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ASOS Research Request: What are some fatigue related research reports other than the 1997 Flight Safety Foundation report?

ASOS Research Brief

ASOS Response:

A review of fatigue research from numerous sources revealed fatigue is still a continuing problem among pilots. Long duty days, multiple legs, and consecutive days of operation contribute to the fatigue problem in the industry. Consideration for flight attendant duty time is often overlooked, and their attentiveness is equally important as they ensure the passengers safety in an emergency. Below are summarizations of fatigue related research, along with supporting ASRS reports from pilots and flight attendants.

Flight Safety Foundation Article, June 2003

A study that appeared in a Flight Safety Digest Issue, called Consensus Emerges from International Focus on Crew Alertness in Ultra-long range Operations, revealed several important items about the actual amount of rest the crew of a long-haul flight is able to attain. Although the study was conducted on a Boeing 777-200ER, the same principles apply to business jet operators with regards to pilot rest. The study examined 21 pilots that traveled from Singapore to Seattle, WA, U.S. and from Seattle to Kuala Lumpur, Malaysia. Most of the pilots spent 72 hours at the destination before returning. The study revealed the following:

A pilot rests on a B-777

- The crews averaged about 7 hours of sleep 24 hours prior to the trip.
- They averaged 4.7 hours in the sleeping bunk, with 3.3 hours of actual sleep.
- 90% sleep efficiency (Actual sleep amount out of time trying to sleep) in the layover hotel, 70% on the aircraft.
- Pilots with the first shift to sleep, slept an average of 2.7 out of 4.0 hours.
- Pilots in second shift slept 3.9 out of 5.4 hours.
- Older pilots (50+) slept less than the younger pilots.
- Pilots who slept second shift were more alert during last 50 minutes of duty.
- The study suggested the landing crew should sleep during the second portion of the flight.

Crew Duty and Rest Planner: Final Report
By Greg Roach and Drew Dawson
Centre for Sleep Research for AVMED at RAAF Base Edinburgh

In this study researchers gathered data from flight crews of the 11 squadron at Royal Australian Air Force Base, Edinburgh, in Australia. The study spanned over approximately 13 days, and consisted of crews that flew through small, compound time-zone changes over this period. Researchers surveyed sleep patterns and alertness levels from 15 participants. The age group ranged from 25-35, and the average duty time was 9.3 hours. The average sleep time was 6.8 hour while on-duty, and 8.6 on off-duty days.

The study delved into the biological effects experienced by the aircrews. While traveling west to east, their bodies were able to adjust fairly well to the time zone change. However, while traveling east to west, their bodies did not adjust as well to the time zone change. According to the study, the reason for the poor adjustment when traveling east to west was the onset of the melatonin levels. Melatonin controls the body's "biological clock" and is at the greatest amount during night time. Day and night controls the onset of the melatonin. The other reason could have been due to the reversal of the time-zone adjustment, that is, traveling back to the time zone of origin.

During the study, the crews were also required to fill out self-rated alertness forms. The results of these forms noted the alertness levels were below average at the beginning of work in those crews that received 5-6 hours of sleep or less. The second self rated alertness results were gauged at the end of work and were a function of flight time. This portion of the study indicated that after 7+ flying hours, the alertness level began to decrease.

Figure 3: Self-Assessed Alertness at Start of Work Period as a Function of Prior Sleep Length

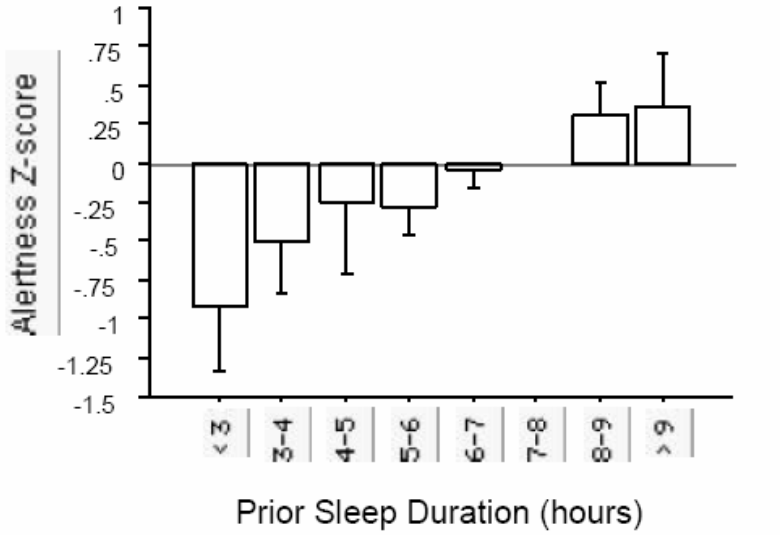


Figure 4: Self-Assessed Alertness at End of Work Period as a Function of Flying Hours

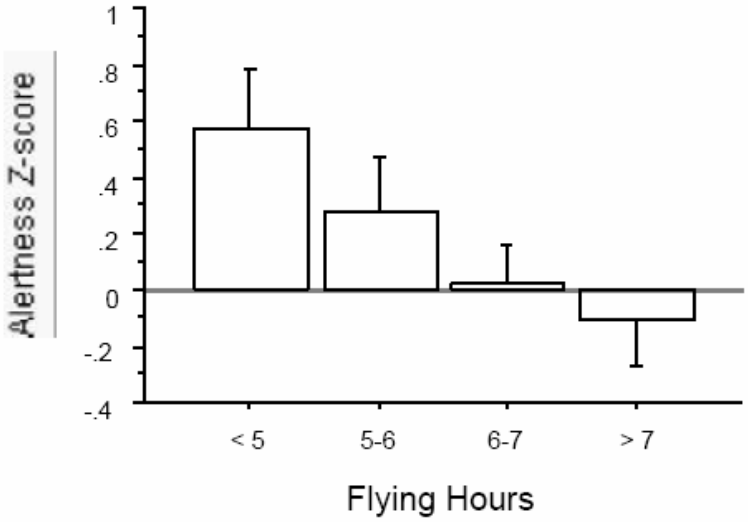
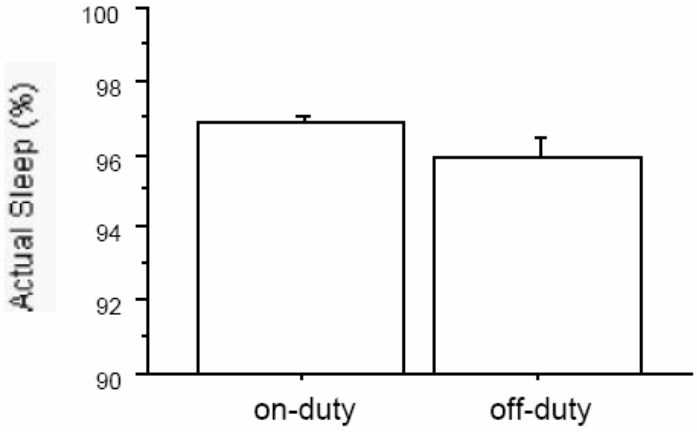


Figure 6: Sleep Quality for On-Duty and Off-Duty Days



Interestingly enough, the study revealed the quality of sleep was greater for on-duty days; however, there was an average of 1.8 hours less sleep for those days. The off-duty days actually received slightly less quality sleep. The researchers attributed this to more of the sleep period being during the daylight, and possibly alcohol consumption the night before an off-duty day. Contrary to popular belief, alcohol will actually cause more disruption of sleep, even though it may be initially easier to fall asleep. An obvious observation made was the quality and amount of sleep was greater when the pilots were at home.

Fatigue in Aviation: Point of View of French Pilots
Universite Rene Descartes- Paris V.

While this study is not as recent as the others, it still relays some important information about the effects of fatigue. The researchers developed a questionnaire that was returned by 739 pilots from several French airlines. Of those pilots, 78% were conducting long-haul flights. During these flights, a common trip was from Paris to New York, and New York back to Paris within 48 hours. This consisted of two-night flights, including a 22 hour layover. The short range flights were 4-5 leg flights during the day, over a period of 5 days. The mean age was 42 and 46% of the respondents were captains. The mean flying experience was 14 years. The study revealed reasons for fatigue and the effects of fatigue as reported by the pilots, below are the results.

The largest reason for fatigue during long-range flights was because they occurred during night time, according to the pilots. In the short-range flights, pilots cited the multiple legs flown the reason for fatigue.

