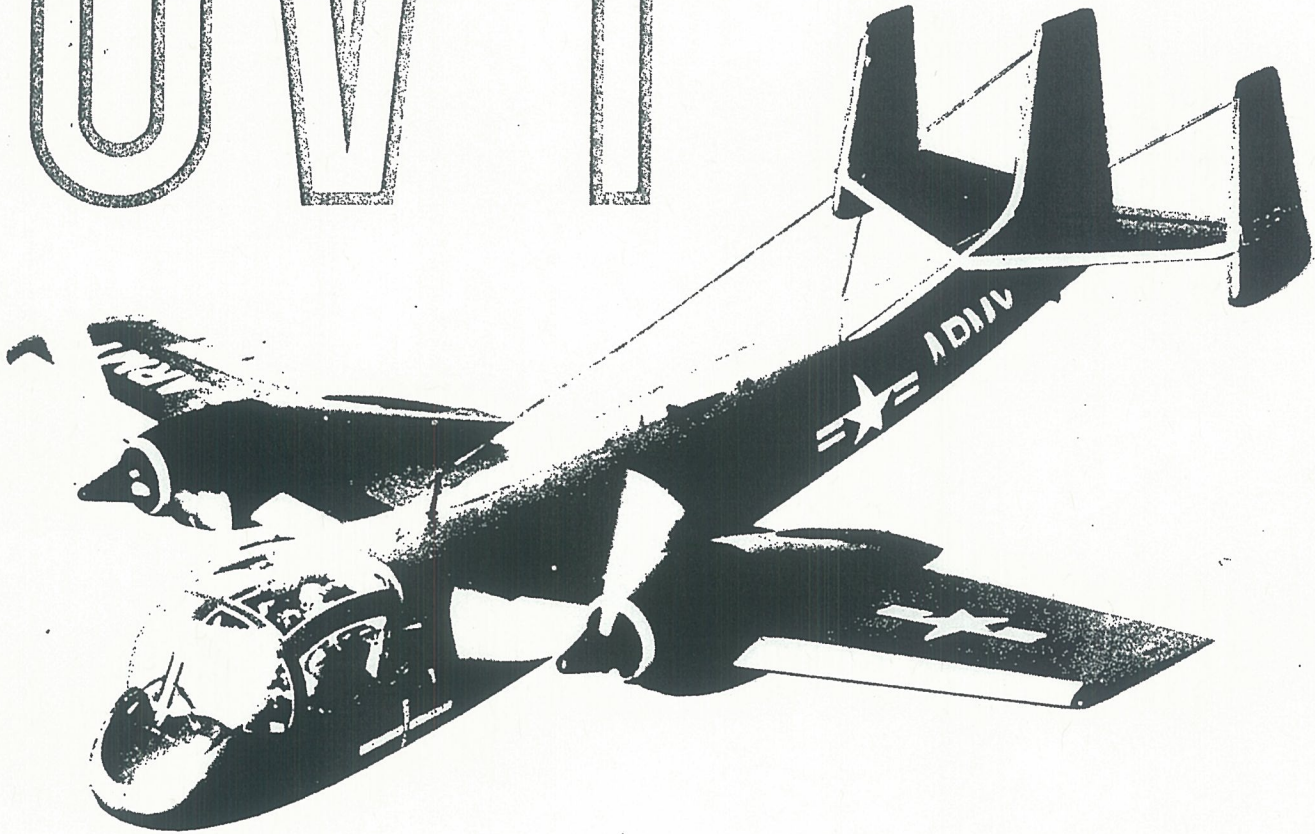


FRANK ZARDECKI

JANUARY 1964

OV-1

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ACCIDENT SUMMARY

MAJORS • MINORS • INCIDENTS • FORCED LANDINGS

NOVEMBER 1, 1961 TO OCTOBER 31, 1963

2000 1013 146

FOREWORD

This is a summary of OV-1 accidents, incidents, and forced landings for the two year period ending 31 October 1963. It was compiled, published, and distributed to Army commands for accident prevention purposes ONLY. This summary is specifically prohibited for use for punitive purposes or for matters of liability, litigation, or competition.

Factor charts are presented in percentages of total cause factors and bear no relation to the total number of accidents, incidents, or forced landings.

The data in this summary all point to a need for greater quality control in personnel selection, training, and supervision. The majority of major accidents reflect poor judgment, improper technique, and lack of knowledge on the part of aircrews.

It is hoped that all OV-1 users will study this summary and relate it to their training and operational programs in the interest of accident prevention.

