Headquarters U.S. Air Force

Integrity - Service - Excellence

Review of F-16 and F-15 Cockpit Pressure Loss and Hypoxia Events

MASW April 2016

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HQ AFSEC/SEFE

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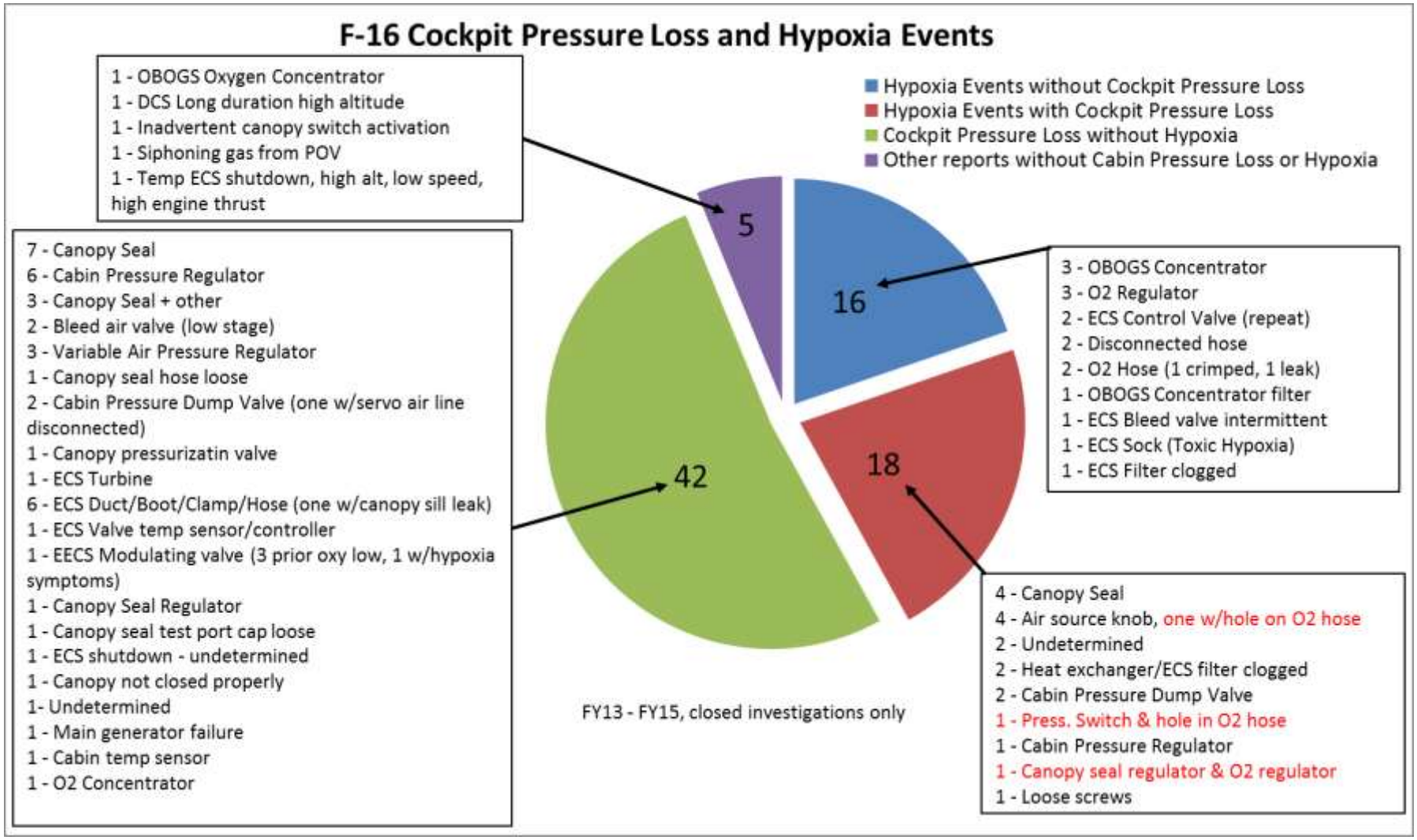
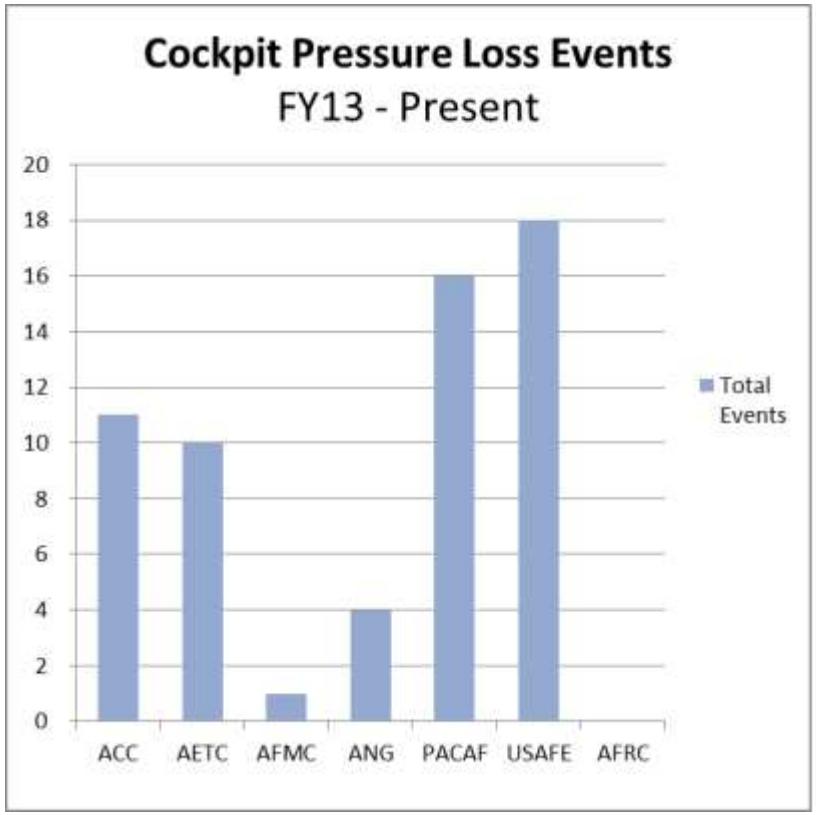
Overview

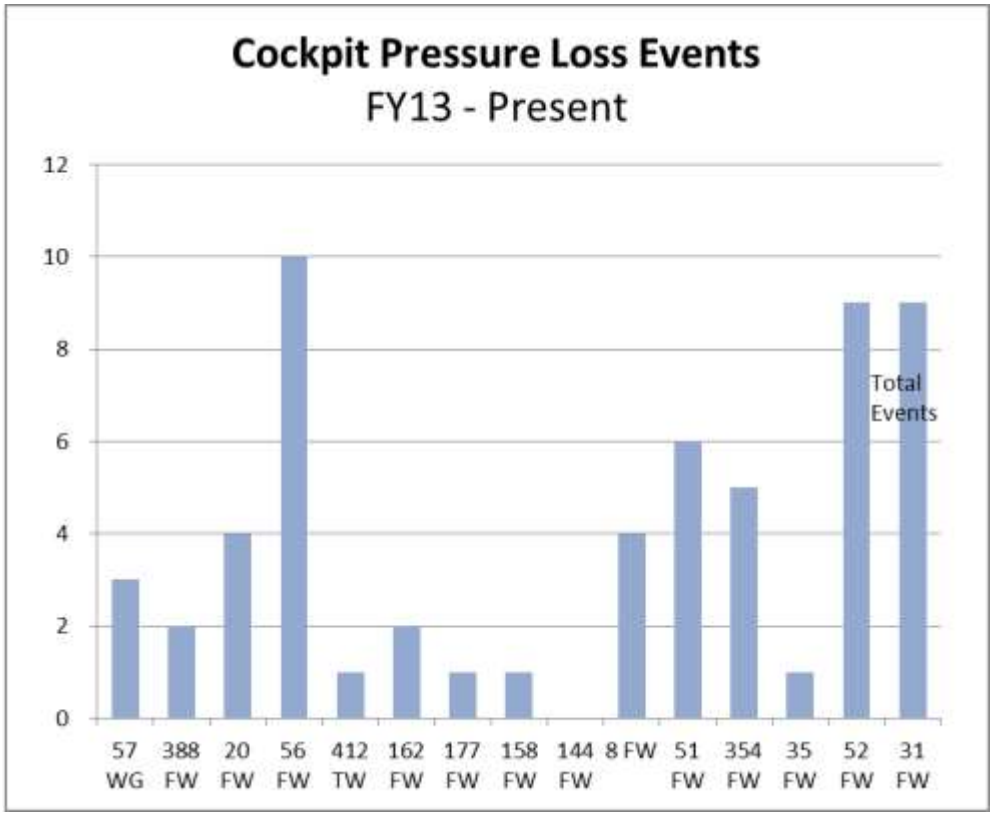
- F-16 Cockpit pressure loss and hypoxia events - causes
- F-16 Cockpit pressure loss events/rates by Component and Wing
- F-16 Hypoxia events/rates by Component and Wing
- F-15 Hypoxia Symptom Reports
- F-15 Pressurization Loss Reports
- F-15 Cockpit pressure loss and hypoxia events – causes
- F-15 Hypoxia Reports by MAJCOM
- F-15 Cockpit pressure loss reports by MAJCOM
- Conclusions/Recommendations

F-16 Cockpit Pressure Loss and Hypoxia Events - Causes

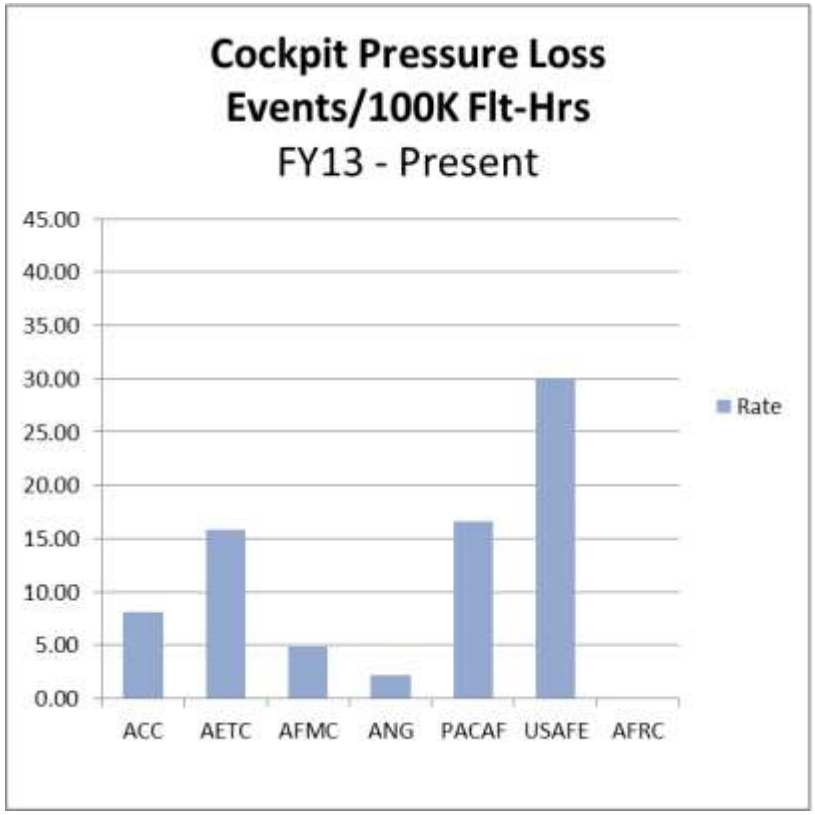


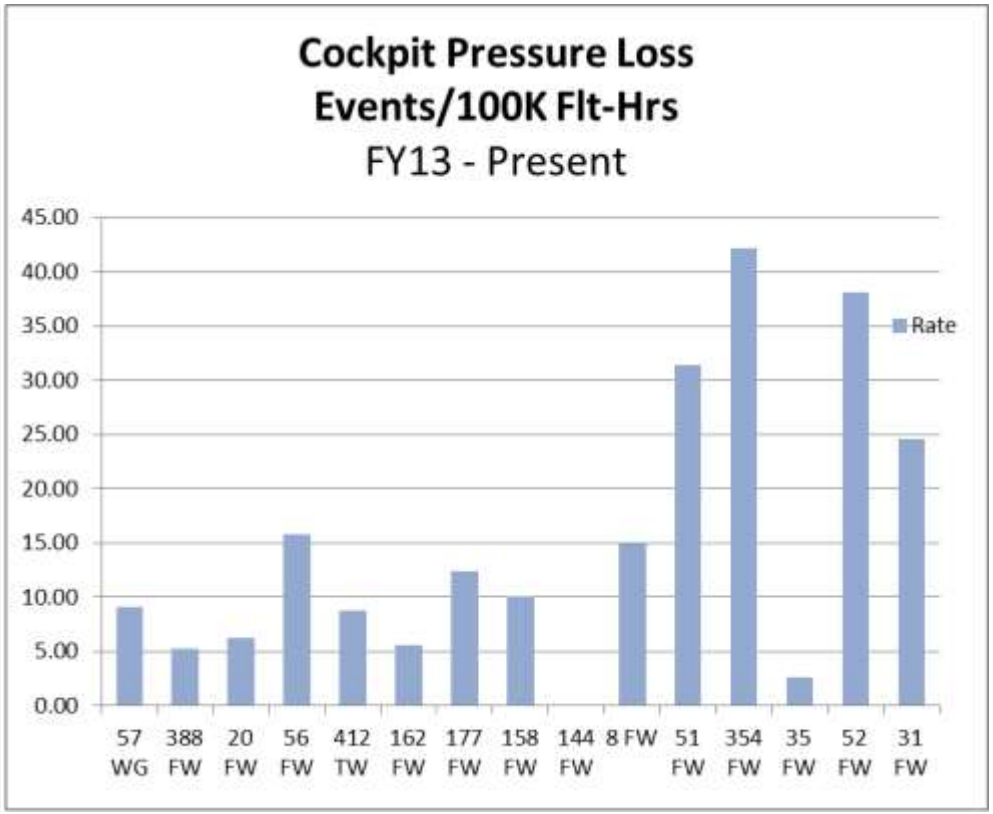
F-16 Cockpit Pressure Loss Events by Component and Wing