Long-range flights (n=704)	Short-range flights (n=248)
- night flight : 59%*	- multi-segment rotation : 53%
- jet lag : 27%	- early wake-up : 41%
- minimum crew : 13%	- night flight : 18%

Table 1. The 3 main characteristics cited by pilots as causes of fatigue.
(* percent of characteristic citation ; n = number of citations).

In both the long-range flights and the short-range flights, a lack of sleep was cited for the cause of fatigue during the climb and descent phases of flight. The next highest cause was the significant workload.

	Long-range flights		Short-range flights	
	Mean ± SD	Significance *	Mean ± SD	Significance *
Significant workload	3.34 ± 0.92	++	3.53 ± 0.85	++
Executing actions in a limited amount of time	3.03 ± 0.86		3.17 ± 0.91	+
Simultaneous actions	2.97 ± 0.84		3.05 ± 0.85	
Interruption during activities	2.76 ± 0.90		2.88 ± 0.95	
Problem of coordination with other cockpit crewmember	2.68 ± 1.04		2.79 ± 1.06	
Density of verbal exchanges	3.17 ± 0.95	++	3.20 ± 1.03	+
Communicating in foreign language	2.77 ± 0.96		2.69 ± 1.04	
Lack of sleep	4.12 ± 0.86	++	4.10 ± 0.87	++

Table 2. Causes of fatigue during climb and descent. Ratings on 5 points scale
(1=none, 2=small, 3=medium, 4=high, 5=very high). * difference from 3.0, t-test, +=p<0.05 and ++=p<0.001.

This chart below examines flight events that contributed to fatigue problems. An additional unplanned leg was the main reason for extra fatigue.

	Long-range flights		Short-range flights	
	Mean ± SD	Significance *	Mean ± SD	Significance *
Flight delay	3.01 ± 1.00		2.93 ± 0.97	
Difficult flight	3.05 ± 0.99		3.14 ± 1.03	
Problem of coordination with other cockpit crewmember	3.40 ± 1.10	++	3.44 ± 1.11	++
Necessity of performing additional leg not planned originally	3.91 ± 0.93	++	3.64 ± 1.03	++
Compliance with time constraints	2.80 ± 1.02		3.44 ± 1.06	++

Table 3. Flight events related fatigue. Ratings on 5 points scale
(1=none, 2=small, 3=medium, 4=high, 5=very high). * difference from 3.0, t-test, +=p<0.05 and ++=p<0.001.

This data below observes what the pilots thought was the primary side effect of fatigue they experienced themselves, as well as the effects they observed in the other crewmember they flew with. In the long range flights, the pilots noticed a reduction of attention and lack of concentration in their own behavior. The pilots observed a decrease in social communication of the other pilot they flew with and an increase in the reaction time.

	For himself	For the other crewmember
Long-range flights		
1	Reduction of attention and lack of concentration (25%)*	Decrease of social communication (31%)
2	Growing and irresistible need of sleep (21%)	Increase of reaction time (13%)
3	Eye irritation, smarting eyes (14%)	Bad message reception (ATC, crew members, …) (12%)
Short-range flights		
1	Reduction of attention and lack of concentration (25%)	Little mistakes (calculation, interpretation) (26%)
2	Omissions (21%)	Decrease of social communication (31%)
3	Reduction of alertness and sleepiness (17%)	Bad message reception (ATC, crew members, …) (17%)

Table 4. Manifestations of pilot fatigue for himself and for the other crewmember.
(* percent of manifestation citation ; n = number of citations).

This chart below outlines the symptoms of fatigue, separated into categories such as mental, physical, and sensorial. Each category was then divided into individual factors specific to that category to pinpoint the greatest effect. The results concluded that on the long and short-range flights, a lack of concentration and difficulty memorizing information were the largest effect of fatigue on the mental state of the pilots. Burning, irritated eyes were also the unanimous factor for both types of flights. Finally, backache was the clear physical factor.

		Long-range flights		Short-range flights	
		Mean ± SD	Significance *	Mean ± SD	Significance *
Mental	Difficulties in memorizing information	3.6 ± 0.8	++	3.5 ± 0.9	++
	Lack of concentration	3.8 ± 0.8	++	3.8 ± 0.7	++
	Periods of inattention	3.4 ± 0.8	++	3.5 ± 0.8	++
	Slow actions	3.2 ± 0.9	++	3.2 ± 0.9	+
	Slow understanding	3.2 ± 0.9	++	3.3 ± 0.9	++
	Getting puzzled	2.0 = 1.0		2.0 ± 1.0	
	Tendency to forget information and actions	3.0 ± 0.9		3.3 ± 0.9	++
	Erreur in interpretation	2.6 ± 0.9		2.7 ± 0.9	
	Focused attention	2.8 + 1.1		2.8 ± 1.1	
	Difficulties to evalate time	2.2 ± 1.0		2.1 ± 1.0	
Sleep and sleepiness	Disturbed sleep	2.9 ± 1.2		2.9 ± 1.2	
	General feeling of getting tired	3.6 ± 0.8	++	3.5 + 0.9	++
	Reduction in vigilance	3.7 ± 0.8	++	3.7 + 0.8	++
	Growing and irresistible need to sleep	3.8 ± 0.9	++	3.5 ± 1.1	++
	Difficulties in falling asleep	2.6 ± 1.4		2.7 ± 1.4	
Behavior	Loss of interest	3.1 ± 1.0		3.1 ± 1.1	
	Depressive state	2.5 ± 1.2		2.7 ± 1.2	
	Reduction in motivation	3.1 ± 1.0		3.2 = 1.1	+
	Irritability	2.7 ± 1.2		2.7 + 1.2	
	Impatience	2.6 ± 1.1		2.7 + 1.1	
Sensorial	Ringing in ears	1.6 ± 1.0		1.6 ± 1.0	
	Smarting eyes, eye irritation	3.1 ± 1.2		3.0 ± 1.3	
	Visual illusions	1.7 ± 1.0		1.9 ± 1.1	
Physical	Headache	1.8 ± 1.1		2.0 ± 1.2	
	Leg pain	1.9 ± 1.1		1.8 + 1.1	
	Backache	2.2 ± 1.3		2.3 ± 1.2	
	Neck pain	2.0 ± 1.2		1.9 ± 1.1	

Table 5. Symptoms of fatigue. Ratings on 5 points scale (1=none, 2=small, 3=medium, 4=high, 5=very high). * difference from 3.0, t-test, +=p<0.05 and ++=p<0.001. This result confirms that for pilot himself, the main manifestations of fatigue are related to sleep loss.

This chart below examined the effect of fatigue on various flying tasks. It revealed that monitoring supervisory activities was the most difficult to perform, followed by manually flying the aircraft.

	Long-range flights		Short-range flights	
	Mean ± SD	Significance *	Mean ± SD	Significance *
Monitoring	62.9 ± 13.1	++	63.5 ± 13.0	++
Flight path monitoring	68.0 ± 13.1	++	67.6 ± 12.2	++
Manuel flying	72.0 ± 14.8	++	74.7 ± 14.7	++
Utilization of aircraft automation	66.4 ± 14.9	++	61.6 ± 15.3	++
Communications	64.8 ± 13.8	++	64.0 ± 13.7	++
Crew ressources management	66.4 ± 13.8	++	66.5 ± 14.0	++
Check-list	58.3 ± 11.8	++	57.9 ± 12.8	++
Briefing	60.5 ± 12.2	++	61.8 ± 13.3	++
Monitoring supervisory activities	75.3 ± 13.3	++	75.8 ± 11.9	++
Selection and entering data	71.6 ± 13.8	++	69.3 ± 12.7	++
Writing officiel reports	67.6 ± 16.2	++	66.7 ± 17.0	++

Table 6. Impact of fatigue on flying tasks. Analogical scale (0=less difficult than usual, 50=as usual, 100=more difficult as usual. * difference from 50.0, t-test, +=p<0.05 and ++=p<0.001

The number one counter-measure for fatigue indicated by the pilots in the study, was managing sleep and naps prior to the flight, during the layover, and after the flight. During the flight, crews cited taking naps for 20-30 minutes was the best way to combat fatigue. For the pilots of short-range trips, they stated closing their eyes for 5 minutes was best. The next top way to counter fatigue, as indicated by the pilots, was to exercise. Exercising promotes a healthier lifestyle, and it also can make an individual more alert throughout the day.