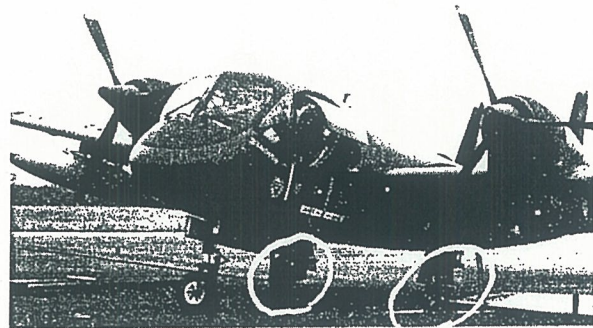


ROBERT M. HAMILTON
Colonel, Infantry
Director, USABAAR

03844

THE ACCIDENT: Landing gear inadvertently retracted on landing.

THE CAUSE: IP accidentally moved gear handle instead of flaps lever during roll of touch and go landing.

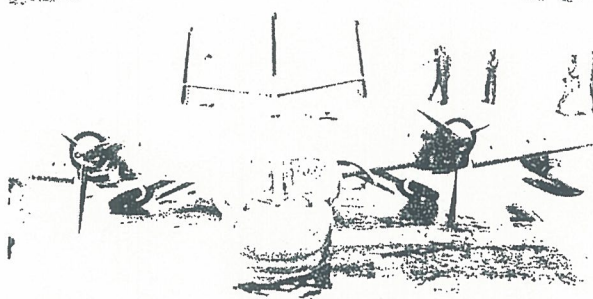


02791

04106

THE ACCIDENT: Pilot made high, fast downwind approach. In an effort to reduce speed, he retarded the power control levers abruptly, causing them to go beyond the ground idle stop into the reverse thrust position. The aircraft dropped to runway and slid to a halt.

THE CAUSE: High, fast downwind approach and use of reverse thrust before touchdown.

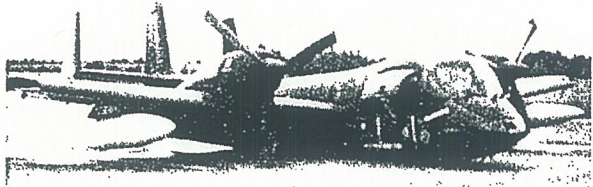


03477

04200

THE ACCIDENT: Nose gear collapsed during landing roll on sod strip. Pilot applied full reverse thrust at touchdown and nose gear drag brace failed, allowing wheel to retract.

THE CAUSE: Materiel failure.

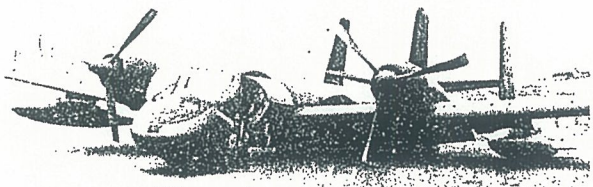


03844

04400

THE ACCIDENT: Nr. 1 engine propeller feathered during single engine go-around demonstration and airspeed dropped below single engine speed. Power was applied to Nr. 2 engine and flaps were raised. Aircraft went into shallow left turn, stalled, and crashed in nose-low attitude. Pilot and instructor pilot killed.

THE CAUSE: IP allowed airspeed to drop excessively and then raised the flaps. This caused loss of inboard ailerons which further reduced controllability of aircraft. External loads were not jettisoned. Cause of propeller feathering undetermined.

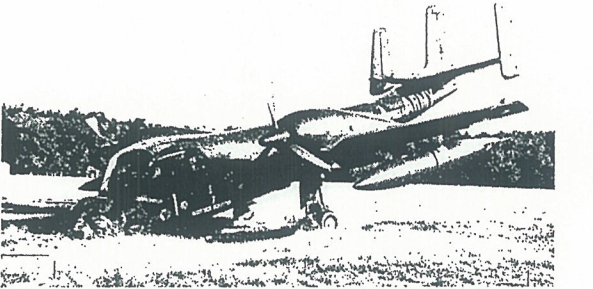


04106

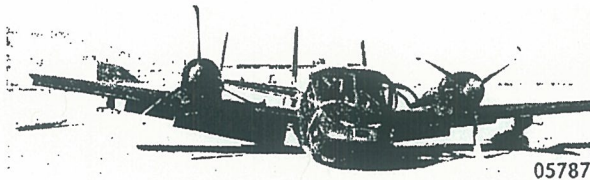
04876

THE ACCIDENT: Aircraft dropped in from approximately 50 feet, landed hard, bounced, and skidded to stop.

THE CAUSE: Power control levers were inadvertently moved to reverse thrust during approach.



04200



fuselage in vicinity of flare pod when remaining flares were salvoed in completion of night photo mission. Fuselage broke in two and aircraft crashed. Pilot ejected and sustained minor injuries. Copilot failed to eject and sustained fatal injuries.

THE CAUSE: The most probable cause of this accident was premature firing of one or more flares which caused an explosion in the flare pod.

