

**HumRRO Final Report
FR-MTRD(CA) 80-13**

CIVIL HELICOPTER WIRE STRIKE ASSESSMENT STUDY

by Clyde H. Tuomela and Mark F. Brennan

October 1980

Volume II. Accident Analysis Briefs

Distribution of this report is provided in the interest of information exchange. Responsibility for the contents resides in the author or organization that prepared it.

**Prepared under Contract No. NAS2-10505 by
Human Resources Research Organization
300 North Washington Street
Alexandria, Virginia 22314**

for

**AMES RESEARCH CENTER
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

For NASA Internal Use Only

PREFACE

This report covers work accomplished during the ten-month period from December 1979 through October 1980.

Volume 1, *Findings and Recommendations*, presents summary findings and recommendations based on an analysis of 208 civil wire strike accidents in the ten-year period 1970 to 1979. Volume II contains a description and analysis of each accident.

The work outlined was performed under contract NAS2-10505, NASA - Ames Research Center, Moffett Field, California 94035. The technical monitor was Mr. William Snyder of the NASA - Ames Research Center.

This project was conducted at the HumRRO office, Carmel, California, under the supervision of Mr. William C. Osborn, Director, Military Training Research Division. Principal investigator was Capt. Clyde H. Tuomela, USN (Ret). Major contributors were Col. Mark F. Brennan, USA (Ret) and Dr. Elaine N. Taylor.

INTRODUCTION

This volume contains a description and analysis of each of the 208 civil helicopter wire strike accidents reported to the National Transportation Safety Board for the ten-year period 1970-1979. The accident analysis briefs are based on pilot reports, FAA investigation reports, and such accident photographs as were made available. Briefs are grouped by year and, within year, by NTSB accident report number.

1970

AGRICULTURE
AERIAL APPLICATION

3-0862 7/20/70 Nr. Buffalo, WY Hughes 269B No Injuries Substantial - \$2,800

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

The Accident: A commercial pilot (1715 hours) struck a barbed wire which was stretched across a coulee about 35 feet above ground. The pilot was on a spraying mission. The pilot's flight time on the day of the accident had been 7.8 hours. The pilot was unaware of the wire until the wire strike.

At the time of the accident, 2017, the weather was clear with visibility of 25 miles. The sun was low and casting shadows across the line of flight, creating poor lighting conditions.

The main rotor of the aircraft struck the wire. The pilot was able to land without further damage. There were no injuries.

Conclusion: The pilot's failure to see and avoid the wire caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

An estimated forward speed of 60 knots would have provided sufficient kinetic energy for external wire cutters to be effective had they been installed.

Pilot's Recommendation: "Fly higher."

AIR TRANSPORTATION

3-1372 8/8/70 Big Rock, VA Hughes 269B 1 Serious Injury Substantial - \$10,000

NTSB Accident Cause:

Pilot Error: Diverted attention from operation of aircraft

Factor: Collision with bird

The Accident: A private pilot (1030 hours) struck power wires about 200 feet above ground. The pilot was on a local flight from one airport to another. The total time of flight was 5 minutes. The pilot stated a bird collided with his windshield while in flight, and while he was leaning forward to inspect the damage to the bubble, he inadvertently allowed the aircraft to descend. The pilot was aware of the wires.

The weather was clear with some haze at the time of the accident, 1930. Visibility was 6 miles. It was dusk.

The initial impact of the wires was with one rotor blade. The main rotor shaft impacted with other wires. During autorotation to a landing, the rotor blades hit a tree and the aircraft crashed. There was no fire. The pilot was seriously injured.

Conclusion: The pilot's diversion from operation of the aircraft to inspect damage from a bird collision caused the wire strike.

Recommendations: A p. warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

The pilot was aware of the wires in this case, therefore identification of wire location was not a factor.

Forward speed of the aircraft of approximately 60 knots provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

AIR TRANSPORTATION

Power-Pipeline

3-1433 3/27/70 Port Huron, Mich. Bell 47G 2 Serious Substantial - \$17,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: A commercial pilot (823 hours) struck and broke an unseen household service line, about 35 feet above ground, while on a powerline patrol mission. Aircraft then went up into the powerline being patrolled and crashed.

At the time of the accident, 1430, the weather was clear with visibility of 15 miles. Total time of flight was 1 hour, 45 minutes. The sun was high and not considered a factor.

The bubble of the aircraft made initial contact with the household service wire, which separated after impact. The helicopter pitched upward, rotor blades caught and separated main power cable. The cable wound around the mast and the aircraft crashed. Both pilot and observer were seriously injured.

Conclusion: Pilot's failure to see and avoid household service powerline and aircraft subsequent entanglement with a second power cable caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of household service lines along flight path would have aided and possibly prevented initial wire strike.

Forward speed of aircraft, approximately 60 knots, would have provided sufficient kinetic energy for effective use of wire cutters had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-2238 5/25/70 Nr. Terra Ceia, NC Bell 47G4 No Injuries Destroyed - \$45,500

NTSB Accident Cause:

Pilot error: 1. Diverted attention from operation of aircraft
2. Misjudged clearance

Factor: High obstructions

The Accident: A commercial pilot (2645 hours) struck several wires at the end of a swath run. Pilot was on a defoliation mission. Total time of flight was 15 minutes. The pilot had knowledge of these and other wires in the area. Pilot momentarily looked away from his flight path to check spray just before striking wires.

At the time of the accident, 0635, the weather was clear with visibility of 5 miles. The sun was low in the east but not a factor as pilot was flying an east-west swath run.

Pilot had made several swath runs before striking wires. After striking wires with the main rotor blades, the aircraft landed, slowly rolled over on its right side and caught fire. The pilot was uninjured.

Conclusion: The pilot's momentary diversion of attention from the operation of the aircraft and misjudgment of clearance caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location was not a factor in this instance, as the pilot knew the location of wires.

Forward speed of approximately 40 to 60 knots would have provided sufficient kinetic energy for wire cutter effectiveness, had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-2261 5/30/70 Nr. Fallon, NV Bell 47G3B 1 Minor Injury Substantial - \$20,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstruction

The Accident: A high time commercial pilot (8800 hours) struck power and telephone lines about 15 feet above ground while making a swath run over an alfalfa field. Total time of the flight was 5 minutes. The pilot was not aware of the wires until impact. The wires were strung parallel to a line of trees at the end of the field.

The weather was clear at the time of the accident, 1300, with visibility of 15 miles. The sun was at its zenith and not considered a factor.

Initial contact of wires was with the cabin bubble. The aircraft came to rest in an irrigation ditch with substantial damage. The pilot received minor injuries. The aircraft was carrying toxic chemicals.

Conclusion: The pilot's failure to see the wires at the end of the field caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of about 60 knots provided sufficient kinetic energy for effective use of wire cutters, had they been installed.

AIR TRANSPORTATION

3-2414 6/6/70 Kettering, Ohio Hughes 369HS 1 Serious, 3 Minor Destroyed - \$60,000

NTSB Accident Cause:

Pilot Error: 1. Inadequate preflight preparation and/or planning
2. Failed to see and avoid objects or obstructions

Factors: High obstructions

The Accident: A high time commercial pilot (19,775 hours) struck a telephone cable approximately 30 feet above ground. The pilot was in a liftoff from a shopping center parking area. Total time of the flight was 1 minute. The pilot was aware of wires surrounding the area.

The accident occurred at night, 2145, in a flood-lighted area. The weather was clear with visibility of 15 miles. The wind was 0-5 knots from NNE.

The tail rotor of the aircraft impacted with the telephone cable, causing the aircraft to crash to the ground. The pilot was seriously injured; 3 passengers received minor injuries. The aircraft was destroyed.

Conclusion: The pilot's failure to see and avoid the telephone cable on liftoff caused the accident.

Recommendation: The benefit of a pilot's warning device is questionable as the pilot knew of the wires.

Likewise, identification of wires is not a factor since the pilot had driven out and inspected the site the day before the flight. He also did a walk-around inspection of the area and the craft prior to the takeoff preceding the accident.

Speed of the aircraft at takeoff/hover would not have been sufficient for effective use of wire cutters.

AGRICULTURE
AERIAL APPLICATION

3-2423 6/4/70 Nr. David City, NE Bell 47D1 No Injuries Substantial - \$11,000

NTSB Accident Cause:

Pilot Error: Misjudged clearance

Factor: High obstructions

The Accident: A high time commercial pilot (3531 hours) struck a power line approximately 15 feet above ground after a turnaround from a swath run. The total time of flight was 5 minutes. The pilot stated he misjudged his distance to wires at the end of the field and struck the top wire of a two-wire line.

The weather was clear at the time of the accident, 0900, with visibility of 15 miles. The sun was high and not considered a factor.

The main rotor of the aircraft engaged the wire, which broke on impact. The aircraft landed under control approximately 150 yards from the point of impact. The pilot was not injured.

Conclusion: The pilot misjudged the distance to the wires at the end of a field on his turnaround before starting a swath run.

Recommendations: A pilot warning device identifying wire location may have been beneficial. However, it would have been of questionable value as the pilot knew the location of the wires.

Identification of wire location was not a factor in this case.

Forward speed of 30-45 knots provided sufficient kinetic energy for effective use of wire cutters had they been installed.

AIR TRANSPORTATION

3-2884 7/3/70 Nr. Bellingham, WA Hughes 269B No Injuries Substantial - \$3,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: High obstructions
Sunglare

The Accident: A commercial pilot (247 hours) with 24 hours dual and 10 hours solo in rotorcraft, struck several power lines about 40 feet above ground. He was practicing hovering, takeoffs and landings from a pasture. Total time of the flight was 15 minutes. The pilot was not aware of the wires until the wire strike.

At the time of the accident, 1330, the weather was clear with visibility of 40 miles. The pilot was lifting off into the sun, which was a factor in the pilot's inability to see the wires.

The main rotor blades contacted the wires first, and then the top of the cabin. The pilot autorotated to a hard landing, further damaging the aircraft. There were no injuries.

Conclusion: The pilot's failure to see and avoid the wires caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Liftoff speed of approximately 30 knots or less may not have provided sufficient kinetic energy for external wire cutter effectiveness had they been installed.

AIR TRANSPORTATION

3-2924 7/11/70 Maupin, OR Hiller UH12A No Injuries Substantial - \$37,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Hidden obstructions
Evasive maneuver to avoid collision

The Accident: A private pilot (345 hours) struck a power line approximately 20 feet above ground, while making a landing approach to a cleared area. The pilot was on a student cross-country flight. Total time of the flight was 50 minutes. The pilot became aware of the power line just before the wire strike.

The weather was clear at the time of the accident, 1650, with unlimited visibility. The sun was relatively high and not a factor. The pilot reported a large tree at the side of the landing site hid the pole supporting the wire.

The main rotor blades impacted initially with the wire. The pilot hit the ground attempting to miss the wire. The hard landing further damaged the aircraft. The pilot was uninjured.

Conclusion: The pilot's failure to see and avoid the power wire caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

The aircraft's forward speed of above 30 knots on a landing approach provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-3245 7/27/70 Queen Creek, AZ Bell 47G No Injuries Substantial - \$1,000

NTSB Accident Cause:

Misc: Ground Signalman

Factor: High obstructions

The Accident: A high time commercial pilot (5900 hours) struck a power line approximately 15 feet above the ground. He was making a swath run in a night spraying operation; the swath run being marked by a ground flagman. Total time of flight was 5 minutes. The ground flagman went to the wrong field, where there was a wire. The pilot was unaware of the wire location until the strike.

The weather at the time of the accident, 2300, was clear with visibility of 10 miles. The night was dark.

The helicopter pilot oriented his swath run in relation to the flagman and during his run struck the wire with the main rotor blade. The pilot was able to control the aircraft to return to the takeoff point. The pilot was not injured.

Conclusion: The error of the flagman in marking the wrong field, one which contained wires, caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight was not a factor, as the flagman marked the wrong field.

Forward speed of 60 knots provided sufficient kinetic energy for effective use of wire cutters had they been installed.

Pilot's Recommendation: "Discontinue spraying fields at night if wires are present."

PUBLIC SERVICE

Police Patrol

3-3299 8/5/70 Redford, VA Hiller FH1100 No Injuries Substantial - \$2,000

NTSB Accident Cause:

- Pilot Error: 1. Inadequate preflight preparation and/or planning
2. Misjudged clearance

The Accident: A state police pilot (1210 hours) took off from a confined area and struck a power wire. The pilot had landed in a parking lot with obstructions on three sides, in connection with a survey of a motor vehicle accident site. Total time of flight was one minute. The pilot was aware of the wires and was attempting to avoid them on liftoff.

At the time of the accident, 1200, the ceiling was 25,000, with scattered clouds at 3500, and visibility of 20 miles. The sun was not a factor.

The aircraft main rotor blade initially impacted with the wire. The aircraft made a hard landing, damaging the tail boom and tail rotor.

Conclusion: The pilot's inadequate preflight planning in landing and lack of pilot skill in taking off from the confined area caused the accident.

Recommendation: A pilot's warning device, had it been installed, would have been of questionable value as the pilot was aware of the wires.

Liftoff speed of under 30 knots would not have made wire cutters effective.

AGRICULTURE
AERIAL APPLICATION

3-4534 9/9/70 Wenatchee, WA Bell 47G2 1 Minor Injury Substantial - \$26,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: High obstructions
Sunglare

The Accident: A commercial pilot (444 hours) struck telephone and power lines about 30 feet above ground while in a pull up from a swath run. The pilot was spraying an orchard. Total time of the flight was 15 minutes. The pilot was aware of the location of the wires prior to the wire strike.

At the time of the accident, 1715, the weather was clear with visibility of 15 miles. The pilot was flying into the setting sun and sunglare on pull up was a factor in this accident.

The aircraft initially engaged the wires with a skid. The aircraft went out of control and crashed. The pilot sustained minor injuries.

Conclusion: The pilot's failure to see and avoid the wire while pulling up from a swath run into the sun caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification was not a factor, since the pilot knew the location of the wires.

A forward speed of 60 knots provided sufficient kinetic energy for external wire cutter effectiveness had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-4556 10/12/70 Nr. Dundee, FL Sikorsky S-55 No Injuries Substantial - \$10,000

NTSB Accident Cause:

Pilot Error: Inadequate preflight preparation or planning

Factors: Sun glare
High obstructions

The Accident: A high time commercial pilot (3441 hours) entangled the right nose gear with power lines about 20 feet above ground. The pilot was engaged in spraying grapefruit trees and had just completed a pull-up into the morning sun. Total time of the flight until engagement was 7 minutes. The pilot was unaware of the wires until entanglement.

The weather at the time of the accident, 1007, was clear with visibility of 10 miles. The pilot stated his vision was temporarily lost as he turned east into the morning sun.

The pilot tried to disengage or break the power lines but failed. He hovered for approximately one hour until the engine quit because of fuel starvation. The pilot autorotated into grove from about 10 feet and the aircraft sustained substantial damage. The pilot was not injured.

Conclusion: The pilot's failure to see and avoid the wires as the result of sun glare caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

A forward speed of 30 knots or more on pull-up from a swath run should have provided sufficient kinetic energy for effective use of wire cutters had they been installed.

1971

AIR TRANSPORTATION

3-0619 2/23/71 Touchet, WA Bell 47G3 No Injuries Substantial - \$34,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: Unmarked obstructions at airport

The Accident: A commercial pilot (920 hours) struck a power line about 30 feet above ground while making an approach to a private airstrip. Pilot was landing to obtain directions. Total time of the flight was 30 minutes. The pilot had no knowledge of the wires before contact.

The weather ceiling was 3000' at the time of the accident, 0800, with haze. Visibility was 10 miles. The weather was not considered a factor.

The tail rotor initially contacted the wire. The helicopter did a 180° turn and landed hard, further damaging the tail rotor and shaft. The pilot was not injured.

Conclusion: The pilot's failure to see and avoid a wire during an approach landing caused the accident. The wire was unmarked.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Landing approach speed under 30 knots would not have created sufficient kinetic energy for effective use of wire cutters had they been installed.

Pilot's Recommendation: Remove power line from the Touchet airport. Or, at least, being a private strip, there should be an X on the runway to indicate the field is closed for public use.

AIR TRANSPORTATION

3-0722 7/4/71 Bowie, MD Hughes 269B 3 Minor Injuries Substantial - \$24,000

NTSB Accident Cause:

- Pilot Error:
1. Exercised poor judgment.
 2. Failed to abort takeoff.
 3. Failed to maintain adequate rotor RPM

Factor: High obstructions

The Accident: A commercial pilot (2800 hours) struck power wires approximately 40 feet above ground on 1'ftoff. The pilot was giving helicopter rides to DAV post members from a parking lot. Total time of the flight was 2 minutes. The aircraft developed power loss on takeoff. The pilot was apparently aware of wires surrounding the landing area.

The weather was clear at the time of the accident, 1900, with visibility of 15 miles. The wind was from the north at 5 knots. The sun was low but not a factor.

The pilot attempted to return to the takeoff point after power loss during the initial climb. The aircraft continued to lose power, struck power wires with the main rotor, and fell to the ground on its right side. The pilot and two passengers sustained minor injuries.

Conclusion: The pilot's failure to observe inadequate engine power and abort takeoff caused the wire strike.

Recommendations: None

AIR TRANSPORTATION

3-0935 6/21/71 New Orleans, LA Bell 47G4A One Fatal Destroyed - \$62,000

NTSB Accident Cause: A high time commercial pilot (3253 hours) struck two power wires approximately 250 feet above ground while on a final approach to a heliport at New Orleans. The pilot was on his first flight for an oil company, and was ferrying the aircraft to the heliport in readiness for an early morning flight the following day. Total time of the flight was 1 hour, 48 minutes.

At the time of the accident, 2040, the weather was clear with visibility of 10 miles. The night was dark.

The aircraft impacted with power wires strung across the Mississippi River. Towers are 425 feet high and each tower has a flashing red light. The cables sag to 250 to 200 feet above the river. The aircraft crashed and burned. Salvage parts from the river had cable wrapped around the rotor head. The pilot was killed in the crash.

Conclusion: The pilot's failure to see and avoid the power wires caused the crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of aircraft at 60 knots provided sufficient kinetic energy for effectiveness of wire cutters had they been installed, however possible initial rotor head wire impact could have precluded their effective use.

AIR TRANSPORTATION

3-1177 3/25/71 LaFollette, TN Hughes 269A 1 Minor Destroyed - \$15,000

NTSB Accident Cause:

- Pilot Error: 1. Inadequate preflight preparation and/or planning
2. Continued VFR flight into adverse weather conditions
3. Failed to see and avoid objects or obstructions

Factors: Low ceiling, fog, snow
High obstructions

The Accident: A private physician pilot (300 hours) struck power wires about 20 ft. above ground on liftoff during adverse weather. The pilot was returning to LaFollette airport where he had taken off earlier. He had run into fog and snow, turned back, and landed in a field when conditions got worse. On liftoff from the field, he became entangled in wires. Total time of the flight was 25 minutes.

At the time of the accident, 1715, the ceiling was indefinite, 200 feet, obscured. Visibility was 3/4 mile with light snow, smoke and haze.

The tail rotor initially came in contact with the power lines on liftoff. It spun out of control and became entangled in an inverted position in telephone wires on the other side of a road from the power lines. The pilot had minor injuries.

Conclusion: The pilot's attempt to take off from a field during IFR conditions and striking wires during liftoff caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Liftoff speed of aircraft would not have created sufficient kinetic energy for effective use of wire cutters had they been installed.

AIR TRANSPORTATION

3-1338 7/21/71 Fairbanks, AK Beil 206A 3 Fatal Destroyed - \$131,000

NTSB Accident Cause:

- Pilot Error: 1. Inadequate preflight preparation and/or planning
2. Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: An experienced commercial pilot (3272 hours) struck two high tension power lines approximately 40 feet above ground after taking off from a landing area adjacent to a road. The pilot was carrying personnel and equipment on a soil sampling program of the Alyeska Pipeline project. The pilot had landed at the area near the road for about 30-45 seconds for a passenger to pick up some equipment. Total time of the flight was 10 minutes. It is not known if the pilot was aware of the power wires before the wire strike.

At the time of the accident, 2210, the skycover was scattered at 6,000 feet with visibility of 15 miles. It was dusk. A witness stated that because of haze, clouds and deep dusk, it was hard to see the wires.

The fuselage and main rotor initially impacted with the wires. The photo shows power cable strand marks on the upper main rotor mast. The aircraft crashed to the ground after impact, killing two passengers. The pilot was thrown clear and was found dead. The aircraft caught fire and burned.

Conclusion: The pilot's apparent failure to check liftoff area for wires and subsequent failure to see and avoid them, caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft of over 30 knots had sufficient kinetic energy for wire cutters to be effective had they been installed; however, their value is questionable if the main rotor blades were involved in initial impact.

AGRICULTURE
AERIAL APPLICATION

3-2085 6/15/71 Franklin, MN Bell 47G One Minor Substantial - \$9,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

The Accident: A commercial pilot (148 hours) struck a telephone wire approximately 10-15 feet above ground while on a spraying mission. The line was out of service and hanging from a pole. Total flight time of the pilot on the day of the accident was 4 hours. The pilot was not aware of the wire until impact.

The weather was clear with visibility of 15 miles at the time of the accident, 1430. The sun was high and not a factor.

The wire impacted with the bubble of the helicopter and wrapped around the rotor mast. The aircraft was put into autorotation and tipped over on landing, damaging the main rotor blades. The pilot received minor injuries.

Conclusion: The pilot's failure to see and avoid the wire caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

A forward speed of 60 knots provided sufficient kinetic energy for use of external wire cutters; however, as one end of the wire was free, the use of wire cutters in this accident would be of questionable value.

Pilot's Recommendation: "Closer observation to obstructions in field."

AGRICULTURE
AERIAL APPLICATION

3-2166 5/29/71 Wilsonville, OR Hughes 269A No Injuries Substantial - \$24,000

NTSB Accident Cause:

Pilot Error: 1. Diverted attention from operation of aircraft
2. Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: A certified agricultural pilot (394 hours) struck a power line approximately 30 feet above ground. The pilot was on a pull up from a swath run while spraying shrubbery. Total time of the flight was 45 minutes. The pilot was aware of the wire prior to entanglement.

The ceiling was 4000 feet with visibility of 15 miles at the time of the accident, 1920. The sun was not a factor.

The pilot looked back at his right to see if spray was coming out of spray booms. At that moment, a main rotor blade hit and severed a power wire. The helicopter went out of control and landed in a lake. The pilot was not injured.

Conclusion: The pilot's diversion of attention from operation of the aircraft and failure to see and avoid the wire caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

An identification of wire location would not have aided the pilot in this case.

Forward speed of 50 knots should have provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

PUBLIC SERVICE

Police Patrol

3-2340 7/3/71 Rosedale, MD Bell 206A No Injuries Substantial - \$70,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

The Accident: A state police officer commercial pilot (480 hours) struck a 5/16 inch cable approximately 35 feet above ground while making a landing. The aircraft was on a medical evacuation mission. The pilot had a search-light on and was descending when he struck an unobserved cable.

The night was bright and the sky was clear at the time of the accident, 2213. Visibility was unlimited. The pilot had ground police car check for wires prior to landing and none were observed. The pilot turned on the search-light, saw wires and cleared them.

The tail rotor impacted with the unobserved cable. The helicopter made a hard landing which caused the main rotor to strike the ground. Damage to the aircraft was substantial. The pilot and passenger were uninjured.

Conclusion: The pilot's failure to see and avoid the cable during landing caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

The speed of the aircraft of under 30 knots would not have provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

AIR TRANSPORTATION

3-2554 7/15/71 Grand Canyon, AZ Hughes 369HS No Injuries Substantial - \$30,000

NTSB Accident Cause:

- Pilot Error:**
1. Failed to see and avoid objects or obstructions
 2. Failed to follow approved procedures, directives, etc.

Factors: High obstructions

The Accident: A commercial pilot (2021 hours) struck telephone wires approximately 180 feet above the river in the Grand Canyon. The pilot was with 3 passengers on a sight seeing flight. Total time of the flight was 11 minutes. The pilot was not aware of the wires until after impact.

The weather was clear at the time of the accident, 1402, with visibility of 20 miles. The wind was variable at 4 knots. The sun was high and not a factor.

Two rotor blades of the aircraft impacted with the wires. The pilot did not lose control and made a safe landing at Phantom Ranch in the bottom of the canyon.

Conclusion: The pilot's failure to see and avoid the wires caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of aircraft at 90 knots provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

AIR TRANSPORTATION

3-2967 8/11/71 Springfield, MO Hiller UH12A 3 Minor Injuries Substantial - \$38,000

NTSB Accident Cause:

Pilot Error: Inadequate preflight preparation and/or planning

Factors: Water in fuel
High obstructions

The Accident: A commercial pilot (1120 hours) struck a power line pole approximately 18 feet above ground. The pilot was on takeoff for a sightseeing trip with two passengers. The pilot had noticed engine did not develop full power on the previous flight.

The weather was clear with visibility of 15 miles at the time of the accident, 1930. The sun had set and was not a factor.

The helicopter began to lose power on liftoff. The pilot did not have enough altitude to clear utility wires and a parked car, so had no other choice but to hit the utility pole in his path. The pole was struck by the main rotor blades. The aircraft crashed on the right side. The pilot and 2 passengers suffered minor injuries.

Conclusion: The pilot's failure to check the loss of power in engine noticed earlier and have it corrected prior to flight, caused the accident.

Recommendations: None

AIR TRANSPORTATION

3-2989 8/13/71 Selma, OR Bell 4703B 1 Minor Injury Substantial - \$5,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: High obstructions

The Accident: A commercial pilot (1519 hours) struck a 1/2 inch steel cable approximately 75 feet above ground. The pilot was on a photo mapping mission with two passengers. Total time of the flight was 40 minutes. The pilot had no knowledge of the cable at the time of the wire strike.

The weather was clear with visibility unlimited, at the time of the accident, 1030. The sun was high but not considered a factor.

The bubble of the aircraft struck the cable, which broke on impact. The aircraft descended under control into a river. The pilot suffered minor injuries - passengers were unhurt.

Conclusion: Pilot's failure to see and avoid the wire cable caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of 45 knots created sufficient kinetic energy for effective use of wire cutters had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-2992 8/12/71 Union Bridge, MD Bell 47D-1 No Injuries Destroyed - \$20,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: An experienced commercial pilot (2474 hours) struck a power line about 40 feet above ground, just after starting a swath run. The pilot was aware of two sets of wires, one set being higher than the other. On his approach, the higher set apparently blended into a cornfield and the pilot failed to see the wires. Total time of the flight was 24 minutes. The pilot was on a spraying mission.

The weather was clear at the time of the accident, 1230. Visibility was 10 miles. The sun was high and not a factor.

The wire impacted with the aircraft skid. The wire did not break initially, causing the aircraft to crash to the ground. The pilot was uninjured.

Conclusion: The pilot's failure to see and avoid the wire caused the crash.

Recommendations: The benefit of a pilot's warning device is questionable as the pilot knew he was approaching wires.

Identification of wires is not a factor in this case.

Estimated forward speed of the aircraft of about 40 knots would have provided sufficient kinetic energy for effective use of wire cutters had they been installed.

Pilot's Recommendation: "Proper markers attached to wires in fields utilizing aerial application."

AGRICULTURE
AERIAL APPLICATION

3-3246 9/14/71 Grandview, TX Hiller UH12C No Injuries Substantial - \$2,000

NTSB Accident Cause:

Pilot Error: Misjudged clearance

Factor: High obstructions

The Accident: A high time commercial pilot (4262 hours) struck a power line about 20 feet above ground. The pilot was on a swath run. Total time of the flight was 15 minutes. The pilot had knowledge of the wire before entanglement.

The weather was clear with 15 miles visibility at the time of the accident, 1430. The sun was high and not considered a contributing factor.

The wire hooked on a skid of the aircraft and then entangled the main rotor, causing it to sever the tail boom.

Conclusion: The pilot misjudged his clearance of the power line while spraying a field.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location was not an issue in this case.

Forward speed of approximately 60 knots would have provided sufficient kinetic energy for effective use of wire cutters had they been installed.

AIR TRANSPORTATION

Power-Pipeline

3-3259 10/5/71 Idaho Springs, CO Bell 47G3B2 1 Minor, 1 Serious, Destroyed - \$58,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Crew coordination - poor
High obstructions

The Accident: A high time air transport pilot (7,561 hours) struck 3 telephone wires 64 feet above ground. The pilot and passenger were on a powerline patrol. The total time of flight was 1 hour, 5 minutes. The pilot and passenger failed to see the telephone lines.

The weather was clear at the time of the accident, 0905. Visibility was unlimited. The sun was relatively high and not a factor.

The helicopter impacted with 3 of 4 telephone wires, lost altitude and struck a power line, a tree, and finally hit the ground tail first. The engine section of the aircraft caught fire, which was extinguished by the pilot. The passenger was seriously injured; pilot sustained minor injuries.