Through a scientific method, the study predicted what the equivalent fatigue level would be if the long-range crew operated during the day. According to the analysis, the crew operating the short-range flights actually experienced more fatigue than the long-range crew, if they flew in the daytime. They also revealed the fatigue levels were increased when operating between 12am-6am, emphasizing the operation during the circadian low phase has a greater effect on fatigue.

Most of the data gathered in this research further supports most of the common conclusions about fatigue. The data revealed the crews on the long-range flights experienced a slightly different type of fatigue than the short-range crews. The long-range crews worked longer hours, and most of those hours were at night. The short-range crews were able to operate during the day, but with multiple legs, the workload increased.

Jeffrey H. Goode FAA, Office of Aviation Policy and Plans (2003)

This study obtained data from 10 carriers over the period of a month. It analyzed how many hours the captains flew and incorporated them into a chi-square test. This test measured the proportion of flight time and duty period with the amount of accidents during that period of duty time. One observation was the pilots operating within the 10-12 hour duty period were 1.7 times more likely to have an accident. Even more striking, the proportion of accidents to pilots with a duty time longer than 13 hours was 5.6 times greater than all of the pilots. The study concluded as duty time increases past 12 hours, the probability of an accident increases exponentially. Other observations were:

- 1994-1998 there were 227 schedule-related fatigue incidents.
- There is no test for fatigue of a crewmember before or after an incident.
- Two accidents where fatigue directly related to the cause:
  -Guantanamo Bay, 1993
  -Little Rock, 1998

The following table tracks the amount of hours flown by the captain, and breaks it down into duty periods. For example, 285,728 of the hours flown were during the 7-9 hour duty period. The 1-6 hour duty period comprised of the largest accident proportion, because that period also held the largest amount of hours flown. If you compare the proportion of accidents to the amount of hours flown, the 13+ duty period had the highest rate of accidents.

Table 1
Captain duty hours and accidents by length of duty

Hour in duty period	Captain's hours	Exposure proportion	Accidents	Accident proportion	Accident proportion relative to exposure proportion
1–3	430,136	0.35	15	0.27	0.79
4–6	405,205	0.33	15	0.27	0.84
7–9	285,728	0.23	14	0.25	1.11
10–12	109,820	0.09	8	0.15	1.65
13 or more	12,072	0.01	3	0.05	5.62
Total	1,242,961	1.00	55	1.00	1.00
Calculated χ^2		14.89		10% χ^2	7.8
Degrees of freedom		4		5% χ^2	9.5

This chart below further illustrates the exponential relationship between the duty period and the accident rate.

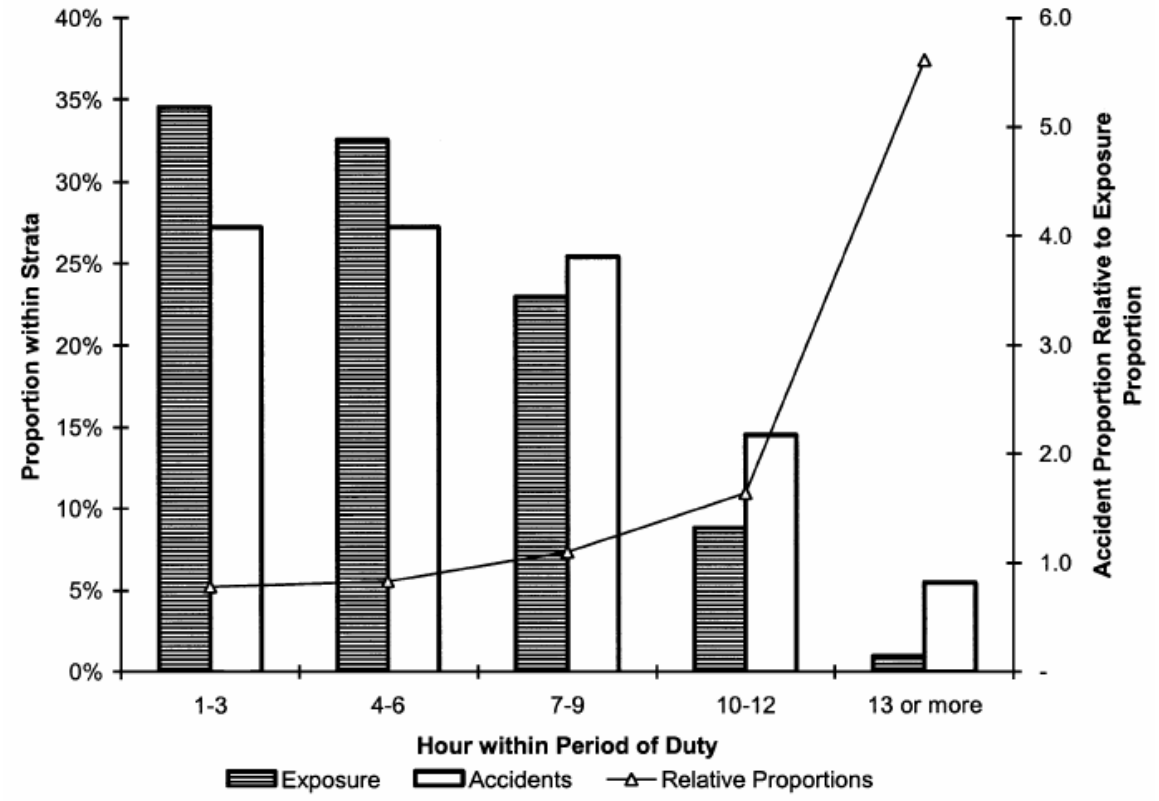


Fig. 1. Captains' duty hours and accidents by length of duty.

European Union

Flight-time limitations have been proposed that are intended to apply across the European Union. Under the proposal, the flight-duty period, without extensions, will be 13 hours for up to two 'sectors.' 'Sectors' indicate a flight from point A to point B with no stop-over. After the third sector of flight, 30 minutes is subtracted for each additional sector. If the flight begins during the window of circadian low, which is 0200-0559, the overall flight duty time is reduced by the amount of time spent flying during the window of circadian low. If the flight ends during the window of circadian low, the total flight duty time is reduced by 50% of the time spent in the window circadian low. These proposals are designed to account for time spent flying during the window of circadian low. During this time, the pilot is at their lowest alertness level. Many prominent Part 91 companies incorporate similar standards with regards to operating during the circadian low in their flight operations.

A Part 91 Operator

The policies of a prominent Part 91 corporate flight department's duty and rest requirements include the following: A maximum of 14 hours duty time and 10 hours of flight time is allowed for a crew. The 10 hours of flight may be extended to 12, with some restrictions. The amount of time flown during the circadian low and the number of legs flown are factored into the extension of flight time. In this particular operator's case, they do not augment the flight crews because there is no dedicated rest area in the aircraft. If the duty/flight time extends beyond the maximum amount, they pre-position the crews. Their rest time is at least 10 hours and is extended to 12 hours if certain conditions are met. These conditions include flying more than the maximum amount of duty/ flight time or flight during the circadian low.

2006 NBAA International Operators Survey (Attached at the end of this report)

In March of 2006 the NBAA held an International Operators Conference in Tampa, FL. They issued a survey relating to crew-duty limits, augmented crews, repositioning crews, and flight attendant duty times. If you compare the data from the preceding research reports with the data obtained from the NBAA survey, there is a noticeable correlation. The survey indicated most of operators had a 16 hour duty limit, and a flight-time limit of 14 hours or 12 hours. These results put most of the operators in this higher risk category of operation. The 'X' factor is the addition of an additional crewmember. This would reduce the actual flight time and enable rest for the other crewmembers. It also increases the overall duty limits of the crew. At approximately 16 hours is when the body begins to experience extreme levels of fatigue, and exhibit symptoms similar to an intoxicated individual.

Driving Time

Another factor sometimes overlooked is the inclusion of driving time. Often the pilots and flight attendants drive themselves long distances to work. Driving takes a significant amount of concentration, and this may factor into the pilots alertness level in the cockpit, as well as the flight attendants ability to respond to an emergency.