06734

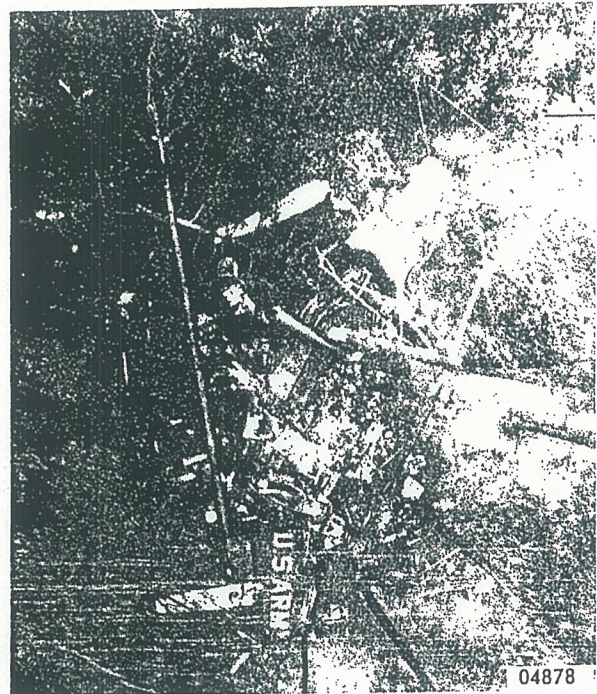
THE ACCIDENT: Explosion occurred next to fuselage in vicinity of flare pod after three flares had been fired during night photo mission. Fuselage broke in two and aircraft crashed. Pilot ejected and sustained minor injuries. Observer failed to eject and sustained fatal injuries.

THE CAUSE: The most probable cause of this accident was premature firing of one or more flares which caused an explosion in the flare pod.

06738

THE ACCIDENT: Aircraft struck power lines during low level visual surveillance mission. Major damage to empennage, fuselage, wings, and propellers.

THE CAUSE: Failure to see and avoid wires. Low



visibility at early dawn in light rain considered possible contributing factor.

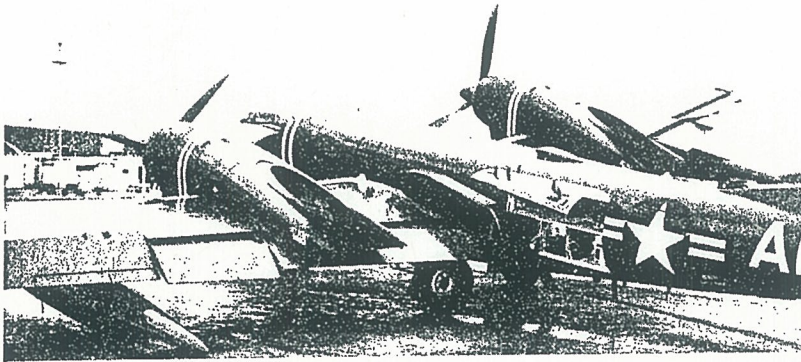
06759

THE ACCIDENT: Right main gear failed during landing roll on tactical strip.

THE CAUSE: Materiel failure. Investigation revealed that a crack, caused by previous stresses, existed on the trunnion pin prior to the accident. Further tests conducted by Grumman showed that a critical area exists in undulating fields with undulation separations of 20-24 inches and a frequency range of 19 cycles per second. In this area, the gear will fail at 23 knots ground speed. Failures occurred in the right gear because engine torque loads during prop reversal are mainly absorbed by the left gear. This lightens vertical loads on the right gear and subjects the right gear assembly to higher drag loads induced by furrows or regularly undulated terrain. Recommend inspection and continued improvement of OV-1 landing strips.

06847

THE ACCIDENT: Nr. 2 engine failed in flight. Propeller was feathered. Pilot was unable to jettison auxiliary fuel tanks electrically and elected not to attempt manual jettison. Aircraft lost altitude and



06244



06672



06734

causing blowout of nose wheel tire as propellers were reversed during strip landing. Nose gear collapsed. Major damage to wing, center section, fuselage, landing gear, flaps, propellers, and engine.

THE CAUSE: Presence of loose rocks on runway.

07058

THE ACCIDENT: Right main gear failed during landing and aircraft settled on right wing.

THE CAUSE: Dynamic "shaker" tests were conducted by Grumman and revealed that a critical area exists in undulating fields with undulation separations of 20-24 inches and a frequency range of 19 cycles per second. In this area, the gear will fail at 23 knots ground speed. Failures occurred in the right gear because engine torque loads during prop reversal are mainly absorbed by the left gear. This lightens vertical loads on the right gear and subjects the right gear assembly to higher drag loads induced by furrows or regularly undulated terrain. Recommend inspection and continued improvement of OV-1 landing strips.