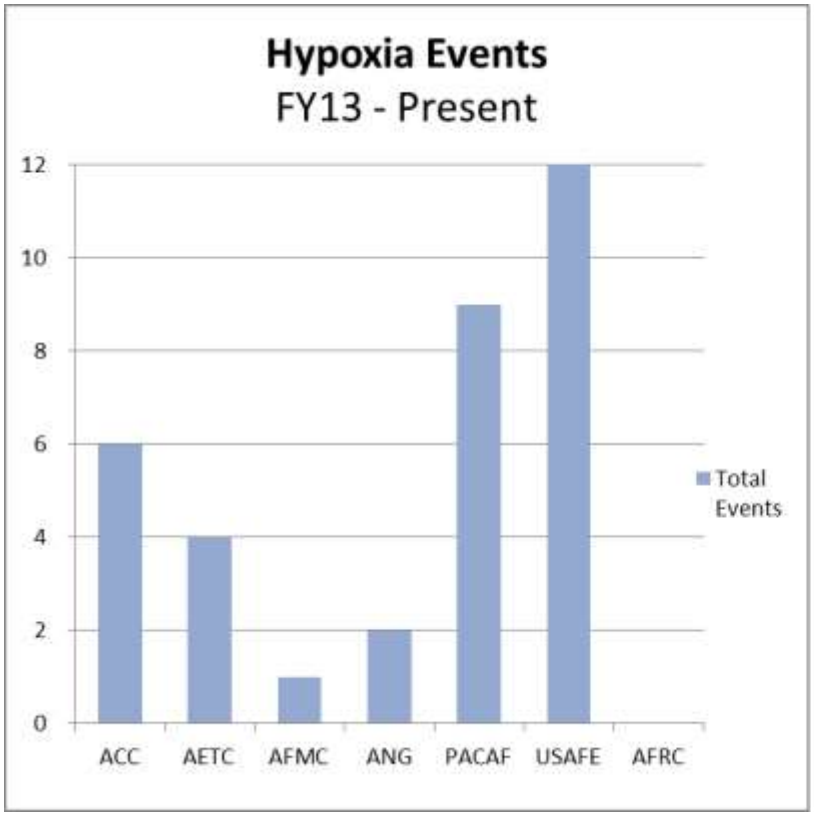


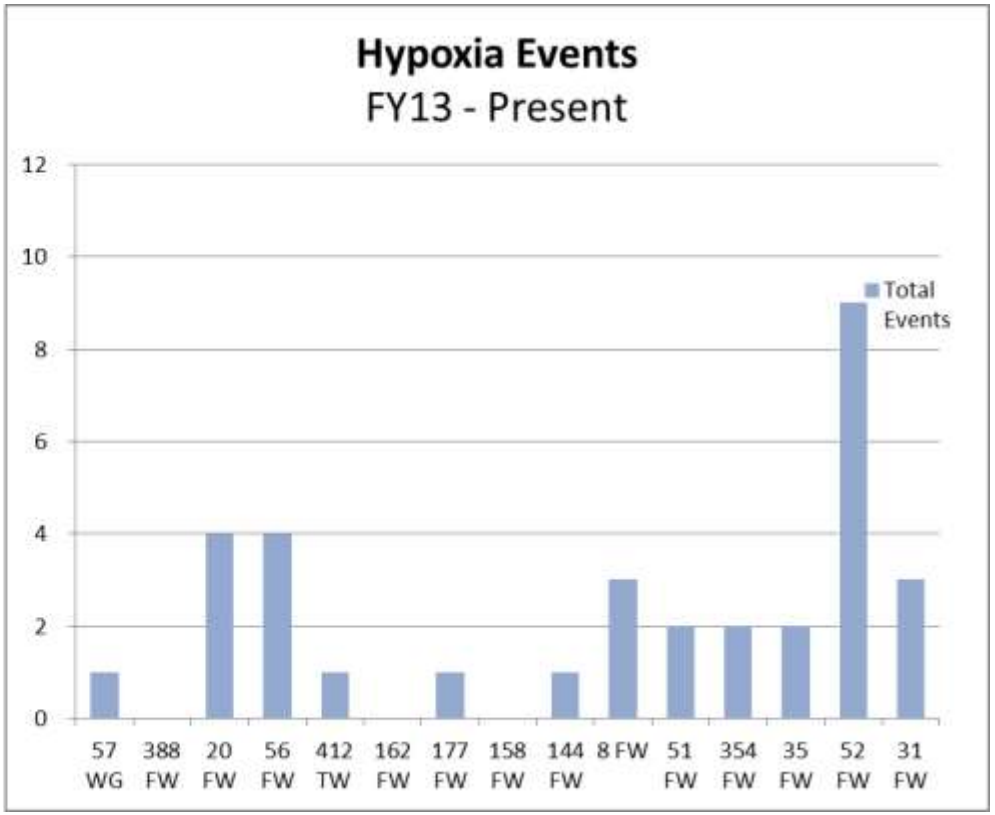
F-16 Cockpit Pressure Loss Rates by Component and Wing





F-16 Hypoxia Events by Component and Wing





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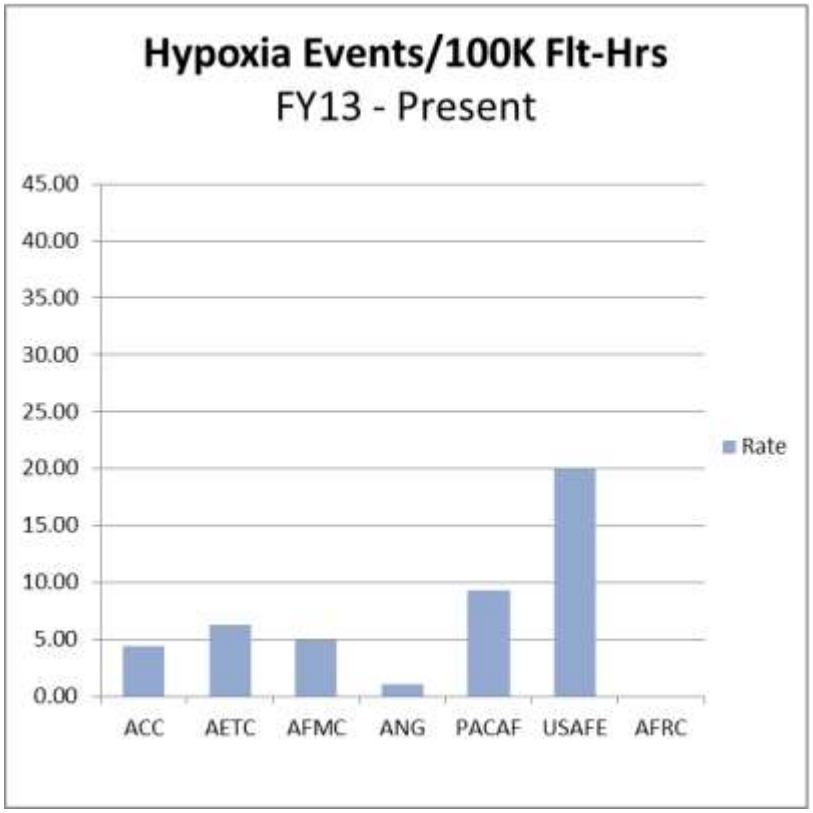
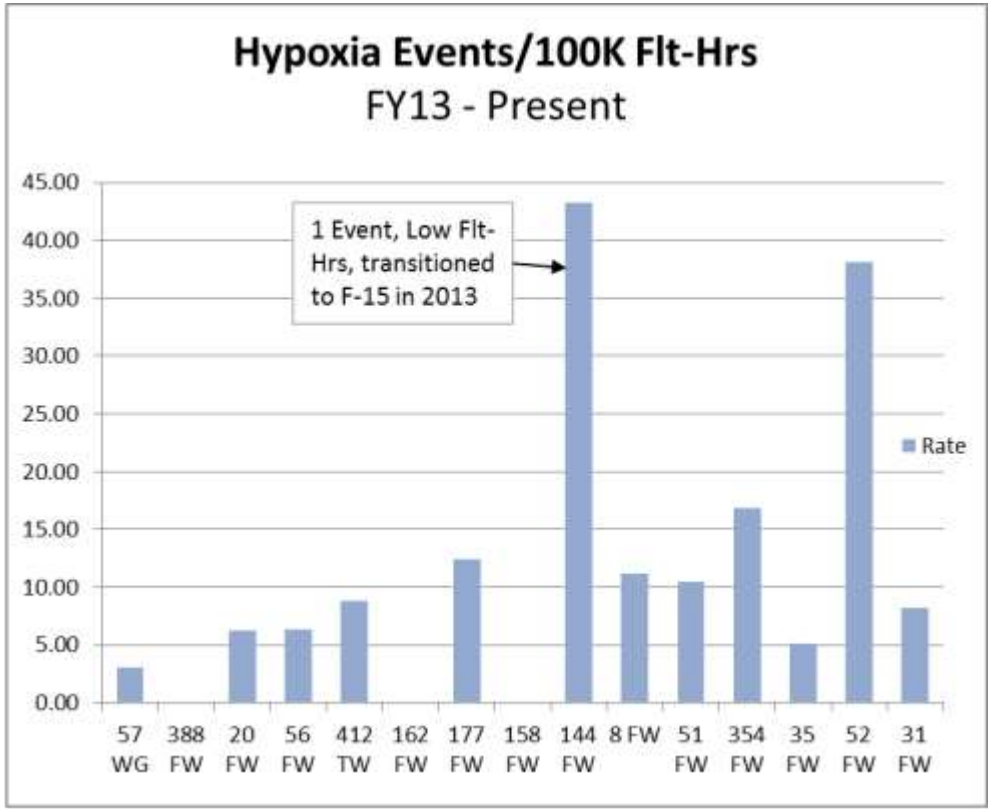
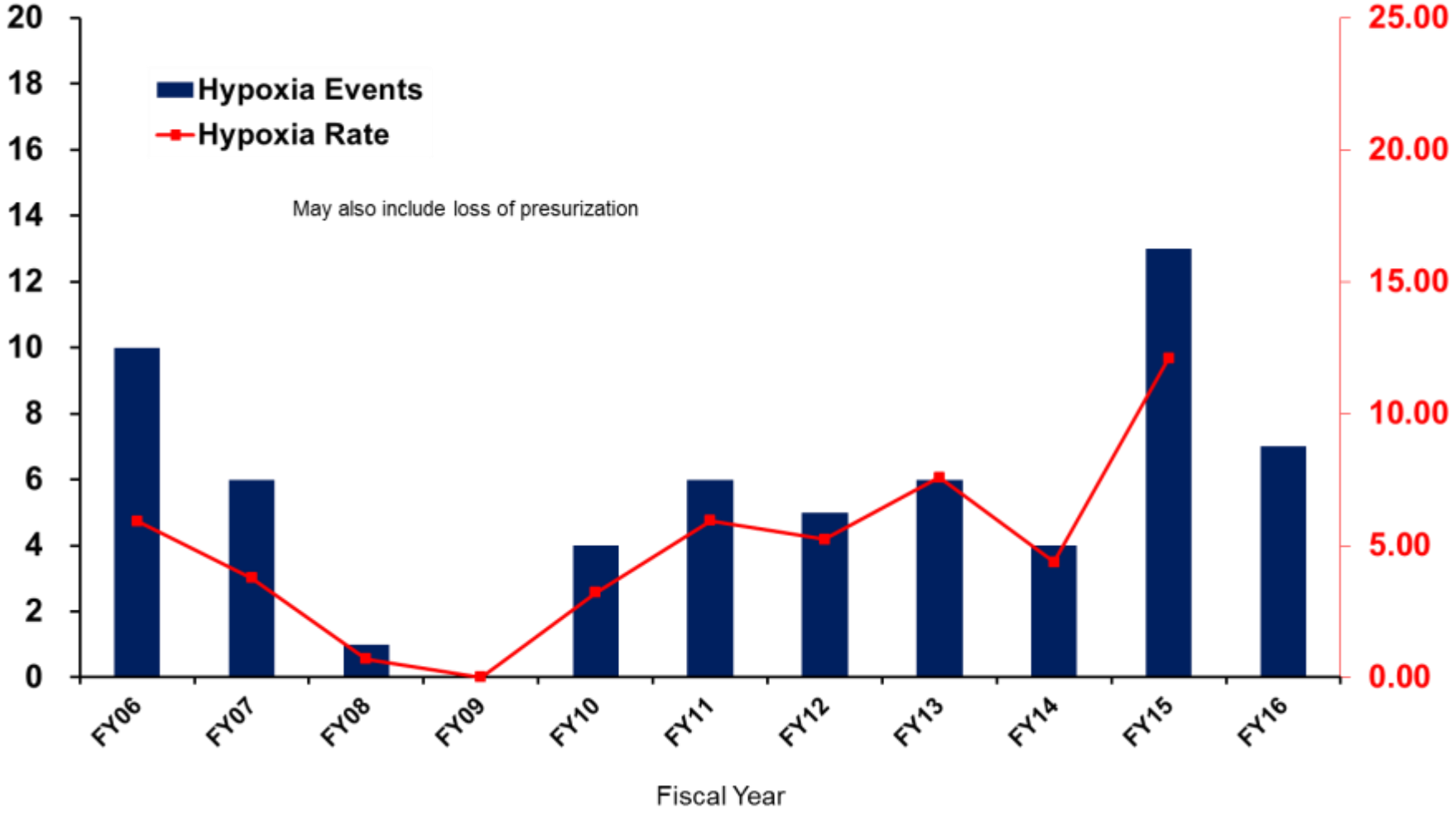
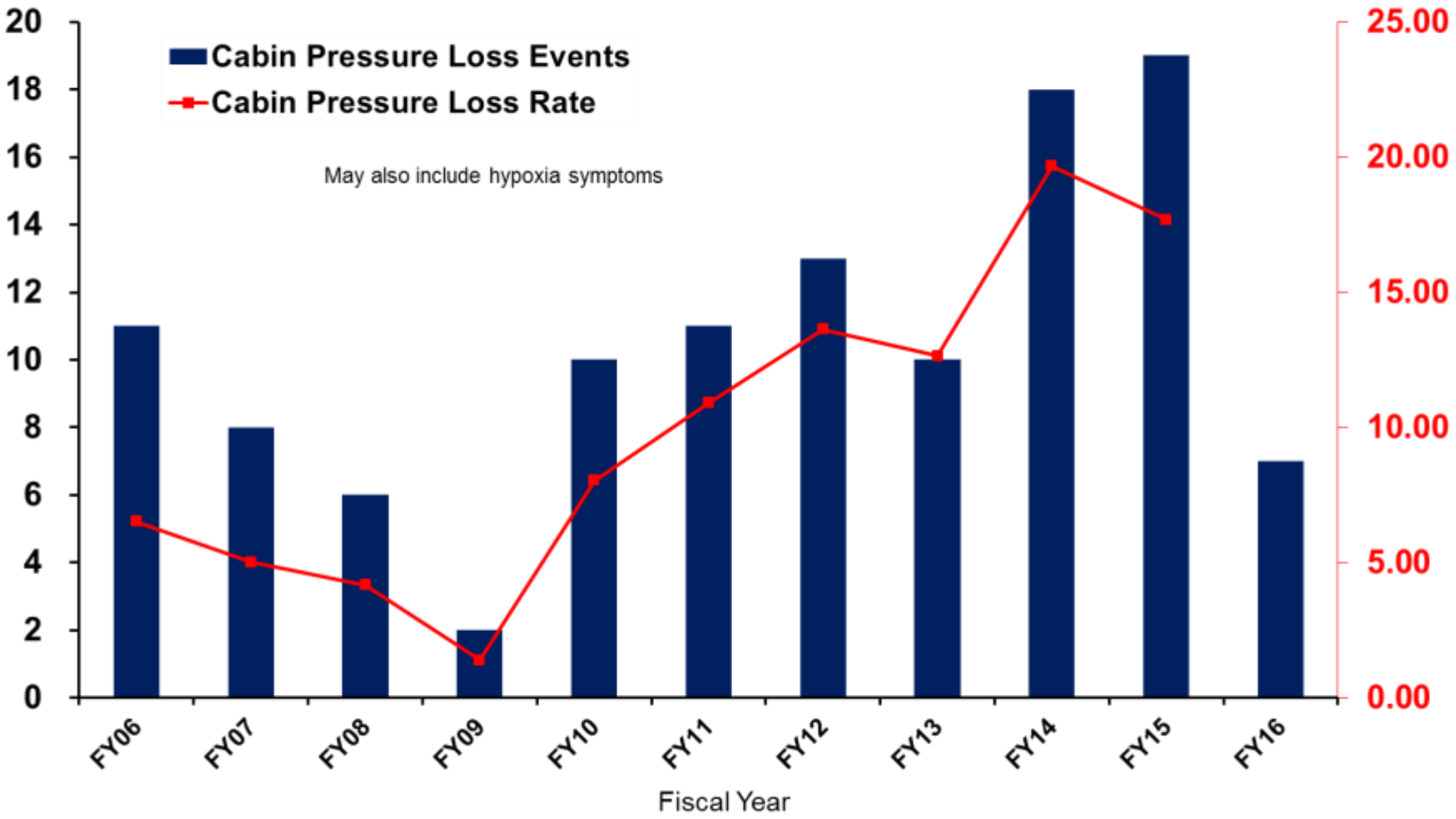