In Britain, there is a maximum of 2.5 hours of driving time allowed in one flight duty period. This amount of driving time counts as a 'sector,' when calculating the maximum flight duty period. This incorporation of driving time into calculating fatigue helps in combating fatigue related incidents. In the case of helicopter pilots, their total duty time is reduced by the amount they drive to work. Here are a few sample ASRS reports, the first by a pilot, the second by a flight attendant:

Narrative

CAPT'S WORK DAY BEGAN AT XX00 AM. THE EVENT OCCURRED AT XY50 PM EST. **AFTER A FULL DAY OF WORKING AND 4 1/2 HRS OF DRIVING** TO BRADLEY, CT, FROM MT HOLLY, NJ, TO PICK UP THE LEAR 31 FROM MAINT, HE WAS EXHAUSTED. ACFT WAS ON AN IFR FLT PLAN OUT OF BDL IN IMC AND WAS CLRED TO FL200. THE AUTOPLT WAS ENGAGED AND THE ALT SELECT MODE WAS DEPRESSED WITH A LIGHT ILLUMINATING THE SELECTION. UPON REACHING FL200 THE ALT CAPTURE MODE DISENGAGED AND THE AUTOPLT DID NOT COMPLETE THE LEVELOFF AT FL200. AT FL202 THE FO, ANNOUNCED TO THE CAPT THAT THE ACFT WAS NOT RESPONDING VIA THE AUTOPLT COMMAND AND THE ALT WAS INCREASING. THE ACFT WAS CONTINUING TO CLB AS THE CAPT BEGAN A ROUNDOFF AND STARTED TO GAIN CTL OF THE ALT SIT. THE ACFT MAY HAVE MOMENTARILY HIT AN ALT OF FL208. THE CAPT WAS DSNDING THROUGH 20200 FT AND LEVELING OFF AT FL200 AS THE BOSTON CTLR QUESTIONED THE ACFT'S ALT. THE FO RPTED LEVEL AT FL200. THE SIT MAY HAVE BEEN AVOIDED BY BOTH PLTS NOTICING THE MISS OF THE ALT HOLD BY THE AUTOPLT AND BETTER REACTION TIME ON BOTH OF THEIR PARTS. FATIGUE WAS A FACTOR DUE TO THE LONG WORK DAY.

Synopsis

A LEAR 31 FLC EXPERIENCES AN OVERSHOOT OF THEIR ASSIGNED ALT WHEN THE AUTOPLT ALT CAPTURE TRIPS OFF AND DOES NOT CAPTURE FL200 AS EXPECTED.

Narrative
AFTER WORKING THE FLT INBOUND TO OGG AND SITTING FOR 2 HRS 28 MINS WITH CHANGE IN ACFT AND WORKING THE ALL-NIGHTER BACK, WE WERE EXHAUSTED AND DELIRIOUS. WORKING A TURN LIKE THAT HAS A TREMENDOUS EFFECT ON THE BODY. WE ALL COULD HARDLY STAY AWAKE. **I FEEL IF THERE WAS AN EMER WE WOULDN'T BE 100% EFFECTIVE**. WE KEPT CHKING ON EACH OTHER AND MOVING AROUND TO KEEP EACH OTHER AWAKE. **I PERSONALLY ALMOST GOT INTO AN ACCIDENT ON THE WAY HOME.**

Synopsis
CABIN ATTENDANT RPTS PERFORMANCE DECREMENT AS A RESULT OF **FATIGUE** ON MAINLAND, HAWAII TURNS.

Sample Pilot ASRS Reports

These sample ASRS reports illustrate the dangerous effects of fatigue.

Narrative
TRIP DEST WAS ASE. APCHING DBL, WE DETERMINED ASE WAS BELOW MINIMUMS AND RIL, OUR FIRST ALTERNATE, WAS ALSO BELOW MINIMUMS. WE CHOSE EGE AS OUR NEW DEST BECAUSE OF ITS GOOD WX. WE TOOK DELAYING VECTORS TO LOAD THE APCH. BOTH PLTS EXPRESSED CONFUSION AT WHAT APCHS THE FMS DATABASE WAS OFFERING, OUR APCH WAS NOT LISTED (DUE TO BEING A CIRCLE TO LAND APCH). FOR SITUATIONAL AWARENESS REASONS WE DECIDED TO BUILD THE APCH IN THE FMS AND NAV USING RAW DATA. AT THIS POINT THE CTLR BEGAN TURNING US BACK TOWARDS THE IAF AND WE BEGAN TO REVIEW WHAT HAD BEEN ENTERED. LOOKING BACK, IT IS AT THIS POINT THAT WE SHOULD HAVE DISCONTINUED OUR APCH DUE TO FEELING RUSHED. IN OUR HASTE WE BOTH FAILED TO REALIZE THAT THE ALTS WERE ENTERED AT THE WRONG FIXES ON OUR 'BUILT' APCH. XING THE IAF, I CALLED FOR THE NEXT ALT AS INDICATED BY THE FMS AND DSNDED. REACHING THE NEW ALT THE CTLR QUERIED OUR ALT, WHICH WE INDICATED WAS 13000 FT. HE INFORMED US WE SHOULD BE AT 14000 FT FOR THAT SEGMENT OF THE APCH. WE IMMEDIATELY CLBED BACK TO 14000 FT AND FINISHED THE APCH WITH NO FURTHER INCIDENT. THE CTLR DID US AN OUTSTANDING SVC. SEVERAL FACTORS CONTRIBUTED TO THIS DEV: 1) I HAD **LESS THAN 5 HRS SLEEP AND AN 0300 WAKE-UP**. THIS WAS THE **4TH LEG OF THE DAY AFTER 12 HRS OF BEING AWAKE. FATIGUE WAS AN ISSUE**, ESPECIALLY IN REGARDS TO OUR CONFUSION WITH THE FMS. 2) WE DID NOT KNOW OUR ULTIMATE DEST UNTIL THE LAST MIN WHICH CAUSED US TO RUSH AND FEEL RUSHED. 3) WE ALLOWED THE CTLR TO TURN US ONTO THE APCH BEFORE WE WERE READY. AGAIN, WE ALLOWED OURSELVES TO BE RUSHED EVEN THOUGH WE HAD PLENTY OF FUEL AND OPTIONS. HAD WE SIMPLY SLOWED DOWN, ENTERED A HOLD AND REVIEWED THE APCH AS WE NORMALLY WOULD THIS EVENT WOULD NOT HAVE OCCURRED.

Synopsis

HS-125 FLT CREW ON A NON PRECISION APCH TO EGE, THEIR SECOND ALTERNATE, HAS AN ALTDEV.

Narrative

THIS FLT WAS DAY #4 FOR ME AND DAY #2 FOR THE CAPT. THE DAY BEFORE WE HAD AN 18 HR DUTY DAY. I WENT TO THE HOTEL AND I HAD A VERY GOOD REST. UP TO THIS FLT, I WAS VERY **FATIGUED**. I TOLD THE CAPT IF WE HAD AN EARLY MORNING FLT THAT I WOULD CALL IN SICK. HE DID ADVISE THE CHIEF PLT WHAT I HAD SAID WITHOUT MY PERMISSION SO MORE CONFLICT, AND **FATIGUE**. ALSO, THE NIGHT BEFORE THIS FLT, HE DID NOT BRIEF ME ON THE CLRNC OUT OF ANOTHER ARPT AS I WAS ACTING AS CAPT THAT DAY AND ATC HAD TO CORRECT MY DIRECTION OF FLT. I KNEW THE AREA A LITTLE BIT AND I WAS ABLE TO GET THE SID TOGETHER BY MEMORY. BACK TO DC AREA, WE WERE CLRED FOR THE BARIN 1 ARR AND TOLD TO DSND PER THE MARIN 1 ARR. WE WERE IN MODERATE WX AND ICING CONDITIONS. I HAD ATIS AND APCH WAS SET UP FOR RWY 19L BOTH GREEN SOURCE AND IN THE FMS'S. NEXT THEY TOLD ME TO EXPECT RWY 19R FOR LNDG. ALL VNAV INFO WAS IN THE FMS AND I TOLD THE CAPT TO DSND PER THE ARR THAT IT WAS IN THE FMS, HE SAID 'OK I UNDERSTAND.' NORMALLY AT THIS POINT I WOULD ARM THE VNAV BUTTON SO THE JET WILL FLY THE ARR ON ITS OWN, BUT THIS CAPT DOESN'T BELIEVE IN USING THIS FUNCTION OF THE JET, ALSO YOU DO HAVE TO MONITOR THE SYS BECAUSE IT DOESN'T ALWAYS CAPTURE THE DSCNTS BUT IT DOES TELL YOU HOW MANY FT PER MIN YOU NEED TO USE TO GET DOWN. SO I PROCEEDED TO SET UP THE OTHER RWY IN THE FMS'S AND GREEN SOURCE FOR THE ILS SYS. THE NEXT THING I HEARD WAS ATC ASKING IF WE WERE GOING TO GET DOWN BY BARIN AND I SAID YES. THE CAPT WAS FOR SURE LATE, AND I TOLD HIM TO START DOWN. WE NEEDED AROUND 4500 FPM TO MAKE THE XING RESTR, WHICH IS NO PROB IN THE LEAR 60. I WAS STILL NOT TOTALLY FOCUSED ON WHAT WAS GOING ON UNTIL ATC STARTED YELLING AND TCAS WAS GOING OFF. FOR SOME REASON THE FLT WAS OFF COURSE AND I TOLD ATC IT WAS THE COMPUTER, BUT COME TO FIND OUT THE CAPT WAS TRYING TO HAND FLY A JET THAT IS REALLY AN AUTOPLT ACFT. WE WERE HEADED ABOUT 60 DEGS OFF COURSE AND WE WERE POINTED TOWARD DC AND ONCOMING TFC AND THE JET WAS SAYING BANK ANGLE WITH A STEEP DSCNT ANGLE. I DROPPED THE APCH PLATES AND THIS IS THE POINT THAT I HAD TO TAKE OVER THE AIRPLANE AND STARTED MAKING YELLING COMMANDS TO THE CAPT, PLUS TAKING AN IMMEDIATE TURN FROM ATC TO TURN TO HDG 270 DES TO REJOIN THE ARR AND AVOID THE TFC. THERE IS ONLY A 4 DEG TURN AFTER BARIN, I STILL DON'T KNOW WHERE HE WAS TRYING TO GO. I NEVER HEARD THE AUTOPLT TONE WHEN HE TURNED IT OFF DUE TO THE NOISE AND EVERYTHING THAT WAS GOING ON. ALSO AT THIS POINT DUE TO **FATIGUE** AND ME STOPPING THE APCH SET-UP AND REVIEW, WE MISSED AN ALT BEFORE THE INITIAL APCH AND STARTED TO DSND TOO EARLY. SO THE MISTAKE WAS NOT THE