07149

THE ACCIDENT: Student pilot was given simulated single-engine in traffic pattern. Student went through single engine procedure, retracting landing gear. Approach was continued and aircraft landed wheels-up. Major damage to fuselage, flaps, propellers, and possible damage to both engines.

THE CAUSE: Failure to extend landing gear. Instructor pilot failed to take corrective action in time to prevent accident.

05960

THE ACCIDENT: Nr. 2 engine failed during low level flight up dead end valley at low airspeed. Pilot made successful ejection with no injury.

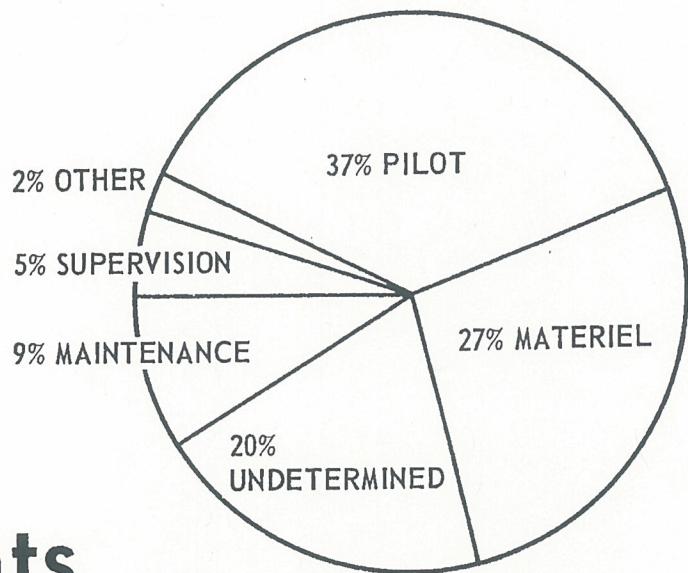
THE CAUSE: Undetermined.

06880

THE ACCIDENT: Hydraulic system failed in flight. Landing gear was extended by emergency means, but right main gear failed to extend. Pilot and observer ejected successfully with no injury.

THE CAUSE: Undetermined.

Incidents



DISTRIBUTION OF ALL FACTORS

03164

Both main tires blew out during landing. Caused by excessive use of brakes.

03230

Inboard cowl to Nr. 1 engine torn off during flight. Cause undetermined.

03387

Private motor vehicle ran across runway during OV-1 landing. Pilot executed heavy braking action to avoid vehicle. Main gear tires blew out. Caused by presence of motor vehicle on runway.

03423

Nr. 1 propeller failed to reverse during landing. Aircraft swerved and pilot used heavy braking action to maintain directional control. Left tire blew out. Caused by broken Nr. 3 wire in pedestal which failed to activate reversal auxiliary motor.

03469

Nr. 1 propeller failed to reverse during landing. Aircraft swerved and pilot used heavy braking action to maintain directional control. Two main tires blew out. Nose wheel struck runway light and nose wheel tire blew out. Caused by broken Nr. 3 wire in pedestal which failed to activate reversal auxiliary motor.

03586

Aircraft flew through trees during low level flight.

Incident damage to left wing tip, navigation light, and slat. Caused by failure to maintain sufficient altitude to clear trees.

03647

Aft nacelle cowl on Nr. 1 engine tore loose in flight. Caused by materiel failure of lower forward stud assembly.

03715

Aircraft pitched up and tail cone struck ground while aircraft was braking. Incident damage to tail cone, skin, and two bulkheads. Caused by excessive use of brakes.

03726

Aircraft swerved sharply to left during landing roll. Right tire blew out. Caused by failure to simultaneously reverse propellers.

03776

Right tire blew out during landing. Incident damage to right wheel assembly. Caused by excessive use of brakes.

03865

Nr. 1 engine aft cowl stripped off during entry into loop. Incident damage to cowl, left flap, left rudder and vertical stabilizer. Caused by materiel failure of all but two studs.

antenna cover, antenna, and skin. Caused by failure to select suitable touchdown and landing roll path.

05243

Left side hatch came open in flight. Incident damage to glass and side of door frame. Cause undetermined. Suspect handle was not in fully locked position during takeoff, or was inadvertently moved to unlocked position in flight.

05674

Left main tire blew out during landing. Cause not reported.

05693

Right wheel dropped off edge of runway during practice back-up taxiing. Aircraft rocked back and tail cone struck ground. Incident damage to tail cone. Caused by failure to remain aligned with runway.

05854

Center panel of Nr. 2 engine lost in flight. Caused by loose fastener.

05580

Right outboard section of engine cowling lost in flight. Caused by materiel failure of fastener.

06471

Heat shroud of left engine lost in flight. Cause not reported.

06084

Middle section of left engine nacelle lost in flight. Caused by screws vibrating loose in flight.

06005

Nr. 1 engine outboard cowling came off in flight. Cause undetermined. Suspect materiel failure of cowling skin.