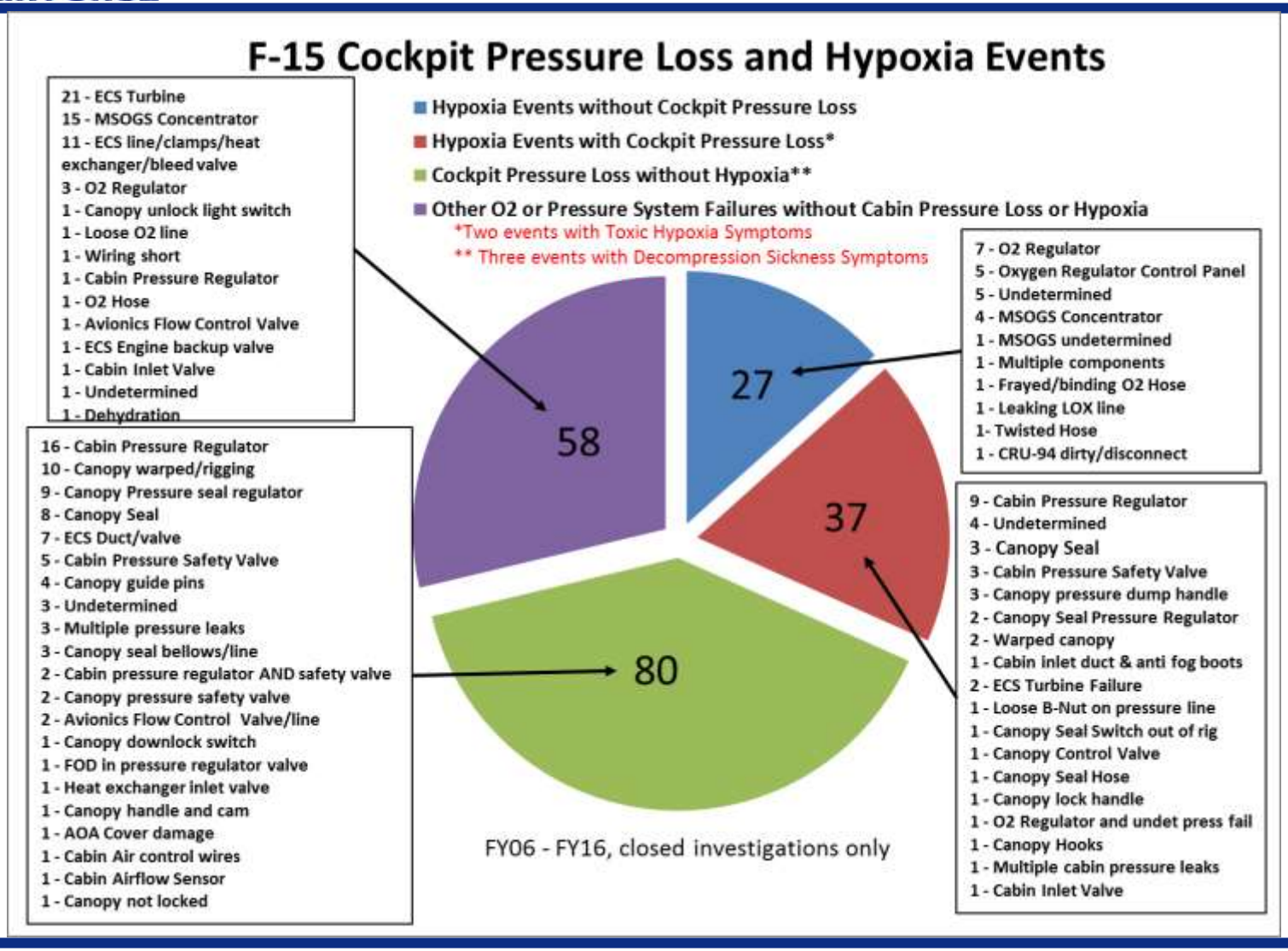
F-15 Hypoxia Symptoms



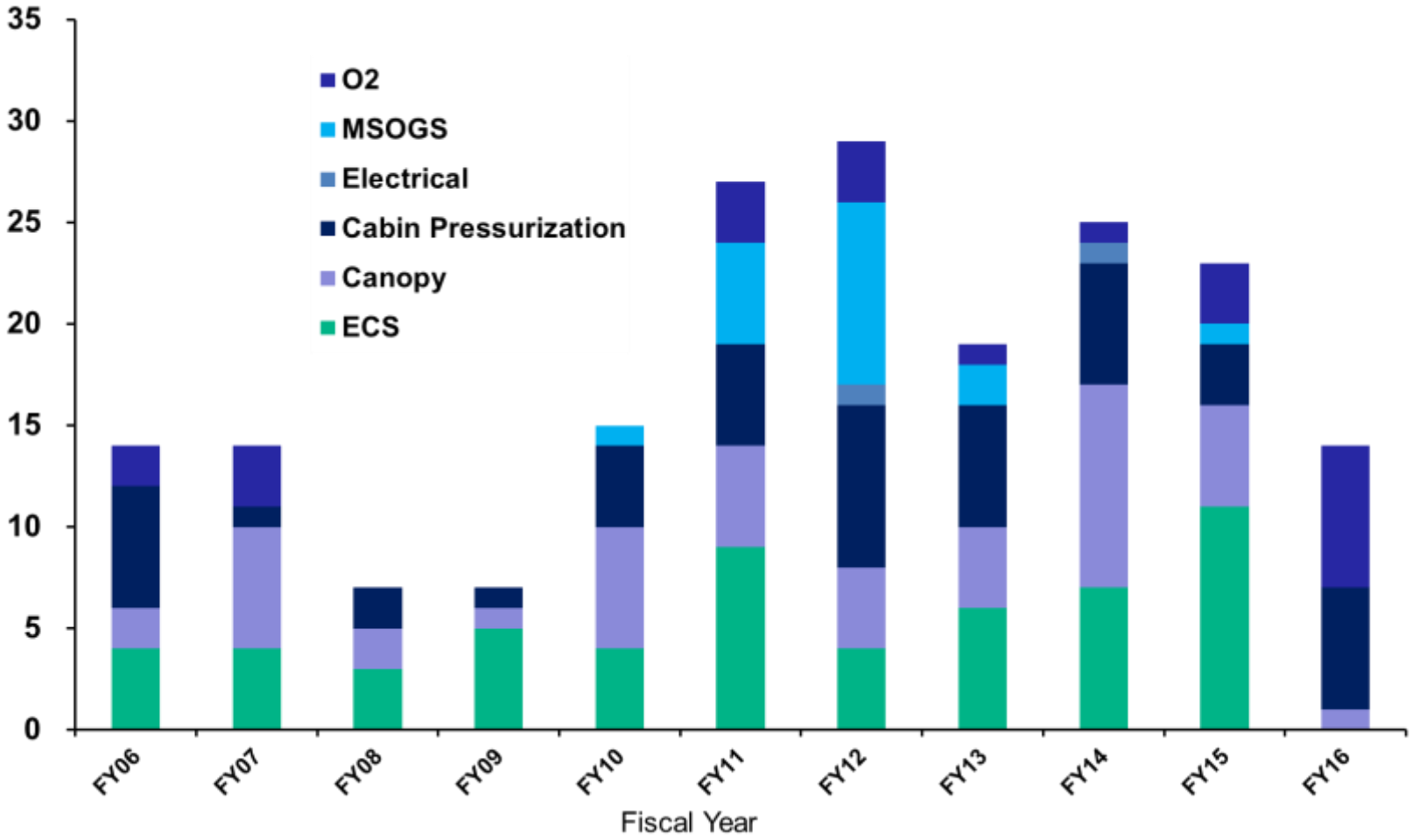
F-15 Pressurization Loss



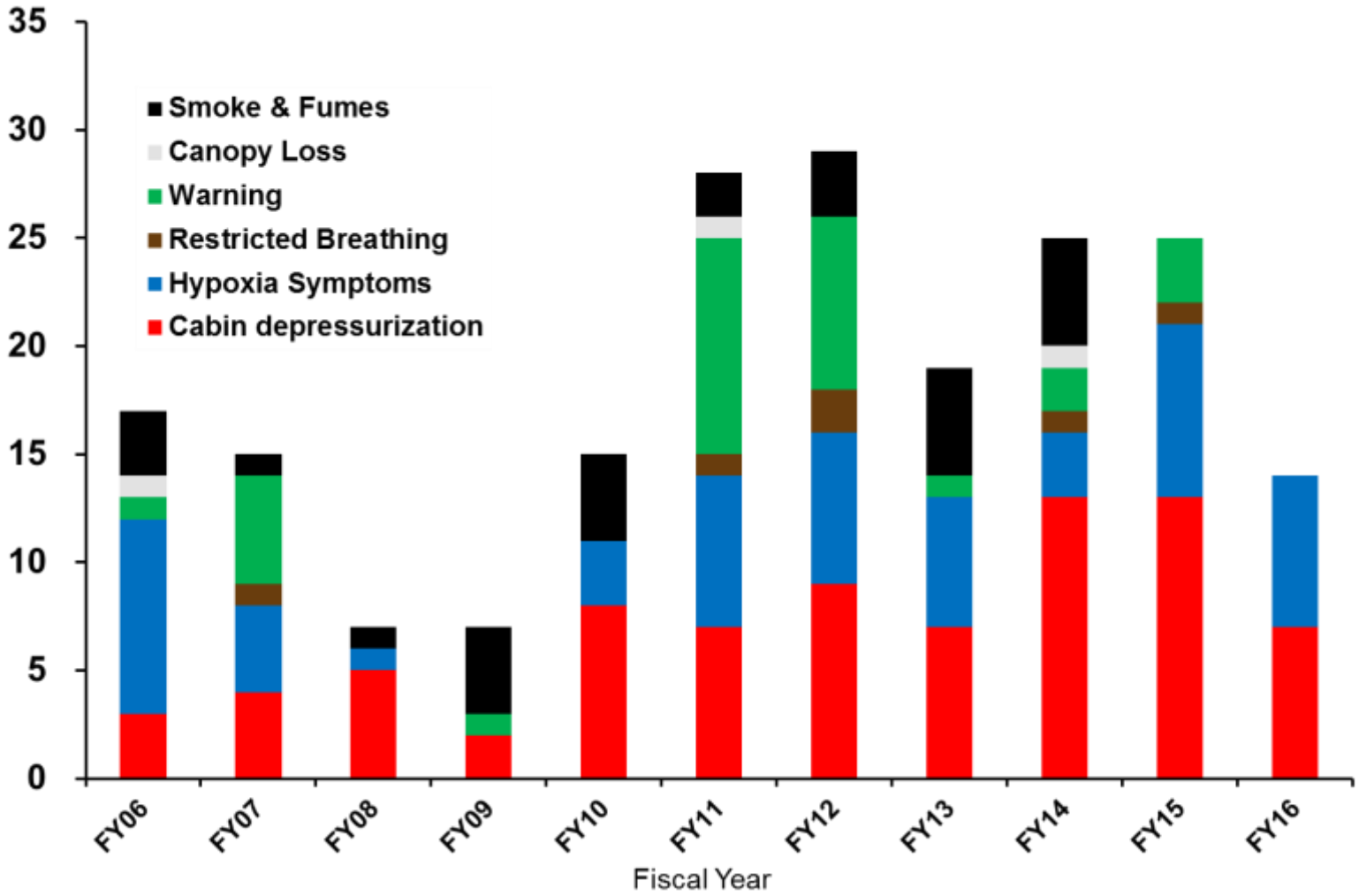
F-15 Cockpit Pressure Loss and Hypoxia Events - Causes



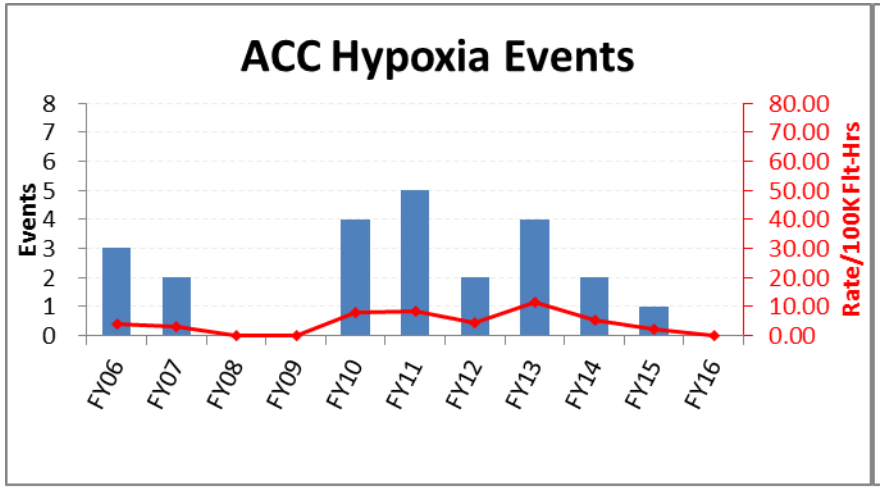
F-15 - Which System?

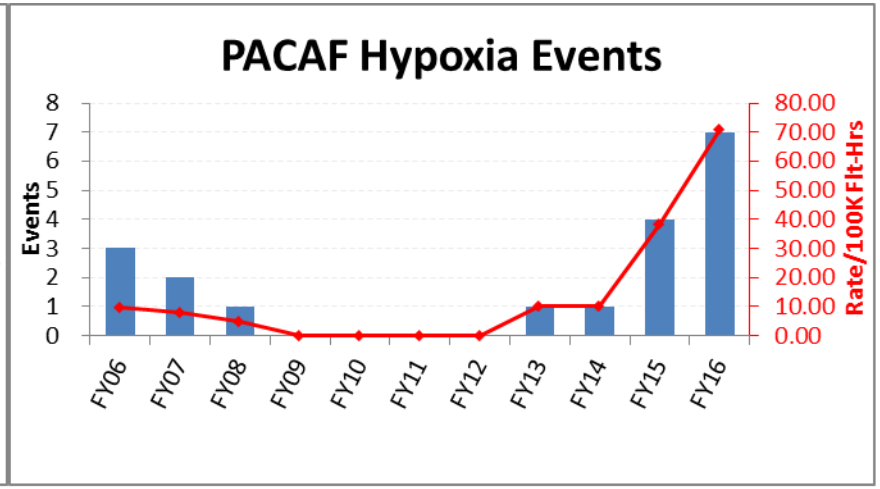


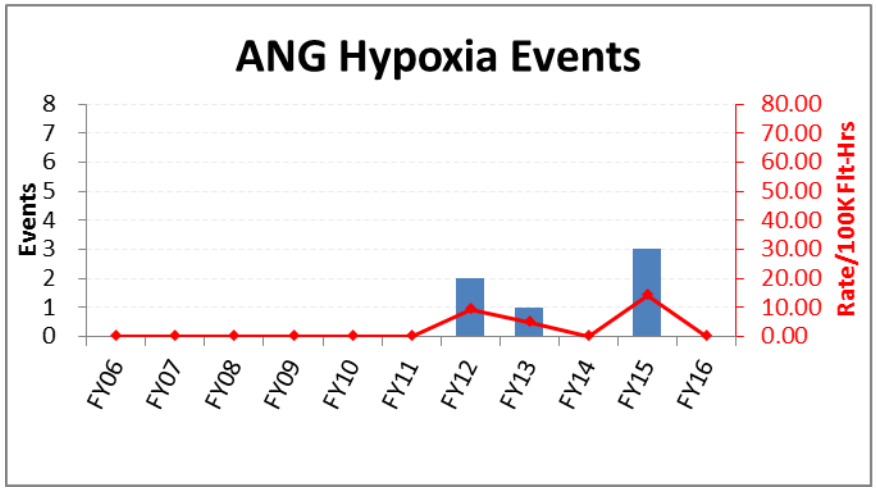
F-15 - How Discovered?