COMPUTER, BUT PROBABLY PLT ERROR DUE TO SPATIAL DISORIENTATION LEADING FROM FATIGUE. THIS CAPT WILL DO ANYTHING IT TAKES TO GET THE JOB DONE AND I DO REFUSE TO OPERATE THAT WAY. I BELIEVE IN BEING SAFE AND FOLLOWING THE RULES. I SHOULD HAVE HAD ATC PUT US INTO A HOLD SOMEWHERE UNTIL WE WERE READY TO DO THE APCH. THERE WAS JUST TOO MUCH GOING ON AT ONCE. ALSO, SOMEHOW I NEED TO REFUSE TO FLY WITH A CAPT LIKE THIS WHO DOES NOT RESPECT SAFETY AND PROCS AT ALL. I HAVEN'T HAD TO DO A RPT IN A VERY LONG TIME, UNTIL I STARTED FLYING HERE. I AM CURRENTLY SEEKING EMPLOYMENT WITH THE AIRLINES WHERE IT WILL BE SAFE AGAIN.

Synopsis

FLT CREW OF LJ60 EXPERIENCE LOSS OF CTL, TCAS RA, TRACK DEV AND ALT BUST WHILE ATTEMPTING TO HAND FLY THE BARIN STAR AND ILS RWY 19R TO IAD.

Narrative

THE TRIP WAS A CONTINUOUS DUTY OVERNIGHT TRIP. ON ARR AT THE GATE, WE FOUND OUT THE FLT WAS WT CRITICAL. EVENTUALLY, WE HAD TO REMOVE 2 PAX FROM THE ACFT. ON THE WT CRITICAL NOTICE, THE ZERO FUEL WT WAS UNDERSTATED BY 1000 LBS. THE FLT TO MSP REQUIRED AN ALTERNATE AND ADDITIONAL FUEL. IN CONFERRING WITH DISPATCH, I WAS TOLD OF SHOWERS BTWN LSE AND MSP. ON TAXI OUT, WE WERE 300 LBS OVER XTOG. WE HAD TO HOLD SHORT OF THE RWY 3/36 THRESHOLD TO BURN OFF FUEL. AFTER XTOG WAS REACHED, WE CONTACTED ZMP FOR OUR IFR CLRNC TO MSP, AS THE TWR AT LSE WAS CLOSED AND THE FIELD UNCTLED. UPON RECEIVING OUR CLRNC, I TAXIED ONTO THE FIRST RWY (RWY 3) AND FAILED TO VERIFY THE PROPER HDG, THRUST LEVERS WERE ADVANCED TO THE FLEX TKOF THRUST SETTING, AND WE BEGAN OUR TKOF ROLL. ABOUT 2/3 OF THE WAY DOWN THE RWY, I REALIZED THE YELLOW 2000 FT LIGHTS WERE MUCH CLOSER THAN THEY SHOULD HAVE BEEN. **IT WAS AT THAT POINT I REALIZED WE WERE ON THE WRONG RWY**. AS WE WERE ALREADY OVER 100 KTS AND ACCELERATING, I MADE THE DECISION TO CONTINUE THE TKOF, RATHER THAN ATTEMPT A HIGH SPD ABORT. THRUST LEVERS WERE ADVANCED TO THE FULL THRUST POS TO INCREASE THE ACCELERATION. VR WAS REACHED WITH ABOUT 1000 FT LEFT ON THE RWY, THE ACFT WAS ROTATED AND THE TKOF AND FLT WERE COMPLETED NORMALLY. CONTRIBUTING FACTORS: 1) COMPLACENCY AND FAMILIARITY WITH THE ARPT. LED TO FAILURE TO REVIEW THE ARPT DIAGRAM. 2) EXTENDED TIME OFF AND RESULTING LACK OF PRACTICE WITH PROCS. 3) FIRST TRIP WITH FO. 4) **LACK OF SLEEP DUE TO CDO**. 5) DISTRS OF WT CRITICAL/OVERWT FLT. 6) CLOSE INTXN OF RWYS 3 AND 36, WITH DISPLACED THRESHOLD OF RWY 36. RWY LIGHTS FOR RWY 36 DID NOT BEGIN AT END OF RWY. HOLD SHORT LINE FOR BOTH RWYS SHORT OF RWY 3. THIS LED TO A LACK OF EXTERNAL VISUAL CUES OF THE INTERSECTING RWYS. 7) FAILURE TO VERIFY THE PROPER HDG ON TAKING THE RWY. CORRECTIVE ACTIONS: 1) DEAL WITH DEP BEFORE

LNDG. THE FLT IS SHORT AND I WAS MORE CONCERNED WITH LNDG AT MSP THAN DEP FROM LSE. REVIEW ARPT DIAGRAM FOR EVERY DEP, REGARDLESS OF FAMILIARITY WITH ARPT. 2) ALWAYS VERIFY RWY HDG.

Synopsis

TIRED FROM A SHORT OVERNIGHT AND DISTR BY OTHER EVENTS, CL65 FLT CREW TAKES OFF FROM RWY 3 VICE RWY 36 AT LSE.

Narrative

AFTER DEPARTING TETERBORO RWY 19 ON THE DALTON DEP, PASSING 800 FT WITH A R TURN TO A HEADING OF 280 DEGS, WE PROCEEDED TO CLB TO AN ALT OF 2000 FT. WHILE IN THE CLB, WE WERE DIRECTED TO CONTACT NEW YORK DEP. THE TCASII SHOWED A TARGET AT MY 9 O'CLOCK POS DSNDING THROUGH 2600 FT. I LOOKED FOR THE TFC AND NOTICED IT TRAVELING AWAY AND DSNDING FROM MY POS. THE LATERAL DISTANCE WAS APPROX 2.75-3 MI AWAY. THERE WAS NO DANGER, NOR ANY CORRECTIVE ACTION TAKEN. SHORTLY THEREAFTER, WE WERE INSTRUCTED TO CLB TO 3000 FT. BEFORE THE HDOF TO THE NEXT CTLR WE WERE GIVEN A NUMBER TO CALL UPON LNDG AT OUR DEST. AFTER DISCUSSING THE DEP PROC WITH MY CREW MEMBER, I LEARNED THE ALT PRE-SELECT WAS NOT SET TO THE PROPER ALT OF 1300 FT, THUS CAUSING US TO BE 700 FT HIGH. SINCE MY ALT PRE-SELECT WAS SET AT 2000 FT, THIS LED ME TO BELIEVE THAT THIS WAS OUR CLRNC LIMIT. MY FO AND I DID OUR COMPANY CHKLIST AND WHEN I ASKED 'FLT INSTS' HE RESPONDED, 'CHK.' AFTER I WAS TOLD TO CONTACT THE NUMBER ABOVE, I ASKED MY FO 'DID YOU SET 2000 FT.' HE RESPONDED, 'NO, THAT WAS FROM THE LAST FLT.' THIS IS WHEN I REALIZED AN ERROR HAD OCCURRED. SUPPLEMENTAL INFO FROM ACN 591903: THE ALT PRE-SELECT WASN'T SET TO 1300 FT. **I WAS ON DAY 5 ON MY ROTATION DUTY AND I HAD WORKED AT LEAST 12 HRS EVERYDAY. FATIGUE PLAYED A MAJOR ROLE IN THIS VIOLATION.**

Synopsis

L60 CREW DEPARTING TEB FAILED TO COMPLY WITH DALTON DEP SID RESTRS.