Conclusion: The pilot's and passenger's failure to see and avoid the wires caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

The aircraft's forward speed of 45 knots provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

PUBLIC SERVICE

Police Patrol

3-3347 12/11/71 Las Vegas, NV Hughes 269C 2 Minor Injuries Substantial - \$35,000

NTSB Accident Cause:

Pilot Error: 1. Failed to see and avoid objects or obstructions
2. Disregard of good operating practice
3. Pilot fatigue

Factors: High obstructions

The Accident: A police officer commercial pilot (1991 hours) struck a telephone cable about 30 feet above ground, after flying under a power line. The pilot and passenger were searching a drainage ditch at night, looking for a missing child. Total flight time was 4.9 hours. The pilot had no knowledge of the cable until entanglement.

At the time of the accident, 0409, there were scattered clouds at 8500 feet with visibility at 15 miles. The night was dark. Aircraft was using searchlights.

The cable broke upon impact with the main rotor blades. The aircraft crashed into a ditch.

Pilot had stayed on duty for search even though his shift was over at 0200. He stated that he was tired and did what he would not normally do - fly under a power line.

Conclusion: Pilot's failure to see and avoid the telephone cable caused the accident. He was fatigued at the time.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Near hover speed of aircraft would not have provided sufficient kinetic energy for effective use of wire cutters.

PUBLIC SERVICE

Police Patrol

3-4198 8/10/71 Bellwood, IL Bell 47G2A1 2 Fatal Destroyed - \$44,000

NTSB Accident Cause:

Rotorcraft: Miscellaneous units and assemblies, tail booms/pylons/cones

Misc. Acts, Conditions: Fatigue fracture

Factor: High obstructions

The Accident: A commercial pilot (1898 hours) struck wires and a telephone pole about 30 feet above ground while attempting a landing in a built-up area. The tail rotor drive shaft yoke failed in flight and the pilot was unable to control the aircraft. The aircraft crashed, caught fire and was destroyed. The pilot and police officer passenger, who were on a traffic control mission, were killed in the accident.

At the time of the accident, 1628, the ceiling was 5000 feet, with visibility of 12 miles. The wind was 22 knots with gusts to 30, which could have been a factor as the pilot tried to land an uncontrollable aircraft without hitting wires/poles.

Witnesses reported the aircraft having trouble as high as 300 feet, losing altitude and rotating clockwise. Witnesses also described the tail rotor rotating so slowly that each blade was distinguishable. The main rotor blade impacted with the wires and poles just before the crash.

Conclusion: The failure of the tail rotor drive shaft yoke during flight caused the aircraft to be uncontrollable in descent. The main rotor blade hit the pole and wires on the way down, causing the aircraft to crash and burn.

Recommendations: None. The aircraft was uncontrollable at the time of the wire strike.

1972

MISCELLANEOUS
CONSTRUCTION

3-0011 3/2/72 Glenwood Springs, CO Bell 47J-2 2 Serious Destroyed - \$76,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Obstructions to vision
High obstructions

The Accident: An experienced commercial pilot (2522 hours) struck 2 steel telephone wires approximately 45 feet above ground. Wires were located 50 feet below a ridge in mountainous country. Pilot and passenger were on a telephone line inspection. Total flight time was 1 hour. Pilot had no knowledge of wire until entanglement.

At the time of the accident, 0930, light snow was falling, ceiling was 2000 feet, and visibility was 2 miles. Pilot reported flying over a bridge just prior to the wire strike and the telephone wires blended into haze and background.

The aircraft became entangled with steel wires on impact, crashed to the ground, and caught fire. Pilot and passenger were seriously injured. 300 yards of steel telephone wire was attached to the wreckage.

Conclusion: Pilot's failure to see and avoid wire under conditions of low visibility caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location with known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of approximately 60 knots should have provided sufficient kinetic energy for effective use of wire cutters. However, effectiveness against #109 steel wire over 2000 lbs/sq. in. tensile strength makes use of wire cutters questionable in this accident.

AIR TRANSPORTATION

3-0058 2/21/72 Winters, CA Hughes 269B No Injuries Substantial - \$1500

NTSB Accident Cause:

Pilot Error: 1. Failed to see and avoid objects or obstructions
2. Unwarranted low flying

Factors: High obstructions

The Accident: A private pilot (98 hours) struck a powerline at approximately 100 feet above a lake. Pilot was sightseeing with two passengers in a canyon above a lake. Total time of flight was 1 hour. Pilot had no knowledge of wire before entanglement.

The weather was scattered clouds at 5000 ft with 20 miles visibility. At the time of the accident, 1500, the sun was high and not considered a factor.

A main rotor blade struck the wire and was pulled back out of phase. After autorotation and landing (aircraft had float equipment) pilot was able to phase rotor blades and return to departure point.

Conclusion: The pilot's failure to see and avoid the wire caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location with known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of 60 knots provided sufficient kinetic energy for effective use of wire cutters had they been installed.

Pilot Recommendation: "Never fly below the ridge altitude in canyon areas. Also recommend power company markers be attached to obvious hazards to flying. Napa County Sheriff advised this exact same wire span caused 2 fatalities in a light plane accident previously. Obvious hazards are well marked except for long span power lines."

AIR TRANSPORTATION

3-0205 1/8/72 Polo, IL Bell 206 No Injuries Substantial - \$5,000

NTSB Accident Cause:

Pilot Error: 1. Improper operation flight controls
2. Improper compensation for wind conditions

Factors: Unfavorable wind conditions
High obstructions

The Accident: A high time private pilot (3168 hours) struck a power pole while hover taxiing from a landing. Pilot applied too much collective pitch to offset strong crosswind and became airborne. Pilot hovered underneath wires and hit a pole off left rear before getting helicopter turned into wind. Total time of flight was 1 hr., 15 minutes.

Weather was clear, 20 miles visibility with 40 knot winds at time of accident, 1230. The sun was high and not a factor.

The main rotor blades hit the pole. There were no injuries to pilot and passenger.

Conclusion: Pilot's improper operation of flight controls and improper compensation for wind conditions on taxi after landing caused the accident.

Recommendations: None

AIR TRANSPORTATION

3-0411 4/24/72 Coeburn, VA Sikorsky H19G 1 Fatal Destroyed - \$205,500

NTSB Accident Cause:

Pilot error: Failed to see and avoid objects or obstructions

Factors: High obstructions
Inadequate preflight preparation and/or planning

The Accident: An experienced commercial pilot (2300 hours) struck 3 power lines approximately 150 feet high, strung across a mountainous valley. The pilot was moving the aircraft to a new location in preparation for strip mine seeding operations for the following day. The time of flight was 8 minutes. The owner of the aircraft stated he had repeatedly warned the pilot not to fly into a hollow without checking for wires.

The weather was clear at the time of the accident, 1908, with unlimited visibility. It was twilight.

The aircraft collided with 3 unmarked high voltage power lines at the point where the lines sag below the ridge lines on either side and where they blend in with the landscape background. The aircraft exploded, crashed and burned. The pilot was killed.

Conclusion: The pilot's failure to see and avoid the wires caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

A forward speed of the aircraft of around 60 knots would have provided sufficient kinetic energy for wire cutter effectiveness, had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-0732 4/5/72 Wynona, OK Bell 47G No Injuries Substantial - \$10,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: A high time commercial pilot (19,000 hrs) struck several power lines approximately 20 feet above ground on a final approach to a landing area. The pilot was moving aircraft from one field to another to start a spraying operation. Time of flight was one minute. The passenger was showing the pilot the fields he was to dust. The passenger did not see the wire before the strike.

The weather was clear at the time of the accident, 1045, with visibility of 15 miles. The sun was relatively high and not considered a factor.

The aircraft crashed on final approach to the landing area and suffered substantial damage. The pilot and passenger were not injured.

Conclusion: The pilot's failure to see and avoid the wire while on landing approach caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

The forward speed of the aircraft of over 30 knots provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-0847 8/5/72 Floyd, VA Bell 47G2A Two Fatal Destroyed - \$30,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

The Accident: A high time commercial pilot (6,589 hours) struck two power wires approximately 80 feet above ground. The aircraft was spraying the right-of-way on a lower power line. Higher power wires, 90° from the flight path, ran from the top of one ridge to the top of another ridge on either side of the flight path. Total time of the flight was 7 minutes. A map found in the wreckage clearly indicated the upper power line crossing flight path.

The weather was overcast at 4500 feet at the time of the accident, 0738, with visibility of 5 miles. The sun was not shining.

The main rotor of the aircraft impacted with and broke two wires of the higher power line. The tail section became entangled with the lower power lines causing the helicopter to crash nose first into the ground. The pilot and passenger were killed. There was no fire.

Conclusion: The pilot's failure to see and avoid the wires caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location is not an issue here, as the pilot had a map marked with the wire locations.

Forward speed of the aircraft of 60 knots provided sufficient kinetic energy for wire cutter effectiveness had they been installed, however initial main rotor wire impact would preclude effective use of wire cutters.

MISCELLANEOUS

Offshore Oil Support

3-0871 11/10/72 Nr. Dulac, LA Bell 47G-4A No Injuries Substantial - \$41,000

NTSB Accident Cause:

- Pilot Error: 1. Inadequate preflight preparation and/or planning.
2. Improperly loaded aircraft-weight-and/or C.G.

The Accident: An experienced commercial pilot (2478 hrs) struck a cable suspended from a crane on liftoff from an offshore platform. Pilot was engaged in transport of cargo to a nearby platform. Flight had just started when the accident happened.

At the time of the accident, 1004, the visibility was 10 miles with high scattered clouds. The sun was high and not considered a factor.

An external load of 150 lbs was placed in the left pontoon carriage. Maximum unsymmetrical Class A external load is 50 lbs. As pilot brought aircraft to a hover, he was unable to maintain control. Aircraft struck a suspended personnel basket cable with main rotor blades and crashed.

Conclusion: Pilot failure to check loading of aircraft caused it to go out of control on liftoff, strike a cable and crash.

Recommendations: None

AGRICULTURE
AERIAL APPLICATION

3-1883 5/29/72 Orovada, NV Kaman K-600 No Injuries Substantial - \$10,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions
Factors: Inadequate preflight preparation and/or planning
High obstructions

The Accident: A high time commercial pilot, 6700 hours, struck several power wires about 20 feet above the ground. The pilot was on a swath run, spraying ditches next to an alfalfa field. Total flight time was 30 minutes.

The weather was clear with visibility unlimited at the time of the accident, 0630. The sun was low but not considered a factor.

The power wires broke upon impact with the helicopter. The aircraft rotor system and cabin were damaged. The pilot was not injured.

Conclusion: The pilot's failure to see and avoid the power lines caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

The forward speed of approximately 40 knots provided sufficient kinetic energy for effective use of wire cutters had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-1914 6/4/72 Warden, WA Bell 47G-2 No Injuries Substantial - \$3,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

The Accident: A commercial pilot (803 hours) struck a guy wire while spraying parallel to a telephone pole line. Pilot was flying about 15 feet above ground and was not aware of an extra long, 90 foot, guy wire. Total time of flight was 5 minutes.

At the time of the accident, 0830, the ceiling was 3000 feet, 5-10 miles visibility with haze. Early morning light conditions made it difficult to see guy wire.

The main rotor blades struck the guy wire, and the helicopter sustained substantial damage on landing.

Conclusion: The pilot's failure to see and avoid the guy wire caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of approximately 50 knots provided sufficient kinetic energy for effective use of wire cutters had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-2243 7/8/72 Molsen, WA Bell 47G3B2 No Injuries Substantial - \$2,200

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects of obstructions

Factor: High obstructions

The Accident: An experienced commercial pilot (2530 hours) struck two power lines about 15 feet above ground. The pilot was on a crop spraying mission and had just started a swath run. Total time of the flight was 45 minutes. The pilot was not aware of the wires until striking them.

The weather was clear at the time of the accident, 2130, with visibility of 25 miles. It was twilight; pilot reporting visibility was poor due to decreasing light.

The nose and main rotor of the aircraft impacted with the wires, which broke. The pilot immediately landed the aircraft without further damage. The pilot was uninjured.

Conclusion: Due to decreasing visibility at twilight, the pilot failed to see the wires, which caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of aircraft in starting a swath run, estimated at 45 knots or over, would have sufficient kinetic energy for wire cutter effectiveness had they been installed.

Pilot's Recommendation: (The accident could have been avoided) "by spraying during good light only. By checking out field to be sprayed for obstacles such as wires, trees, etc., before spraying is initiated."

AGRICULTURE
AERIAL APPLICATION

3-2282 6/9/72 Stockton, CA Bell 47G2 No Injuries Substantial - \$28,500

NTSB Accident Cause:

- Pilot Error: 1. Failed to see and avoid objects or obstructions
2. Operated carelessly

The Accident: A commercial pilot (2275 hours) struck 2 telephone wires approximately 20 feet above ground. The pilot was making a pull up from a swath run in spraying a field. Total time of flight was 15 minutes. The pilot knew the location of the wires but stated he forgot about them being there.

The weather was clear with visibility of 20 miles. At the time of the accident, 0935, the sun was high and not considered a factor.

One wire went above the aircraft bubble and was broken. The other wire went beneath the aircraft and became entangled with the tail rotor blades and drive/mount assembly. Aircraft flew about 200 feet and struck the ground, sustaining substantial damage.

Conclusion: Pilot failed to see and avoid wires, although their location was previously known.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of 40 knots provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

AIR TRANSPORTATION

Power/Pipeline Patrol

3-2638 10/2/72 Cambridge, Ohio Bell 47G4 No Injuries Substantial - \$37,000

NTSB Accident Cause

Pilot Error: 1. Diverted attention from operation of aircraft
2. Failed to see and avoid objects or obstructions

Factors: Unwarranted low flying

The Accident: A commercial pilot (1578 hours) struck a power line approximately 40-50 feet above ground. The pilot and passenger were on a power line patrol. Total time of the flight was 2 hours, 45 minutes. The pilot looked down at a map, at which time the wire strike occurred. The passenger saw the wire but too late to warn the pilot.

The weather was clear at the time of the accident, 1450, and the visibility was 20 miles. The sun was high and not considered a factor in the accident.

Initial impact was with the bubble and skid. The helicopter took up the slack in the power line and then snapped it. The line whiplashed and damaged the tail rotor. The pilot landed in median on I-77 highway. There were no injuries.

Conclusion: The pilot's momentary diversion from operation of the aircraft and resultant failure to see and avoid the power line caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of 60 knots provided sufficient kinetic energy for external wire cutter effectiveness had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-2675 7/23/72 Murdock, IL Bell 47G-2 One Minor Injury Substantial - \$28,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: High obstructions

The Accident: A commercial pilot (1594 hours) struck a power pole approximately 10-20 feet above ground with the tip of a main rotor blade. Pilot was on a swath run in a corn pollination operation. Total flight time was 5 minutes.

The weather was clear and visibility was 15 miles. At the time of the accident, 1400, the sun was high and not considered a factor.

Conclusion: Pilot misjudged distance to highline pole and struck it with his main rotor blade.

Recommendations: None. Pilot was aware of all poles in field prior to making his swath runs.

AGRICULTURE

Aerial Application

3-3035 8/16/72 Oxnard, CA Bell 47G5 No Injuries Destroyed - \$53,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Poor judgment
High obstruction

The Accident: An experienced commercial pilot (4300 hours) struck two power wires approximately 40 feet above ground. The pilot was making a reconnaissance of a lemon orchard prior to spraying with toxic chemicals. Total time of the flight was 5 minutes. The pilot was unaware of the wires at the time of the strike. The power line poles were 300 feet apart and extended 40 feet above the orchard trees.

The weather was clear at the time of the accident, 0540. Visibility was 50 miles. It was dawn, but lack of light was not reported as a factor.

The tail rotor impacted with the wires, which were 90° to the line of flight. The helicopter could not be controlled and crashed. The aircraft was destroyed; the pilot was not injured. The pilot was exposed to toxic chemicals and immediately received a shower. He was examined by a pathologist and the results were negative.

Conclusion: The pilot's failure to see and avoid the wires caused the aircraft tail rotor to strike the power wires.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects when to flight would have aided the pilot in avoidance.

Forward speed of the aircraft of 60 knots would have provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

AGRICULTURE
AERIAL APPLICATION

3/3079 7/7/72 Twisp, WA Bell 47G2 No Injuries Substantial - \$8,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Sun glare
High obstructions

The Accident: A commercial agricultural pilot (1359 hours) struck 3 power wires 100-120 feet above ground at the end of a swath run. The pilot was on a spraying mission. Total time of the flight was 20 minutes. The pilot was aware of the wires at the end of the swath run.

The weather was clear at the time of the accident, 2015, with visibility of 10 miles. The sun was low and the pilot stated he was going to stop spraying after this run because of the sun in his eyes.

The bubble impacted with the wires and snapped them. The pilot landed the aircraft with a hard landing. The pilot was not injured.

Conclusion: The pilot's failure to see and avoid the wires because of the sun-glare caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location is not a factor in this accident, as the pilot knew the location of the wires.

Forward speed of aircraft of approximately 60 knots provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-3634 9/6/72 Elberton, GA Hughes 269A One Serious Injury Destroyed - \$37,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: High obstruction

The Accident: A student pilot (hours unknown) struck a telephone wire approximately 20 to 25 feet above ground while on a swath run during a spraying operation. Total flight time is unknown. The pilot saw the wire, realized he could not fly over it, and attempted to fly under it and crashed. Pilot did not hold Agricultural Aircraft Operator Certificate.

The weather was clear with VFR conditions. At the time of the accident, 1530, the sun was high and not considered a factor as pilot was on a south to north run.

The wire struck the main rotor blades of the helicopter causing the crash.

Conclusion: The pilot failed to see the wires in time to avoid hitting them.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of approximately 40 knots would have provided sufficient kinetic energy for effective use of wire cutters had they been installed.

AIR TRANSPORTATION

3-3767 12/3/72 Stonewall, TX Bell 206A 2 Minor Injuries Destroyed - \$131,000

NTSB Accident Cause:

Pilot Error: Misjudged Altitude

Factors: High obstructions
Low ceiling
Fog

The Accident: A high time commercial pilot (10,250 hrs), while maneuvering to align on taxiway lights, struck a power line approximately 20 to 30 feet above ground and crashed about one mile southeast Johnson City airport. Pilot was engaged in a night VFR flight from Austin to airstrip on Lyndon B. Johnson ranch. Total flight time was 25 minutes. The pilot had no knowledge of wires until entanglement.

At the time of the accident, 2110, the night was dark, ceiling at 900 feet, scattered at 200, with fog and haze.

The power line broke on impact with the aircraft. The helicopter continued forward, hit trees and crashed.

Conclusion: Pilot misjudged h. altitude while making a final approach, under low visibility conditions.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of estimated 40 knots, provided sufficient kinetic energy for effective use of wire cutters had they been installed.

AIR TRANSPORTATION

3-3838 12/25/72 Bishop, CA Bell 47G 3B1 No Injuries Minor - \$2,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

Factors: High terrain

The Accident: A high time commercial pilot (6700 hours) struck an abandoned radio antenna cable 150 to 200 ft. above the ground. The pilot was engaged in a sightseeing tour of mountain country. Total time of flight was 20 minutes. The pilot had no knowledge of wire until entanglement.

The weather was clear with 50 miles visibility. At the time of the accident, 1220, the sun was near zenith and not considered a contributing factor.

The wire broke upon initial impact with the cockpit, and no further damage to the helicopter occurred.

Conclusion: The pilot's failure to see and avoid the wires caused the crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of approximately 60 knots provided sufficient kinetic energy for effective use of external wire cutters had they been installed.

1973

AGRICULTURE
Aerial Application

3-0169 1/12/73 Marysville, CA Bell 47D1 No Injuries Destroyed - \$10,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Diverted attention from operation of aircraft
High obstructions

The Accident: A very experienced commercial pilot (8760 hours) struck three wires approximately 20 feet above ground while midway on a swath run. The pilot was spraying peach trees. Total time of the flight was 4 hours from midnight to the time of the accident. The pilot was finishing the field, however, he did not indicate he knew of the presence of the wires.

At the time of the accident, 1400, the sky was clear with visibility of 15 miles. The sun was high and not reported as a factor.

Initial impact with the wires was with the canopy. The aircraft lost forward motion and fell upright into the trees below. The aircraft was destroyed and the pilot was uninjured. The aircraft was carrying dry toxic chemicals. The pilot was not affected by exposure.

Conclusion: The pilot's failure to see and avoid the wires caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft of over 30 knots provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

AGRICULTURE
Aerial Application

3-0413 3/1/73 Live Oak, CA Hiller UH-12E 1 Serious Destroyed - \$57,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

The Accident: A very experienced commercial pilot (10,000 hours) struck 3 power lines approximately 25 feet above ground while on a cleanup swath run. The pilot was spraying an orchard and stated he completely forgot about the wires, flew under them, striking wires with the rotor mast. Total time of the flight was 6 minutes. The pilot had flown one hour that day up to the time of the accident.

At the time of the accident, 0921, the ceiling was 1000 feet, cloudy, with visibility of 10 miles. There was light rain which reduced visibility.

After striking the wires with the rotor mast, the helicopter pitched up sharply, fell back on the tail boom and bounced onto a road. The aircraft was destroyed and the pilot seriously injured. The aircraft was carrying non-toxic chemicals at the time. The report states the pilot had handled little toxic material for a considerable period prior to the accident and toxicity was not considered a factor.

Conclusion: The pilot's failure to see and avoid wires caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft at 40 knots had sufficient kinetic energy for wire cutter effectiveness had they been installed.

AGRICULTURE
Aerial Application

3-0436 3/18/73 Stockton, CA Bell 47G2 No Injuries Substantial - \$18,000

NTSB Accident Cause:

- Pilot Error: 1. Diverted attention from operation of the aircraft
2. Failed to see and avoid objects or obstructions

The Accident: An experienced commercial pilot (2,438 hours) struck a telephone wire approximately 8 to 15 feet above ground while on a swath run. The pilot was spraying an alfalfa field. Total time of the flight was 4 hours and 50 minutes. The pilot was unaware of the wire, having stated he had not seen it on his initial reconnaissance of the field. The pilot stated that just before the wire strike his attention was diverted to the left spray boom as it cleared a tree near the wire.

The sky was clear at the time of the accident, 1610, with visibility of 15 miles. The sun was still relatively high and not reported as a factor.

Wire impact was midway between the main rotor hub and main transmission. The aircraft crashed in a nose down attitude. The pilot was uninjured. The aircraft was carrying liquid toxic chemicals. An interconnecting hose between two insecticide tanks was broken upon impact but the pilot was not exposed to poisoning.

Conclusion: The pilot's momentary diversion to observe spray boom clearance resulted in his failure to see and avoid a telephone wire.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft over 30 knots had sufficient kinetic energy for wire cutter effectiveness had they been installed.

Pilot's Recommendation: "Better inspection of wire locations on alfalfa field."

AIR TRANSPORTATION

3-0503 3/19/73 Girdwood, AK Hiller FH1100 1 Minor Injury
4 No Injuries Substantial - \$35,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: An experienced commercial pilot (3878 hours) struck two long span power wires approximately 200 feet in the air. Total time of the flight was 1 minute. The pilot had flown 2 hours in the last 24. The pilot was carrying four passengers from a ski resort parking area to the top of a mountain for skiing. The pilot saw wires just before the impact. The power lines were not marked for visual identification.

At the time of the accident, 1615, the sky cover was scattered at 5,000 ft. with visibility of 60 miles. The aircraft was flying to the southwest and the position of the sun could have been a factor in the pilot's inability to see the wires, although no statement was made to that effect in the report.

Initial impact was with the bubble. The pilot kept the aircraft under control, landed, and discharged the passengers. One passenger received minor injuries. The pilot returned the aircraft to Aleyska Resort, a distance of 11 miles, after inspecting the aircraft. The pilot was unaware the main rotor blades had been damaged.

Conclusion: The pilot's failure to see the long span wires in time to avoid a wire strike caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft of over 100 knots had sufficient kinetic energy for wire cutters to be effective had they been installed.

Pilot's Recommendation: "Had the wires been marked in some way, I am certain that I would have seen them sooner and been able to avoid them. They are very high in the air and difficult to see against the dark trees in the pass."

AIR TRANSPORTATION

3-0850 5/1/73 Nr. Uvalde, TX Hughes 269A 1 Fatal, 1 Serious Destroyed-\$37,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Misjudged altitude
High obstructions

The Accident: An experienced commercial pilot (4743 hours) with a student pilot aboard (44 hours) struck two long span telephone wires across the Nueces River, approximately 25 feet above ground while on a aerial survey of livestock. Total time of the flight is estimated at 2 1/2 hours. The seriously injured student pilot was unable to be interviewed and there is no indication either member of the crew was aware of the wire strike.

At the time of the accident, 1010, the ceiling was 300 feet broken with 1000 foot overcast. There was a light drizzle and haze restricting visibility.

The skids, fuselage, rotor blades, and tail boom/pylon assembly impacted with the wires. The aircraft crashed to the ground. The pilot died in the crash and the student pilot was seriously injured. There was no fire.

Conclusion: The pilot's failure to see and avoid wires caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft, estimated above 60 knots, had sufficient kinetic energy for wire cutters to be effective had they been installed.

AIR TRANSPORTATION

Power Line Patrol

3-0973 4/25/73 Humboldt, TN Bell 47G-4 1 Serious, 1 Minor Destroyed - \$55,400

NTSB Accident Cause:

1. Power plant failure for undetermined reasons
2. Pilot misjudged clearance

Factor: High obstructions

The Accident: A very experienced commercial pilot (6550 hours) was on power line patrol when the engine failed without any indication. The pilot had arrived over a power substation to pick up a new set of wires. He had turned to the left when the engine failed, and in descending, struck one of two sets of power lines approximately 75 feet above ground. The pilot was aware of wire location prior to the wire strike. Total time of the flight was 20 minutes.

At the time of the accident, 0955, the ceiling was broken at 2500 feet with visibility of 12 miles. The sun was not a factor.

The main rotor impacted initially with the wire and the pilot lost control of the aircraft. The aircraft crashed to the ground and was destroyed. There was no fire. The passenger was seriously injured and the pilot received minor injuries. The cause of the power plant failure was undetermined.

Conclusion: Engine failure in flight and the pilot's inability to clear wires while descending caused the accident.

Recommendations: A pilot warning device identifying wire location would not have been beneficial as the pilot was aware of wires and their location.

Forward speed of the aircraft of approximately 40 to 50 knots had sufficient kinetic energy for wire cutters to be effective had they been installed.

PUBLIC SERVICE
Search and Rescue

3-1066 4/26/73 Portage De Sioux, MO Bell 47J One Minor Substantial - \$40,000

NTSB Accident Cause:

- Pilot Error: 1. Diverted attention from operation of aircraft
2. Failed to see and avoid objects or obstructions

Factors: High obstructions

The Accident: A high time commercial pilot (13,000 hours) struck a power line while attempting to land in a small helipad on which two other helicopters had landed. The pilot was assisting in evacuating people from an area surrounded by water. In landing, the pilot was following two other helicopters. The pilot struck a line approximately 20 feet above ground while attempting to land to the right of the second helicopter. The pilot did not see the power wires. Total time of the flight was 30 minutes.

At the time of the accident, 1910, it was a dark night with the ceiling at 4000 feet. Visibility was 10 miles. Wind velocity was 15 knots with gusts to 25 knots.

Initial impact of wires was with rotor blades as the pilot maneuvered sideways to avoid being too close to the helicopters on the ground. Control was lost, the aircraft crashed and received substantial damage. The pilot suffered minor injuries.

Conclusion: The pilot failed to see wires as he attempted to land in a confined area in which two other helicopters had landed.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Landing speed of under 30 knots would not have created sufficient kinetic energy for wire cutter effectiveness had they been installed.

Pilot's Comments: "Helipad was to have been FAA approved as indicated by Union Electric personnel. Pad was not inspected by FAA personnel and was represented as a pad to accommodate 4 to 5 copters. There was room for two copters only and within 50 feet of distance through a gate there was a safe approvable area to operate. Area not properly lit. Obstructions not lit. Improper clearance to pad."

AIR TRANSPORTATION

Aerial Survey

3-1125 6/9/73 Kettleman City, CA Bell 47G-2 No Injuries Substantial - \$28,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: A commercial pilot (2050 hours) struck two long span power wires approximately 30-40 feet above ground while on a geological survey flight. The pilot and passenger were attempting to find a geological seismic cable and were flying 20-30 mph at 30-40 feet above ground level. The pilot, flying the contour of the land, descended into a canyon and hit power lines which were below the horizon and blended into background. The pilot hit midway on a 900 foot wire span. He was not aware of the wires prior to the wire strike. Total time of the flight was 15 minutes.

The weather was clear at the time of the accident, 1000, with visibility of 10 miles. The sun was high and not a factor. The pilot stated the position of his helicopter at midpoint of the wire span prevented him from seeing the power poles.

The part of the aircraft initially impacting with the wires was not reported. The pilot maintained partial control after the wire strike, landed hard on the side of a hill, bounced, and crashed on the left side. The pilot and passenger were not injured. The aircraft sustained substantial damage.