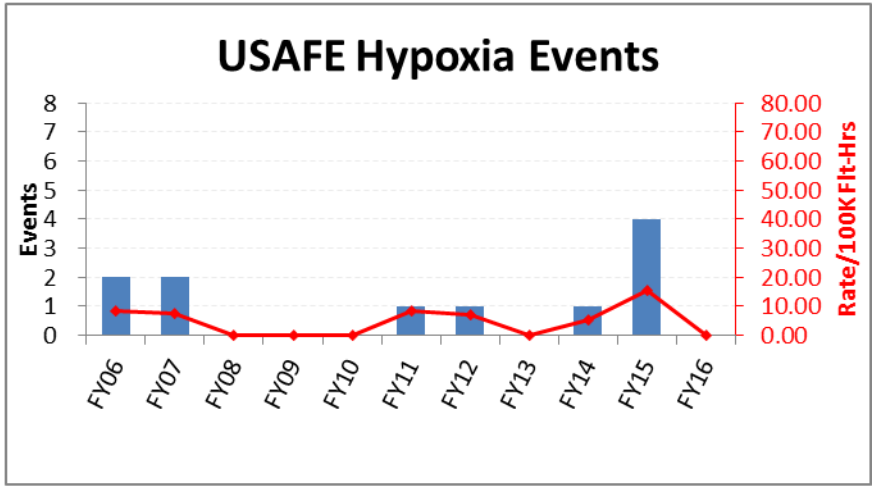


F-15 Hypoxia Symptom Reports by MAJCOM

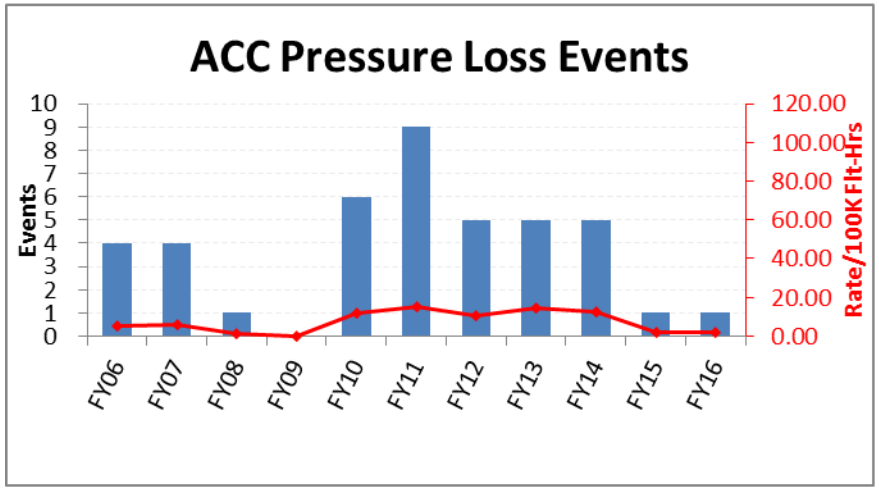


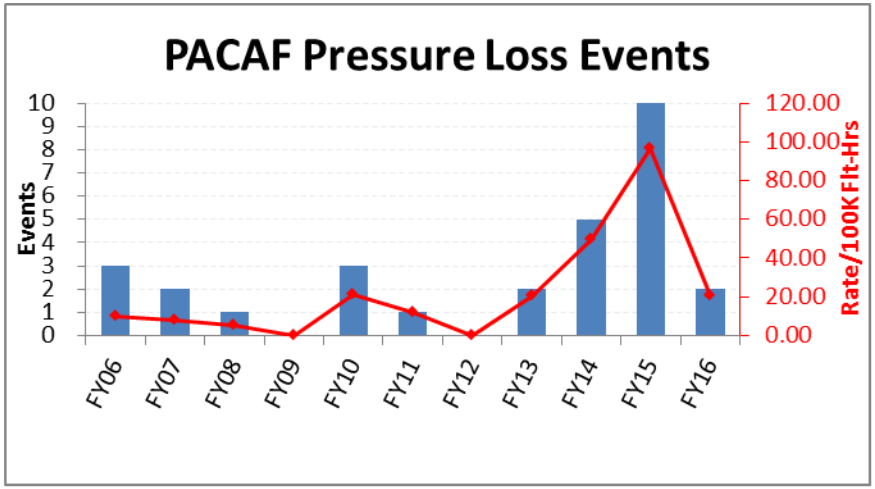


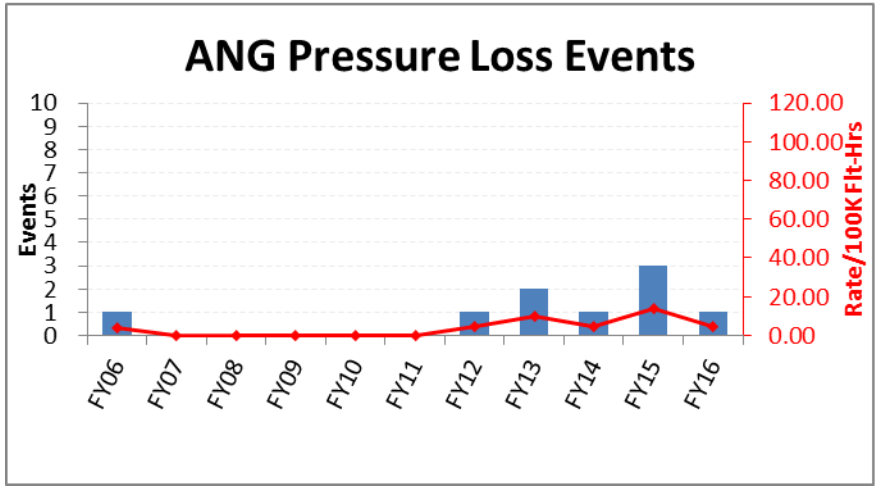


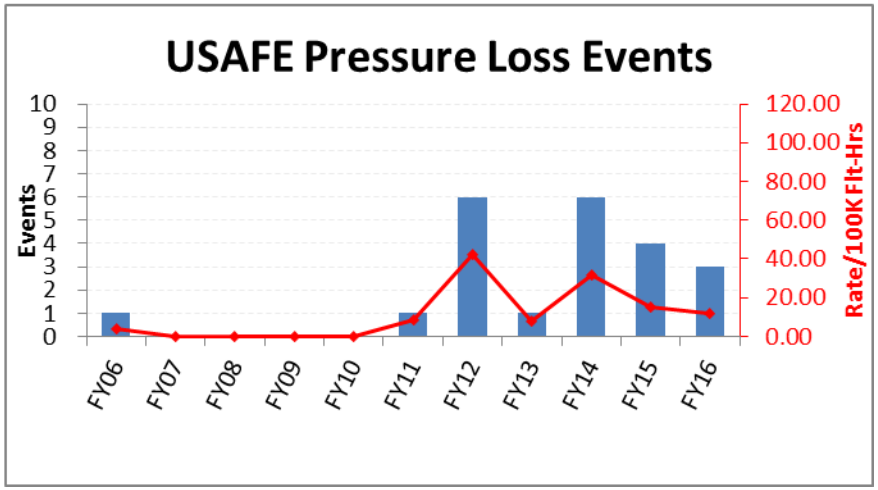


F-15 Cockpit Pressure Loss Reports by MAJCOM









18 WG Tail Number Reports

DATE	CLASS	MDS	Wing	Tail Number
27 Jul 2015	E-PHYS	F-15C	18 WG	80-000012
02 Nov 2015	E-PHYS	F-15C	18 WG	80-000012
21 Oct 2015	E-PHYS	F-15C	18 WG	81-000029
23 Oct 2015	E-PHYS	F-15C	18 WG	81-000029
15 Mar 2006	E-PHYS	F-15C	1 FW	81-000038
25 Jul 2013	E-MISC	F-15C	18 WG	81-000038
28 Jun 2010	E-PHYS	F-15C	18 WG	81-000040
03 Nov 2015	E-PHYS	F-15C	18 WG	81-000040
04 Apr 2008	E-PHYS	F-15C	18 WG	82-000012
05 Dec 2014	E-MISC	F-15C	18 WG	82-000012
28 May 2015	E-MISC	F-15C	18 WG	82-000012
23 Jun 2015	E-PHYS	F-15C	18 WG	82-000012
30 Aug 2006	C	F-15C	18 WG	83-000011
07 Apr 2015	E-MISC	F-15C	18 WG	83-000011
02 Dec 2014	E-MISC	F-15C	18 WG	85-000103
13 Apr 2015	E-MISC	F-15C	18 WG	85-000103
24 Jun 2015	E-PHYS	F-15C	18 WG	85-000103
23 Jul 2015	E-PHYS	F-15C	18 WG	85-000103
02 Aug 2010	E-PHYS	F-15C	18 WG	85-000104
28 Dec 2015	E-PHYS	F-15C	18 WG	85-000104

366 FW Tail Number Reports

DATE	CLASS	MDS	Wing	Tail Number
13 Oct 2010	E-PHYS	F-15E	366 FW	87-000173
21 Oct 2010	E-PHYS	F-15E	366 FW	87-000173
04 Feb 2016	E-MISC	F-15E	366 FW	87-000173
26 Jan 2012	E-HAP	F-15E	366 FW	87-000183
25 Jul 2012	E-PHYS	F-15E	366 FW	87-000183
05 Jan 2011	E-PHYS	F-15E	366 FW	87-000201
16 Feb 2011	E-PHYS	F-15E	366 FW	87-000201
03 Jun 2011	E-PHYS	F-15E	366 FW	87-000201

48 FW Tail Number Reports

DATE	CLASS	MDS	Wing	Tail Number
24 Jan 2012	E-PHYS	F-15E	48 FW	00-003000
16 Sep 2013	E-PHYS	F-15E	48 FW	00-003000
22 Apr 2014	D	F-15E	48 FW	00-003000
09 Jan 2014	E-MISC	F-15C	48 FW	86-000159
04 Jun 2014	E-PHYS	F-15C	48 FW	86-000159
18 Jun 2015	E-PHYS	F-15C	48 FW	86-000159
01 Aug 2006	E-PHYS	F-15C	No Data	86-000178
27 Oct 2015	E-MISC	F-15C	48 FW	86-000178
05 Apr 2014	E-PHYS	F-15E	48 FW	91-000321
10 Nov 2014	E-MISC	F-15E	48 FW	91-000321
13 Dec 2011	E-PHYS	F-15E	48 FW	96-000202
10 Jan 2012	E-MISC	F-15E	48 FW	96-000202
21 Aug 2013	E-PHYS	F-15E	4 FW	96-000202
22 Jan 2014	E-PHYS	F-15E	48 FW	96-000202
15 Oct 2015	E-MISC	F-15E	48 FW	96-000202
11 Dec 2015	E-MISC	F-15E	48 FW	96-000202
14 Apr 2012	E-PHYS	F-15E	48 FW	98-000133
11 Dec 2013	E-MISC	F-15E	48 FW	98-000133

4 FW Tail Number Reports

DATE	CLASS	MDS	Wing	Tail Number
04 Jan 2011	E-HAP	F-15E	4 FW	87-000178
02 Mar 2011	E-MISC	F-15E	4 FW	87-000178
09 Jan 2013	E-HAP	F-15E	4 FW	87-000199
31 Jan 2013	E-PHYS	F-15E	4 FW	87-000199
19 Jun 2014	E-PHYS	F-15E	4 FW	87-000199
16 Sep 2011	E-PHYS	F-15E	4 FW	88-001708
21 Sep 2011	E-PHYS	F-15E	4 FW	88-001708
25 Oct 2011	E-PHYS	F-15E	4 FW	89-000482
19 Mar 2014	E-MISC	F-15E	4 FW	89-000482
13 Oct 2011	E-PHYS	F-15E	4 FW	89-000492
03 Jan 2012	E-MISC	F-15E	4 FW	89-000492
23 Jan 2012	E-PHYS	F-15E	4 FW	89-000492
09 Sep 2013	E-MISC	F-15E	4 FW	89-000492

144 FW Tail Number Reports

DATE	CLASS	MDS	Wing	Tail Number
07 May 2015	E-MISC	F-15C	144 FW	84-000009
16 Sep 2015	D	F-15C	144 FW	84-000009

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Conclusions

- Cockpit pressure loss predominates, and often precedes hypoxia events
- F-16 Cockpit pressure loss warning may be too high (27K)
- F-16 Cockpit pressure loss event leading causes:
  - Canopy seal failures
  - Cabin pressure regulator failures
  - Miscellaneous Mx related actions
- F-16 Hypoxia event leading causes:
  - Loose/crimped hoses
  - O2 regulator failure
- F-16 Cabin pressure loss and hypoxia events/rates are higher at a few organizations

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Conclusions

- F-15 Cockpit pressure loss predominates, and often precedes hypoxia events
- Cockpit pressure loss warning – there is none!
- Cockpit pressure loss event leading causes:
  - Cabin pressure regulator failures
  - Canopy seal pressure regulator failures
- Hypoxia event leading causes:
  - O2 regulator failure
  - MSOGS failures (declining in recent years)
- Maintenance troubleshooting to identify failures is a challenge

Recommendations

- Flying Units:
  - PRICE Checks
  - Immediate EP execution for cockpit pressure loss
  - Review Mx training and procedures on ECS, pressurization, O2 systems
- SPO:
  - F-16 - Improve cockpit pressure loss warning schedule
  - F-16 - Consider time change for canopy seals
  - F-15 - Consider adding cockpit pressure warning
  - Consider scheduled cockpit pressurization checks
  - Verify Mx T.O.s are appropriate for ECS, pressurization, O2
  - Consider technology insertion for pilot monitoring

Thank you.

QUESTIONS?

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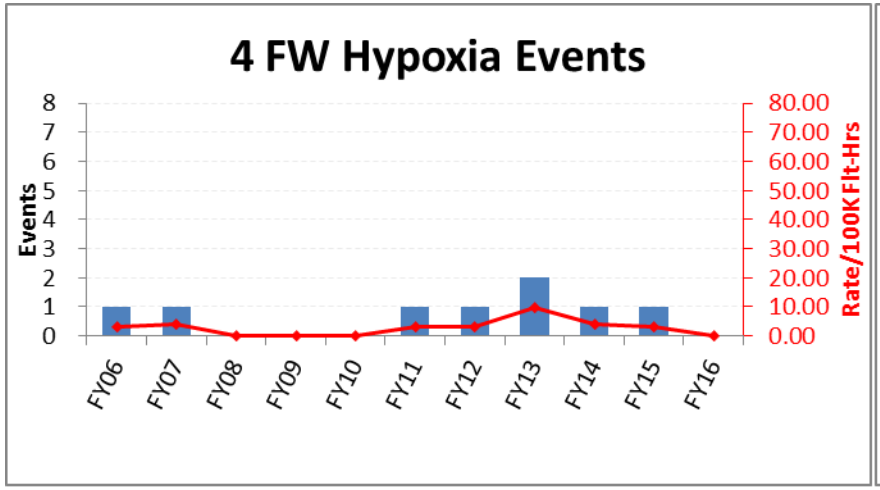
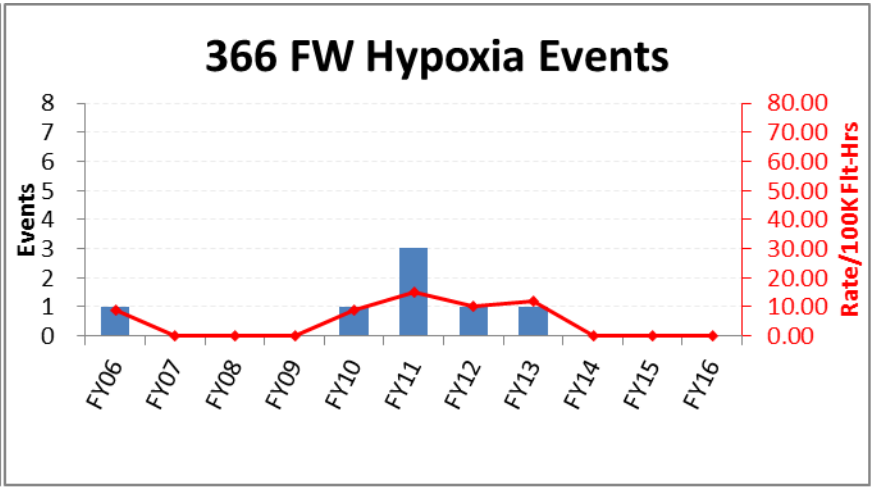
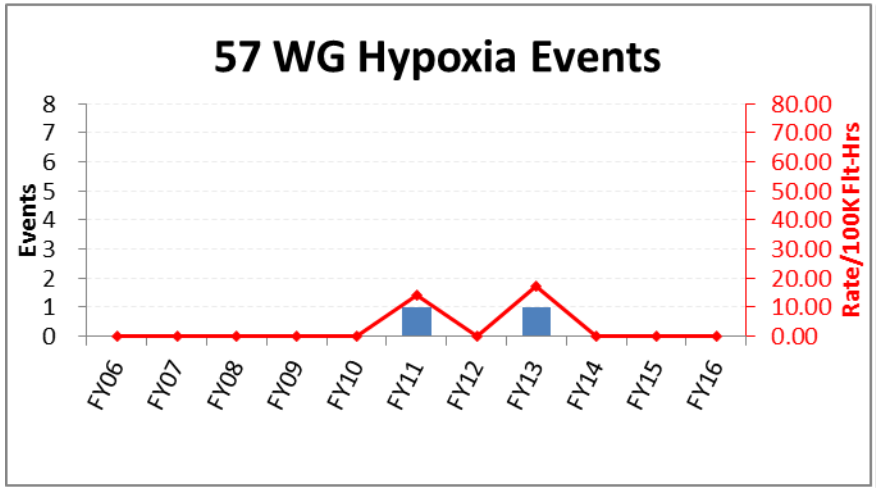
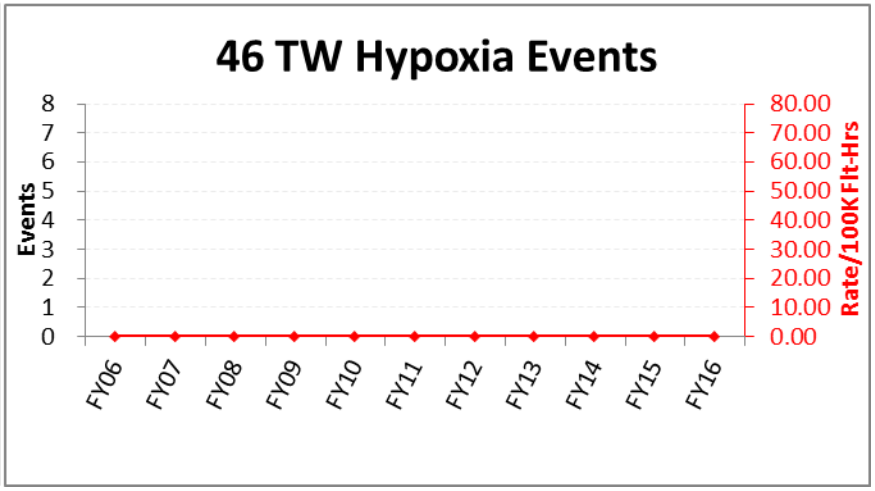
Backups

