

# UNCLASSIFIED

ABBREVIATED AVIATION ACCIDENT REPORT (AAAR)								
<b>Source</b>	RECEIVED INPROCESS							
<b>1. Case Number</b>	<b>1a. Date of Accident</b>	<b>1b. Time</b>	<b>1c. Aircraft Serial Number</b>	<b>2a. Classification</b>			<b>2b. Category</b>	
20020706001	Jul 06 2002	1955	8900138	A			FLIGHT	
<b>3. Type of Aircraft</b>	<b>4. Period Of Day</b>	<b>5. No Acft Involved</b>	<b>6. Nearest Installation</b>					
CH47D	DAY	1	SR299 - CP BONDSTEEL, SERBIA					
<b>7. Accident Location</b>		a. On Post	b. Not On Airfield	e. SERBIA				
<b>8. Organization Involved in Accident</b>								
<b>Unit</b>	<b>UIC7</b>	<b>UIC6</b>	<b>UIC5</b>	<b>UIC4</b>	<b>UIC3</b>	<b>UIC2</b>	<b>Army Headquarters Element</b>	<b>Station</b>
WC5LAA						WAT6FF	W0ANAA	GE303
F/159AX						5 CORPS	USAREUR	GIEBELSTADT, FRG
<b>9. Organization Accountable for Accident</b>								
WC5LAA						WAT6FF	W0ANAA	GE303
F/159AX						5 CORPS	USAREUR	GIEBELSTADT, FRG
<b>10. Estimated Accident Cost</b>								
<b>a. Total Loss</b>	<b>b. Aircraft Damage</b>		<b>c. Man Hrs</b>		<b>d. Man Hrs Cost</b>		<b>e. Other Mil Damage</b>	
No	\$1814568		3063		\$49008		\$0	
<b>f. Civilian Damage</b>		<b>g. Injury</b>		<b>h. Total This Aircraft</b>		<b>i. Total Accident</b>		
\$0		\$0		\$1863576		\$1863576		
<b>11. General Data</b>								
<b>a. Mission</b>				<b>S/M</b>	<b>b. Flight Plan</b>		<b>c. Data Recorder</b>	
T - TRAINING				SINGLE	VFR		No	
16 - TACTICAL								
57 - FAST ROPING								
<b>d. Night Vision</b>		<b>e. Fire</b>		<b>f. Fluid Spillage</b>		<b>g. Field Training</b>		
		NONE		Yes		Joint Endeavor (Bosnia)		
<b>12. Flight Data</b>								
<b>a. Emergency</b>		<b>Duration</b>		<b>Phase of Operation</b>				
		.5		3 - DECELERATION				
				J - APPROACH				
		<b>AGL</b>	<b>KIAS</b>		<b>Weight</b>		<b>Overgross</b>	

	0	20	34444	No
<b>b. Termination</b>	<b>Duration</b>		<b>Phase of Operation</b>	
	.5		3 - DECELERATION	
	J - APPROACH			
	<b>AGL</b>	<b>KIAS</b>	<b>Weight</b>	<b>Overgross</b>
	0	0	34444	No
<b>13. Type Event</b>				
30 - Collision With Ground/Water				
<b>14. Accident Cause Factors</b>		<b>Human Error</b>	<b>Material Failure</b>	<b>Environmental</b>
		DEFINITE	NO	NO
<b>15. Summary</b>				
<p>The mission was to conduct a day, night vision goggle, Fast-Rope Insertion and Extraction System (FRIES) qualification training mission for two unqualified unit aviators and FRIES currency sustainment training for the Kosovo Force Task Force Falcon Special Operations Command and Control Element. During the final deceleration phase to commence the maneuver, the standardization instructor pilot established the aircraft at 80 KIAS and 26 to 28 feet radar altimeter indicated altitude. As the jumpers prepared to exit the aircraft, the ramp struck the ground, initiating a series of events that caused the subsequent crash and extensive structural damage to the fuselage and aft rotor system. The flight engineer received a minor injury.</p>				
<b>16. COMPONENT AND PART FAILURE/MALFUNCTION DATA</b>				
No Component/Part Data				
<b>17. ENVIRONMENTAL</b>				
<b>a. General</b>	(1) <input type="checkbox"/> IMC	(2) <input checked="" type="checkbox"/> VMC	(3) <input type="checkbox"/> Unknown	
<b>b. Environmental Conditions</b>				
<b>1. Weather Conditions</b>		<b>2. Other Conditions</b>		
(a) Hail	<input type="checkbox"/>	(a) Animals	<input type="checkbox"/>	
(b) Sleet	<input type="checkbox"/>	(b) Fowl	<input type="checkbox"/>	
(c) Fog	<input type="checkbox"/>	(c) Surface	<input type="checkbox"/>	
(d) Drizzle	<input type="checkbox"/>	(d) Noise	<input type="checkbox"/>	
(e) Rain	<input type="checkbox"/>	(e) Chemicals	<input type="checkbox"/>	
(f) Snow	<input type="checkbox"/>	(f) Radiation	<input type="checkbox"/>	
(g) Lightning	<input type="checkbox"/>	(g) Glare	<input type="checkbox"/>	
(h) Thunderstorm	<input type="checkbox"/>	(h) FOD	<input type="checkbox"/>	
(i) Gusty Winds	<input type="checkbox"/>	(i) Temperature	<input type="checkbox"/>	
(j) Freezing Rain	<input type="checkbox"/>	(j) Vibration	<input type="checkbox"/>	
(k) Other	<input type="checkbox"/>	(k) Dust	<input type="checkbox"/>	
<b>c. Aircraft Icing</b>	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	<b>d. Turbulence</b>	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	
<b>19. MOON ILLUMINATION DATA</b>				
<b>a. Above Horizon</b>	<b>b. Visible</b>	<b>c. Degrees Above Horizon</b>	<b>d. Percent Illumination</b>	<b>e. Clock Position</b>