Narrative

JUST AFTER ROTATION I ASKED MY FO IF WE HAVE OBTAINED A DEP RELEASE FROM BANGOR APCH. WE HAD AT THAT TIME CLBED TO 1000 FT AGL AND IMMEDIATELY CONTACTED BANGOR TO ADVISE THAT WE HAD DEPARTED VFR AND WERE CURRENTLY AIRBORNE. THE WX DEPARTING THE FIELD WAS 600 FT OVCST AND 10 MI VISIBILITY. BY 1000 FT AGL WE HAD BECOME VFR ON TOP. BANGOR ADVISED US

TO MAINTAIN VFR, OUR TCASII INDICATED NO TFC WITHIN 12 NM RADIUS. WE MAINTAINED VFR FOR APPROX 30-45 SECONDS BEFORE OUR IFR RELEASE BECAME AVAILABLE. ONCE RECEIVED WE CONTINUED PER OUR PRE-DEP CLRNC. **I KNOW THE CAUSE OF THIS SIT WAS FATIGUE.** THIS EVENT HAPPENED ON THE 7TH STRAIGHT DAY OF FLYING FOR MYSELF AND MY FO. **DURING THE PRIOR 6 DAYS, OUR FLT TIME WAS BTWN 6-9 HRS PER DAY, WHILE DUTY TIME WAS BTWN 10 TO 13+ HRS PER DAY.** WE WOULD NEVER INTENTIONALLY HAVE DISREGARDED ANY FARS OR ATC PROTOCOL. AS FAR AS CORRECTIVE ACTIONS, **I BELIEVE CREWS SHOULD BE GIVEN ADEQUATE REST AND CONSIDERATION AFTER EXTENDED 12+ HR DUTY DAYS, 8+ FLT HR DAYS, AND 6+ DAY ROTATIONS**. I ALSO BELIEVE AS CAPT ON THE ABOVE FLT I SHOULD HAVE BEEN MORE VOCAL TO THE COMPANY THAT WE AS A CREW WERE OPERATING ON THE VERGE OF STUPIDITY.

Synopsis

LJ45 CREW DEPARTED IN IMC CONDITIONS WITHOUT GETTING THEIR IFR CLRNC. EXTREME CREW **FATIGUE** WAS INDICATED.

Narrative

I LINED UP AND ATTEMPTED TO TAKE OFF FROM A TXWY LOCATED BTWN PHX ARPTS RWY 7L AND 7R. MY TKOF CLRNC WAS CANCELED BY AN ALERT TWR. MY BACKGND: I'M A TRAINED MIL MISHAP ACFT ACCIDENT INVESTIGATOR. I HAVE BEEN GOING THROUGH MY MIND WHAT FACTORS WOULD LEAD ME, A CONSERVATIVE, BY-THE-BOOK PLT, TO LINE UP ON A TXWY IN DAYLIGHT? I CROSSED RWY 7L GETTING CLRNC FROM TWR TO POS AND HOLD. CAPT WAS ENTERING DATA IN FMS. I FELT RUSHED AS PLANE WAS APCHING TO LAND. I HAVE RECEIVED SUPERB TRAINING, AND WORK FOR A SAFE COMPANY THAT STRESSES SAFETY, CREW PROCS, ETC. **I SUSPECT THE MAIN FACTOR WAS LONG TERM FATIGUE** WHICH PREVENTED ME FROM BREAKING THE MISHAP CHAIN AS I ALLOWED MYSELF TO BECOME RUSHED DURING THE LAST MIN BEFORE ENTERING THE PHX TXWY. THE CAPT ALSO IS EXPERIENCED. ONLY THE ALERT PHX TWR STOPPED US.

Synopsis

AN H25C CREW, TAXIING FOR TKOF AT PHX, WHEN TOLD TO TAXI INTO POS, LINED UP ON THE TXWY INSTEAD OF THE RWY.

Narrative

WHILE TAXIING FOR TKOF RWY 19 ON TWR FREQ, WAS ISSUED A SID CHANGE, WHILE CONDUCTING TAXI CHKLIST. I GOT BACKED UP AND HAD MY HEAD DOWN WHEN PF, TAXIING, STATED 'WE WERE CLRED TO HOLD SHORT OF RWY 19, SO WE'RE CLRED TO CROSS RWY 24.' I LOOKED UP MOMENTARILY AND SAW RWY THRESHOLD, AND SAID 'YEAH, WE'RE CLRED TO RWY 19.' WE TAXIED ACROSS RWY THRESHOLD, VISUALLY CLRING L AND R, WHEN TWR STATED THAT WE HAD JUST CROSSED RWY 19, AND 'WHAT WERE WE DOING?' WE MADE A 180 DEG TURN ON TXWY AND HELD SHORT OF RWY 19.

THERE WAS TFC ON ABOUT A 5 MI FINAL (?) TO RWY 19 AT THE TIME. WE HAD STARTED THE NIGHT AT HEATHROW ARPT (EGLL) AND REPOSITIONED TO PARIS (LRPB) FOR A PAX FLT, AND HAD JUST DROPPED PAX AT TEB. WE WERE TAXIING FOR TKOF TO OUR HOME BASE (ISP). AT THE TIME OF THE INCIDENT, **WE HAD BEEN ON DUTY 12 1/2 HRS, AND HAD FLOWN 8 HRS 25 MINS**. THIS IS NOT AN ESPECIALLY LONG DAY FOR OUR OP, BUT AFTER THIS INCIDENT, THE COPLT (ALSO CAPT RATED) AND **I ADMITTED WE WERE VERY TIRED**. WE HAD DEPARTED TEB FOR EGLL ON JAN/TUE/02 AND HAD ARRIVED AT ABOUT XA00Z ON JAN/WED/02. THERE WERE CONSTRUCTION BARRIERS ON TXWY JUST BEFORE RWY 19 THRESHOLD, WHICH MAY HAVE DISTR PLT TAXIING.

Synopsis
RWY INCURSION AT THE END OF A LONG DAY.

Narrative

WX AT DEST WENT BELOW MINIMUMS. I PHONED WX SVC FOR OPINION ON WHEN WX WOULD COME UP. I WAS JUST HANGING UP AND DISCUSSING SIT WITH FLT ATTENDANT. ATC ISSUED HOLDING INSTRUCTIONS. ALL I HEARD WAS HOLD AT GRACO INTXN. FO WAS A NEW HIRE, HE COPIED THE HOLDING INSTRUCTION. I BROUGHT UP THE HOLDING PAGE AND DISPLAYED THE HOLD. I ASKED FOR CONFIRMATION. WHEN HE SAID IT WAS OK, I EXECUTED THE HOLD. AFTER COMPLETING THE OUTBOUND TURN, ATC ASKED US TO MAKE THE NEXT TURN IN THE HOLD TO THE L. THE FO REPLIED THAT'S WHAT HE HAD COPIED. 2 SOLUTIONS: 1) HAVE MORE PATIENCE AND LET THE FO ENTER THE HOLD. 2) EMPHASIZE TO FO THAT I DID NOT HEAR THE HOLDING INSTRUCTIONS. CONTRIBUTING FACTORS: HIGH SPD, UNEXPECTED HOLD, LATE INSTRUCTION, FAR FROM DEST. SUPPLEMENTAL INFO FROM ACN 438952: HE MISTAKENLY PROGRAMMED THE HOLD WITH R TURNS AND WHILE CHKING THE HOLD I FAILED TO CATCH THE ERROR. CONTRIBUTING FACTORS WERE: **FATIGUE** -- **ONLY A 12 1/2 HR DAY, BUT WAS 12 1/2 HRS OF NONSTOP FLYING, 4 LEGS, 6 APCHS -- 2 OF THEM TO A MISS, 2 OF THEM TO MINIMUMS. WE WERE TIRED.** ALSO, I AM NEW TO THE ACFT WHICH I THINK CONTRIBUTED TO MY ERROR IN NOT CATCHING AN ERRONEOUS HOLD PROGRAMMED IN THE FMS.