F-15 Hypoxia Symptom Reports by Wing

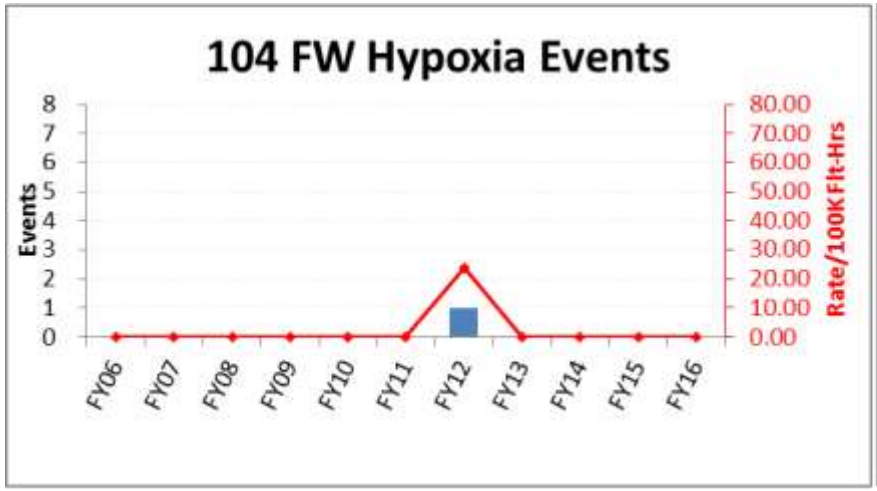


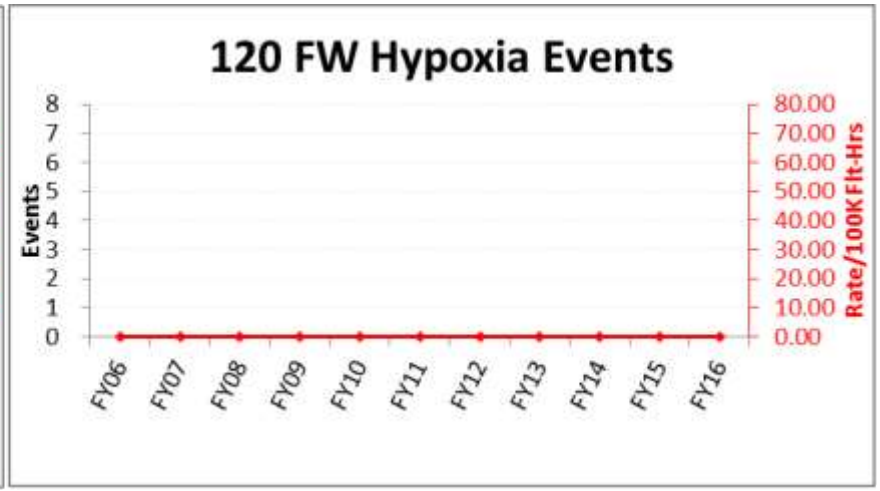


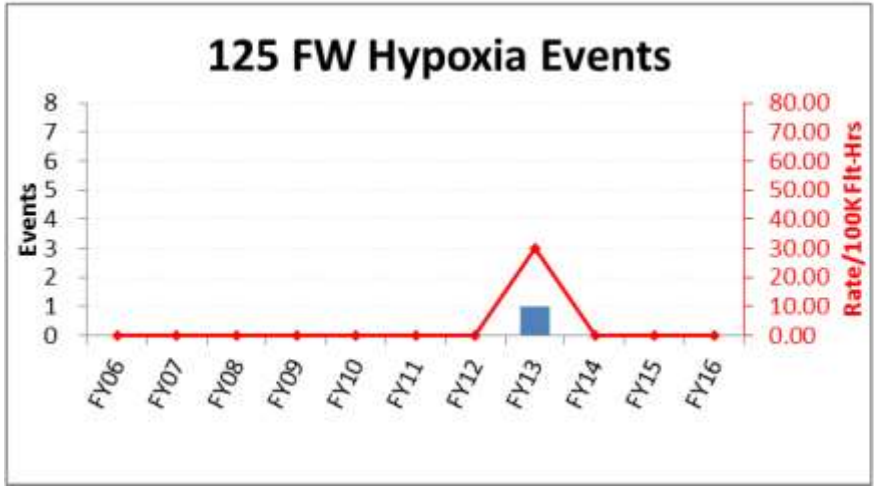


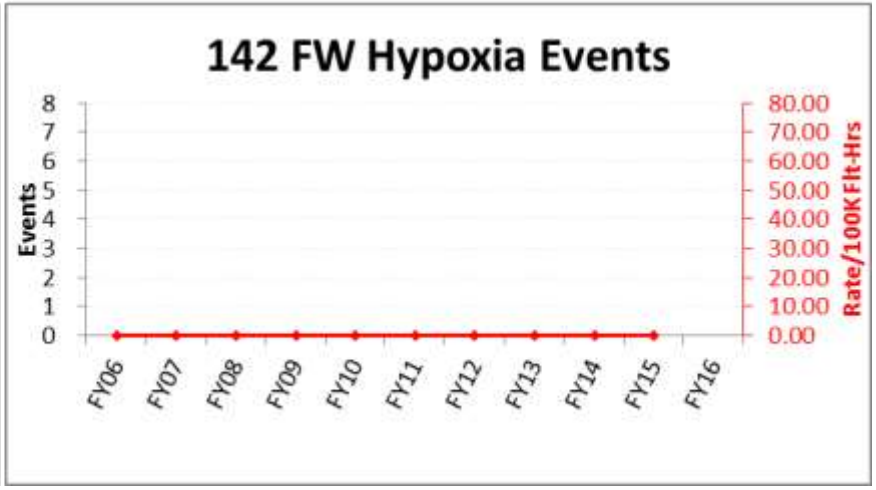


F-15 Hypoxia Symptom Reports by Wing









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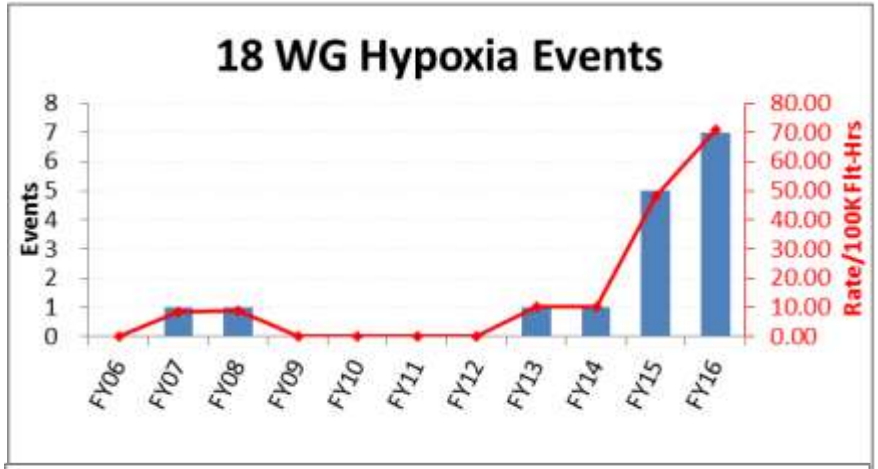