Conclusion: The pilot's failure to see and avoid a long span set of power wires caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft of 30 knots or under would make effectiveness of wire cutters questionable had they been installed.

AIR TRANSPORTATION

3-1157 5/27/73 Honolulu, HI Bell 206A 1 Minor Injury Substantial - \$50,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: A very experienced commercial pilot (20,000 hours) struck a long span power line lightning arrest cable about 200 feet above ground across a valley. The pilot had off-loaded passengers at a rock quarry. Total time of the flight was 1 minute. The pilot had been warned by a Hawaiian Electric Co. employee to be careful of the power lines in the valley. The pilot stated he was aware of the cable but thought he was 40-50 feet above it.

At the time of the accident, 1515, sky cover was scattered at 5000 feet with visibility of 75 miles. The aircraft was flying east and sun was not a factor.

Initial wire impact was with the right skid. The pilot attempted to keep the aircraft level as the airspeed dissipated and the cable drew taut. The helicopter eventually settled into trees and brush, sustaining substantial damage.

Conclusion: The pilot's failure to see and avoid a long span wire across a valley caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects might have aided, however the pilot knew the location of the wire and thought he was above it.

Forward speed of 70-80 mph provided sufficient kinetic energy for wire cutters to be effective had they been installed.

Pilot's Recommendation: "Having electric wires marked across valleys."

AIR TRANSPORTATION

3-1212 1/22/73 Miami Beach, FL Bell 47G 1 Serious
1 Minor, 1 None Substantial - \$11,000

NTSB Accident Cause:

- Pilot Error:
1. Inadequate preflight preparation and/or planning.
 2. Misjudged distance, speed, altitude or clearance.
 3. Failed to maintain adequate rotor RPM.
 4. Improper operation of flight controls.

Factors: High obstructions

The Accident: A commercial pilot (1214 hours) on an initial climb out after takeoff, experienced a settling condition. The pilot turned the aircraft to avoid wires. The main rotor blade hit a light pole, resulting in a crash landing onto a street. The pilot was carrying two passengers, one injured seriously and the other receiving minor injuries. The pilot was uninjured.

At the time of the accident, 1130, the weather was clear with scattered clouds at 1200 ft. Visibility was 10 miles. The wind was from the southeast at 20-25 mph.

The pilot was carrying close to the maximum load of the aircraft.

Conclusion: The pilot was aware of all wires and obstacles in the take-off area. The failure to maintain lift when operating at near gross carrying weight caused the aircraft to strike a pole while settling.

Recommendations: Identification of wire location might have aided the operators of this sightseeing service to select a more suitable heliport for their sight-seeing operations.

PUBLIC SERVICE

Police Patrol

3-1218 5/28/73 Gary, IN Hughes 269A Two Minor Substantial - \$24,600

NTSB Accident Cause:

Pilot Error: Improper in-flight decisions or planning

Terrain: High obstructions

The Accident: An experienced commercial pilot (2930 hours) struck two power wires approximately 20 feet above ground while autorotating to a landing. The pilot had exhausted his fuel while returning from a police mission. Total time of the flight was 15 minutes.

At the time of the accident, 2015, it was dusk, with 6 miles visibility. The ceiling was 1000 feet. The weather was not a factor.

The pilot knew he was low on fuel but he checked the gauge before the flight and had enough for his mission. Returning from the mission, his engine quit and the pilot autorotated to a landing in a street intersection. The main rotor blades clipped (but did not break) the wires. The aircraft landed hard with substantial damage. The pilot and passenger sustained minor injuries.

Conclusion: The pilot's miscalculation of fuel caused fuel exhaustion in flight and subsequent emergency autorotation which struck wires on the way down.

Recommendation: None

AGRICULTURE
Aerial Application

3-1625 6/15/73 Lumberton, NC Hughes 269B No Injuries Substantial - \$1,500

NTSE Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: A very experienced commercial pilot (6585 hours) struck a power line approximately 15 to 20 feet above ground, while starting a swath run. The pilot had completed spraying corn on a nearby field and was on his initial swath run of another field when he struck the wire. The total time of flight was 15 minutes or less. The pilot had made a ground reconnaissance of the first field but not of the field where the wire strike occurred. The pilot was not aware of the exact location of the wires.

The sky was clear at the time of the accident, 1115, with visibility of 3 miles. There was haze. The sun was high but not reported as a factor.

The windscreen and a main rotor blade impacted with the power line. There was no other damage to the aircraft. The pilot was uninjured. The aircraft was carrying liquid toxic chemical. The pilot was exposed 15 minutes or less but was not affected.

Conclusion: The pilot's failure to see and avoid the power line caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft of over 30 knots would have provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

Pilot's Recommendation: "Entry to swath run could have been made from opposite end of the field, over trees, thereby giving the pilot more time to pinpoint the exact location of the wires. This may or may not have prevented the wire strike."

AGRICULTURE
AERIAL APPLICATION

3-1834 5/26/73 Harrington, WA Bell Tomcat 1 Serious Substantial - \$ 11,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: High obstructions

The Accident: A high time commercial pilot (9000 hours) struck a power line approximately 20 feet above ground, while letting down to start a swath run. Pilot was on a spraying mission over a wheatfield. Total time of the flight was 10 minutes. The pilot had just flown over a powerline and was unaware of a diagonal power line in his flight path.

A: the time of the accident, 0840, the weather was clear with visibility of 15 miles. The pilot's flight path from SW to NE precluded the sun from being a factor in this accident.

The wire struck the windshield, causing substantial damage to the cockpit and serious injury to the pilot. The wire became entangled with the rotor mast. The pilot maintained control of the aircraft and landed 600 feet from the point of wirestrike.

Conclusion: The pilot's failure to see and avoid the wire caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of approximately 60 knots would have provided sufficient kinetic energy for effective use of wire cutters had they been installed.

PUBLIC SERVICE

Police Patrol

3-1877 4/5/73 Washington, DC Bell 47G4A 1 Serious, 1 Minor Substantial - \$40,000

NTSB Accident Cause:

1. Power plant - engine structure - master and connecting rods
2. Fatigue fracture
3. Miscellaneous - High obstructions

The Accident: A commercial pilot (741 hours) struck 3 power lines approximately 40 feet above ground, while autorotating the aircraft after a power failure. The pilot was on a call for assistance mission from a ground police car. Total time of the flight was 36 minutes. The pilot apparently was not aware of the wire location before the strike.

At the time of the accident, 2206, the night was dark with visibility of 12 miles. Weather was not a factor.

The pilot lost power suddenly and attempted to autorotate to a landing at an intersection in Washington, DC. The aircraft tail rotor struck the power lines and landed hard, with substantial damage. The passenger was seriously injured and the pilot received minor injuries. There was no fire. Subsequent investigation showed Number 6 cylinder connecting rod cap bolt failed.

Conclusion: Engine failure in flight caused the pilot to autorotate to a landing, with the aircraft striking power wires on the way down.

Recommendation: None

AGRICULTURE
Aerial Application

3-1947 8/9/73 Black Rock, AR Bell 47G One Minor Substantial - \$3,600

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstruction

The Accident: A high time commercial pilot (6834 hours) struck two power lines about 20 feet above ground on a pull up from a swath run. The pilot was spraying weeds in pasture land. The power line angled across the pasture. The power pole was set back in trees and the pilot did not see either pole or wires. Time of the flight was 45 minutes.

The weather at the time of the accident, 0655, was clear with visibility of 15 miles. The sun was low but was not reported as a factor.

The bubble initially impacted with the wires. The main rotor blades and tail rotor were damaged. The pilot received minor injuries.

Conclusion: The pilot's failure to see and avoid a wire on pull up from a swath run caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of 60 knots would have provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

AGRICULTURE

3-2002 7/13/73 Dublin, TX Hiller UH-12A No Injuries Substantial - \$8,000

NTSB Accident Cause:

- Pilot Error: 1. Misjudged clearance
2. Misjudged speed and altitude

The Accident: An experienced commercial pilot (2010 hours) struck 2 wires approximately 20 feet above ground on liftoff from a trailer. The pilot had moved the helicopter by trailer to an area where he was to prepare for aerial application. Total time of flight was 1 minute or less. The pilot stated he made a thorough preflight and area survey and felt there was sufficient clearance over the wires.

The sky was clear at the time of the accident, 1330, with visibility of 15 miles. The sun was high and not a factor. The wind was calm.

After starting helicopter and completing run up while the aircraft was still on the trailer, the pilot lifted the helicopter off and started to climb out. The pilot misjudged the distance to the wires and hooked the skids on the wires. The pilot managed to break the wires but landed hard and further damaged the aircraft. The pilot was uninjured. The aircraft was not carrying chemicals.

Conclusion: Pilot's misjudgment of clearance to the wires caused the accident.

Recommendations: None

Pilot's Recommendation: "On calm day allow more room to get over wires. Check area better."

AGRICULTURE
Aerial Application

3-2151 7/30/73 Nr. Shreveport, LA Bell 47G5A No Injuries Substantial - \$61,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: A high time commercial pilot (20,931 hours) struck two telephone wires and a steel support cable approximately 20 feet above ground while getting into position for a swath run. The pilot was spraying brush in a bayou. The pilot was carrying non-toxic spray and was on his fifth load. The total time of flight was 1.2 hours. The pilot was looking for the set of wires he knew to be in the area. He stated the wires were shaded by trees and difficult to see.

At the time of the accident, 0822, visibility was unrestricted, clouds scattered at 6000 feet. The sun was relatively high and not a factor.

Initial impact was with the left landing skid. The pilot applied full power, snapped the telephone wires but failed to break the steel support cable. The aircraft crashed to the ground sustaining further damage. The pilot was uninjured.

Conclusion: The pilot's failure to see and avoid the wires caused the crash.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of aircraft at 20 knots had sufficient kinetic energy to snap the telephone wires, however at that speed, wire cutter effectiveness against the heavier steel cable would be questionable, had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-2186 8/4/73 Berlin, MD Bell 47G-5 1 Minor Injury Substantial - \$36,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: A high time commercial pilot, 3060 hours, struck 2 power wires approximately 40 feet above ground while starting a swath run. The pilot was on a spraying mission, and was not aware of the wires at the time of strike. Total time of the flight was 5 minutes. The pilot made a high reconnaissance of the field and was descending for a swath run when the wire strike occurred.

The weather was clear at the time of the accident, 1215, with visibility of 15 miles. The sun was at its zenith and not a factor.

The aircraft bubble impacted with the wires. The bubble broke, the aircraft made a hard landing and rolled over on its right side. The pilot received minor injuries. He received no toxic effects from some spillage of toxic chemicals.

Conclusion: The pilot's failure to see and avoid the power wires caused the crash.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

A forward speed of 40-50 knots would have provided sufficient kinetic energy for wire cutter effectiveness, had they been installed.

Pilot's Recommendation: "Aerial recon of fields be supplemented by detailed ground recon prior to moving aircraft to field."

AIR TRANSPORTATION

3-2720 8/25/73 San Andreas, CA Bell 206B 2 Fatal, 2 Serious Destroyed - \$140,000

NTSB Accident Cause:

Pilot Error: Failed to see objects or obstructions

Factor: Inadequate preflight preparation and/or planning
High obstructions

The Accident: An experienced commercial pilot (6400 hours) struck a telephone line after takeoff from the site of a grass fire. The pilot had three Forest Service personnel as passengers. The pilot had landed the aircraft at the site of the fire, stayed in the aircraft until passengers reboarded, and then took off between two trees. The wire strike took place approximately 75 feet above ground after the aircraft had traveled 300 feet. Apparently the pilot was unaware of the location of the wire.

The weather was clear at the time of the accident, 1130, with visibility unlimited. The sun was high and not a factor. A sketch and photo show poles supporting the wire partially hidden by trees from the point where the pilot started his takeoff.

Initial impact was with the aircraft canopy. A witness stated rotors were still turning when the aircraft landed hard, bounced and came to rest. The aircraft was destroyed. There was no fire. The pilot and one passenger were killed. Two other passengers received serious injury.

Conclusion: The pilot's failure to see and avoid the wire on takeoff caused the accident. Had the pilot made a recon of the area to determine location of wire and pole, the accident might have been prevented.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location with known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of over 30 knots had sufficient kinetic energy for wire cutters to be effective had they been installed.

Owner's Recommendation: "Require all companies installing lines make efforts to mark the lines to make them visible, not try to conceal them for ecology. These kinds of lines are a hazard to the flying public, and create safety problems."

AGRICULTURE
AERIAL APPLICATION

3-2911 7/5/73 Little York, IN Bell 47G-2A No Injury Substantial - \$30,000

NTSB Accident Cause:

Pilot Error: Misjudged clearance

Factor: High obstructions

The Accident: A commercial pilot (936 hours) struck a static wire on a power line while making a right turn after a swath run. The pilot was spraying the powerline right of way about 10 feet above the static lines, which were 150 feet above ground. The pilot was aware of the wires. Time of the flight was 3 minutes.

At the time of the accident, 0753, the weather was clear with visibility of 10 miles. The sun was low but not a factor as the pilot was flying south and turning to the west.

The tail rotor impacted with the static wire during the right turn. The aircraft autorotated through the main power lines, breaking two. A hard landing damaged the aircraft further. A fire was quickly extinguished. The pilot was uninjured.

Conclusion: The pilot's misjudgment of clearance while making a turn caused the accident.

Recommendations: None

AGRICULTURE
AERIAL APPLICATION

3-3403 7/30/73 Nr. Pulaski, VA Bell 47G-2A No Injuries Substantial - \$25,000

NTSB Accident Cause:

Power Plant: Failure for undetermined reasons
Misc: Evasive maneuver to avoid collision
Factor: High obstructions

The Accident: A commercial pilot (675 hours) struck a power line about 70 feet above ground while surveying a power line right-of-way. The pilot was on a spraying mission for the power line. Total time of the flight was 20 minutes. The pilot had knowledge of the wires, but the engine lost power in flight and the pilot was unable to avoid the wire strike.

The weather was clear at the time of the accident, 1050, with visibility of 4 miles. Weather was not considered a factor in the accident.

The pilot was making a low survey (10 feet above the line) over a three phase main line, executed a right turn, flew out 100 feet and turned to come back over a top line, when the engine backfired and momentarily lost power. The helicopter struck a power line and crashed into a hillside. The pilot was going downwind. The engine and fuel system were checked. There was no apparent reason for the engine failure.

Conclusion: The pilot was unable to avoid the wire strike due to engine failure while on a power line survey. The wire strike was incidental and not a cause factor in this accident.

Recommendations: Even with momentary power loss, a forward speed of over 30 knots would have sufficient kinetic energy for effective use of wire cutters had they been installed.

AGRICULTURE

AERIAL APPLICATION

3-3750 10/15/73 Nr. Marsing, ID Bell 47G-3B No Injuries Destroyed - \$28,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions
Factors: Inadequate preflight preparation and/or planning
High obstructions

The Accident: A commercial pilot (1440 hrs) struck 3 power cables about 20 feet above the ground. The pilot was engaged in making a swath run in an orchard spraying operation. Total time of flight was 1 hour. Pilot was not aware of wire location until entanglement.

The weather was clear with visibility of 40 miles. At the time of the accident, 1300, the sun was at its zenith and not considered a factor.

The bubble of the aircraft struck the power cables at a forward speed of approximately 40 knots. The pilot attempted to climb, but the aircraft descended in a shallow turn and crashed to the ground.

Conclusion: The pilot's failure to see and avoid the wires caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of 40 knots provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

AIR TRANSPORTATION

3-3829 8/8/73 Inchelium, WA Bell 47J-2A 1 Serious Destroyed - \$27,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects and obstructions

Factors: Inadequate preflight preparation and/or planning
High obstructions

The Accident: A commercial pilot (1920 hours) struck a power wire approximately 30 feet above ground, while on a landing approach to a cleared area. The pilot was picking up a radio before proceeding further on a fire control mission. Total time of the flight was 1 hour, 5 minutes. The pilot had used the area previously, but not within the last 2 years.

At the time of the accident, 2025, the weather was clear with visibility of 20 miles. It was dusk, with the pilot landing into the shadows of the sun on a heading of 240°. Tall trees surrounded the landing area.

The main rotor blades impacted with the wires, causing the aircraft to crash to the ground. The helicopter caught fire and was destroyed. The pilot was seriously injured.

Conclusion: The pilot's failure to see and avoid the wire on an approach landing caused the crash.

Recommendations: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed on landing of 30 knots or under would not have provided sufficient kinetic energy for effective use of wire cutters had they been installed.

1974

PUBLIC SERVICE
Search and Rescue

3-0380 1/20/74 Wapato, WA Bell 47G-4A One Fatal Destroyed by fire - \$45,000

NTSB Accident Cause:

Pilot Error: 1. Failed to see and avoid objects or obstructions
2. Unwarranted low flying.

Factor: High Obstructions

The Accident: An experienced commercial pilot (2360 hours) struck three power lines while on in-flight descent after crossing a ridge. The height of the wires above ground was not reported. The pilot mission was evacuating flood victims. Knowledge of wire strike by pilot is unknown.

At the time of the accident, 0838, the weather was clear with visibility unlimited. The sun was low but since flight direction was to the southwest, it is not considered a factor.

The pilot was observed on a in-flight descent by another pilot. On striking the power lines, the aircraft burst into flame, crashed and was destroyed. The pilot received fatal injuries. The impact with 3 lines, steel core wrapped with aluminum wire, was initially with the aircraft bubble. The photo with the report shows a power line tower in the distance, indicating the wires were long span, approximately 150-200 feet above ground.

Conclusion: The pilot's failure to see and avoid the power cables caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects would have aided the pilot in avoidance.

Forward speed of aircraft of approximately 60 knots created sufficient kinetic energy for effective use of wire cutters had they been installed.

AIR TRANSPORTATION

3-0397 1/21/74 Deadhorse, AK Bell 206B 3 Minor Substantial - \$106,000

NTSB Accident Cause:

Pilot Error: Selected unsuitable terrain

Factors: High obstructions
Inadequate preflight preparation or planning

The Accident: A commercial pilot (2319 hours) struck a long span heavy steel antenna wire approximately 40-60 feet above ground while descending to land at a construction camp. The pilot was carrying two passengers. The pilot stated he did not see the wire because of existing light conditions. The wire was unmarked and supporting poles, unlighted, were 1400 feet apart. Total time of the flight was 40 minutes.

At the time of the accident, 1545, the night was bright, sky cover was scattered at 10,000 feet, with visibility of 10 miles.

Impact was with the main rotor mast. The wire wrapped around the mast rendering the aircraft uncontrollable. The pilot and passengers sustained minor injuries when the aircraft crashed to the ground.

Conclusion: The pilot's failure to see and avoid a long span antenna wire supported by unlighted poles caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of aircraft at approximately 30 knots while in an approach to landing might have had sufficient kinetic energy for wire cutters to be effective had they been installed.

Pilot's Recommendation: (1) "All wires, cables, etc., that could be a hazard to aircraft should be marked: Balls, streamers, etc. (2) Poles supporting these hazards should be lighted during hours of darkness. (3) When such a wire obstruction is not in use for an extended length of time, it should be removed. This antenna was not in use nor had it been for a considerable time."

AIR TRANSPORTATION

3-0573 4/6/74 Marion, Ohio Enstrom F28A No Injuries Substantial - \$ 37,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

Factor: High obstructions

The Accident: A private licensed pilot (680 hrs) struck two power lines about 20 feet above ground during the final phase of a landing approach at a school area. The pilot was carrying a passenger - they were surveying a job site for future work. Total time of flight was 30 minutes. The pilot had no knowledge of wire until entanglement.

The weather was clear with 30 miles visibility. At the time of the accident, 1800, the sun was low but not considered a factor.

The wires struck the main rotor mast forcing the bubble up and the tail rotor into the ground, resulting in substantial damage to the aircraft.

Conclusion: The pilot's failure to see and avoid the wires caused the crash. The pilot failed to conduct a low altitude reconnaissance before making his approach landing.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of 30 knots or less during landing would not have provided sufficient kinetic energy for effective use of external wire cutters.

AIR TRANSPORTATION

3-0718 3/30/74 Gouldbusk, TX Hiller UH-12A No Injuries Substantial - \$46,000

NTSB Accident Cause:

1. Power plant failure for undetermined reasons
2. Unwarranted low flying

Factors: Exercised poor judgment
Disregarded good operating practice
High obstructions

The Accident: An experienced commercial pilot (8400 hours) started to climb over wires and trees, lost power, struck two power wires approximately 25 feet above ground and crashed into trees. Total time of flight was 1 hour, 45 minutes. The pilot stated the failure was sudden and he did not have time to lower pitch control and accomplish autorotation. The pilot was carrying two passengers on a hunting trip. There were no injuries.

At the time of the accident, 1015, the weather was clear with visibility of 15 miles. The sun was relatively high. Weather was not a factor.

Initial impact was with the upper transmission, breaking the power lines. The aircraft struck a tree, rolled on its right side with the blades striking the ground. The aircraft was substantially damaged. The engine driven fuel pump drive was broken. The report stated that it could not be determined if the "biscuit" broke before or after impact. The pilot was uninjured.

Conclusion: Engine failure as the pilot attempted to climb over wires and trees caused the aircraft to settle and strike the wire.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial, giving the pilot advance warning of wires in his flight path.

Identification of wire location might have aided in wire avoidance.

Forward speed estimated at over 30 knots at the time had sufficient kinetic energy for wire cutters to be effective had they been installed.

AIR TRANSPORTATION

3-0839 3/24/74 Superior, WI Enstrom F-28A 1 Fatal, 2 Serious Substantial-\$52,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Unwarranted low flying
High obstructions

The Accident: A commercial pilot (740 hours) struck two long span power cables approximately 59 to 75 feet above an ice-covered bay. The pilot and two passengers were making an aerial survey of real estate. Total time of the flight was 2 hours. There is no indication that the pilot was aware of the cables. Photos show that supporting poles on land were not visible to the pilot.

At the time of the accident, 1630, sky cover was thin broken clouds at 23,000, with visibility of 10 miles. The flight was to the east and sun was not a factor.

Physical evidence showed that the helicopter flew up into the cables. One cable was forced between the cabin bubble and landing skid tube. A second cable impacted with the tail rotor guard. The main rotor blades then struck a second cable and the aircraft crashed to the ground. The pilot was killed and two passengers were seriously injured. Repair of the airplane was not economically feasible.

Conclusion: The pilot's failure to see and avoid long span power wires caused the crash. Supporting poles on either side were not visible to the pilot.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft of 85 mph had sufficient kinetic energy for wire cutters to be effective had they been installed.

Owners' Recommendation: "The power lines should be brushed out and cleared around poles so they would be visible. The lines should be marked with bright marking balls. The power lines are almost impossible to see."

"A few years ago, the same power line was hit by a float plane on a landing approach in the same area and crashed. Fortunately, no lives were lost in this mishap."

AIR TRANSPORTATION

3-1436 6/22/74 Nr. Douglas, WY Hughes 269A 2 Minor Substantial .. \$24,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Selected unsuitable terrain
High obstructions

The Accident: An experienced private pilot (8120 hours) struck a telephone wire approximately 20 feet above ground while landing at a ranch house. The pilot was carrying a passenger to the ranch. Total time of flight was 10 minutes. The pilot was apparently aware that there was a telephone wire to the ranch house but failed to keep it in sight when landing.

At the time of the accident, 1025, the sky was clear with visibility of 60 miles. The sun was relatively high and not a factor.

The left skid of the helicopter impacted with the wire, causing the aircraft to crash to the ground. There was substantial damage to the helicopter and minor injuries to the pilot and passenger.

Conclusion: The pilot's failure to keep the telephone wire in sight when selecting a landing area caused the wire strike.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Forward speed of aircraft at approximately 30 knots while landing had sufficient kinetic energy for wire cutters to be effective had they been installed.

Pilot's Recommendation: "Could put marking balls or high visibility tape on wire."

AIR TRANSPORTATION

3-1780 7/4/74 Delores, CO Hiller UH12L4 1 Minor Substantial - \$24,000

NTSB Accident Cause:

Pilot Error: Improper inflight decisions or planning

Misc: Poorly planned approach - sun glare

The Accident: A commercial pilot (1876 hours) struck power lines about 20 feet above ground while making a final approach to landing. The pilot was picking up a forest manager to investigate a forest fire. Total time of the flight was 15 minutes. Although the pilot had circled landing area looking for wires, he did not see the power lines until too late to avoid them. The poles supporting the power lines were hidden by trees.

At the time of the accident, 0640, the weather was clear with visibility of 15 miles. The sun was low, which was a factor as the pilot's approach was into the rising sun. Wind velocity was 5 knots.

The main rotor and fuselage engaged the power lines, which broke on impact. The aircraft crashed to the ground with substantial damage. The pilot received minor injury.

Conclusion: The pilot's failure to plan approach and landing so that rising sun would not affect his visibility caused him to strike the wire.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to ground objects prior to flight would have aided the pilot in avoidance.

A landing speed of approximately 30 knots may not have sufficient kinetic energy for effective use of wire cutters had they been installed.

AIR TRANSPORTATION

3-2140 8/13/74 Sacramento, CA Bell 47G No Injury Substantial - \$11,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

Factors: High Terrain

The Accident: An experienced fixed wing pilot (4297 hours), transitioning to rotor craft (31.3 hours), struck a single strand of electrical transmission wire strung across a field approximately 40 ft. above the ground. The pilot was engaged in flying back from practice landings at an outlying field. Total time of flight was 30 minutes. The pilot had no knowledge of the wires until entanglement.

The weather was clear with 30 miles visibility at the time of the accident, 2030, the pilot was flying under conditions of reduced visibility due to oncoming darkness.

The main rotor and cockpit struck the wire at a forward speed of approximately 50 knots; the wire broke and the pilot executed an emergency landing to assess damage. Despite substantial damage to the leading edge of the rotor blades, the pilot flew the helicopter to home base.

Conclusion: The pilot's failure to see and avoid wires caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

The forward speed of 50 knots provided sufficient kinetic energy to cut the wire. An external wire cutter might have been beneficial, but initial main rotor wire engagement makes positive use of the device questionable.

PUBLIC SERVICE

Police Patrol

3-2269 6/4/74 Crockett, CA Hughes 269C 2 Fatal Destroyed - \$50,000

NTSB Accident Cause:

Pilot Error: Failed to see objects or obstructions

Factors: Inadequate preflight preparation or planning
High obstructions

The Accident: An experienced commercial pilot (3347 hours) struck a long span power cable that crosses Carquinez Straits at an altitude of approximately 350 feet. The pilot and a passenger were on a routine police patrol. Cables that cross the straits are supported by steel towers spaced 4,427 feet apart. Vertical spacing of cables is 10 feet apart. The photo shows cables above and below the cable which was hit, indicating the pilot did not see them until too late to avoid the wire strike. Total time of the flight was 10 minutes.

At the time of the accident, 1246, the sky was clear with visibility unlimited. The sun was high and not a factor.

Investigation revealed the main rotor shaft housing and the tail boom initially impacted with the wires. Witnesses stated an explosion occurred at the time of the wire strike. The aircraft crashed into the water and was destroyed. The pilot and passenger, both police officers, were killed.

Conclusion: The pilot's failure to see and avoid the long span power cables caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Although the aircraft speed was estimated at 80 knots, it is doubtful that there was sufficient kinetic energy for wire cutters to be effective against large long span power cables.

Police Recommendation: "If PG&E were required to mark power lines, this accident may have been avoided."

AGRICULTURE
Aerial Application

3-2350 8/6/74 Centerville, WI Bell 47D1 No Injuries Substantial -- \$11,000

NTSB Accident Causes:

Pilot Error: Failed to see and avoid objects or obstructions
Factors: Inadequate pre-flight preparation and/or planning
High obstructions

The Accident: An experienced commercial pilot (3691 hours) struck a power line approximately 60 feet above the ground while starting a swath run. The pilot was spraying a corn field. Total time of the flight was 10 minutes. The pilot was aware of power line through the field but on his reconnaissance did not see the feeder power line which he struck. There were trees in the vicinity of the feeder line.

At the time of the accident, 1710, there were scattered clouds at 5,000 feet with visibility of 10 miles. There was haze. The sun was relatively high and not a factor as the pilot was headed east at the time of the wire strike.

The impact with the power line was with the tail rotor. The pilot went into autorotation and landed hard. The aircraft was carrying non-toxic fertilizer. The pilot was not injured.

Conclusion: The pilot's failure to see and avoid the feeder line in the field caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft at 30 knots had sufficient kinetic energy for wire cutter effectiveness had they been installed.

AIR TRANSPORTATION

3-2414 8/5/74 Wilbur Spring, CA Bell 206B No Injuries Destroyed - \$168,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Terrain - High obstructions

The Accident: An experienced commercial pilot (2891 hours) struck two telephone wires about 30 feet above ground, while landing at a pickup point in the bottom of a canyon. The pilot was engaged in picking up firemen in a fire suppression operation. Total flight time was 10 minutes. Pilot had no knowledge of wire location until it was too late to avoid them.

