AAIB Bulletin No: 7/93 **Ref: EW/G93/05/20** **Category: 2c**

Aircraft Type and Registration:	Robinson R22 Beta, G-ROBS
No & Type of Engines:	1 Lycoming O-320-B2C piston engine
Year of Manufacture:	1988
Date & Time (UTC):	17 May 1993 at 1012 hrs
Location:	Southend Airport, Essex
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - Serious Passengers - Minor
Nature of Damage:	Helicopter destroyed
Commander's Licence:	Commercial Pilot's Licence with Instructor rating
Commander's Age:	36 years
Commander's Flying Experience:	900 hours (of which 175 were on type) Last 90 days - 88 hours Last 28 days - 53 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

The weather at Southend was fine but a gusty wind was blowing from 150°M. On returning to the airfield with a student, the instructor considered demonstrating an engine-off autorotation and landing. He requested a wind check from ATC who responded with a wind reading of 150°/11 kt. The instructor judged the wind as suitable and sought clearance from ATC for the manoeuvres. Clearance was given with the instruction that the helicopter should remain north of the central taxiway (a long straight taxiway oriented 150°). The helicopter was positioned at 1,000 feet agl, heading into wind at 75 kt IAS and the windsock was checked to ensure that the wind direction had not changed. Full carburettor heat was applied and autorotation was entered. After establishing a stable autorotation at 60 kt IAS and 104% RRPM, the instructor looked ahead and noticed a Lockheed Electra turning onto the south eastern end of the central taxiway. The instructor's intended landing point was approximately 200 metres to the east of this taxiway and the flight path was almost parallel to it and so the Electra was well clear of the intended approach path. At 300 feet agl he closed the throttle and, after a check of air and rotor speeds, he prepared to flare the machine. At about 40 to 50 feet agl he lowered the collective lever fully and started to flare with the cyclic control. At first the flare seemed satisfactory to him but suddenly at about 15 to 20 feet agl the helicopter 'dropped vertically onto its

tail'. The tail struck the ground before the instructor had time to react and the helicopter bounced forward in a nose down attitude. In an attempt to prevent it executing a forward roll, the instructor opened the throttle, raised the collective slightly and levelled the rotor disc but the machine began to spin violently which the application of full left yaw pedal was unable to stop. Before he could take further action the helicopter struck the ground, probably twice, and then came to rest on its starboard side. The instructor switched off the fuel valve and pushed the student out of the cockpit through a hole in the nose; he followed the student and they both collapsed some distance upwind of the helicopter. The airport emergency services arrived on the scene within two minutes and an emergency service helicopter with a medical doctor on board arrived a few minutes later to take the occupants to hospital.

The helicopter had lost its tail rotor during the first impact which explains why the machine rotated rapidly when power was applied. The instructor attributed the cause of the initial heavy landing to a disturbance of the surface wind during the critical stage of the cyclic flare. He also believed that the disturbance may have been caused by the propeller wash of the Electra's four turboprop engines.