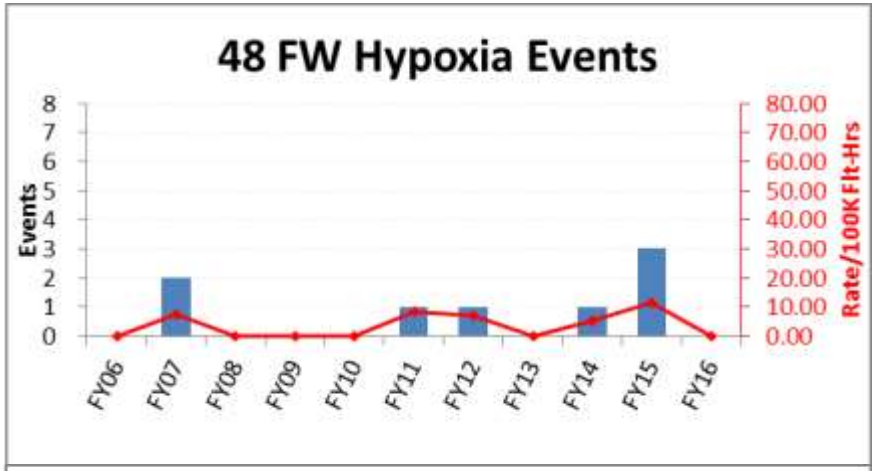

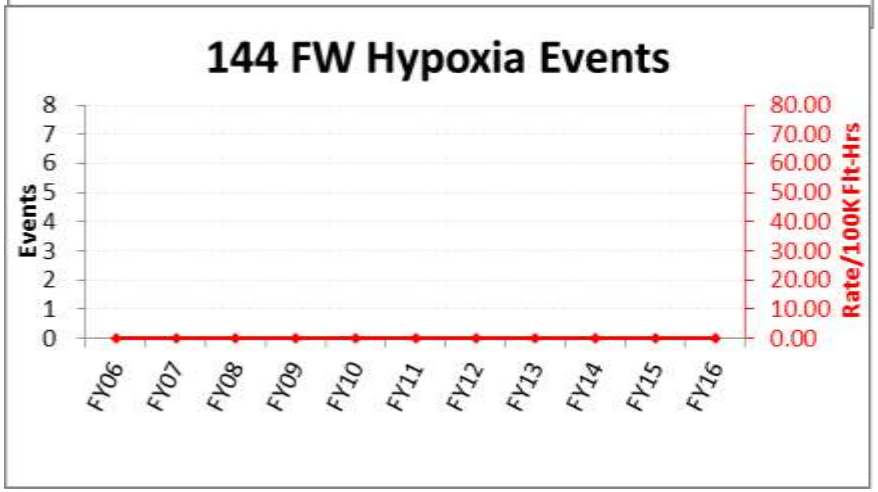

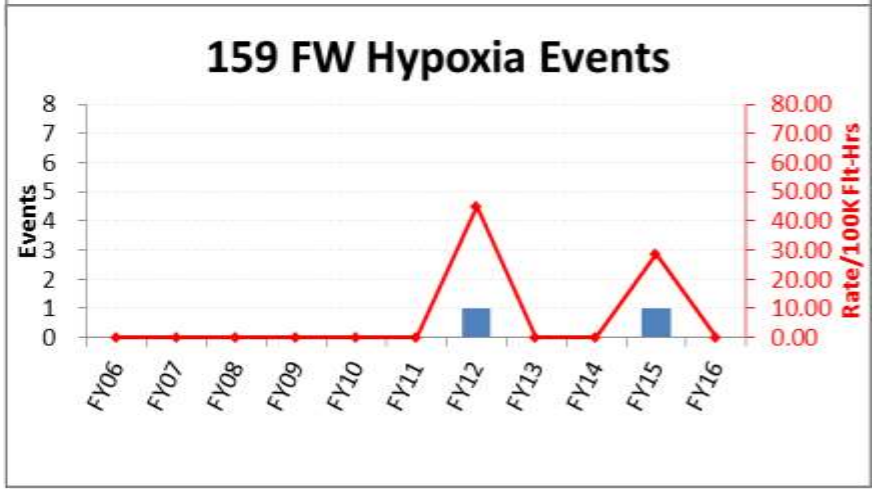

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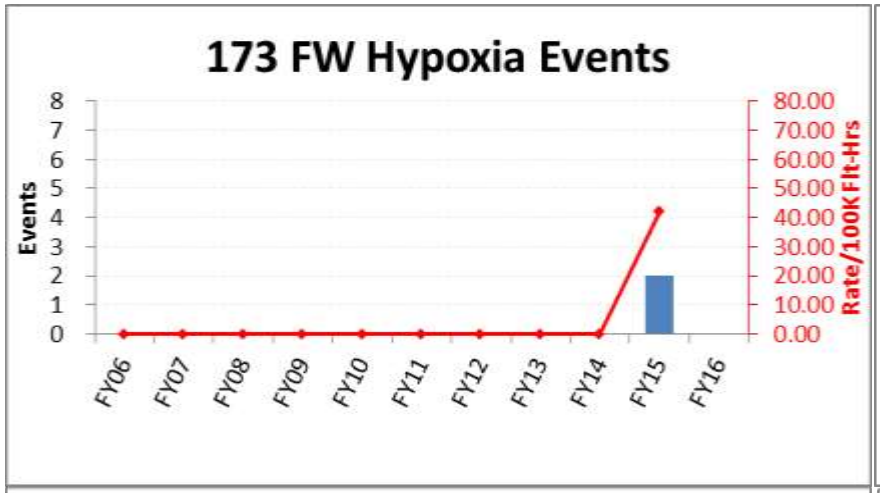
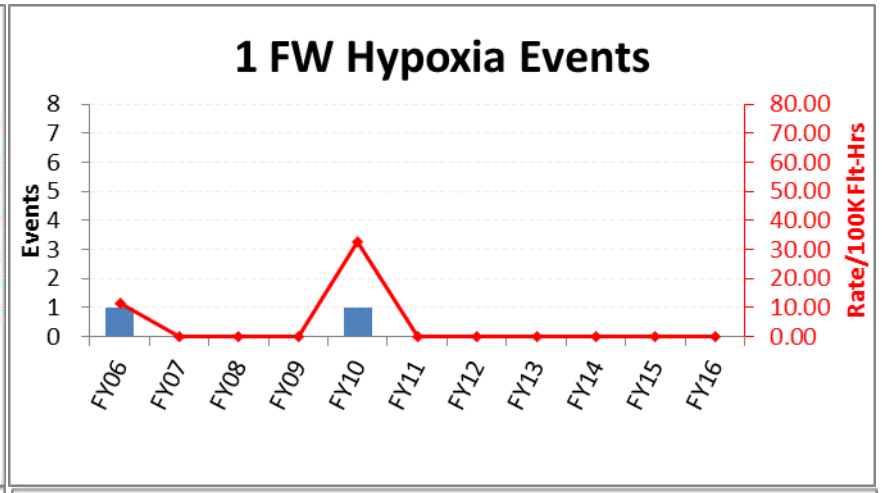
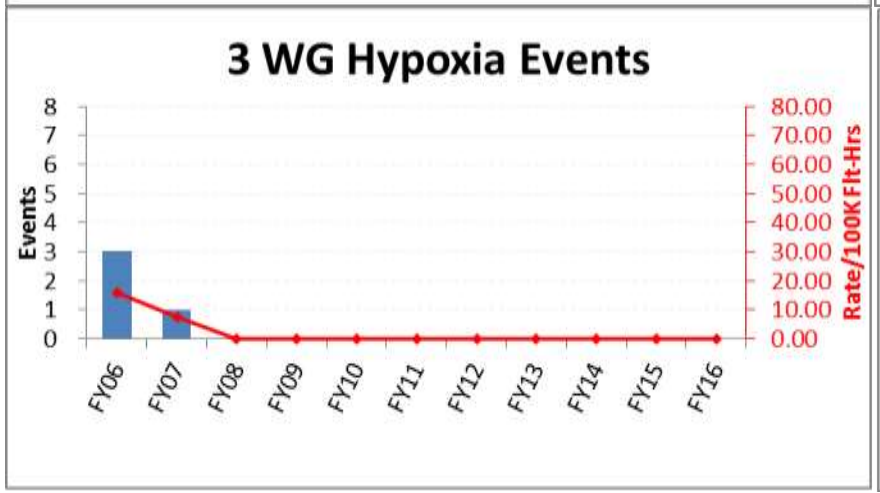
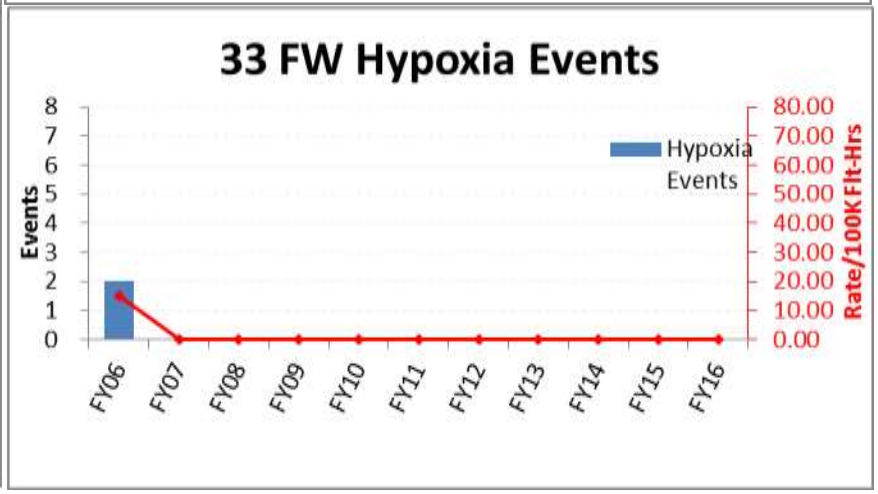
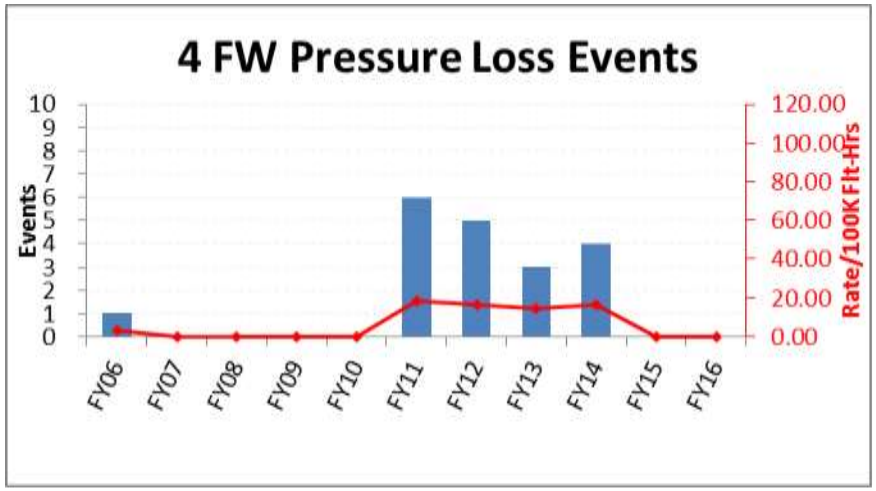