Synopsis
A CL64 CPR JET MAKES ITS HOLDING PATTERN TURN IN THE WRONG DIRECTION NEAR GVE, VA.

Flight Attendant ASRS Reports

Narrative
THIS TRIP COMBINED WITH THE ONE PREVIOUS MADE FOR EXTREMELY BAD **FATIGUE** AND **I FLEW WITHOUT SLEEP FOR 48 HRS**. **I WAS SO FATIGUED I BELIEVE IT WAS DANGEROUS AND I WAS TOO AFRAID TO CALL ENRTE SICK LIST FOR FATIGUE BECAUSE OF OUR STRINGENT SICK POLICY.** I COULD BARELY FUNCTION WHICH WOULD MAKE FOR EVACING A PLANE DANGEROUS FOR PAX AND CREW. WHEN IS TOO MUCH **FATIGUE** AND CONCERN FOR SAFETY THE TIME TO CALL ENRTE SICK WITHOUT BEING THREATENED BY OUR SICK CALL POLICY?

Synopsis
AN A320 FLT ATTENDANT COMMENTS THAT HER SERIES OF TRIP PAIRINGS DID NOT ALLOW SUFFICIENT REST AND THE ACR'S FLT ATTENDANT SICK POLICY DISCOURAGED **FATIGUE** SICK CALLS.

Narrative
WE WERE ENRTE BTWN ARUBA AND BOSTON, MA, WHEN THE FO LEFT THE FLT DECK TO USE THE LAVATORY. WHILE HE WAS STANDING OUTSIDE THE FORWARD LAVATORY, A PAX CAME OUT FROM THE LAVATORY AND SAID THEY COULD SMELL BURNING COFFEE ODOR IN THE LAVATORY. THE FO OPENED A SMALL BULKHEAD DOOR NEXT TO THE FORWARD LAVATORY DOOR WHERE ONE OF THE FORWARD COFFEE MAKERS WAS LOCATED AT. HE COULD SEE A LITTLE SMOKE AND SMELL WAS COMING FROM THE COFFEE POT, WHICH HE KNEW WAS THE SMELL OF THE COFFEE RESIDUE HEATING FROM ALL OF THE WATER BOILING OFF. HE TURNED OFF THE PWR TO THE COFFEE MAKER AND AT THAT SAME TIME THE SMOKE DETECTOR IN THE FORWARD LAVATORY WENT OFF BECAUSE OF THAT SMOKE/SMELL COMING OUT OF THAT SMALL BULKHEAD CUBBYHOLE. HE DECIDED TO DISCONNECT THE SMOKE DETECTOR AT THAT TIME BECAUSE HE SAID HE COULD SEE THAT THERE WASN'T ANYTHING BUT THE COFFEE POT CAUSING THE DETECTOR TO GO OFF AND IT WAS CAUSING THE PAX SOME DISCOMFORT WITH THE NOISE. WHEN HE RETURNED TO THE FLT DECK AND THE DOOR WAS OPENED, THE FE AND MYSELF SMELLED THE BURNT COFFEE. WE DID NOT HEAR THE SMOKE DETECTOR GO OFF FROM THE FLT DECK NOR SEE ANY SMOKE. THE FO TOLD US ABOUT THE EVENTS RELATING TO THE COFFEE MAKER AND SMELL AND DID NOT INDICATE TO US THAT IT WASN'T ANY MORE THAN JUST A LITTLE SMOKE FROM THE COFFEE POT HAVING THE WATER BOIL OFF OCCURRED. A FLT ATTENDANT CALLED US AND ASKED THE FE TO TURN OFF THE GALLEY PWR. I TOLD THE FO TO GO BACK AND RECONNECT THE COFFEE POT AND FOLLOWED UP WITH THE FE GOING BACK (HE'S AN A&P) AND CHKING TO MAKE SURE THAT THE SMOKE ALARM WAS CONNECTED CORRECTLY. I FOUND OUT LATER THAT A SECOND BAG OF COFFEE WAS FOUND IN THE COFFEE POT ITSELF CAUSING THE SMELL AND SMOKE

FROM OVERHEATING. **THE FLT ATTENDANTS HAD FORGOTTEN TO DUMP THE COFFEE AND TURN OFF THE COFFEE MAKER WHEN THEY HAD FINISHED THEIR SVC.** I DID NOT MAKE A LOGBOOK ENTRY OF THIS BECAUSE I BELIEVED IT WAS ONLY THE WATER BOILING OFF THAT CAUSED THE SMOKE AND SMELL FROM THE BOTTOM OF THE POT. THINKING BACK ON IT, I'M NOT SURE IF I SHOULD HAVE MADE A LOGBOOK ENTRY BECAUSE THE FE ASKED ME IF I WANTED TO MAKE AN ENTRY AND THE FO DISCONNECTED THE SMOKE DETECTOR AND I HAD HIM RECONNECT IT AGAIN. IN THE FUTURE, I WILL MAKE ENTRIES OF UNUSUAL SITS SO THAT I MAKE SURE I AM IN COMPLIANCE WITH ALL THE REQUIREMENTS OF THE FAR'S AND COMPANY. SOME CONTRIBUTING FACTORS TO THIS SIT ARE: 1) THE LOCATION OF THE COFFEE MAKER IN A SMALL, ENCLOSED SIDEWALL CUBBYHOLE WHERE HEAT FROM THIS TYPE OF EQUIP CAN CONTINUE TO BUILD BECAUSE IT HAS NO PLACE TO DISSIPATE. 2) **THE FLT ATTENDANTS WERE ON DUTY THE DAY BEFORE FOR AROUND 13 HRS AND HAD ONLY MINIMUM REST OF ABOUT 8 1/2 HRS BTWN RELEASE FROM THEIR TRIP JAN/SAT/03 AND OUR RPT TIME OF XA35 ON JAN/SUN/03 TO FLY TO ARUBA WHICH WAS ANOTHER 13+ HR DUTY DAY.** I COULD TELL THAT THEY WERE A LITTLE TIRED THAT MORNING RPTING FOR DUTY BUT ACCORDING TO THE FAR'S THEY HAD RECEIVED LEGAL REDUCED REST. **I BELIEVE THIS CONTRIBUTED TO THE FLT ATTENDANTS FORGETTING ABOUT THE COFFEE MAKER BEING ON.** I DO NOT BELIEVE YOU CAN RELEASE A FLC AT THE ARPT, HAVE THEM WAIT FOR TRANSPORTATION TO THE HOTEL, CHK IN, SLEEP, SHOWER, AND TRANSPORTATION BACK TO THE ARPT TO RPT FOR DUTY IN 8 HRS. THIS ALSO DOES NOT ALLOW ANY TIME FOR THE FLC'S TO EAT AND NOT ALLOW AIRLINES PROVIDE MEALS FOR THEIR CREWS.

Synopsis

B727 CABIN CREW HAD SMOKE, FUMES FROM A COFFEE POT THAT WAS ALLOWED TO GO DRY.

Conclusions

All of the studies draw definitive conclusions regarding fatigue. Multiple and consecutive long duty days create the highest levels of fatigue. Through these studies an operator may develop an appropriate policy for their flight crews. A few factors to consider when making policy are:

- Operation during the window of circadian low
- Operation at night
- Severe weather conditions
- Amount of rest prior to the flight
- Driving time prior to the flight
- Amount of days operated consecutively
- Crew augmenting or pre-positioning
- Flight attendant duty time

Different types of flight operations may influence the level of fatigue experienced. In the French study, it predicted the short-range crew performing multiple legs experienced greater fatigue than the long range crew in equivalent day operations. The long range crew may operate for a longer period of time; however, the short range crew experiences an increased workload. *It also indicated the pilots were unaware of the affects of fatigue on themselves.* They noted the other crewmember had an increased reaction time, and poor reception of messages such as from ATC. This further emphasizes the effects of fatigue are insidious, and one may not notice it until it is too late.

Not only do pilots experience fatigue, the cabin crew is also susceptible due to long duty times. The flight attendants have the important responsibility of ensuring the safety of the passengers during flight and on the ground. As cited in the ASRS reports, the flight attendants felt they would not be able to respond effectively to an emergency with such a high level of fatigue.