06686

Right tire blew out during landing. Cause factors not reported.

06828

Aircraft struck tree during low level training flight. Front canopy dented. Caused by failure to maintain sufficient altitude to clear tree.

06832

Right tire blew out during landing. Incident damage to tire. Cause factors not reported.

06855

Nr. 2 upper access cowling lost in flight. Cause factors not reported.

06875

Aircraft struck birds during demonstration low altitude, high speed penetration. Incident damage to engine cowling, wing leading edge slat, vertical fin, horizontal stabilizer, and empennage de-icer.

Forced Landings

03368

Engine failed in flight. Caused by materiel failure of Nr. 2 turbine wheel.

03452

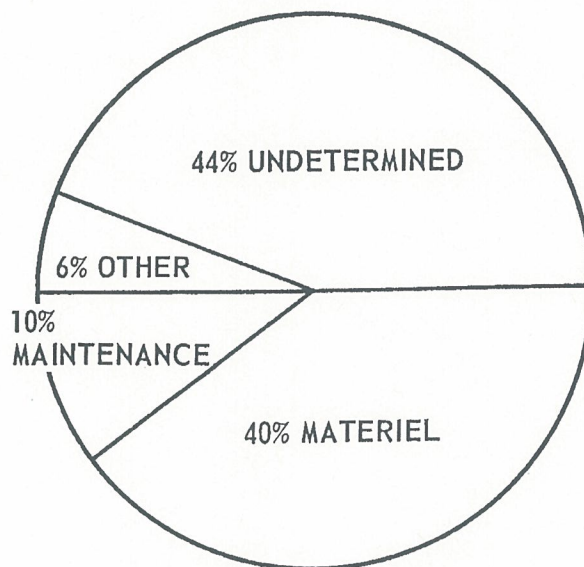
Fire noted in Nr. 2 engine in flight. Cause undetermined. Suspect compressor stall.

03461

Nr. 2 engine torque surged between 20 and 60 psi in flight. Cause factors not reported.

03462

Fire warning indicator came on in flight. Caused by



DISTRIBUTION OF ALL FACTORS

04973

Hydraulic pressure lost in flight. Emergency gear extension used. Caused by materiel failure of hydraulic line at flange connection.

05110

RPM and torque of Nr. 2 engine fluctuated in flight. RPM dropped to 1300. Engine was shut down and propeller feathered. Caused by materiel failure of prop control assembly.

05182

Nr. 1 engine failed during landing approach while simulating Nr. 2 engine-out condition. Cause undetermined. N1 turbine found frozen. N2 turbine found dragging.

05189

Hydraulic pressure lost in flight. Emergency gear extension used. Caused by partially sheared plug on hydraulic pump of Nr. 1 engine. Part of "O" ring found blown out.

05220

Hydraulic pressure lost in flight. Emergency gear extension used. Caused by materiel failure of pump seal. Hydraulic fluid was pumped out drain line.

05350

Oil pressure of Nr. 2 engine lost in flight. Cause undetermined. Suspect failure of N1 compressor.

05494

Oil pressure of Nr. 2 engine lost in flight. Engine was shut down and propeller feathered. Cause undetermined.

05838

Nr. 2 engine lost power in flight. Cause undetermined.

06006

Nr. 2 engine lost oil pressure in flight. Cause undetermined.

06456

Pilot heard loud popping noise from Nr. 2 engine. Caused by materiel failure of N2 turbine. Turbine sheared and passed out tail pipe.

06458

Nr. 2 engine lost power in flight. Cause undetermined.

06601

Aircraft shook violently and pitched up from straight and level flight. Aircraft reached 50 degrees nose high pitch attitude before stabilizing. Pilot was using both hands to apply forward pressure. He regained control and stabilized airspeed at approximately 150 K. Landing was accomplished with reduced power settings. Caused by missing cotter pin from mounting bolts (NAS 1104-21D and NAS 1104-14D) of elevator trim push rod assembly. Condition of zinc chromate indicated cotter pin had never been installed.

06714

Pilot heard loud noise from Nr. 2 engine. Caused by failure of N2 turbine and exhaust diffuser.

06814

Nr. 2 engine failed in flight. Caused by materiel failure of power shaft.

05646

Nr. 1 engine failed in flight. Caused by materiel failure of N2 turbine. Turbine froze.

05641

Nr. 2 engine failed in flight. Cause undetermined. Suspect deterioration of vanes on N1 turbine wheel from high temperatures.

06549

Engine failed in flight. Engine was shut down and propeller feathered. Caused by materiel failure of reduction gear and power shaft.

06527

Nr. 2 engine failed in flight. Cause undetermined.

06410

Instructor pilot was unable to start Nr. 2 engine during demonstration of air start procedures. Cause undetermined.

