Overall Statistics 1976 - 2012

- All accidents:
  - 72 accidents,
  - Approx. 2 per year,
  - 2.1 per 100,000 flight hours.

- Fatal accidents:
  - 12 fatal accidents,
  - 0.32 per year or approx. one every 3 years,
  - 0.36 per 100,000 flight hours.
Chronology of Reportable Accidents – Factored by Flying Hours

- Fatal accident rate per 100,000 hours
- Accident rate per 100,000 hours
- 5-year average all accidents
- 5-year average fatal accidents
Coding of Accidents (1)

- CAST/ICAO Common Taxonomy Team (CICTT)

- **Operational:**
  
  - **Ground** – Aerodrome [ADRM], Evacuation [EVAC], Fire/Smoke (post-impact) [F-POST], Ground Handling [RAMP], Ground Collision [GCOL], Loss of control (ground) [LOC-G], Runway Incursion (vehicle, aircraft or person) [RI-VAP], Undershoot/Overshoot [USOS], Runway Excursion [RE].

  - **Flight** - Abnormal Runway Contact [ARC], Abrupt Manoeuvre [AMAN], Loss of Separation/Mid-Air Collision [MAC], Air Traffic Management [ATM], Cabin Safety Events [CABIN], Collisions during take-off and landing [CTOL], Controlled Flight Into Terrain [CFIT], Fuel related [FUEL], Loss of Control (in flight) [LOC-I], Unintended flight in IMC [UIMC].
Coding of Accidents (2)

- CAST/ICAO Common Taxonomy Team (CICTT)
  - **Technical**: Fire/Smoke (non-impact) [F-NI], System/Component Failure/Malfunction (non-powerplant) [SCF-NP], System/Component Failure/Malfunction (powerplant) [SCF-PP].
  - **External**: Bird Strike [BIRD], Icing [ICE], Security [SEC], Turbulence [TURB], Windshear or Thunderstorm [WSTRW].
  - **Not applicable**: External load related [EXTL], Glider towing related [GTOW], Low altitude operations [LALT], Loss of lifting conditions in flight [LOLI], Runway Incursion (animal) [RI-A], Unknown [UNK], Other [OTHR].
Breakdown of Accidents by Category
1976 - 2012

Technical: 46%
Operational: 39%
External: 15%
Chronology of Accidents by Category – Rate per 100,000 Flight Hours
Breakdown of Accidents by Category

1976 - 2012
- Technical: 46%
- Operational: 39%
- External: 15%

1992 - 2012
- Technical: 29%
- Operational: 42%
- External: 29%
Comparison of Overall Statistics for All Accidents

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>72</td>
<td>24</td>
</tr>
<tr>
<td>Years</td>
<td>37</td>
<td>21</td>
</tr>
<tr>
<td>Annual rate</td>
<td>1.95</td>
<td>1.14</td>
</tr>
<tr>
<td>Flying hours</td>
<td>3,452,951</td>
<td>1,754,512</td>
</tr>
<tr>
<td>Rate per 100,000 flight hours</td>
<td>2.09</td>
<td>1.37</td>
</tr>
<tr>
<td>Sectors</td>
<td>7,499,229</td>
<td>3,667,963</td>
</tr>
<tr>
<td>Rate per 100,000 sectors</td>
<td>0.96</td>
<td>0.65</td>
</tr>
</tbody>
</table>
Technical Accidents

1976 - 2012

- Main rotor: 30%
- Tail rotor: 21%
- MRGB: 9%
- Engines: 6%
- Undercarriage: 6%
- Flt controls: 6%
- Structure: 15%
- Unknown: 3%

1992 - 2012

- Main rotor: 43%
- Tail rotor: 15%
- MRGB: 14%
- Engines: 14%
- Undercarriage: 14%
- Flt controls: 29%
- Structure: 14%
- Unknown: 3%
Operational Accidents

1976 - 2012

- Ground handling (RAMP) 32%
- Ground collision (GCOL) 7%
- Collision with obstacle(s) during take-off & landing (CTOL) 25%
- Abnormal runway contact (ARC) 11%
- Loss of control - in flight (LOC-I) 14%
- Loss of control - ground (LOC-G) 7%
- Controlled flight into terrain (CFIT) 4%

1992 - 2012

- Ground collision (GCOL) 20%
- Controlled flight into terrain (CFIT) 30%
- Collision with obstacle(s) during take-off & landing (CTOL) 10%
- Abnormal runway contact (ARC) 10%
- Loss of control - in flight (LOC-I) 10%
- Loss of control - ground (LOC-G) 20%
Operational Accidents - Pilot Error Accidents (22/28)

1976 - 2012
- Flt crew preparation (10.7) - 9%
- Flt crew situational awareness (10.11) - 18%
- Flt crew perception & decision making (10.10) - 27%
- Flt crew handling/ skill (10.8) - 32%
- Flt crew human performance (10.9) - 14%

1992 - 2012
- Flt crew preparation (10.7) - 14%
- Flt crew situational awareness (10.11) - 29%
- Flt crew perception & decision making (10.10) - 14%
- Flt crew handling/ skill (10.8) - 29%
- Flt crew human performance (10.9) - 57%
External Accidents

1976 - 2012
- 55% (Green)
- 27% (Blue)
- 18% (Red)
- Windshear or thunderstorm (WSTRW)

1992 - 2012
- 86% (Green)
- 14% (Blue)
### Comparison of Accident Rates by Category (1992 – 2012)

