TECHNICAL REPORT OF U.S. ARMY AIRCRAFT ACCIDENT
PART VII - IN-FLIGHT OR TERRAIN IMPACT AND CRASH DAMAGE DATA
For use of this form, see DA Pamphlet 385-40; the proponent agency is OCSA.

REQUIREMENTS CONTROL SYMBOL
CSOCS-309

1. IN-FLIGHT COLLISION KINEMATICS AT INSTANT OF IMPACT

a. Airspeed at Impact *(knots)*: 50

b. Vertical Speed *(feet per minute)*: 30 ☐ Up ☑ Down

c. Flight Path Angle *(degrees)*: 5 ☐ Up ☑ Down

d. In-Flight Attitude At Impact

(1) Pitch Angle

Degrees 5 ☑ Up ☐ Down

(2) Roll Angle

Degrees 0 ☐ Left ☐ Right

e. Obstacle Identity And Collision Height

Obstacle	Collision Height Above Ground *(feet)*
(1) ☐ Birds	
(2) ☐ Aircraft	
(3) ☑ Wires/Cables	95
(4) ☐ Vehicles	
(5) ☐ Tree	
(6) ☐ Other	

f. Obstacle Strike Sequence *(Enter 1, 2, 3, etc. to show sequence of strike)*

1	Prop/Rotor		Landing Gear
2	Rotor Mast		Wing
	Tail Rotor		Empennage
	Tail Boom		WSPS
	Windscreen		FLIR
	LWR Nose/Gun Turret		Other *(Specify)*

g. Obstacle Conspicuity *(Within accident distance from pilot's position, the obstacle in its surroundings was obscured)*

(1) ☐ Completely (2) ☐ Partially (3) ☑ Not Obscured

h. Wire or Cable Description

Type	Dia In Inches	No. Struck
(1) Power Transmission	0.5	1
(2) Telephone or TV		
(3) Bracing *(guy/support)*		
(4) Other *(Specify)*		

i. WSPS (1) Installed ☑ Yes ☐ No
(2) Cut Wire ☐ Yes ☑ No

j. Obstacle Struck Other Than Wire *(diameter in inches)*

2. TERRAIN COLLISION KINEMATICS AT INSTANT OF MAJOR IMPACT

a. Ground Speed at Impact: 50 *(knots)*

b. Vertical Speed: 500 *(FPM)* ☐ Up ☑ Down

c. Flight Path Angle: 70 *(degrees)* ☐ Up ☑ Down

d. Indicate by Check Marks Which Two of The Three Preceding Parameters *(a, b, c)* Are The Most Accurate
a. ☑ b. ☑ c. ☐

e. Impact Angle: 70 *(degrees)*

f. Attitude at Major Impact

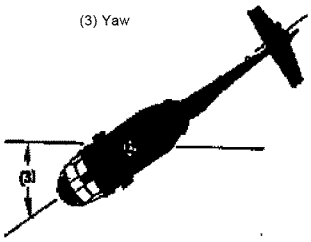
(1) Pitch

Degrees 5 ☑ Up ☐ Down

(2) Roll

Degrees 20 ☑ Left ☐ Right

(3) Yaw



Degrees 10 ☑ Left ☐ Right

3. ROTATION AFTER MAJOR IMPACT

a. Did Aircraft Rotate About Any Axis After The Above Major Impact *(If yes, complete items b, c, and d)*
☑ Yes ☐ No ☐ Unknown

b. Roll Degrees ☑ Left ☐ Right Degrees 90

c. Yaw Degrees ☐ Left ☐ Right Degrees 0

d. Pitch Degrees ☐ Up ☐ Down Degrees 0

4. IMPACT FORCES RELATIVE TO AIRCRAFT AXES *(G's)*

a. Vertical *(G's)* ☐ Up ☑ Down G's 80

b. Longitudinal *(G's)* ☑ Fore ☐ Aft G's 20

c. Lateral *(G's)* ☑ Left ☐ Right G's 5

5. CASE NO.	a. Date *(YYYYMMDD)*	b. Time	c. Acft Serial No.	6. OTHER ACFT SERIAL NO.
	20070626	2121	0010031	

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APD PE v1.01

SAMPLE

Figure 3–8. Example of a completed DA Form 2397–6, Part VII, In-flight or Terrain Impact and Crash Damage Data