06391

Nr. 2 engine failed in flight. Cause undetermined.

06079

Hydraulic pressure lost in flight. Caused by materiel failure of seal on pressure line to hydraulic pump of Nr. 1 engine.

06080

Nr. 1 engine failed in flight. Cause undetermined.

06917

Nr. 1 engine froze in flight. Cause undetermined. Suspect failure of engine sun gear.

4. The aircraft circled a strip and made a low pass with gear and flaps down. It then climbed out, made a right turn, and entered a left downwind for landing. It passed the marked touchdown point while 3-10 feet in the air, yawed to the left, straightened out, yawed again, and straightened out. It continued approximately 3-5 feet above the ground and a loud engine noise was heard. The aircraft immediately yawed and rolled or banked sharply to the left. The left wing tip struck the ground and the pilot ejected. The seat operated successfully, but the main chute did not fully deploy, and the pilot was killed. This ejection was initiated well below the designed limits of the seat for airspeed, altitude, and attitude.

Corrective Action

The details of this ejection were also published in the January 1963 issue of the U. S. ARMY AVIATION DIGEST.

5. The aircraft was flying at 130 knots at approximately 100 feet in a dead end canyon. Nr. 2 engine lost power as a climb was initiated to clear the hill at the end of the canyon. The aircraft would not maintain a rate of climb sufficient to clear the hill. As the airspeed dropped to approximately 90 knots, the pilot ejected. This ejection was successful and the pilot sustained minor injuries.

6. The aircraft completed a night photo run at 2,200 feet and 180 knots. At this point, the pilot salvoed the remaining flares. A brilliant light was seen and the aircraft immediately nosed into a steep dive. The pilot pulled the stick all the way back but the aircraft did not respond. He told the copilot to eject and then ejected himself. The ejection was successful and after approximately two oscillations, he landed in brush. The aircraft crashed and exploded. The copilot, a foreign national, failed to eject. It was considered that a language barrier may have played a part in his failure to eject.

7. The aircraft was on a night photo mission, flying at 1,000 feet. The pilot began a photo run, firing flares individually. He saw a white flash as one flare exploded very close, then a bright red flame enveloped the aircraft. At this time, he felt a severe concussion and momentarily lost consciousness. As he regained consciousness, he saw the aircraft was in a steep dive and moved the stick full aft. There was no control response. The pilot

ejected. This ejection was successful and the pilot sustained fractured vertebrae. At first, it was believed the pilot's injuries resulted from the in-flight explosion. However, examination proved his injuries to be compression fractures which could only have come from ejection.

Corrective Action

As a result of the copilot's failure to eject in the sixth ejection and the observer's failure to eject in the seventh ejection, a rapid production training film showing the use of the Martin-Baker seat was made by the Army Pictorial Center in coordination with USABAAR. This film (TF 420-25458) is scheduled for distribution at an early date.

8 and 9. This emergency evolved from the loss of both engines at an altitude of approximately 400 feet. The observer ejected from an altitude of less than 200 feet and airspeed was less than 100 knots. The aircraft was in a nose low left bank attitude. The observer's seat functioned properly and his main chute deployed immediately prior to his landing. The pilot ejected a few seconds after the observer and only his drogue chute was deployed when he hit the ground still in the seat. There was no apparent malfunction of the seat and the fatality was attributed to ejecting beyond designed limits.

10 and 11. The aircraft was on a photographic test flight, flying at approximately 1,500 feet and 180 knots. Nr. 2 engine lost power and the pilot started a climb. At this point, the Nr. 2 engine failed. The pilot feathered Nr. 2 propeller and advanced the Nr. 1 engine to METO power. He attempted to jettison the auxiliary fuel tanks electrically and was unsuccessful. He elected not to attempt manual jettison and continued flying toward the home field. The aircraft lost altitude and airspeed en route. When the pilot saw that he could not make the home field, he and the photographer passenger ejected. The aircraft was in a slight nose high attitude at approximately 150 feet. Airspeed was 90 knots. The aircraft crashed and burned. The ejection sequences were photographed in slow motion high speed movie film by a photographer in another aircraft. These films show both the pilot and passenger's main chutes blossoming as they descended into the trees. Both sustained fractured vertebrae, and the photographer, who descended through the flames of the burning aircraft, sustained facial and hand burns. These

Martin-Baker seat should know emergency procedures by instinct. Once the emergency happens, it's too late to start learning.

EJECTION SEAT MAINTENANCE

Nine lives saved from what would have meant certain death prove the value of ejection seats. They also prove these seats must be maintained by thoroughly trained, competent personnel. For once the ejection sequence has started, it must work perfectly or fail. One discrepancy can render the entire system inoperative.