<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		
<b>20. WIRE STRIKE DATA</b>			
<b>a. Wire Strike</b>		<b>b. WSPS Installed</b>	
<b>c. WSPS Engaged</b>			
<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	
<b>d. WSPS Cut Wire</b>		<b>e. WSPS Functioned</b>	
<b>f. Wires Struck</b>			
<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	Number wires 0	Dia.(inches)
<b>21. PERSONNEL DATA</b>			
<b>Person # 1</b>		<b>c. Grade</b>	
<b>d. Sex</b>		<b>e. Duty</b>	
W3		MALE	
SP - STANDARDIZATION INSTRUCTOR PILOT			
<b>f. SVC</b>		<b>g. UIC</b>	
<b>h. Role</b>		<b>i. On Controls</b>	
A - ACTIVE ARMY		WC5LAA	
D - DEFINITELY		<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	
<b>j. Lab Test</b>		<b>k. Hrs Slept 24</b>	
<b>l. Hrs Worked 24</b>		<b>m. Hrs Flown 24</b>	
<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes		10	
4		4	
<b>n. RL</b>		<b>o. FAC</b>	
<b>p. Injury</b>		<b>q. MTDS Total Flt Hrs</b>	
<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3		<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	
1540			
<b>Person # 2</b>		<b>c. Grade</b>	
<b>d. Sex</b>		<b>e. Duty</b>	
E5		MALE	
CE - CREW CHIEF/FLIGHT ENGINEER			
<b>f. SVC</b>		<b>g. UIC</b>	
<b>h. Role</b>		<b>i. On Controls</b>	
A - ACTIVE ARMY		WC5LAA	
D - DEFINITELY		<input type="checkbox"/> No <input type="checkbox"/> Yes	
<b>j. Lab Test</b>		<b>k. Hrs Slept 24</b>	
<b>l. Hrs Worked 24</b>		<b>m. Hrs Flown 24</b>	
<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes		12	
8			
<b>n. RL</b>		<b>o. FAC</b>	
<b>p. Injury</b>		<b>q. MTDS Total Flt Hrs</b>	
<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3		<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	
F - NO LOST WORKDAY OR RESTRICTED ACTIVITY		0	
<b>Person # 3</b>		<b>c. Grade</b>	
<b>d. Sex</b>		<b>e. Duty</b>	
W3		MALE	
PI - PILOT			
<b>f. SVC</b>		<b>g. UIC</b>	
<b>h. Role</b>		<b>i. On Controls</b>	
A - ACTIVE ARMY		WC5LAA	
D - DEFINITELY		<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	
<b>j. Lab Test</b>		<b>k. Hrs Slept 24</b>	
<b>l. Hrs Worked 24</b>		<b>m. Hrs Flown 24</b>	
<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes		10	
6		2	
<b>n. RL</b>		<b>o. FAC</b>	
<b>p. Injury</b>		<b>q. MTDS Total Flt Hrs</b>	
<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3		<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	
364			
<b>Person # 4</b>		<b>c. Grade</b>	
<b>d. Sex</b>		<b>e. Duty</b>	
E5		MALE	
CE - CREW CHIEF/FLIGHT ENGINEER			
<b>f. SVC</b>		<b>g. UIC</b>	
<b>h. Role</b>		<b>i. On Controls</b>	