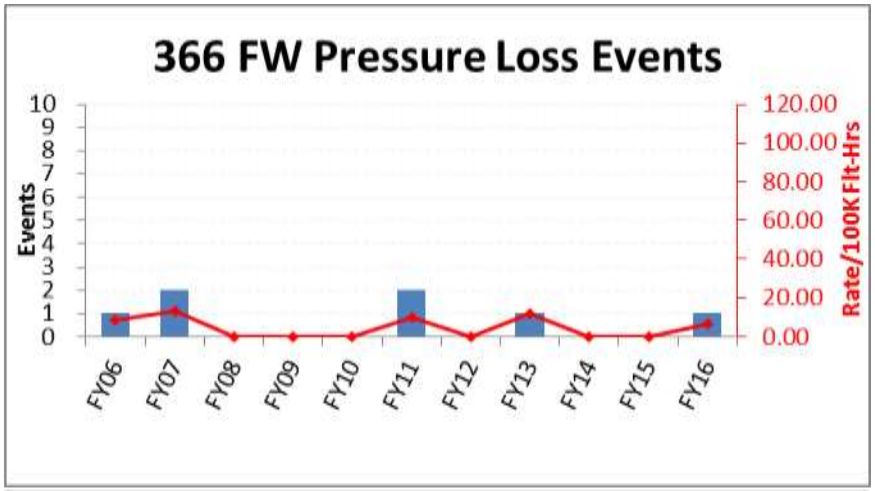


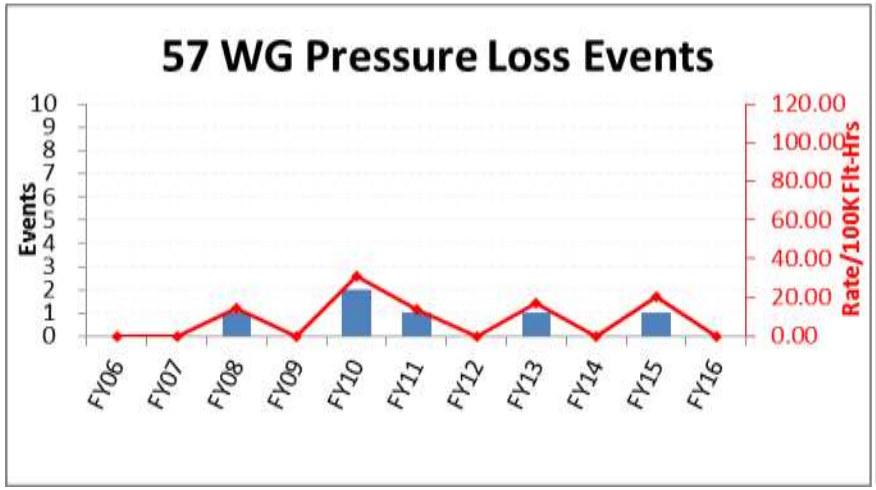


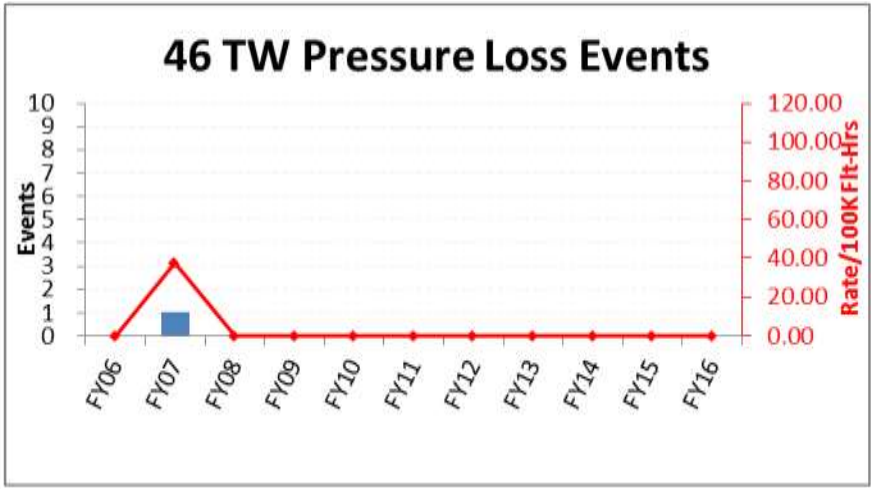


F-15 Cockpit Pressure Loss Reports by Wing









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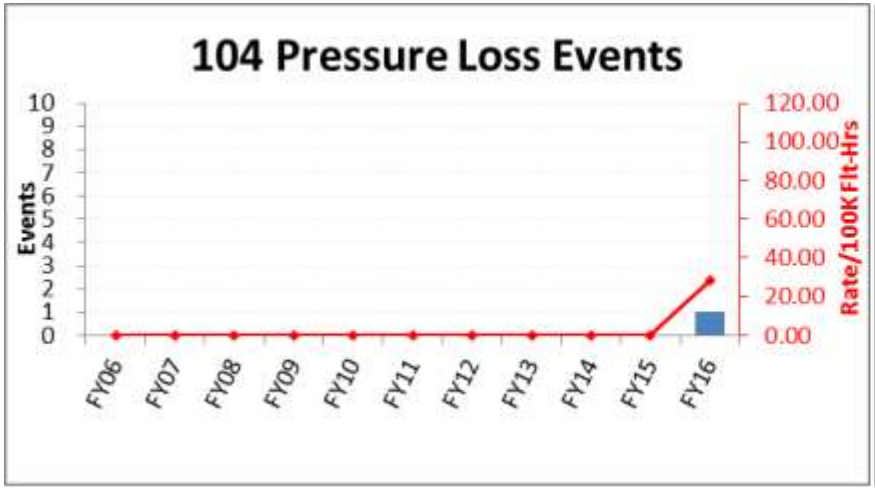
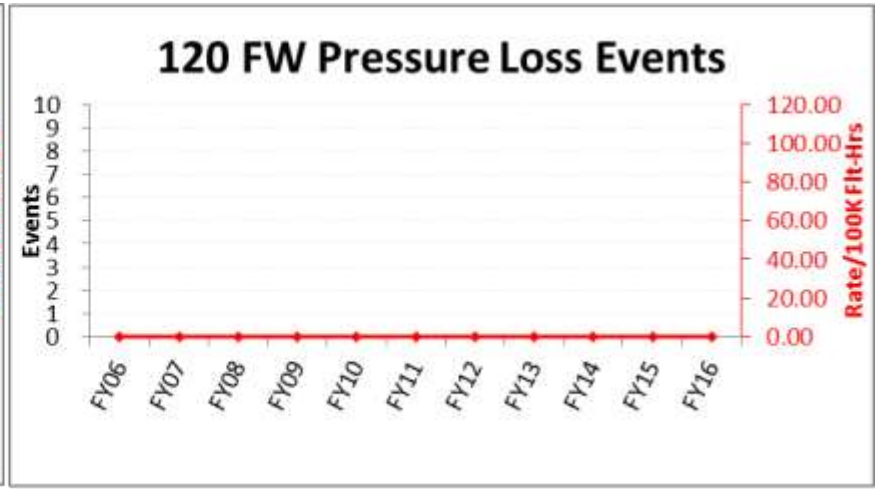
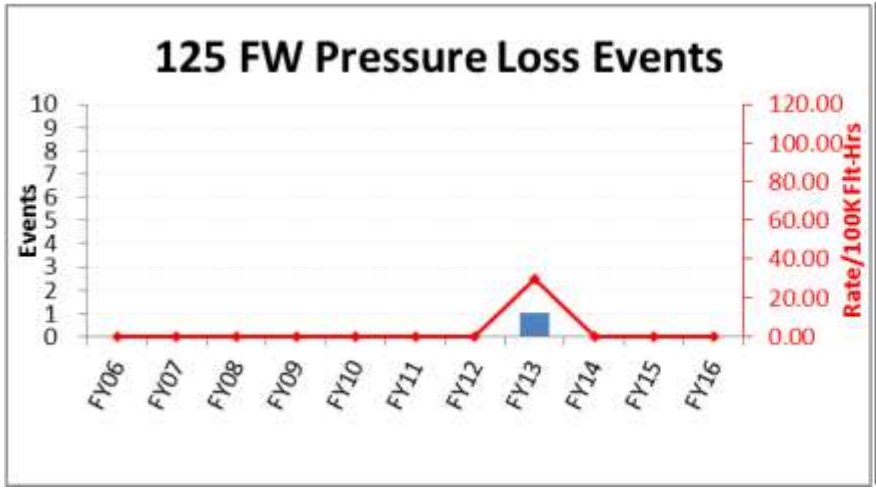
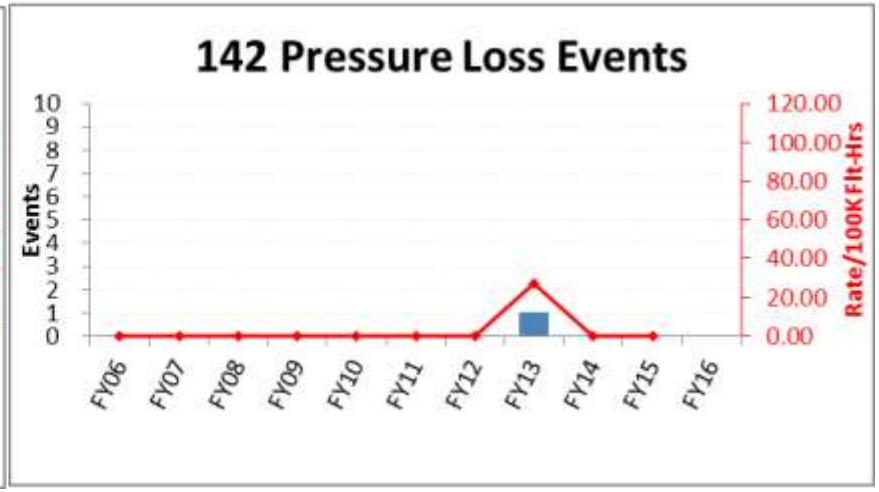