Visibility was 15 miles with high scattered clouds. At the time of the accident, 1240, the sun was at its zenith and was not considered a factor in the crash.

The carriage structure of the aircraft became entangled with the wires. The helicopter fell to the ground on its right side.

Conclusion: The pilot's failure to see and avoid the wires, which were partially obscured by brush and trees, caused the crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed while landing of under 30 knots, would not have provided sufficient kinetic energy for effective use of external wire cutters had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-2462 7/16/74 Loxahatchee, FL Bell 47 1 Minor Destroyed - \$20,000

NTSB Accident Cause:

Pilot Error: 1. Diverted attention from operation of aircraft
2. Failed to see and avoid objects or obstructions

Factors: High obstructions
Obstructions to vision

The Accident: A high time commercial pilot (7277 hours) struck two power wires approximately 25 feet above ground. The pilot was spraying an orange grove in early morning darkness, and overflow his turnaround point while adjusting floodlights. The total time of the flight was 10 minutes. The pilot saw the wires before the strike, started to turn, but could not avoid them.

At the time of the accident, 0520, the sky was clear with visibility of 10 miles. The night was dark with haze.

The main rotor blade impacted with the two powerlines causing the aircraft to go out of control and crash. The aircraft was destroyed, and the pilot sustained minor injuries.

Conclusion: The pilot's diversion from operation of the aircraft, which caused him to overfly his turnaround point caused him to fly into the wires and crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

In this accident, the pilot started a turnarcond to avoid the wires. The rotor blades struck the wires, which did not break, making the effectiveness of wire cutters questionable.

Pilot's Recommendation: "I believe one of the main factors that caused this accident was my trying to do too much too soon. With my helicopter experience, I of course had no problem with the handling of the aircraft, but I was new to spraying orange groves and should have waited a little longer before starting spraying groves at night."

AGRICULTURE
AERIAL APPLICATION

3-2505 8/21/74 Nr. Orangeville, PA Bell 47G No Injuries Substantial - \$11,000

NTSB Accident Cause:

Pilot Error: Misjudged clearance

Factors: Terrain - High obstructions

The Accident: A high time commercial pilot (4363 hours) struck a power line about 20 feet above the ground, when starting a swath run while crop spraying. Total flight time was 30 minutes. The pilot had knowledge of wires in the field being sprayed.

At the time of the accident, 0800 hours, visibility was 5 miles with haze. The sun was low but not considered a factor as pilot was flying in a northerly direction.

The wire broke the bubble, and then became entangled with the tail rotor. The pilot autorotated the helicopter to landing.

Conclusion: Pilot misjudged clearance of wires in starting swath run.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wires is not an issue in this instance as the pilot knew location of wires above the field.

Forward speed of approximately 30 knots in starting a swath run after a turn would provide a questionable amount of kinetic energy for effective use of wire cutters had they been installed.

AGRICULTURE
Aerial Application

3-2804 4/24/74 Kekaha, HI Hughes 269A 1 Fatal Destroyed - \$37,000

NTSB Accident Causes:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: A very experienced commercial pilot (8050 hours) struck three long span power wires approximately 100 feet above ground while on an in-flight turn-around after a swath run. The pilot was spraying ditches. The pilot had flown 1.5 hours that morning prior to the accident. The pilot was aware of the wires and had noted their location from the ground. The pilot had been in five accidents involving helicopters: one pilot error, one of undetermined cause, and three from mechanical failures.

At the time of the accident, 0905, the weather was clear with unlimited visibility. The sun was to the pilot's right and rear and not a factor.

The aircraft skid impacted with the wires, breaking two of them. A third wrapped around the skid causing the aircraft to crash and catch fire. The aircraft was destroyed and the pilot's injuries were fatal. The aircraft was carrying non-toxic herbicide. An autopsy was performed with results that the fatal crash was not directly related to pesticide exposure.

Conclusion: The pilot's failure to see and avoid wires on turnaround caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wires was not a factor as the pilot knew of wire location.

Although the aircraft was in a turnaround with a speed of under 30 knots, two of the three wires snapped, indicating sufficient kinetic energy for effective use of wire cutters, had they been installed.

AGRICULTURE
Aerial Application

3-3571 8/30/74 Alma, GA Hughes 269B 1 Minor Injury Destroyed - \$37,500

NTSB Accident Cause:

Pilot Error: Misjudged clearance

Factors: Windshield dirty - restricted vision
High obstructions

The Accident: A commercial pilot (1700 hours) struck a low wire on finishing the spraying of a bean field. Total time of the flight was 30 minutes. The pilot stated he knew the location of the wire but he let aircraft get ahead of him. He stated the windshield had some spray on it which limited his visibility.

At the time of the accident, 1600, the sky cover was scattered at 2000 feet with visibility of 10 miles. The sun was relatively high and not a factor.

Details of the aircraft wire strike were not reported. The aircraft was destroyed and the pilot received minor injuries. The aircraft was carrying non-toxic chemicals.

Conclusion: The pilot's misjudgment of clearance to a known wire caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Forward speed of the aircraft at approximately 40 knots had sufficient kinetic energy for wire cutter effectiveness had they been installed.

Pilot's Recommendation: "Installation of a wire cutter would have prevented this accident. I feel that all Ag Aircraft should be required to have a wire cutter."

1975

AIR TRANSPORTATION

3-0206 1/13/75 Ft. Lauderdale, FL Enstrom F28A 1 Serious
1 No Injury Substantial - \$37,000

NTSB Accident Cause:

Pilot Error: Improper compensation for wind conditions

The Accident: A commercial pilot (855 hours) struck a utility pole after the pilot lost airspeed and altitude on takeoff. The pilot was taking off from a construction yard with a passenger. The helicopter made a normal liftoff to the east from a three-foot hover, and at approximately 100 feet of altitude the airspeed dropped from between 40-50 mph to below 10 mph. Altitude began to be lost, a right pedal turn was initiated, and the main rotor speed dropped out of the green. The aircraft struck the ground in a tail low attitude and at the same time the main rotor struck a utility pole.

At the time of the accident, 1330, sky cover was scattered at 2500 ft. The wind was from the south at 15 knots, gusting to 25 knots. A ground witness stated the wind shifted to 270° with a gust of high velocity.

Conclusion: The pilot's failure to compensate for wind conditions caused the accident.

Recommendations: None

AGRICULTURE
Aerial Application

3-0581 3/19/75 Nr. Prescott, WA Bell 206B No Injuries Substantial - \$40,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: A commercial pilot (2381 hours) struck a TV cable approximately 20 feet above ground on a pull up from a swath run. The pilot was spraying weeds parallel to a TV cable and hooked the cable with the right spray boom as he pulled up. Total time of the flight was 5 minutes. The pilot was aware of the location of the TV cable.

At the time of the accident, 0930, the ceiling was 1500 feet with visibility of 5 miles. The sun was not a factor.

After the spray boom hooked the cable, the cable then contacted the tail rotor. The aircraft turned 120° and made a hard landing with further damage. The pilot was uninjured. The aircraft was carrying non-toxic chemicals.

Conclusion: The pilot's failure to see and avoid the TV cable on pull up from a swath run caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance might possibly have been beneficial in warning the pilot of the proximity of the cable.

Identification of cable location is not a factor as the pilot knew the location of the TV cable.

Pull up speed of the aircraft of over 30 knots would have provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

AIR TRANSPORTATION

D-1304 4/4/75 Grand Cuenier, LA Bell 206B 2 Serious
2 Minor Substantial - \$112,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Sun glare
High obstructions
Unfavorable wind conditions

The Accident: A commercial pilot (2143 hours) struck a guy wire to a microwave tower about 50 feet above ground while on a landing approach to an oil company facility. The pilot was carrying three passengers to a Continental Oil Separator Station. Total time of the flight was 15 minutes. The pilot was familiar with the guy wire but thought the approach was high enough to avoid contact.

At the time of the accident, 0730, the weather was clear with visibility unlimited. The sun was low and the pilot stated it was impossible to see the guy wires. The wind was from the NNE, 15 to 20 knots - the pilot was landing to the east.

The main rotor impacted with the guy wire. The aircraft was uncontrollable, struck a car and rolled over on the ground. A ground foreman extinguished a fire. Two passengers were seriously injured; the pilot and one passenger received minor injury. The aircraft was substantially damaged.

Conclusion: The pilot's failure to see and avoid the guy wire while on a landing approach into low sun caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Forward speed of less than 30 knots on landing would not have provided sufficient kinetic energy for wire cutter effectiveness.

AGRICULTURE

Aerial Application

3-1353 6/11/75 Oakdale, NE Bell 47G 1 Minor Injury Substantial - \$15,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: Sun glare

The Accident: An experienced commercial pilot (3926 hours) struck three power lines approximately 40 feet above ground, while making a swath run. The pilot was spraying a corn field. He had planned a pass under power wires at the end of the run. Nearing the end of the run, the pilot looked up to locate wires and was temporarily blinded by the sun. The helicopter climbed into the power lines and crashed. Time of the flight was 15 minutes. The pilot had flown for 6 hours from midnight to the time of the accident.

At the time of the accident, 1430, the sky cover was scattered at 3000 feet. Visibility was 7 miles. The pilot's swath run was to the west toward the sun. The pilot did not have sun visor down as he was not expecting any bright sun. Although the weather was overcast, a hole permitted the sun to shine through.

The main rotor blades and mast impacted with the wires. The aircraft crashed to the ground sustaining further damage. The pilot received minor injuries. The aircraft was carrying non-toxic chemicals.

Conclusion: The pilot's failure to see and avoid wires while flying into the sun caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wires is not a factor as the pilot knew the wire location.

The speed of the aircraft at 60 knots had sufficient kinetic energy for wire cutters to be effective had they been installed on rotor mast. However, wire cutter effectiveness when impact is by main rotor blades is questionable.

AIR TRANSPORTATION

3-1385 6/12/75 Nr. Paso Robles, CA Hiller UH12-D 2 Serious Destroyed - \$70,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: An experienced commercial pilot (5146 hours) struck 4 long span telephone wires approximately 1000 feet above ground over a canyon. The pilot and passenger were enroute to a ranch site. Total time of the flight was 1.5 minutes. The pilot had flown 3.5 hours in the last 24. Investigation revealed that the pole supporting the wires on east side of the canyon was not visible. The other pole was in an almond orchard. Wires that were replaced were not visible from the ground in any direction after replacement.

At the time of the accident, 1937, the sky was clear with visibility of 10 miles. The aircraft was flying northeast at the time of the accident and the sun was not a factor.

Impact was apparently with the rotor mast. The pilot maintained control after the wire strike for approximately 3000 yards and came down in a walnut tree near a ranch house. Collective and cyclic controls were bound up with the wire. The aircraft was destroyed; pilot and passenger were seriously injured. A fire was extinguished by a rancher.

Conclusion: The pilot's failure to see and avoid long span wires whose supporting poles were hidden by brush or trees caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of aircraft at 80 knots had sufficient kinetic energy for wire cutters to be effective had they been installed.

Owner's Recommendation: "Identification markers should be placed on wires in agricultural areas. This should be a definite requirement in rugged terrain where utility poles are not clearly visible."

AGRICULTURE
Aerial Application

3-1515 5/14/75 Palouse, WA Bell 47G3B1 No Injuries Destroyed - \$51,100

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstruction

The Accident: A commercial pilot (2075 hours) struck a power line approximately 25 to 35 feet above ground while on a swath run. The pilot was spraying herbicide on a wheat field. Total time of the flight was 1 minute or less. The pilot had flown 5 hours that day up to the time of the accident. The wire was strung diagonally across a corner of the field for a considerable distance, with no poles in between.

The sky was clear at the time of the accident, 1616, with visibility unlimited. The sun was relatively high and not a factor.

The wire impacted with the rotor system, causing loss of control. The aircraft hit the ground hard, remaining upright, and caught fire. The aircraft was destroyed; the pilot was uninjured. Type of chemical was not reported.

Conclusion: The pilot's failure to see and avoid a long span wire over a field caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft of 60 knots had sufficient kinetic energy for wire cutter effectiveness had they been installed. However, wire impact with the main rotor system in this case makes wire cutter effectiveness questionable.

Pilot's Recommendations: "A more complete reconnaissance of the field."
"The marking on a long span of power lines."

AGRICULTURE
Aerial Application

3-1534 6/6/75 Carmi, Il. Bell 47D-1 No Injuries Destroyed - \$18,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: An experienced commercial pilot (5181 hours) struck two power lines approximately 20 feet above ground while on a swath run. The pilot was spraying brush in drainage ditches. Total time of the flight was 1.2 hours. The pilot had flown over the power lines on a previous swath run. The pilot stated the wires were hard to spot because the poles were placed 60 to 75 feet from the edge of the ditch and obscured by trees and high brush surrounding the poles.

The weather was clear at the time of the accident, 0740, with visibility unlimited. The sun was relatively high and not a factor.

The part of the aircraft impacting with the wires was not reported. The aircraft crashed to the ground with damage beyond economical repair. The pilot was not injured. The aircraft was carrying liquid non-toxic chemicals.

Conclusion: The pilot's failure to see and avoid wires with supporting poles hidden by trees and brush caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification was not a factor in this case, as the pilot knew of the location of the wires.

Forward speed of 60 knots had sufficient kinetic energy for wire cutter effectiveness, had they been installed.

AIR TRANSPORTATION

3-1675 7/2/75 Columbus, MS Hughes 269C 1 Minor Substantial - \$30,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: A commercial pilot (2311 hours) struck two power wires approximately 20 feet above ground while approaching a field to check crops. Total time of the flight was 15 minutes. The pilot had flown 6.4 hours in the last 24. The pilot did not see the wires until impact. The sun had gone down and the tinted aircraft windshield created less visibility. The wires blended in with the trees in the background.

At the time of the accident, 1930, the sky was clear with visibility of 10 miles. It was dusk.

Wire impact was with the rotor mast. The aircraft was suspended momentarily and fell to the ground sustaining further damage. The pilot received minor injuries.

Conclusion: The pilot's failure to see and avoid the wires during a period of low visibility caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft above 30 knots would have provided sufficient kinetic energy for wire cutters to be effective had they been installed.

Pilot's Recommendation: "Avoid crop inspection under low visibility conditions. Accident could have been avoided if visibility greater."

AGRICULTURE
Aerial Application

3-2397 9/3/75 Byron, CA Bell 205A1 1 Minor Injury Substantial - \$180,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

The Accident: A commercial pilot (2100 hours) struck a power pole while reconnoitering a field for areas missed during application. The pilot was spraying a tomato field. The pilot was hovering parallel to a power line. As he came 90° to a power pole the main rotor blades struck the pole. The aircraft turned 45° to the left and settled to the ground.

The weather was clear at the time of the accident, 1115, with visibility of 15 miles. The sun was high and not a factor.

The aircraft suffered substantial damage. The passenger was bruised; the pilot was uninjured. The aircraft was carrying non-toxic chemicals.

Conclusion: The pilot's failure to avoid the power pole while hovering caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance might have been beneficial in wire avoidance.

Pilot's Recommendation "Emphasize over and again importance of constant alertness."

AIR TRANSPORTATION
Power Line Inspection

3-2489 8/22/75 Compton, KY Hughes 269C No Injuries Destroyed-\$20,000

NTSB Accident Cause:

- Pilot Error: 1. Failed to see and avoid objects or obstructions
2. Diverted attention from operation of aircraft

Factor: Sun glare

The Accident: A commercial pilot (1280 hours) struck a power line 75 feet above ground while on a powerline inspection mission. Total time of the flight was 1 1/2 hours. The pilot hit a 400 foot wire span about midway. He could see a pole on his left which he believed to be part of the line being inspected, but not the pole on the right, which was hidden by trees. The pilot did not see the wire.

At the time of the accident, 1045, the weather was clear with visibility of 5 miles. There was haze. The pilot stated the sun was in his eyes at the time of the wire strike.

Wire impact was with the left front strut and skid of the helicopter. The aircraft settled into small trees and brush in a nose low attitude with the wire entangled. There were no injuries or fire.

Conclusion: The pilot's failure to see and avoid the long span wire, with sun-glare being a factor, caused the accident. The only supporting pole visible was believed to be part of the power line being inspected.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

It is not known if the pilot had an identification chart of all wires, however, such a chart would have aided the pilot.

Forward speed of around 90 knots provided sufficient kinetic energy for wire cutters to be effective had they been installed.

AGRICULTURE
Aerial Application

3-2511 3/20/75 Mumford, NY Hughes 269B 1 Minor Destroyed - \$37,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: High obstructions
Hidden obstructions

The Accident: A commercial pilot (1250 hours) struck two power wires approximately 20 feet above ground while on a swath run spraying corn. Pilot pulled the aircraft over a house and dipped back into the field. The helicopter struck the powerline which the pilot had not seen on his reconnaissance. Total time of the flight was 5 minutes or less. The pilot had flown 6.5 hours from midnight to the time of the accident.

The sky was clear at the time of the accident, 1755, with visibility of 15 miles. The pilot was flying to the east and the sun was not a factor. The report states the wires and poles were partially hidden by trees on the northern border.

The spray boom of the aircraft initially impacted with the wires. The aircraft went out of control and crashed. There was no fire. The pilot suffered minor injuries. The aircraft was carrying liquid toxic chemicals. The pilot was exposed after the crash for 1 hour or less, effects unknown.

Conclusion: The pilot's failure to see wires partially hidden by trees during reconnaissance, and avoid them during flight caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of aircraft of approximately 60 knots provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

Pilot's Recommendation: "I felt I did a satisfactory visual reconnaissance. However, it's very hard to see wires when the poles are placed in the tree lines. Perhaps some type of markers could be hung on the lines where the wires are strung between 'hidden' poles."

Note: Fire extinguisher mounted on left forward door post did not cause injury. Report recommended relocation, however, due to its position in relation to pilot's head.

AIR TRANSPORTATION

3-2535 7/24/75 Hillisdale, IN Bell 206B 2 Minor Substantial - \$25,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: An experienced commercial pilot (5237 hours) struck 2 long span power wires approximately 35 feet above the ground while in a final approach to landing. The pilot was carrying a passenger to a construction site. Total time of the flight was 30 minutes. The pilot stated he and the passenger first saw the wires about 10 feet from the helicopter and slightly below them on the left. The pilot attempted to climb to avoid them, but was not successful. Poles supporting the wires were approximately 400 feet apart.

At the time of the accident, 1020, the sky cover was scattered at 8,000 feet with visibility of 7 miles. The sun was relatively high and not a factor.

The tail rotor impacted initially with the wires. The pilot autorotated the aircraft, which landed hard causing further damage. The pilot and passenger received minor injuries.

Conclusion: The pilot's failure to see and avoid the wires while landing at a road construction site caused the accident. Poles supporting the wires were unobstructed from view.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Approach landing speed of the aircraft estimated to be around 30 knots would have provided sufficient kinetic energy for effective wire cutter use; however, pilot's attempt to stop descent and to climb would make their use questionable.

AGRICULTURE
Aerial Application

3-2593 6/10/75 Great Falls, MT Bell 47G-3 1 Minor Injury Destroyed - \$25,000

NTSB Accident Cause:

1. Power plant failure for undetermined reasons
2. High obstructions

Factor: Pilot fatigue

The Accident: A commercial pilot (740 hours) struck a power line approximately 40 feet above ground, while in recovery from a momentary power loss which caused him to settle into power lines. The pilot was approaching a wheat field for spraying. The pilot had 12 hours flying time in the last 24 hours.

The weather was clear at the time of the accident, 1430, with visibility of 50 miles. The sun was high and not a factor.

The rotor blades impacted with the power line. The aircraft crashed to the ground and caught on fire. The pilot received minor injuries. The aircraft was carrying non-toxic chemicals.

Conclusion: Momentary power loss while approaching a field for spraying caused the aircraft to settle into the power line.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Forward speed of the aircraft above 30 knots would have provided sufficient kinetic energy for wire cutters to be effective had they been installed, however in this case main rotor blades impacted with the wires and the effectiveness of wire cutters is questionable.

PUBLIC SERVICE

Police Patrol

3-2645 7/24/75 Atlanta, GA Hughes 269C Two Serious Destroyed by fire - \$56,000

NTSB Accident Cause:

Misc: Powerplant failure for undetermined reasons
Pilot Error: 1. Failed to see and avoid objects or obstructions
2. Diverted attention from operation of aircraft
Factors: High obstructions

The Accident: An experienced commercial pilot (2173 hours) struck trees while attempting to avoid a wire during an autorotation landing. The pilot was on a routine police patrol when the aircraft engine lost power. The total time of flight was 10 minutes.

At the time of the accident, 1639, there was haze with visibility of 12 miles. Weather was not a factor.

The pilot lost engine power and elected to land in the front yard of a residence. During autorotation, he saw a wire, attempted to avoid it, and the tail rotor struck trees. The aircraft crashed and caught fire. The pilot and passenger were seriously injured.

Conclusion: Not a valid wire strike for this study, as the pilot struck trees attempting to avoid a wire during an emergency autorotation.

Recommendation: None

AIR TRANSPORTATION

3-2659 8/30/75 Collins, IA Bell 47 2 Minor Substantial - \$11,000

NTSB Accident Cause:

Pilot Error: 1. Inadequate preflight preparation and/or planning
2. Mismanagement of fuel

Factors: High obstructions
Complete power loss

The Accident: A commercial pilot (1284 hours) struck 4 power wires 30 feet high and 1 telephone cable 20 feet high when the aircraft was autorotating to a landing after a power loss. Total time of the flight was 1 hour and 45 minutes, the majority of which was high power hover work in drying out a baseball field. The pilot placed the aircraft in autorotation after the power failed and selected a street in Collins for a landing. The pilot came over a tree and hit the wires.

At the time of the accident, 0955, visibility was 10 miles. The pilot was flying VFR. Weather was not a factor.

Initial impact was with the aircraft tail pylon. All wires were broken as the aircraft came down. The aircraft spun counterclockwise after wire impact, landed hard, and rolled on its right side. Fuel sumps were empty except for several tablespoons of fuel. Just before power loss, the pilot had picked up a passenger in Collins and estimated 1/4 tank of fuel from his fuel gauge.

Conclusion: The pilot's inadequate check of fuel caused the power loss in flight. During autorotation to a selected landing site, the pilot came over a tree and was too late to avoid a wire strike.

Recommendations: Forward speed of the aircraft during autorotation of around 30 knots may have provided sufficient kinetic energy for wire cutters to be effective had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-3142 6/19/75 Paulding, OH Bell 47G2 No Injuries Substantial - \$28,500

NTSB Accident Cause:

Pilot Error: 1. Failed to see and avoid objects or obstructions
2. Diverted attention from operation of aircraft

Factor: High obstruction

The Accident: A commercial pilot (1277 hours) struck a power wire approximately 15 to 20 feet above ground at the end of a swath run. The pilot was on an agricultural spraying operation. The total time of flight was 3.4 hours. The pilot had made a surveillance flight of the area but was unaware of the wire at the end of the field where the accident occurred. The pilot stated the wire was obscured in a background of trees and heavy foliage.

The weather was clear at the time of the accident, 1815, with visibility of 5 miles. There was haze. The sun was still relatively high and not considered a factor.

The pilot stated he was nearing the end of the swath run and diverted his attention to an auto which he thought would cross his flight path. Wire impact was with the skid legs. The aircraft made a hard landing, damaging the tail rotor. The pilot was not injured.

Conclusion: The pilot's failure to see and avoid the wire caused the crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of the wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft of approximately 40 knots would have provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

PUBLIC SERVICE

POLICE PATROL

1-1184 5/23/75 Nr. Bakersfield, CA Bell 47G3B2 2 Serious Destroyed - \$55,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: High obstructions

The Accident: An experienced commercial pilot (4350 hours) struck 4 telephone wires about 300 feet above ground over Kern River Canyon. The pilot and passenger were enroute from Bakersfield to Kernsville. Total time of the flight was 15 minutes. The pilot apparently had no knowledge of the wires until striking them.

The weather was clear at the time of the accident, 1215, with visibility of 30 miles. The sun was at its zenith and not considered a factor.

The aircraft bubble and main rotor impacted with four 14 gauge steel wires, causing the aircraft to crash to the ground. The helicopter was destroyed and the pilot and passenger were seriously injured.

Conclusion: The pilot's failure to see and avoid the wires caused the crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of 60 to 80 knots provided sufficient kinetic energy for wire cutters to be effective had they been installed.

Recommendation of Chief Pilot,

Deputy Sheriff (not involved in accident): "Continual emphasis on flight safety and a course of instruction on mountain flying for all new pilots, and refresher course for other pilots."

AIR TRANSPORTATION

3-3344 11/18/75 Little Rock, AR Sikorsky S-55R No Injuries Substantial - \$136,000

NTSB Accident Cause:

Pilot Error: 1. Inadequate preflight preparation and/or planning
2. Mismanagement of fuel

Factors: Fuel exhaustion
High obstructions

The Accident: A commercial pilot (1661 hours) struck a power line about 30 feet above ground, while making an autorotative landing in a street. The pilot was conducting familiarization flights for nurses at a hospital. The total time of flight was 10 minutes. The pilot picked the street for landing after the engine quit, and probably was aware of wires.

At the time of the accident, 2053, the weather was clear with visibility of 7 miles. The night was bright. Weather was not a factor in the wire strike.

The pilot had given one ten-minute familiarization flight and was on the second when the engine backfired and quit. The pilot autorotated into the street, which was the only place he saw to land. The aircraft struck the power line on the way down, sustaining substantial damage. The pilot and four passengers were uninjured.

Conclusion: Engine failure for lack of fuel forced the pilot to land in a street area, where contact with a wire caused the accident.

Recommendation: An independent low level fuel warning system is recommended for future design to reduce incidence of fuel exhaustion accidents of this nature.

AIR TRANSPORTATION

3-3388 10/24/75 Sand Point, ID Bell 47G3B2 No injury Substantial - \$11,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

Factor:s: High Terrain

The Accident: An experienced commercial pilot (7165 hours) struck an electrical transmission wire strung across a field approximately 40 feet above ground.

The pilot was engaged in a takeoff from a meadow. Total time of flight was five minutes. The pilot had no knowledge of wires until entanglement.

The weather was 8000 foot overcast with 15 miles visibility. At the time of the accident, 1045, the sun was obscured by the overcast and not considered a contributing factor.

Entanglement with the wires from a takeoff speed caused loss of the tail rotor and subsequent loss of control, followed by a semi-controlled crash.

Conclusion: The pilot's failure to see and avoid wires caused the crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Takeoff airspeed of less than 20 knots would not have provided sufficient kinetic energy for effective use of external wire cutters had they been installed.

AIR TRANSPORTATION

3-3534 11/29/75 Lumber City, PA Bell 206B No Injuries Substantial - \$24,500

NTSB Accident Cause:

Pilot Error: 1. Diverted attention from operation of aircraft
2. Failed to see and avoid objects or obstructions

Terrain: High obstructions

The Accident: A high time commercial pilot (3859 hours) struck a power line about 200 feet above the ground, while following the Susquehanna River. The pilot was engaged in surveillance of strip mining operations. The pilot had no knowledge of the wire until striking it. Total time of the flight was 30 minutes.

At the time of the accident, 1430, the ceiling was 10,000 ft. with scattered clouds at 3,000 ft. Visibility was 15 miles. The sun was not a factor in the accident.

Upon impact, the wire broke and the windshield shattered. The main rotor blades were damaged and required replacement. The pilot was able to land the aircraft at a heliport.

Conclusion: The pilot's failure to see and avoid a power line extending from one hill to another across a river caused the wire strike.

Recommendations: A pilot warning device identifying the wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of the wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

A forward speed of approximately 80 knots provided sufficient kinetic energy for effective use of external wire cutters had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-3753 8/21/75 Monticello, FL Bell 47D1 No Injuries Substantial - \$17,000

NTSB Accident Cause:

- Pilot Error: 1. Spontaneous improper action
2. Failed to see and avoid objects or obstructions
3. Misjudged speed and altitude

Factors: Pilot fatigue
Evasive maneuver to avoid collision

The Accident: An experienced commercial pilot (2125 hours) struck a set of wires to his right about 20 feet above ground, after applying controls to avoid wires he thought he had seen on his left. The pilot had reacted to a reflection on the opposite (left) side of his bubble of the sun shining on the wires on his right. The pilot was on a spraying mission. Total time of the flight was two hours. The pilot had knowledge of wires on his right before the wire strike.

At the time of the accident, 1815, the weather was clear with visibility unlimited. The sun was low at the pilot's left. The statement of the pilot that the sun shining on the wires created an image on the left side of the bubble, implicates the sun as a possible factor in this accident.

The aircraft boom initially struck a bottom wire. The aircraft then crashed with substantial damage. The pilot was uninjured.

Conclusion: The pilot's error in attempting to avoid a reflection of wires on his left, and thereby striking the actual wires on his right, caused the accident. The bubble design is suspect, also.

Recommendations: A pilot warning device to indicate wire location with reference to the flight path would have been beneficial.