A - ACTIVE ARMY		WC5LAA	D - DEFINITELY	<input type="checkbox"/> No <input type="checkbox"/> Yes
j. Lab Test		k. Hrs Slept 24	l. Hrs Worked 24	m. Hrs Flown 24
<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes		7	7	
n. RL		o. FAC	p. Injury	q. MTDS Total Flt Hrs
<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3		<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	-	0
<b>22. IMPACT/PROTECTIVE/ESCAPE/SURVIVAL/RESCUE DATA</b>				
a. Aircraft Space Compromised		b. Escape/Survival Difficulties		c. Protective/Restraint Equip Functioned
<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes		<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes
<b>24. FINDINGS AND RECOMMENDATIONS</b>				
<b>Findings</b>				
<p>FINDING 1: (Present and Contributing: Human Error - Individual, Training, and Standards Failure) During the final deceleration phase of a day, fast rope insertion and extraction system (FRIES) qualification training mission, the standardization instructor pilot (SP) failed to accurately judge the aircraft's height above the ground IAW the unit-developed Aircrew Training Manual Task 3016 (Perform fast rope insertion/extraction). That is, the SP mistakenly relied on radar altimeter indications as his sole reference of aircraft altitude. The radar altimeter was indicating slant range to the ground and not indicating the height of the aircraft's aft wheels and ramp above the ground. As a result, the ramp struck the ground, breaking a fuel line and rupturing the fuel flow to the number one engine. This initiated a chain of events that ultimately led to extensive structural damage to the fuselage and aft rotor system. The flight engineer received a minor injury. The SP failed to execute the maneuver properly because of his overconfidence in his ability to execute and instruct the task, inadequate experience in executing "live" FRIES missions, and an inadequate unit training program for FRIES operations. Additionally, the board determined the 30-foot entry altitude standard in the unit-developed task is too low and does not allow for adequate margin of error during a 20-degree, maximum, nose-up deceleration maneuver. FINDING 2: (Present and Contributing: Human Error - Training Failure) During the mission planning and briefing process, the detachment commander and SP failed to properly assess the overall risk associated with this mission IAW risk-management application principles in FM 100-14 and AR 95-1, paragraphs 2-14b(3) and (6). That is, they failed to recognize the overall risk associated with the mission that was clearly high risk due to inadequate unit training, unqualified crewmembers, lack of overall experience, and lack of proficiency in performing live FRIES missions, and inadequate task standards. As a result, the aircraft impacted the ground during a live FRIES mission and caused extensive damage to the aircraft and a minor injury to the flight engineer. The unit leaders failed to recognize the overall risk associated with the FRIES mission and elevate the risk acceptance to the proper level of command due to inadequate unit training in mission briefing responsibilities and inadequate knowledge of risk-management principles. A visit by Directorate for Evaluation and Standardization SPs in December 2001 revealed the lack of training for unit mission briefing officers. FINDING 3: (Present and Contributing: Human Error - Individual and Training Failure) During the deceleration phase of a day FRIES mission with fast ropers onboard, the crewmembers failed to execute positive crew coordination IAW TC 1-216, paragraph 6-3. That is, the crew did not effectively communicate the height above the ground with positive feedback among all crewmembers. As a result, the aircraft ramp struck the ground and severed the fuel line to the number one engine after the PI shut down the number two engine. The rotor RPM rapidly decayed and the aircraft received extensive structural damage to the fuselage and aft rotor system as it crashed to the ground. The crew failed to execute positive</p>				

communication as a result of overconfidence in each other's ability to perform a live rope FRIES task and inadequate unit training in crew coordination. THE FINDING LISTED BELOW DID NOT DIRECTLY CONTRIBUTE TO THE CAUSAL FACTORS INVOLVED IN THIS ACCIDENT; HOWEVER, IT DID CONTRIBUTE TO THE SEVERITY OF THE ACCIDENT DAMAGE.

