

Australian Government



HEMS Operations

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Australian Transport Safety Bureau



Analysis of VH-HTD Bell 407 Night VFR Accident near Mackay Qld - 17 October 2003



Overview

✓ Investigation

Organisational issues

Regulatory issues

11,12 June 2005

NZASASI Conference Queenstown



HEMS Tasking

- NVFR flight, 3 POB, inter-hospital transfer Mackay > Hamilton Island > Mackay
- patient was 'non-critical'
- weather broken stratus 2-3,000 ft, visibility 7 km, wind 15 kts from ESE, no celestial lighting
- departed 2132 EST, ETA 2207
- PIC chose 3,000 ft MSL to transit

Flight path





History of flight

- at 2217 Mackay advised no arrival
- repeated calls from flight-following
- at 2239 AusSAR advised and BK117 dispatched
- BK117 locates wreckage at 0040
- at 0133 rescue vessel on site no survivors



Helicopter Equipment

- VFR suite, pop-out floats, Nitesun, RADALT, EPIRB, winch, GPS, moving map, one AH
- <u>didn't include</u> full IFR suite with standby AH, autopilot or stabilisation system

Sonar and Salvage



Sonar search



Wreckage recovery



Wreckage recovery





Technical examination

- all components recovered except MR, MRGB, MRBs upper deck (video analysis)
- reconstruction of the wreckage
- engine, servos, and instrument examination
- analysis of radar data and tower tapes
- download of ECU

Wreckage reconstruction



Engine examination



Radar data







AVIATION SAFETY INVESTIGATION 200304282

Bell 407 VH-HTD Cape Hillsborough, Qld



Organisational Issues



Organisational 'Lite'

Investigation of organisational aspects,

- doesn't have to be complex
- doesn't have to be time consuming or expensive
- can achieve something worthwhile



The circumstances of the accident combined most of the risk factors known for many years to be associated with helicopter EMS accidents,

- pilot factors
- operating environment factors
- organisational factors



Pilot factors

- the pilot had little experience in that type of operation (ie long distance over water at night)
- the pilot was not instrument rated
- the pilot was new to the organisation and EMS operations



Operating environment factors

- dark night with no celestial or ground-based lighting
- the flight path was over water with no fixed surfacelit features
- marginal VMC



Organisational factors

- operation from a remote base
- actual or perceived pressures to not reject missions due to weather or other reasons
- lack of awareness of helicopter EMS safety issues and helicopter night VFR limitations
- divided and diminished oversight for ensuring safety







Safety oversight

The organisations involved...

- the QLD Department of Emergency Services Aviation Services Unit operated a helicopter EMS service (Queensland Rescue)
- CQRESQ was a community advocacy group of concerned local citizens
- the operator was part of a large worldwide helicopter operation



Safety oversight

No single organisation had the 'big picture'

- Paradoxically, the organisation with the greatest knowledge and experience had relatively little input, while the organisation with the least knowledge and experience had relatively large input.
- Greater safety assurance could have been obtained if one organisation with knowledge and expertise in aviation had overall responsibility for operational and safety oversight of the Mackay helicopter EMS operation.

TABLE 4: Helicopter EMS services accident rates comparisons

Helicopter EMS service	Period	Fatal accident rate †	Total accident rate †
Australia (total)	1992 to 2002	1.46	4.38
Australia (excluding QLD)	1992 to 2002	0.00	0.00
QLD government	1992 to 2002	0.00	0.00
QLD Community Helicopter Providers	1992 to 2002	8.34	25.03
Germany	1982 to 1987	4.1	10.9
United States	1982 to 1987	4.7	11.7
United States	1992 to 2001	1.69	4.83

† Accident rate per 100,000 flying hours. Adapted from Holland and Cooksley (2005).



Queensland DES - Local safety actions

- strengthened safety standards in service agreements
 CIR requirement, CRM training, Safety Management System, Safety Officer
- centralised clinical coordination of tasking (two centres state-wide)
- celestial lighting consideration for NVFR



Operator - Local safety actions

- flying staff instruction on NVFR operations with celestial lighting considerations
- all base pilots to have a Command Instrument Rating
- replacement helicopter is IFR equipped



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Regulatory Issues



Regulatory issues

- CASA requirements and international differences on categorisation of HEMS
- CASA requirements and ICAO differences on CPL (10 hours instrument, 30 hours for ATPL)
- CASA requirements differences between ATPL aeroplane and helicopter (CIR)
- limited panel training for NVFR



JAR OPS 3.005

HEMS requirements

- two pilots NVFR, one for day VFR
- flight-following
- 1,000 hours PIC (500 rotary) or HEMS co-pilot
- 500 hours HEMS
- 30 minutes helicopter or SIM instrument flying last 6 months



CASA - Local safety actions

In the pipeline,

- CASR Pt 61 requirement for bi-annual flight review of NVFR rating
- CAAP highlighting HEMS safety issues
- CAAP clarifying NVFR safety guidelines



CASA - Recommendations

For single-pilot night VFR helicopter operations, assess the safety benefits of;

- a standby attitude indicator
- an autopilot or stabilisation system





CASA - Recommendations

- review the night visual flight requirements and promulgate relevant information to pilots
- review operator classification and minimum safety standards for HEMS operations





Folklore on NVFR

- remember that the airplane/ helicopter doesn't know that it's dark.
- there are certain aircraft sounds that can only be heard at night.
- if you're going to fly at night, it might as well be in the weather so you can double your exposure to both hazards.



US Army review of spatial disorientation accidents 5/87-4/92

"Of the 583 accidents, 32% had spatial disorientation as a factor. The cost was 78 lives and \$308,887,000 USD. A distinct trend existed between night flying and spatial disorientation, the maximum risk being associated with the use of NVGs and FLIR."



Night VFR?

The definition relates to the weather conditions and the regs, NOT to the techniques required to control the helicopter or aircraft.

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If you have no visible horizon, night flight is instrument flight and you are on the clocks....

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