Identification of wire locations in relation to ground objects prior to flight would not have aided as the pilot knew the location of the wires to his right.

Forward speed of 30 knots might have provided sufficient kinetic energy for use of wire cutters had they been installed.

PUBLIC SERVICE

POLICE PATROL

3-4010 12/22/75 Richmond, VA Hughes 269C 2 Minor Injuries Destroyed - \$35,000

NTSB Accident Cause:

Power Plant: 1. Engine Structure Valve Assemblies
2. Materiel failure

Factors: High obstructions

The Accident: A private licensed pilot (387 hours) on routine police patrol developed engine trouble, with complete power loss. During autorotation landing the aircraft struck 5 power lines about 35 feet above the ground. Total time of the flight was 1 hour. The pilot had no knowledge of the wires until entanglement.

The weather was clear. At the time of the accident, 1745, it was dark and the wires were not visible to the pilot during autorotation descent.

The power lines broke upon impact with the bubble, main rotor mast and rotor blades. The aircraft crashed to the ground and was destroyed.

Conclusion: The failure of a valve assembly in the engine was the cause of the crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been of questionable value to the pilot in an autorotation descent.

Identification of wire location relative to known ground objects prior to flight would not have aided the pilot in this accident.

The autorotation descent speed of less than 30 knots would not have provided sufficient kinetic energy to make external wire cutters effective.

1976

AGRICULTURE
AERIAL APPLICATION

3-0167 2/3/76 Oahu, HI Hiller UH-12E No injury Substantial - \$53,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Terrain - High obstructions

The Accident: A high time experienced agricultural pilot (3963 hrs/22 last 10 days) struck six 12-gauge braided copper wires strung across a sugar cane field 15 feet above ground. The pilot was engaged in treating a level sugar cane field with a weed defoliant. Total time of flight was 30 minutes. The pilot had no knowledge of wires until entanglement.

The weather was clear with 20 miles visibility. At the time of accident, 0915, the sun was relatively high and not considered a contributing factor.

Upon entanglement with the wires, at a forward speed of approximately 5 knots, the helicopter made a forced landing. The wires entangled the main and tail rotors, causing major damage to the craft.

Conclusion: The pilot's failure to adequately identify all wires in the field prior to commencement of work, is the primary cause of the accident.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of 5 knots at time of impact probably would not have provided sufficient kinetic energy for effective use of external wire cutters had then been installed.

AGRICULTURE
AERIAL APPLICATION

3-0384 3/17/76 Dows, Iowa Bell 47-G-2 No Injury Destroyed - \$42,870

NTSB Accident Cause:

Pilot Error: 1. Inadequate preflight preparation and/or planning
2. Failed to see and avoid obstructions

Factors: High terrain

The Accident: A high time experienced agricultural pilot (3400 hrs./3.0-last 10 days) struck three strands of (7200 volt) electrical transmission wire crossing a highway at approximately 20 ft. above ground. The pilot was engaged in a grass seeding operation on the center divider between a parallel road system. Total time of flight was 10 minutes. The pilot had no knowledge of the wires until entanglement.

The weather was 1500 foot overcast with 5 miles visibility. The pilot reported difficulty in seeing the wires against the cloud background. At the time of accident, 0935, the sun was relatively high, and not considered a contributing factor.

Upon entanglement with the wires at a forward speed of approximately 38 knots, the pilot was forced down after 50 feet of flight. The wires struck and remained entangled with the main rotor.

Conclusion: The pilot's failure to locate wires relative to known ground objects and visual blending of wires with the overcast caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location with known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of estimated 38 knots should have provided sufficient kinetic energy for effective use of external wire cutters had such device been installed. However, main rotor engagement of the wires rather than cockpit impact makes use of the external wire cutters questionable.

AIR TRANSPORTATION

3-0865 4/12/76 N. Miami Beach, FL Bell 47-G 3 Minor Injuries Destroyed - \$23,500

NTSB Accident Cause:

Pilot Error: 1. Inadequate preflight preparation and/or planning

Miscellaneous Conditions: 1. Fuel exhaustion
2. Complete engine failure
3. Forced landing off airport

The Accident: An experienced helicopter pilot (1887 hrs) struck the power lines connected to traffic lights with the main rotor of the aircraft, when engaged in an emergency autorotation caused by fuel starvation. The pilot was returning from conducting a sight-seeing tour of the Everglades when the engine lost power due to lack of fuel. In attempting to avoid landing on an automobile in the emergency autorotation, the pilot struck the traffic light lines. Total time of flight was 1 hour, 4 minutes. The pilot saw the wires, but was unable to avoid entanglement due to the emergency auto avoidance maneuver.

The weather was scattered clouds with 15 miles visibility. Neither the weather, nor sun angle had any bearing on this accident.

The helicopter struck the traffic signal cables at approximately 25 knots, cutting some and throwing wires clear of aircraft.

Conclusion: The pilot's failure to monitor fuel and subsequent engine fuel starvation was the cause of the crash. The resulting wire strike is incidental and not a cause factor in this accident.

Recommendations: None

AGRICULTURE
AERIAL APPLICATION

3-1224 5/10/76 Spokane, WA Bell 47G-3B One Minor Injury Substantial - \$40,000

NTSB Accident Cause:

Pilot Error: 1. Operated carelessly
2. Failed to see and avoid objects or obstructions

Factors: High terrain

The Accident: An experienced agricultural pilot (2200 hours/20 hrs last 10 days) struck three power distribution lines crossing a grain field that was being treated with a herbicide. The wire strike occurred after one hour of flight on the pilot's third swath run in the same field. The pilot was aware of the wires located 30 feet above the field.

The weather was scattered clouds at 6000 feet, 10,000 foot overcast with 50+ miles visibility. At the time of accident, 1230, the sun was near zenith and not considered a factor in the accident.

Upon entanglement with the wires at forward speed of approximately 45 knots, the aircraft was forced down after 80 feet of flight. The wires struck the main rotor mast and tail rotors.

Conclusion: The pilot's inattention to detail of known wires was the primary cause of the accident.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

NTSB Recommendation: Institute stricter roles and safety policy for ag operations in wire environments.

Forward speed of estimated 45 knots should have provided sufficient kinetic energy for effective arc of external wire cutters had such a device been installed. However, main rotor engagement of wires rather than cockpit impact makes use of the external wire cutters questionable.

AGRICULTURE
AERIAL APPLICATION

3-1259 6/6/76 Dallas Center, Iowa Hiller UH-12D No injury Destroyed - \$32,000

NTSB Accident Cause:

Pilot error: Failed to see and avoid objects

The Accident: An experienced agricultural pilot (2338 hrs/7 hrs last 10 days) struck one cable of electrical power lines adjacent to a field he was working, with the tail rotor of his craft approximately 20 feet above the ground. Total time of flight was 45 minutes. The pilot knew of wire location, but misjudged distance on pull up and turn around for next swath run.

The weather was clear with 8 to 10 miles visibility. At the time of accident, 0700, the sun was relatively high and not considered a contributing factor.

Upon entanglement with the wire at less than 5 knots, the tail rotor wrapped around the wire with such rapidity as to cause the helicopter to crash within 25 feet of the power line. The aircraft was destroyed in the ensuing fire.

Conclusion: The pilot's failure to properly judge distance from the wires was the primary cause of the accident.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance and with increase in warning intensity with impending impact would have been beneficial in wire avoidance.

Pilot's Recommendation: "All flights along power lines should be made with the direction of the lines thus avoiding any pull ups into the wires."

AIR TRANSPORTATION

3-1342 6/10/76 Somerset, CO Bell 47G-3B1 Two Fatal Destroyed - \$45,000

NTSB Accident Cause:

Pilot Error: 1. Failed to see and avoid objects or obstructions
2. Unwarranted low flying;

Factors: Terrain - high obstructions

The Accident: An experienced pilot (1087 hours) struck four 3/4 inch 42 KV unmarked electric power line cables crossing a river approximately 70 feet above the ground. The pilot with one passenger were enroute to a loading area to position the helicopter for a drilling equipment lift up the mountains. Pilot knowledge of wire location is not known.

The weather was clear with visibility in excess of 15 miles. At the time of accident, 1009, the sun was high and not considered a contributing factor.

Upon striking the wires at an estimated forward speed of over 45 knots, the aircraft caught fire and immediately struck the earth, scattering debris over a 330 foot long swath. Both pilot and passenger died in the crash. Accident investigation revealed wire strikes on main rotor blades and plexiglass cockpit bubble.

Conclusion: The pilot's failure to see and take timely evasive maneuvers to avoid the power lines caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

NTSB Investigator Recommendation: "Power lines must be clearly marked, whenever the line lies in the path of flight, even though the possibility of flight over the route obstructed by the line is extremely remote."

Forward speed in excess of 45 knots should have provided sufficient kinetic energy for effective use of external wire cutters had such device been installed. However, accident investigation indications of main rotor engagement plus cockpit impact makes use of the external wire cutter questionable.

AIR TRANSPORTATION

3-1495 6/26/76 Nr. Lampasas, TX Hughes 269C Minor Injury Substantial - \$15,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Terrain - High obstructions
Struck power lines beside highway

The Accident: A relatively inexperienced pilot (300 hrs) struck electric power lines running parallel to a highway approximately 20 feet above ground. The pilot was attempting a landing to come to the aid of a friend that had been apprehended by the Texas Highway Patrol for speeding. The police-apprehended friend was driving the car that was intended for return of the pilot and his passenger girl friend after the helicopter ferry mission. The pilot had no knowledge of the wires until entanglement.

The weather was 5000 foot overcast with 10 miles visibility. At the time of accident, 1735, the sun was relatively low but not considered a contributing factor.

At time of entanglement with the power lines, the helicopter was in a hover about 6 feet from the ground and the pilot nulled up into the wires. One of the main rotor blades was ripped off and the aircraft came to rest on its skids.

The emotional involvement of the pilot with the ground situation possibly caused a stress situation that taxed his ability, or capability, for prudent observation of obstructions to safe flight.

Conclusion: The pilot's involvement with an external emotional situation overtaxed his limited flight ability to exercise due caution and care for avoidance of obstructions and thereby caused the crash.

Recommendation: Limited time pilots devote full attention to aircraft flight and avoid any external distractions that would unduly tax safety of flight.

Effective use of a pilot wire warning device in this accident is questionable since the pilot was in a partial hover and raised the aircraft into the wires.

External wire cutters would not have been effective in this accident.

AGRICULTURE
AERIAL APPLICATION

3-1551 6/17/76 Ravender, AZ Bell 47B One serious Substantial - \$15,000

NTSB Accident Cause:

Pilot error: Misjudged clearance

Factor: Miscellaneous conditions - sun glare

The Accident: A high time experienced agricultural pilot (6900 hrs/17 hrs 10 days prior) struck electrical power lines during pull up from swath run at approximately 20 feet above ground. The pilot was engaged in applying a defoliant to pasture underbrush. Total time of flight was one hour and 30 minutes. The pilot had knowledge of wire location.

The weather was clear with unlimited visibility. At the time of accident, 0800, the sun was at such an angle as to cause pilot blinding on pull up from the swath run and is considered a contributing factor in the accident.

Entanglement with the power lines occurred on the pull up from the swath run at minimum speed. The main rotor and spray boom engaged the power lines. The wire broke and became engaged with the tail rotor shaft, causing the aircraft to crash in the immediate area of the wires. The aircraft sustained substantial damage and the pilot received serious injury.

Conclusion: The pilot's failure to properly judge distance to the wires on pull up caused the helicopter to become entangled with the power lines and caused the crash.

Recommendation: Agricultural pilots conduct swath runs parallel to power lines to avoid judgement errors on pull up for turn arounds.

A pilot warning devices continuously identifying wire location when within hazardous distance might have been beneficial in wire avoidance.

The minimal speed of wire entanglement probably would not have provided sufficient kinetic energy for effective use of external wire cutters. Main and tail rotor wire engagement would have precluded effective usage of cockpit mounted wire cutters.

AGRICULTURE
AERIAL APPLICATION

3-1716 7/10/76 Gooding, ID Hughes 300c No injury Substantial - \$25,000

NTSB Accident Cause:

Pilot error: Failed to see and avoid objects or obstructions

The Accident: A high time experienced agricultural pilot (3093 hrs/27 hrs 10 days prior) struck power lines crossing a plowed field at approximately 20 feet above the ground. The pilot was airborne for his first pass from a chemical truck when he struck the power line with the left skid. The pilot had no knowledge of the wire until entanglement.

The weather was clear with 10 miles visibility. At the time of the accident, 1030, the sun was high and not considered a contributing factor.

Upon entanglement with the wires at a forward speed of approximately 40 knots, the wire failed to break and forced the aircraft to the ground.

Conclusion: The pilot's failure to see the wires in time to take evasive action caused the accident.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Pilot Recommendations: Wires in the middle of fields - (1) should have more poles; (2) be marked with orange ball; (3) be taken down; (4) aircraft should have been equipped with wire cutters.

Forward speed of estimated 40 knots should have provided sufficient kinetic energy for effective use of external wire cutters had such device been installed. With just initial port skid wire engagement in this accident, wire cutters could possibly have been effective.

AIR TRANSPORTATION

3-1748 2/26/76 Westport, WA Bell 206B No injuries Substantial - \$100,000

NTSB Accident Cause:

Pilot Error: Misjudged clearance

Factors: Terrain - High obstructions

The Accident: An experienced private pilot (2935 hrs) struck power lines when attempting a landing on a sand beach when approximately 15 feet in the air. The pilot was conducting pleasure flight for friends from a sand beach. Total time of flight was 50 minutes. The pilot was not familiar with the area and had no knowledge of the wires until entanglement.

The weather was clear with 25 miles visibility. At the time of accident, 1600, the sun was relatively high and not considered a contributing factor.

Wire entanglement occurred just prior to landing, with the tail rotor striking the wires first. Tail rotor control was lost with the initial wire strike and autorotation from about four feet caused the aircraft to hit left side down causing a roll over into the main rotor and ultimate aircraft destruction. There were no injuries. The pilot was flying with medical limitation for glasses for near vision.

Conclusion: The pilot's failure to see the wires and take proper evasive action was the cause of the accident.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

The near hover speed approaching landing probably would not have provided sufficient kinetic energy for effective use of external wire cutters had such device been installed. Initial tail rotor entanglement could not have been avoided with wire cutters.

AIR TRANSPORTATION

3-1792 8/15/76 Sheep Mountain, AK Hiller UH-12EJ Fatal Destroyed - \$79,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: High Obstructions

The Accident: A high time experienced commercial pilot (5856 hrs) struck 16 or more telephone lines crossing a river bed at an altitude of approximately 170 feet. The pilot was ferrying the aircraft at the termination of a day's work. Total time of flight was 2.5 hours. Pilot knowledge of wire location is not known.

The weather was reported as 5000 broken with broken lower clouds at 500 feet, with occasional rain. At the time of the accident, 1930, with cloud cover, light conditions was regarded as dusk. Lack of light and reduced visibility is considered a contributing factor in this accident.

Upon entanglement with the wires at an estimated speed of 60 knots, the main rotor sheared off the tail boom and broke off the aircraft. The wreckage fell from the wires and traveled in the direction of flight approximately 100 feet. The crash caused fatal injury to the pilot and total destruction of the aircraft.

Conclusion: The pilot's failure to see the telephone wires in the reduced visibility and darkness in time to take evasive action, caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous proximity would have been beneficial in wire avoidance.

Owner's Recommendations: "Accident could have been prevented if telephone wires had been marked. There are no visible poles on either bank of the river; the wires are 300 ft and 100 ft above the ground on either end and have an uninterrupted span of more than 1/4 mile crossing the river. I feel this accident was caused by gross negligence of the operators of the telephone wires for not putting markers along the span."

Foward speed of estimated 60 knots should have provided sufficient kinetic energy for effective use of external wire cutters, had such devices been installed. However, the cluster of over 16 wires striking the aircraft in the rotor assemblies in addition to the cockpit, would probably have invalidated any beneficial effect of wire cutters.

AIR TRANSPORTATION

3-1865 4/23/76 White Bird, ID Enstrom F-28A 2 Fatal Destroyed - \$65,500

NTSB Accident Cause:

Pilot Error: 1. Improper in-flight decision or planning
2. Unwarranted low flying
3. Failed to see and avoid objects or obstructions

Factors: Terrain - High obstructions

The Accident: A low time student pilot (40 hrs) struck two strands of copper-clad steel wire crossing a roadway. The pilot was engaged in a pleasure flight and was on his return home. Total flight time is unknown. Pilot knowledge of wires is not known.

Weather conditions were not reported, but assumed VFR. At the time of the accident, 1815, the sun was low but not considered a factor in the accident.

Upon entanglement with the wires at an estimated forward speed of 50 knots, the aircraft was subsequently forced to the earth due to wire wrappage around both main and tail rotor. The aircraft crashed and burned, causing ultimate fatal injuries (4-6 weeks) to both occupants.

Conclusion: The pilot's failure to see and take evasive action to avoid the wires is the cause of this accident.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Forward speed of estimated 50 knots should have provided sufficient kinetic energy for effective use of external wire cutters had such a device been installed. However, both main and tail rotor wire entanglement makes the use of wire cutters questionable.

AGRICULTURE
AERIAL APPLICATION

3-1866 6/10/76 Rupert, ID Hiller UH-12E None Destroyed - \$79,000

NTSB Accident Cause

Pilot Error: 1. Inadequate preflight preparation and/or planning
2. Failed to see and avoid objects or obstructions

Factors: Terrain - High obstructions

The Accident: An experienced agricultural pilot (1900 hrs/8 hrs last 10 days) struck a telephone wire, estimated at 3 feet, crossing a field he was starting to spray. The pilot was engaged in applying a toxic chemical to the grain field and this was his first pass. The pilot had no knowledge of the telephone wire until entanglement.

The weather was clear and calm with unlimited visibility. At the time of the accident, 0645, the sun was low and was a contributing factor, in that the pilot was flying into the sun and had his visor lowered for better visibility.

Wire entanglement occurred at a forward speed of approximately 40 knots. A detailed description of the ultimate crash is not known, other than the aircraft was damaged beyond economical repair. The pilot was not injured.

Conclusion: The pilot's failure to see the wires and conduct evasive maneuvers is the cause of the accident.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location with known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of 40 knots should have provided sufficient kinetic energy for effective use of external wire cutters had such devices been installed.

AIR TRANSPORTATION

3-2085 8/14/76 Milagro, NM Hughes 269A-1 No Injury Substantial - \$25,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Terrain - High obstructions

The Accident: A low time private pilot (102 hrs) struck a powerline beside a highway when attempting a landing at a service station. The pilot had no knowledge of wires until entanglement.

The weather was VFR, but actual conditions were not reported. At the time of accident, 1315, the sun was near zenith and not considered a factor in the accident.

Wire entanglement occurred during the landing approach at minimal speed. Information regarding wire strikage on aircraft is unknown.

The pilot's relative flying inexperience and landing at an unfamiliar location are considered human stress factors that affected pilot judgment on wire avoidance.

Conclusion: The pilot's failure to locate wires relative to the landing task and avoid such hazards, caused the accident.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance might have been beneficial in wire avoidance. The pilot motor skills required for landing at a strange site, plus wire avoidance, could possibly have taxed the pilot beyond reasonable acceptance of any further stimuli.

The landing approach speeds (less than 5 knots) would have precluded any effective use of external wire cutters as a remedial solution to wire entanglement.

AGRICULTURE
AERIAL APPLICATION

3-2124 4/3/76 Comer, GA Hughes 269A One serious, one minor Substantial - \$16,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

The Accident: A limited experience agricultural pilot (614 hrs) struck a power line crossing a field at an altitude of approximately 20 feet. The pilot was engaged in a spray rig test flight with a mechanic on board to visually check for suspected vibration problems. The helicopter had just lifted off for the flight when the power line was engaged. The pilot had no knowledge of the power line until entanglement.

The weather was clear with 8 miles visibility. At the time of accident, 1805, the sun was low and on the pilot's left side, causing the wires to be difficult, if not impossible to see. The sun elevation was a contributing factor in this accident.

Upon entanglement with the wires at a forward speed of about 10 knots, the wires engaged the helicopter skids. One wire broke instantly, but the other detained the machine to almost a complete stop, when it parted, causing the helicopter to pitch forward uncontrolled into the the ground.

Conclusion: The pilot's failure to locate wires relative to anticipated flight patterns, and ultimate failure to see and avoid the wires caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location with known ground objects prior to flight would have aided the pilot in wire avoidance.

While forward speed and kinetic energy were low for wire cutting, installation of an external wire cutter would have been beneficial in freeing the helicopter from the resultant skid wire entanglement and could have prevented the accident.

AGRICULTURE
AERIAL APPLICATION

3-2175 7/3/76 Lore City, OH Hiller UH-12E No injury Substantial - \$40,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Terrain - High obstructions

The Accident: A commercial agricultural pilot (943 hrs) struck two electrical power cables crossing a field at approximately 20 feet above the ground. The pilot was engaged in applying liquid fertilizer to the field and was on his first run. Time of flight was 5 minutes. The pilot had no knowledge of the wire until entanglement.

The weather was clear with 10 miles visibility. At the time of the accident, 1915, the sun was still relatively high and not considered a contributing factor.

Initial impact with wire was on the top of the bubble canopy at a speed of approximately 40 knots. The wire hit the wind screen, flipped into the main rotor control rods, and cut the tail rotor blades off. Losing the tail rotor, the helicopter made a control descent into the field causing extensive damage. The pilot was not injured.

Conclusion: The pilot's failure to locate all wires relative to known ground objects and failure to see the wires in time to conduct evasive maneuvers were the cause of this accident.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location with known ground objects prior to flight would have aided the pilot in wire avoidance.

The estimated forward speed of 40 knots should have provided sufficient kinetic energy for effective use of external wire cutters had such devices been installed. In this accident, with wire strike initially occurring on the wind-screen, wire cutters could have been most beneficial in avoiding the ultimate accident.

AIR TRANSPORTATION

3-2247 6/27/76 Keokuk, Iowa B47J-2A No Injuries Substantial - \$7,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

The Accident: A commercial pilot (1347 hrs) was engaged in providing helicopter sightseeing flights from a commercial store parking lot. The aircraft lifted to a hover, moved sideways and made a hover turn. During the turn the tail rotor struck a telephone cable causing the pilot to lose control. He made an emergency descent and hard landing with no injury to passengers or himself. The aircraft suffered substantial tail rotor and landing skid damage.

The weather was clear with unlimited visibility. At the time of the accident, 1600, the sun was high and not considered a factor in the accident.

Wire entanglement occurred in hover and information regarding continued wire interference after initial impact is not known.

Conclusion: The pilot's failure to locate wires relative to known ground objects caused the crash.

Recommendation: Use of a pilot warning device continuously identifying wire location when within hazardous distance is questionable in this instance.

Identification of wire location with ground objects would have aided the pilot in wire avoidance.

The lack of forward speed and initial tail rotor wire engagement would have precluded any use of external wire cutters.

AIR TRANSPORTATION

3-2333 5/4/76 Nr. Alsea, OR Hiller UH12E No injury Substantial - \$12,000

NTSB Accident Cause:

Pilot Error: Failure to see and avoid objects or obstructions

Factors: Weather - low ceiling
Terrain - High obstructions

The Accident: A high time experienced pilot (3832 hrs) struck three power lines crossing a major mountain highway at an estimated altitude of 200 feet above the terrain. The pilot was ferrying the aircraft to a Forestry Station for use in timber spray operations. Total time of flight was 15 minutes. The pilot had no knowledge of the wires until entanglement.

The weather was 200 feet overcast with a visibility of 10 miles. The pilot was below the overcast and attempting to remain in the clear by following the major mountain highway. At the time of the accident, 0605, the sun was low, but obscured by the overcast and not considered a factor in this accident.

Conclusion: The pilot's failure to see the power lines, which were obscured by the low overcast, was the cause of the accident.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Forward speed at the time of impact is not known and wire cutter effectiveness cannot be evaluated.

Pilot's Recommendation: Mark power lines at summit crossings.

AIR TRANSPORTATION

3-2412 8/12/76 Brownsville, TX Enstrom F-28A One Minor Destroyed - \$65,000

NTSB Accident Charge:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Failed to maintain adequate rotor RPM

Terrain: High obstruction

The Accident: A high time experienced commercial pilot (9675 hrs) struck a telephone line with the main rotor, while attempting an emergency landing adjacent to a highway. The pilot was engaged in providing aerial observation of real estate properties to his two passengers. Total time of flight was about one minute. The pilot was aware of wires and was attempting to maneuver the aircraft for wire avoidance when the main rotor struck.

The weather was clear with 15 miles visibility. At the time of the accident, 1250, the sun was near zenith and is not considered a contributing factor.

Upon main rotor entanglement with the telephone wire, the blades were deflected down, cutting off both tail rotor and boom. The aircraft rolled to the left and resulted in total destruction of the craft.

Conclusion: The pilot's involvement with deteriorating main rotor RPM and attempted forced landing resulted in inadvertent telephone wire entanglement that caused the crash.

Recommendation: Use of a pilot warning device continuously identifying wire location would not have been beneficial in wire avoidance.

External wire cutters would not have been effective in this accident.

AIR TRANSPORTATION

3-2425 8/8/76 Brewster, N.Y. Bell 47D-1 Two Fatal Destroyed - \$16,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High terrain

The Accident: A low time commercial pilot (520 hrs) struck two electrical transmission lines crossing a highway at approximately 25 feet. The pilot was engaged in a pleasure flight along a major highway. Total time of flight was 32 minutes. The pilot had no knowledge of wires until entanglement.

The weather was partial obscuration at 1500 feet, 6 miles visibility in haze. Witnesses to the accident reported no difficulty in observing wires from the ground.

The helicopter struck the power lines between the plastic bubble and main rotor with sufficient energy to swing the craft upside down and onto the highway, killing both occupants and destroying the machine. Speed of impact was 60 knots.

Conclusion: The pilot's failure to see and avoid wires was the cause of this accident.

Recommendation: use of a pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Forward speed of estimate. 60 knots should have provided sufficient kinetic energy for effective use of wire cutters, had such devices been installed.

AGRICULTURE
AERIAL APPLICATION

3-2829 6/9/76 Eltopia, WA Bell 47G-2 Minor Injury Destroyed - \$30,000

NTSB Accident Cause:

Material Failure: 1. Transmission rotor drive system
2. Tail rotor drive shaft assembly

Terrain: High obstructions

The Accident: A high time experienced agricultural pilot (5000+hrs/25 hrs last 10 days) experienced a tail rotor assembly failure in flight that caused the aircraft to descend uncontrolled through 3 power lines prior to earth impact.

The weather was clear, with 15 miles visibility. At the time of the accident, 1230, the sun was near zenith and was not a cause factor in the accident.

The pilot attempted to avoid the power lines on the emergency descent, but the aircraft failed to respond. The machine cut 3 out of 4 power lines, causing a fire that ultimately destroyed the craft. The pilot suffered minor injury.

Conclusion: Mechanical failure of the tail rotor transmission caused the aircraft to fall uncontrolled through the power lines. Wire strike in this instance was not a cause factor in the accident.

Recommendation: None

AIR TRANSPORTATION

3-3132 10/17/76 Aztec, N.M. Bell 206B No injuries Substantial - \$20,000

NTSB Accident Cause:

- Pilot Error:
1. Failed to see and avoid objects or obstructions
 2. Unwarranted low flying

Factors: Terrain - High obstructions

The Accident: An experienced commercial pilot (4796 hrs) struck some electrical power lines crossing a river at approximately 50 feet above ground. The pilot was engaged in a low level pleasure sightseeing flight. Total time of flight was 25 minutes. The pilot had no knowledge of wires until entanglement.

The weather was scattered clouds at 10,000 feet, and visibility was more than 40 miles. At the time of the accident, 1750, the sun was relatively high and not considered a contributing factor to the accident.

Upon impact with the wires at a forward speed of approximately 50 knots, the swashplate and main rotor controls were damaged. The pilot made a forced landing and caused further damage to the tail rotor on touchdown. There were no injuries to the three persons in the helicopter.

Conclusion: The pilot's failure to see and avoid wires was the cause of the accident.

Recommendation: Use of a pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location prior to flight would have been beneficial.

Forward speed of estimated 50 knots should have provided sufficient kinetic energy for effective use of external wire cutters, had such devices been installed.

AIR TRANSPORTATION

3-3187 7/12/76 New York, NY Bell 47J One serious,
One minor, One no injury Destroyed - \$72,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors; Aircraft came to rest in water

The Accident: A high time commercial pilot (5550 hrs) struck the corner of a building under construction on takeoff from an authorized heliport in New York City. The pilot with two observers was to conduct a routine railroad patrol. Total time of flight was about two minutes. The accident is listed by the NTSB as a wire strike, although it appears the main rotor blades struck a steel girder adjacent to the heliport.

The weather was clear with 25 miles visibility. At the time of the accident, 1402, the sun was high and not considered a contributing factor.

There was no wire entanglement.