FINDING 4: (Present and Contributing to the Severity of the Damage: Human Error - Individual Failure) When told by the flight engineer (FE) to shut down the number two engine during the accident sequence, the pilot (PI) failed to properly diagnose the actual emergency by verifying the number two engine condition with torque indications, number two engine N1, and number two engine oil pressure, in contravention of the emergency procedure in TM 55-1520-240-10, paragraph 9-3d. The PI performed an emergency shutdown of the number two engine after the number one engine quit from fuel starvation, effectively creating a dual engine-out condition at a 20-foot hover. This created an extremely low rotor RPM condition that prevented the interposer droop stops from engaging. As a result, the aft rotor blades struck the aircraft fuselage and caused extensive structural damage to the aircraft. The PI's actions were a result of his fear of an impending fire and overconfidence in the FE's ability to diagnose the emergency. In the opinion of the board, the damage to the aircraft would have been limited to the ramp and broken fuel line had the emergency been correctly diagnosed. THE FINDINGS LISTED BELOW DID NOT CONTRIBUTE TO THIS ACCIDENT; HOWEVER, IF LEFT UNCORRECTED, THEY COULD HAVE AN ADVERSE EFFECT ON THE SAFETY OF FUTURE AVIATION OPERATIONS.

FINDING 5: (Present but not Contributing) The investigation revealed an unauthorized modification where a Walkman radio was wired into the accident aircraft's wiring and intercommunication system (ICS) box aircraft system. This modification is not authorized IAW the WARNINGS on page (a) of TM 55-1520-240-10. The modification allowed the crewmembers to hook up a compact disk player, radio, or cassette tape player to the volume control knob on the number four HF radio and listen to music during missions. While seemingly a harmless modification, the unauthorized installation could have allowed stray voltage from the ICS box to ignite fuel vapors when the number one engine fuel line broke during the accident sequence.

FINDING 6: (Present but not Contributing) The investigation revealed a folding field chair was strapped to the cabin floor forward of the NO CARGO line (FS 160), in contravention of TM 55-1520-240-10, figure 6-12, Note 5. This chair, combined with the current M24 machinegun mounting bar configuration, delayed rapid egress of the passengers and aft crewmembers. The passengers had to swing under the bar and between the chair and doorframe to egress the aircraft. Due to the potentially dangerous fuel spill and vapors, any presence of fire could have been disastrous.

FINDING 7: (Present but not Contributing) The investigation revealed the CH-47D Operator's Manual, TM 55-1520-240-10 (with required changes), was not in the aircraft. The operator's manual is required to be in the aircraft at all times IAW TM 55-1520-240-10, paragraph 1-2, and DA PAM 738-751, paragraph 1-15(c)(2).

FINDING 8: (Present but not Contributing) The investigation revealed the SP did not properly measure the fast rope at a high hover with the radar altimeter prior to fast rope operations as required by the unit-developed ATM Task 3016.

FINDING 9: (Present but not Contributing) The aircraft historical weight and balance files (DD Form 365-3) indicated that the FRIES modification was not entered in the aircraft basic weight. The aircraft configuration (helicopter internal cargo handling system [HICHS]) was not per the available DD Form 365-4, and the SP did not have a current weight and balance form as required by AR 95-1 and TM 55-1500-342-23.

#### **Recommendations**

RECOMMENDATION 1: A. Unit Level Action: Commander, Company F, 159th Aviation, 3-158th Aviation Regiment, 12th Aviation Brigade: (1) Brief all unit personnel on the facts and