7. FUSELAGE INWARD DEFORMATION OR COLLAPSE AND INJURY RELATIONSHIP *(Check appropriate boxes)*

Fuselage Area	Amount or Type of Deformation or Collapse	Specific Area of Deformation or Collaspse				Fuselage Deformation Produced/Contributed to Injury			
		Cockpit (1)	Forward Cabin Area (2)	Mid Cabin Area (3)	Rear Cabin Area (4)	Cockpit (5)	Forward Cabin Area (6)	Mid Cabin Area (7)	Rear Cabin Area (8)
a. Roof	Up to 1 Foot	☐	☐	☐	☐	☐	☐	☐	☐
	More Than 1 Foot But Less Than 3 Feet	✓	☐	☐	☐	✓	☐	☐	☐
	More Than 3 Feet	☐	☐	☐	☐	☐	☐	☐	☐
b. Left Side	Up to 1 Foot	☐	☐	☐	☐	☐	☐	☐	☐
	More Than 1 Foot	☐	☐	☐	☐	☐	☐	☐	☐
c. Right Side	Up to 1 Foot	☐	☐	☐	☐	☐	☐	☐	☐
	More Than 1 Foot	✓	☐	☐	☐	✓	☐	☐	☐
d. Nose	Up to 1 Foot	☐	☐			☐	☐		
	More Than 1 Foot	☐	☐			☐	☐		
e. Floor	Up to 1 Foot	✓	☐	☐	☐	✓	☐	☐	☐
	More Than 1 Foot	☐	☐	☐	☐	☐	☐	☐	☐
f. Floor *(local deformation under seats)*	Vertical	✓	☐	☐	☐	✓	☐	☐	☐
	Sideward	☐	☐	☐	☐	☐	☐	☐	☐
	Forward/Rearward	☐	☐	☐	☐	☐	☐	☐	☐

8. LARGE COMPONENT DISPLACEMENT *(Check appropriate boxes)*

Component	Displaced (1)	Torn Free (2)	Cockpit Penetrated/Entered (3)	Cabin Penetrated/Entered (4)
a. Transmission *(forward or main)*	☐	☐	☐	☐
b. Transmission *(rear)*	☐	☐	☐	☐
c. Rotor Blade *(forward or main)*	☐	✓	☐	☐
d. Rotor Blade *(rear or tail)*	☐	☐	☐	☐
e. Landing Gear *(specify location)*	☐	☐	☐	☐
f. Other *(specify)*	☐	✓	☐	☐

9. FLUID SPILLAGE

a. Equipped With Crashworthy Fuel System: ✓ Yes ☐ No

b. If So Equipped, Did Breakaway Valves Separate as Designed: ✓ Yes ☐ No ☐ NA

c. Flammable Fluid Spillage Occurred: ✓ Yes ☐ No

d. Auxiliary Fuel Tanks Installed: ☐ Yes ✓ No ☐ Internal ☐ External Crashworthy ☐ Yes ☐ No

e. Amount and Type Fluid Spilled

Gallons	Fuel *(Type)*	Oil *(Type)*	Hyd Fluid *(Type)*	Other *(Specify)*
0 - 1				
> 1 - 2				
> 2 - 10				
> 10 - 20				
> 20	JP8			

10. SPILLAGE SOURCE

Part	a. Part Name/Nomenclature	b. Part Number	c. National Stock No.
(1) Cell/Tank/Reservoir	Tank, Fuel Aircraft	4060606010895	1560011646785
(2) Filter			
(3) Fitting			
(4) Fluid Line			
(5) Value			
(6) Breakaway Valve			
(7) Other *(Specify)*			
(8) Other *(Specify)*			
(9) Other *(Specify)*			

11. REMARKS

SAMPLE

Figure 3–8. Example of a completed DA Form 2397–6, Part VII, In-flight or Terrain Impact and Crash Damage Data—continued

3–9. DA Form 2397–6, Part VII, In-Flight or Terrain Impact and Crash Damage Data

a. Introduction. DA Form 2397–6 (see fig 3–8) will be completed for the following (see table 3–6):

(1) All technical reports involving in-flight collisions (see definitions below), excluding tail rotor strike accidents.

(2) All technical reports involving aircraft damage excluding the following:

(a) Aircraft ground accidents.