Conclusion: The pilot's failure to locate the steel girder relative to ground objects and rotor diameter was the cause of accident.

Recommendation: Identification of girder location relative to ground objects prior to flight would have aided the pilot in obstruction avoidance.

AGRICULTURE
AERIAL APPLICATION

3-3192 8/18/76 Zion Grove, PA Bell 47D1 No Injury Substantial - \$20,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Terrain - High obstructions
Conditions - Sun glare

The Accident: An experienced agricultural pilot (3280 hrs) struck two telephone lines crossing a field at approximately 10 feet above ground. This was the last flight of the evening; the pilot was spraying potatoes with an insecticide. Total flight time is not known. The pilot was aware of wire location and assumed he had sufficient altitude for clearance.

The weather was clear with over 15 miles visibility. At the time of the accident, 1945, the sun was low and caused the pilot considerable difficulty in seeing, as his swath run was almost into the sun. The sun angle was a most definite contributing factor in this accident.

Upon entanglement with the first set of three telephone wires that were engaged with the helicopter skids, the pilot attempted to break loose with power. The wires stretched and he encountered a second set of wires that caused the aircraft to flip over and turn on its side. The pilot was not injured, but the aircraft suffered substantial damage.

Conclusion: The pilot's failure to see and avoid the telephone lines was the cause of the crash.

Recommendation: Use of a pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Flight away from the setting sun on the swath runs could possibly have been advantageous in wire avoidance.

The forward speed is unknown, but there was insufficient aircraft kinetic energy to cut the telephone lines on impact. External wire cutters could possibly have been of assistance. Pilot hover and retraction from wire engagement would have been more prudent than attempting wire breakage with engine power.

PUBLIC SERVICE
Search and Rescue

3-3261 9/22/76 San Bernardino, CA Sikorsky S-55B 4 Fatal Destroyed - \$80,000

NTSB Accident Cause:

- Pilot Error: 1. Failed to see and avoid obstructions
2. Improper in-flight decisions or planning

Factors: Weather - Low ceilings, fog
Terrain - High obstructions

The Accident. An experienced evacuation pilot (1934 hrs) flew into 500,000 volt electrical transmission lines which were strung across a mountain highway. The pilot was engaged in transferring a patient and medical attendants from a hospital to a medical center. Total time of flight was 25 minutes. Pilot knowledge of wires is not known.

The weather was 500 foot overcast with about one mile visibility, with low clouds prevalent in the area. At the time of the accident, 1959, it was totally dark, and the pilot was attempting to remain clear of clouds by following a major interstate highway over a mountain pass.

The helicopter passed a major highway intersection, flew into the 500,000 volt power lines, whereby the main rotor was destroyed, and the craft crashed inverted, killing all four occupants. Fire and impact destroyed the helicopter.

Conclusion: The pilot failed to see the wires due to darkness and weather, and flew into them, causing the crash.

Recommendation: Use of a pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed is not known, and no assessment of external wire cutter effectiveness can be made.

PUBLIC SERVICE

Search and Rescue

3-3275 10/31/76 Quake Lake, MT Bell 47J-2 No Injury Substantial - \$71,000

NTSB Accident Cause

- Pilot Error: 1. Inadequate preflight preparation and/or planning
2. Failed to see and avoid obstructions

The Accident: An experienced commercial pilot (3945 hrs) struck a power line on takeoff from a remote location. The pilot was engaged in a rescue mission for an injured hunter. Total time of flight was less than one minute. The pilot had no knowledge of wire location until entanglement.

The weather was clear with unlimited visibility. At the time of the accident, 1810, darkness had set in and was a contributing factor to the accident since the wires were not illuminated and location not known to the pilot.

Upon main rotor entanglement with the wires, the pilot made an immediate emergency descent into a ditch alongside the road. The pilot was not injured but the helicopter received substantial damage.

Conclusion: The pilot's failure to locate wires relative to known ground objects prior to takeoff, and wire obscurement by darkness, caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location with known ground objects prior to flight would have aided the pilot in wire avoidance.

Takeoff hover speed would not have provided sufficient speed to make the use of external wire cutters practical.

Pilot Recommendation: "More wires in this country should have illuminated balls on them." "Don't take anyone's word about existing conditions on obstacles. Walk a further distance over the takeoff path than I did."

AIR TRANSPORTATION

3-3443 10/15/76 Nr. Beaver, UT Bell 47G Two Minor Injuries Destroyed - \$16,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factors: Pilot - Improper level-off
Terrain - High obstructions
Miscellaneous - Sun glare

The Accident: A 2830 hour airline transport rated pilot struck a cluster of three high voltage wires with two static shield lines, in a canyon, at an altitude of 200 feet above ground. The pilot was engaged in hunting coyotes, a vocation that is called predator control. Total time of flight was 45 minutes. The pilot was aware of wires in the canyon, but had no knowledge of the exact location of wires involved until entanglement.

The weather was clear with unlimited visibility. At the time of the accident, 1045, the sun was high, but the pilot reports glare from flying up the canyon into the sun. Pilots statement was "The position of the sun, dark background of the trees and hills and our direction of flight (away from visible pole) contributed to the accident."

Upon entanglement with the wires, one of the tail rotor blades parted, shortly followed by the other, wherein the helicopter autorotated to the ground. In the resulting crash, the helicopter received substantial damage and the two man crew suffered minor injuries.

Conclusion: The pilot's failure to see and avoid wires is the cause of the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location on aeronautic charts might have been beneficial in wire avoidance.

Attempted turn to avoid wires on initial sighting reduced speed so that helicopter kinetic energy would not have been sufficient for effective use of external wire cutters. Initial tail rotor wire impact further supports this observation.

AIR TRANSPORTATION

3-3508 11/28/76 Nr. Glen Ivy, CA Bell 47J One Serious
One Fatal Destroyed - \$72,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

Factors: Personnel - passenger
Terrain - High obstructions
Fire after impact

The Accident: A commercial pilot (1715 hrs) struck three high power lines on a night takeoff at approximately 20 feet above the ground. The pilot was going to engage in a citrus orchard frost control flight. The total time of flight was 30 minutes. The pilot was not familiar with the area and had no knowledge of accident wire location.

The weather was clear with 20 miles visibility. At the time of accident 0500, it was totally dark. Since the pilot was not familiar with the area, he was to be aided by the passenger who summarily directed the pilot to take off into the power lines.

Upon entanglement with the wires on transition from lift-off, the pilot attempted to land in the orchard, but about 10 feet above the ground the helicopter rolled to the right, and crashed 60 feet beyond the wires, bursting into flames upon impact. In the fire, the passenger died, the pilot was severely burned and the aircraft was destroyed.

Conclusion: The pilot's failure to familiarize himself with hazardous wire locations in the takeoff and landing area prior to night operations, and failure to see and avoid wires were the cause of this accident.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance might have been beneficial in wire avoidance.

Identification of wire location with known ground objects prior to flight would have aided the pilot in wire avoidance.

Lift-off speed and transition speed would not have provided sufficient energy for effective use of external wire cutters.

MISCELLANEOUS
CONSTRUCTION

3-3521 11/19/76 Nr. Ephrata, WA Hiller UH-12E One Serious Destroyed - \$79,000

NTSB Accident Cause:

Pilot Error: Misjudged clearance
Diverted attention from operation of aircraft

Factors: Personnel - Ground crewman
Terrain - High obstructions

The Accident: An experienced commercial pilot (2200 hrs) was stringing a power line with the helicopter when he struck 4 static wire cables, which were suspended from steel towers in the construction area. The pilot was engaged in untangling the new primary power cable from obstructions on the ground. Total time of flight is unknown. The pilot was aware of the static cables but misjudged distance.

The weather was clear with 20+ miles visibility. At the time of the accident, 1600, the pilot experienced dusk lighting and this could have been a contributing factor in the accident.

Upon entanglement, at hover, the wires wrapped around the main rotor blade and forced the aircraft to the ground. The aircraft crashed from approximately 20 feet, and burned after impact. The pilot was rescued from the wreck by ground personnel working with the helicopter, and had serious injuries.

Recommendation: Identification of wire location with known ground objects prior to flight would have been beneficial in wire avoidance.

The lack of forward speed in this accident, would have precluded any effective use of external wire cutters.

Pilot's Recommendation: "By maintaining continuous radio communications between pilot and ground crew - with special care taken by pilot and observer on the ground when wires - for one reason or another - are hard to judge the distance from."

PUBLIC SERVICE

Police Patrol

3-3696 7/31/76 Westbury, NY Hughes 369 No Injuries Substantial - \$18,000

NTSB Accident Cause:

Pilot Error: Misjudged clearance
Factors: Terrain - High obstructions
Weather - Haze

The Accident: An experienced police officer commercial pilot (3110 hours) struck utility wires which were strung across a main turnpike approximately 20 feet above ground. The pilot was engaged in attempting to make an unscheduled landing to deliver a medical technician to aid victims of an automobile accident. Total time of the flight was ten minutes. The pilot was not aware of wires until entanglement.

The weather was clear, with four miles visibility in light haze. At the time of the accident, 1710, the sun was relatively high and not considered a factor in the accident.

Upon entanglement with the wires, from a hover, the pilot managed to disengage and execute a controlled forced landing. Main damage to the helicopter involved the main rotor and rotor head.

Conclusion: The pilot's failure to locate and avoid wires in his landing attempt was the cause of this accident.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location with known ground objects prior to flight would have aided the pilot in avoidance of wires.

Lack of forward speed in hover would have precluded any effective use of external wire cutters.

AIR TRANSPORTATION

3-3760 10/24/76 Laredo, TX Bell 47G-4A Three Serious Destroyed - \$55,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions
Diverted attention from operation of aircraft
Unwarranted low flying

The Accident: An experienced commercial pilot (3500 hrs) struck three strands of heavy electrical power line 25 feet above ground. The pilot was engaged in a deer population survey. Total time of flight was one hour and 15 minutes. The pilot had no knowledge of wires until entanglement.

The weather was clear with 5 miles visibility. At the time of the accident, 0915, the sun was relatively high and not considered a contributing factor.

Upon entanglement with the wires at a estimated forward speed of 40 knots, two wires parted, but the third remained attached to the aircraft until the crash 150 feet from initial engagement. All three occupants were seriously injured and the aircraft was destroyed by fire.

Conclusion: The pilot's failure to see and avoid wires was the cause of the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have aided the pilot in wire avoidance.

Identification of wire location with known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of estimated 40 knots should have provided sufficient kinetic energy for effective use of external wire cutters, had such devices been installed.

1977

AGRICULTURE
AERIAL APPLICATION

3-0514 3/29/77 Ville Platte, LA Ball 47G-4A One Serious Destroyed - \$45,000

NTSB Accident Cause:

Pilot Error: Inadequate pre-flight preparation and/or planning

Factors: Hidden obstructions

The Accident: A highly experienced agricultural pilot (11,575 hrs) struck two strands of electric powerline which were approximately 50 feet above a field. The pilot was engaged in applying herbicide to willow trees in a ditch. Total time of flight was approximately two minutes. The pilot had no knowledge of wires until entanglement.

The weather was 800 foot overcast with 5 miles visibility. The pilot did not see the wires or supporting poles, as they were surrounded by trees. At the time of the accident, 1130, the sun was relatively high and was not considered a contributing factor in the accident.

Upon entanglement with the wires at a low forward speed, the helicopter was pitched up and struck the ground, tail rotor first, approximately 150 feet from the initial wire strike. A fire started upon impact with the ground, which destroyed the aircraft and caused serious burn injury to the pilot.

Conclusion: The pilot's failure to locate wires relative to known given objects, to see and avoid wires, caused the crash.

Recommendations: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location with known ground objects prior to flight would have aided the pilot in wire avoidance.

The low forward speed at the time of impact, and initial tail rotor entanglement in wires, would preclude the usefulness of external wire cutters.

Operator Recommendation: "Industrial Helicopters recommends to all pilot that each individual job be surveyed by a reconnaissance flight over areas to be sprayed, at an altitude sufficient to clear electric lines and make observation and mark on maps any and all obstructions on or near proposed spray sites. These observations should be made prior to commencement of spraying activities."

AGRICULTURE
AERIAL APPLICATION

3-0554 3/30/77 Dexter, Missouri Bell 47D-1 No injury Substantial - \$15,000

NTSB Accident Cause:

Pilot Error: Misjudged clearance

The Accident: A high time experienced agricultural pilot (4800 hrs/25 last 10 days) struck high power electrical wires crossing a field approximately 20 feet above ground. The pilot was engaged in spraying a wheatfield. Total time of flight was 30 minutes. The pilot was aware of the wires, since he had made repeated passes under the same wires on previous swath runs.

The weather was clear with 10 miles visibility. At the time of the accident, 1430, the sun was high and not considered a factor in this accident.

At a forward speed of approximately 35 knots, the tail rotor struck the power lines and the aircraft made one uncontrolled rotation and then struck the ground, rolling on one side. The pilot had made an early pull up to avoid a tree on the swath run and misjudged distance from the power line.

Conclusion: The pilot's failure to properly judge distance from the power line, and his premature pull up to avoid a tree, caused the crash.

Recommendation: A pilot warning device identifying wire location, could possibly be beneficial in wire avoidance.

Forward speed of 35 knots provided sufficient kinetic energy for effective use of external wire cutters, but tail rotor initial entanglement on impact made use of such wire cutters ineffectual.

PUBLIC SERVICE

Police Patrol

3-0608 3/16/77 Nr. Honolulu, HI Hughes 269C 2 Fatal Destroyed - \$66,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

Factors: Pilot fatigue - Pilot had flown 12 hours in last 24
Black-gray painted wires masked against foliage.

The Accident: A high time aerial law enforcement pilot (10,149 hrs) struck one strand of a 7 wire electrical high tension power line, about 225 feet above the ground. The pilot was engaged in a routine police patrol operation and had just taken off from a power pumping station prior to wire engagement. Total time of the flight was one hour and 51 minutes. The pilot had knowledge of wire location in that he had flown over the wires on departure from the last landing site and had gone 500 yards beyond, when he reversed direction and flew back into the wires.

The weather was scattered clouds with 25 miles visibility. At the time of the accident, 1521, the sun was high and not considered a contributing factor.

Upon initial impact with one wire at an estimated speed of 30 knots, the main rotor was sheared off and the aircraft crashed to the ground, fatally injuring both pilot and crewman.

The Honolulu police attribute the power lines being painted black to "satisfy environmental group" as a cause factor.

Conclusion: The pilot's failure to see and avoid the wires caused the crash. Pilot fatigue is regarded as a contributing factor in the crash.

Recommendations: A pilot warning device identifying wire location would have been beneficial in wire avoidance.

Forward speed of 30 knots could possibly have provided sufficient kinetic energy for effective use of wire cutters, had they been installed. However, main rotor engagement of the wires, rather than cockpit contact, makes use of external wire cutters questionable.

AIR TRANSPORTATION

3-0621 4/17/77 Sour Lake, TX Bell 206B No injuries Substantial - \$142,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

Factors: High terrain

The Accident: A high time experienced commercial pilot (5826) struck two strands of power line which were strung across an open field. The pilot was engaged in making an impromptu landing in what he assumed to be a field clear of obstructions. Total time of flight was 30 minutes. The pilot had no knowledge of the wires until entanglement.

The weather was 2000 foot overcast with 5 miles visibility in haze. At the time of the accident, 1645, the sun was relatively high and not considered a factor.

Upon entanglement, at a hover airspeed, the wires struck the main rotor blades, main rotor control tubes and upper cockpit. Neither pilot nor passenger were injured.

Conclusion: The pilot's failure to see and avoid wires on the landing approach was the cause of this crash.

Recommendation: A pilot warning device identifying wire location would have been beneficial in wire avoidance.

Identification of wire location with known ground objects prior to flight would have aided the pilot in wire avoidance.

The near hover approach speed would not have provided sufficient kinetic energy on impact to make external wire cutters effective.

AGRICULTURE
AERIAL APPLICATION

3-0802 5/23/77 Nr. Post, TX Hughes 269B No injury Substantial - \$25,000

NTSB Accident Cause:

Pilot Error: Inadequate preflight preparation and/or planning

Factors: Terrain - Hidden obstructions

The Accident: A low time agricultural pilot (609 hours) struck two telephone wires which were strung across a field 5 feet and 15 feet above ground. The pilot was engaged in seeding crops and was on a swath run. Total time of flight was 40 minutes. The pilot had no knowledge of wires until entanglement.

The weather was clear, with over 10 miles visibility. At the time of accident, 1700, the sun was relatively high and not considered a contributing factor.

Upon entanglement with the wires at a forward speed of approximately 55 knots, the pilot was forced to land, hitting the ground at approximately 15 knots. The wires struck the main rotor and cockpit. Loss of the tail rotor assembly occurred with ground impact. The pilot was not injured.

Conclusion: The pilot's failure to see and avoid wires was the cause of the crash.

Recommendation: A pilot warning device identifying wire location would have been beneficial in wire avoidance.

Identification of wire location with known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of 55 knots should have provided sufficient kinetic energy for effective use of external wire cutters, had they been installed. However, wire entanglement with the main rotor, could possibly have negated effective use of the wire cutters.

AIR TRANSPORTATION

3-0956 4/17/77 Nr Polson, MT Bell 47G 3B1 2 Serious Destroyed - \$51,100

NTSB Accident Cause:

Pilot Error: 1. Failed to see and avoid obstructions
2. Inadequate supervision of flight

Factors: Unmarked wires

The Accident: A very experienced instructor pilot (17,095 hrs) struck two electric power lines approximately 150 feet above ground, which were strung across to an island. The pilot was engaged in checking out a student for a flight instructor's rating. Total time of flight was one hour. The pilot had no knowledge of the wires until entanglement.

The weather was clear with unlimited visibility. At the time of the accident, 1700, the sun was relatively high and not considered a contributing factor.

Upon entanglement with the wires at a forward speed of approximately 10 knots, the tail rotor was cut off by one of the main rotor blades. The aircraft crashed immediately upon loss of main rotor blade and tail rotor, in shallow water (2 to 3 feet). Both pilots received serious injuries.

Conclusion: The pilot's failure to see and avoid wires caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of approximately 10 knots would not have provided sufficient kinetic energy for effective use of external wire cutters had such devices been installed. Initial engagement of main rotor with wires would also have rendered external wire cutters ineffective.

Pilot's recommendation: "This accident could have been avoided by having seen the wires. There was no evidence visible of a power wire. The post on the mainland and on the island were all set in a wooded area. Their camouflage was perfect except for the transformer. There were no markings on any pole or wire. Any indications of these wires, other than the base, weathered wires themselves could have helped avoid this accident."

AGRICULTURE
AERIAL APPLICATION

3-1126 4/6/77 King City, CA Bell 47G2 One Serious Destroyed - \$42,870

NTSB Accident Cause:

- Pilot Error:** 1. Failed to see and avoid obstructions
2. Inadequate preflight preparation and/or planning

Factors: High obstructions

The Accident: A high time experienced agricultural pilot (6,000 hrs/12 hrs last ten days) struck a power line which was strung across a field at approximately 20 feet above ground. The pilot was engaged in a takeoff to proceed to the aerial application area. Total time of flight was less than three minutes. The pilot had no knowledge of the wires until entanglement.

The weather was clear with unlimited visibility at the time of the accident, 1230; the sun was near zenith and not considered a contributing factor.

Upon entanglement with the wires at a forward speed of less than 20 knots, the helicopter was forced to the ground, where it crashed and burned. The exact location of initial wire impact on the helicopter is not known.

Conclusion: The pilot's failure to see and avoid wires caused the crash.

Recommendation: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of approximately 20 knots could possibly have provided sufficient kinetic energy for effective use of wire cutters if installed.

Pilot's recommendation: "Better recon of takeoff area. Publication of accident prone areas (wire traps) by local PG&E [This wire had been hit several times before]."

AGRICULTURE
AERIAL APPLICATION

3-1340 5/2/77 Nr. Big Lake, MN Hiller UH-12E One Serious Substantial - \$65,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: An experienced agricultural pilot (3179 hrs) struck six 3/8" guy wires leading from the ground to a power line approximately 10 to 15 feet above the ground. The pilot was engaged in a swath run. Total time of flight was one hour. The pilot had no knowledge of the wires until entanglement.

The weather was clear with over 10 miles visibility. At the time of the accident, 0700, the sun was low and was a contributing factor to the accident. The pilot reports "Sun was shining in eyes and trees blended in wires and didn't see them till I was about 40 ft. away. I knew I couldn't get over them so tried to go under and caught wire."

The main rotor struck the wires initially at a forward speed of approximately 40 knots. This entanglement forced the helicopter to the ground. The pilot received serious injury and the aircraft was destroyed.

Conclusion: The pilot's failure to see and avoid the wires, caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of 40 knots should have provided sufficient kinetic energy for effective use of wire cutters had they been installed. However, initial main rotor entanglement with the guy wires makes effective use of the external wire cutters questionable.

Pilot's recommendation: "Wires marked by flags."

AIR TRANSPORTATION

3-1410 5/2/77 Wahoo, NE Bell 206B No Injury Substantial - \$ 142,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

Factors: Terrain - High obstructions

The Accident: A experienced commercial pilot (5813 hrs) struck a telephone wire which was approximately 20 ft above an automobile parking lot. The pilot was in a hover looking for a suitable landing location adjacent to a parking lot. Total time of flight was 45 minutes. The pilot had no knowledge of the telephone wire until entanglement.

The weather was clear with 20 miles visibility. At the time of the accident, 0815, the sun was low and is considered a contributing factor to the accident. The pilot reports "I was hovering to a corner to sit the helicopter down and was looking into a bright sun when I realized I had caught a telephone wire; I flinched and in so doing came off the collective, causing a hard landing on the rear of the skids, doing damage to skids, tailboom and vertical fin."

Upon entanglement with the telephone line at a hover airspeed, the pilot inadvertently made a hard landing. Exact location of wire impact on the helicopter is not known.

Conclusion: The pilot's failure to see and avoid the telephone wire caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Hover airspeed would not have provided sufficient kinetic energy for effective use of external wire cutters had they been installed.

AIR TRANSPORTATION

3-1514 7/2/77 Chandler, AZ Hiller UH-12E One Serious Destroyed - \$103,500

NTSB Accident Cause:

Mechanical Malfunction: Engine Structure - Cylinder Assembly

Conditions: Material Failure

Factors: . Terrain - High obstructions
Power Loss-Complete engine failure

The Accident: A high time experienced commercial pilot (9000 hrs) struck a power line adjacent to an airport approximately 20 feet above ground. The pilot was attempting an emergency autorotation to a landing, following a complete engine failure. Total time of flight was 20 minutes. The pilot was aware of wire location, but was unable to avoid the hazard due to the emergency descent.

The weather was clear, with unlimited visibility. At the time of the accident, 0750, the sun was relatively high and not considered a contributing factor.

Upon main rotor wire entanglement during the emergency autorotation, the aircraft became uncontrollable and crashed tail first, then rolling on the left side. A fire followed the crash and the aircraft was destroyed. The pilot received serious injury in the accident.

Conclusion: The total engine failure caused the crash. Wire entanglement occurred as a result of the emergency autorotation and is not considered a basic cause factor.

Recommendation: None

AGRICULTURE
AERIAL APPLICATION

3-1660 7/5/77 Gooding, ID Hughes 300C No Injury Destroyed - \$60,000

NTSB Accident Cause:

Pilot Error: 1. Inadequate preflight preparation and/or planning
2. Failed to see and avoid obstructions

Factors: Terrain - High obstructions

The Accident: A high time experienced agricultural pilot (3550 hrs) struck two telephone wires strung across a field at approximately 15 feet elevation. The pilot was engaged in conducting a survey of the field for wires and other hazards prior to spraying. Total time of flight was less than one minute. The pilot had no knowledge of wires until entanglement.

The weather was clear with unlimited visibility. At the time of the accident, 1000, the sun was high and not considered a contributing factor.

Upon entanglement with the wire at a forward speed of approximately 30 knots, the aircraft became uncontrollable and crashed. The aircraft was destroyed. Neither pilot nor passenger received any injury.

Conclusion: The pilot's failure to see and avoid wires caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to ground objects prior to flight would have aided the pilot in wire avoidance.

Forwarded speed of 30 knots should have provided sufficient kinetic energy for effective use of external wire cutters had they been installed.

AIR TRANSPORTATION

3-2084 5/14/77 Nr. Enumclaw, WA Bell 47D1 No Injuries Substantial - \$15,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

Factors: Diverted attention from operation of aircraft.

The Accident: An experienced flight instructor (5085 hrs) struck electrical power lines which were strung across a river at approximately 130 feet above ground. The pilot was engaged in an impromptu investigation of an overturned raft in the river, looking for possible survivors. Total time of flight was 45 minutes. The pilot had no knowledge of wires until entanglement.

The weather was scattered clouds at 3000 feet, with 7 miles visibility. At the time of the accident, 1015, the sun was high and not considered a contributing factor.

Upon entanglement with the wires, from a near hover airspeed of approximately 5 knots, the aircraft became uncontrollable and the pilot made an emergency landing. The resultant hard landing fractured the main right skid and caused the main rotor to shatter. Neither pilot nor passenger were injured.

Conclusion: The pilot's failure to see and avoid wires caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

The near hover approach speed (5 kts) in all probability would not have provided sufficient energy for effective use of external wire cutters.

AIR TRANSPORTATION

3-2246 9/26/77 Carroliton, MI Hiller UH-12B No Injuries Destroyed - \$18,000

NTSB Accident Cause:

Pilot Error: Misjudged clearance

Factors: Weather - gusty winds

The Accident: A low time private pilot (310 hrs) struck two telephone lines strung across a field approximately 16 feet above ground. The pilot was engaged in providing individual sight-seeing trips to a group of about six people. Total time of flight was less than one minute. The pilot was well aware of wire location, since this was his fourth transit of the area.

The weather was clear with 10 miles visibility. Surface wind was erratic with gusts varying between 8 and 20 knots. The pilot claimed the gusty wind caused the tail rotor to swing up from a hover and engage the telephone line. At the time of the accident, 0956, the sun was high and not considered a contributing factor.

Upon tail rotor entanglement with the wires from about a 3 foot hover, the pilot lost control and made a hard landing. The impact was hard enough to drive the skids about 4" into the damp clay with some bending. Fire broke out after impact, but occupants exited the aircraft uninjured.

Conclusion: The pilot's failure to adequately judge distance to the wires, accounting for varying wind conditions, caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would not have aided in wire avoidance. The pilot was aware of wire location, but failed to account for varying wind conditions.

The hover airspeed would not have provided sufficient energy for effective use of external wire cutters; initial tail rotor wire engagement would have precluded use of wire cutters.

AGRICULTURE
AERIAL APPLICATION

3-2258 9/6/77 Nr. Urbana, OH Hughes 269C One Serious Destroyed - \$ 66,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: An experienced agricultural pilot (2378 hrs/56 hrs-last 10 days) struck a 3/4" braided steel guy wire stretched across a bean field approximately 20 feet above the ground. The pilot was engaged in a swath run applying chemicals to a soybean field. Total time of flight was five hours, with intermittent fueling and chemical stops. The pilot had no knowledge of the wire until entanglement.

The weather was overcast with 1200 foot ceiling, and 2 miles visibility. At the time of the accident, 1530, the sun was obscured by the overcast and not considered a contributing factor.

Upon main rotor engagement with the guy wire at a forward speed of approximately 30 knots, the aircraft was immediately forced to the ground. All components were centered within 25 feet of the main wreckage. The aircraft was a total loss and the pilot received serious injury.

Conclusion: The pilot's failure to see and avoid the cable caused the accident.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of approximately 30 knots should have provided sufficient kinetic energy for effective use of external wire cutters had they been installed. However, main rotor engagement of the wires rather than cockpit impact makes the value of wire cutters questionable.

AGRICULTURE
AERIAL APPLICATION

3-2283 8/2/77 Nr. Waupaca, WI Hughes 269B One Serious Substantial ~ \$15,000

NTSB Accident Cause:

Pilot Error: Misjudged clearance

The Accident: A commercial agricultural pilot (926 hrs/50 in last 10 days) struck two 7000 volt high power electrical transmission lines strung across a field at approximately 20 feet above the ground. The pilot was engaged in his fourth swath run in the same field applying chemicals to a potato crop. Total time of flight was 20 minutes. The pilot was well aware of wire location since he had avoided same on three previous swath runs.

The weather was clear with unlimited visibility. At the time of the accident, 1730, the sun was relatively high and not considered a contributing factor.

Upon skid entanglement with the wires at a forward speed of approximately 25 knots, the aircraft nosed over out of control and crashed. The aircraft had substantial damage and the pilot received serious injury.

Conclusion: The pilot's failure to judge clearance from the power lines caused helicopter skid entanglement and the resulting crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Forward speed of 25 knots should have provided sufficient kinetic energy for effective use of external wire cutters had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-2320 3/25/77 Nr. Kentland, IN Bell 47G2 Minor Injury Substantial - \$20,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: A low time commercial agricultural pilot (480 hrs/15 hrs. last 10 days) struck two rural electric power lines which were parallel to a four lane highway, approximately 20 feet above ground. The pilot was engaged in applying soil conditioner to a field and struck the wires during his third swath run. Total time of flight was 10 minutes. The pilot had no prior knowledge of wire location.

