Europa, G-BWFX, 9 September 1996

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Aircraft Type and Registration:	Europa, G-BWFX
No & Type of Engines:	1 Rotax 912 piston engine
Year of Manufacture:	1996
Date & Time (UTC):	9 September 1996 at 1000 hrs
Location:	Kemble Airfield, Gloucester
Type of Flight:	Private
Persons on Board:	Crew - 2 - Passengers - None
Injuries:	Crew - None
Nature of Damage:	Damage to landing gear, propeller and engine cowling
Commander's Licence:	Commercial Pilot's Licence
Commander's Age:	34 years
Commander's Flying Experience:	458 hours (of which 85 were on type)
	Last 90 days - 52 hours
	Last 28 days - 18 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot, and additional AAIB inquiries

The aircraft had been on an airtest for the purpose of obtaininga Permit to Fly and was loaded close to its maximum weight. Thetest was successfully completed and the aircraft returned to Kemble,where the wind was 12 to 15 kt, but only some 10° off therunway direction. The approach was normal and the aircraft wasflared at an indicated airspeed of 50 kt. The pilot reportedthat the rate of descent did not appear to be excessive, howeveras the aircraft touched down, the main landing gear gave way resultingin the propeller and lower engine cowling striking the runway. The aircraft skidded along on its main and tail wheels for approximately50 metres before coming to rest on the grass at the side of therunway.

The Europa is a home-built aircraft constructed from a kit, andthe landing gear consists of a single retractable mainwheel inaddition to a tailwheel and two outrigger wheels under the outerwings. The principal components of the main landing gear areshown in the attached diagram. It was found that

the main landinggear support frame had failed, leading to the collapse of themain gear. The support frame was not examined by the AAIB, butthe kit manufacturer concluded that the failure had been due tooverload, such as might result from one, or more, heavy landings.

It was subsequently revealed that immediately prior to the airtest,the aircraft had suffered a 'ground loop' incident in which ithad veered off the runway at 90° during the take-off roll. The next take-off attempt was successful. This incident, andthe possibility of previous heavy landings, suggested that thefailure following the airtest may have been the result of cumulativedamage.

The main landing gear had been designed to Joint Aviation Requirements(JAR)-VLA (Very Light Aircraft), although home-built aircraftdo not need to comply with these standards. Associated drop testshad shown that the landing gear met the 'reserve energy' requirementof a descent rate in excess of 10 ft/second, at which some distortionof components might be expected. However, since the drop testshad been carried out, a shock absorber assembly had been addedwhich resulted in minor changes to the landing gear geometry,and which incorporated a 'limit stop'. The kit manufacturer subsequentlyconsidered that this may have slightly altered the loads in someof the landing gear components. Following additional testing,a modification is now offered featuring, for new kits, a revisedshock absorber with increased thickness of rubber and with thelimit stop deleted. For existing aircraft, packing pieces areincorporated into the shock absorber. The deletion of the limitstop means that shock absorber movement is limited by the naturalcompression limit of the rubber. The modification, which thekit manufacturer considers should be mandatory, also includesadditional reinforcement of the support frame. The Popular FlyingAssociation are currently considering whether to confer mandatorystatus on this modification.

A similar landing gear collapse is known to have occurred on oneother aircraft, and there are unsubstantiated reports of crackshaving been found in the support frames of other Europa aircraft.