(b) Flight-related accidents with no aircraft damage.

(c) Rotor blade strikes (main and tail rotor) with no additional aircraft damage.

b. Flight terminology.

(1) *In-flight collision.* The aircraft collides with an obstacle while in flight (helicopters at an altitude greater than normal taxi-hover height).

(2) *Terrain collision.* The aircraft collides with the terrain.

(3) *Flight path.* The profile motion of the aircraft center of gravity (CG) during flight relative to the horizontal, measured in degrees.

(4) *Terrain slope.* Slope of terrain measured in degrees.

(5) *Aircraft attitude.* The orientation of the aircraft with respect to the horizontal at the instant of impact. The attitude is measured in degrees about the pitch, roll, and yaw axes.

(6) *Impact angle.* The angle between the flight path and the terrain. This angle is identical to the flight path angle for level terrain. For an upslope impact, the terrain slope angle is added to the flight path angle. For a downslope impact, the terrain slope is subtracted. An upslope and downslope impact is shown in figure 3–8.

(7) *Flammable fluid.* Engine fuel, lubricating oil, and hydraulic fluid.

(8) *Major impact.* The impact causing the most severe crash forces.

(9) *Gravitational force (G-force).* A downward force resulting from gravitational deceleration action on a mass (Newton's second law, F=Ma). This is normally expressed as a 1 G-force.

(10) *Impact force.* A force in any direction resulting from the deceleration of an aircraft. These forces are usually expressed as multiples of the G-force such as, 1G, 2Gs. Impact forces are resolved into components relative to some reference such as the longitudinal and vertical axes of an aircraft.

(11) *Airspeed.* Indicated airspeed along the flight path (knots).

(12) *Vertical velocity.* Rate of ascent or descent in feet per minute (fpm).

(13) *Ground speed.* Ratio of distance covered to time required relative to ground (knots).

a. Also see paragraph 3–9.

b. Complete instructions as follows:

(1) *Block 1.* This block is required for in-flight collisions, such as a midair collision, wire strike, bird strike, or tree strike. If doubt exists as to whether this block or block 2 should be used, both blocks can be completed. For example, the aircraft may strike a structure during an approach and continue under control some distance forward and crash; thus, in-flight and terrain collisions are involved. Near simultaneous impacts with trees, structures, and the ground require only block 2 to be completed. In other cases, such as a bird strike, in which a subsequent routine landing is made, only block 1 would be checked. If the information desired in these blocks cannot be determined, so state in the box(es) provided for the information.

(a) Block 1a. Estimate or analytically determine and enter the knots indicated airspeed or true airspeed just before impact.

(b) Block 1b. Estimate or analytically determine and enter the vertical speed (feet per minute) just before impact, and check whether "Up" or "Down." If zero, enter "0" in space provided and do not check "Up" or "Down" box.

(c) Block 1c. Enter the flight path angle (degrees) at major impact and check whether "Up" or "Down."

(d) Block 1d. Enter the pitch and roll angles (degrees) at moment of impact and check the appropriate direction.

(e) Block 1e. Check obstacle(s) struck while aircraft was in flight. For example, contact with a hangar building would be checked as "Other." Specify in the block. Also enter collision height above the ground.

(f) Block 1f. Check box to identify area of aircraft that sustained the strike. If aircraft sustained a strike at more than one location, check several boxes and indicate 1st, 2d, 3d, to show strike sequence.

(g) Block 1g. Check the appropriate box to reflect the wire/cable(s)/obstacle conspicuousness to the pilot under the environmental conditions and terrain at the time of the accident.

(h) Block 1h. Enter the outside diameter for the type cable/bundle struck. The outside diameter of the wire bundle/cable including insulation is desired, not the individual wire inside the bundle or cable. Enter the number of wires struck in the impact. For example, in a five-cable power transmission line, only three cables may be struck.

(i) Block 1i. Check whether or not a Wire Strike Protection System (WSPS) was installed. Also check whether or not the WSPS cut the wire.

(j) Block 1j. Enter outside diameter of tree limb, pole, bush that was struck, if applicable.

(2) *Block 2.* Complete this block to show terrain collision kinematics at instant of major impact. If block 1 was filled out and aircraft continues under control after in-flight collision and then sustains further damage upon ground impact, complete block 2 also. If aircraft sustains in-flight damage such as from a bird strike and then makes a routine landing, block 2 does not have to be filled out.