circumstances surrounding this accident, as appropriate, emphasizing the hazards associated with FRIES operations. (2) Review and revise the unit-developed ATM task to include an entry altitude standard that allows a greater margin of error; i.e., increase the entry altitude to a minimum of 50 feet AGL to mirror the U.S. Army Special Operations Command standard in TC 1-216-1. (3) Review the unit training program and standing operating procedures requirements for CH-47 FRIES qualification and develop a more stringent qualification and sustainment training program. B. Higher Level Action: Commander, 12th Aviation Brigade: (1) Brief all brigade personnel on the facts and circumstances surrounding this accident as appropriate, emphasizing the hazards associated with CH-47/UH 60 FRIES/Special Patrol Insertion/Extraction System (SPIES) operations. (2) Review the unit training program and SOP requirements in the 12th Aviation Brigade SOP for CH-47/UH-60 FRIES/SPIES qualification for adequacy. (3) Ensure FRIES/SPIES sustainment training receives command attention at appropriate quarterly training briefings and in the Quarterly Training Guidance. C. DA Level Action: (1) Commander, U.S. Army Safety Center, disseminate/publish the facts and circumstances surrounding this accident in FLIGHTFAX as appropriate. (2) Commander, U.S. Army, Europe and 7th Army, review MACOM command guidance and ensure continuous safety and standardization oversight (USAREUR Aviation Safety and Standardization Detachment) of USAREUR FRIES and SPIES training. RECOMMENDATION 2: A. Unit Level Action: Commander, Company F, 159th Aviation, 3-158th Aviation Regiment, 12th Aviation Brigade: (1) Brief all unit personnel on the facts and circumstances surrounding this accident and how incomplete application of risk-management principles contributed to this accident. (2) Develop a unit training program of instruction to educate mission briefing officers and approval authorities on their duties and responsibilities. (3) Review the unit risk-management standing operating procedures (SOP) for adequacy and content. (4) Develop a risk management worksheet IAW FM 100-14 and USASOC Reg 350-6 to identify hazards associated CH-47 FRIES operations, develop controls to mitigate the risks, and approve the residual risks at the appropriate level of command for all future FRIES operations. B. Higher Level Action: Commander, 12th Aviation Brigade: (1) Brief all unit personnel on the facts and circumstances surrounding this accident and how incomplete application of risk management principles contributed to this accident. (2) Develop a unit training program of instruction to educate mission briefing officers and approval authorities on their duties and responsibilities. (3) Review the unit risk-management SOP for adequacy and content. (4) Develop a risk management worksheet IAW FM 100-14 and USASOC REG 350-6 to identify hazards associated with CH-47 and UH-60 FRIES/SPIES operations, develop controls to mitigate the risks, and approve the residual risks at the appropriate level of command for all future CH-47 and UH-60 FRIES/SPIES operations. C. DA Level Action: None. RECOMMENDATION 3: A. Unit Level Action: Commander, Company F, 159th Aviation, 3-158th Aviation Regiment, 12th Aviation Brigade, assess the overall crew coordination training in the unit and conduct re-training using the exportable training package. B. Higher Level Action: None. C. DA Level Action: Commander, U.S. Army Training and Doctrine Command, resource and expedite the development and fielding of an aircraft and mission-specific crew coordination training and sustainment program for rotary-wing flight crews. RECOMMENDATION 4: A. Unit Level Action: Commander, Company F, 159th Aviation, 3-158th Aviation Regiment, 12th Aviation Brigade, brief all company personnel on the importance of verifying an actual engine emergency before performing an emergency engine shutdown in flight. B. Higher Level Action: Commander, 12th Aviation Brigade, brief all personnel on the importance of verifying an actual engine emergency before performing an emergency engine shutdown in flight. C. DA Level Action: None. RECOMMENDATION 5: A. Unit Level Action: Commander, Company F, 159th Aviation, 3-158th Aviation Regiment, 12th Aviation Brigade,

inspect all unit aircraft for similar type modifications. B. Higher Level Action: Commander, 12th Aviation Brigade, inspect all unit aircraft for similar type modifications. C. DA Level Action: None. RECOMMENDATION 6: A. Unit Level Action: Commander, Company F, 159th Aviation, 3-158th Aviation Regiment, 12th Aviation Brigade, develop a unit policy to prevent field-expedient seats from being used in the aircraft and brief crews that this could potentially impede emergency egress and result in serious injury if used during an accident sequence. B. Higher Level Action: None. C. DA Level Action: (1) Program Executive Officer-Aviation: (a) Expedite fielding of the crashworthy Simula seat to all CH-47D units. (b) Evaluate the design of the M24 machinegun-mounting system to allow more unimpeded egress from the forward cabin door with the gun installed; i.e., better quick disconnect. (2) Commander, U.S. Army, Europe and 7th Army, program funding at the MACOM level to equip USAREUR CH-47D helicopters with the Simula seats. RECOMMENDATION 7: A. Unit Level Action: Commander, Company F, 159th Aviation, 3-158th Aviation Regiment, 12th Aviation Brigade, ensure adequate numbers of CH-47D operator's manuals are available for all aircraft. B. Higher Level Action: None. C. DA Level Action: None. RECOMMENDATION 8: A. Unit Level Action: Commander, Company F, 159th Aviation, 3-158th Aviation Regiment, 12th Aviation Brigade: (1) Measure all ropes as required prior to all fast rope missions. (2) Obtain unit training ropes to allow crews to physically practice this maneuver in qualification and sustainment training. B. Higher Level Action: None. C. DA Level Action: None. RECOMMENDATION 9: A. Unit Level Action: Commander, Company F, 159th Aviation, 3-158th Aviation Regiment, 12th Aviation Brigade, review all FRIES and HICHS-configured aircraft for proper weight and balance configuration and accurate DD Forms 365-4. B. Higher Level Action: None. C. DA Level Action: None.

**U N C L A S S I F I E D**