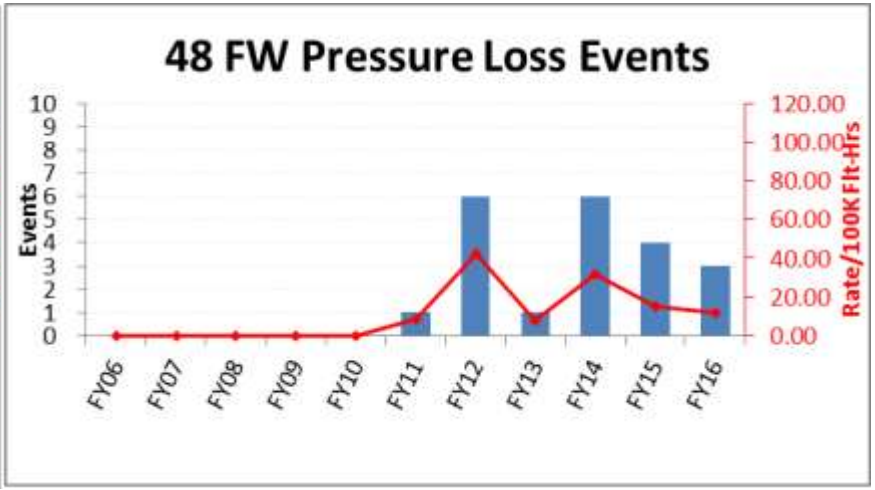


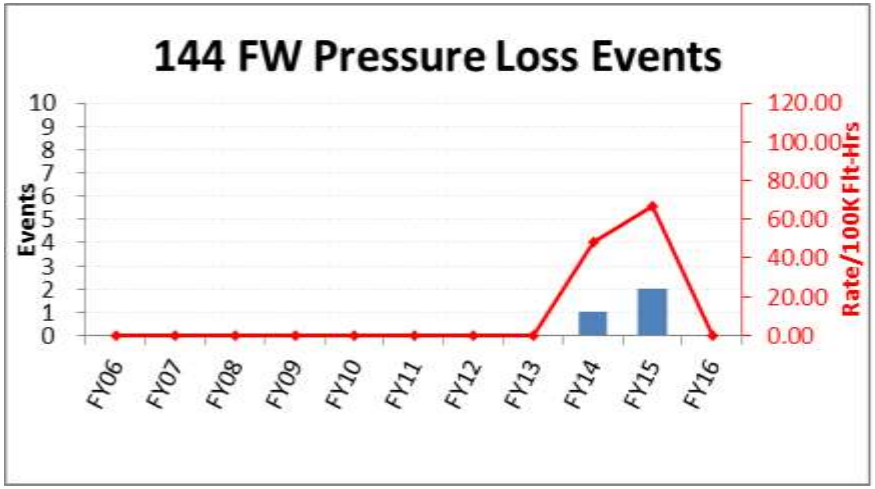


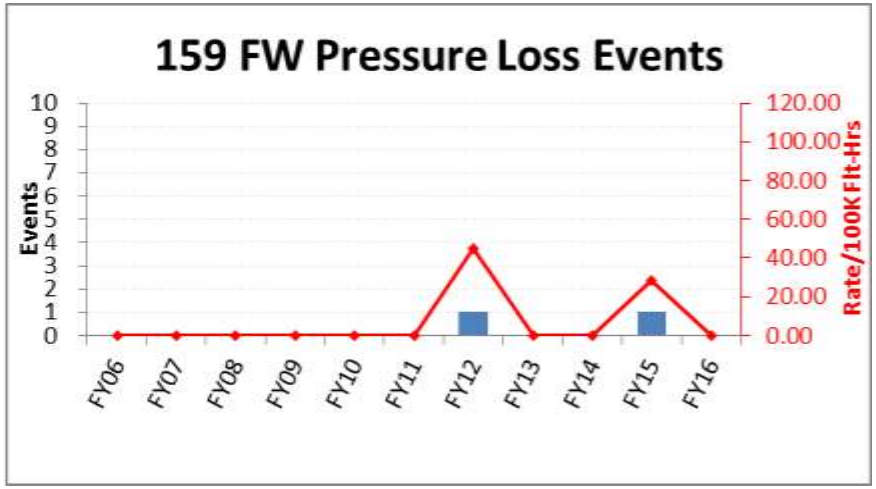
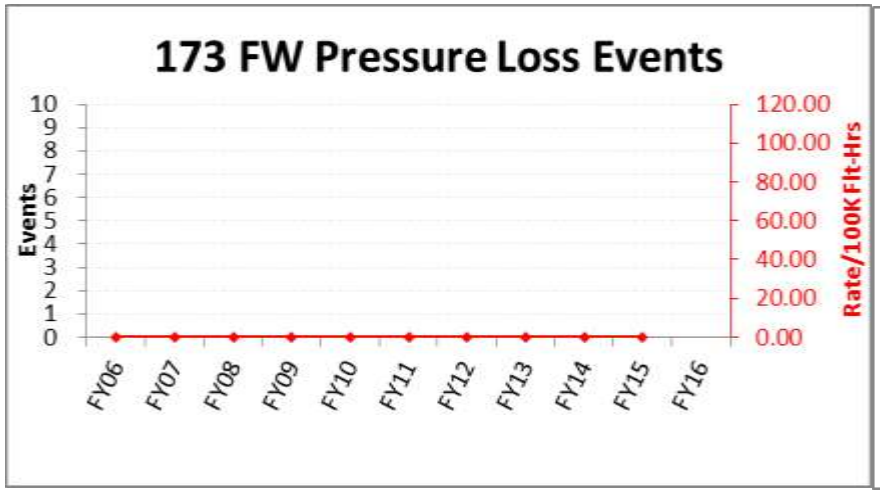
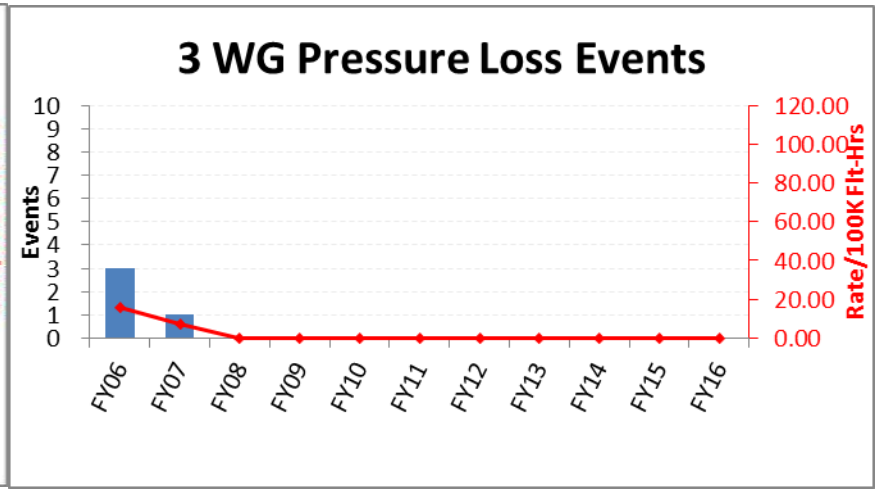
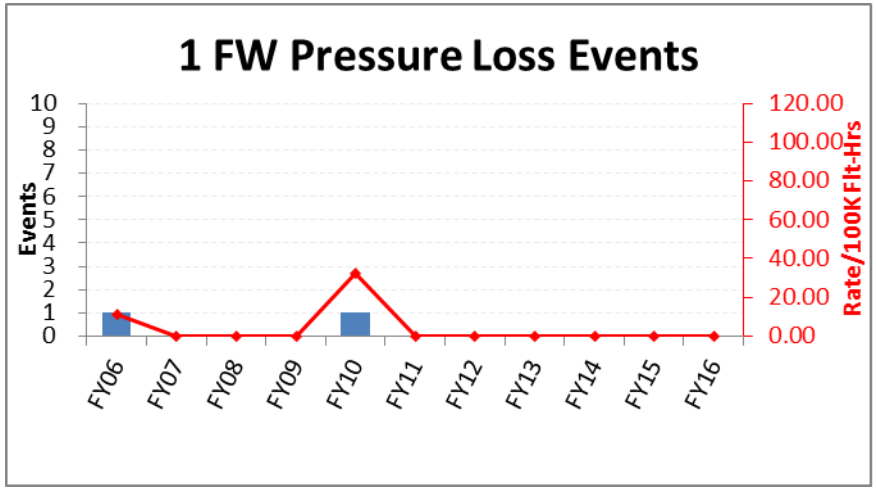
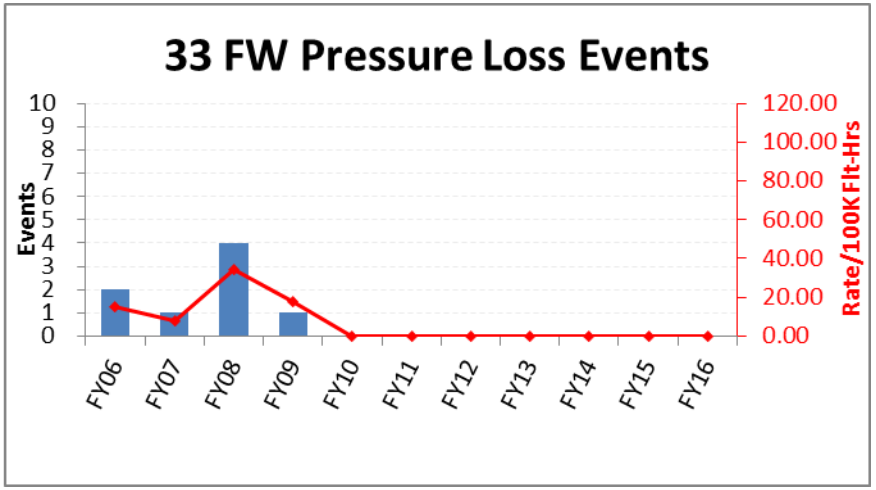




F-15 Cockpit Pressure Loss Reports by Wing







F-15 Cockpit Pressure Loss Reports by Wing