(a) Block 2a. Estimate or analytically determine and enter the ground/horizontal velocity (knots) at the instant of the major impact. The horizontal velocity is desired. This value is not to be confused with airspeed or resultant velocity. The ground speed vector combined with the vertical speed vector can be used to determine the resultant velocity as shown for sample high-angle and low-angle impacts.

(b) Block 2b. Estimate or analytically determine and enter the vertical speed (feet per minute) just before impact and check whether "Up" or "Down." The vertical speed at impact can be combined with ground speed to yield the resultant velocity as discussed above.

(c) Block 2c. Enter the flight path angle (degrees) just before impact and check whether "Up" or "Down."

(d) Block 2d. Indicate by check marks which two of the three parameters above are the most accurate. Since any two items can determine the third, it is necessary to determine which two (a and b, b and c, or a and c) the investigator feels are most accurate. Check only two boxes.

(e) Block 2e. Enter the impact angle (degrees).

(f) Block 2f. Enter the pitch, roll, and yaw attitude (degrees) of aircraft at the instant of impact.

1. Pitch. Enter degrees and check "Up" or "Down" pitch in appropriate box.

2. Roll. Enter degrees and check "Left" or "Right" roll in appropriate box.

3. Yaw. Enter degrees and check "Left" or "Right" yaw as appropriate. If nose is to left of flight path, check "Left" box; if nose is to right, check "Right" box.

(3) *Block 3.*

(a) Block 3a. Check the appropriate box.

(b) Block 3b. Enter the roll in degrees for the appropriate direction if the aircraft rolled significantly after the major impact. A value should be entered even if the aircraft comes to rest in the original attitude after it has rotated during the crash sequence.

(c) Block 3c. Enter the yaw in degrees for the appropriate direction if the aircraft yawed significantly after the major

impact. A value should be entered even if the aircraft comes to rest in the original attitude after it has yawed during the crash sequence.

(d) Block 3d. Enter the pitch in degrees from the horizontal (level) attitude if the aircraft pitched (nose up or down) after major impact, and check the appropriate box to indicate if the pitch was up or down. For example, if an aircraft rotates forward about the nose as a fulcrum or a forward pitching motion, check "Down."

(4) *Block 4.*

(a) Block 4a. Estimate or analytically determine and enter the vertical force (Gs) at the aircraft CG. Check whether the force was "Up" or "Down."

(b) Block 4b. Estimate or analytically determine and enter the longitudinal force (Gs) at the aircraft CG. Check whether the force was "Fore" or "Aft."

(c) Block 4c. Estimate or analytically determine and enter the lateral force (Gs) at the aircraft CG. Check whether the force was "Left" or "Right."

(5) *Block 5.* Enter the case number as shown on the DA Form 2397–1 (see table 3–16).

(6) *Block 6.* Use only for aircraft other than "case aircraft" in accidents involving more than one aircraft. Enter serial number of other aircraft only on each DA Form 2397–6 that applies to other aircraft.

(7) *Block 7.* This block shows fuselage structural deformation or collapse and its relation to personnel impact injuries. The areas of fuselage most likely to be deformed are stated in items a through f. The location of the deformation is indicated in the four columns labeled cockpit, forward, middle and rear cabin. If the deformation or collapse caused injuries to personnel, the appropriate box of item (5), (6), (7), and (8) should be checked. Information in this block shall agree with the injury/occupational illness mechanism identified in DA Form 2397–9 and the LSE failure modes identified in DA Form 2397–10, Personal Protective/Escape/Survival/Rescue Data.

(a) Blocks 7a-e. Check column(s) 1 through 4 to show the location of deformation for each fuselage area. As a general rule, deformation of 3 inches or less is not enough to be recorded because injuries are not likely to result from such movement. If personnel injuries were caused by fuselage structural deformation, columns 5 through 8 should be checked in the appropriate box. Injuries caused by nonuse of restraint and seat failure and other injuries not related to fuselage deformation are not to be recorded here.

(b) Block 7f. Check box to indicate whether the floor was deformed locally under the seat structure. This type deformation may occur as a result of external rock or tree stump impact. For example, if one seat leg floor fitting is pushed upward by at least 2 inches with respect to the other three fittings, check the box. The same applies to sideward or fore-aft movement of the seat leg floor fittings.

