 42, in part, details the inspections required when nosewheel shimmy occurs and is required to be complied with during each periodic inspection and following hard landings. Inspection of the lower firewall attachment brackets is not listed as part of the inspection

required. This Service Bulletin is only applicable to Rallye aircraft models MS.880-881-885-886-890-892 and 893.

As a result of this investigation, safety action was discussed with the CAA. The CAA considered that the simplest way of addressing this problem would be to issue an Airworthiness Directive which would require dye penetrant inspection of such brackets on all Rallye aircraft. In view of this positive response by the CAA, the following Safety Recommendation is made:

**93-73** It is recommended that the CAA, in conjunction with the French DGAC and the manufacturer of Morane Saulnier Rallye aircraft, introduce a requirement for the dye-penetrant inspection of the nose landing gear lower firewall attachment brackets (part number 880.21.0.456, and similar) on Morane Saulnier Rallye aircraft at a given interval, after any hard landing incident and after incidents of nosewheel shimmy. (Issued 18 January 1994)

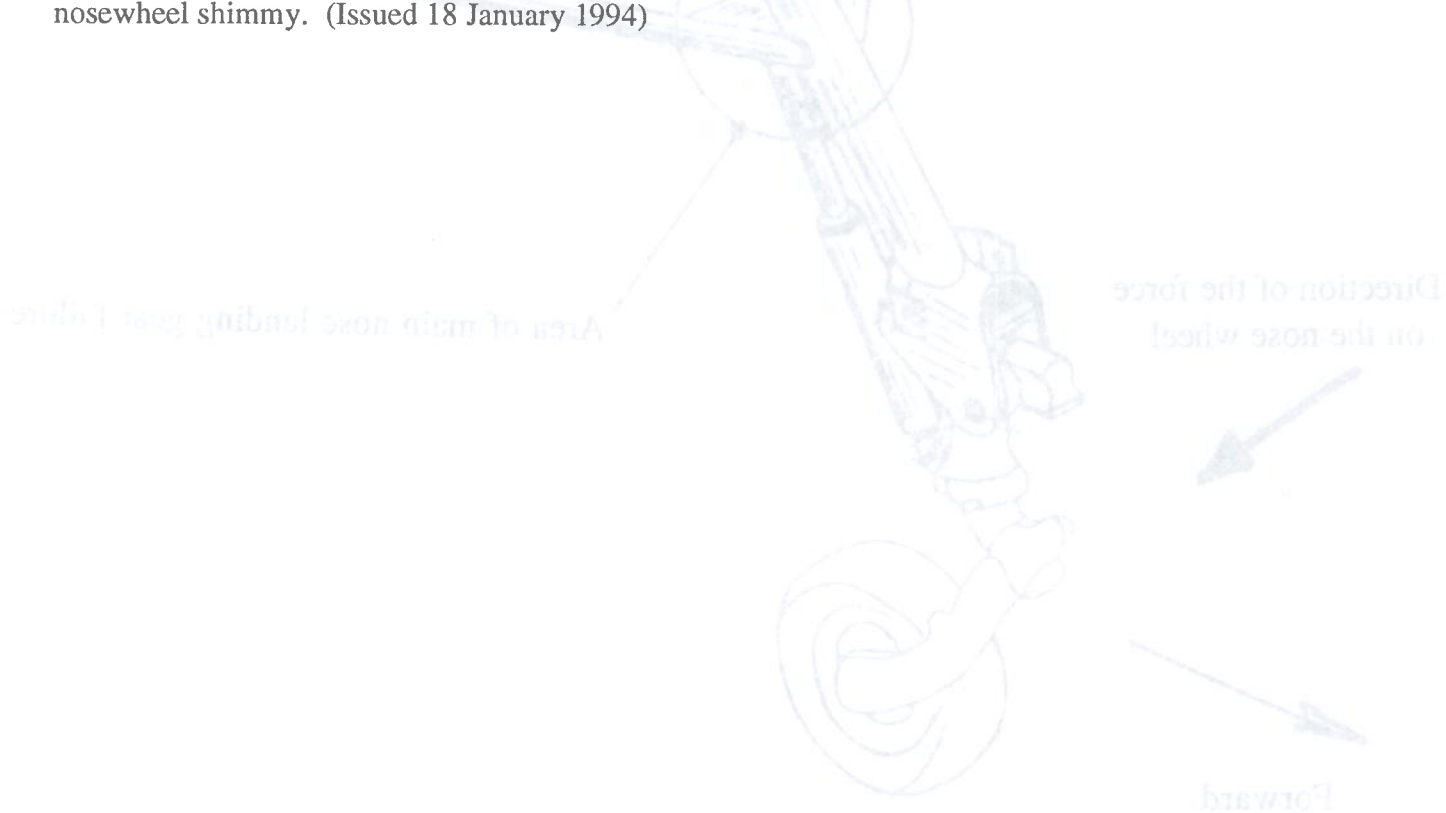


Figure 1 Nose Landing Gear

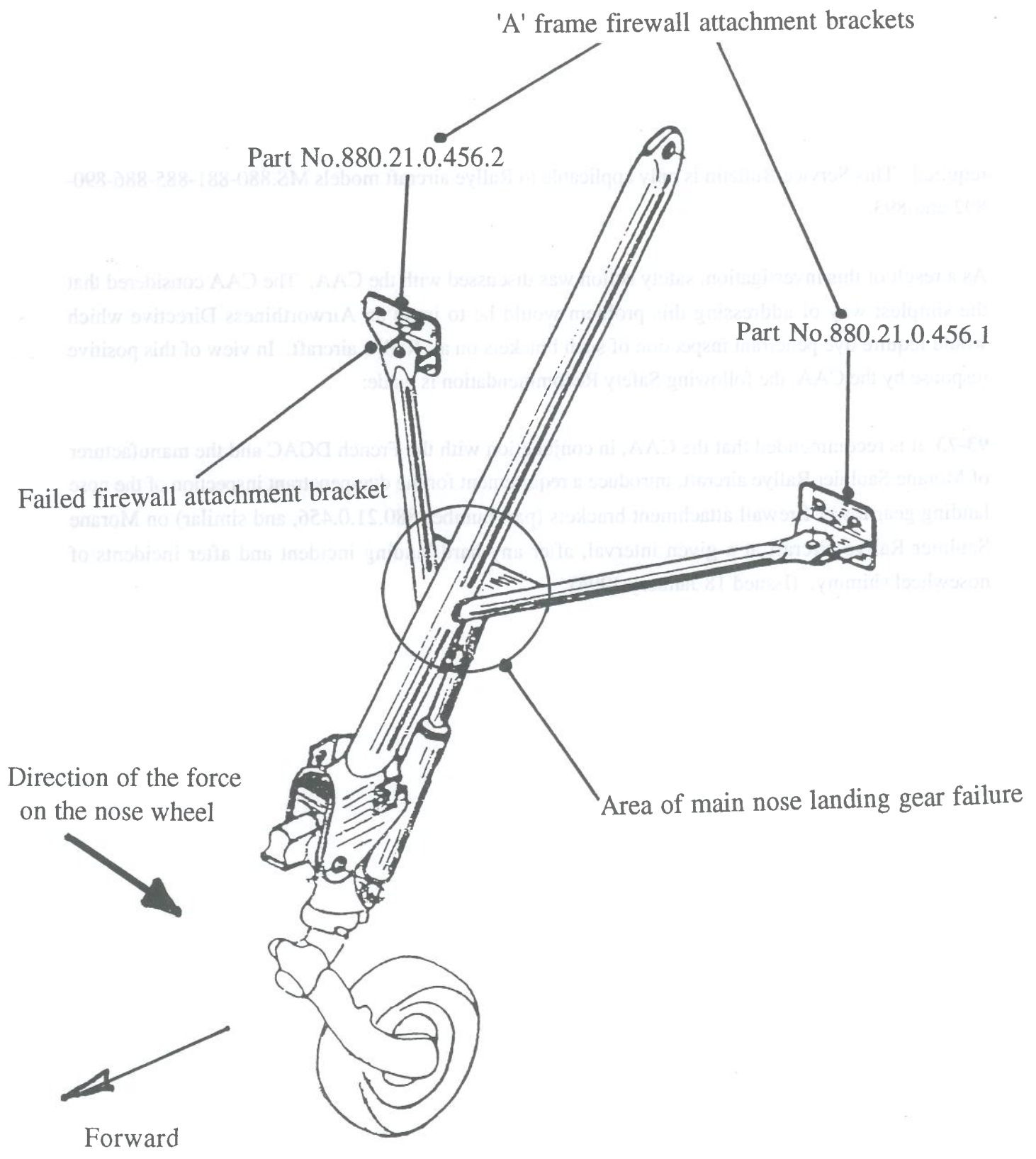
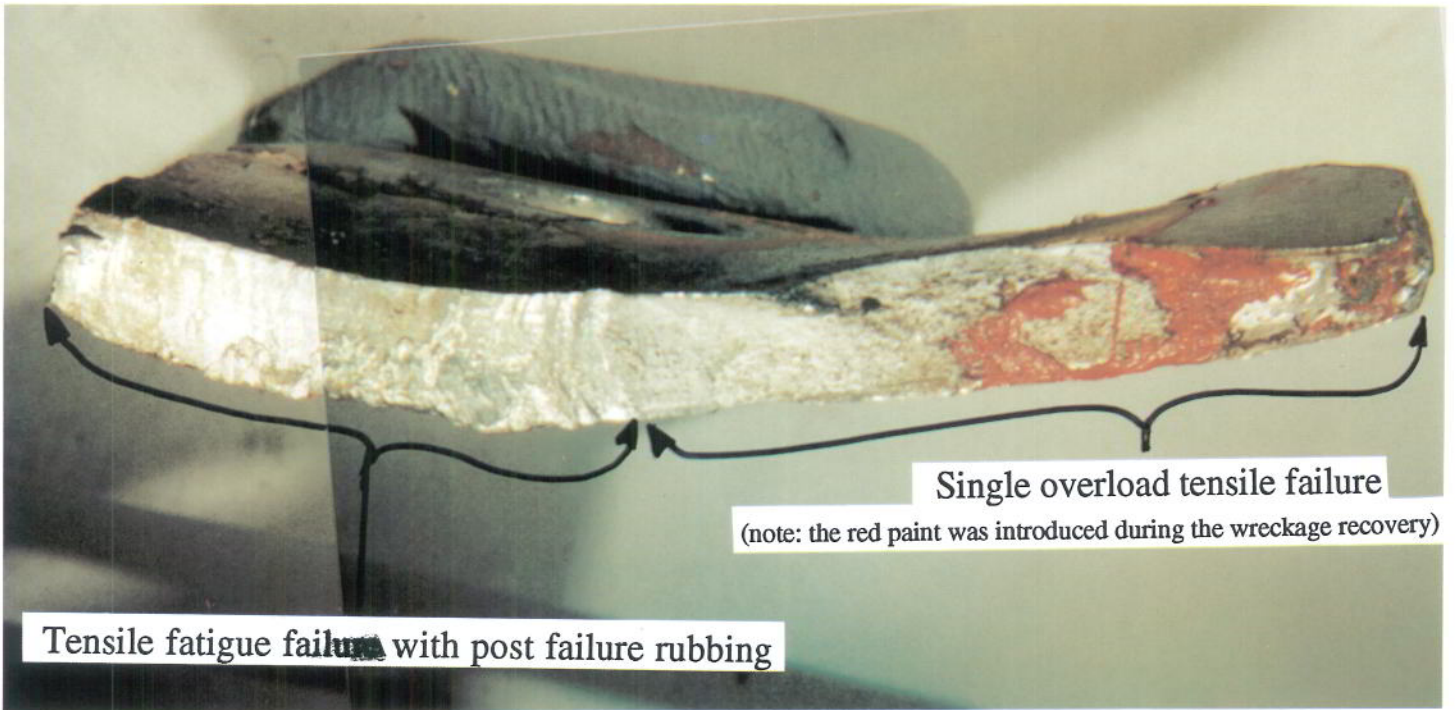
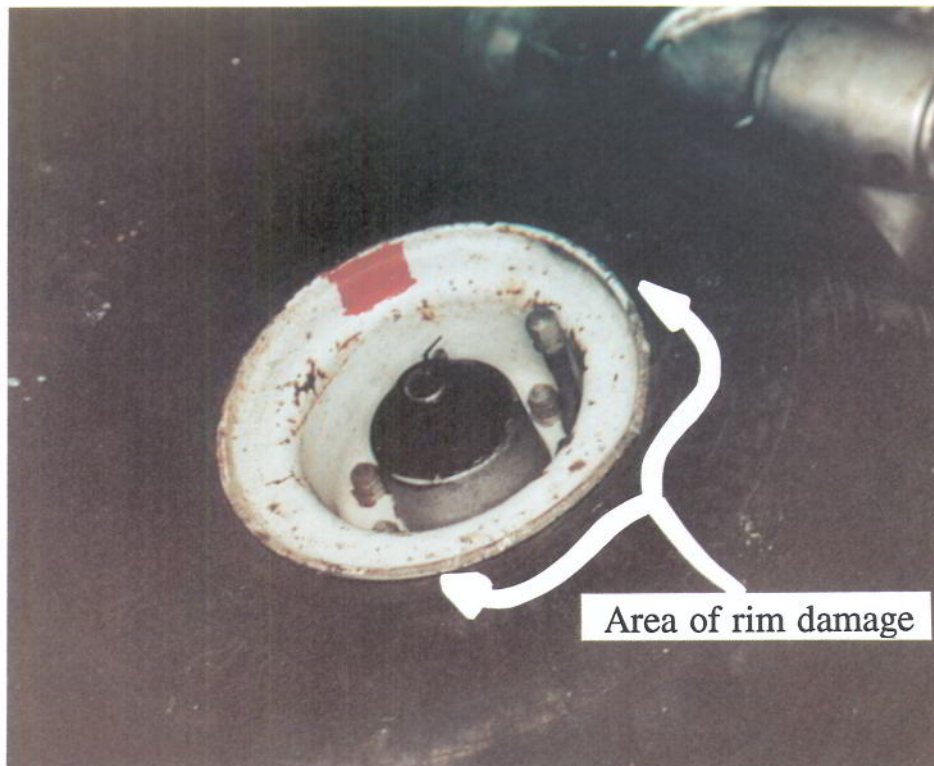


Figure 1 Nose Landing Gear

Adapted from a Socata drawing



Photograph No 1 **Fractured Nose Landing Gear 'A'  
Frame Firewall Mounting  
Bracket**  
(note: the photograph is upside down)



Photograph No 2 **Damaged Nose Wheel right-hand  
Rim**