<table>
<thead>
<tr>
<th></th>
<th>Operational</th>
<th>Technical</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Count</strong></td>
<td>10</td>
<td>7</td>
<td>7</td>
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<tr>
<td><strong>Annual rate</strong></td>
<td>0.48</td>
<td>0.33</td>
<td>0.33</td>
</tr>
<tr>
<td><strong>Rate per 100,000 flight hours</strong></td>
<td>0.57</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Rate per 100,000 sectors</strong></td>
<td>0.27</td>
<td>0.19</td>
<td>0.19</td>
</tr>
</tbody>
</table>
Fatal Accidents

1976 - 2012

- System/component failure - non-powerplant (SCF-NP)
- Loss of control - in flight (LOC-I)
- System/component failure - powerplant (SCF-PP)
- Collision with obstacle(s) during take-off & landing (CTOL)
- Ground handling (RAMP)
- Controlled flight into terrain (CFIT)

1992 - 2012

- System/component failure - non-powerplant (SCF-NP)
- Loss of control - in flight (LOC-I)
- System/component failure - powerplant (SCF-PP)
- Collision with obstacle(s) during take-off & landing (CTOL)
- Ground handling (RAMP)
- Controlled flight into terrain (CFIT)
### Comparison of Overall Statistics for Fatal Accidents

<table>
<thead>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Count</strong></td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td><strong>Years</strong></td>
<td>37</td>
<td>21</td>
</tr>
<tr>
<td><strong>Annual rate</strong></td>
<td>0.32</td>
<td>0.29</td>
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<td><strong>Sectors</strong></td>
<td>7,499,229</td>
<td>3,667,963</td>
</tr>
<tr>
<td><strong>Rate per 100,000 sectors</strong></td>
<td>0.16</td>
<td>0.16</td>
</tr>
</tbody>
</table>
## Comparison of Overall Statistics for Fatalities

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Number of fatalities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>124</td>
<td>47</td>
</tr>
<tr>
<td>Technical</td>
<td>97</td>
<td>27</td>
</tr>
<tr>
<td>Operational</td>
<td>27</td>
<td>20</td>
</tr>
<tr>
<td>Proportion of occupants killed (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>72.4</td>
<td>91.25</td>
</tr>
<tr>
<td>Technical</td>
<td>72.3</td>
<td>100</td>
</tr>
<tr>
<td>Operational*</td>
<td>54.5</td>
<td>82.5</td>
</tr>
</tbody>
</table>

* Excludes two operational accidents each involving a single external (HLO) fatality.
Conclusions – All Accidents (1976 - 2012)

- Total of 72 reportable offshore helicopter accidents (MOR grade A or B) during the period 1976 to 2012.
- Overall accident rate is just under 2 per year or 2.09 per 100,000 flight hours or 0.96 per 100,000 sectors.
- From 1976 to 2012, largest single cause of accidents is **Technical** (33/72 or 46%), most of which (22/33 or 67%) relate to rotor and transmission failures.
- The second largest cause of accidents is **Operational** (28/72 or 39%), most of which (22/28 or 79%) relate to pilot error.
- The third largest cause is **External** (11/72 or 15%), the largest single part of which (5/11 or 46%) were lightning strikes.
Conclusions – All Accidents (1992 – 2012)

- Change in rate and distribution of accidents by category around 1992 mainly due to significant reduction in Technical accidents – coincident with introduction of HUMS.
- Distribution of accidents relatively even across categories and stable from 1992 to 2012.
- From 1992 to 2012, largest single cause of accidents is Operational (10/24 or 42%), most of which (7/10 or 70%) relate to pilot error.
- The remainder of the accidents during the period 1992 to 2012 are equally divided (7/24 or 29% each) between Technical and External causes.
- Most Technical accidents (6/7 or 86%) relate to rotor and transmission failures.
- Most External accidents (5/7 or 71%) are lightning strikes.
Conclusions – Fatal Accidents

- Of the 72 reportable accidents during the period 1976 to 2012, 12 (17%) involved fatalities.
- The fatal accident rate is stable throughout the period at just under one every 3 years or 0.33 per 100,000 flight hours or 0.16 per 100,000 sectors.
- The fatal accidents are evenly distributed between Technical and Operational causes.
- The main cause of Technical fatal accidents (4/6 or 67%) is rotor and transmission failures.
- The main cause of Operational fatal accidents (4/6 or 67%) is pilot error.
- There have been no External cause fatal accidents.
Conclusions – Fatalities

- The 12 fatal accidents during the period 1976 to 2012, resulted in a total of 124 fatalities, representing 72.4% of the occupants.
- The 6 fatal accidents during the period 1992 to 2012, resulted in a total of 47 fatalities, representing 91.25% of the occupants.
- Technical accidents consistently account for a greater number of fatalities than Operational accidents.
- Technical accidents consistently result in a greater number of fatalities as a proportion of total number of occupants than Operational accidents.
Overall Conclusions

- The last 20 years (1992 to 2012) of offshore operations are representative of current operations.
- The accident rate is relatively stable at 1.14 per year or 1.37 per 100,000 flight hours or 0.65 per 100,000 sectors.
- The fatal accident rate over this period is 0.29 per year or 0.33 per 100,000 flight hours or 0.16 per 100,000 sectors.
- The main causal factors of reportable accidents are (in order):
  1\textsuperscript{st} \textit{Operational} – pilot error.
  =2\textsuperscript{nd} \textit{Technical} – rotor and transmission failures.
  =2\textsuperscript{nd} \textit{External} – lightning strikes.
- Fatal accidents follow a similar pattern except that there have been equal numbers of \textit{Technical} and \textit{Operational} fatal accidents, and no \textit{External} cause fatal accidents.
- \textit{Technical} accidents are consistently more lethal than operational accidents.
Thank you for your attention…

Any questions?