Note. Photographs should be made of the deformed areas checked under items a through f. At least two photos should be obtained, and they should be taken along mutually perpendicular axes to help offset the effect of distortion.

(8) *Block 8.* This block indicates the displacement of heavy aircraft components so their potential for injury/occupational illness or for ignition of fires may be evaluated. Only those components expected to be a major hazard are listed under items a through e. Block f provides for the displacement of other heavy components, such as engines, prop blades, electrical boxes, which could be a hazard to personnel. Columns 1 through 4 describe the displacement of the components from their normal position.

(a) Blocks 8a-d. These components are potentially the most hazardous on rotary-wing aircraft. Displacement of single rotor transmission and/or rotor blades are to be checked in items "a" and "c" while tandem rotor aircraft are to be checked in items a, b, c, and d as appropriate. If the main rotor hub(s) remain attached to their blades, the hub is assumed an integral part of the blade(s) and is checked under item c or d. If the hub(s) remain attached to the transmission(s), the hub is assumed an integral part of the transmission and displacement is checked under item "a" or "b."

(b) Block 8e. Check landing gear displacement. Specify which landing gear, wheel, or skid displaces by simply stating the location on the aircraft. For example, left front, center front, right front, left rear, center rear, right rear. If more than one gear displaces, continue the identities shown above in remarks block (block 11) to indicate the displacement.

(c) Block 8f. Check this box(es) to identify displacement of heavy component(s) not shown above. If more than one mass is involved, explain in block 11.

1. Column 1. Check box(es) in this column if sufficient displacement has occurred to cause the component to be hazardous even though injuries may not be present. For helicopter transmissions, it is probable that a 10-degree tilt of the transmission and rotor mast will result in a hazardous condition due to fuselage rotor blade strike potential. Likewise, a 6-inch displacement of the transmission, along any axis, will probably result in a hazardous condition. Check the box for rotor blade(s) (item c or d) if it is determined that further blade rotation would result in an occupiable volume blade strike.

2. Column 2. Check box if a major component is separated completely from its normal structural attachment even though the component may still be held by flexible attachments such as control cables or rods and electrical wires.

3. Column 3. Check this box if component actually deformed or penetrated the cockpit "container" sufficiently to create a hazard.

4. Column 4. Check this box if component actually deformed or penetrated the cabin "container" sufficiently to create a hazard. Photographs should be made of the displaced components checked under items a through f. At least two photos should be obtained, and they should be taken along mutually perpendicular axes to help offset the effect of distortion.

(9) *Block 9.*

(a) Block 9a. Check whether or not aircraft is equipped with crash-resistant fuel system.

(b) Block 9b. If aircraft is equipped with crashworthy fuel system, check to determine whether the breakaway valves in the fuel system did separate.

(c) Block 9c. Check whether or not flammable fluid spillage occurred. If "Yes" box is checked, complete block e.

(d) Block 9d. Check whether or not aircraft was equipped with auxiliary fuel tanks and indicate if the tanks were internal or external. Also, check the appropriate box which best describes the crashworthiness of the tanks. If the tanks are partially crashworthy, check "No" and explain in the remarks.

(e) Block 9e. In the space corresponding with the amount of flammable fluid spilled, enter the type of fluid which was spilled. For example, JP–8, 7808. For example, 15 gallons of JP–8 fuel were spilled so enter "JP–8" under the fuel column, adjacent to the 10–20 amount line. The amount of spilled fluid can be estimated by:

1. The difference between quantity of liquid remaining and fluid before accident.

2. A knowledge of the probable mode of failure in the fluid system. For example, did fluid trickle out at slow rate, or did it gush out all at once?

(10) *Block 10.* Identify one or more spillage sources by writing the name of the part causing or permitting leakage. Rows 7, 8, and 9 may be used to list other sources such as coolers, accumulators. Also, write in the manufacturer's PN and the NSN. The exact identity of the part causing leakage is desired, not the component or assembly. State the cause of fluid spillage in Remarks. For example, a shift of cargo may have crushed the internal auxiliary fuel tanks.

(11) *Block 11.* Explain in remarks any additional data the investigation board deems appropriate.