A fatigue counter-measures program would help prevent fatigued flight and cabin crewmembers. Having a fatigue counter-measures program in place is best practice and heightens employee awareness of fatigue effects. Perhaps a scheduled stretch period during the long-range flight could help in the reduced alertness levels, and other physiological problems experienced by international crews. Consideration for an ill crewmember may also factor in. They may not be sick enough to call out; however, a simple cold will wear on the immune system and contribute to fatigue. Encouraging exercise and a healthy lifestyle may help with a crew's alertness level. Adapting policies similar to those proposed in Europe and the Part 91 operator example given earlier, could further aid in combating fatigued crews.

ARG/US Standard Flight Attendant Duty and Maintenance Duty

ARG/US recommends flight attendants and maintenance technicians be held to the same duty and rest requirements the pilots are held to. This is an industry best practice, and therefore, they should all have the same amount of rest and duty time. Often, the requirements for rest and duty for flight attendants and maintenance technicians are not as stringent as those for pilots; however, they all play an equally vital role. The pilots depend on the maintenance technicians to perform repairs and ensure preventative maintenance is accomplished correctly. A tool left in the aircraft or a missed step could be disastrous. The flight crew also depends on the flight attendant for ensuring the safety of the passengers during the flight, and remaining vigilant in the event of an emergency. If either the pilot, the flight attendant, or the maintenance technician are fatigued, they may serve as one of the contributing factors that lead to an accident.

Referenced documents, in order mentioned:

Pilots Bunk Sleep Varies Significantly During Long Rest Periods
An extract from - “Consensus Emerges from International Focus on Crew Alertness in Ultra-long range Operations”. Flight Safety Foundation Flight Safety Digest Vol. 22 No. 5-6 May-June 2003

Crew Duty and Rest Planner Final Report
Prepared by Greg Roach and Drew Dawson at the Centre for Sleep Research for AVMED at RAAF Base Edinburgh

Fatigue in Aviation: Fatigue in Aviation: Point of View of French Pilots.
BOURGEOIS-BOUGRINE (S.) ; CABON (P.) ; GOUNELLE (C.) ; MOLLARD (R.) ; COBLENTZ (A.) Université René Descartes - PARIS V - Laboratoire d’Anthropologie Appliquée—45, rue des Saints-Pères - 75006 PARIS (FRANCE)
SPEYER (J-J.) Airbus Industrie - 1, Rond-point Maurice Bellonte - 31707 BLAGNAC (FRANCE)

Are Pilots at Risk of Accidents due to Fatigue?
Jeffrey H. Goode* Federal Aviation Administration, Office of Aviation Policy and Plans, Washington, DC 20591, USA Received 23 September 2002; received in revised form 31 January 2003; accepted 27 March 2003

Europe FTL– at a Glance
European Cockpit Association

If you would like to obtain a copy of any of the referenced documents, please contact us.

In an effort to provide real time information to the attendees at the NBAA IOC, we are asking you to answer some questions concerning the following subject. The results will be provided during one of our sessions. Thank you for participating in this survey and attending the NBAA IOC.

Subject: Crew Duty Limits, Augmented Crews, Repositioning Crews, including Flight Attendants.

All answer are in red. Total Reponse: 135

The following questions concern the International Trip when your company <u>does not use</u> Augmented Crews.

1. Does your company have Crew Duty Limits on International Trips?

a.	yes	128	95%
b.	no	7	5%

2. If yes, what are your Duty Limits for the Crew?

a.	18+ hrs.	9	
b.	17 hrs.	4	
c.	16 hrs.	63	
d.	15 hrs.	11	
e.	14 hrs.	42	
f.	13 hrs.	2	
g.	12 hrs.	1	

3. Does your company have Crew Flight Time Limitations on an International Trip?

a.	yes	113
b.	no	18

4. If yes, what are your Crew Flight Time Limitations?

a.	16+ hrs.	5	
b.	15 hrs.	5	
c.	14 hrs.	31	
d.	13 hrs.	10	
e.	12 hrs.	28	
f.	11 hrs.	1	
g.	10 hrs.	24	
h.	9 hrs.	2	
i.	10-12 hrs.	6	

The following questions concern the International Trip when your company <u>uses Augmented Crews.</u>

5. Does your company have Crew Duty Limits for Augmented Crews on International Trips?

a.	yes	92
b.	no	43

6. If yes, what are your Duty Limits for Augmented Crews?

a.	18+ hrs.	51	
b.	17 hrs.	6	
c.	16 hrs.	23	
d.	15 hrs.	2	
e.	22 hrs.	1	
f.	21 hrs.	4	
g.	20 hrs.	1	
h.	19 hrs.	1	

7. Does your company have Crew Flight Time Limitations on an International Trip?

a.	yes	84
b.	no	9

8. If yes, what are your Crew Flight Time Limitations for Augmented Crews?

a. 16+ hrs.	32	f. 21 hrs.	1
b. 15 hrs.	6	g. 20 hrs.	1
c. 14 hrs.	20	h. 18 hrs.	2
d. 13 hrs.	2	i. 10 hrs.	2
e. 12 hrs.	14		

9. What guidelines does your company use to determine if an Augmented or a Non-Augmented crew is to be used for the International Trip? *(The most common answers are listed)*

a. Duty limits	54	g. Destination	9
b. Flight Time limits	46	h. Time Zones Crossed	6
c. Day Night Departure	23	i. Length of Stay	5
d. Length of Trip	20	j. Each Trip Reviewed	5
e. Rest Prior / After Trip	11	k. Customer Request	4
f. # of legs involved	10		

The following questions concern Repositioning Crews on an International Trip.

10. Does your company reposition crews for International Trips?

a.	yes	110
b.	no	23

11. What guidelines does your company follow to determine the need to reposition crews?

a. Duty limits	55	g. Ability to Preposition	7
b. Flight Time Limits	45	h. # of legs involved	5
c. Length of Trip	12	i. Length of Stay	5
d. Rest Prior / After Trip	9	j. Depends	5
e. Day vs. Night Trip	9	k. Time Zones Crossed	4
f. Customer Requests	7		

12. If yes to question #10, how many days prior to their portion of the International Trip do they arrive at the Reposition location?

a. 3 days	8	d. 1 - 2 days	15
b. 2 days	42	e. 1 - 3 days	2
c. 1 day	32	f. varies	3

The following questions concern the Flight Attendants on an International Trip?

13. Do you have duty and flight time limits for Flight Attendants?

a.	yes	62
b.	no	42
Write in - No Flight Attendant:		24

14. If yes to question #13, what limits or guidelines does your company use for duty and flight time limitations concerning Flight Attendants?

Duty:	a. 18 hrs.	5	*Flt Time:*	a. 15 hrs.	4
	b. 17 hrs.	2		b. 14 hrs.	16
	c. 16 hrs.	32		c. 13 hrs.	5
	d. 15 hrs.	5		d. 12 hrs.	22
	e. 14 hrs.	12		e. 11 hrs.	1
				f. 10 hrs.	7

Any other information that you would like to share concerning Crew Duty & Flight Time Limits, Augmented Crews, and Repositioning Crews on International Trips?

(*All answers were write - ins, listed in no particular order.*)

What have others found to be a good rotation interval for 3 pilots, when we augment crews, 3rd pilot rests in jump seat. This is not rest in my opinion, results in 3 tired pilots.

We must cover 2 hour calls, 24/7, then go fly.

No need for augmented crews.

Departure time effects duty length.

Publish for all to enjoy.

Use FlightSafety Foundation & NASA guidelines.

One single a/c operator, 1 trip to Europe, don't run into limits.

Times or limits are subject to modification.

SOP with strict limits are often violated by companies are high risk to litigation & insurance trouble plus crew morale issues.

A/C not configured for 3+ crews, Principle does not feel comfortable with crew augmentation.

We are trying to convince our Aviation Manager that some limits are needed. Please stress the importance to all of your members.

This is the best company I've ever flown for. They are smart about crew rest & duty limits, not cutting corners.

I question many "so called" repositioned rest rules. The rules leave crew members more tired than would otherwise be.

Most important topic concerning Business Aviation.

Crew stay with a/c after being relieved even if little or no room - I think this is unsafe.

Augmented crews do not work! Have 3 tired pilots!

Have established guidelines for this. Many corporations lack any interest to flight crew limits. Same corporations view flight crews as a machine that can operate as an aircraft.