The weather was clear with 15 miles visibility. At the time of the accident, 1455, the sun was high and was not considered a contributing factor.

When the helicopter struck the wires, at a forward speed of approximately 30 knots, the pilot lost control and crashed approximately 120 feet from initial wire strike. The wires struck the bottom of the cabin section and top of skid attachment. Both wires broke cleanly and did not entangle the helicopter.

Conclusion: The pilot's failure to see and avoid the wires caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of 30 knots provided sufficient kinetic energy to break the wires, and external wire cutters would have been effective in accident prevention.

AGRICULTURE
AERIAL APPLICATION

3-2435 6/25/77 Oswego, S.C. Bell 47 D No injury Substantial - \$ 11,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: A high time experienced agricultural pilot (6051 hrs/30-last 10 days) struck one strand of electric power line strung across a field at approximately 15 feet elevation. The pilot was engaged in applying insecticide to a cotton field. Total time of flight was 15 minutes. The pilot was well aware of wire location, inasmuch as he had made previous swath runs under the same wire.

The weather was clear with over 10 miles visibility. At the time of the accident, 1230, the sun near zenith and not considered a contributing factor.

The tail rotor struck the wire at a forward speed of about 30 knots, whereupon the pilot lost control and was forced to execute an emergency landing. The single wire that was struck broke cleanly and did not further foul the helicopter.

Conclusion: The error in estimating distance to the wire caused the tail rotor strike and ultimate loss of aircraft control, causing the crash.

Recommendation: A pilot warning device would not have been an aid in wire avoidance in this case.

Use of external wire cutters would not have been possible since the tail rotor made initial contact with the wire.

Pilot's Recommendation: "Do not fly under wires!"

AGRICULTURE
AERIAL APPLICATION

3-2456 8/23/77 Nr. Denison, IA Bell 47G5 One Serious Destroyed - \$60,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions.

The Accident: A high time experience^d agricultural pilot (2980 hrs) struck two strands of rural electrical power line strung across a field approximately 20 feet above ground. The pilot was engaged in applying chemicals to a corn crop. Total time of flight was 10 minutes. The pilot had no knowledge of wires until contact.

The weather was clear with unlimited visibility. At the time of the accident, 1945, the sun was relatively low, but not considered a contributing factor.

The aircraft rotor mast assembly struck the lower power line, breaking the rotor blade pitch control linkage, which caused loss of helicopter control. The wire broke and did not remain with the aircraft.

Conclusion: The pilot's failure to see and avoid the wires caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of estimated 30 knots did provide sufficient kinetic energy for wire breakage. External wire cutters would have been beneficial if they had been installed.

AGRICULTURE
AERIAL APPLICATION

3-2523 6/30/7/ Ashford, NY Hughes 269C No injury Destroyed - \$ 66,000

NTSB Accident Cause:

Mechanical failure: Engine failure, or malfunction

Factors: Personnel - inadequate maintenance and inspection
Terrain - High obstructions

The Accident: A high time experience agricultural pilot (4832 hrs./28.6-last 10 days) struck rural electrical power lines which were parallel to a road, approximately 20 feet above ground. The pilot was forced into an emergency autorotation following engine failure. Total time of flight was 14 minutes. The pilot was well aware of wire location since he had made repeated swath runs over the same wires.

The weather was clear with unlimited visibility. At the time of the accident, 1359, the sun was high and not considered a contributing factor.

The pilot struck the power line as a result of emergency autorotation, following the engine failure. The landing skids were first to contact the wire.

Conclusion: Total engine failure was the cause of the crash, and the wire strike was incidental to the incident.

Recommendation: A pilot warning device or detailed knowledge of wire location would not have aided the pilot in this emergency.

Forward speed of approximately 40 knots would have provided sufficient kinetic energy for effective use of wire cutters, had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-2609 9/1/77 Nr. Monrovia, IN TomCat MK5A Minor Injury Destroyed - \$57,862

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

Factors: Terrain - High obstructions

The Accident: A high time experienced agricultural pilot (3377 hrs./25-last 10 days) struck two strands of rural electrical power line strung across a field at approximately 20 feet above ground. The pilot was engaged in applying chemicals to a bean field. This was his first swath run. Total time of flight was 6 minutes. The pilot had no knowledge of wires until entanglement.

The weather was clear with over 10 miles visibility. At the time of the accident, 1121, the sun was high and not considered a contributing factor.

Following an initial windscreen and main rotor blade strike of the wires at a forward speed of approximately 40 knots, the tail rotor sheared and control was lost. The pilot executed a semi-controlled crash whereby the helicopter was destroyed. The pilot received only minor injury.

Conclusion: The pilot's failure to see and avoid obstructions caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of approximately 40 knots should have provided sufficient kinetic energy for effective use of external wires cutters had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-2686 10/3/77 Crossville, IL Bell 47G4 No Injury Destroyed - \$55,400

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: A high time experienced agricultural pilot (6960 hrs./50-last 10 days) struck two temporary rural electric power lines which were strung across a bean field at approximately 15 feet above ground. The pilot was engaged in applying chemicals to the field. Total time of flight was 10 minutes. The pilot had no knowledge of wires until entanglement.

The weather was clear with 10 miles visibility. At the time of the accident, 1720, the sun was relatively high and not considered a contributing factor.

Upon contact with the initial wires at a forward speed of approximately 40 knots, the canopy bubble shattered, the pilot lost forward visibility, and flew into a second set of wires and a light pole. The helicopter was destroyed by fire following impact. There were no injuries to the pilot.

Conclusion: The pilot's failure to see and avoid the wires caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of estimated 40 knots should have provided sufficient kinetic energy for effective use of external wire cutters had they been installed.

AIR TRANSPORTATION

3-2705 9/13/77 Fayetteville, NC Enstrom F-28A No Injuries Substantial - \$44,000

NTSB Accident Cause:

Pilot Error: Failed to maintain adequate main rotor RPM

Factors: Terrain - High obstructions
Settled into wires

The Accident: An experienced flight instructor (3098 hrs) struck a series of electric power lines in a residential district, while executing an emergency landing. The pilot had planned on a routine air transportation flight when he lost main rotor RPM on takeoff. Total time of flight was approximately 2 minutes. The pilot had no knowledge of wires until entanglement.

The weather was clear with over 15 miles visibility. At the time of the accident, 1545, the sun was high and not considered a contributing factor.

Upon initial tail rotor entanglement with the power lines at a near hover airspeed, 10-15 knots, the aircraft continued to settle in an emergency auto-rotation into more power lines and ultimate main rotor contact with a light pole. There was no fire but the helicopter received substantial damage. Neither pilot nor passengers received any injuries.

Conclusion: The pilot's failure to maintain main rotor RPM caused the crash. Wire strikes that occurred as a result of the emergency landing are not a cause factor and incidental to the accident.

Recommendation: A pilot warning device would not have been beneficial in wire avoidance.

Identification of wires prior to flight would not have aided in avoidance.

Forward speed of 10 to 15 knots would not have provided sufficient kinetic energy for effective use of wire cutters. Initial tail rotor engagement of the wires would have rendered their use ineffective also.

AGRICULTURE
AERIAL APPLICATION

3-2773 7/26/77 Malta, ID Hughes 269C No Injury Destroyed - \$65,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

Factors: Terrain - High obstructions

The Accident: A experienced agricultural pilot (3154 hrs) struck two strands of rural electric power line strung across a field approximately 20 feet above the ground. The pilot was engaged in applying chemicals to a hayfield. Total time of flight was 10 minutes. The pilot had known of wire location, but forgot until impact.

The weather was clear with over 30 miles visibility. At the time of the accident, 0920, the sun was high and not considered a contributing factor.

Upon initial main rotor mast contact with wires, all control rods were severed, causing immediate loss of control of the aircraft. Impact speed is estimated at over 40 knots. The aircraft was destroyed upon ground impact. There was no injury to the pilot.

Conclusion: The pilot's failure to see and avoid wires caused the crash.

Recommendation: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of estimated 50 knots should have provided sufficient kinetic energy for effective use of external wire cutters had they been installed.

Pilot's Recommendation: "Pilot had made recon of field prior to spraying the field. It was completed except for the clean up passes on east end. Pilot knew of wires, but forgot. Possible preoccupation of other matters on pilot's mind."

AGRICULTURE

AERIAL APPLICATION

3-2889 7/9/77 American Falls, ID Hughes 369 HS Fatal Destroyed - \$235,000

NTSB Accident Cause:

Pilot Error: Misjudged clearance

The Accident: An experienced agricultural pilot (2500 hrs, 10-last 10 days) struck one strand and pole of a high power electrical transmission line (138,000 volts) 70 feet above the ground, at the end of a field. The pilot was engaged in applying chemicals to a potato field. Total time of flight was 1 1/2 hours. The pilot was aware of high power transmission line location since he had made repeated turns over the same lines.

The weather was clear with unlimited visibility. At the time of the accident, 2009, the sun was lowering, but the pilot was making pull ups away from the sun and therefore it could not be considered a contributing factor.

The helicopter struck one high power transmission line, and the 70 foot pole simultaneously, became totally uncontrollable and crashed 120 yards from initial impact. The crash was fatal to the pilot and the helicopter was totally destroyed.

Conclusion: The pilot's failure to judge range to the high power transmission line caused the crash.

Recommendation: A pilot warning device would not have aided in wire avoidance.

Further identification of wire location would not have aided, and external wire cutters would have been ineffective in avoiding this crash.

AGRICULTURE

AERIAL APPLICATION

3-4159 6/27/77 Nr. Woodstock, IL Hughes 269 Minor Injury Substantial - \$15,000

NTSB Accident Cause:

Pilot Error: Failed to maintain adequate rotor RPM

Factors: Failed to compensate for wind

The Accident: A low time beginning agricultural pilot (286 hrs/4-last 10 days) struck a rural electrical power line paralleling a road at approximately 15 feet above ground. The pilot was engaged in applying fertilizer to a nearby corn field. Total time of flight was one minute. The pilot had knowledge of wires since he had covered the same flight path on two previous flights.

The weather was scattered clouds at 4000 feet with 5 miles visibility. At the time of the accident, 1818, the sun was still relatively high and not considered a contributing factor.

The aircraft was operating at maximum gross weight on a hot day (93°F). After initial takeoff, the aircraft was forced into an unplanned touch down and the pilot literally attempted a bounce to clear the oncoming power lines. The spray boom engaged the power lines, forcing the helicopter back to the ground. The helicopter received substantial damage. There were minor injuries to the pilot.

Conclusion: The pilot's failure to maintain adequate main rotor RPM caused the crash.

Recommendation: A pilot warning device identifying wire location would not have aided in wire avoidance.

Identification of wire location would not have aided in avoidance.

Forward speed of approximately 20 knots might have provided sufficient kinetic energy had wire cutters been installed. However, initial wire engagement with spray boom makes use of external wire cutters questionable.

1978

AIR TRANSPORTATION

3-0084 1/18/78 Nr. Portola, CA Bell 47G-3B1 No Injuries Substantial - \$34,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

Factors: High obstructions

The Accident: An experienced commercial pilot (2680 hrs) struck a rural electric power line. The pilot was engaged in a photo mapping operation. Time of flight is unknown. Pilot's knowledge of wires is not known.

Weather is unknown. At the time of accident, 1515, the sun was high and not considered a contributing factor.

The pilot hooked a powerline with his skids, lost directional control and autorotated to the ground. The aircraft received substantial damage. There were no injuries to either pilot or passenger.

Conclusions: The pilot's failure to see and avoid the wires caused the crash.

Recommendations: A pilot warning device continuously identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

External wire cutters would have been effective in avoiding this accident.

AIR TRANSPORTATION

3-0399 3/30/78 Puyallup, WA Hughes 269B No injury Substantial - \$25,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

Factors: Weather - obstructions to vision

The Accident: An extremely experienced airline captain (24,700 hrs/700 in type) struck two high power electrical transmission lines paralleling an airport, approximately 50 feet above ground. The pilot was engaged in local pleasure flight. Total time of flight was less than one minute. The pilot had no knowledge of wires until entanglement.

The weather was 2500 foot overcast with 15 miles visibility. The pilot reported that due to the long span between poles it was virtually impossible to see the wires against the overcast background. At the time of the accident, 1143, the sun was high, obscured by the overcast and not considered a contributing factor.

Upon entanglement with the wires from a slow speed liftoff, the controls were jammed, making autorotation impossible. The pilot cut the engine with the FUEL SHUT off switch and attempted an adjacent to runway landing. After 100 feet of roll, the helicopter rolled to the right, causing substantial damage. The pilot was not injured.

Conclusion: The pilot's failure to see the wires against the overcast caused the crash.

Recommendation: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

The slow speed on takeoff would not have been ample to develop sufficient kinetic energy for effective use of external wire cutters. Initial wire entanglement with main rotor would further preclude effective use of wire cutters.

AIR TRANSPORTATION

3-0668 5/8/78 Nr. Brownsville, TX Hughes 369HS Fatal Destroyed - \$136,000

NTSB Accident Cause:

Pilot Error: Improper in-flight decision or planning

Factors: Local whirlwind
Terrain: High obstructions

The Accident: A high time commercial pilot (5500 hrs) struck high power electrical transmission wires strung across a field at approximately 40 feet above ground. The pilot was ferrying the helicopter to home base. Total time of flight was approximately 2 minutes. The pilot was aware of wires and was attempting to avoid entanglement.

The weather was clear with over 20 miles visibility. At the time of the accident, 1620, the sun was relatively high and not considered a factor. A witness stated the helicopter ran into a whirlwind and was forced into the wires.

Upon tail rotor entanglement, from a near hover airspeed, the aircraft crashed within 30 feet of initial point of contact. Approximately 15 feet of 1/2 inch wire cable was found wrapped around the tail rotor shaft. The crash was fatal to the pilot and the aircraft was destroyed.

Conclusion: The pilot's failure to properly react to erratic atmospheric conditions, i.e., whirlwind, caused the crash.

Recommendation: A pilot warning device would have been of no use in this instance, as the location of wires was known.

Near hover airspeed and initial tail rotor wire engagement would have precluded effective use of external wire cutters.

AGRICULTURE
AERIAL APPLICATION

3-1204 7/7/78 Hannibal, MO Hughes 269A Minor Destroyed - \$37,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions:

The Accident: An experienced agricultural pilot (958 hrs/12 hrs-last 10 days) struck two telephone lines strung across a field approximately 20 feet above ground. The pilot was engaged in applying chemicals to a cornfield. Total time of flight was 10 minutes. The pilot had no knowledge of wires until entanglement.

The weather was clear with greater than 10 miles visibility. At the time of the accident, 1205, the sun was at zenith and not considered a contributing factor.

Upon entanglement with the wires at a forward speed of approximately 40 knots, the aircraft was dragged toward the ground. The pilot pushed the collective forward, the lines broke and the aircraft crashed into the ground on its port skid. With ground impact, the aircraft started to roll and ultimately was destroyed. The pilot received minor injuries.

Conclusion: The pilot's failure to locate wire relative to known ground objects caused the crash.

Recommendation: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of estimated 40 knots should have provided sufficient kinetic energy for wire cutters to be effective. Initial landing skid engagement would have been suited to use of wire cutters.

AGRICULTURE
AERIAL APPLICATION

3-1205 6/14/78 Naylor, MO Bell 47G-2 No Injury Substantial - \$6,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: A high time experienced agricultural pilot (5202 hrs/40 hrs-last 10 days) struck an electrical power line strung across a field approximately 20 feet above ground. The pilot was engaged in applying chemicals to a rice crop. Total time of flight was five minutes. The pilot was aware of main power lines, but struck a smaller branch wire.

The weather was clear with over 15 miles visibility. At the time of the accident, 1900, the sun was relatively high and not considered a contributing factor.

Upon initial tail rotor wire entanglement at a speed of 40 knots, the aircraft was forced to the ground, where it received substantial damage. The pilot was not injured.

Conclusion: The pilot's failure to see and avoid the wires caused the crash.

Recommendation: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of 40 knots should have provided sufficient kinetic energy for effective use of wire cutters. However, initial tail rotor engagement of wires makes use of external wire cutters questionable.

AIR TRANSPORTATION

3-1230 5/10/78 Vero Beach, FL Hughes 269A One Serious
One No Injury Destroyed - \$70,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: A high time experienced flight instructor (10525 hrs) struck two strands of (7600 volt) electrical transmission wire strung across a field approximately 40 ft above ground. The pilot was engaged in demonstrating an emergency landing (autorotation). Total time of flight was 55 minutes. The pilot had no knowledge of wires until entanglement.

The weather was 4000 foot overcast with 5 miles visibility. At the time of the accident, 1615, the sun was relatively high and not considered a contributing factor.

Upon tail rotor wire engagement while in a demonstrated autorotation, the aircraft became uncontrollable and a forced landing resulted. The aircraft was destroyed and the instructor received serious injuries.

Conclusion: The pilot's failure to locate wires relative to ground objects caused the crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Pull up from autorotation and initial tail rotor wire engagement would not have been conducive to effective use of external wire cutters.

AIR TRANSPORTATION

3-1448 6/23/78 Atlanta, GA Hughes 269C One Serious, One Fatal Destroyed - \$76,500

NTSB Accident Cause:

- Pilot Error: 1. Misjudged clearance
2. Spontaneous, improper action

The Accident: An experienced commercial pilot (2629 hrs) inadvertently caught the hoist line of a mechanism used to raise a bucket to the top of a 65 foot pole. The pilot was engaged in retrieving banking transactions from the transfer device which was located on the roof of a bank. Total time of flight was 2 hours, 22 minutes. The pilot was familiar with the bank hoisting rig.

The weather was clear with unlimited visibility. At the time of the accident, 1652, the sun was relatively high and not considered a contributing factor.

Upon right skid entanglement with the transfer device hoisting line, at a hover speed, the pilot attempted a pull away that caused the helicopter to pitch over inverted on the bank roof. The helicopter was destroyed, the passenger killed and the pilot received serious injuries.

Conclusion: The pilot's failure to avoid hoisting rig entanglement and subsequent poor judgment on attempting to break loose, caused the crash.

Recommendations: None. This accident is not regarded as a valid wire strike sampling.

AGRICULTURE
AERIAL APPLICATION

3-1600 5/28/78 Red Lick, MS Bell 47G3B Serious Injury Destroyed - \$52,300

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: A commercial agricultural pilot (980 hrs) struck an electrical power line strung across a field approximately 20 feet above the ground. The pilot was engaged in applying chemicals to a bean field. Total time of flight was 15 minutes. The pilot had no knowledge of wires until entanglement.

The weather was clear, with 15 miles visibility. At the time of the accident, 1515, the sun was high and not considered a contributing factor.

The main rotor mast of the aircraft struck the wires and subsequently the wires entangled in the tail rotor, causing its separation from the aircraft. The helicopter became uncontrollable, pitched up, rolled and crashed. The aircraft was destroyed by fire and the pilot received serious injuries.

Conclusion: The pilot's failure to locate wires relative to known ground objects caused the crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of estimated 45 knots should have provided sufficient kinetic energy for effective use of external wire cutters. Initial main rotor mast engagement indicates an external wire cutter would have been most beneficial in avoiding this accident.

AIR TRANSPORTATION

3-1624 7/7/78 Nr. Glen Ellen, PA Bell 47G No Injury Substantial - \$6,300

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: A commercial agricultural pilot (826 hrs) struck a power line strung across a field approximately 20 feet above ground. The pilot was engaged in conducting an aerial survey of fields to be chemically treated. Total time of flight was 5 minutes. The pilot had no knowledge of wires until entanglement.

The weather was clear with 20 miles visibility. At the time of the accident, 0930, the sun was high and not considered a contributing factor.

Upon initial wire entanglement with the skids, the pilot continued his approach to landing. Forty feet from touchdown, tail rotor control was lost and the aircraft was forced to the ground. The main rotor sheared off the tail boom and rotor. The aircraft received substantial damage but neither pilot nor passenger were injured.

Conclusion: The pilot's failure to locate wires relative to known ground objects and continuation of the landing approach when entangled with wires, caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of less than 15 knots during landing approach probably would not have provided sufficient kinetic energy for effective use of wire cutters. However, initial skid engagement would have been suited to use of wire cutters.

AIR TRANSPORTATION

3-1711 6/15/78 Charlotte, NC Hughes 269C One Fatal Destroyed - \$77,000

NTSB Accident Cause:

- Pilot Error: 1. Failed to see and avoid obstructions
2. Inadequate preflight preparation and/or planning

The Accident: An experienced commercial pilot (4571 hrs) struck two electrical transmission lines strung across a field approximately 20 feet above ground. The pilot was engaged in an approach to landing. Total time of flight was 5 minutes. The pilot had no knowledge of the wires until entanglement.

The weather was clear with greater than 5 miles visibility. At the time of the accident, 1500, the sun was high and not considered a contributing factor.

Upon main rotor entanglement with the wires at an approach speed of less than 10 knots, the aircraft became uncontrollable and crashed. The aircraft was destroyed by fire and the pilot received fatal injuries.

Conclusion: The pilot's failure to locate wires relative to known ground objects prior to attempting a landing caused the crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of less than 10 knots probably would not have provided sufficient kinetic energy for effective use of wire cutters. Initial main rotor wire engagement would have also precluded effective use of wire cutters.

AGRICULTURE
AERIAL APPLICATION

3-1737 7/30/78 Buena Vista, GA Hughes 269C One Serious Destroyed - \$76,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: A high time experienced agricultural pilot (10,252 hrs) struck a telephone wire strung across a field approximately 20 feet above ground. The pilot was engaged in applying chemicals to a peanut field. Total time of flight was 5 minutes. The pilot was aware of wire location.

The weather was scattered clouds with 20 miles visibility. At the time of the accident, 1400, the sun was high and not considered a contributing factor.

Upon entanglement at a forward speed of approximately 40 knots, the aircraft became uncontrollable and crashed. The aircraft was destroyed and the pilot seriously injured.

Conclusion: The pilot's failure to see and avoid wires caused the crash.

Recommendations: Use of a pilot warning device would have been of questionable value since the telephone lines were beneath power lines.

Closer identification of telephone line location with power lines would have aided in wire avoidance.

Forward speed of 40 knots should have provided sufficient kinetic energy for effective use of external wire cutters had they been installed.

MISCELLANEOUS

CONSTRUCTION

3-1884 6/28/78 Harrisburg, PA Sikorsky S58DT One Serious Destroyed - \$850,000

NTSB Accident Cause:

- Pilot Error: 1. Failed to follow approved procedures/directives
2. Misjudged clearance

The Accident: A highly experienced airline transport pilot (11,240 hrs) struck an 80 foot tall athletic field lighting tower with the tail rotor of a construction helicopter. The pilot was engaged in the operation of removing the lighting towers from the athletic field. Total time of flight was 5 minutes. The pilot was well aware of the lighting tower hazards to his operation.

The weather was clear with over 10 miles visibility. At the time of the accident, 0950, the sun was high and not considered a contributing factor.

There were no wires involved in this accident. The tail rotor struck one of the lighting towers still standing and disintegrated upon impact. With the helicopter uncontrollable, the pilot dropped the tower load being carried and crash landed in the athletic field. The pilot was seriously injured and the helicopter destroyed.

Conclusion: The pilot's failure to judge distance was the cause of the accident.

Recommendations: This helicopter accident was not a valid wire strike for the NASA study and recommendations are not pertinent.

AGRICULTURE
AERIAL APPLICATION

3-2068 8/6/78 Nr. Salinas, CA Bell H-13B Minor Injury Destroyed - \$55,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: An experienced agricultural pilot (2250 hrs/3-last 10 days) struck three strands of electrical power line strung across a field 20 feet above ground. The pilot was engaged in applying chemicals to a potato crop. Total time of flight was 10 minutes. The pilot knew of wire location prior to wire strike.

The weather was clear with 8 miles visibility. At the time of the accident, 0915, the sun was high and not considered a contributing factor.

The helicopter's main rotor became entangled in the wires when executing a turn, and the aircraft was forced to the ground. The pilot received minor injury and the aircraft was destroyed.

Conclusion: The pilot's failure to judge distance to the wires caused the crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

The helicopter had minimal speed when executing the turn for the next swath run and lacked sufficient kinetic energy for effective use of wire cutters. Initial main rotor engagement further precludes effectiveness of external wire cutters.

AIR TRANSPORTATION

3-2133 5/21/78 Nr. Birchwood, WI Hughes 269 No Injury Substantial - \$15,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: An experienced commercial pilot (4742 hrs) struck two strands of long abandoned telephone wire (12 yrs) strung approximately 50 to 60 feet above the water of a remote lake. The pilot was engaged in conducting a geological survey of the area. Total time of flight is unknown. The accident occurred 5 hours and 30 minutes after initial takeoff. The pilot had no knowledge of the wires until entanglement.

The weather was clear with over 20 miles visibility. At the time of the accident, 1330, the sun was high and not considered a contributing factor.

The aircraft struck the lower wire of two, separated by approximately 3 feet, at canopy level, which shattered the plexiglass. The upper wire missed the main rotor, but wrapped around the tail rotor, causing the tail boom to be sheared off. The aircraft was forced down into the water.

Conclusion: The pilot's failure to see and avoid wires caused the crash.

Recommendations: A pilot warning device identifying wire location would have been beneficial in wire avoidance.

Identification of wire location with known objects would not have been feasible, since the flight hazard had been created and abandoned 12 years prior to the accident.

Forward speed of 50 knots provided sufficient kinetic energy for effective use of wire cutters; however, initial tail rotor entanglement would have made their use ineffective.

Pilot's Recommendation: "Maximum performance takeoffs should be executed no matter how large and unconfined the takeoff area is."

AIR TRANSPORTATION

3-2823 10/7/78 Nr. Clovis, CA Hughes 369D No Injury Substantial - \$158,600

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: An experienced commercial pilot (4155 hours) struck two strands of electrical cable strung between two hills, approximately 200-300 feet above ground. The pilot was engaged in a sightseeing flight of the hills. Total time of flight was 50 minutes. The pilot had no knowledge of the wires until entanglement.

The weather was clear with 10 miles visibility. At the time of the accident, 1530, the sun was high and not considered a contributing factor.

Upon impact with the wires at a forward speed of approximately 60 knots, the windscreen was shattered and the main/tail rotors were damaged. Neither pilot nor passenger received any injury.

Conclusion: The pilot's failure to see and avoid wires caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of approximately 60 knots provided sufficient kinetic energy for effective use of external wire cutters, had they been installed.

AIR TRANSPORTATION

3-3111 9/24/78 Nr. Kingman, AZ Enstrom 280C One Serious
One Minor Destroyed - \$90,000

NTSB Accident Cause:

- Pilot Error: 1. Failed to see and avoid obstructions
2. Diverted attention from operation of aircraft

The Accident: An experienced commercial pilot (2416 hours) struck five strands of electrical transmission wire (24,900 volts) strung across a freeway approximately 20 feet above ground. The pilot was engaged in conducting an aerial survey. Total time of flight was 30 minutes. The pilot had no knowledge of wires until entanglement.

The weather was 8000 foot scattered with unlimited visibility. At the time of the accident, 0900, the sun was high and not considered a contributing factor

At an airspeed of 68 knots, the aircraft initially struck the wires at cockpit level, with wires deflecting up to the rotor mast. The ensuing wire entanglement caused shearing of the tail rotor and subsequent loss of control. The aircraft crashed very close to the power lines, with injury to the passenger and total loss of the helicopter.

Conclusion: The pilot's failure to see and avoid wires was the cause of this accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided in avoidance.

Forward speed of 68 knots would have provided sufficient kinetic energy for effective use of external wire cutters. Initial wire impact in this accident would have been most conducive to use of wire cutters.

Pilot's Recommendations: Change Federal Air Regulations (FAR 91.79d and 135.91b) to require helicopter pilots to fly no lower than 300 feet AGL, except when taking off and landing, or when conducting operations that require flight at lower altitudes.

Revise the FAA "Basic Helicopter Handbook" to include a special section on hazards and pilot techniques for ensuring flight safety at near ground altitudes.

AGRICULTURE
AERIAL APPLICATION

3-3113 10/14/78 Queen Creek, AZ Hiller UH-12E One Minor Destroyed - \$104,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: A high time experienced agricultural pilot (15,000 hrs/40 last 10 days) struck power lines strung across a field approximately 20 feet above ground. The pilot was attempting his first swath run to apply chemicals to a cotton field. Total time of flight was one minute. The pilot had no knowledge of wires until entanglement.

The weather was clear with 30 miles visibility. At the time of the accident, 0715, the sun was relatively high and not considered a contributing factor.

Upon skid entanglement with the wires at a speed of approximately 40 knots, the nose of the aircraft pitched down, causing the main rotors to strike the ground, and resulting in loss of the aircraft.

Conclusion: The pilot's failure to see and avoid wires caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of 40 knots should have provided sufficient kinetic energy for effective use of external wire cutters. Initial skid engagement with wires would also have been conducive to their use.