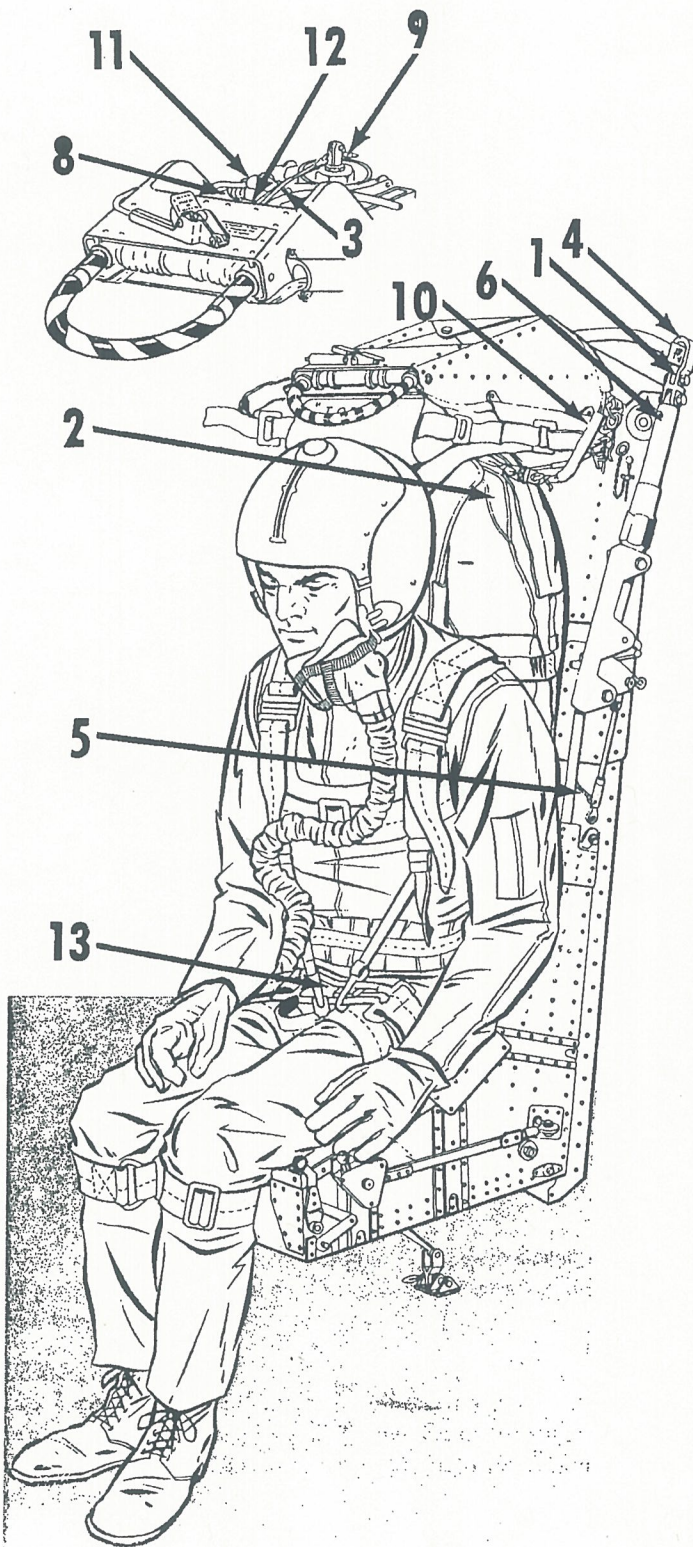
To further emphasize the need for quality control, here are some maintenance boners found in OV-1 ejection seats during the past few months:

1. Incorrect cotter keys in drogue guns.
2. Withdrawal lines routed wrong.
3. Excessive slack in firing cables.
4. Spacer missing on drogue gun bullet.
5. Bungee cords needed replacing.
6. Wrong type nut and bolt on drogue gun bullet.
7. Safety wire missing from time release.
8. Drogue flap withdrawal pins not safetied.
9. Main gun sear bent.
10. Face blind and personnel retainer straps rigged backwards.
11. Link lines rigged improperly over tops of shackles.
12. Drogue pack safety pin out of packet and seal broken.
13. Harness clips broken.

Small items? Not to the pilot whose life may be at stake!

What is necessary to effect a cure? The cure demands thorough TRAINING, strict SUPERVISION, and absolute ADHERENCE TO APPROPRIATE MANUALS. Now is the time to check the seats in YOUR Mohawks to see how YOU stack up in these areas.

(Note: A training film, TF 420-25459, Operation of the Martin-Baker J5 Ejection Seat, showing correct rigging and some of the errors in rigging that have been found in recent months, has been completed and will soon be available through your film library.)