AGRICULTURE
AERIAL APPLICATION

3-3264 12/8/78 Nr. Ivanhoe, CA Hiller BH12E No Injuries Substantial - \$40,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: An agricultural pilot (858 hours) struck three strands of electrical transmission wire strung across a field approximately 20 feet above ground. The pilot was engaged in making a temperature survey over an orange orchard in pre-dawn darkness. The pilot had knowledge of wire location.

The weather was clear with 20 miles visibility. At the time of the accident, 0400, the pilot's visibility was restricted by darkness.

Wire entanglement occurred when the pilot was in a shallow turn and his attention was distracted by making observations of orange grove temperatures.

Conclusion: The pilot's failure to concentrate on flight, and being distracted by temperature observations caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Slow turning speed at time of wire impact would not have provided sufficient kinetic energy for effective use of external wire cutters.

AIR TRANSPORTATION

OIL SUPPORT

3-3451 11/25/78 Lutcher, LA Bell 206B Two Minor Substantial - \$175,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: A commercial pilot (2944 hours) struck a steel guy wire which was strung across a levee 20-25 feet above ground. The pilot was engaged in air taxi operations to a pipeline oil spill. This was his second landing on the levee. Total time of flight was 65 minutes. The pilot had no knowledge of the guy wire until entanglement.

The weather was 4000 foot overcast with 7 miles visibility. At the time of the accident, 0820, the sun was relatively high, obscured by the overcast and not considered a factor.

Upon entanglement with the guy wire at a near hover landing speed, the main rotor blades were lost and the aircraft crashed, inflicting minor injury to the pilot and one crewman.

Conclusion: The pilot's failure to locate wires relative to the landing site and visual blending of the wires with the environment caused the crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Near hover landing speed, less than 10 knots, would not have provided sufficient kinetic energy for effective use of wire cutters.

AGRICULTURE
AERIAL APPLICATION

3-1476 9/23/78 Waveland, IN Bell 47G2 One Minor Substantial - \$ 28,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

The Accident: A high time experienced agricultural pilot (6444 hrs/2-last 10 days) struck a power line strung across a field approximately 20 feet above ground. The pilot was engaged in applying chemicals to a bean field. Total time of flight was less than one minute. The pilot had no knowledge of wires until entanglement.

The weather was clear with 15 miles visibility. At the time of the accident, 1150, the sun was near zenith and not considered a contributing factor.

The main rotor mast struck the wires at a forward speed of approximately 30 knots. The wires further fouled the main rotor control rods causing the pilot to lose control and crash. The wires remained entangled with the main rotor. The pilot received minor injuries and the aircraft substantial damage.

Conclusion: The pilot's failure to see and avoid the wires caused the crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided in wire avoidance.

Forward speed of approximately 30 knots should have provided sufficient kinetic energy for effective use of external wire cutters. Initial wire engagement with main rotor mast would have been conducive to use of the wire cutters.

AGRICULTURE
AERIAL APPLICATION

3-3740 12/0/78 Nr. Castroville, CA Bell 47G Minor Injuries Substantial - \$11,000

NTSB Accident Cause:

Pilot Error: Misjudged distance

The Accident: A high time experienced agricultural pilot (4765 hrs/30-last 10 days) struck a power line strung across a field approximately 20 feet above ground. The pilot was engaged in applying chemicals to a artichoke field. Total time of flight was two minutes. The pilot was well aware of power line location.

The weather was clear with 6 miles visibility. At the time of the accident, 0830, the sun was relatively high and not considered a contributing factor.

Upon tail rotor entanglement with the wires due to a late pull up from a swath run, the pilot lost control and the aircraft crashed, causing minor pilot injuries.

Conclusion: The pilot's failure to determine range to wires on a swath run pull up caused the crash.

Recommendations: Effective use of a pilot warning device is questionable in that the pilot was aware of wire location; he just misjudged swath run pull up.

Further wire location identification is questionable in that the pilot was well aware of wires.

Pull up airspeed of approximately 40 knots should have provided sufficient kinetic energy for effective use of external wire cutters. However, initial tail rotor wire engagement on swath run turn around makes use of wire cutters of questionable value.

MISCELLANEOUS
COMMERCIAL CONSTRUCTION

3-3817 7/28/78 Sauk Centre, MN Hughes 369HS One Serious Destroyed - \$183,000

NTSB Accident Cause:

Miscellaneous - Undetermined

The Accident: A high time commercial pilot (5300 hours), discharging a workman atop a 140 ft. tower, struck the tower arm with main rotor blades. The aircraft fell to the ground and was destroyed by fire. Total time of flight was 12 hrs., 30 min. Pilot had knowledge of location of tower arm.

The weather was clear with 20 miles visibility. At the time of the accident, 1935, the sun was low but not considered a factor in the accident.

The pilot had been involved in an helicopter accident on 7/13/78, received head injuries which caused dizziness. This was his first day back at work since the previous accident. The pilot had made 12 to 15 tower landings on 7/29/78.

Conclusion: Cause of the accident is undetermined.

Recommendations: None. Pilot was within hazardous distance limits of tower arm at time of accident.

AIR TRANSPORTATION

J-4102 12/21/78 Phoenix, AZ Bell 206 Two serious
One minor Destroyed - \$225,000

NTSB Accident Cause:

Misc. - Powerline tower static cable fell on aircraft.

The Accident: A commercial pilot (2205 hours) was hovering near a electrical transmission tower when it collapsed and a powerline static cable fell on the aircraft. The pilot was engaged in conducting a storm damage assessment of the electrical power line. Total time of flight was 42 minutes. Pilot knowledge of wire location was not pertinent to the accident. The wire fell on the helicopter.

The weather was clear with 25 miles visibility. At the time of the accident, 0812, the sun was high and not considered a contributing factor.

When the support tower collapsed, the wire fell upon the helicopter, fouling the main rotor and causing loss of control that resulted in a crash.

Conclusion: Material failure of the electrical support tower caused the static wire to fall upon the helicopter and caused the crash.

Recommendation: None; this accident is not a valid NASA wire strike data sampling.

AIR TRANSPORTATION

3-4177 10/14/78 Nr. Rockville, IN Bell 206 No Injuries Substantial - \$30,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid obstructions

Emergency Circumstance: Precautionary landing off airport with suspected or known aircraft damage

The Accident: An airline transport pilot (5532 hours) struck one strand of electrical power line strung across a field approximately 20 feet above ground. The pilot was engaged in evaluating engine recovery characteristics from autorotations in an unsurveyed field. Total time of flight was two hours. The pilot had no knowledge of wires until entanglement.

The weather was clear with over 20 miles visibility. At the time of the accident, 1400, the sun was high and not considered a contributing factor.

Upon entanglement with the wire at a climb speed of 100 knots, the aircraft developed vibrations that prompted the pilot to execute an emergency autorotation into the field. All aircraft damage resulted from the initial wire strike and not subsequent flight. Post-flight investigation revealed a 4 foot length of power cable wrapped around both tail rotor blades at the hub.

Conclusion: The pilot's failure to locate wires relative to intended area of autorotation evaluation, and failure to see and avoid the wires caused the crash.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of 100 knots provided sufficient kinetic energy for effective use of wire cutters.

1979

AGRICULTURE
Aerial Application

3-0285 2/25/79 Brentwood, CA Hiller UH12B No Injuries Substantial - \$20,000

NTSB Accident Cause:

Not available

The Accident: A commercial pilot (1305 hours) struck three power wires approximately 35 feet above ground after making a spray pass and the aircraft was in an Ag turn. The engine developed roughness and loss of power. It fell through the wires and landed on its right side.

At the time of the accident, 1230, the sky was scattered at 4000 feet with visibility of 10 miles. The sun was high. The weather was not a factor.

The main rotor blades initially impacted with the wires. The wires were broken as the aircraft crashed to the ground with substantial damage. The pilot was uninjured. Maintenance inspection showed lead deposits on all spark plugs; more prevalent in the two plugs removed from the #2 cylinder and the front plug from the #4 cylinder. The aircraft was carrying liquid toxic chemicals. The pilot was not affected.

Conclusion: Momentary loss of power while in an Ag turn caused the aircraft to lose altitude and hit wires.

Recommendation: None. The wire strike was the result of engine power loss in flight and was unavoidable.

AGRICULTURE
Aerial Application

3-0570 3/24/79 Friend, OR Hiller UH12E No Injuries Substantial - \$35,000

NTSB Accident Cause:

Not available

The Accident: A very experienced pilot (13,761 hours) hit two power lines while on a swath run spraying weeds in a wheat field. The pilot had flown three hours the same day. The power line, which crossed the field 90° to the line of flight, was observed by the pilot before taking off with the spray load.

At the time of the accident, 1000, the sky was clear with unlimited visibility. The sun was relatively high and not a factor.

The part of the aircraft initially impacting with wires was not reported. The aircraft was substantially damaged; the pilot was not injured. The aircraft was carrying non-toxic chemicals.

Conclusion: The pilot's failure to see and avoid the wire across the field caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazard-out distance would have been beneficial in wire avoidance.

Identification of wire location would not have aided in this case as the pilot had observed the wire.

Forward speed of the helicopter, estimated about 30 knots during a spray run, had sufficient kinetic energy for wire cutters to be effective, had they been installed.

AGRICULTURE
Aerial Application

3-0576 4/27/79 Gustine, CA Hiller UH12E One Minor Substantial ~ \$70,000

NTSB Accident Cause:

Not available

The Accident:

A very experienced commercial pilot (5750 hours) struck two power wires approximately 35 feet above ground while on a pull up from a swath run. The pilot was spraying a walnut orchard. The pilot had flown 2 1/2 hours that day. The pilot was flying into the sun. The aircraft was on the second pass of the fourth load.

At the time of the accident, 1800, the sky was clear with visibility of 10 miles. The sun was low and sunglare was a factor.

The part of the aircraft impacting initially with the wires was not reported. The pilot, seeing that he was dragging cable, went into a quick stop and auto-rotation. On landing, the aircraft main rotor hit a tree at the edge of the orchard. The pilot received minor injuries. The aircraft was substantially damaged. Liquid toxic chemicals were being carried. The pilot was not affected.

Conclusion: The pilot's misjudgment of the altitude and distance to the power lines caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Forward speed of the aircraft of over 30 knots had sufficient kinetic energy for wire cutters to be effective had they been installed.

AGRICULTURE
Aerial Application

3-0645 5/15/79 Moses Lake, WA Bell Tomcat MK5A No Injuries Destroyed - \$40,000

NTSB Accident Cause:

Not available

The Accident: An experienced commercial pilot (3695 hours) struck a power pole while on a swath run spraying a wheat field. The pilot was spraying along a pole line flying from west to east. The pilot had flown eight hours in the last 24. The flight originated at the field site being sprayed, moments before the accident.

At the time of the accident, 0600, the sky was clear with unlimited visibility. The angle of the sun was low and could have been a factor.

The main rotor blades hit the pole and the aircraft was thrown to the ground and destroyed. The pilot was not injured. Liquid nontoxic chemicals were being carried on the aircraft.

Conclusion: Pilot misjudgment of the distance to power poles near the flight path caused the accident.

Recommendation: A pilot's warning device indicating close proximity to a hazard would have been beneficial.

AIR TRANSPORTATION

3-0682 5/6/79 Weatherly, PA Bell 47G Three Minor Injuries Destroyed - \$16,500

NTSB Accident Cause:

Not available

The Accident: A commercial pilot (2147 hours) struck a guy wire about 75 feet high which was strung across a river. The wire was supported by a pole on one embankment of the river and at ground level at the opposite side. The pilot was carrying forest rangers on a fire control reconnaissance over the river. Total time of the flight was 15 minutes. The pilot had been flying at the height of mountain ridges and descended lower to make contact with a ground party, when the aircraft hit the guy wire.

At the time of the accident, 1145, the weather was clear with visibility of 15 miles. The sun was high and not a factor.

The aircraft impacted with the wire at 50 mph, flipped and crashed into the river and was destroyed. The pilot and passengers received minor injuries.

Conclusion: The pilot's failure to see and avoid the guy wire strung across the river caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of aircraft of approximately 50 knots had sufficient kinetic energy for wire cutters to be effective had they been installed.

Pilot's Recommendation: "Masking of wires with aircraft orange balls"
"Prominent notices of wire locations at heliports/airports in local area"

AGRICULTURE
Aerial Application

3-1031 5/1/79 Nr. Drew, MS Hiller UH12D 1 Minor Substantial - \$27,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

The Accident: A commercial pilot (1668 hours) struck a wire approximately 20 feet above ground while on a swath run spraying cotton. The pilot had flown 1.5 hours between midnight and the time of the accident. The pilot stated to the inspector making the investigation that he was dispensing herbicide on this field, working under the wires. He stated that after several swath runs he flew into the wires, thinking he had passed over them.

The weather at the time of the accident, 1730, was estimated as 3000 feet broken, with unlimited visibility. The sun was relatively high and a factor.

The part of the aircraft impacting with the wire was not reported. The aircraft was substantially damaged; the pilot received minor injuries. The aircraft was carrying liquid non-toxic chemicals.

Conclusion: The pilot's failure to see and avoid the wire caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Forward speed of the aircraft of approximately 60 knots provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

Pilot's Recommendation: "If wires were better marked around trees and houses" (the accident might have been avoided).

AIR TRANSPORTATION

3-1039 3/9/79 Angleton, TX Hughes 369D 2 Fatal Destroyed - \$76,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: Unwarranted low flying

The Accident: An experienced commercial pilot (6150 hours) struck 2 long span power wires 60 feet above ground while carrying a passenger from Brazoria County Airport, Texas to Columbia Lakes, Texas. Total time of the flight was 5 minutes. It is not known if the pilot or passenger were aware of the wire strike. Photos show wires are long span power lines.

At the time of the accident, 1320, weather was clear with visibility of 10 miles. The sun was high and not a factor.

Apparently, the bubble and main rotor blade initially impacted with the wires. Plexiglass and plastic fragments were found below the impact point and there were steel power wire imprints on a main rotor blade. The aircraft crashed to the ground and caught fire after the pilot and passenger were pulled from the wreckage. Apparently the pilot and passenger died in the crash. The aircraft burned and was destroyed.

Conclusion: The pilot's failure to see and avoid the long span power wires caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft of around 80 knots would have provided sufficient kinetic energy for wire cutters to be effective; however, effectiveness is questionable as main rotor blade impact in this case was a primary factor.

AGRICULTURE

Aerial Application

3-1049 6/15/79 Nr. Napa, CA Bell OH-13H 1 Minor Injury Destroyed - \$70,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: Sun glare

The Accident: An experienced commercial pilot (3900 hours) struck two power lines approximately 25 feet above ground while on a swath run. The pilot was dusting grapes in mountainous terrain. The pilot had flown 3 hours from midnight to the time of the accident. Time of the flight was 5 minutes. The pilot stated that lines blended in with mountainous terrain and apparently he was unaware of the location of the wires.

The sky was clear at the time of the accident, 0820, with visibility of 20 miles. The pilot was flying in a NE direction with the sun in his eyes.

The aircraft crashed and burned after wire impact. Dry non-toxic chemicals were being carried. The pilot suffered minor lacerations and bruises.

Conclusion: The pilot's failure to see and avoid the wire while flying with the sun in his eyes caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in wire avoidance.

Forward speed of the aircraft of approximately 60 knots provided sufficient kinetic energy for wire cutter effectiveness had they been installed.

Pilot's Recommendation: "Don't fly with sun in eyes."

AGRICULTURE

Aerial Application

3-1077 6/23/79 Nr. Lihue, HI Hiller UH12E No Injuries Substantial - \$67,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: High obstructions

The Accident: An experienced commercial pilot (5649 hours) struck 3 power wires about 75 feet above ground. The pilot was dusting sugar cane and was in flight to reload. After completing a spray run prior to reloading the pilot stated he momentarily forgot about the power line and pulled up too late to avoid it. The pilot had flown 1.4 hours between midnight and the time of the accident.

The weather was clear at the time of the accident, 1400, with visibility of 10 miles. The sun was high and not a factor.

Initial wire impact was with the main rotor mast and tail rotor driveshaft. The aircraft lost directional control and sustained further damage on landing. There were no injuries. The aircraft was carrying liquid non-toxic chemicals.

Conclusion: The accident was caused by the pilot momentarily forgetting about the power line location and failing to see and avoid it on his pull up from a swath run.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Forward speed of the aircraft of approximately 60 knots had sufficient kinetic energy for wire cutter effectiveness had they been installed.

Pilot's Recommendation: "Would help to have lines marked with balls that are presently available for this specific purpose. Would probably have seen line earlier."

AGRICULTURE
Aerial Application

J-1207 5/18/79 Island City, OK Bell 206B One Minor Injury Destroyed - \$212,500

NTSB Accident Cause:

Not available

The Accident: An experienced commercial pilot (4521 hours) struck two power wires about 20 feet above ground while on a swath run, spraying a wheat field. Total time of flight that day was 24 minutes. The pilot stated he had just looked at his boom pressure gauge when he hit the power line at the edge of the field.

At the time of the accident, 0545, the sky was scattered at 8-10 thousand feet. There were no restrictions to visibility.

One wire impacted with the aircraft windshield and the other with the main rotor blades. The aircraft made a right turn, crashed, caught fire and was destroyed. The pilot received minor injuries. The aircraft was carrying liquid nontoxic chemicals.

Conclusion: The pilot's momentary diversion of attention from the flight path during a swath run caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight might have aided the pilot in avoidance.

Forward speed of the aircraft estimated around 60 knots would have sufficient kinetic energy for wire cutters to be effective, except effectiveness is doubtful when wire becomes entangled with the main rotor blades.

AGRICULTURE
Aerial Application

3-1487 3/22/79 Tularosa, NM Hiller UH 12J3 One Minor Destroyed - \$186,000

NTSB Accident Cause:

Not available

The Accident: An experienced commercial pilot (3889 hours) struck the second of two sets of two power lines approximately 35 feet above ground, on a pull up from a swath run of an alfalfa field. The pilot stated the flagman had reported wires at the end of his pass, but he had indicated there was only one row of lines.

At the time of the accident, 1300, the sky was clear with visibility of 50 miles. The sun was high and not a factor.

Initial wire impact was with the tail rotor. The aircraft descended and landed on the pavement with left skid, then bounced onto the left side. The aircraft was destroyed. There was no fire. The pilot received minor injuries. The aircraft was carrying liquid toxic chemicals. The pilot's exposure was 15 minutes or less, with no effect.

Conclusion: The pilot's failure to see and avoid wires at the end of the swath run caused the accident.

Recommendations: A pilot's warning device might have been beneficial in avoidance.

Identification of the two sets of wires prior to flight would have aided the pilot in avoidance.

Forward speed of aircraft of over 30 knots had sufficient kinetic energy for wire cutters to be effective had they been installed.

Pilot's Recommendation: "Less reliance on flagman to mark wires and a more thorough field check."

AIR TRANSPORTATION

3-1753 6/24/79 Findlay, Ohio Hughes 269 B Three Minor Injuries
One No Injury Substantial - \$25,000

NTSB Accident Cause:

Not available

The Accident: A very experienced commercial pilot (16,113 hours) struck a power line approximately 35 to 40 feet above ground while landing in a parking lot. The pilot was carrying passengers on local helicopter rides. Total time of flights were three hours. A very strong wind from the left drifted the hovering helicopter rapidly toward the power lines on the right. The pilot attempted to pull up and over but engaged the skid on the top power line.

At the time of the accident, 1515, the weather was clear with visibility of 30 miles. Wind velocity was 15-18 knots. The pilot had made the same approach to landing before, but this time was caught by the wind as he was hovering.

Initial impact with the wires was with the landing gear skid. The helicopter continued to turn another 120° to the right and crashed 50 yards south of the intended landing area. The passengers received minor bruises and scratches; the pilot was uninjured. The aircraft was substantially damaged. The pilot stated a passenger may have had a foot on the lower section of the dual control column where the control had been removed, thereby restricting movement of controls in attempting the avoidance maneuver.

Conclusion: The pilot's attempt to climb out of a confined landing area after attempting to land with an unfavorable wind, caused the accident.

Recommendations: Identification of wires in area may have aided the pilot in selecting a landing area more suitable for passenger operation.

Climb out speed of aircraft of around 20-30 knots might have provided sufficient kinetic energy for wire cutters to be effective had they been installed.

AGRICULTURE

Aerial Application

3-1772 8/16/79 Hart, MI Bell 47G2 No Injuries Substantial - \$28,000

NTSB Accident Cause:

Not available

The Accident: A very experienced commercial pilot (5688 hours) struck a power wire about 30 feet above ground while on an approach to spray a field. The pilot had completed spraying the north-south leg of the field and in starting the east-west leg, he had to approach over wires on the west side of the field. Total time of the flight was three hours in that day. The pilot was aware of the location of the wires but did not see them on his approach.

At the time of the accident, 1120, the sky was clear with visibility of 20 miles. The sun was high and not a factor.

Wire impact was with right skid. The aircraft crashed to the ground with substantial damage. The pilot was not injured. The aircraft was carrying nontoxic liquid spray.

Conclusion: The pilot's failure to see and avoid power wire on his approach to a spray run caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Forward speed of the aircraft, estimated at over 30 knots, had sufficient kinetic energy for wire cutters to be effective had they been installed.

Pilot's Recommendation: "Have utility companies mark wires in areas where low flying aircraft operate."

AGRICULTURE
Aerial Application

3-1791 8/2/79 Salinas, CA Bell 47G2 No Injuries Substantial - \$950 (Pilot's estimate)

NTSB Accident Cause:

Not available

The Accident: A experienced commercial pilot (9730 hours) struck a telephone line approximately 20 feet above ground parallel to the line of flight, while spraying a lettuce field. The pilot had flown 35 minutes that day. The pilot stated that the tail rotor hit a parallel telephone line at the west end of the field being sprayed.

At the time of the accident, 0610, the sky was overcast, ceiling was 300 feet, with visibility of 1/2 mile. There was light drizzle and fog. It was dawn.

The tail rotor initially impacted with and snagged telephone wire. Directional control was lost and the aircraft crashed to the ground with substantial damage. The pilot was not injured. The report did not state the type of insecticide was being used for spraying. The pilot was not affected.

Conclusion: The misjudgment of the distance to the wires by the pilot caused the accident.

Recommendation: The aircraft forward speed of approximately 40 knots on the swath run had sufficient kinetic energy for wire cutters to be effective had they been installed.

AGRICULTURE

AERIAL APPLICATION

3-1916 7/23/79 Flanagan, IL Brantley B2B No Injuries Substantial - \$23,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

The Accident: A commercial pilot (374 hours) was completing spraying end rows of a bean field and inadvertently flew into a power line approximately 15 or 20 feet above ground. Total time of flight that day was one hour. The pilot stated that the wire was strung from across a road to a farm house with no poles or markers in sight, and the wire was difficult to see.

At the time of the accident, 1120, the sky was clear with visibility of three miles. There was haze. The sun was high and not a factor.

The part of the aircraft impacting with the wire was not reported. The aircraft received substantial damage. The pilot was not injured. Aircraft was carrying liquid toxic chemicals. The pilot was not affected by exposure.

Conclusion: The pilot's failure to see and avoid the wire caused the accident.

Recommendations: A pilot warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft, estimated around 60 knots, had sufficient kinetic energy for wire cutters to be effective had they been installed.

AGRICULTURE
AERIAL APPLICATION

3-1834 7/30/79 Chillicothe, OH Sikorsky S55C 1 Serious Injury Destroyed - \$205,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

The Accident:

A helicopter pilot (2204 hours) struck a power cable 30 feet above the ground while on a swath run over a bean field. Total time of the flight was two hours that day. The pilot stated to a witness that he had previously made a couple of spraying passes and on the last one he had forgotten about the wire.

At the time of the accident, 0950, the sky was clear with visibility of 10 miles. The sun was relatively high and not a factor as the aircraft was flying east to west.

Wire impact was on the rotor shaft just under the blades. The wire cable wrapped around the rotor shaft after breaking. The aircraft crashed and burned. The pilot was seriously injured. The aircraft was carrying liquid non-toxic chemicals.

Conclusion: The pilot's failure to see and avoid the power cable caused the crash.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight might have aided in this case.

Forward speed of the aircraft, estimated at 60 knots, had sufficient kinetic energy for wire cutters to be effective, had they been installed.

Pilot's Recommendation: "This field has been sprayed by air several times over the past years. The wire situation is a bad one and if the electrical service company would have installed large red balls on these lines, the accident could have been prevented."

AGRICULTURE
AERIAL APPLICATION

3-1917 7/30/79 Barnesboro, PA Hughes 300C 1 Minor Injury Destroyed-\$85,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

The Accident: An experienced commercial pilot (3,817 hours) struck a power wire approximately 20 feet above ground while spraying a potato field. The pilot was starting his descent for a swath run and struck a branch line which he had not seen on his check of the area for obstructions. The pole supporting the wire was hidden by trees. Total time of the flight that day was 4 hours.

At the time of the accident, 1930, the sky was clear with visibility unlimited. The sun was low, but not a factor.

The part of the aircraft initially impacting with the wire was not stated. The pilot attempted to land, the aircraft rolled onto its side and was destroyed. There was no fire. The pilot received minor injuries. The aircraft was carrying non-toxic chemicals.

Conclusion: The pilot's failure to see and avoid the wire where the supporting pole was hidden by trees caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft at approximately 60 knots provided sufficient kinetic energy for wire cutters to be effective had they been installed.

AIR TRANSPORTATION

3-2104 9/8/79 LaGrange, TX Bell 206B No Injuries Substantial - \$100,000

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions

Factor: Unwarranted low flying

The Accident: An experienced commercial pilot (3500 hours) struck a long span wire over a river while mapping limestone deposits near LaGrange, Texas. Total time of the flight was 30 minutes. The pilot stated he had not seen the wires; if he had, he would have flown over them. The report does not state if poles supporting the wires were visible to the pilot.

At the time of the accident, 1330, the weather was clear with visibility of 15 miles. The sun was high and not a factor.

The main rotor blades initially impacted with the wire, causing the aircraft to crash to the ground and sustain substantial damage. The pilot was uninjured. There were no passengers.

Conclusion: The pilot's failure to see and avoid a long-span wire crossing a river caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft of 80 mph had sufficient kinetic energy for wire cutters to be effective; however, main rotors initially impacted with the wire so wire cutter effectiveness is questionable.

Pilot's Recommendation: "Marking on wires that cross river would help."

AGRICULTURE

Aerial Application

3-2278 6/3/79 Carrollton, Ohio Bell 47G2A One Serious Destroyed - \$45,500

NTSB Accident Cause:

Pilot Error: Failed to see and avoid objects or obstructions.

The Accident: An experienced commercial pilot (4227 hours) struck two power lines approximately 25 feet above ground while spraying corn. Photos show poles supporting wires were partially hidden by trees in the cornfield. The pilot had flown 6.6 hours in the last 24. The pilot stated that due to head injuries, he did not remember what happened in the accident. It is not known if the pilot was aware of the wire location.

At the time of the accident, 1215, the ceiling was 10,000 feet with visibility of 10 miles. The sun was at its zenith and not a factor.

The part of the aircraft initially impacting with wires was not given in the report. The aircraft crashed into a clump of trees and was destroyed. There was no fire. The pilot was seriously injured. The aircraft was carrying dry nontoxic chemicals.

Conclusion: The pilot's failure to see and avoid power lines while spraying a cornfield caused the accident.

Recommendations: A pilot's warning device identifying wire location when within hazardous distance would have been beneficial in wire avoidance.

Identification of wire location in relation to known ground objects prior to flight would have aided the pilot in avoidance.

Forward speed of the aircraft, estimated to be 60 knots in a swath run, had sufficient kinetic energy for wire cutters to be effective had they been installed.

Owner's Recommendation: "Power companies should not obscure poles in wooded areas with wires camouflaged against trees."

AIR TRANSPORTATION

3-2552 8/18/79 Houston, TX Bell 206B No Injuries Substantial - \$10,000

NTSB Accident Cause:

Not available

The Accident: A commercial pilot (2228 hours) struck a power line approximately 35 feet above ground while hover taxiing to a takeoff. The pilot was carrying one passenger. Total time of the flight was 30 minutes. The pilot was attempting to hover under the struck wire as he maneuvered to obtain a better takeoff position which would avoid higher wires.

At the time of the accident, 1630, the weather was clear with visibility of 7 miles. The sun was relatively high and not a factor.

The tail rotor impacted with the wire as the pilot hovered the aircraft under the wire. The aircraft was landed without further damage. There were no injuries to the pilot or passenger.

Conclusion: The pilot's misjudgment of clearance in hovering under a wire caused the accident.

Recommendation: Identification of wire location may have aided in selection of a more suitable area for a heliport.

Pilot's Recommendation: "This accident could have been prevented by landing the helicopter in a larger field to the east of the power lines. This would have caused the customer more inconvenience and a longer distance to walk, but possibly this accident would not have happened had this other landing area been used."