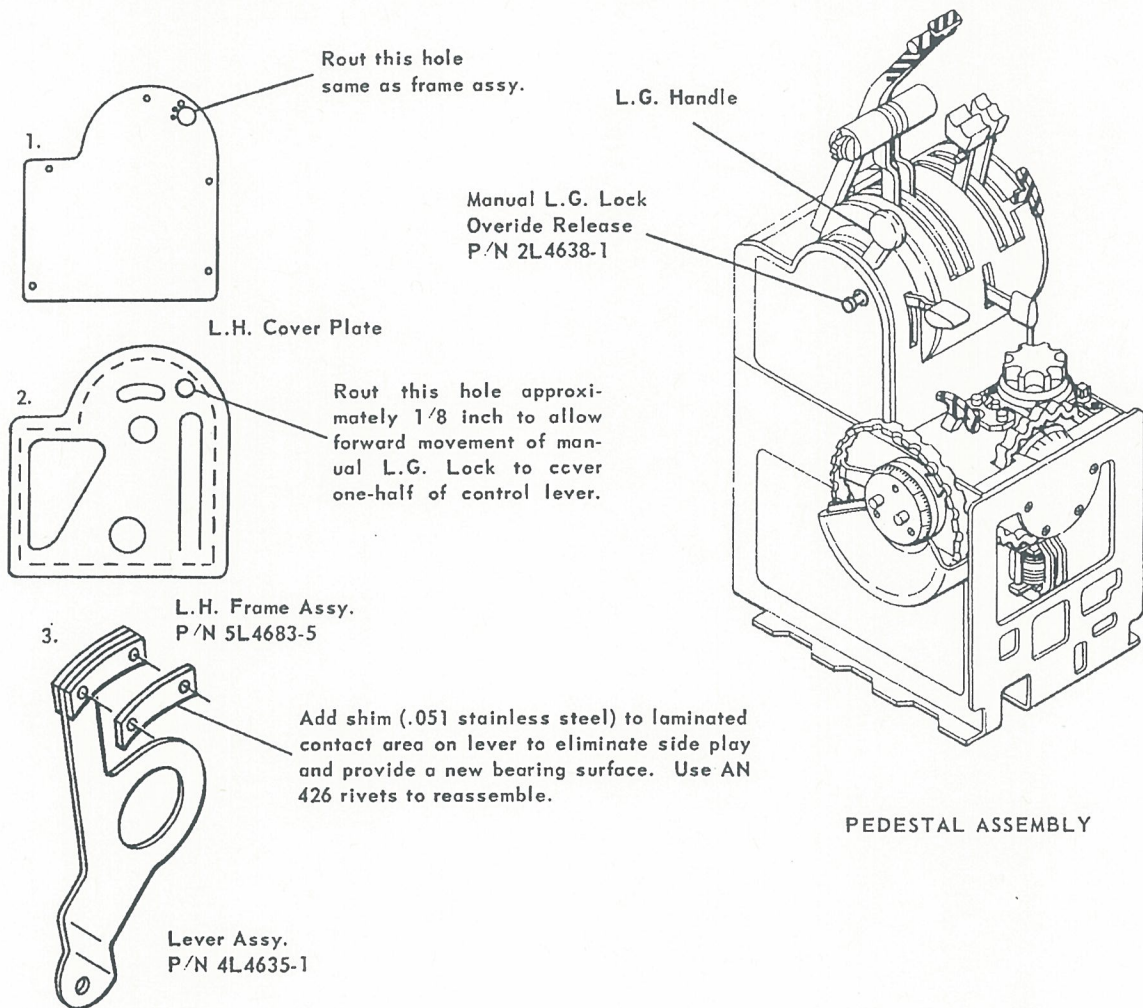
Directional control was maintained with aileron and rudder. Stick pressure was reduced and the pilot was able to hold attitude with one hand as he reduced power to approximately 20 psi and rolled in full nose-down trim. With the aircraft under control, power was increased to 30 psi and the airspeed stabilized at approximately 150 knots. Forward pressure was still necessary but could be held with one hand. The airfield tower was notified and only slight forward stick pressure was necessary to accomplish a normal landing at reduced power settings with no damage to the aircraft. Cotter pin found missing from mounting bolts of elevator trim push rod assembly. Condition of zinc chromate

coating indicated pin had never been installed (parts numbers - elevator trim push rod assembly, 134CZ0029-3; bolt, NAS 1104-21D; bolt, NAS 1104-14D).

Landing Gear Malfunctions

Due to several inadvertent landing gear retractions, MWO 55-1510-204-34 '1, 21 Nov 1961, was issued covering inspection of the landing gear lever. Inadvertent retractions can be caused by wear in various parts of the pedestal assembly. Repair as shown should be incorporated during the next scheduled periodic inspection.

TO PREVENT INADVERTENT RETRACTION OF LANDING GEAR DUE TO WEAR AND TOLERANCE BUILD UP OF POSITION LOCK, REWORK THE THREE PARTS SHOWN BELOW.



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